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It is our sad duty to announce the passing of Major J. Wesley Powell, for many years Director of the United States Geological Survey. A review of his life work will be found on another page.

In his scientific work Major Powell was a great geological explorer, but his chief work was done as a far-seeing organizer in the development of government work in geological exploration. His greatest achievement was the development, in the face of great opposition from strongly diverse interests, of a systematic topographic map of the United States, the necessary base for all geologic and other scientific study of the earth's surface. Without the work already accomplished on this map, neither the geological work nor that in forestry could have been promptly accomplished, nor would it have been possible to make the advance in the irrigation work authorized by the last Congress and now being organized by Director Wolcott. The organization of the Geologic branch of the Survey was the specific contribution to the development of the United States, which took Powell from a group of scientific pioneers, including Agassiz, Baird, Hayden, Le Conte and Marsh, and placed him at the head of those who turned the attention of the government to the scientific needs of the country.

THE RECENT tests with petroleum as a fuel for marine purposes, which have been followed so keenly by our naval officers, and the large number of patents which are being taken out for devices for burning oil, indicate the importance which is attached to this fuel since the development of the new fields in California and Texas, both of which are sufficiently near the sea to permit of the cheap distribution of their products. In this connection a highly interesting development will be the new zinc smelting plant at Beaumont, which will use oil as its fuel and will supply local petroleum refiners with the sulphuric acid they need.

THE SILVER shipments from London to the East for the eight months ending with August show a decrease, as compared with last year, of 22.1 per cent in value and 12.9 per cent in quantity; estimating the latter from the average price for the year, as the official reports give values only. The London shipments for the eight months are given in the following table:

	1901.	1902.	Changes.
India.....	£5,322,910	£4,303,810	D. £1,019,100
China.....	525,512	135,850	D. 389,662
The Straits.....	81,526	178,120	I. 96,594
Total value.....	£5,929,948	£4,617,780	D. £1,312,168
Total, ounces.....	51,707,500	45,038,000	D. 6,669,500

The shipments from San Francisco to the East for the same period are reported as follows:

	1901.	1902.	Changes.
British East Indies.....	\$30,000	\$1,032,340	I. \$1,002,340
China.....	4,618,492	3,872,274	D. 746,218
Total value.....	\$4,648,492	\$4,904,614	I. \$256,122
Total, ounces.....	7,750,190	9,196,100	I. 1,445,900

The increase shown here is 5.5 per cent in value and 15.7 per cent in quantity. This increase was due to the large shipments made this year to the British East Indies, which are a new development of the trade; this silver having heretofore gone almost entirely by way of London. It is understood that this shipment was made to Bombay direct, and that such direct shipments will continue to be made.

The two statements together show the total shipments to the East this year of approximately 54,234,100 ounces of silver, against 59,459,900 ounces of silver

in the corresponding period of last year; a decrease of 5,225,800 ounces, or 8.8 per cent. This decrease was less than had been expected earlier in the year, and shows that there has been some revival in the Chinese demand. The future takings of silver for that country, however, will remain an uncertain quantity until the indemnity question is finally settled. Until some final disposition of that question is made little or no recovery in the silver market can be expected.

THE VARIOUS statistics as to the consumption and stocks of copper which have lately been presented in the financial columns of the daily papers show for the most part an amusing misconception of statistical methods. It would be an extremely difficult task to determine the consumption by reports from the consumers themselves, and we do not believe that has ever been undertaken. On the other hand, it is quite feasible to determine the production and stocks in first hands, and when the investigation is made by statisticians familiar with the conditions of the industry, and therefore able to avoid errors by duplication of reports, the result may be expected to be close to the truth. The stocks on hand at the beginning of a year plus the production and imports give the total available supply, and deducting the exports and the stocks at the end of the year, the consumption is arrived at by difference. There is no other way except a compilation of reports from all the consumers. When the consumption is estimated and the stock on hand is determined by difference, the result is simply a guess, because the same elements of uncertainty enter into it as do in the estimate of the consumption.

The statistics recently compiled by Dr. Ledoux have been criticized in various quarters, wherein the disclosure made by them as to the actual situation in copper may be unpalatable, but we believe that the most competent authorities in the copper trade regard them not only as truthful but also as the only complete presentation that has been made for a long time; and that is our own opinion, knowing as we do Dr. Ledoux's high personal ability and his unusual facilities for obtaining the actual data as to stocks, which the holders are always disinclined to communicate, and compiling them in an intelligent and discriminating manner. If a comparison between his results and those of other statisticians for a previous time shows an improbable consumption, we are disposed to consider that the error is in the figures of the other statisticians. We know from our own experience how difficult it is to carry through a reliable statistical investigation of this nature, and therefore we have the greater appreciation of Dr. Ledoux's painstaking effort.

### PAYMENT BY THE CAR-LOAD.

In connection with my recent explanation of the method of payment to anthracite miners for the crude material mined by them, the inquiry has come to me whether on this system the miner is not made to suffer all the consequences of the inferior character of the coal-seam in the particular breast where he is working. In other words, if he works as hard and as long to mine a certain bulk or weight of material, should he not be paid as much for it as if it were worth more?

My answer is, that the attempt is invariably made at every mine to adjust the payment of contract miners so that an average good day's work will earn good wages, while special industry and zeal will

earn more. This is, so far as I know, the universal practice of mine managers. It necessitates, however, the freedom of the employer to fix and to change, from time to time, as justice and policy may require, the terms offered for mining contracts. And this necessary freedom the proposals of Mr. Mitchell and his union for uniform scales and rates would destroy. Moreover, by arbitrarily limiting the amount of work which a miner may do in a day, without incurring the terrible discipline of the Union, the inducement to special industry or skill has been, in many cases, removed, so far as this could be done by organized tyranny.

It is conceivable that, in the fixing of the conditions of payment (which, as shown above, must be elastic and variable, if they are to be just), instances of injustice or unwisdom may occur. Such instances would constitute local grievances, and all such grievances Mr. Baer offered to examine personally with Mr. Mitchell, pledging himself that they should be corrected if the complaints were found to be reasonable. But Mr. Mitchell wants neither justice nor reform in individual cases.

R. W. RAYMOND.



### ZINC ORE IN KENTUCKY.

In recent issues we have referred to the zinc deposits of Kentucky, which are now attracting considerable attention and have actually begun production, although they are by no means new discoveries. They are, in fact, situated in the extension southward of the lead and fluorspar district of Rosiclare, Hardin County, Illinois. They are situated, therefore, in that part of Kentucky which is surrounded on three sides by the Ohio and Cumberland rivers, comprising Livingston and Crittenden counties. The town of Marion, county seat of Crittenden, near which the most promising developments appear to have been made, is only about 10 miles distant from the Ohio River; it is reached from Henderson, Ky., by a line of the Illinois Central Railroad.

The mineral occurrences in the Rosiclare District and southward in Kentucky are of old knowledge, having been referred to by Schoolcraft, J. D. Whitney and other early writers, and described in the reports of the Kentucky Geological Survey. Mining for galena was begun near Rosiclare in 1842, but the work was for a long time of only desultory character. The production of galena has never been important, and recently the mines have been exploited chiefly for fluorspar, the occurrence of the latter mineral being, in the words of Mr. S. F. Emmons, on a scale of magnitude unequalled in any other part of the world. The most recent and authoritative account of the geology of the region is contained in a paper in the *Transactions* of the American Institute of Mining Engineers, XXI, 31, by Mr. Emmons, who visited it in June, 1891.

The mineral deposits, according to him, occur in limestones which underlie the coal measures of the States bordering on the Ohio River. The bottom of this coal basin is formed by a series of sandstones and conglomerates, with a certain amount of intercalated argillaceous shales. The underlying limestone is of Lower Carboniferous age. The country has been faulted by a series of more or less parallel fissures, which have an important longitudinal extent and have caused displacements of 150 feet and more in the strata. The mineralization occurs along such fault fissures. Because of the displacement in the strata, the veins may show one wall of limestone and the other of sandstone, both walls becoming limestone with depth. Some of the earlier geologists considered that the fissures were simply gash veins, but Emmons shows conclusively that they are true fault fissures, and is of the opinion that they prob-

ably extend to great depth, although the mineral contents may be expected to vary with the character of the enclosing beds, and to diminish very much, if not be cut off entirely, when the walls are formed by more siliceous and hence less readily soluble rocks.

Emmons' examinations were confined chiefly to the veins near Rosiclare, Ill., where the Mullins, Pell and Rosiclare workings show a remarkably continuous deposit, opened for nearly 3,500 feet in length and in some places to a depth of 200 feet, the vein ranging from 4 feet to 20 feet in width and averaging 10 feet. The Daisy workings show a vein of apparently equal regularity and persistency, but of less width, averaging 3 to 8 feet. The occurrence of galena in the fluorspar vein filling is very irregular. Generally it is in large, coarsely crystalline masses, entirely enclosed by and often intergrown with the fluorspar. The occurrence of blende, which is of very subordinate amount in the upper workings, is apparently similar to that of the galena. According to the testimony of the miners, the proportion of galena to fluorspar increases with depth, being very sensibly greater between 100 feet and 200 feet than above. In certain of the lower workings continuous masses of galena yielding 100 tons are said to have been found.

Veins of the above character have been worked successfully for fluorspar on the Kentucky side of the river for several years back, but there has been comparatively little prospecting done for lead and zinc. Judging from the reports which we have received, the veins in the vicinity of Marion, Ky., while of the same general character as those near Rosiclare, Ill., are zinc-bearing to a much larger extent, and in some cases are capable of exploitation as zinc mines. In certain instances, however, the mechanical separation of the blende from the finely interwoven fluorspar has presented a serious difficulty, and blende mixed with fluorspar is a rather undesirable ore for zinc smelting.

A description of the work now being carried on in Crittenden County, with some illustrations of interest, will be found on another page.



### MARKET CONDITIONS.

*Iron and Steel.*—The iron market remains comparatively quiet. Pressing needs have been satisfied, in the East at any rate, by imported material. In the Pittsburg District and the Central West, the chief incident has been the placing of very large orders for ship-plates and similar material by the American Ship-Building Company. Structural material is now sold up pretty completely for the first half of 1903 and some orders have been placed that run well into the third quarter. Manufacturers have practically nothing to sell for the first half of next year, while jobbers find their stock very light. The only quarter in which there is lack of business is in sheets, on which there are some concessions reported.

The movement of coke to the furnaces has been somewhat improved and several stacks in Western Pennsylvania and Ohio, which had been banked, have been enabled to resume work.

Exports of pig iron from Great Britain to the United States for the 8 months ending August 31 are reported as 211,317 tons, against 27,957 tons for the corresponding period in 1901. Exports of steel billets and ingots to the United States for the same period were 32,068 tons, against 7,797 tons in 1901. The only item in manufactured iron and steel showing a notable change was steel rails, of which 9,743 tons were shipped to the United States, against 42 tons last year. Probably these figures will be very much increased by the returns for September and October, especially in pig iron. While the figures show a very large relative increase, the imports are

really very small, as compared with our own total production. The shipments have been of service, however, in relieving the tension in the market and supplying pressing needs here.

*Copper.*—The market remains quiet and unchanged. Very little business has been done during the week and buyers seem for the time to have lost interest in the market. The same influences which have heretofore combined to prevent any considerable advance are still holding the market down. Consumption, however, continues on a large scale, and manufacturers will necessarily be in the market again before very long.

*Other Metals.*—Tin continues dull, although inquiry for the metal is said to be improving. There is little change in prices.

Spelter remains strong and the price of ore continues high. There seems to be no material change in the pressing demand for the metal.

Lead continues in good demand at unchanged prices. In this metal and in silver an important incident this week is the reaching of a settlement between the American Smelting and Refining Company and the miners of the Coeur d'Alene District. It is well known that differences of opinion have existed for some time past and there have been negotiations in progress. An arrangement was finally made at a recent convention in which the mine owners of the district, the American Smelting Company and the railroads running into the district were represented. The arrangement reached provides for a material decrease in the railroad rates on ore from the Coeur d'Alene mines to the smelters, the amount varying slightly with the location of the mine. The amount will be between \$2.50 and \$3 a ton. The Smelting Company agrees to give the miners the entire benefit of the reduction in rates and at the same time contracts to take 12,000 tons of ore and concentrates monthly; some minor concessions are also made. Under this agreement shipments which had been partially suspended since September 1, will be at once resumed. All the mines in the Coeur d'Alenes agreed to this, with the exception of one company which has shipped its ore to the Pacific Coast. The American Smelting Company is enabled to make this increase in the ore taken from Idaho without materially increasing its present production as its receipts of ore from Colorado and Utah mines have been less than for some time past.

Silver remains dull and somewhat depressed. The shipments to the East which form an important part of the trade are referred to in another column. There is little doubt that the production is on a somewhat lower scale than it has been and that imports of ore and bullion from Mexico and British Columbia are also showing a decrease. The Australian production has also shown some decrease this year. The condition of the market appears dependent very largely upon the settlement of the affair in China.

*Coal.*—The Western coal market shows no change for the better. Transportation in all directions is slow, the supply of both cars and motive power being still very much short of the demand. Lake shippers have been compelled to send vessels away empty and it is estimated that the receipts at Lake Erie ports for the last week or two have not been 50 per cent of the quantity needed. There seems to be, moreover, little hope for any improvement.

The seaboard bituminous trade shows no material change from last week. There is still a heavy demand from the cities for soft coal, to take the place of anthracite, which is not to be had.

Anthracite conditions show little change, although the companies are evidently making some attempt to reopen the collieries. The process is extremely slow, however, and shipments are not yet approaching anything like the current demand.



## J. WESLEY POWELL.

Major J. Wesley Powell, Director of the Bureau of American Ethnology and formerly Director of the United States Geological Survey, died on September 23 at Haven, Me. Major Powell's health failed rapidly after a cerebral hemorrhage which he suffered early in the summer. His great vitality enabled him to resist the stroke with characteristic vigor until he suffered a second, one week ago.

Major Powell was born in Mount Morris, N. Y., of English parents, on March 24, 1834. His father, a preacher of the Wesleyan Church in England, continued his vocation after reaching America, and removed from New York to Jackson, O., when his son was seven years of age. A drift towards scientific pursuits, which afterwards absorbed him, was given to him at an early age by a man named Crookham, who directed his studies and imparted an intense interest in natural phenomena. When he was 12 years of age the family removed to Walworth County, Wis., and here the conduct of the farm purchased devolved upon the boy, his father giving his whole attention to preaching, and on the long trips in which he hauled wheat to market, 50 or 60 miles distant, by ox-teams, in the fall and winter months, he read extensively, carrying his books in his wagon-box. For a time, in the winter of 1850, he attended school at Janesville, working for a farmer before and after school hours, and in 1851 he removed again with his family to Boone County, Ill. For six weeks he studied at home, and then taught school on Jefferson Prairie, in Southern Wisconsin, for the sum of \$14 a month, studying hard himself, and one night in the week giving lectures on geography, which were attended by the young people of the district, as well as his pupils. His father having removed to Wheaton, Ill., and become one of the trustees of the college at that place, he attended that institution at intervals, taught in Macon County, at Decatur and Clinton, and took partial courses at Jacksonville and Oberlin colleges, but acquired most of his education by individual exertion. Being devoted to the study of natural science, he traversed Wisconsin, Illinois, Iowa and the Iron Mountain region of Missouri, collecting shells, minerals, plants, etc., and acquiring a reputation which led to his election in 1859 to the secretaryship of the Illinois Natural History Society. Most of his wanderings were made on foot, and though constantly resolved to graduate from an Eastern college, he was each spring lured from his purpose by his desire to roam. At the outbreak of the war he enlisted in the 20th Illinois Volunteers, and was mustered into the United States service as second lieutenant, entering at once earnestly on the study of military science, the construction of bridges and civil engineering. He was for a time employed in the extensive fortification of Cape Girardeau, undertaken by Gen. Fremont. As captain of Battery F of the 2d Illinois Artillery, organized by him, he took part in the battle of Shiloh, losing his right arm. As acting chief of artillery under Gen. Ransom, he commanded three batteries of the fourth division of the Seventeenth Corps on the march to Grand Gulf. He returned to service as soon as his wound healed. On the return march from Jackson, Miss., he took part in the battles of Champion Hills and Black River bridges. After the 40 hardest days' work of his life, he was obliged to return home to submit to the operation of resection of his arm; but in the fall took part in the Meridian raid. Declining a colonelcy of colored troops, as likely to detain him in garrison, he was made major and chief of artillery, first of the Seventeenth Army Corps and subsequently of the Department of Tennessee, taking part in the operations around Atlanta, and with sixteen batteries (all of which were in the front) in the battle of Franklin. At the close of the war he became professor of geology at Bloomington

University, in Illinois, from which he had previously received the degrees of A. B. and A. M. He also delivered lectures on geology at Normal University, to the museum of which he presented a collection of fossils from Vicksburg and the region around, having no means abandoned his scientific pursuits in camp. By his lectures and addresses throughout the State, he was able to influence largely the introduction of science into college curriculums, insisting principally upon studies in the field. In this he inaugurated a new practice, which has been extensively followed.

In May, 1867, with a party of 16 students, he undertook an expedition across the Great Plains to the mountain regions of Colorado, ascending Pike's Peak (which then had no trail) and Mount Lincoln, 14,297 feet high. Mrs. Powell accompanied the expedition, which was before the building of the Pacific railroads,



J. WESLEY POWELL.

when danger was to be feared from Indian tribes. After the break-up of the party at Denver, the professor and his wife went, with a few others, over into Middle Park, continuing explorations until driven in by the winter snows. A second expedition, undertaken in 1868, was assisted by several institutions, such as Bloomington and Normal universities, and the State Agricultural Society, but principally by the Smithsonian Institute, which supplied the apparatus, outfit and instruments necessary for the collections contemplated and geographical reconnaissance. The influence of Gen. Grant also obtained from Congress authority for the commissary-general of the army to supply the party with provisions at the military posts in the West. Important studies in high latitudes were made, Long's Peak being ascended for the first time, and the whole mountain system of Colorado carefully traversed, the highest peak of Gore Mountains receiving the name of the enthusiastic explorer. The majority of the students having returned, Major Powell and his wife remained in winter camp in the valley of the White River, making studies of cañon geography, the cañons of the Green, White, Yampa and Blue rivers being thoroughly gone through, in preparation for the exploration of the great Cañon of the Colorado itself, hitherto quite unknown. In spite of the warnings of the Indians, four boats, manned by 11 men, were launched, and finally the mysterious cañon was entered. In them until August 29 the party was lost

and antecedent drainage of rivers. In addition, it contains a narrative of his adventures. His ethnological studies, in which he took the deepest interest, are, for the most part, to be found in scattered lectures and addresses. In 1875 appeared a "Sketch of the Ancient Province of Tusayan;" and he also treated "The Political System of the Wyandots," "A Few Myths of the Utes," "Various Institutions of Indian Life," and "The Philosophy of the North American Indians. In 1880 he published "An Introduction to the Study of the Indian Languages" in *Scribner's Magazine*. Four volumes of the "Survey of the Rocky Mountains" were devoted to "Contributions to North American Ethnology." He was the originator of an anthropological philosophy, partially worked out in the following essays: "Mythologic Philosophy" (1879), "Evolution of Languages" (1881), "Outlines of Sociology" (1882), "Human Evolution," and "Three Methods of Evolution" (1883) and "Activital Similarities." "The Limitations to the Use of Certain Ethnological Data" have not been neglected by him.

to the world, enduring the perils of the whirling waters and climbing precipitous cliffs. Entering the Grand Cañon August 13, they found themselves literally three-quarters of a mile in the depths of the earth, the river dashing waves against vertical walls in some places over a mile in height. A few ruins were discovered, believed to be those of Pueblo Indians who escaped to these inaccessible fastnesses from Spanish oppression, but for the most part they were alone with nature.

Government aid (the first appropriation being \$12,000) was asked and received for an extended line of exploration of the same course, undertaken in 1871-72, and with increasing scope and organizations the work was carried on as the "Survey of the Rocky Mountains," in rivalry with those of Hayden and Wheeler, until the three were abolished in 1879 and the United States Geological Survey created, falling under the Department of the Interior. This measure Major Powell advocated, and in March, 1881, he was appointed Director by President Garfield (on the resignation of Clarence King), receiving the exceptional honor of immediate confirmation by the Senate. After his voluntary resignation, in 1895, he was succeeded by Dr. Charles D. Wolcott.

The ethnological studies carried on by the Survey of the Rocky Mountains, which published four volumes of "Contributions to North American Ethnology," were continued by the bureau of ethnology of the Smithsonian Institute, created for that purpose with Major Powell at its head, and he still retained that office at the time of his death.

In 1874-75 he gave much attention to the irregularities of the land laws in the West, publishing in 1887 "The Lands of the Arid Region," and in 1879-80 he was a member of the Public Lands Commission appointed by Congress to investigate the same, with little result. In 1888, however, an investigation of the subject of irrigation of arid government lands was ordered by Congress, to be made by the Geological Survey.

Exclusive of government reports published under his name in his official capacity, he was author of "The Exploration of the Colorado River of the West, and Its Tributaries" (1875), and a "Report on the Geology of the Uinta Mountains" (1875). In the first are contained his contributions to geological theory, the principal being the "base level of erosion" in mountains and the superimposed and antecedent drainage of rivers. In addition, it contains a narrative of his adventures. His ethnological studies, in which he took the deepest interest, are, for the most part, to be found in scattered lectures and addresses. In 1875 appeared a "Sketch of the Ancient Province of Tusayan;" and he also treated "The Political System of the Wyandots," "A Few Myths of the Utes," "Various Institutions of Indian Life," and "The Philosophy of the North American Indians. In 1880 he published "An Introduction to the Study of the Indian Languages" in *Scribner's Magazine*. Four volumes of the "Survey of the Rocky Mountains" were devoted to "Contributions to North American Ethnology." He was the originator of an anthropological philosophy, partially worked out in the following essays: "Mythologic Philosophy" (1879), "Evolution of Languages" (1881), "Outlines of Sociology" (1882), "Human Evolution," and "Three Methods of Evolution" (1883) and "Activital Similarities." "The Limitations to the Use of Certain Ethnological Data" have not been neglected by him.

Major Powell's enthusiasm for science is attested by his whole life, and when we remember that he was partially disabled by loss of his arm, his personal adventures appear marvelous. It is characteristic that in the early days of his governmental work he drew no salary, expending all appropriations upon his work and supplying all his own needs by lecturing.

In 1886 he received the degree of Ph. D. from Heidelberg, Germany, and that of LL. D. from Harvard. For seven years he was president of the Anthropological Society of Washington, and was also the founder of the Cosmos Club, a social club of scientific men in that city. In 1887 he was made president of the American Association for the Advancement of Science. As a writer he was concise, his subject being carefully thought out, and as a speaker he was deliberate and effective.

In 1862 he married Emma Dean, of Detroit—being on leave of absence of one week. The lady returned with him at once to the army, and remained until the fall of Vicksburg. As we have seen, she has borne her own part in his scientific labors.

#### THE ROASTING FURNACE LITIGATION.

The decision handed down in the United States Circuit Court at Denver on September 5, making permanent the injunction issued at Fort Scott, Kan., on July 3, against the Lanyon Zinc Company, restraining it from further use of the Ropp furnace, which has been declared an infringement of the patents granted to Horace F. Brown, marks the end of a highly important metallurgical litigation. The recent litigation has been prosecuted by the Edgar Zinc Company, with the co-operation of the Collinsville Zinc Company, which own the rights to the Brown furnaces for blende, roasting in the States of Kansas, Missouri, Illinois and Indiana, against the Lanyon Zinc Company, which has been employing the Ropp furnace; but the question at issue has been, of course, much broader than the use of the furnaces in the States mentioned, involving as it has the validity of the respective patents.

The Brown roasting furnace, constructed either in the horseshoe, or elliptical, or straight-line form, is now known all over the world as a standard means for the desulphurization of ores. It was an outgrowth of the old O'Harra furnace, which was one of the earlier mechanical furnaces, largely used during the 80's and still employed in a modified form at some places. It consisted originally of two long hearths, heated by external fireplaces along the sides, through which plows were continually dragged by means of a chain passing over grooved wheels at the ends of the furnace. The capacity of this furnace was large and the roasting was satisfactory, but the bill for repairs was excessive and the loss of time occasioned in making them was vexatious and expensive; the chain and the plows traversing the hearth broke and wore out, while the plows tore up the hearth and dragged it to the front. Allen remedied these defects to some extent by laying rails through the hearths and mounting the plows on wheeled carriages, but the repair bill continued heavy, and this was the weakest point of the improved furnace; it appeared unavoidable in a furnace wherein the iron chain, rabble carriage and track are all exposed to the flames and the intense heat of the burning sulphides.

With that difficulty in view, Brown hit upon the idea of partitioning off a little corridor on each side of the hearth chamber. This was done by setting vertically a row of tiles on each side of the hearth, near the side walls, and a corresponding row projecting downward from the roof arch, a narrow, continuous slot being left between the two rows on each side. The rails were laid in the corridors, or recesses, through which the wheels of the rabble carriages and the tractive chains passed, while the arm to which the rables were fixed passed through the slot; consequently only the rabble arm and the rables were exposed to the intense heat of the furnace. Brown's improvement did not at first prove so entirely successful as was expected, but with subsequent modifications the drawbacks were overcome, and since then, as is well known, his furnace has become a very valuable design.

The furnace invented by Mr. Ropp, a highly accomplished metallurgist, which was patented soon after Brown's, was also a long reverberatory, but beneath the hearth and extending for its entire dis-

tance there was a tunnel in which the rails for the rabble carriage were laid. In the middle of the hearth there was a continuous longitudinal slot, through which passed a vertical bar, supported by the truck in the tunnel and carrying the rabble arm extending across the hearth. The track was extended around outside of the furnace so that the trucks and rables made a complete circuit, being drawn by a cable. The Ropp furnace was in fact an adaptation on a small scale of the principles which are employed in street cable railways. It was an excellent design, and has done very satisfactory work.

The owners of Brown's patents brought suit against the users of the Ropp furnace on the ground that it infringed the inventions of the slot and the recessed chambers, which were the essential features of Brown's improvement on the O'Harra and the Allen-O'Harra furnaces. Their claim was upheld on very broad grounds by a decision of the Circuit Court about three years ago, and since then has been sustained through the appeals and re-openings of the case by the defendants, who have contested it strenuously. The recent decision in Denver is final. Further action on the part of the owners of the Brown patents will be awaited with great interest, inasmuch as it is asserted by them that other standard roasting furnaces as well as the Ropp infringe the broad claims which were allowed for their patents and have been sustained by the courts.

#### AMERICAN INSTITUTE OF MINING ENGINEERS.

The following circular from the secretary's office is dated New York, September 22:

1. As already announced in Circular No. 4, of August 12, the eighty-third meeting of the Institute will be held at New Haven, Conn., beginning on Tuesday evening, October 14. The local committee comprises Russell H. Chittenden, chairman; Louis V. Pirsson, 137 Wall street, New Haven, secretary; George J. Brush, William H. Brewer, Theodore A. Blake, John Hays Hammond, Samuel L. Penfield, Charles E. Beecher, Horace L. Wells, Morris F. Tyler, Eli Whitney and others.

2. Hotel headquarters will be at the New Haven House (fronting Yale University). As the middle of October is one of the most crowded periods of the year, members desiring accommodations at this hotel should give early notice to the manager.

3. The opening session will be held on Tuesday evening, October 14, at the North Sheffield Hall of Yale University. Subsequent sessions will be held in the same place, unless different arrangements should be made by the local committee, for the greater convenience of members.

4. It is not practicable to announce in detail at this time the programme of papers, sessions, excursions, etc. Such announcements will be made, through a local programme or otherwise, to those attending the meeting. The following general statements, however, will sufficiently indicate the interesting nature of the meeting:

Opportunity will be given for the inspection of the magnificent new bi-centennial buildings of the University and of the educational plant of the Sheffield Scientific School, including the Yale Forest School, the famous collections of the late Prof. Marsh, etc., which will be explained in appropriate papers and addresses by members of the scientific faculty.

Excursions will be made to points of geological, historical and scenic interest in the vicinity of New Haven, the features of which will be explained by eminent experts.

A biographical notice of the late Clarence King, one of the most eminent graduates of the Sheffield School, prepared jointly by a number of his friends and associates, will be presented at one of the sessions.

At a session, to be hereafter designated (probably on Wednesday, October 15), the establishment of the "Blake Stone-Breaker Prize," by the heirs of the inventor, the late Eli W. Blake, will be for-

mally announced, and a paper will be presented by his nephew, Prof. Wm. P. Blake, director of the Mining School of the University of Arizona (who first introduced into the mining industry this epoch-making machine), on the Blake crusher and its applications in modern industry.

Other important papers have been accepted, and opportunity will be given for the discussion of papers of previous meetings.

**COAL MINES IN BALUCHISTAN.**—A good quality of coal is now being obtained at Khost in Baluchistan, according to *Indian Engineering*, headings at Dip Adit No. 3. The Northwestern Railway works these mines. The seam here is nearly 3 feet thick with only a narrow 4-inch band of clay in the middle. The output during March was 2,100 tons and would have been considerably more, but for the difficulty of obtaining labor. The local Kakar Pathan is now taking to work in the mines, which is a good sign, and about 20 of them are at present employed. The tramway from the mines to the station at Khost is now ready. A new mine has been opened out at a place called Zardalu, about 5 miles above Khost and a siding for loading trucks connected up with the main line.

**ELECTRIC POWER IN RUSSIA.**—According to the *London Engineer*, electricity has heretofore been little used in Russia for the transmission of energy for great distances. Projects, however, are under way to utilize the waterfalls of Marva and Imatra. The Russian Government has granted a concession to a company to supply power to St. Petersburg from the Volho rapids. The estimated cost of the enterprise is about \$14,000,000. It is said that the power to be transmitted will equal 150,000 kilowatts, and the maximum transmission distance is 188 miles. The company has undertaken to provide the public lighting of St. Petersburg gratuitously. It is also intended to use the colossal force of the Dnieper cataracts for the transmission of energy.

**LARGE COAL CARS IN ENGLAND.**—The *London Colliery Guardian* says that the Leeds Forge recently delivered the second installment of fifteen 30-ton wagons for the Midland Railway Company, thus completing the order. Each vehicle weighs over 13 tons, and has a capacity of 1,200 cubic feet. The length over the buffers is 39 feet, width over all 8 feet, and height from the rails 8 feet 4 inches. They will be used for the conveyance of locomotive coal on the Midland line, and to that end they are provided with three doors on each side for expedition in discharging. The company has now in hand, for the Northeastern Railway Company 50 hopper wagons of the same length as those described, but 10 feet in height, and with a capacity of 40 tons. These will be used for shipping coal at the northeast ports.

**MINERAL IMPORTS AND EXPORTS OF SPAIN.**—Imports of fuel into Spain for the seven months ending July 31 were 1,212,758 tons of coal and 93,109 tons of coke. Imports of metals were 1,711 tons of pig iron, 3,735 tons wrought iron and 5,923 tons of steel. Exports of minerals are reported by the *Revista Minera* as below, in metric tons:

	1901.	1902.	Changes.
Iron ore .....	3,858,493	4,240,805	I. 382,312
Copper ore .....	617,935	568,809	D. 49,126
Zinc ore .....	41,787	45,363	I. 3,576
Lead ore .....	2,069	2,094	I. 25
Pyrites .....	245,349	278,285	I. 32,936
Salt .....	198,430	170,464	D. 27,966

Exports of metals were 28,833 tons pig iron, against 14,006 for the corresponding period in 1901; 15,404 tons copper, against 15,493 in 1901; 1,196 tons spelter, against 1,518 in 1901; 96,889 tons lead, against 80,711 tons last year.



**RECENT CHANGES IN MINING AND MILLING IN THE GALENA-JOPLIN LEAD AND ZINC DISTRICT.**

By W. R. CRANE.

The financial depression and lack of confidence in this district which followed the boom of 1898-99 has passed away. The old-time vigor and push is making itself felt, and is particularly marked in the Joplin portion, at the following points: Chitwood Hollow, 2½ miles northwest of Joplin; the Old Smelter digging, ½ mile west of Joplin; Prosperity, just south of Carthage, and Centerville diggings, half way between Galena and Joplin. In the Galena portion of the district work has been resumed at North Empire, on the South Side mining property, in East Galena, and on the Hoosier and Galena lead and zinc

quite productive in times past, but, owing to the extensively fissured condition of the formation and to the fact that the creek has no well-defined channel, flooding is of common occurrence. Several flumes have been constructed over the greater portion of the ground, probably extending over a distance of 25 to 30 rods, but it is rather difficult to maintain them, and for that reason mining has not flourished. The mine or open-cut in question is located on the site of an old mine, which had caved in, but was known to be fairly rich in mineral. An attempt is being made to open up by starting at the foot of the original shaft and extend the working into the broken ground, thus drawing off the materials which have fallen and run into the mines. The loose materials are rapidly being removed, exposing a large funnel-

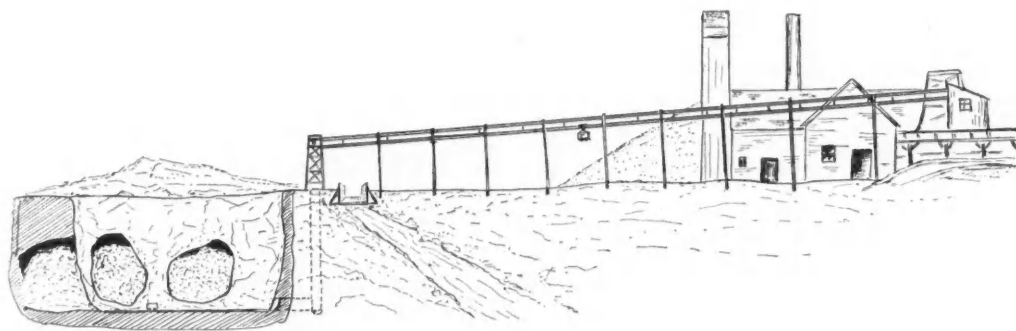
mouth of the shaft is increased to prevent a too steep inclination of the track and maintain the proper slope.

A truck operates upon the rail which forms the track. This truck supports the receptacle which carries the ore. In the mine in question the car which is run into the open-cut conveys the ore. The car is run to the foot of the shaft and attached to a hook, which in turn is connected with a pulley. The pulley is supported by a traction rope, which is run out by the weight of the car, being tripped by a lever when the truck comes to rest at a point directly above the shaft. When the car has been attached to the pulley the hoisting signal is given and the car raised. When the car reaches the top it is connected automatically with the truck, and continued winding draws the truck, with its load of car and ore, to the crusher room at the other end of the track, where the car is automatically dumped. Gravity then returns it to the shaft, where, being freed from the truck, it is lowered to the track at the foot of the shaft. The whole operation is automatic, with the exception of the winding, and the work is very smooth.

Occasionally a bucket, which is especially necessary in small shafts, is substituted for the car.

*Drilling.*—Power drills are largely taking the place of hand drills, but as they are as a rule operated by steam instead of air, considerable inconvenience and trouble are experienced in their use. When a mine is large enough or is connected with a mill, and an air plant is installed, the most satisfactory results are obtained. As the formation is so extremely variable in hardness, it is difficult to give an average speed, but a range of from 3 to 6 feet per hour is common for a hole 1¼ inches in diameter.

*Pumping.*—Cornish pumps are still used quite extensively and are considered by many operators to be the ideal pump of the district, but many vertical pumps of the Cook type—the so-called "bull pumps"—are taking the place of the Cornish type. Cross-head pumps are also occasionally used. The main objection to the Cook type of pumps is that it reverses too quickly and throws too great a strain upon the "snake," or end of the plunger rod. In some of the deeper mines the Snow & Worthington type of steam pumps are being installed 3 and 4-inch discharges being the most common.



SECTION OF OPEN-CUT.

FIG. 1—OPEN-CUT MINE, WITH MILL AND TRAMWAY.

property, in West Galena, also to some extent on the Mastin, Apple-Jack and Stanley grounds.

The diggings which are most productive and have attracted the most attention at the present time are, in the order of their importance: Chitwood Hollow, Prosperity, Old Smelter works, and Centerville, all of which are in Missouri, while in Kansas the greater part of the work is being done within the city limits of Galena. Next in importance is the Mastin diggings and a line of properties extending to the south and west, as the Riceville, Schermerhorn and Stanley leases.

In the Joplin portion of the district there are in the neighborhood of 450 mills, of which the majority lie west of a north and south line passing through Joplin and located at the points noted above.

In the Galena portion of the district in 1898-99 there were in the neighborhood of 200 mills. At the present time there are under 100, of which not over 50 per cent are operating, yet the phenomenally high price of zinc ore for the past few weeks is bringing about a remarkable change in the attitude of the mine and mill operators.

*Change in Method of Leasing.*—In the early history of mining in this district the leases were given in lots ranging from 200 to 210 feet square. When operations were begun on a larger scale leases of five acres were common, but at the present time many of these leases have expired or have been forfeited, and the ground is being re-leased to "hand-jig" outfits according to the former system, i. e., 200 to 210-foot lots.

This method of leasing is becoming quite common again, and is being closely adhered to in many properties, notably so in the Mastin diggings, and with other properties, especially in the Galena portion of the district.

*Methods of Mining.*—The usual method of underhand stoping still prevails in the working of hard ground, while in the softer ground timbering is necessary both in drifting and mining. In exaggerated cases of weak, loose ground, a modification of the top-slice method commonly employed in the massive deposits of iron in the north is occasionally used.

Little or no open work has been done, to our knowledge, until within the last few months. Open-cut work is now being undertaken in the neighborhood of Galena. The principal workings are on the south bank of Short Creek, between Empire and Galena—Fig. 1. The mine is located on a strip of country lying in the valley of the creek, which has been

shaped opening of elliptical cross-section—minor and major axes 100 and 200 feet, with a depth of about 75 feet. In some places the walls are precipitous and even overhanging. The drifts and stopes by which the mine was formerly worked are exposed upon the sides of the cut, but most of them are at least partially filled with the debris of the cave-in.

The track leading into the workings runs from the foot of the shaft through a drift 35 feet long, and extends into the open-cut for a distance of 50 feet or more.

Up to the present time the waste, as well as pay dirt, have been removed from the cut by the same shaft, but an inclined track or slope is being rapidly

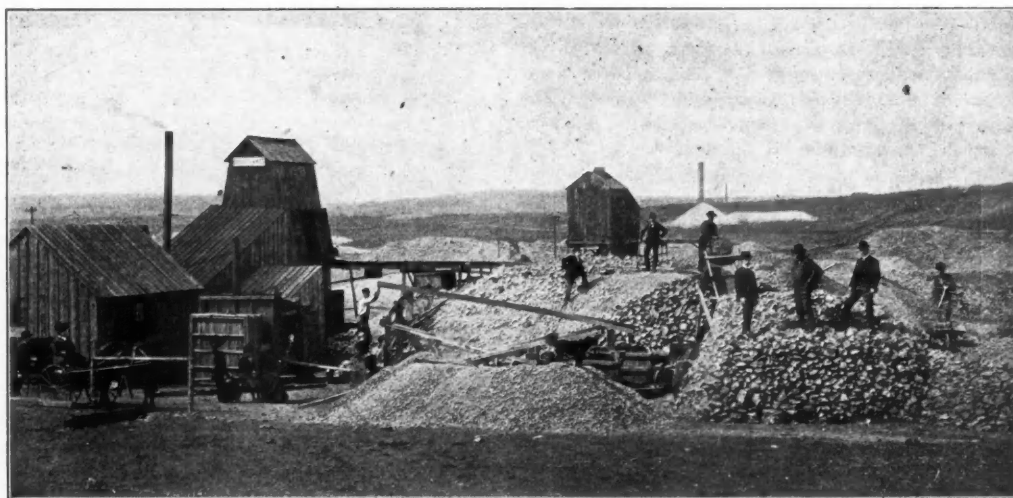


FIG. 2—ROBERT EMMET MINE, GALENA DISTRICT, KANSAS.

put in place, extending from a height of 30 or 40 feet above ground downward at an angle of 45 degrees to the bottom of the cut. Upon this slope cars are to be operated by a cable, and the waste will be run out to one side and dumped.

The method of transferring the ore to the mill is unique and is used only at a very few mines where the shaft from which the ore is obtained is at some distance from the mill. (Fig. 1.) It consists of a wooden rail track, supported by bents, running from the crusher room to the mouth of the shaft at inclination of 8 or 10 degrees. When the distance to the shaft is short the vertical distance above the

For mill work the centrifugal pump is used largely. When the waters are especially acid wooden centrifugal pumps are usually employed.

*Milling.*—Although the methods of milling have not changed radically during the last two years, many minor and extremely important changes have crept into the system, which are interesting to note.

As a rule apparatus for the treatment of slimes and sands is not employed. In the Joplin portion of the district it is the usual practice to carry on the treatment of slimes, such as it is, in the main concentrating mills, employing spitzkasten and spitzlutte as adjuncts to the jigs, while in the Galena portion

of the district separate mills are usually employed for the treatment of such material.

The mills, then, can be placed in three classes: First, mills employing classifiers; second, mills in which no systematic attempt is made to save the slimes, except to allow them to run first into a settling box, the settling being sold to the third-class or the sludge mills.

Synopses of a few of the methods employed in different portions in the district are given below, and may be considered as typical of the systems generally employed. They will be considered by class in the order given above.

Outline of the method of treatment employed in the Jack Rose mill, located in Chitwood Hollow, W. A. Ryno, superintendent.

- Ore hoisted to 1.
1. Crusher room; ore to 2.
2. Grizzly, 5-inch spaces; yields oversize to 3, undersize to 4.
3. Sledge; waste to 21, ore to 4.
4. Shaking grizzly, 1 1/4-inch spaces; yields oversize to 5, undersize to 6.
5. Blake crusher, 14-inch jaw, reducing to 3/4-inch; ore to 6.
6. Rolls; ore by elevator to 7.
7. Trommel, 3/8-inch hole; yields oversize to 8, undersize to 9.
8. Rolls; ore by elevator to 7.
9. Harz jig (five sieves), 1/2-inch spaces; yields first discharge galena to 16, first hutch to 15; second discharge blende to 17, second hutch to 15; third discharge middling to 10, third hutch to 15; fourth discharge middling to 10, 4th hutch to 15; fifth discharged middling to 10, fifth hutch to 15; wastes to 18.
10. Rolls; ore by elevator to 11.
11. Trommel, 3/8-inch hole; yields oversize to 12.
12. Spitzkasten, yields; spigot to 13, discharge to 14.
13. Harz jig (five sieves) 5 mesh to the inch yields; first discharge galena to 16, first hutch blende to 17; second, third, fourth and fifth discharge blende and second, third, fourth and fifth hutch blende to 17.
14. Spitzkasten (3 boxes) yields; first, second and third spigots to 13, discharge to 20.
15. Harz jig (five sieves) 5 mesh to the inch, yields; first, discharge blende to 17, first, hutch galena to 16; second, third, fourth and fifth discharge blende to 17, second, third, fourth and fifth hutch blende to 17; waste to 21.
16. Galena to bin.
17. Blende to bin.
18. Spitzkasten, yields spigot to 13, discharge to 14.
19. Spitzkasten, yields spigot to 14, discharge to 20.
20. Settling pond, water to 22.
21. Dump.
22. Mill water pond.

An outline of the system of concentration of lead and zinc ores, as employed in the Commercial Mill, on the Apple Jack ground, in the Galena portion of the district, will serve to illustrate the second class. This mill is a two-story or "gravity mill," which is a radical departure from the usual plan of mill construction. Here two rougher jigs occupy the second floor, while the cleaners are placed on the first floor. The idea of the arrangement is to prevent re-elevating a large amount of the material treated, yet it either requires two jig men, one for each floor, or one must be passing between the two floors. The former arrangement is expensive, while the latter is, to say the least, hard on the jig men.

- Ore hoisted to 1.
1. Crusher room; ore to 2.
2. Grizzly, 1 1/4-inch spaces; yields oversize to 3, undersize to 4.
3. Blake crusher, reducing to 3/4-inch; ore to 5.
4. Rolls, No. 2; ore by elevator to 6.
5. Rolls No. 1; ore by elevator to 6.
6. Trommel, 3/8-inch hole; yields oversize to 7, undersize to 8.
7. Rolls, No. 3; ore by elevator to 6.
8. Two Harz jigs (six sieves) 1/2-inch spaces, yields; first discharge galena to 13, first hutch to 10; second discharge middlings to 9, second hutch to 10; third discharge middlings to 9, third hutch to 10; fourth discharge middlings to 9, fourth hutch to 7; fifth discharge middlings to 9, fifth hutch to 10; sixth discharge middlings to 9, sixth hutch to 10; tails to 15.
9. Rolls, No. 4; ore by elevator to 6.
10. Two Harz jigs (five sieves), 5 mesh to the inch yields; first discharge blende to 14, first hutch galena to 13; second discharge blende to 14, second hutch blende to 14; third discharge blende to 14, third hutch blende to 14; fourth discharge blende to 14, fourth hutch blende to 14; fifth discharge blende to 14, fifth hutch product to 11; tailings to 15.
11. Spitzkasten, yields; spigots, 1st, 2d, 3 and 4th to 12.
12. Bin, sold to custom mills.
13. Galena to bin.
14. Blende to bin.
15. Dump.

This arrangement of concentrating apparatus is probably more typical than the first one given, with the exception of the two-story arrangement. A few mills in the Joplin portion of the district are built along the same lines of which the Lackawanna, of Chitwood Hollow, is an example.

The arrangement and system of concentration employed in the third class can be readily shown by the following outline, which is taken from the Allen Brothers' sludge mill, situated just west of the Jim Murphey custom mill, Galena:

- Ore hauled by wagon to 1.
1. Mill, ore fed to 2.
2. Trommel, 1/4-inch hole; yields oversize to 3, undersize to 4.
3. Elevator to 7.
4. Buddle (22 feet in diameter) yields: first foot to 5, second foot to 5, third foot to 5, wastes to 11.
5. Buddle (20 feet in diameter) yields: first 6 inches to 6, next 12 inches with first 12 inches of 4 to 5, next 12 inches to 5.
6. Hand buddle (4 by 8 ft.) yields: first 12 inches to 10, next 24 inches to 6.
7. Hand jig, 1/4-inch spaces, yields discharge middlings (chats) to 8, smittem (hutch) to 9.
8. Bin—sold to custom mills.
9. Hand jig (1/4-inch spaces with filter-bed of ore or scrap iron) yields: heads on bed to 10, hutch to 10.
10. Blende to bin.
11. Dump.

The system of treatment employed in the sludge mills is flexible, and is varied as the ore varies in richness.

**Mill Construction.**—The method of handling and storing the mine-run ore is gradually changing. Formerly the only place for storage was in the crusher room, but beyond a certain tonnage it was found that the crusher feeders were interfered with. This has led to increasing the height of the mill buildings, with the addition of ore bins, usually two, which are filled with sized products from grizzlies situated

property, and are in the neighborhood of 1/2 mile apart.

The former was opened up by the Robert Emmet shaft, at a depth of about 80 feet, and ore is now being extracted. (Fig. 2) The ore occurs in a more or less massive form, but shows quite plainly the lines of deposition or "sheets." The bulk of the ore is blende, but probably 20 per cent is lead, which is scattered quite uniformly through the matrix of blende and chert.

The ore body varies from 3 and 4 up to 6 and 7 feet in thickness, and the indications are good for its continuance. A pile of ore containing, approximately, 1,000 tons is on the ground, and 40 or 50 tons of lead and zinc concentrates from hand jiggling lie in the ore bins.

The second mine on this property, while probably not so rich, is possibly more permanent in value, and has some features unusual to this district.

The formation is laminated, being made up of successive layers of blende, galena and both chert and cherkortite. The blende is largely of the "steel" variety and is pebbly, *i. e.*, vugs exist, in which fairly good aggregates of crystals are found. The lead oc-

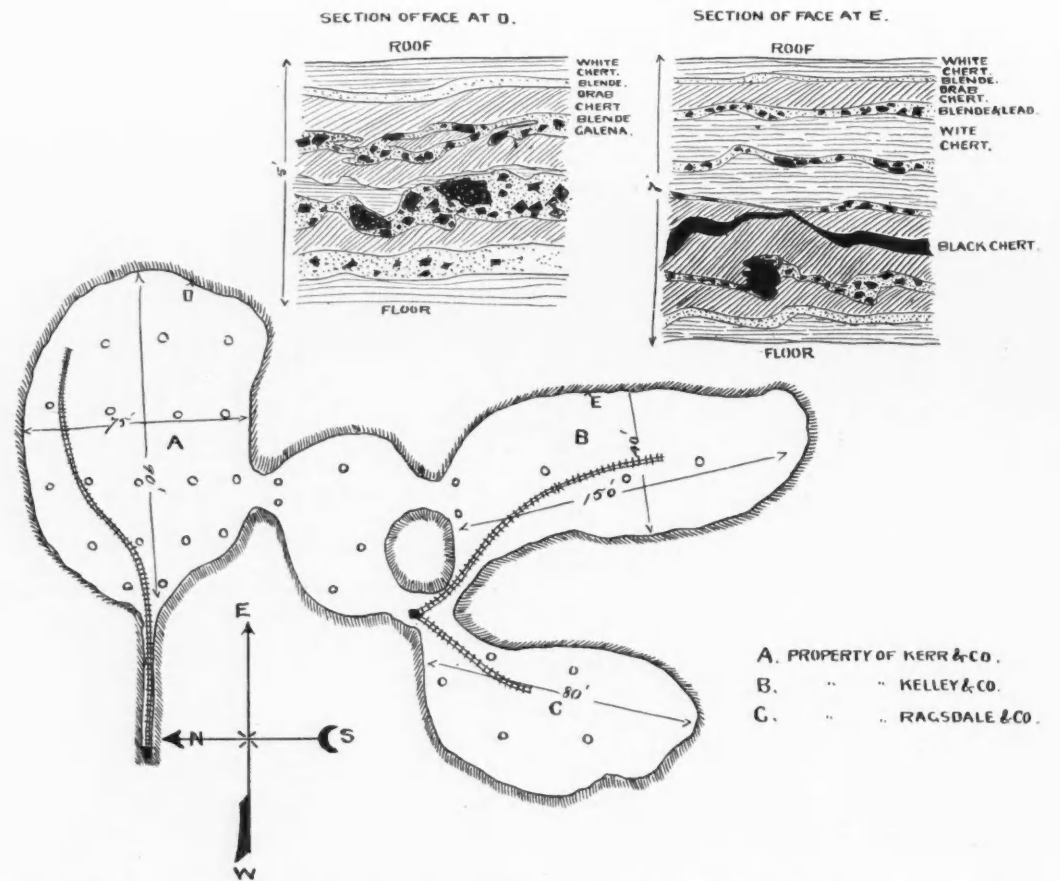


FIG. 3—PLAN OF UNDERGROUND WORKINGS IN SCHERMERHORN LEAD MINE, GALENA, KAN.

at the top of the same. A good illustration of this type of construction is the mill before referred to; namely, the Lackawanna in Chitwood Hollow. This method of construction tends toward the multiple-story style of mills.

**New Mines.**—Good producing properties are being opened up in Prosperity diggings. Several of these exhibit the so-called "sheet" formation, mentioned further on.

Chitwood Hollow is developing some phenomenal finds, both of lead and zinc, and to which place, probably, above all others in the district, the greater part of the labor and capital which are active at present are turning.

Chitwood Hollow and Prosperity lead as producers, but there are a few remarkable ore bodies which have been opened up at various other points. The two most important of these deposits are producers of lead and are located on the Schermerhorn property, west of Galena. They are at the extreme northeast and southwest corners, respectively, of this

property, and are in the neighborhood of 1/2 mile apart. The bands or sheets of ore and gangue do not maintain continuous straight lines, but are sinusoidal and are occasionally broken up by nodules of chert. (Fig. 3.)

The roof is quite smooth and is separated from the ore by a layer of chert 4 to 6 inches in thickness, which breaks away and falls when left unsupported, and consequently rows of pillars are placed across the deposit as it is widened out. The thickness of ore ranges from 5 to 7 feet, and is remarkably regular, both floor and roof dipping to the west at an angle of about 10°. The floor is not, however, as regular as is the roof.

Mining is carried on wholly by breast works, a continuous advance being made in all directions. Fig. 3 shows a plan of the workings, with positions of props, together with a section of the face at two different points. The mine has been worked for several months, and there seems to be no diminution in the extent and value of the ore body.



**THE ECONOMIC THEORY OF SHAFTS AND SLOPES FOR FLAT COAL BEDS.**

By E. BRACKETT.

(Concluded from page 377.)

Now, a selection from these systems depends—  
First—Upon the available room. That is, a tract of land may be too small for a long slope.

Second—Upon the cost.

Third—Upon the relative economy of operation of one system over another of less cost.

Fourth—Upon the relative economy of maintenance of different systems.

Fifth—Safety.

The first of these needs no comment. For lack of sufficient data the fourth must also be omitted. It is said, however, that the cost of maintaining a slope is greater than for a shaft. A slope has usually been considered safer than a shaft, but except for the fact that a slope does not need emergency ladders, the writer sees little difference in this regard.

This leaves only the question of cost and economy for discussion, and to these we now proceed.

ing values be assigned to the various elements above enumerated.

With soft coal measures and ordinary methods of timbering and not much water a double hoist shaft can be put at \$30 per foot, depth complete (rock and timber). A single haul slope under similar conditions costs \$10 per lineal foot (timber and rock). A double track slope, say \$15 per lineal foot.

Let trestle and grading from mouth of mine be appraised at \$7 per lineal foot where there are two tracks and \$9 per foot where there are three tracks. Its length is considered the length necessary for the rise from the mine plus the necessary landing to accommodate the loaded trip. This landing is, of course, somewhat longer than the trip. From the surface to the highest point of the loaded track, vertical measurement, is considered 30 feet in all cases. Let the head frame, complete, be appraised at \$750.

The grading at the foot of the shaft or slope depends entirely upon the method of mine haulage. Large trips will require a great amount of grading to make them feed properly to the foot of a shaft or slope. When the slope haulage is carried underground no grading is required. Where it is required

the depth. The boilers need not be included, as they evidently must generate nearly the same horse power where the output and depths are the same. Hence, they have no weight in the comparison. Let rope, machinery and tipples be given a fair valuation.

The cost of the mine haulage plant may be omitted for the present. It is only useful when comparing a continuous haulage with one where the mine haulage and the slope or shaft hoist are separate. This will be discussed later when economy comes for consideration.

The cost of rounding of the toe and apex of a slope when continuous haulage is used, so that the vertical obliquity of the rope will not derail the front or rear car, and the cost of setting pulleys in the roof at the toe, if necessary, to prevent rubbing, we will place at \$150 for single slope and \$250 for double tail rope; also \$100 for endless rope. Further discussion of this is a problem in itself which would be out of place here.

From the system listed as the cheapest in the above table no deviation can be made except where a justifiable economy is shown. This economy can now be considered under two heads:

First—The comparative economy of shafts, slopes, etc., where an independent system of haulage is used.

Second—The comparative economy of separated systems of hoists for shafts and slopes, including another system for mine haulage with systems where the slope haulage is carried into the mine.

A comparison of systems of continuous haulage belongs properly to haulage, and may therefore be here omitted.

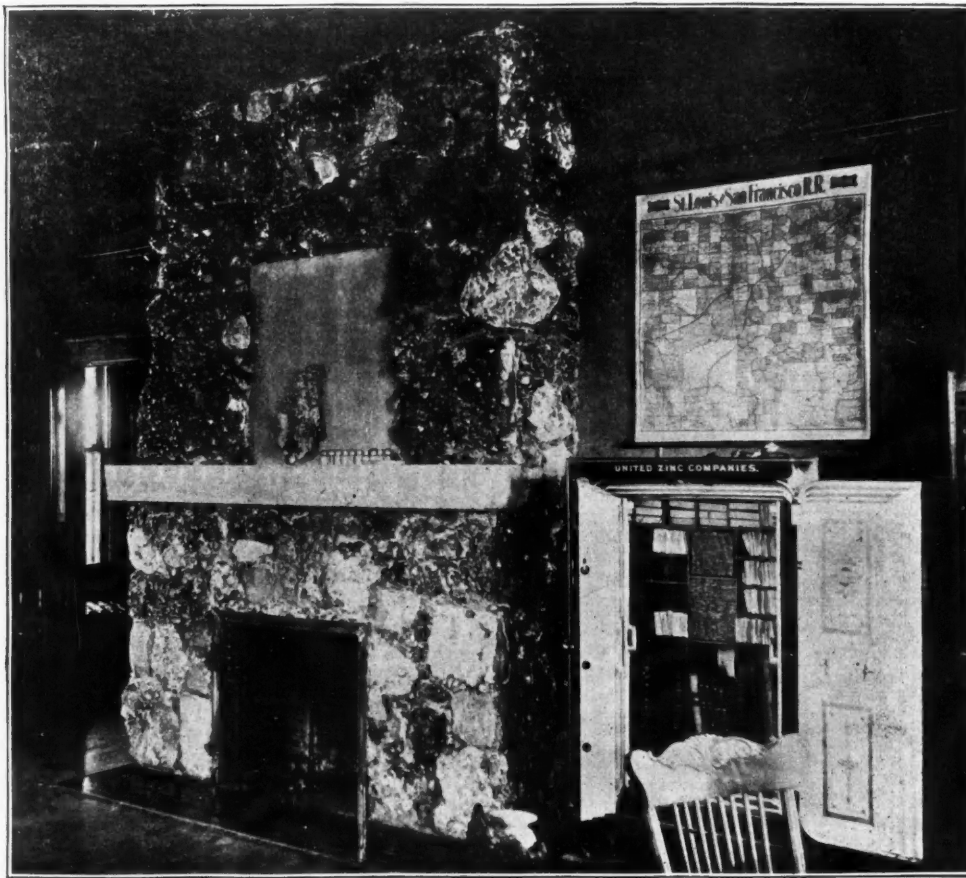
The several operations at the surface and in the mine at the foot of the shaft or slope may be classed into the handling of trips and the handling of single cars. The costs of these operations, where tracks are properly graded, vary principally with the output, being less as the output increases. They also vary somewhat with the size of the trip considered. It is believed, however, that in most cases the accompanying table of costs per ton of the several operations enumerated are approximately correct. The gross weight of the car is considered 5,000 or 6,000 pounds and the labor \$2 per day.

The table contains no estimate of the actual expenses of hauling or hoisting, but only such expenses as differ with different systems, the two last items only excepted. They are tabulated only for completeness, and need not enter into the present calculations. It is to be remarked, however, that chain haulage requires very little attention to its engine. This advantage is omitted in these calculations.

Now, if an advantage can be shown of any other system over the cheapest system, whose net proceeds during the life of the mine will exceed the additional principal invested, added to the interest, say at 10 per cent, during the life of the mine, then the adoption of such other system is justified.

It now appears that a chain haul slope is more economical by 6,000 during the life of the mine than a single haul slope, which is the cheapest in first cost. The difference in first cost is 6,900 less 5,520 equals 1,380, which in ten years amounts to \$2,760. Hence the adoption of a chain haul under these conditions would be justified.

For illustration, let a shaft, single haul slope and



MANTEL IN OFFICE OF UNITED ZINC COMPANY AT CHITWOOD, MO., MADE OF MINERAL FROM COMPANY'S TRACT.

The difference in costs may be classed under the following heads:

- a. Cost of rock work, i. e., slope or shaft.
- b. Cost of tipple.
- c. Cost of head frame for shafts and trestle landing on top for slopes.
- d. Cost of grading at foot of shaft or slope.
- e. Cost of hoisting or hauling machinery for shaft or slope, including rope or chains for mine haulage if necessary.
- f. Cost of hauling machinery for mine, including rope if separate from shaft or slope hoists.
- g. Cost of rounding off with vertical curves the apex and toe of slopes. Also, the cost of wheels at the foot of some slopes where the haulage is carried inside, placed in the roof to prevent the rubbing of the rope.

With a view of tabulating the costs let the follow-

let it be appraised at \$150 for O = 25 or 50 and \$300 for O = 100 or 150.

	500 or 1,000 per day. O = 25 or 50.	2,000-3,000 per day. O = 100 or 150.
Handling trips		
Landing, including uncoupling of rope	\$0.002	\$0.0015
Uncoupling cars	.001	.0007
Partially uncoupling cars and attaching to slope rope	.001	.0008
Feeding small trips to foot of slope	.002	.0015
Coupling single cars and attaching to slope rope	.002	.0015
Handling single cars		
Feeding to shaft	.003	.0022
Feeding to chain haul	.003	.0022
Feeding from trips and chain haul to tipple	.003	.0022
Shafts should be self feeding after uncaging	0	0
Caging (loads)	.002	.0015
Uncaging (loads)	.002	.0015
Recaging (empties)	.002	.0015
Uncaging (empties)	.002	.0015
Dumping	.002	.0015
Oiling	.001	.0008

The cost of the machinery and rope for the shaft or slope hoist depends upon the output, the speed and chain haulage be compared for d = 100 O = 50. Or output equals a thousand tons per day. Let the

life of the mine be 10 years, and let the cars be delivered to the foot of the shaft or slope one at a time. For example, by endless rope:

For Shaft.		For Chain Haul Slope.		For Single Slope.	
Feeding to shaft.....	.003	Feeding to chain.....	.003	Coupling, etc.....	.002
Caging.....	.002	Feeding to tippie.....	.003	Uncoupling.....	.001
Uncaging.....	.002			Feeding tippie.....	.003
Recaging.....	.002			Coupling, etc.....	.002
Uncaging.....	.002			Uncoupling.....	.001
	.011				.009
Daily expenses.....			\$11.00		\$6.00
Working days in ten years.....			2,000		2,000
Expense.....			\$22,000		\$18,000

We have assumed in the above calculation that the point of reaching the coal was the same for the shaft and slope. Such may not be the case. The nearer the point of reaching the coal is to the center of gravity of a tract (haulage in all directions being equally expensive) the more economical will be the haulage for the mine. This advantage may be financially calculated as follows:

Let A, D, G—J be a regular or irregular tract of coal, and let M and N be two points of reaching the coal. For example, let M be for the shaft and N for the two slopes in the last example. Draw BI and CH through M and N parallel to one of the principal haulage directions. In a similar manner draw LE and KF parallel to the direction of the other principal haulage ways. For example, let the first pair of lines be on the face and the second pair on the butts. Let "back hauls" be neglected.

First, considering the butt haulage only: Let ABIJ and BDGI represent the tons of coal in those tracts, and let the distance in feet of their centers of gravity from M be  $m_1$  and  $m_2$ . Let  $C_1$  and  $C_2$  be the cost per foot ton of main butt haulage from each tract, respectively. Then the cost of the butt haulage

The total cost, then, of delivery to M is

$$ABIJ \times m_1 \times C_1 + BDGI \times m_2 \times C_2$$

In a similar way the cost of face haulage of the entire tract ADGJ delivered to M is

$$ADFK \times m_3 \times C_3 + KFGJ \times m_4 \times C_4$$

The total cost, then, of delivery to M is

$$ABIJ \times m_1 \times C_1 + BDGI \times m_2 \times C_2 + ADFK \times m_3 \times C_3 + KFGJ \times m_4 \times C_4$$

In a similar way the cost of the entire tract delivered to N is

$$ACHJ \times n_1 \times C_5 + CDGH \times n_2 \times C_6 + ADEL \times n_3 \times C_7 + LEGJ \times n_4 \times C_8$$

The values of  $C_1, C_2, C_3$ , etc., may or may not be the same, according to the proposed system of underground haulage. This cost of haulage varies much with method, conditions of the tracks, etc., but with fairly good tracks and very little grade we may as-

sume the following, labor being from \$1.50 to \$2 per day:

Cost per foot ton (net) horse haulage from \$0.00015 to .00020.

Cost per foot ton (net) mechanical haulage from \$0.00005 to .00007.

The difference between the costs of delivering the

entire tract to either opening will be one factor in deciding on the method.

For example, let us assume that the mine for

which we have compared shaft and slope haulages is opening the square tract ADGJ. That M is the point of entry of the shaft and N the point where the slopes strike the coal. Let BI and LN be parallel to the sides of the square. Let AB=600 feet, AC=900 feet and AD=3,600 feet. Let GF=1,200 feet, GE=1,800 feet and GD=3,600 feet. Let the entire tract contain 1,800,000 tons of coal uniformly distributed. Let endless rope haulage be contemplated from N or M to E or F. Let the cost of horse haulage be assumed at .000015 and of endless rope .000005. The following calculations may then be made.

Delivery to M.

300,000 × 300 × .000015.....	=	\$1,350
1,500,000 × 1,500 × .000005.....	=	11,250
1,200,000 × 1,200 × .000015.....	=	21,600
600,000 × 600 × .000015.....	=	5,400
		\$39,600

Delivery to N.

450,000 × 450 × .000015.....	=	\$3,037
1,350,000 × 1,350 × .000005.....	=	9,113
900,000 × 900 × .000015.....	=	12,150
900,000 × 900 × .000015.....	=	12,150
		\$36,450

Difference in favor of N.....

\$3,150

An amount which in this case stands in favor of opening with one of the slopes.

The account between the chain haul and the shaft in this case now stands as follows:

Chain Haulage—

To cost of that part of plant where differences occur.. \$6,900

To interest for 10 years..... 6,900

To cost of operation for 10 years..... 12,000

To cost of haulage underground for 10 years..... 36,450

\$62,250

Shaft—

To cost of that part of plant where differences occur.. \$6,780

To interest for 10 years..... 6,780

To cost of operation 10 years..... 22,000

To cost of haulage underground for 10 years..... 39,600

\$75,160

Balance in favor of chain haulage..... 12,910

The balance in favor of chain over single slope was

6,000 less 2,760..... = \$3,240

The comparative economy of carrying haulage underground differs in no respect from the principles above explained except that to the cost of the separate haulage system for slope or shaft must be added the cost of a haulage plant for the mine. It is also necessary to count the delivery of the coal to the tippie instead of to the slope or shaft bottom, as heretofore.

For example, let the relative economy of the following plants be considered for  $o=100$ , or 2,000 tons per day, and  $d=50$ . First, let chain haulage on a short slope be considered with tail rope haulage un-

derground. Second, let a system of tail rope be carried from the tippie continuously down the slope and underground. The following diagram represents the tract, which for simplicity is assumed square and parallel with the butts or faces, to which the main haulage ways are also parallel. For further simplicity the two slopes are assumed on the same line, it being the line of the butts. On this account we need only consider the butt haulage. The haulage of the part of the tract back of the slope is assumed to be done by horses in both cases.

We can now figure

ABFE contains.....	75,000 tons
BDHF ".....	1,925,000 "
ACGE ".....	350,000 "
CDHG ".....	1,650,000 "

T being the point where the tail rope slope reaches the coal and C the same point for the chain haulage.

Then

75,000 × 75 × .000015.....	=	\$84
1,925,000 × 1,925 × .000005.....	=	18,528

Total to C.....

\$18,612

350,000 × 350 × .000015..... = \$1,838

1,650,000 × 1,650 × .000005..... = 13,612

Total to T..... \$15,450

For hauling from foot of slope to the tippie:

Total from C, say 2,000,000 × .001..... = \$2,000

Total from T, say 2,000,000 × 700 × .000005..... = 7,000

Expenses peculiar to the two systems at foot and top of slope:

Chain Haul.

Landing mine trip inside..... .0015

Uncoupling cars..... .0007

Feeding to chain..... .0022

Feeding to tippie..... .0022

Coupling at foot of slope..... .0015

.0081

Total tonnage..... 2,000,000

Total cost..... \$16,200

Tail Rope.

Landing trip outside..... .0015

Uncoupling outside..... .0007

Feeding to tippie..... .0022

Coupling for return..... .0015

.0059

Total tonnage..... 2,000,000

Total cost..... \$11,800

Life of mine =  $\frac{2,000,000}{2,000 \times 200}$  = five years.

Costs for tail rope..... 19,210

\$5,880

Interest at 10 per cent for five years..... 2,940

In favor of chain haulage..... \$8,820

The following comparison can be made. For chain haulage:

Total cost of mine haulage..... \$18,612

Total cost haulage up slope..... 2,000

Total of peculiar expenses..... \$16,200

For Tail Rope.

For total excess of initial cost, including interest.. \$8,820

Total cost of mine haulage..... 15,450

Total cost haulage up slope..... 7,000

Total of peculiar expenses..... 11,800

\$43,070

36,812

Balance in favor of chain haulage..... \$6,258

If a double system of tail rope haulage had been used, the result might be somewhat different, as the grade in that case is heavier. While the writer has never seen nor heard of this system being used, he can see no serious obstacle to its adoption. It will require two empty tracks, however, with the loaded track included between them between the slope and the tippie.

The self-dumping cage, which we have so far omitted, seems to the writer to possess two very important advantages which might give the shaft a much better showing than here appears. We refer to the avoidance of caging and uncaging at the surface, which very materially increases its economy, and to the avoidance of a landing for loads and empties at the surface, which decreases the cost. The writer knows of mines of, say 500 or 600 tons daily output where elevator engines are used with such cages. They require but one man on top, who attends hoisting and dumping.

The influence of slight grades in the seam may be allowed for in figuring the cost of haulage underground.

In conclusion, the writer wishes to say that data here given refer principally to localities where the cars weigh 5,000 or 6,000 pounds and where labor is from \$1.50 to \$2 per day. The conclusions reached are, of course, conditional, subject to local circumstances. In a general way, however, and for the average American coal bed the writer believes they are not misleading.

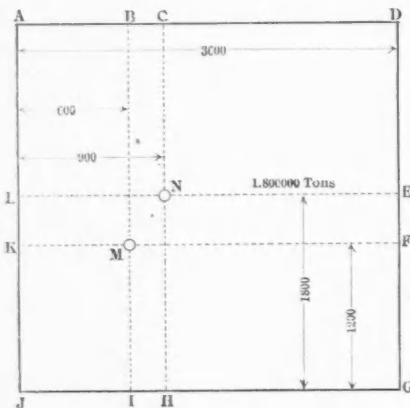


Fig. 2.

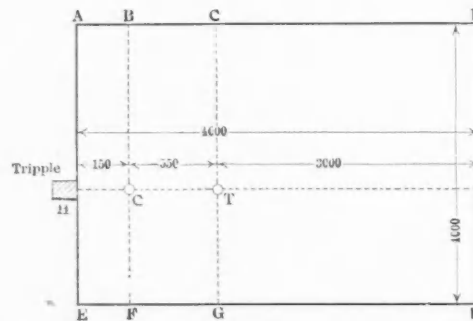


Fig. 3.

sume the following, labor being from \$1.50 to \$2 per day:

Cost per foot ton (net) horse haulage from \$0.00015 to .00020.

Cost per foot ton (net) mechanical haulage from \$0.00005 to .00007.

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entire tract to either opening will be one factor in deciding on the method. For example, let us assume that the mine for which we have compared shaft and slope haulages is opening the square tract ADGJ. That M is the point of entry of the shaft and N the point where the slopes strike the coal. Let BI and LN be parallel to the sides of the square. Let AB=600 feet, AC=900 feet and AD=3,600 feet. Let GF=1,200 feet, GE=1,800 feet and GD=3,600 feet. Let the entire tract contain 1,800,000 tons of coal uniformly distributed. Let endless rope haulage be contemplated from N or M to E or F. Let the cost of horse haulage be assumed at .000015 and of endless rope .000005. The following calculations may then be made.



**A LARGE GERMAN PUMPING ENGINE.**

A notable instance of recent German practice in mine pumping is found in a large pumping engine shown at the Dusseldorf Exposition, for the description and illustration of which we are indebted to the *London Engineer*.

This is a large triple-expansion engine, built by Messrs. Haniel & Lueg for the Harpen Mining Company, and illustrated. This is to be erected at the No. 3 Gneisenau Pit, near Dortmund, as a central drainage unit for a group of collieries, and has a capacity of 25 cubic meters (5,580 gallons) per minute lifted 500 meters (1,640 feet), representing about 2,800 horse-power in water lifted, or 3,400 to 3,500 indicated horse-power, and will replace 4 other engines varying in capacity from 3 to 12 tons each per minute, which will in future be kept in reserve for emergencies. The leading dimensions of this engine, which is of twin-tandem form, with single high-pressure and intermediate cylinder, and 2 low-pressure cylinders, are as follows: High-pressure cylinder, 950 millimeters diameter; intermediate

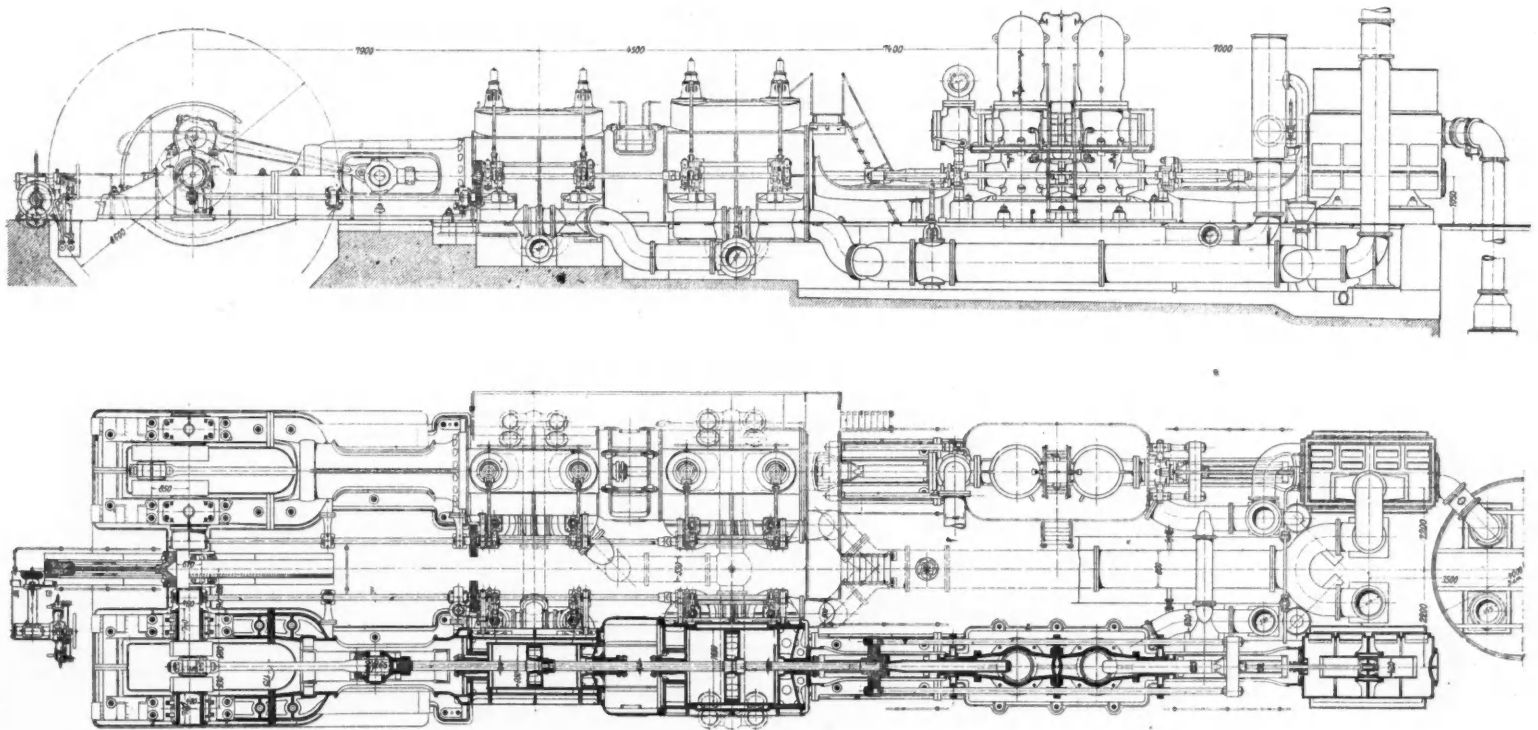
the mine, which has restricted the breadth of the underground engine room to 8 meters.

This is, no doubt, the cause of the most striking feature of this fine engine, namely, its enormous length, the distance from the barring engine at the edge of the fly-wheel pit to the center of the suction pipes in the shaft being about 110 feet, and that of the line of rod from the crosshead slipper on the fly-wheel side to the end of the air pump plunger about 75 feet. In order to facilitate the erection underground, as the shaft giving access to the chamber is only 13 feet in diameter, the intermediate and low-pressure cylinders are divided into two parts, and the bed-plates and other parts of the framing are built up in comparatively small pieces. The piston-rods are bored out through their entire length in order to reduce the momentum of the moving parts.

Although considerably larger and more powerful than any underground engine previously constructed, the type is not entirely experimental, the system of triple expansion in four cylinders having been previously used at another pit belonging to the same

it is stated that the coal deposits of the island have recently attracted a considerable share of attention. The existence of several deposits had been known for many years, and in their report on the geology of Trinidad, 1858, Messrs. Wall and Sawkins give the results of analyses of several samples of coal. Last year there were discovered further deposits, of one of which it is reported that the coal is spread over a sufficient quantity to justify the construction of a line of railway from the present terminus at Sangre Grande. Borings are being made, and the coal has been analyzed. The fuels of Trinidad are either lignitic in character or remarkably bituminous.

**A GERMAN BOUNTY SYNDICATE.**—A combination has recently been effected in Germany which includes the Coal Syndicate, the Coke Syndicate, the Westphalian Pig Iron Syndicate, the Siegen and the Lorraine-Luxemburg Pig Iron syndicates, the "Halbzeug" (semi-finished product) Syndicate, the Wire Drawers' Association, and the syn-



PUMPING ENGINE BUILT BY HANIEL & LUEG, DUSSELDORF, GERMANY.

cylinder, 1,500 millimeters; low-pressure cylinders, each 1,650 millimeters; pump plunger, 285 millimeters; stroke, 1,700 millimeters. The normal working rate is 60 revolutions per minute. At this the high piston speed of 3.4 meters per second (670 feet per minute) is realized. Each pair of cylinders is arranged symmetrically to and coupled at right angles upon a fly-wheel of 6,600 millimeters diameter, having a toothed rim and small barring engine for starting. Each side has a double-acting forcing set, formed of 2 single-acting plunger pumps, placed back to back, coupled by outside rods, and a box condenser and air pump all in one line, the air pumps doing duty as suction lifts in the shaft. All the cylinders and covers are jacketed, the steam admission valves are placed on the tops, and those for the exhaust at one side of the cylinders. The high-pressure admission valves are fitted with Wieglib trip gear, with oil buffers in the dashpots, and are under control of a governor, allowing a variation of 30 to 35 per cent in the number of revolutions while running. The exhaust valves and those for steam admission on the other 3 cylinders are worked by eccentrics from a shaft running parallel to the center line of the cylinders, receiving motion from the fly-wheel shaft by screw and worm wheel gearing, an arrangement rendered necessary by the condition of

company, with a similar engine by Messrs. Ehrhard & Sehmer of about half the power, lifting 12 tons per minute 1,312 feet, and a smaller one at the Lintorf metal mines by Messrs. Haniel & Lueg, lifting 30 tons per minute. With a boiler pressure of 180 pounds and 165 pounds at the high-pressure admission valve, the steam consumption guaranteed by the makers is 5.6 kilograms per indicated horse-power hour, or, taking the combined efficiency at 83 per cent, 6.3 kilograms per horse-power in water lifted. This supposes the engine to be kept continuously at work, in which case the condensation in the steam conduit pipes will be reduced to a minimum. Supposing the working conditions to be changed by reducing the quantity of water lifted to one-half, and the lift to be doubled, the water raised by the pumps would still be sufficient to condense the steam used, so that it would be actually possible to work an engine of this class with a lift of 1,000 meters. Probably no one will be bold enough to make such an experiment, but the figures are remarkable as showing the increase in the capacity of pumping machinery by the use of very high-pressure steam.

**COAL IN TRINIDAD.**—The British Board of Trade has received a communication from the collector of customs at Trinidad, West Indies, in which

indicates of sheet metal, girders, and structural, iron besides all analogous bodies in process of formation at the time the agreement was made. This association is based upon an agreement that its members shall pay to such members as export their products a bonus equal to the difference between the current price of the merchandise in the German markets and the price actually obtained for it abroad. The bonuses are to be paid quarterly, and the system is dated back to the commencement of the present year, so as to cover the transactions of the past six months. They will be based on the sales made and actually exported by each member.

**IRON AND STEEL EXPORTS OF GREAT BRITAIN.**—Exports of iron and steel and their manufactures from Great Britain for the eight months ending August 31 are valued by the Board of Trade returns as below:

	1901.	1902.	Changes.
Iron and steel . . . . .	£16,927,166	£18,659,955	I. £1,732,789
Machinery . . . . .	12,050,683	12,368,678	I. 311,995
New ships . . . . .	6,126,202	4,273,875	D. 1,852,327
Total . . . . .	£35,110,051	£35,302,508	I. £192,457

The increase in iron and steel was large, but was offset by the decrease in value of new ships delivered to foreign nations.

## THE MEXICAN MALACATE.

By J. NELSON NEVIUS.

This form of horse or mule whim has its three component parts—the winding drum, means of applying power, and retaining supports, all composed entirely of wood. Its cumbersome appearance commands but small respect at first sight, yet it is so serviceable an apparatus that one of the largest mining companies in Mexico recently took one apart and shipped it 120 miles overland in preference to purchasing an American whim or an engine, for use on a deep prospecting shaft.

tension is slack. The middle set of projections prevents the two oppositely winding cables from interfering.

A larger malacate is shown in the photograph, Fig. 4, while Fig. 3 shows the method of bracing. This has a drum 16 feet in diameter and 6½ feet high and is built of proportionately heavier stock.

The power-sweeps are two or four in number, according to the size of the drum and depth of the shaft. They are mortised into the center-post near the top of the drum, pass downward between the three sets of parallel braces, out at the lower edge of

just to one side of the center of the drum and supports the center-post in bearings of hardwood bolted to the side of the cap.

The only form of brake used is wooden sticks carried by the drivers and braced from the ground to the ends of the sweeps when the malacate comes to rest. Evidently the Mexicans have never felt the need of a lever brake acting on the drum, or they would have applied one.

The photograph shows a typical malacate with 16-foot drum. It is operating on a ventilation shaft 580 feet deep. The reel on the braces between the sweeps carries the surplus length of ¾-inch steel cable.

In their primitive form the hoisting buckets consist of entire raw-hides, sewed together, but leaving an opening to be laced up to retain the load of ore, waste or water. Frequently several malacates have operated at the same shaft, and to accommodate them the shafts were made hexagonal or octagonal in section and of great size. The famous "Tiro General" on the Valenciana property, near Guanajato, which is octagonal in section, about 31 feet in diameter and near 1,800 feet deep, is supposed to have accommodated eight malacates. In the same district the San Juan de Rayas shaft is also octagonal, 37 feet in diameter and accommodated several malacates, one of which has gone down in history as the largest ever built in America. The old La Cruz vertical shaft at

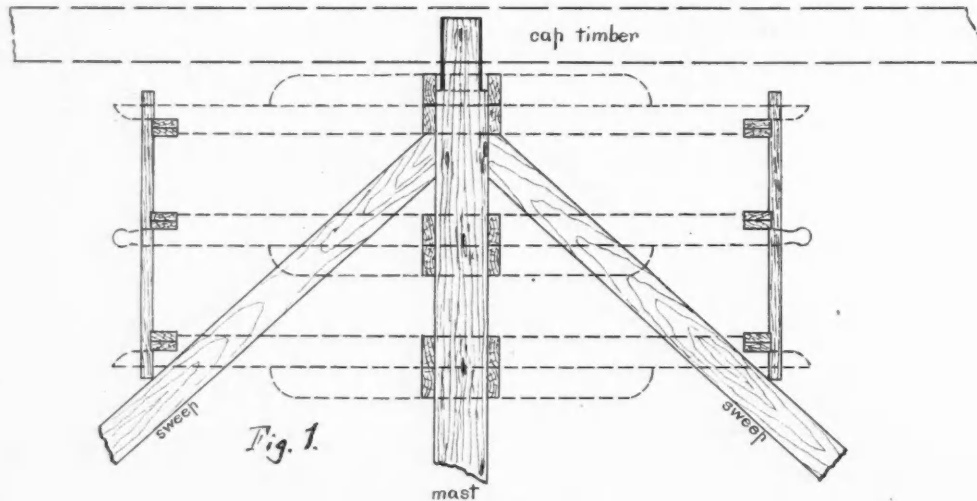
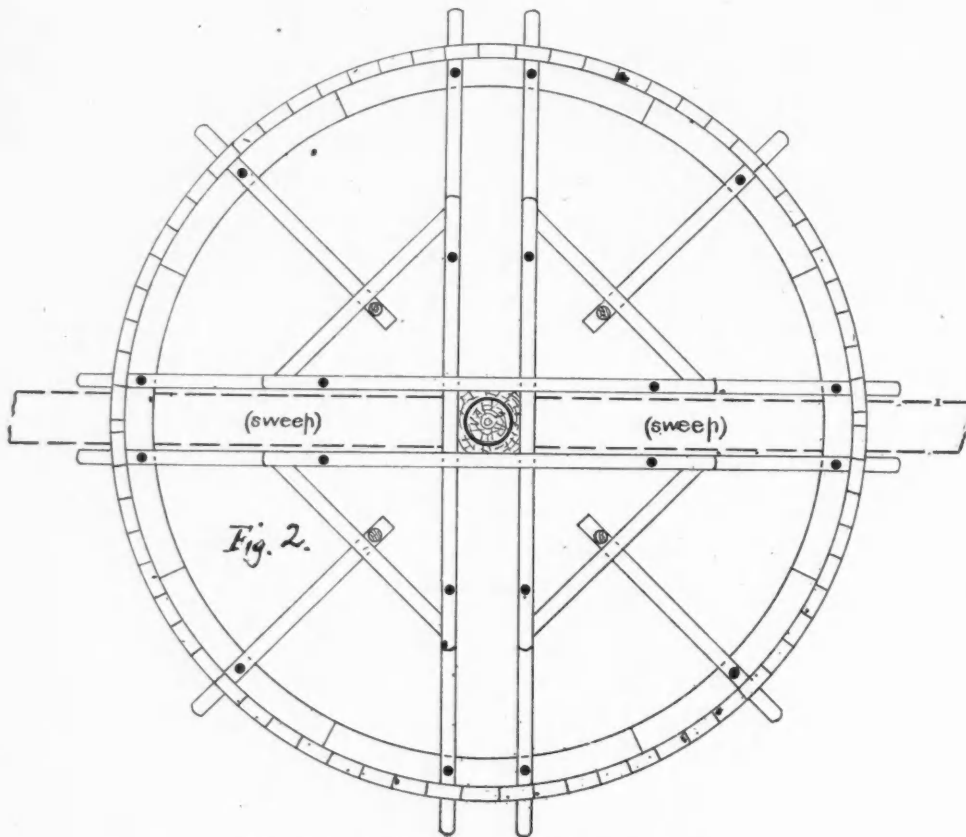


Fig. 1.



SECTION AND PLAN OF MALACATE WINDING DRUM.

The winding drum consists of a shell of boards fastened vertically to three inner rings, which are suitably braced to a vertical center-post which revolves with the drum and is pivoted on an iron pin turning in a concave iron or stone plate on the ground. A very common size, as constructed by the Mexicans, has a drum 12½ feet in diameter and 5½ feet high. Figs. 1 and 2 show the construction, in section and plan respectively, of a drum of the above dimensions. The center-post is a 12 by 12-inch stick, 20 feet long. The three ring braces are of two thicknesses of 6 by 1½ inch stock and are counter-sunk ½ inch into the rim. The radial braces are all of 7 by 3-inch stock and project through the rim to prevent the cable from falling from the drum when

the drum and terminate 3 feet above the ground in a hook, to which the mules are attached, and a seat for the driver. The radius of the circle described by the sweeps is three times the radius of the winding drum. Owing to the great leverage thus obtained—the exact balance of the weight of the moving parts on a vertical axis, and to the reverse winding of the hoisting cables on the drum—the malacate requires a comparatively small amount of power to hoist at a speed greater than is attainable by any other form of whim.

The retaining supports consist of a massive cap-piece extending in the direction of the cables and supported by inclined legs. This frame resembles a carpenter's "saw-horse" of huge size. The cap is set

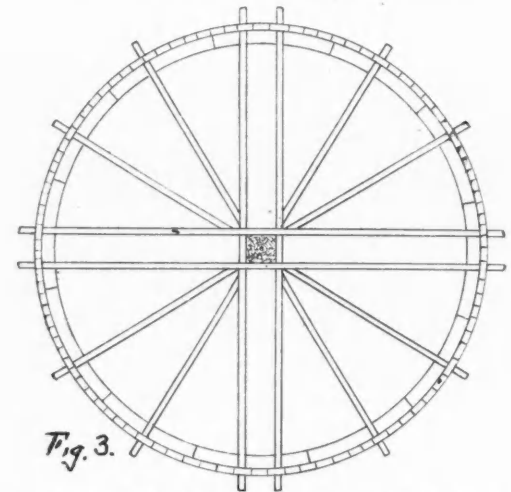


Fig. 3.

METHOD OF BRACING 16-FOOT MALACATE DRUM.

Sombrerete, Zacatecas, was equipped with five malacates working to a depth of 800 feet, the shaft section being about 12 by 8 feet. In vertical shafts no guides are used, the raw-hide sacks slipping past each other in the open shaft.

The American companies line the shaft and divide it into two compartments and hoist with regular iron buckets.

With the 16-foot drum 9 mules can hoist from a depth of 1,200 feet as fast as safety will allow (no guides being used) for a shift of four hours. When the mules are walking they are hoisting about 84 feet per minute, and when on a slow trot about 175 feet per minute, which is as fast as safety and economy permit. On a 600-foot shaft four mules can easily maintain the above rates of speed. They will also work satisfactorily with only one cable and buckets in operation, scarcely noticing the absence of a counter-weight.

For purposes of sinking prospecting or ventilating shafts, or even for doing development work to a depth of 800 feet, the malacate will remove all the material that can be broken down. It is cheap in both installation and maintenance and (perhaps most important of all) it is thoroughly understood by the native laborers, who can be trusted to keep it in repair.

COAL IN MADAGASCAR.—The colonial administration has made public a study of the Grande-Terre District and of Nossi-be Island made by M. Villaume. Several coal seams were found in Carboniferous strata, but no examinations were made to determine the extent of the deposits.



**ANALYTICAL CHEMISTRY OF POTASSIUM.\***

C. Reichard<sup>1</sup> recommends sodium picrate as a reagent for the qualitative recognition of potassium. Potassium picrate is soluble in 260 parts of water at 15 deg. C., and can be recognized in a 1 per cent solution of KCl. Ammonium, caesium, rubidium and thallium salts interfere, lithium salts do not. In a later article<sup>2</sup> the author attempts to make the method quantitative. His directions are as follows: The potassium salt and sodium picrate are dissolved separately, each in the smallest quantity of water, the solutions heated to boiling, and the hot picrate solution filtered into that of the potassium salt. After standing several hours, the liquid is decanted through a filter and the crystals washed repeatedly with small quantities (1 or 2 c.c.) of water, dried at 80 deg. C. and weighed. In the results given the loss of potassium is 5 per cent in some cases. While the solubility of the potassium picrate in water is less than the chloroplatinate, it is more soluble in alcohol than in water, whereas when alcohol is added to the

states that, owing to the slight solubility of the precipitate the results are lower than those obtained by the platinum method to the extent of about one-quarter of 1 per cent of the K<sub>2</sub>O present.

F. H. Van Lent<sup>3</sup> has proposed a combination of the perchlorate method, practically as just described, with the precipitation as double cobaltic-potassium-nitrite, as particularly well adapted to the determination of small quantities of potassium in sea water and other cases when mixed with relatively large amounts of sodium and other salts. The details of the cobalt precipitation are as follows: 300 c.c. of sea water are evaporated and the calcium sulphate filtered out, then sodium carbonate added till alkaline and the calcium and magnesium precipitates filtered out. The filtrate after acidification by acetic acid is ready for precipitation. The reagents are, 9.58 grams of crystallized cobalt chloride and 25 c.c. glacial acetic acid dissolved and diluted to half a liter, and 90 grams of sodium nitrite dissolved and diluted to half a liter. They are kept separate and

with 521,444 pounds in 1900, valued at \$140,790, an increase of 30,599 pounds in quantity and \$13,782 in value for the year. The price per pound during 1901 averaged 28 cents, as compared with 27 cents in 1900 and 29 cents in 1899. The production of bromine in the world continues to be controlled by the Associated American Producers and by the Leopoldshall-Stassfurt convention, which is operative for several years to come.

**THE MINERAL INDUSTRY OF CHILE.**

There are few South American republics that can equal Chile in the importance of their mining industries. In nitrate of soda, Chile leads the world, no other country producing this valuable mineral in commercial quantities. The industry is in the hands of a combination of producers. This industry is centered in the northern provinces, extending from Jazpampa to Lagunas, and then from Tocopilla to Taltal, the most important field being in the Province of Tarapaca. In the *ENGINEERING AND MINING JOURNAL* for February 23, 1901, we published an illustrated article on the nitrate of soda industry.

Metal mining is growing, though the depreciation in the market prices of silver and copper has interfered with production in the past year. Chile is the second largest silver mining country in South America. The principal mines are located in the District of Caracoles, 150 miles inland from Antofagasta. Operations are carried on by the leasing system, the lessees paying the owner of the property a royalty of 15 to 30 per cent upon the net value after deducting mining expenses. Extensive silver-lead smelting works are at Antofagasta, one being in the suburb Bella Vista, owned by the Antofagasta Smelting Company, and the other at Playa Blanca, owned by the Compañia de Minas de Huanchaca. American and French capitalists are interested in the Huanchaca Company.

Copper mining is largely centered in the provinces of Coquimbo and Atacama, where British capital is heavily invested. Chile is the third largest copper producer in the world.

In Northern Chile, notably in the Province of Antofagasta, extensive deposits of calcium borate are being worked by the Borax Consolidated—British corporation—which has obtained control of the leading properties.

Manganese mines are being worked in Coquimbo and Atacama, and the annual exports are between 20,000 and 25,000 tons. The ore averages 50 per cent manganese and contains about 10 per cent silica and something less than 0.1 per cent phosphorus.

**CHINESE IRON ORE FOR JAPAN.**—An article from the *Chronicle*, of Kobe, Japan, forwarded by United States Consul S. S. Lyon, says: "One of the most important questions to be considered by the committee appointed by the Government to consider ways and means for the successful working of the Imperial Iron Works at Yawata, Fukuoka prefecture, is the future supply of iron ore. The production of iron in Japan is limited, there being few mines in the northeastern district and in the vicinity of Hiroshima. There is no prospect of any new deposits of iron ore being discovered, and the only course open seems to be to work the rich Hanyang iron mine in China, as at first proposed.

"A proposal was made by Baron Komura, Minister for Foreign Affairs, and Baron Hirata, Minister for Agriculture and Commerce, to secure the privilege of working the iron mine at Hanyang, it being intended to construct a steamer suitable for carrying the ore from China to Japan. Mr. Uchida, Japanese Minister at Peking, was instructed to sound the Chinese Government on the subject, but it is stated that the success of the proposal is very doubtful, as the Hanyang iron mine forms one of the most important sources of revenue of the Chinese Government. The Japanese Government, however, has not given up the idea. The two principal Japanese steamship lines are prepared to transport the ore from China."



MALACATE, 16 FEET DIAMETER, AT SHAFT 580 FEET DEEP.

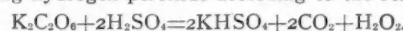
H<sub>2</sub>PtCl<sub>6</sub> solution, the K<sub>2</sub>PtCl<sub>6</sub> is practically completely precipitated.

The method is given here because, on account of the present high price of platinum, any method which avoids its use is of more than ordinary importance.

O. Schumm<sup>4</sup> recommends filtering K<sub>2</sub>PtCl<sub>6</sub> on a Gooch crucible, dissolving in hot water, adding 2 c.c. of dilute sulphuric acid (1 : 5) for each 100 c.c. of solution, and electrolyzing the solution with a current of 1.2 volts and 0.03 amperes at about 60 deg. C. for six hours. The potassium is calculated from the deposited platinum as usual.

C. Montanari,<sup>5</sup> in an article on the estimation of potassium by perchloric acid, gives the following directions for the precipitation of KClO<sub>4</sub>: A solution of perchloric acid is made by shaking 100 grams of sodium perchlorate with 150 grams of pure concentrated hydrochloric acid and filtering from the insoluble sodium chloride through glass wool, then evaporating to expel the excess of hydrochloric acid. Half a gram of the substance freed from ammonia salts and from sulphates, is dissolved in from 15 to 20 c. c. of water, mixed with 1 c.c. of the reagent and evaporated till volatile acids are expelled, then allowed to cool; 20 c.c. of 95 per cent alcohol containing 2 per cent (by volume) of perchloric acid are next added. After standing some hours the KClO<sub>4</sub> is filtered on a Gooch crucible, washed, first with alcohol containing HClO<sub>4</sub>, then alcohol alone, dried at from 120 to 130 deg. C. and weighed; then dissolved through with water; the crucible and filter re-dried and their weight obtained. M. Montanari

mixed in equal parts just before using. About 100 c.c. are added to the solution from the sea water and allowed to stand 6 or 7 hours at from 40 to 50 deg. C., then over night in the cold. The yellow potassium cobalt compound is filtered and washed once with the precipitant then with 80 per cent alcohol. After drying, etc., the precipitate is decomposed by heating on water bath with hydrochloric acid and evaporated to dryness; then taken up and evaporated again with dilute hydrochloric acid and the potassium determined as KClO<sub>4</sub>. The results given are slightly lower than by the platinum method, and confirm the allowance of 0.25 per cent of the potassium present as given by Montanari. Although not connected with the analytical determination of potassium, a recent article<sup>6</sup> by Prof. Treadwell on potassium percarbonate as a substitute for hydrogen peroxide deserves notice here. Potassium percarbonate can now be obtained free from all but traces of chloride and sulphate and containing about 80 per cent K<sub>2</sub>C<sub>2</sub>O<sub>6</sub>, so that it forms a convenient means of getting hydrogen peroxide according to the reaction.



It can also be used in many cases as a substitute for hydrogen peroxide; as for the oxidation of sulphur in soluble sulphides or sulpho salts to sulphuric acid; manganese, nickel and cobalt to higher oxides; chromium to chromates, etc.; also like hydrogen peroxide it reduces hypochlorites to chlorides with the evolution of oxygen.

**BROMINE PRODUCTION.**—The production of bromine in the United States during 1901 amounted to 552,043 pounds, valued at \$154,572, as compared

\*From the review of Analytical Chemistry in 1901, by Edmund H. Miller, in *Mineral Industry*, Volume X.

<sup>1</sup>*Zeitschrift fuer Analytische Chemie*, 40, 377.

<sup>2</sup>*Chemiker Zeitung*, December 21, 1901, p. 1151-4.

<sup>3</sup>*Zeitschrift fuer Analytische Chemie*, 40, 1901, p. 385.

<sup>4</sup>*Chemische Centralblatt*, 1901, p. 203.

<sup>5</sup>*Zeitschrift fuer Analytische Chemie*, 40, 1901, p. 560.

<sup>6</sup>*Chemiker Zeitung*, November 18, 1901, p. 1008.

### THE CANADIAN MINING INSTITUTE.

Pursuant to notice a special meeting of the Canadian Mining Institute opened in Nelson, B. C., September 10. The object of the meeting was to organize a branch of the Institute in accordance with the resolutions passed at the meeting in Montreal last March. The members assembled in the Board of Trade rooms in Nelson at 4 o'clock, a large number of well-known engineers being present.

The members who registered during the day were Edmund B. Kirby, Bernard Macdonald, W. Thompson, A. Sharpe, Rossland; J. McEvoy, J. H. Tonkin, Fernie; A. C. Garde, Sandon; G. W. Chaplin, St. Catharines, Ont.; E. E. D. Wilson, Kingston, Ont.; H. C. Black, A. H. Gracey, R. Hedley, H. Harris, N. Carmichael, H. E. Croasdale, E. R. Woakes, S. S. Fowler, G. R. Driscoll and Leslie Hill, Nelson.

After a temporary organization had been completed, it was moved by H. J. Tonkin and seconded by Bernard Macdonald that a branch of the Institute should be formed. The election of officers and appointment of committees was deferred until the second session.

Mr. Bernard Macdonald read a paper on Mine Timbering by the Square Set System in the Rossland District. In this he gave an extended account of the difficulties arising in the timbering of ledges of any great breadth, and how these difficulties led to the invention of the system by Philip Deidsheimer, of Georgetown, Cal., who applied it to the rich Ophir Mine. On this property at the 50-foot level the vein of black sulphurets was only 3 or 4 feet thick and could readily be extracted through a drift along its line, propping up the walls and roof when necessary by simple uprights and caps. As the edge descended the sulphuret vein grew broader, until at a depth of 174 feet it was 65 feet in width, and the miners were at a loss how to proceed, for the ore was so soft that pillars could not be left to support the roof. They spliced timbers together to hold up the caving ground, but these jointed props were too weak, and ill supported to stand the pressure upon them, and were constantly broken and thrown out of place. During Mr. Deidsheimer's engagement at the Ophir the principles of square timbering were evolved under his immediate supervision, and the wide ore-bodies occurring in that mine were successfully extracted without loss or injury from caving by the use of the system. The system was used in all the mines of the Comstock Lode, and subsequently in metalliferous mines elsewhere, where the ore-bodies exceeded a width of 15 feet, the extreme width that is practicable to timber by stalling. The paper described how the system was altered and adapted to the varying characteristics of the mines of different localities. It also detailed how it was applied in the mines at Rossland, a full description being given.

We hope to give a fuller summary of this paper hereafter. After the reading, a long discussion followed, in which many of those present participated. Mr. W. Thompson, manager of the Le Roy No. 2 Mine, at Rossland, read a paper comparing the costs of operating air compressors by steam and electricity at Rossland. In this paper, after dealing generally with the use of compressed air in mines, and showing what an important factor it had become, he went on to show how the cheapest method of handling it was something in which every mine owner was interested. He spoke of the different kinds of power in use in mining operations, and showed how with its magnificent system of waterfalls, British Columbia was well situated for the cheap generation of power. Besides this, in the inexhaustible coal deposits of the province another source of power was available. In the paper no conclusions were drawn as to whether steam or electricity was the best factor to use in compressing air, but a number of interesting statistics were given. This paper was also thoroughly discussed.

A discussion followed the reading of this paper, at the conclusion of which an adjournment was had until the evening.

At the evening session Mr. S. S. Fowler read a very interesting paper on Coarse Concentration as Practiced in the Slocan District in British Columbia. We hope to present an abstract of this paper in a later issue.

Mr. Edmund B. Kirby then read a paper on the Influence of Government in Mining. The most notable feature of this was a denunciation of the present system of taxation of mining property in British Columbia. He criticised especially the tax of 2 per cent levied on the gross output of the mines.

This paper was received with much interest, and the subject was taken up and followed by speeches from Messrs. Bell, Thompson, Sharpe and Fowler, all of whom endorsed the position taken by Mr. Kirby. At the conclusion of the discussion a motion was made by Mr. W. Thompson and seconded by Mr. Sharpe that a committee should be appointed to draft a letter upon this subject to be sent to every paper in British Columbia.

Messrs. Thompson, Sharpe, Fowler, Tonkin, Macdonald, Bell and Hedley were appointed the members of this committee. It was then resolved, in view of the visit of the English party now in British Columbia, to postpone the second session until Friday.

On Thursday the members visited the Ymir Mines in company with the English party. Besides the members of the Institute, there were present a large number of local mining men who were prepared to join in the organization of the British Columbia branch.

### THE SICILIAN ASPHALT INDUSTRY.

In Sicily in recent years much development work has been carried on in new localities, showing good quality asphalt rock. The industry is in the hands of a few large companies, who are increasing the capacity of their factories for extracting the bitumen from the asphalt rock and compressing it into blocks, and also for pulverizing the rock for shipment in bags. The three largest concerns are the French Company, which has important mines at Ragusa and Vizzini; the United Limmer and the Sicula Company.

A large part of the asphalt produced is exported from Syracuse and Mazzarelli. In 1901 the exports amounted to 62,770 tons, of which the United States received 11,870 tons, Germany 29,300 tons, Holland 3,750 tons, Great Britain 7,630 tons and France and Austria-Hungary the balance.

**COPPER IN ROUMANIA.**—The copper mines of the Dobrudja, in Roumania, are situated in a triangle, with the Danube from Macin to Tulcea as its base, and Hamandji as its apex. In this region iron and copper are found, the latter in the form of carbonate. The explorations have so far been confined to four points, which, by their geographical position, seem to form a center for mining operations Balabancea, Islam-Géafer, and Carapolit, near Ortachioi, and Altan-Tepe, near Tcheamourli.

**COAL PRODUCTION IN SIBERIA.**—According to London *Engineering* the building of the Siberian Railroad and the demand for coal for the locomotives has been instrumental in moving Siberian coalowners to develop their properties. Although the coal industry of Siberia is only five years old, the output in 1901 was as follows: In Western Siberia the Sudshensk output was 136,518 tons, and that at Ekibastusk was 58,000 tons; in Eastern Siberia 76,200 tons were produced in the Government of Irkutsk, and only 4,762 tons in Trans-Baikalia. Thus, altogether there were produced 275,480 tons of Siberian coal during 1901. Apart from the railroad consumption of this coal, there is also a growing consumption on the part of factories and households. The greater part of the coal mines in Eastern Siberia began working only in 1901, and their output will no doubt be largely increased during the next

few years; in fact, the greatest output of coal took place during the last months of 1901. Moreover, the State has begun to work the coal-fields in the Southern Ussuri territory; the yearly output of coal in that region is estimated at 95,238 tons. So far no returns have been made public with regard to the output of coal on the convict island of Sakhalin during 1901; on the average the yearly output for the last five years has been 79,365 tons.

### DEVELOPMENTS IN CENTRAL IDAHO.

BY ROBERT BELL.

In view of the extensive advertising that central Idaho has received as a result of the Thunder Mountain boom, the important gold mining developments recently made at several points in that portion of the State are of special interest.

The apparent richness and size of these new discoveries give much promise.

Development is now in progress at another district in Idaho County, about 100 miles north of Thunder Mountain. The chief center of attraction at this new district is the Sherman Mine. This property has recently developed a shoot of bonanza gold ore 75 feet long and 4 feet wide that carries very high average values in free gold and has all the appearance of permanency and continuity in depth. The Sherman Mine is still in the possession of its original owners. It is opened on a 20-foot vein of white quartz sprinkled with iron oxide. It stands at a steep angle, and is in a contact between walls of porphyry and granite.

The development consists of 2 adit tunnels driven on the vein, which carries a general average value of \$10 to \$15 per ton in free gold. The upper tunnel is 300 feet long and the lower tunnel 500 feet. The bonanza ore shoot was encountered in this lower tunnel 430 feet from the entrance. It is well defined and rich all through, and had a face depth at 500 feet of 180 feet. A sample taken across the face after the payshoot had been traversed for 70 feet yielded an average value of \$1,000 per ton. A goldpan full of shattered quartz taken from the bottom of a couple of shots fired in this pay streak yielded \$7 in free gold. This rich ore shoot did not manifest itself at the surface. It is well defined in the tunnel and gives every evidence of vertical strength. The size of the vein and its average values aside from the high-grade payshoot give the property large proportions.

The discovery of such phenomenally rich ore has created considerable excitement in the district, and a great many claims are being located. This property is situated on Seigel Creek, 6 miles south of Elk City.

The Hogan Mine, which is situated on Crooked River, 12 miles south of Elk City, promises to develop into an important gold mining enterprise. It is owned by the Crooked River Mining and Milling Company, of Butte, Mont., and has recently been equipped with a 20-stamp mill. The company has a large group of claims, and has a good water power, timber, and a location where gravity handling can be utilized, insuring a low cost of operation.

The property follows the course of a nearly vertical dike of altered igneous rock in granite for a distance of 2 miles. The dike is from 200 to 700 feet wide. On account of its great width it is hard to determine its average value, although the tests made by the owners and others indicate an average of \$5 per ton, with selected shoots and areas of considerable extent that are of higher value. The ore so far is free milling. The hill in which the vein occurs rises rapidly to an altitude of 500 feet above the mill, so that it can be quarried very cheaply, and underground mining will be unnecessary for years.

The Valley Creek Mine is situated on the Ketchum Thunder Mountain road, at Stanley Basin, in Custer County, and about 75 miles southeast of Thunder Mountain. It is owned by Hon. Lyttleton Price, of Hailey, Idaho, and Wayne Darlington, former general manager of the White Knob Copper Company, at Mackay. This mine has been under development for over a year, and now has 2,000 feet of tunnels, mostly on the vein. The vein dips at an



angle of 70°. It is 25 feet wide, with well defined walls of granite on both sides. It is accompanied (at a short distance from the vein) by two larger dikes, one of quartz porphyry and the other diorite. The values lie in well-defined shoots 75 to 150 feet in length, of which there are several already exposed.

Careful average sampling of these pay-shoots for the full width of the vein yield \$10 per ton, while selected widths of several feet at different points along the tunnels give average values of \$25 to \$30.

The ore is 50 per cent free milling, while it is thought that 85 per cent of the balance of the value can be recovered by cyaniding. The machinery for a 20-stamp mill, with cyanide plant, has been purchased for this property. It has all been delivered, and is expected to be up and in operation before winter sets in. This property is under the management of Mr. J. B. Hastings.

Some remarkably rich specimen gold ores have recently been brought into Boise from Loon Creek, 40

ZINC IN CRITTENDEN COUNTY, KY.

By GEORGE D. WHEELER.

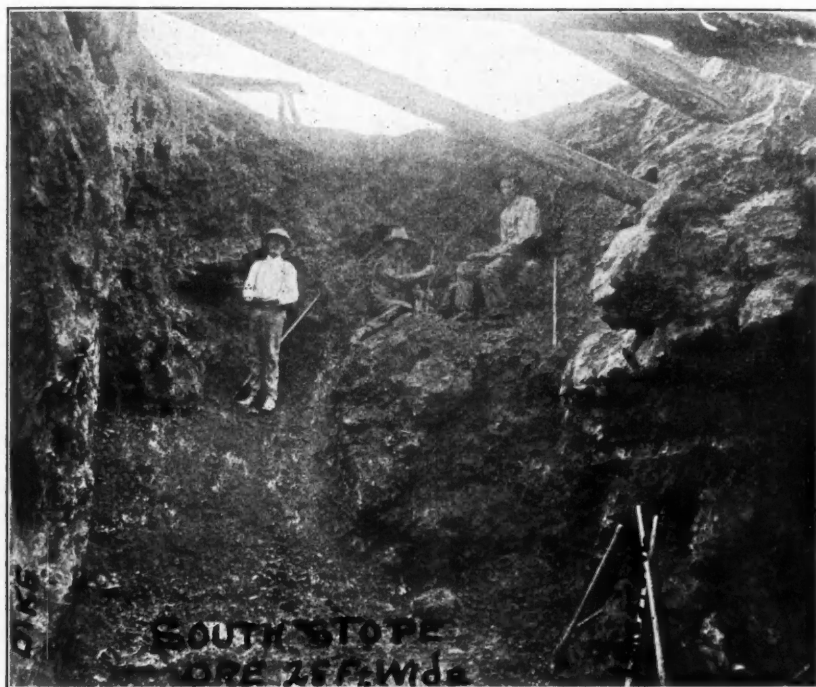
The Blue & Nunn Mine, situated 4½ miles from Marion, the county seat of Crittenden County, Kentucky, is a carbonate of zinc proposition.

The locality is rough; the ridges are very broken, but have a general trend of 15 degrees east of north. They are made up of sub-carboniferous limestone, and are capped with sandstone. The sandstone varies from a fine grained rock, suitable for razor hones and whetstones, to a coarse quartz pebble conglomerate, the latter sometimes cemented with iron ore. The sandstone and limestone strata lie, as a rule, nearly horizontal. The mine is in a depression, a creek bottom, where the contour is especially broken, and where limestone is conspicuous.

The strike of the main or original vein is 30 degrees west of north. It is considered to be a continuation of the old Eureka vein, which has other openings

of sphalerite 6 inches thick were taken out. It is the massive cleavable form, practically the same as the typical Joplin jack or blende, containing about 0.16 Fe. Some of the larger pieces of smithsonite have a core of sphalerite, which has not been altered. The smithsonite may continue in parts of the vein to some depth, as there are three sink holes in the present workings to carry down the surface waters; and, it is not known at just what depth the permanent underground water level will be found.

A surmise as to the origin of the zinc can hardly be ventured, as sufficient geological work and assays of the intrusive dike and country rock have not been made. As the ore body comes within 3 or 4 feet of the surface, and is from 10 to 30 feet wide, it is worked on the open-cut system. The west side of the vein is limestone, the east side altered dike material. The lagging on the east side is kept in place by numbers of timbers braced against the limestone. The vein has been stripped for 300 feet,



SOUTH STOPE, BLUE & NUNN ZINC MINE.



NORTH STOPE, BLUE & NUNN ZINC MINE.

miles north of Stanley Basin, while the same is also true of the Profile, Big Creek and Beaver Creek districts, adjoining the Thunder Mountain District to the north and west, where a number of large veins are receiving considerable attention.

There is, in fact, a considerable amount of development work in progress throughout central Idaho as a result of the influx of people on the Thunder Mountain boom, and new discoveries are of almost daily occurrence.

One of the most important mining news items of this State is the recent discovery of high-grade telluride gold ore in the Boise Basin, a new district near Atlanta in Elmore County.

PIG IRON IMPORTS OF GREAT BRITAIN.

—The imports of pig iron into Great Britain for the eight months ending August 31 were 165,264 tons, of which 8,894 tons were from the United States. For the corresponding period in 1901 the imports were 99,757 tons, of which 28,387 tons were from the United States.

IRON ORE IMPORTS OF GREAT BRITAIN.

—Imports of iron ore into Great Britain for the eight months ending August 31 were as follows, in long tons:

	1901.	1902.	Changes.
Spain .....	3,066,707	4,487,311	I. 420,604
Other countries .....	548,593	772,517	I. 223,924
Total.....	3,615,300	4,259,828	I. 644,528

The other countries include Sweden, Norway, Greece, Algeria and Newfoundland.

about a mile north from the present workings, and where the Columbia and Eureka veins intersect. At this intersection galena was mined during the war and until 25 years ago. There was a primitive smelter operated in connection with the mine. The main shaft of the old Columbia reached a depth of 180 feet. It was cleaned out and re-timbered in 1901.

The field in which the Blue & Nunn Mine is located contains a number of sink holes. There are reasons for thinking that they follow the lines of fracture which first made the fissure and its branches which contain the ore.

It is presumably a true fissure vein, as the others in this district have proved to be, but is peculiar in that a dike of mica peridotite separates the main ore body into two parts. Horizontal flats of flint extend out from the sides into the ore.

At the south end of the vein, where it is being stripped, a branch or cross vein is found to extend as shown in the sketch, except that on the east side it may run parallel with the main vein. The faces of this cross vein are about 10 feet wide.

When the vein is first uncovered, the earth is yellowish, and the smithsonite is coated with limonite. With depth, it becomes darker and a reddish color. On some of the lumps of carbonate is a scale or layer of a white chalky appearing substance which, analysis has shown to be zinc oxide 98 per cent pure, equal to the commercial brand of zinc white. The smithsonite is graded by its size. A little sphalerite has been found from the beginning, and it becomes more abundant as the depth increases. In preparing to lay the track in the bottom of the cut, pieces

and benches with a 20-foot face at the south end, and a 12-foot face at the north end are being carried from the center, toward which the track grades, and from which the cars are hoisted. On reaching the upper platform the car is landed on other tram tracks, and, if filled with ore in pieces as large as a man can handle, is run along a raised track, and the contents dumped on a platform, where men with hammers made for the purpose, clean it. It is then shipped without further treatment, and the best price is obtained for it.

The ore in this vein has not shown a trace of lead, and the presence of considerable quantities of native zinc oxide, gives it an unusually high assay, and makes it desirable ore.

If the pieces of ore are small, say about the size of a man's fist, it is fed into one of two log washers. The dirt next the ore-body taken off in stripping, and that collected in the vein, and crushed from shooting and picking, is also run through a log washer. Thirty tons of this dirt and fine material are run through the washers in a day. A jig of three cells, similar to the Cooley jig, is to be installed shortly to take care of this fine material.

The hoisting is done with a 12-horse-power gasoline hoist, 50 tons of material being taken out in a day with a consumption of two gallons of oil. The log washers are run by a 2½ horse-power gasoline engine, and the water used, a 2-inch stream, is furnished by a pump run by a gasoline engine, being pumped a distance of 600 feet with a 50-foot raise. Altogether, 5 gallons of oil are used per day. The engines are made by the Fairbanks Morse Com-

pany. All the care taken of the pumping engine, is to see that it is oiled every three or four hours. One engineer with one assistant takes care of the hoisting, landing and running off of the cars, and of all the machinery. The capacity of the hoist is about 65 tons a day of 10 hours, but it can easily handle all the material, as only a small per cent of it is gangue.

The superintendent of the mine, Mr. Uren, who for 12 years has been a buyer and contractor for the Mineral Point Zinc Company, and has seen all the smithsonite mines of note in the United States, speaks highly of the grade and quantity of ore. The full extent of ore is not known, as neither the length nor width of the main vein, or the branch, has been

**RECENT DECISIONS AFFECTING THE MINING INDUSTRY.**

SPECIALY REPORTED.

**LIABILITY OF MINE OPERATOR FOR DEFECTIVE APPLIANCES.**—A timber having been lowered down a shaft of a mine to a landing, workmen commenced to haul it to the landing, but it not having been lowered quite far enough, it jammed, and, the order to lower it further being obeyed, it fell, because a defective hook became detached, and killed one of the miners. It was held that, even if the fellow workmen were negligent in getting it jammed, this would not prevent a recovery, where, notwithstanding this, the accident would not have occurred had it not been for

the conduct of the superintendent.—*Sutton v. Consolidated Apex Mining Company* (89 *Northwestern Reporter*, 1020); Supreme Court of South Dakota.

**PARTY NOT ESTOPPED BY ACTION OF HIS ATTORNEY.**—Two parties were the equal owners of two mining claims, and one agreed to advance the other's share of the \$400 necessary to secure a patent, as security for which advance he was to receive the note of the other for \$200 and a trust deed on his interest in the claims. The note and deed were made and left with an attorney to be delivered upon the other party executing and delivering to such attorney a declaration as to the use and purpose to be made of the \$200. The attorney, without the knowledge of the maker of the note and deed, delivered them without receiving the money for the patents or securing them caused the trust deed to be foreclosed and purchased that interest at the sale. It was held that the maker of the note and trust deed was not estopped from asserting that the delivery of same was invalid.—*Davis v. Bower* (68 *Pacific Reporter*, 292); Supreme Court of Colorado.

**RELIEF AGAINST FRAUDULENT REPRESENTATIONS.**—The lessee of an iron mine under a lease by which it agreed to pay a royalty of 6 cents per ton did not succeed, and while negotiating a sale of its plant represented to the lessors that the sale could not be made and mine operated unless the royalty was reduced to 4 cents per ton. Relying on such representations, the lessors agreed to make such reduction. Thereupon the lessee completed the sale and contracted with the purchaser that he should pay it the royalty of 6 cents, as provided in the lease. On discovering the falsity of such representations, the lessors filed a bill against the lessee and the purchaser to cancel such agreement to reduce the royalty, on the ground that it was fraudulently obtained, and for an accounting for the 2 cents per ton for ore mined. It was held that he was entitled to the relief as against the original lessee.—*Lasier v. Appleton Land and Iron Company* (90 *Northwestern Reporter*, 322); Supreme Court of Michigan.

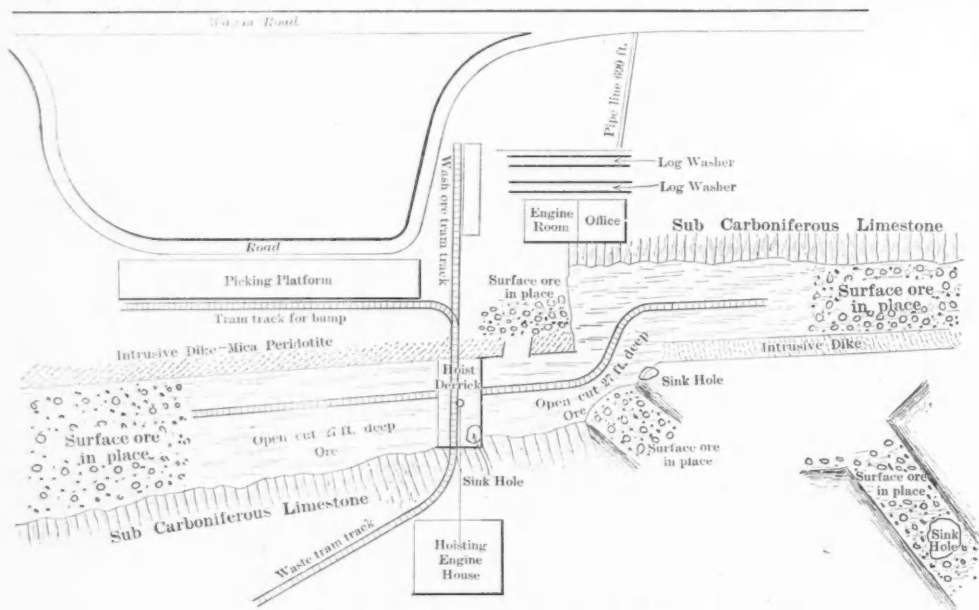
**ABSTRACTS OF OFFICIAL REPORTS.**

*Asbestos and Asbestic Company, Quebec.*

The report of this company, as issued from the London office, covers the year ending March 31, 1902. The directors' report says: "The actual year's trading after providing for director's remuneration and all expenses in London and Danville resulted in a net profit of £1,075. The board of directors found after careful investigation that it was necessary to liquidate the American Asbestic Company, consequently they have been compelled to write off to profit and loss account, under the heading of special items, the shares of the American Asbestic Company, that company's indebtedness for goods purchased, etc., also the stock of 47,402 tons of asbestic on the dump, which had been previously carried at a small valuation. These items, together with some other smaller adjustments of old matters which the board felt it their duty to make, has resulted in the writing off to the debit of profit and loss account an amount of £22,573, which, added to the debit balance from last account of £5,641, makes a total of £28,214; but, deducting from this the actual net profit on the year's working of £1,075, leaves a final debit balance of £27,139.

"The organization of the Asbestos & Danville Railway has been completed and all the stock issued to this company, so the directors consider the original cost of the railway should now be shown under investment account.

"The output of asbestos for the year has been produced by the small temporary plant which was put in after the unfortunate fire, and the percentage of fiber obtained from the rock has been very high. The demand for asbestos of all grades has continued to increase. In accordance with the promise which



BLUE & NUNN ZINC MINE, CRITTENDEN COUNTY, KENTUCKY.

ascertained, and a large quantity of ore has been left in the sides, and where it reaches under the layers of limestone. The smithsonite is known to stop near the permanent underground water level, but no estimate can be made as to the depth that the blende reaches. It is found at 150 feet in other veins in the locality, but has, in no place, been gone through.

The Blue & Nunn Mine made its first shipment June 1 of last year; and, during that year, shipped 1,636 tons.

**NEW COAL FIELDS IN ENGLAND.**—The *London Colliery Guardian* says: "It is understood that the borings for coal on the estate of Mr. Monckton, near Four Ashes, about 5 miles from Wolverhampton, have resulted in the discovery of a good workable coal seam at a depth of 1,800 feet. The steam does not resemble those at Cannock and Essington, but is more like the Thick coal of the Dudley district, although far from attaining the dimensions of the Tenyard seam. This find, following upon that at Himley, is thought to leave no doubt as to the co-relation of the coal fields of South Staffordshire and Shropshire.

**MINING MACHINERY EXPORTS FROM GREAT BRITAIN.**—Exports of mining machinery from Great Britain for the eight months ending August 31 are reported as follows:

	1901.	1902.	Changes.
European countries . . . . .	£54,056	£29,136	D. £24,920
United States . . . . .	904	1,165	I. 261
South America . . . . .	25,805	25,729	D. 76
South Africa . . . . .	73,108	127,713	I. 54,605
East Indies . . . . .	47,714	47,399	D. 315
Australasia . . . . .	88,955	61,593	D. 27,362
Other countries . . . . .	51,353	62,824	I. 11,471
Totals . . . . .	£341,895	£355,559	I. £13,664

The chief features are the large increase in exports to South Africa, and the decreases in those to European countries and to Australasia.

the defective hook which was not reasonably safe. Also, that a miner does not assume the risk from the falling of a timber while it is being lowered into the mine, through the detaching of a hook wholly unsafe for lowering timbers, he not knowing it was to be used for that purpose, though, as he knew, it had been used for the lowering and raising of ore buckets. Under the laws of California (section 1881), providing that a physician cannot, without consent of his patient, be examined as to information acquired in attending such patient, which was necessary to enable him to prescribe or act for the patient, he cannot in an action for death of such patient from an injury, testify for the defendant (the mine operator) from his knowledge of the injuries acquired while attending deceased.—*Keast v. Santa Ysabel Gold Mining Company* (68 *Pacific Reporter*, 7771); Supreme Court of California.

**MEASURE OF DAMAGES FOR BREACH OF CONTRACT FOR COAL.**—In an action for the breach of a contract for the delivery of coal, the allowance of the difference between the prices at which the seller agreed to furnish it and the market price at the time of purchasing coal to take the place of that which he refused or failed to furnish is the proper measure of damage.—*Hercules Coal and Mining Company v. Central Investment Company*. (98 *Illinois Appellate Court Reporter*, 427); Appellate Court of Illinois.

**RIGHT OF LIENOR AGAINST MORTGAGEE.**—The manager and superintendent of a mining company, who was also a stockholder and director of the company, and who as such took part in procuring loans secured by mortgage on the property, and expended the money received in and about the mine, without informing the mortgagee that he claimed a miner's lien for services, is not by such facts prevented from asserting that such lien was prior to the mortgages, where it did not affirmatively appear that the mortgagee was in any manner misled to his prejudice by



Mr. James G. Cannon made to re-equip the mine, the directors have pleasure to state that a large new modern mill, equipped with all the latest machinery for fiberizing asbestos, has been erected on the company's property at Danville, Quebec. The directors are confident that when this new mill is in operation the quality and amount of fiber produced will be largely increased and that substantial savings in the cost of production will result.

"The directors have been able to provide all the necessary money to erect this plant and carry on the business of the company without placing a mortgage on the property, but should the directors feel that an issue of bonds or debenture stock may be necessary later on, they will offer the same to the shareholders first and give preference to their subscription, in accordance with the promise which Mr. Cannon originally made."

*Homestake Mining Company, South Dakota*

This company's report, just issued, covers the operations of its extensive properties in the Black Hills for the year ending June 1, 1902. The report does not give very full accounts of the working of the mines, and contains no details of costs.

The bullion and mill statement shows that there were 1,218,089 tons of ore milled during the year. The product was bullion containing \$3,747,408 in gold and \$28,497 in silver; in addition \$537,724 in bullion was returned from the cyanide plant and \$430 from concentrates; a total of \$4,314,059. Deducting \$10,082 mint charges, left a net bullion return of \$4,303,977, or \$3.53 per ton milled. Miscellaneous receipts were \$72,453, bringing the total working receipts up to \$4,376,427, or \$3.60 per ton.

From the manner in which the accounts are stated it is difficult to analyze the expenses closely, but an approximate statement may be made as follows:

	Total.	Per ton.
Working receipts as above.....	\$4,376,427	\$3.60
Working expenses .....	4,017,131	3.31
Balance .....	\$359,296	\$0.29

In expenses are included all repairs and extensions, new machinery and similar charges.

In a similar way, by collecting and analyzing the charges the income account may be stated as follows:

Net balance, as above .....	\$359,296	
Bills payable .....	300,000	
Black Hills and Fort Pierre R. R.....	1,091,037	
New capital stock .....	630,000	
Superintendent's cash .....	10,039	
Drafts outstanding, etc. ....	210,407	
Total .....	\$2,600,779	
Dividends .....	\$1,260,000	
Property purchased .....	302,452	
Bills payable paid.....	750,000	
Balance from previous reports.....	288,327	
Total .....	\$2,600,779	

The new capital stock issued was 8,400 shares, sold at \$75 per share. The Black Hills & Fort Pierre Railroad was sold to the Chicago, Burlington & Quincy Railroad Company.

The company had 7 mills in operation during the year, the tonnage worked in each and the expenses charged to each being as follows:

Mill:	Tons.	Charges.	Per ton.
Homestake .....	287,134	\$119,612	\$0.42
Golden Star .....	288,310	108,206	0.38
Amicus .....	193,015	94,086	0.49
Deadwood Terra .....	169,435	103,510	0.61
Mcroe .....	139,200	78,029	0.56
Mineral Point .....	83,705	109,804	1.31
Pocahontas .....	57,290	25,044	0.44
Total .....	1,218,089	\$698,291	\$0.52

The Mineral Point mill was in operation only eight months of the year, and the Pocahontas three months.

Superintendent T. J. Grier's report says: "I have to report everything about the property of the company in good condition and running smoothly. During the past twelve months 100 stamps were added to the company's milling facilities, so that at this writing 900 stamps are dropping on ore from the mine. Three months ago the installation of a Riedler pump at the 1,100 level of the mine was completed and the pump started. The mine is now equipped with pumping facilities in duplicate. The Ellison shaft was sunk 100 feet, is now 900 feet deep and is being

sunk further. None of the other shafts on the property has attained greater depth than was reported a year ago. A second large cyanide plant is in course of erection at the north end of the property, and will start about the latter end of August on tailings from the three mills, containing 360 stamps there located. Preparations are in progress looking to the installation at the Ellison hoist of a large compressor, with boilers to run it, in order to supply the deficiency in air felt in operating additional drills to supply with ore the additional stamps started during the past two years."

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail prices. These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

*Western Australia. Preliminary Report of the Department of Mines for the Year 1901.* H. S. King, Under Secretary for Mines. Perth, W. A.; Government Printer. Pages, 44.

*Report of the State Board of Geological Survey of Michigan for the Year 1901.* Alfred C. Lane, State Geologist, Lansing, Mich.; State Printers. Pages, 304; with maps and illustrations.

*Twelfth Census of the United States. Manufactures. Part III. Special Reports on Selected Industries.* Prepared under direction of S. N. D. North, Chief Statistician for Manufactures. Washington; United States Census Office. Pages, 1116.

*Anuario de la Minera, Metalurgia y Electricidad de España, 1902.* Prepared under the direction of Don Adriano Contreras. Madrid, Spain; published by the *Revista Minera*. Pages, 576.

*American Chamber of Commerce in Paris. Year book for 1902.* Paris, France; published by the Chamber. Pages, 110.

*Report on a Geological Reconnaissance of Cuba, made under Direction of Gen. Leonard Wood, Military Governor, by C. Willard Hayes, T. Wayland Vaughan and Arthur C. Spencer.* Washington; published for the War Department. Pages, 120; with maps and illustrations.

*United States Geological Survey. Utilization of Iron and Steel Slags.* By Edwin C. Eckel. Pages, 18.

*Manufacture of Coke in 1901.* By Edward W. Parker. Pages, 78. Washington; Government Printing Office.

BOOKS REVIEWED.

*Coal-field of Recherche Bay, Tasmania.* By W. H. Twelvetrees, Government Geologist, Hobart, Tasmania; Government Printer. Pages 16; with map.

This is a monograph giving the result of a special examination of the district named by the State Geologist. It is one of many similar reports issued by the Mines Department of Tasmania on different sections of the State, and is of much interest to those concerned in the development of its resources.

*Record of the Mines of South Australia, Tarcoola and the Northwestern District.* By H. Y. L. Brown, Government Geologist. Adelaide, South Australia; Government Printer. Pages, 32; with maps.

The Northwestern District of South Australia is comparatively new mining territory, actual development work, having been carried on only to a small extent, though there has been a great deal of prospecting done, and a number of companies have been organized to exploit mines there. Gold and copper are the more important metals found, and it is believed that a considerable production of both can be made.

*Les Convertisseurs pour Cuivre.* By Paul Jannetaz. Reprinted from the *Memoires* of the Civil Engineers' Society of France. Paris, France; Ch. Beranger. Pages, 56; illustrated.

The monograph is a reprint of a paper read by the author before the Society of Civil Engineers of France. After a brief description of the methods formerly in use for refining copper mattes, it gives a description of the various forms of converters, including the machinery in use, the method of application and the chemical changes involved. American practice is very fully treated, and it is a fairly complete account of the converter and its uses.

*En Indo-Chine. Du Sous-Sol.* By J. Mare Bel, Paris, France; Societé de Geographie Commerciale. Pamphlet, 20 pages.

This a reprint of a paper read by the author before the Societé de Geographie Commerciale at Paris. It is a general account of the economic geology of French Indo-China and the possibilities for the development of its mineral resources. It is necessarily very much condensed in form, but points out the existence of mineral deposits carrying gold, tin, copper, zinc, antimony, lead and iron. Of these only the coal deposits are now worked to any extent. The pamphlet contains also an address by M. Donmer, Governor of the colony, on the same topic.

*Twentieth Annual Coal Report of the Illinois Bureau of Labor Statistics, 1901.* David Ross, Secretary of Bureau. Springfield, Ill.; State Printers. Pages, 322.

This report covers the production of coal in Illinois for the year ending June 30, 1901, and gives also statistics concerning labor, accidents and the general condition of the coal mines. Besides the general report and summaries, it contains the reports of the district inspectors, which go into a great deal of detail. A supplement gives an account of the working of the free employment offices established in Chicago and Peoria, under the authority of a law passed some three years ago.

*British Columbia. Annual Report of the Minister of Mines, 1901.* William Fleet Robertson, Provincial Mineralogist. Victoria, B. C.; Public Printer. Pages, 348; with maps and illustrations.

We have already given extracts from this volume showing the general results of British Columbia mining in 1901. We can only add here that, in addition to the statistical chapters, the report contains a variety of detailed information with regard to the different mining divisions of the Province and the work done in them during the year. The publication will be of much service to the mining industry of British Columbia, and to all who are interested in it, or propose to invest in mines there.

*American Electrochemical Society. Transactions of Inaugural Meeting, 1902.* Charles J. Reed, Secretary. Philadelphia; Published by the Society. Pages, 252; illustrated.

The electrochemists who organized this society at the initial meeting in Philadelphia in April last seem to realize how wide and important a field is open to them. Apart from the work of organizing the association, time was found at the meeting for the presentation of a number of interesting and important papers on different branches of electrochemical work. The extent and variety of the applications of electricity to chemical work which are already in use, and the probability of a great extension of such applications, make the new society one which can do important work. This first volume may be taken as a promise of many even more valuable ones in the future.

*Subject Matter Index of Mining, Mechanical and Metallurgical Literature for the Year 1900.* Compiled under direction of M. Walton Brown. Newcastle-upon-Tyne, England; published by the North of England Institute of Mining and Mechanical Engineers. Pages, 200. Price (in New York), \$14.50.

This index is intended to give a list of all publications of the classes named which appeared during 1900 in technical journals or proceedings of societies.

The titles of the papers are arranged by subjects and by countries, with numbered references to the journals or transactions in which they were published. A general index of authors' names is added. It seems to us that the index would have been improved if the names of journals and societies had been given in the text. As it is, those names are indicated by numbers, which makes it necessary to refer constantly to the numbered list, and wastes a good deal of time. By the use of proper abbreviations the addition of the names would have added very little to the size of the book, and very much to the convenience of those who use it. The use of year dates instead of or in addition to volume numbers in referring to periodicals would have been an improvement. The index represents an enormous amount of work, which seems to have been very carefully performed.

*Moody's Manual of Corporation Securities.* Third Annual Number, 1902. Edited by John Moody. New York; John Moody & Co. London; Effingham Wilson. Pages, 2248. Price, \$7.

This volume is intended to hold the same position with regard to industrial and similar stocks that *Poor's Manual* has so long held with railroad securities. The intention is a good one, although it is certain that it is difficult for a single publication to cover it. The present is the third volume, and certainly shows a very great improvement over its predecessors. The contents include, in the first place, a list of the members of the stock exchanges in all the principal cities of the United States. The second section is devoted to government securities, American and foreign included. The third section covers steam railroads, and it seems to us if this section had been omitted and the space and work devoted to it had been distributed among the other sections it would have been better, since it is impossible to give in the 400 pages devoted to these sections anything like the full information which can be found in *Poor*. The fourth section covers gas, electric light and water companies. The fifth section contains a list of telephone, telegraph and cable companies. The sixth section includes miscellaneous industrial corporations, the seventh, mining and oil companies, and the eighth financial institutions in cities. The mining companies occupy 104 pages, and, while the list has been very much improved from that given in the first volume, it is still not a complete one. We do not wonder at this, since we realize the difficulty in making anything like a full list of this kind, but we think nevertheless, that the list might have been considerably extended. So far as time has permitted an examination, it is correct so far as it goes, although some companies have been included in it which a stricter examination might possibly have decided the compiler to omit. The improvement, however, is encouraging, and we hope it will continue in the future numbers.

*California State Mining Bureau; Bulletin No. 23, Copper Resources of California.* By Lewis E. Aubury, State Mineralogist, Sacramento, Cal.; State Printing Bureau. Pages, 282; with maps and illustrations. Price, 50 cents.

We have heretofore published some extracts from this *Bulletin*, which is one of the most important ever published by the Bureau. For the first time it has put into collected form the facts concerning the copper resources of the State, the extent of which had hardly been realized. Besides a general view of the subject, it gives a great deal of information about individual mines and ore deposits. As State Mineralogist Aubury says in his introductory letter, the purpose which has guided the field and office work of which this bulletin is the product has been primarily that of setting forth the practical and economic facts that could most readily afford to the people of the State, and to others elsewhere, a comprehension of the extent of the copper resources, the condition and prospects of the copper industry at this early stage of its development, and the opportunities open to capital and enterprise. In pursuance

of this policy, the purely scientific and technical phases of the subject have been given but small and incidental attention. The value that would attach to the results of special research in the geology and mineralogy of the widely distributed and much varied copper deposits of the State, and to expert expositions of technical features, is fully recognized, but a fair apportionment of the time and resources of the Bureau did not permit the work to take this direction. What has been sought is to give a general understanding of the status and significance of the copper industry and a brief descriptive account of the principal copper mines and prospects that seem worthy of present attention. It is hoped that the chief object of this bulletin, that of stimulating the development of the copper resources by both home and foreign enterprise, will be in a measure gained.

The field work on this bulletin began in July, 1901. During the succeeding months, field assistants visited every county in the State. Every facility was granted the assistants in making inspection of mines and prospects, except at a few of the larger properties, and the obtaining of necessary information regarding the latter and of supplementary information along various lines caused the issuance of the bulletin to be delayed somewhat. The assistants who have gathered the data here presented were P. C. DuBois, F. M. Anderson, J. H. Tibbits, G. A. Tweedy, Marion Aubury and J. O. Denny.

Appropriately following the recent organization of the American Electrochemical Society, comes the initial number of a new journal called *The Electrochemical Industry*, to be published on the first of each month. Its character is vouched for by Dr. J. W. Richards as president of the publishing company. Dr. E. F. Roeber is editor and Mr. Herbert W. Pool manager. The initial issue calls attention to the great proportions which the application of electro-chemistry have assumed in the United States, and to the fact that the industry lacks a journalistic exponent in this country. The promise to make this new journal authoritative in its interesting field is made good in the first number by valuable articles by Professors J. S. Peck, Carl Hering, C. F. Burgess and several others, as well as by a general article on the "Industries of Niagara Falls," by Dr. J. W. Richards, president of the American Electrochemical Society. The press work and illustrations are creditable. THE ENGINEERING AND MINING JOURNAL wishes every success to the new enterprise.

#### CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested. Letters should be addressed to the MANAGING EDITOR. We do not hold ourselves responsible for the opinions expressed by correspondents.

#### Gold Mines of the Transvaal.

SIR:—In your article upon the "Gold Mines of the Transvaal," page 3, of your issue of July 3, you state: "The mines actually producing extend a distance of about 12 miles along the reef. The whole length of the so-called outcrop is nearly 30 miles, but the eastern and western sections are not yet fully tested, and exploitation is confined to the central section. It is quite possible, however, that valuable mines may be made beyond the limit of that section." This statement is not quite correct. The length of known outcrop of the Main Reef Series of the Witwatersrand is 46.87 miles, and the mines actually producing extend a distance of 36.1 miles along that outcrop, or three times the length you have stated. It is perfectly true that the majority of the gold has been obtained from what is termed the Central Section of the Rand, extending from the Langlaagte Estate Company, 1½ miles west of Johannesburg, to the Witwatersrand (Knights) Company, 10¼ miles to the east. That is to say, 11¾ miles of the Rand have produced three-quarters of the entire gold output; at the same time, the yield

from the sections on either side of this area are not to be despised. The eastern flank from Knights Gold Mining Company to Modderfontein Gold Mining Company, inclusive, has produced to date £6,230,106, and the western flank from the Paarl Central Gold Mining Company to Randfontein Estates and Gold Mining Company, inclusive, has produced £11,863,539. These two areas had therefore up to December 31, 1901, yielded £18,093,645. There are a number of very payable mines on either side of what has been termed the Central Section of the Rand, notably the Angelo, Dreifontein Consolidated and New Comet companies of the East Rand Proprietary Mines, Limited, to the east, and to the west the mines in the Roodepoort District, the Champ d'Or, the South Randfontein, and others in this vicinity. There is also no doubt that many other payable mines will be opened out in these two sections of the Rand during the next 10 years.

You state: "The mills are generally large, most of them having 100 stamps or more." While it is true the tendency is toward larger mills, the accepted unit being 200 stamps for the great majority of the deep-level properties, as a matter of fact at present more than one-half of the mills are of 60 stamps or less, since out of 77 stamp mills in operation in 1899, a total of 43, or about 56 per cent, contained but 60 stamps or less.

I am glad to note you extend the life of the Witwatersrand to "from 30 to 40 years," and I think had you made it from 40 to 50 years you would have been nearer the mark.

THOS. HAIGHT LEGGETT.

Johannesburg, Aug. 18, 1902.

#### The Algoma Colliery Explosion in West Virginia.

SIR:—In the newspaper account of the explosion in the Algoma Colliery, at North Fork, in the Flat Top field of West Virginia, which occurred on the morning of September 15, mention is made of six kegs of blasting powder which had been stored in the mine. This powder spoken of, the explosion of which must have greatly increased the force of the gas and dust explosion, was in the mine in direct violation of Section 10 of the amended mining law of the State, to which the attention of the miners has been called without avail, especially since the disastrous occurrence at the Baby Mine, at Pocahontas.

All the companies operating the Pocahontas-Flat Top field have posted printed regulations in conspicuous places about their works, which prescribe the duties of employes and call their attention to the important provisions of the amended law, but only a small percentage of the miners take the trouble to read, the general sentiment appearing to be "to — with the law."

The text of the law in regard to powder is as follows:

"No miner or other employe shall take into the mine in this State any larger quantity of powder or other explosive than he or they may reasonably expect to use during their term of employment of one day of twelve hours."

I doubt if 5 per cent of the miners in the entire field pay the slightest attention to this clause, yet an examination of the records of accidents will show that a large percentage of those in the Flat Top field are due to powder explosions.

An accident, which might have been far more serious than it was occurred a little over a year ago at a mine in the Thacker field, not many miles from North Fork. On a Sunday, during the temporary absence of the manager and without his knowledge, 25 kegs of powder were taken into the mine behind an electric motor. Perhaps it would have been safe on a Monday or even a Friday, but nevertheless the entire load exploded.

The individual miners almost invariably carry their full keg of powder into the mine and store it near their working place, unless, perhaps, they fear its being stolen.

The responsibility naturally rests upon the bank boss, who is supposed to exercise direct super-



vision over the miners. Probably the majority do their duty as well as they can, though there are bound to be some incompetent ones under the present system.

A partial remedy for this evil would be a further amendment of the West Virginia State mining law, providing for the examination and certification of all bank bosses and fire bosses, with a possible gradation such as first, second and third-class certificates.

With such a law in operation, the mines would undoubtedly be safer, and the truly competent mine bosses would be able to command salaries in accordance with their abilities.

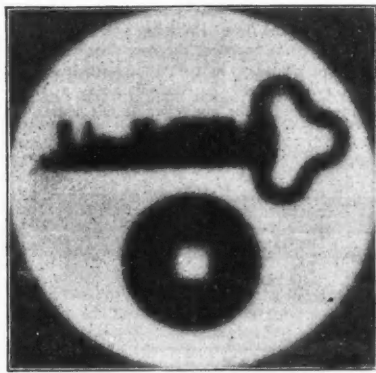
WM. B. MCKINLAY.

New York, Sept. 16, 1902.

*Radio-Active Elements.*

SIR:—Upon reading a paper in the August number of *Harper's Magazine*, by Robert Kennedy on "Radio-Activity," it occurred to the writer to test some uranium ores from the mines of Welsh, Loftus & Co., at Richardson, Utah, for this new property of matter.

The results were, much to my surprise, highly successful. The enclosed is a copy of one of several radiographs which I have made by exposing a photographic plate securely sealed from light in a plate holder by the hard rubber slides, to the ac-



RADIOGRAPH.

tion of 100 grams of the ore concentrated in the form of an impure uranate of soda, for a period of 48 hours. I have also obtained good results by using the same amount of crude ore for the same period of time. The key and Chinese coin were placed on the rubber slide and covered by the uranium salt, which was confined within the circular area by a metal pin.

The radio-active element, as is the case with uranium, is precipitated from its solutions by sodium carbonate, and the precipitate is soluble in an excess of the reagent. Accordingly, it appears to act in the same manner as thorium, and not like bismuth or barium, from which one might conclude that the element was actinium.

STEPHEN T. LOCKWOOD.

Buffalo, N. Y., Sept. 22, 1902.

**QUESTIONS AND ANSWERS.**

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

*Ilmenite.*—We know of a large deposit of ilmenite. Has this mineral any commercial value, and if so, for what special purpose is it used?—S. G.

Answer.—Ilmenite is a titaniferous magnetite, or magnetic oxide of iron. It is found in large quantities in several localities in the United States and Canada. There is no use for it at present, and it has no commercial value.

*Locomotives in Russia.*—Can you give me any idea of the number of locomotives in Russia? Also whether they are all of foreign construction?—D. B.

Answer.—A recent official report states that on all the Russian railroads, with the exception of the Finland State lines and the Trans-Baikal and Ussuri sections of the Siberian Railroad, there were in use in 1901 a total of 12,187 locomotives. Of these locomotives 7,421, or 61 per cent, were built in Russia and 4,766, or 39 per cent, in foreign countries.

*Mica.*—What is mica generally used for, besides stove windows? Can spotted mica be sold at a paying price? Is there a combination or trust in this article?—J. F. H.

Answer.—These questions have been so frequently answered in our columns that we can give little space to them here. There is now an extensive use for mica in the electrical industries, where it is employed for insulating purposes. For this class of work the color of the mica is of little importance, but it must be of even thickness and free from cracks and flaws. For stove work the color is, of course, an important point. By spotted mica we presume our correspondent means mica which is clouded or streaked in color. The price of this would depend upon its freedom from defects and upon the size of the sheets which can be furnished. There is no "trust" or combination in the mica business, though dealers' price lists generally agree. For electrical purposes all the large electrical companies are buyers, and the best way is to submit samples to them.

**DESULPHURIZING PROCESS FOR COAL BEFORE COKING.**

BY OSCAR DAUBE.

A difficulty in the production of good metallurgical coke is frequently the high percentage of sulphur in coal that would otherwise make an ideal coke. Many efforts have been made to eliminate this objectionable element, and have been unsuccessful, particularly where the sulphur occurs in organic combination.

Results of tests recently made for the Dominion Iron and Steel Company in connection with the Otto-Hoffman by-product coke ovens at Sydney, having for its object the reduction of sulphur in the coal, are of interest. It is well known that all Cape Breton coals carry an excess of sulphur, running on an average about 2½ per cent. It is otherwise a fair coking coal, although from being somewhat high in volatile matter the coke is porous and does not bear well in large modern furnaces.

An average analysis of unwashed coal shows: Carbon, 75.10 per cent; ash, 5.84; sulphur, 2.75. The sulphur by washing is reduced to about 1.35 to 1.50 per cent, and the resulting coke generally runs from 0.10 to 0.15 per cent higher than the coal, showing that no material reduction of sulphur in the coking occurs after washing the coal. These observations and figures were obtained from the Dominion Iron and Steel Company, but it may be stated that coal from the same seam washed and supplied to the New England Gas and Coke Company, Everett, Mass., and coked in the same type of oven runs on an average 2.5 per cent sulphur in the coal and 2.25 per cent in the coke.

The average yield of coke in eight consecutive days was 67 per cent coke, 7 per cent breeze, the coke showing an average of 78.96 per cent carbon and 1.44 per cent sulphur, as follows:

Carbon.	Sulphur.
75.80.....	1.33
76.87.....	1.59
80.82.....	1.67
83.16.....	1.39
79.39.....	1.46
75.20.....	1.23
78.24.....	1.53

Average 78.96 per cent. Average 1.44

These figures are given in order that they may be

compared with results obtained after the desulphurization process was applied. In the first test a charge of 12,300 pounds of coal was used. Half of the coal was washed and half unwashed. The charge as mixed contained 1.66 per cent S. The time occupied in the process was 1 hour and 10 minutes. After desulphurizing the charge was coked, yielding 67 per cent coke and 2½ per cent breeze. Analysis of the coke showed carbon 89.25 per cent; volatile matter, 3.7 per cent; sulphur, 1.27 per cent, indicating a reduction of 0.39 per cent in the sulphur contents. A second test was made with 12,600 pounds of wet coal containing 9.4 per cent moisture and 1.74 per cent S. The resultant coke (72.5 per cent yield) contained carbon, 87.6 per cent; volatile matter, 4.4 per cent; sulphur, 1.28 per cent; showing a reduction of 0.46 per cent in the sulphur contents.

The tests were made without any change in the ovens, and after desulphurizing the charge was coked as under ordinary conditions.

The desulphurizing process does away with the expensive washing plant and avoids loss in coal and the charging of wet coal into the hot ovens. It also prevents the dilution of the gas liquor by the moisture in the coal coming over as condensed steam from the oven into the condenser.

**PATENTS RELATING TO MINING AND METALLURGY**

UNITED STATES.

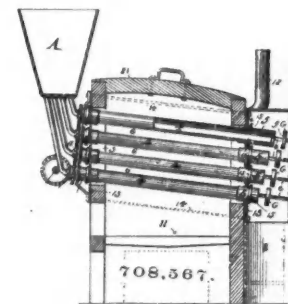
The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon receipt of 25 cents.

Week Ending September 9, 1902.

708,532. MOLD FOR MAKING CEMENT STONE.—Robert B. Coltrin, Jackson, Mich. The combination with a mold, of a two-part member forming a series of cores, the core at one end of the series being closed and the core at the opposite end being open.

708,561. PROCESS OF SEPARATING ALUMINA FROM SILICA.—Adolf Kayser, Buffalo, N. Y. A process which consists in heating a mixture, containing alumina, silica, lime and soda in the proportion of two molecules of soda to one molecule of alumina and two molecules of lime to one molecule of silica, to a cindering temperature and leaching out the aluminates of soda thus formed.

708,567. APPARATUS FOR SEPARATING METALS FROM THEIR ORES.—Warren A. R. Loose, Provo, Utah. In an apparatus for separating metals from their ores, the combination with a muffle, of a shield adjustable toward and



from the discharge end of the muffle and having a sight-opening to afford inspection of the interior of the muffle while the ore is being reduced, and means inclosing the end of the muffle and the shield.

708,580. ANTI-FRICTION METAL ALLOY.—Harry Pearce and Eyre F. Ievers, Buenos Ayres, Argentina. An anti-friction metallic alloy composed of lead, antimony, tin, copper, wrought-iron, and cast-iron.

708,584. PIGMENT.—Alexander S. Ramage, Cleveland, Ohio. A pigment consisting of the light, yellow, hydrated basic, ferric oxide, having the formula Fe<sub>2</sub>O<sub>3</sub>Fe<sub>2</sub>(OH)<sub>6</sub>, impregnated with an independent coloring agent.

708,585. PROCESS OF TREATING FERROUS LIQUORS.—Alexander S. Ramage, Cleveland, Ohio. A process of treating ferrous liquors, which consists in precipitating therefrom a yellow, hydrated basic, ferric oxide, containing occluded oxygen, and calcining said oxide by heating it to a temperature sufficient to cause the occluded oxygen to react on the oxide with evolution of heat.

708,587. DREDGE-BUCKET.—Arthur W. Robinson, Montreal, Canada. A bucket the back of which is composed of a single continuous casting having a horizontal stiffening-flange near its upper edge and means for the direct attachment of the hoisting-tackle to said casting.

708,588. BOOM FOR DREDGES, EXCAVATORS, ETC.—Arthur W. Robinson, Montreal, Canada. The combination of a boom having a tapering form and rigidly attached at its larger end to a turn-table, the turn-table itself, feet on the under side of the turn-table and a rotatable collar supported about a fixed center and provided with sockets adapted to receive said feet.

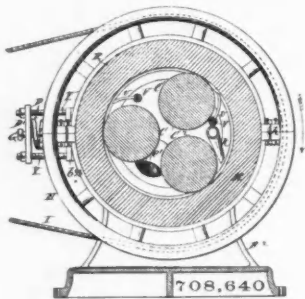
708,589. HOISTING-GEAR FOR DIPPER-BUCKETS FOR USE UPON DREDGES, STEAM-SHOVELS, ETC.—Arthur W. Robinson, Montreal, Canada. A hoisting-gear embodying a doubled hoisting-rope and five guiding-sheaves over the turn-table, three of them equally spaced and horizontally arranged, the central one lying between the hoisting-ropes, and two vertically arranged, and a turn-table which directly or indirectly supports all of said sheaves.

708,590. STEAM-SHOVEL, ETC.—Arthur W. Robinson, Montreal, Canada. The combination of a boom rigidly attached to a turn-table the turn-table itself and a hoisting-engine and drum located upon the boom and centered about the axis of revolution thereof.

708,599. TRAP FOR AMALGAM.—George R. Tuttle, Grass Valley, Cal. An amalgam-trap comprising a plate having a recess therein, and a cell in said recess comprising a tubular body portion and a partition therein, said body portion and partition being composed of dissimilar metals.

708,615. ORE-ROASTING APPARATUS.—Aron M. Beam, Denver, Colo. The combination with the source of heat, and a stack, of a shell mounted to rotate, a conveyor located therein and connected to rotate therewith, the relative size of the shell and conveyor being such that a chamber surrounding the conveyor is formed, said chamber being in communication with the source of heat at one extremity and with the stack at the other extremity, but having no communication with the interior of the conveyor, a spiral partition located between the shell and conveyor to cause the heat to travel in a spiral path through the intervening chamber, means for feeding the ore to the conveyor at one extremity, and means for discharging the ore therefrom at the opposite extremity.

708,640. PULVERIZER.—Alburtis C. Hilsinger, New York, N. Y., and Adin W. Hilsinger, Orange, N. J., assignor to Calvin Amory Stevens, New York, N. Y. The combination of a rotatable crushing-ring to the periphery of which



the power is applied directly, two internal crushing-rolls with fixed bearings arranged to oppose the power applied to the ring, and a crushing-roll having two movable bearings connected with springs which allow the said roller to yield to the material under treatment and to distribute and equalize the strain.

708,669. APPARATUS FOR RAISING LIQUIDS BY MEANS OF STEAM OR COMPRESSED AIR.—Albert Scholl, Mannheim, Germany. The combination of a pressure vessel having a compressed-air space at its upper part and inlets for liquid and compressed fluid and an outlet for the liquid to be raised, a stand-pipe extending into said vessel and in communication with said air-space, a valve in said compressed-fluid inlet a valve-plate rigidly connected with said valve and adapted to close communication between said stand-pipe and air-space and opening the compressed-fluid valve on overpressure existing in the vessel, and means for putting the pressure vessel into communication with the atmosphere on cessation of overpressure therein.

708,705. FURNACE FOR HEATING AND MELTING IRON, ETC.—Henry L. Gantt, Fountain Hill, Pa. A furnace comprising regenerators for air, a heating-chamber, waste-gas-burning chambers respectively connecting on one side with the space at the end of the regenerator checker-work, and on the other side with the heating-chamber, and that act as dust-collectors to protect the regenerators, means for introducing into the heating-chamber a finely-divided or attenuated fuel that is burned in suspension in said chamber, and a passage, connecting the waste-gas-burning chambers, through which part of the incoming heated air passes, and which is of such cross-sectional area as compared with the passages between the combustion-chambers and the heating-chambers that the incoming heated air passing to the heating-chamber is of such volume as to produce therein a partial combustion only of the fuel the

unconsumed parts of the fuel leaving the heating-chamber being completely burned in the waste-gas-burning chambers.

708,713. HOISTING APPARATUS.—Charles W. Hunt, West New Brighton, N. Y. The combination of a trolley, a support therefor, a hoisting-rope, a rope for effecting movement of the trolley on its support, operating means for said ropes, and a trolley-brake or holding device in operative relation with one of said ropes.

708,717. WATER-PURIFYING APPARATUS.—Cass L. Kennicott, Chicago, Ill., assignor to Kennicott Water Softener Company, Chicago, Ill. The combination of a precipitating-tank, a chemical-solution tank therein having its upper portion serving as a mixing-chamber and provided with an overflow into said precipitating-tank, and a water-supply source with a discharge opening into said mixing-chamber.

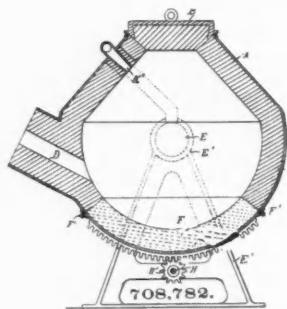
708,763. MACHINE FOR PERFORATING PIPES.—Edwin R. Graham, Bakersfield, Cal. The combination of a rod adapted to be reciprocated within a well-casing, a mandrel or spreader carried on said rod, a block having a series of radially-operating knives or punches disposed in relation to said mandrel, means by which said block may be supported at any desired point in the casing and means by which the mandrel may be supported out of contact with the knives.

708,728. ROASTER.—James A. Ogden, Philadelphia, Pa., assignor of one-third to Charles H. Cornell, Valentine, Neb. The combination, in a roaster, of a furnace having a flue, an inclined plate situated in said flue, supports for said plate, swinging links connecting said plate with said supports, and mechanism for positively moving said plate in one direction, and means for suddenly checking its motion in the other.

708,759. ENDLESS CONVEYOR.—James M. Dodge, Philadelphia, Pa., assignor to the Link Belt Engineering Company, Philadelphia, Pa. The combination of a chain, means for driving said chain, carriers pivoted thereto, the pivot of each carrier being longitudinal, and means for allowing the carriers to swing on their pivots below the carrying level to discharge their loads.

708,778. BRICK-PRESS.—Joseph J. Nieters, St. Louis, Mo. The combination with a hopper, of a mold-wheel provided with pockets in its periphery, plungers arranged in the bottoms of said pockets, and a cam for holding said plungers in their outermost position when they enter the hopper and for permitting said plungers to occupy their innermost position as they leave the hopper.

708,782. MELTING-FURNACE.—Edward H. Schwartz, Chicago, Ill., assignor, by direct and mesne assignments, of two-thirds to the Hawley Down Draft Furnace Company, Chicago, Ill. A furnace comprising side walls, a vent-



opening through one wall and a burner discharging into the furnace through an opening distinct from the vent-opening, the side walls being arranged to cause the flame to sweep downwardly and thence across the hearth or bottom of the furnace and out through the vent-opening.

708,783. METHOD OF MELTING AND TREATING METALS.—Edward H. Schwartz, Chicago, Ill., assignor to the Hawley Down Draft Furnace Company, Chicago, Ill. A method of melting metals which consists in combining a plurality of flame-jets into a single flame, giving this flame a whirling movement and bringing it into contact with the metal to be melted.

708,840. PROCESS OF RENDERING ALUMINUM CAPABLE OF BEING WELDED OR SOLDERED.—Christen P. Sorensen, Copenhagen, Denmark. A process for rendering aluminum capable of being soldered, which consists in first heating the metal to about 300° C., then subjecting it to the action of concentrated soda-lye, and finally rinsing with cold water.

708,851. AIR-FEEDING APPARATUS FOR FURNACES.—Herbert Abbott, Balmain, near Sydney, New South Wales, Australia. The combination of a furnace having an upright passage opening at its upper end, into the atmosphere, a pipe connected with the lower end of said passage and extending forwardly therefrom, its forward end being situated under the grate and having a series of openings, an upright pipe substantially coextensive with said passage, the lower end of the pipe being provided with a forwardly-extending portion substantially coextensive with said other pipe and its forward end being situated above the grate, and means for delivering steam into the upper ends of said upright passage and upright pipe, respectively.

708,788. PROCESS OF COATING METALS PREPARATORY TO BEING HEATED.—Heinrich Wachwitz, Hersbruck, Germany, assignor of one-half to Moritz Dünkelsbühler, Nuremberg, Bavaria, Germany. A process of welding metals, which consists in rubbing the surface of the metals with metallic aluminum, so as to cause a thin coating of the same to adhere to such metals and thereby prevent their oxidation, during the subsequent heating, and then suitably heating and welding together said metals.

708,897. OIL-WELL PUMP.—Samuel W. Meals, Waynesburg, Pa. An oil-well pump having a plunger, a spring device in the well, means carried by the plunger for engaging said spring device, and a disengaging device for said means.

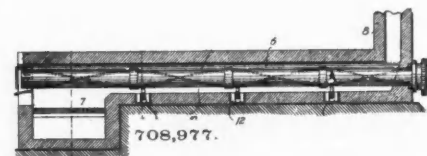
708,921. PROCESS OF MANUFACTURING CALCIUM CARBIDE.—Isaiah I. Roberts, New York, N. Y. A process of manufacturing carbide of calcium which consists in the admixture of lime and finely-granulated anthracite coal.

708,941. MANUFACTURE OF IRON AND STEEL.—Frank J. Tone, Niagara Falls, N. Y., assignor to the Carborundum Company, Niagara Falls, N. Y. An improvement in the art of making iron and steel, the improvement which consists in adding to molten iron or steel silicon in its elemental form.

708,970. APPARATUS FOR TREATING AND TINNING PLATES.—James R. Phillips, Pittsburg, Pa., assignor to the American Tin Plate Company, Pittsburg, Pa. The combination with a tank arranged to contain liquid for treating plates, of tinning-pots in proximity thereto, mechanism for feeding the sheets through the liquid, and a switch device arranged to transfer the sheets laterally from the liquid to the tinning-pots.

708,972. ATTACHMENT FOR DISINTEGRATORS.—Charles J. Samuelson and Eugene M. Johnson, Calders Station, Utah. A scraper consisting of two members one of which is secured to the periphery of the rotary cage of a disintegrator.

708,977. COMBINED ORE-ROASTING AND FUME-SAVING APPARATUS.—William H. Motter, Denver, Colo. In a roasting-furnace, the combination with a source of heat and a chamber in communication therewith, of a rotary conveyor located in the chamber, a hollow feed-screw connected with the conveyor at one extremity, a per-



forated pipe concentrically arranged in said conveyor and passing through the feed-screw, and means connected with said pipe outside of the furnace, for drawing off the fumes rising from the ore during the roasting operation.

REISSUE NO. 12,028. CASTING APPARATUS.—David T. Croxton, Canal Dover, and Samuel W. Croxton, Cleveland, Ohio. Original No. 650,372, dated May 29, 1900. In combination, a horizontally-arranged rotary mold-carrier, molds thereon for receiving the molten metal to form castings, and a castings-carrier below the mold-carrier arranged to rotate around the axis of the mold-carrier and to support the castings while they are stationary vertically after they have been removed from the molds and while they are rotating around said axis.

#### GREAT BRITAIN.

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

Week Ending August 28, 1902.

16,992 of 1901. COAL CUTTER.—W. E. Garforth, R. Sutcliffe and W. Buxton, Wakefield. Improvements in coal cutting machines that will cut vertically and horizontally simultaneously.

19,993 of 1901. GAS PRODUCER.—B. Talbot, Leeds. A gas producer for metallurgical furnaces, regulated to produce large quantities of ammonia with a small supply of steam.

4,925 of 1902. STAMP MILL.—W. S. McKinney, Chicago, U. S. A. Improvements in stamp mills for regulating the number and force of the drops and for adjusting shoes and dies for wear.

10,315 of 1902. FURNACE FOR ALLOYS.—W. Wakeley, Taunton, Mass., U. S. A. A furnace for producing an alloy of lead, tin and antimony from dross and oxides.

11,533 of 1902. ROASTING FURNACE.—F. Klepetko, and W. J. Evans, Great Falls, Mont., U. S. A. A roasting furnace with several chambers one over the other and raked by revolving rakes attached to a common vertical shaft, improved methods of regulating feed and temperature.

15,046 of 1902. COPPER CONVERTER.—G. Mitchell, Naco, Ariz., U. S. A. An improved arrangement of converter and reverberatory for bessemerizing copper matte and afterwards polishing.



## PERSONAL.

Mr. J. E. Ryan, of Salt Lake, Utah, is visiting Grant's Pass, Ore.

Mr. John Hays Hammond is stopping at the Waldorf-Astoria, New York City.

Mr. W. H. Wiley, of Idaho Springs, Colo., has gone to Mexico to examine mining property.

Mr. P. R. Alsdorf, of Central City, Colo., is making a business visit to the Eastern cities.

Mr. J. C. Cox, of Aspen, Colo., is to be assayer and chemist at the Camp Bird Mine, Ouray, Colo.

Mr. F. M. Miller, of Grass Valley, Cal., is at Mineral Park, Ariz., examining mining properties.

Mr. C. S. Hazelwood, of Chicago, Ill., is making a visit to mining interests in Gilpin County, Colo.

Mr. W. J. Murphy, of Chicago, Ill., has been in Grant's Pass, Ore. He is interested in the Victory Mines on Soldier Creek.

Mr. B. W. Goodsell, of Chicago, Ill., president and general manager of the Goodsell Mining Company, has been at Salt Lake, Utah.

Mr. W. E. Defty, of Phoenix, Ariz., who recently examined mining properties in Washington, is now looking at a mine in Sonora, Mex.

Mr. W. H. Bunce, of Ouray, Colo., has been appointed general superintendent of the North American Copper Company at Encampment, Wyo.

Sir Henry Wilkinson has been at the Black Eagle Mine, near Rat Portage, Ont., taking with him the managing director, Mr. N. S. McMillan.

Mr. P. J. Donohue, of Salt Lake, Utah, mining expert of the Western Exploration Company, has returned from a professional trip into Idaho.

Mr. W. H. Hampton, of Placer, Josephine County, Ore., now has charge of work at the mines of the Columbia Mines Company, on Galice Creek.

Mr. Edward W. Sebben, of Denver, Colo., who has been examining mines at Cripple Creek, is now looking into some zinc mining properties in Missouri.

Mr. William O'Brien, who has been connected with the Little Johnny mines at Leadville, is the new superintendent of Stratton's Independence, Cripple Creek, Colo.

Mr. John Owen, of Idaho Springs, Colo., is in Chicago, Ill., in reference to the working of mining property at Idaho Springs, Colo., and near Baker City, Ore.

Mr. K. T. Awara, of the engineering department of the University of Tokio, Japan, is now in the United States for the purpose of inspecting American iron and steel plants.

Mr. J. F. Luth, connected with the Manhattan Elevated Railroad of New York City, has been looking after mining properties about Cripple Creek, Colo., in which he is interested.

Mr. Harold A. Titcomb, who has been looking temporarily after the affairs of the Camp Bird Company at Ouray, Colo., has gone to Montana to examine mining properties.

Mr. J. W. Mercer, formerly manager of the Liberty Bell Mine, at Telluride, Colo., is stopping at Denver, Colo., after a two years' absence in Ecuador, examining mining properties.

Mr. Luther Wagoner, mining engineer, of San Francisco, who recently returned from Siskiyou County, Cal., where he had been examining mining properties, is on a professional trip to Chimpas, Mex.

Mr. George Croft is the new superintendent of the Blue Belle Mining Company, Ouray, Colo., succeeding Mr. Mowry Bates. Mr. Croft will have charge of the Hudson Mine, at Red Mountain, Colo.

Mr. Henry Hobart Knox, consulting mining engineer of New York City, is about to leave for a 4 or 5 months' trip to Rhodesia, South Africa. His address after October 1 will be 99 John street, New York.

Messrs. W. A. Evans, J. Adams, W. H. Euderbrock and Oscar Schnaitman, all of St. Joseph, Mo., stockholders in the Hidee Gold Mining Company, operating in Gilpin County, Colo., visited the property last week.

Mr. E. de Haen, manufacturer of chemicals, has removed his offices and factory from List to Seelze, near Hanover. His address will henceforward be Chemische Fabrik "List," Seelze, near Hanover, Germany.

Mr. John T. Hodson, general manager of the Lincoln Mining Company's property, near Boise, Idaho, passed through Salt Lake, Utah, last week on his way to New York City and other points of interest in the East.

Mr. H. L. J. Warren, formerly Utah representative of the ENGINEERING AND MINING JOURNAL, has been in Salt Lake from Colorado points. Mr. Warren says there is less development work being done in the lead and silver mines of Colorado than for 10 years past.

Mr. Thomas B. De Armit, who was general superintendent of the Empire Coal Mining Company at Bel-

laire, O., has been made general superintendent of the Sharon Steel Company's mines, with headquarters at Grove City, W. Va.

Messrs. Alexander Bevan, W. E. Colley, E. J. F. Coleman and Dr. E. L. B. Parker, all of Providence, R. I., attended a stockholders' meeting of the Specie Payment Company, operating on Bellevue Mountain, at Central City, Colo., during last week.

Mr. William Beit, of the London house of Wernher, Beit & Company, is now on a visit to the United States regarding the placing of some important contracts for American mining and electrical equipment for South Africa. He is stopping at the Waldorf-Astoria, New York City.

Prof. H. L. Smyth, of Harvard University, in company with Mr. J. E. Jopling, of the Cleveland Cliffs Company, has been inspecting conditions on the Vermilion iron range in Minnesota. Prof. Smyth, in collaboration with Mr. J. R. Finlay, published some years ago the most valuable paper on the occurrence of the ore bodies near Tower and Ely that had appeared to that time.

Mr. Eugene Santschi, Sr., for 14 years with the Pleasant Valley Coal Company, has tendered his resignation to General Manager Williams, to take effect October 1. Mr. Santschi has resided at Castle Gate, Utah, and is going to Switzerland. He has accepted a position with another company, and will have his headquarters at Salt Lake after January 1.

Mr. Sidney Williams, superintendent of the collieries of the Pennsylvania Coal Company, now controlled by the Erie Company, has resigned to become manager of G. B. Markle & Company's mines near Hazleton, Pa. Mr. Williams has been with the Pennsylvania Company since 1895. He will be succeeded by Mr. W. J. Ingalls, of Scranton, Pa., who is at present superintendent of the Hillside Coal and Iron Company's collieries.

A dinner is to be given John Fritz, of South Bethlehem, Pa., at the Waldorf-Astoria, New York City, on October 31, in honor of his 80th birthday. This banquet will also signalize the founding of the John Fritz gold medal for achievement in the industrial sciences, the medal to be awarded annually by a committee of members of the American Society of Civil Engineers, the American Institute of Mining Engineers, the American Society of Mechanical Engineers and the American Institute of Electrical Engineers.

Mr. Mark B. Kerr has resigned as superintendent of the Grass Valley Exploration Company, Grass Valley, Cal., and has been appointed general manager of the Jumper Gold Syndicate of California, Limited, in place of Mr. P. Geo. Gow. The Jumper Syndicate, a Scotch concern, owns the Jumper and New Era mines at Stent, Tuolumne County; the Griffiths Consolidated, Menzanita, Knox, Manzanita Queen, Chol-lar-Potosi, Bryant and Princess mines at Diamond Springs, El Dorado County, and a mine in Sonora, Mex. Mr. Kerr was for some 10 years with the United States Geological Survey in the statistical and topographical divisions, went to Ecuador as chief engineer at some hydraulic gold mines, and on his return was superintendent of the South Paloma Mine, in Calaveras County, Cal. He has been superintendent of the Grass Valley Exploration Company for 3 years. He now holds one of the finest mining positions in California.

## OBITUARY.

Edward T. Cobb, reputed a millionaire mine owner of Australia, died September 25 in St. Vincent's Hospital, New York City, of heart disease. He arrived from Australia a few days before and was taken from the steamship to the hospital. Mr. Cobb was about 49 years old. He was born in Vanceboro, Me. When quite young he went to Australia and accumulated a fortune in the gold fields.

## SOCIETIES AND TECHNICAL SCHOOLS.

THAMES SCHOOL OF MINES.—O. G. Adams, lately director of the School of Mines, at Stowell, Victoria, has been appointed director of this institution in place of F. B. Allen, who has received an important appointment in Western Australia. Mr. Adams is a New Zealander, and received his mining education at the Otago University School of Mines.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY.—The institute issues a 36-page pamphlet describing the course in mining engineering and metallurgy. This course covers 4 years, with 2 options, the first option being a general course in mining engineering and metallurgy, and the second option being especially adopted to students who wish to devote themselves to the metallurgy of iron and steel. Students wishing to give attention principally to the chemical side of metallurgy can take the metallurgical option of the course in chemistry. A special course of one year is also provided for graduate students.

CUTLERS' COMPANY.—Joseph H. Choate, the American Ambassador, has accepted an invitation from Albert J. Hobson, master cutler, of Sheffield, Eng.,

and director in Wm. Jessop & Sons, Limited, to attend the dinner of the Cutlers' Company, on September 30 in Sheffield. This dinner is termed the "Cutlers' Feast." This company is an old organization of great prominence, and with the exception of a similar organization in London, is the only association of its kind in England. The membership is strictly limited, the master cutler or head of the association is next in importance to the mayor of the city. Many notable persons gather at the feast each year, including prominent dignitaries throughout England, and also foreign persons of prominence. This year, besides the American Ambassador, Lord Kitchener will be among the guests.

ENGINEERS' CLUB OF ST. LOUIS.—At the meeting on September 17 21 members and 4 visitors were present. In the absence of the president and vice-president B. H. Colby was elected chairman of the meeting. Messrs. L. F. Goodale and A. P. Greensfelder were elected to membership.

The chairman was instructed to appoint a committee to revise the rules governing the award of an annual prize so as to eliminate the feature of a gold medal. The chairman appointed Mr. Roper on this committee.

The secretary read an invitation to the Jubilee Meeting of the North of England Institute of Mining and Mechanical Engineers to attend the annual meeting of the Institute of Mining Engineers, and also to attend a conversation of the same society.

Mr. Burt Cole read a paper on "Bituminous Coal Mining in Illinois." For the year ending July, 1901, there were 915 mines in operation in Illinois, employing over 44,000 men and boys and mining about 26,000,000 tons. The death rate from accident was about 2.2 per 1,000 employes, or 1 death for 269,000 tons. Nearly 60 per cent of the deaths are due to falling rock, coal or slate. Coal is mined by 2 general systems: the long wall and the pillar-and-room system. The long-wall system requires thin veins, an elastic roof, and considerable refuse; it mines about 90 per cent of the coal. The system is used in a few mines in the northern part of the State. The pillar-and-room method is the more common method, but mines only about 50 per cent of the coal. This system of mining was described in considerable detail. By means of lantern slides, surveys of mines using this system were shown, and the method of ventilating described. Mechanical haulage is rapidly replacing mule haulage along the main entry. The endless rope, tail rope and electric systems of haulage were described. A number of machines for undercutting coal were illustrated and their use was explained. The methods of surveying were given in some detail, and the paper closed with a few remarks on the labor conditions.

In the discussion which followed Messrs. Fish, Freeman, Barwick, Bausch, Russell and others participated.

## INDUSTRIAL NOTES.

The E. W. Bliss Company, of Brooklyn, N. Y., is about to ship machinery to Buenos Ayres, Argentina.

J. T. Logan, of Waldo, Ore., has ordered an elevator from the Joshua Hendy Machine Works, of San Francisco, Cal., for his placer mines.

The Salt Lake branch of the Ingersoll-Sergeant Drill Company, has furnished the York Mining Company with 2 drills for the York Mine, at Bingham, Utah.

The Baldwin Locomotive Works, of Philadelphia, Pa., is buying a lot of medium sized and standard machine tools. Its total purchases will amount to about \$200,000.

The Northwestern Fuel Company, at the West Superior, Wis., docks, is using a dock unloader made by the Ottumwa Box Car Loader Company. The machine has been given a thorough test.

The American Blower Company, of Detroit, Mich., is receiving bids for the construction of a new machine shop, 50 by 60 ft., and a third story on a portion of the plant, measuring 35 by 150 ft.

The John A. Roebling's Sons Company is erecting 3 buildings at its plant in Trenton, N. J., a leaded cable shop 324 by 105 ft., one story high, and 2 insulated wire buildings at right angles to the cable shop.

The Babcock & Wilcox Company has been awarded a contract by the Underground Electric Railway Company of London, Limited, for 128 mechanical stokers to be connected to 64 boilers for installation in the Chelsea, London, power station.

The Rand Drill Company, of New York City, is stated to have received a large order for mining equipment from South Africa. The Salt Lake branch of the company has furnished 2 Rand drills for the Wolverine Company, of Park City, Utah.

The Eugene Dietzen Company, of New York City and Chicago, for the convenience of its patrons in the west has opened a branch office at 508 Market street, San Francisco, Cal., where it will carry in stock a



full line of drawing materials and engineers' supplies.

The Clear Creek Mining and Reduction Company, of Denver, Colo., which owns the Golden Smelter, is installing the improved mineral briquetting machine manufactured by the Chisholm, Boyd & White Company, of Chicago, Ill., for briquetting flue dust and fine ore.

The Pittsburg Gage and Supply Company, of Pittsburg, Pa., will furnish 2 250-h. p. water tube boilers, for the Ward-Mackay Company, of Pittsburg, and is installing a complete White Star filtering system in the power-house of the New York & Stamford Street Railway Company, of Portchester, N. Y.

The Salt Lake branch of the Allis-Chalmers Company has been awarded the contract for the crushing machinery for the Bamberger-DeLamar Gold Mines Syndicate's new 500-ton mill at DeLamar, Nev. This machinery consists of 2 No. 6 and 2 No. 4 Gates crushers of special design, 2 of each size working in tandem.

The Mine and Smelter Supply Company, contracting agents for the enlarged smelter of the North American Copper Company, at Encampment, Wyo., has purchased a complete briquetting outfit from the Henry S. Mould Company, of Pittsburg, Pa. The outfit, consisting of a No. 3 press, mixers and slackers, was shipped from Pittsburg recently.

The Harrisburg Foundry and Machine Works, of Harrisburg, Pa., has lately booked these orders for engines among others: Two 500-h.p. engines for the Jefferson & Clearfield Coal and Iron Company for an electrical plant; a large engine for the Webster Coal and Coke Company, and a 250-h.p. engine for the Philadelphia, Wilmington & Baltimore Railroad's electric plant at Anticosta, Md.

The Amalgamated employees of the American Tinplate Company have agreed to accept the proposed reduction of 25 per cent on rebate tin plate orders. The company demanded this in order to secure an order of 1,000,000 half boxes of tin from the Standard Oil Company. This order has previously been placed in Wales. The Amalgamated Association voted the proposition down 5 weeks ago.

The Clayton Air Compressor Works, of New York City, manufacturers of vacuum pumps and air compressors for all purposes and pressures states that it continues to do business at its offices, 114 to 116 Liberty street, where it will be pleased to receive orders for its well known products. The new management intends that the high standard of Clayton compressors shall be maintained and improved.

Franz Solomon, who for some years was with the Brown & Sharpe Manufacturing Company, of Providence, R. I., and has lately been consulting engineer for the German firm of Schuchardt & Schutte, Berlin, has, with Paul Job. Illing, of Berlin, formed the firm of Franz Solomon & Illing, and will represent various American machine manufacturing concerns in the German markets. The new firm's addresses are 4 Neue Promenade and 9 Pradidenstrasse, Berlin, C 22.

The Passaic Steel Company, of Paterson, N. J., has been incorporated by Albert C. Fairchild, Henry F. Bell and Frederick F. Searing to take over the property and business of the Passaic Rolling Mill Company of Paterson. The transfer will occur some time prior to November 1. The management will continue the same as heretofore, with the exception that President W. O. Fayerweather, after 30 years' connection with the company, will retire from active business.

The C. W. Hunt Company, of West New Brighton, Staten Island, N. Y., through its sales manager, D. Ashworth, of Pittsburg, Pa., has received a contract from the American Sheet Steel Company to install a complete coal handling plant in the new extension of the boiler plant at Leechburg, Pa. It will be in keeping in every way with the one now in operation at the Union station power house of the Pennsylvania Railroad Company which has been pronounced one of the finest in the country.

The Holthoff Machinery Company, of Cudahy, Wis., since starting its new works has taken these large orders: Dos Estrellas Mining Company, Mexico, complete cyanide plant; Johnny Gold Mining Company, Salt Lake, Utah, 10-stamp mill, complete, with power; Silverton Mining Company, Silverton, Colo., miscellaneous equipment, including power for stamp mill; United States Reduction and Refining Company, roll shells; Buena Vista Mining Company, Mexico, roll shells; Inguaran Gold Mining Company, Mexico, 6,200 ft. of pipe line; Milwaukee Gaslight Company, Milwaukee, Wis., 10 large condensers and 4 large internal fire boilers; State Board of Control, Madison, Wis., internal fire boiler; Magnus Metal Company, Chicago, Ill., 2 150-h. p. internal fire boilers.

The Syracuse Railroad Construction Company, which is building a 25-mile electric railroad between Auburn and Syracuse, New York, has recently closed a contract with the Westinghouse Electric and

Manufacturing Company for 2 650-kw. engine-type alternators, delivering 3-phase current at 360 volts and 3,000 alternations; also for 5 400-kw. rotary converters, together with raising and lowering transformers for operating a 15,000-volt transmission line to 2 substations. A complete switchboard is included. The generators are to be direct connected to 2 22 and 44 by 48-in. cross-compound horizontal Corliss engines, purchased from Messrs. Westinghouse, Church, Kerr & Co., and built by the Westinghouse Machine Company, of Pittsburg, Pa. The engines are to receive steam at 150 lbs., are to run at 100 revolutions per minute, and are rated at 1,000 h. p. each, with a maximum rating of 1,800 h. p.

Among the August sales of heavy engines reported by the Allis-Chalmers Company, Chicago, are: Pawling & Harnischfeger, Milwaukee, 18 by 36-in. 1890 frame Reynolds-Corliss engine; Sloss-Sheffield Steel and Iron Company, Birmingham, Ala., 3 vertical standard long cross head 44-in. and 84 by 60-in. blowing engines; National Lead Company, New York City, 18 in. and 32 by 36-in. 1890 tandem compound Reynolds-Corliss engine; Oregon Smelting and Refining Company, Sumpter, Ore., 16 by 36-in. girder frame Reynolds-Corliss engine; Iroquois Iron Company, Chicago, 42-in. and 87 by 60-in. vertical long cross head blowing engine; Denver Tramway Power Company, Denver, Col., 32-in. and 68 by 60-in. 1890 cross compound condensing Reynolds-Corliss engine and 30-in. and 64 by 48-in. 1890 cross compound condensing Reynolds-Corliss engine; Detroit Copper and Brass Rolling Mills, Detroit, Mich., 26 by 48-in. 1890 Reynolds-Corless engine, and Southern Electric Light and Power Company, Philadelphia, Pa., 42-in. and 86 by 60-in. combined vertical and horizontal duplex compound condensing Reynolds-Corliss engine.

J. W. Duntley, president of the Chicago Pneumatic Tool Company, who has just returned from a 5-weeks' trip to Europe, says that his company now owns the New Taite Howard Pneumatic Tool Company and the International Pneumatic Tool Company, of England, and has reorganized these companies under the name of the Consolidated Pneumatic Tool Company. The Chicago Pneumatic Tool Company owns all the stock of the 3 English companies, the Consolidated Company being capitalized for £300,000, with A. W. Macnochie as chairman. They operate factories in Tooley street, London, and in Chippenham, Wiltshire, Eng., for the partial production of the pneumatic tools in Europe. The Chicago Pneumatic Tool Company expects to arrange to duplicate its Detroit plant in Scotland for the production of tools required in the shipbuilding work. The exhibition before the Ship Builders' Federation in Glasgow, which has recently been concluded, was highly successful and pneumatic tools have practically been adopted for all the shipbuilding work in the Scotland yards. The American workmen making the exhibit of pneumatic tools on shipbuilding are now in Germany, and from there will go to France for the purpose of making other exhibits. While in France Mr. Duntley took an order for 130 pneumatic riveters, for one of the largest French ship yards. As an evidence of the growth of the pneumatic tool business of this company, Mr. Duntley says that sales in 1895 amounted to \$8,000, while in the current year they will run about \$3,000,000. The Chicago Pneumatic Tool Company is now operating 4 of its own factories in the United States, and has 2 factories under contract manufacturing pneumatic tools, and is operating a pneumatic tool plant at Detroit and the air-compressor plant at Franklin day and night.

#### TRADE CATALOGUES.

*Sparks from the Anvil*, a publication issued by the Crucible Steel Company of America, appears in a new dress. This little periodical is devoted to a better knowledge of steel and its treatment, and contains interesting information, given in a bright and snappy style. It is of particular interest to blacksmiths and machinists.

Bulletin No. 1,025, issued by the Fort Wayne Electrical Works, of Fort Wayne, Ind., describes that company's direct-current generators, types LB and MPL. Bulletin No. 1,030 tells about single-phased generators, type WAL, and bulletin No. 1,032 treats of direct-current belted motors, types LB and MPL.

An ingenious card device, for displaying the colors of Dixon's silica-graphite paint in such manner as will permit of an exact idea of each color, is being issued by the Joseph Dixon Crucible Company. The color chart carries with it suggestions as to the class of construction that can be protected with this paint, also instructions as to best methods of applying protective paint. The chart can be secured by request to the Joseph Dixon Crucible Company, Jersey City, N. J.

Lobnitz & Co., Limited, of Renfrew, Scotland, have issued copiously illustrated catalogues describing vessels, dredging plants, etc., recently constructed at their shipbuilding yards on the Clyde River at Renfrew. The works cover an area of 15 acres, and are said to be fitted with the most modern machinery for executing contracts economically. In dredging plants, the

working parts are made interchangeable, to gauge. Gold dredgers are made the subject of a special catalogue.

The Robinson Machine Company, of Monongahela, Pa., is sending out illustrated leaflets calling attention to some of its products. These include automatic dump cages for coal and metal mines, double-drum positive-acting and friction clutch, tail-rope haulage engines, endless rope haulage engines and single-drum hoists. The company states that it is prepared to furnish hoisting engines, either geared or first motion, from 35 to 800 h.p. The company also makes ventilating fans, constructed entirely of iron and steel, from 4 to 20 ft. in diameter, having a capacity of 75,000 to 500,000 cu. ft. of air per minute.

The water Leyner rock drill that has gained much prominence in the West through its showing in recent drilling contests is described in a finely illustrated pamphlet of 40 pages published by J. George Leyner, of Denver, Colo. The Leyner drill, as is well known, is unlike rock drills of the ordinary type, in that the piston and tool are entirely disconnected, the tool being driven into, not plunged against the rock, while the cuttings are forced from the hole by air and water under pressure discharged through the tool or drill steel. The manufacturer claims for this drill, and particularly for the improved model, No. 5, lightness, easy portability, ease of adjustment and that it does not fish nor get hung up nor lose holes. Numerous testimonials from mining companies are given.

The 8th illustrated catalogue of the Contractor's Plant Manufacturing Company, of Buffalo, N. Y., a pamphlet of 152 pages, describes the company's full line of steam, horse and hand-power hoists, traveling and revolving derricks, wrought and steel tackle or cable blocks, sheaves with phosphor-bronze bushings, miners' whims, steam and hand cranes, wire cable and other contractor's supplies. The company's portable hoists are especially adapted for dock building, quarry work, coal hoisting, etc. They have patent friction drums and boilers of the best homogenous steel. They are quick acting, strong and durable. The company also deals in double-cylinder hoisting engines without boilers, deck-hoists, material elevators, steam-derrick cranes, shop and foundry cranes and makes whim-hoists from 1 to 5 h.p.

Hoisting engines of a great variety of designs are described in a large 92-page pamphlet, published by J. S. Mundy, of Newark, N. J. Some of these engines are of the portable type with engine and boiler on the same base for prospecting or light mining work; others are suited for pile driving, conveying derricks, bridge work or general contractor's use, while the company builds also independent engines for logging, dredging, quarrying and general mining work. The company makes heavier engines for wire-rope haulage, also first motion mine hoists, and engines particularly intended for operating cable-ways. The company also manufactures electric hoists, boilers, etc. The company's hoists are regularly equipped with the Mundy patent friction clutch, by which the drum may be made to revolve fast or slow with the engine running at a constant speed, or the drum may be allowed to turn in a direction contrary to the revolution of the shaft.

#### GENERAL MINING NEWS.

##### ARIZONA.

###### COCHISE COUNTY.

*Calumet & Arizona.*—The No. 2 White briquetting press, recently ordered from the Henry S. Mould Company, of Pittsburg, Pa., has been received at Douglas, and the work of installing the plant is now going on.

###### GILA COUNTY.

*Old Dominion Copper Mining and Smelting Company.*—The company's mines and smelter have temporarily closed owing to the short supply of coke. A force of about 40 men is retained at the mines, near Globe. The company recently installed a complete briquetting plant.

###### MOHAVE COUNTY.

(From Our Special Correspondent.)

*Elkhart.*—Work is resumed on this mine at Chloride. The company has reorganized.

*German-American.*—This company, in San Francisco District, is advertising for proposals for assessment work on 20 claims, contracts to go to the parties who will do the most work for \$100.

*Gold Road Mining Company.*—This company, in San Francisco District, is said to employ over 50 men. The mine is reported opening up well.

*Lenora Mining Company.*—This company, after a mill run on its ores near Hardyville, has suspended work.

*Minnesota.*—Owing to lack of water the 225-ton mill at Chloride has suspended work.

*Nighthawk.*—The machinery for this mine, at Layne Springs, is being installed.



**Oro-Plata.**—A good body of gold and silver ore is reported in the lower workings of this mine in Night-hawk District. A reduction plant for low-grade ores is to be installed.

**Paymaster.**—Owen McNeely, of Kingman, has men busy on this mine near Mineral Park.

**Planet.**—The new owners of these mines, at Planet, are preparing for work. A force of men is employed. A reduction plant is contemplated, but will not be ordered until the quality of the ore below water level is ascertained.

**Portales de Oro Company.**—This company, at Union Pass, is preparing for winter's work on its free milling gold claims. N. M. Richardson, one of the two brothers that were the former owners, has been retained as superintendent.

**Senator.**—C. E. Linburg, superintendent of this mine and mill in Gold Basin, reports the 5-stamp mill ready. If necessary, a cyanide plant will be put in.

**Tennessee.**—H. N. Botsford, superintendent of this mine, at Chloride, has laid off all but 9 of the working force until more ground is opened by sinking.

**Wallapai Mountain.**—W. W. Ross and C. E. Braden have made the location of an old mining claim in the vicinity of the American Flag, and discovered that the ore thrown over the dump by the former owners carries good gold values. Sinking and drifting are going on. Arthur Edwards, of Kingman, is interested.

**White Hills Company.**—A number of suits have been filed against this company at White Hills aggregating several hundred thousand dollars, and the entire property of 74 mines and claims is under attachment.

PIMA COUNTY.

(From Our Special Correspondent.)

**Mammoth Company.**—This company's mines at Schultz have resumed work.

YAVAPAI COUNTY.

**Standard Smelting and Refining.**—The 10-stamp mill and concentrating plant at Val Verde is in operation. The concentrator has crushing rolls, a Frue vanner and other appliances.

**Val Verde Copper Company.**—This company, of Val Verde, has just received its briquetting plant, furnished by the Chisholm, Boyd & White Company, of Chicago, Ill. The machinery consists of an improved mineral briquetting machine, conveyor mixer, lime slacker and automatic feeding device, and will be used for briquetting flue dust and concentrates. S. E. Bretherton, manager, states that the plant will be in operation at an early date. J. F. Mitchell Roberts, formerly of Sudbury, Ont., will take charge of the Val Verde concentrating plant October 1.

CALIFORNIA.

BUTTE COUNTY.

(From Our Special Correspondent.)

**Northern California Gold Mining Company.**—This company organized to work the bed of the North Fork of Feather River, between Big Bend and the De Long mines, with H. H. Yard, of Oroville, as superintendent, intends to run a level until bed-rock is reached, and then work up stream. The water will be taken from the stream by a dam, and used for generating electric power.

CALAVERAS COUNTY.

(From Our Special Correspondent.)

**Reliance.**—Work has been resumed on this mine, at West Point, A. C. Aiken, of San Francisco, owner. A cyanide plant is being put in.

**Rose Rock.**—This mine, at Murphys, is being examined with a view to purchase.

FRESNO COUNTY.

(From Our Special Correspondent.)

**Apache Mining Company.**—This company has been organized at Selma to work the Apache group of claims, near Trimmer. A contract has been let to extend the 300-ft. tunnel. The directors are: H. G. Drew, R. E. Stevens, D. W. Michaels, J. B. Sturges and W. L. Terrell, of Trimmer.

HUMBOLDT COUNTY.

(From Our Special Correspondent.)

**Orleans Bar Gold Mining Company.**—This company, at Orleans, has about mined out Graham's Hill, and will begin work on some other holdings in the vicinity.

LASSEN COUNTY.

(From Our Special Correspondent.)

**Donnelly Mountain District.**—About 150 claims have been taken up near Amadee, but nothing more than development has been done. Mr. Harb, of Amadee, has found a 5-ft. ledge of free milling ore. On the Donnelly claim the owners are pounding out the richer specimen rock. The camp is at an altitude of nearly 8,000 ft., and is no place for men without means.

**Lassen Mining Company.**—This company has been

incorporated in San Francisco with the following directors: A. M. Hunt, Myron Meredith, Louis Sloss, Leon Sloss and Edward H. Benjamin, the latter being secretary of the California Miners' Association. The new company is reopening the Golden Eagle Mine at Hayden Hill, and has been at work for some months. Recently other interests have been bought out, resulting in the formation of the new company. Some very high-grade ore has been found in this mine, which had previously been closed by litigation for some time. The company bought the property from the bank which held the mortgage, has equipped it with suitable machinery, and is proceeding with development.

LOS ANGELES COUNTY.

(From Our Special Correspondent.)

**Asphaltum Shipments.**—Fifty car-loads of asphaltum were recently shipped from the Los Angeles oil refineries to Eastern points. The New Franklin Oil Refinery has a contract for 2,000 tons of refined asphalt to be delivered at Philadelphia, Pa., at \$26 per ton.

MADERA COUNTY.

(From Our Special Correspondent.)

**Coarse Gold District.**—The opening of several mines has given this camp a small boom. The Texas Flat Company intend to put in a 20-stamp mill, 5-mile pipe line and electric plant. The Flying Dutchman is being opened with good prospects. The Alpha Consolidated is running its mine and mill.

**Gambetta.**—In this mine, at Grub Gulch, J. E. Porter superintendent, very rich rock is reported cut in sinking the 700-ft. shaft 100 ft. and running about 100 ft. of drifts. The vein is about 5 ft. wide, and the pay streak between 2 and 3 ft. carries pyrites. The values are in iron pyrite, some of the gold being in small nuggets and wire. The property, owned by Bishop & Spring, of San Francisco, will be worked on a larger scale.

MARIPOSA COUNTY.

(From Our Special Correspondent.)

**Alice.**—This mine, owned by the Mariposa Commercial and Mining Company, is worked under lease by Merrilees, Champion and others who have found good ore at 115 ft. There is a steam hoist on the property.

**Grimshaw.**—At this mine, near Hornitos, owned by J. F. Peck, of Merced, considerable ore is being taken out, and will be hauled to the Mount Gaines Mill.

**Hite's Cove.**—At this mine, at Hite, H. H. Hicks, superintendent, the work of putting the 20-stamp mill in order is to start. A new dam has been built across the river and the power system improved. The mine has been idle a long time.

**Long Mary.**—This mine, near Hornitos, is worked under lease by D. and J. Lord, Claude Wills, William Northrup and M. Cathey. The shaft is down 300 ft., and ore is hauled to the Princeton Mill. A large hoist has been installed. Fourteen men are at work.

**Organita.**—At this mine, near Hornitos, Robin Dodds superintendent, the mills is being remodeled. Buildings have been erected, and a shaft sunk 140 ft., which is to be sunk 200 ft. deeper. Oil fuel will displace wood.

**Princeton.**—At this mine, owned by the Mariposa Commercial and Mining Company, at Mount Bullion, C. C. Derby, manager, work has begun on the addition to the 20-stamp mill.

**Teats.**—Jacob Teats has put on double shifts of men, and a rich pay shoot is reported.

NAPA COUNTY.

(From Our Special Correspondent.)

**Paint Mill.**—C. R. Look, of Napa, intends erecting a mill for grinding mineral paint from his mine.

NEVADA COUNTY.

(From Our Special Correspondent.)

**Allison Ranch.**—At this mine, in Grass Valley, a 20-stamp mill, from plans of Harron, Rickard & McCone is being erected, and 15 men are busy on surface improvements. The 2 lower levels are being opened. Robert Robertson is superintendent.

**Ben Franklin.**—At this mine, near Grass Valley, Michael, Richard and Thomas White are running a tunnel.

**Champion Mines.**—This is the new name of the company working the Champion and other mines at Nevada City. The directors are: M. Sondheimer, J. Fetz, Jr., J. Bernhard, E. Schuck and J. Assion, of San Francisco, and A. Wilhelm, of Alameda.

**Delhi.**—This mine, near Nevada City, owned by the St. Gothard Mining Company, Gus Kartschoke superintendent, has shown recently some very rich ore. The pay streak is 2½ ft. thick, and the ore body 8 ft. thick. There have been 22 consecutive assessments levied. The mine was formerly owned by the late Robert McMurray, and yielded about \$700,000.

**Gold Hill.**—Superintendent Walker is rushing work on this mine, at Grass Valley. Electric power runs

the 2 Norwalk compressors and compressed air the Dow compound duplex pumps. In the past few weeks some very good ore has been found.

**Grass Valley Consolidated Mining Company.**—Plans are under consideration for enlarging the shaft to 3 compartments and increasing the mill from 10 to 20 stamps. G. W. Root is the general manager, and D. Coffin superintendent at Grass Valley. The mill is run by electric power.

**Merrimac.**—Col. George Stone, of San Francisco, is owner of this mine, at Grass Valley, and James T. Gribble is superintendent. The old shaft will be rebuilt and retimbered to the drain tunnel.

**Mohawk.**—In this mine, at Graniteville, a 5-ft. ledge is reported showing sulphurets and free gold. Wm. McLean, of Graniteville, and Charles Scheunart, of Sacramento, are the principal owners.

PLUMAS COUNTY.

(From Our Special Correspondent.)

**Northern California Gold Mining Company.**—This company, of which H. H. Yard, of Oroville, is superintendent, has recorded 200 mining claims in this county recently. The company is to mine the North Fork of Feather River in this and Butte counties.

SAN BERNARDINO COUNTY.

(From Our Special Correspondent.)

**Bagdad Mining Company.**—This company, at Ludlow, C. Grant superintendent, has purchased the Rochester and Syracuse claims entire and a 2-3 interest in the Siberia, Bagdad, Ash Hill, Ludlow and Klondike claims in Bullion and Old Dad mining districts.

**Southwest Ore Reduction and Investment Company.**—This company, organized in Los Angeles, is to exploit mines in Virginia Dale District and erect cyanide and concentrating plants. The incorporators are: J. E. Schwenf, J. W. White, M. V. Parks, F. M. Sterling, H. Kuhl, H. D. Stablein and R. L. Stablein, of Los Angeles. The latter is president, H. Kuhl is secretary and E. J. Young business manager.

SHASTA COUNTY.

(From Our Special Correspondent.)

**Modoc Chief Mining Company.**—This St. Louis company has purchased from the Clover Creek Mining Company 8 quicksilver claims 16 miles from Millville, and will erect a furnace.

SIERRA COUNTY.

(From Our Special Correspondent.)

**Alice and Papoose.**—E. F. Harris, of Alameda, has taken a bond on these mines in Jim Crow Canyon, near Downieville, and has 12 men building a wagon road to the property. A tunnel is being run and buildings are being put up. John Schofield is in charge.

**Bellevue Mining Company.**—This mine was formerly known as the Feather Fork or Thistle Shaft. C. B. Wingate is manager and Aug. Holtz superintendent. Fifty men are running a tunnel, now in 3,600 ft., with 2,400 ft. yet to run. The mine is near the town of Gibsonville, but the mouth of the tunnel is near La Porte. The channel has been well prospected. The cost of working will be much reduced when the tunnel is completed.

**New Independence.**—A new 10-stamp mill has been shipped to this mine, near Moore's Flat.

SISKIYOU COUNTY.

(From Our Special Correspondent.)

**Ager.**—This coal mine, Mr. Cardwell superintendent, is shipping coal to Yreka and other points.

**Golden Seal Mining Company.**—This Tacoma, Wash., company recently bought the Golden Seal Mine, near Oro Fino, from Pitz Bros., and will erect a mill. The officers are E. F. Messenger, president; Dudley Eshelman, secretary, and J. B. Champlain, general manager, all of Tacoma.

**Tacoma & Oro Fino Mining Company.**—This company, A. Reith superintendent, has bonded the Sayer, Champlain and other claims near Oro Fino, and intend putting in a mill. It is a Tacoma, Wash., company.

**Whip.**—This mine, near Yreka, has been bought by George Vernon Gray, who recently returned from Alaska, from E. D. Baker, and men are at work developing it.

TRINITY COUNTY.

(From Our Special Correspondent.)

**Chloride-Bailey.**—This mine, at Dedrick, owned by the Trinity Gold Mining Company, has started its new mill, air compressor and four air drills. They have 35 men busy.

**Coffee Creek Mines.**—Several mills are busy. McIlwaine & Osborne have 40 men at work on the Dorleska, and Strode Bros. have 15 men at work. A 10-stamp mill is to be put on the Three Peaks under the management of J. J. Chambers.

**La Grange.**—P. Bouery, superintendent at Weaver-

ville, has increased the pay of miners who have worked over 6 months, 25c. per day.

**Morrison Gulch.**—This mine, at Carrville, owned by Hilton & Webb, has started work with 20 men.

**Three Peaks.**—This mine, at Coffee, owned by W. I. Conant and George W. Cook, has been sold to J. J. Chambers. Active development is to begin.

#### TUGLUMNE COUNTY.

(From Our Special Correspondent.)

**Confidence Mining Company.**—At this mine, at Carters, Neil Carmichael superintendent, the new cyanide plant now at work has a capacity of 100 tons daily.

**Cosmopolite.**—In this mine, at Groveland, Harry Argall superintendent, cross-cutting is in progress with 3 shifts busy.

**Draper.**—In this mine, at Soulsbyville, the miners have returned to work after receiving a payment on wages.

**Eagle-Shawmut Mining Company.**—This property is at Chinese Camp. C. E. Uren is superintendent and John Rosenfeld's Sons, of San Francisco, are owners. The 40 stamps of the old mill may be moved to the new 60-stamp mill. There is a large body of ore in the mine.

**Lost Fox.**—On this mine, at Carters, 2 tunnels are being driven in Grapevine canyon, and between them a 2-compartment shaft is being sunk. A 20-stamp mill is being erected. Electric power has been installed.

**Mayflower.**—W. A. Pierce has given an option on this mine, near Tuttle town, to J. A. Whiteford, of San Francisco.

**Mazepa.**—Grading is going on for a 20-stamp mill at this mine, near Stent.

**Parole and Good Shepherd.**—These mines, at Soulsbyville, are being re-opened by W. H. Barron.

**Prudhomme.**—Frank Prudhomme, owner of this mine, at Arrastraville, has given a bond for 1 year.

**Sierra Mining Company.**—At this property, near Groveland, work will start October 1, when hoisting machinery is to be installed.

**Sullivan.**—Machinery is being installed at this mine, an extension of the Black Oak at Soulsbyville.

**Victory.**—This mine, near Confidence, is to be started next month by George A. Lightfoot and others of San Francisco.

**Water Shortage.**—Some Mother Lode mines have reduced forces and others have closed owing to lack of water for power.

#### VENTURA COUNTY.

(From Our Special Correspondent.)

**Big Chief.**—At this property, in Antelope Valley, near Griffin, extensive improvements are started. C. B. Siebert is general manager and H. W. Wilcox president. A roller mill, to be run by water power, has been shipped in.

#### YUBA COUNTY.

(From Our Special Correspondent.)

**Pacific Mining Company.**—This company has been organized to work claims in Bullard's Bar and Fosters' Bar districts. The officers are: P. D. Whitehead, president; F. C. Butterfield, vice-president; C. W. Florence, secretary, and F. E. Wright, superintendent. The offices are at 204 Dearborn street, Chicago, Ill. The company owns 28 claims in this county.

**Albion Hill Mining Company.**—This new company has been organized to work claims near Cabbage Patch, at Albion Hill, close to the Brown's Valley mines. The officers are: W. E. Collins, secretary; A. W. Lehmer, James A. Barr, C. H. Paddock, Richard Vincent and W. H. Smith.

#### COLORADO.

##### BOULDER COUNTY.

**Fourth of July.**—Work is started on the 8 by 8-ft. tunnel with Leyner drills. The tunnel is expected to be completed by next June.

**Village View.**—This group, on Ute Mountain, consisting of the Village View, Mountain King, Mountain Queen and Stars and Stripes lodes, is being developed by B. J. Hardin. A tunnel now in 225 ft. will cut the veins at a depth of 250 ft.

**Senator Tillman.**—This mine, on Eldorado Mountain, has been working steadily a vein of sulphide ore from 2½ to 4 ft. in width. There is a good plant of machinery. The 4 by 8-ft. shaft is down 200 ft, with 245 ft. of drifts.

##### CLEAR CREEK COUNTY.

(From Our Special Correspondent.)

**Gem Extension.**—This property, belonging to W. E. Renshaw, of Idaho Springs, is being examined for a consolidation with about 50 other patented claims. A big company is now being promoted in Pennsylvania.

**Georgetown Gold Mining Company.**—Charles Lerchen has been appointed manager of this property at Georgetown to succeed F. L. Branham.

**Idaho Springs Mining and Reduction Company.**—The new concentrating plant at Idaho Springs is idle because of lack of funds to complete it. A deal is under way between the owners and 2 big mining companies.

**Seaton Mining and Milling Company.**—It is stated by Manager F. S. Goldsmith that the company expects to install a power plant at Idaho Springs and run an air pipe line to the mine, a distance of 2 miles.

**Spect Group.**—This property, at Dumont, owned by Cleveland people and idle for the past 2 years, will, it is now stated, be started up. An air compressor will be put in.

**Sun & Moon Mining and Milling Company.**—This company at Idaho Springs has installed 2 Leyner belt-driven side-crank 16 by 18-in. air compressors, to be driven by 2 100-h. p. General Electric Company's induction motors, electricity to be supplied by the Cascade Company, an auxiliary of the United Power Company, of Georgetown. H. N. Sims is manager. He has sunk the shaft 930 ft., and is now driving levels above this and moving 1,350 tons of ore per month. The station is cut for a raise from the Newhouse Tunnel, which encountered the vein at a depth of 2,000 ft.

#### GILPIN COUNTY.

(From Our Special Correspondent.)

**Fannie Mining and Leasing Company.**—A recent shipment of ores gave values of 545.8 oz. silver, 21½ per cent lead and a trace of gold per ton for first class, while the second class showed values of 256.8 oz. silver and 5.10 per cent lead, the ores coming from a depth of 110 ft. The property is situated on Cyclops Hill, west of Black Hawk, and is operated by Black Hawk parties.

**Frontenac.**—Local parties have leased the plant and are replacing the machinery recently destroyed by fire by putting in a 30-h. p. plant. They have shipped some ores to the Golden Smelter, which have given satisfactory values. Kruse, Campbell & Company are the owners.

**Justice.**—Vallero & Co., a local pool, have taken a lease on this property in Lake District, and agreed to sink the shaft 150 ft., which will put it down 825 ft. in all.

**Lotus.**—Sternberger Brothers, owners, have received an 80-h. p. boiler, and as soon as the pump is in place intend to carry on heavier developments. Fred Wood, of Russell Gulch, is in charge.

**New Stamp Mill.**—McFarlane & Co., of Black Hawk, are erecting a slow drop 15-stamp mill on Fall River for treating ores from the Gold King lode. The mill is to be run by water-power. The ores are free milling.

**Old Town.**—Idaho Springs parties, who have a lease on the east shaft of the Old Town, are installing a small plant of machinery and getting ready to sink 100 ft. At the main shaft a Worthington pump is in place and the new Leyner air compressor, and sinking will soon start. G. K. Kimball, Jr., of Idaho Springs, is manager.

**Pewabic.**—Berry Brothers and associates, of Detroit, Mich., owners of the Saratoga group and of the Golden Smelter, have taken a 15 years' lease and option on this group in Russell District, and are installing hoists on the Richardson and Iron shafts. Temporary structures will be erected over the machinery while the mines are being examined. The Iron shaft is over 600 ft. deep, while the Richardson is but 400 ft. They are incline shafts, with water standing up to about 100 ft. from the top. The group is credited with a good past production, and the pyritic ores are needed for the smelter. E. R. Nelson, of Russell Gulch, is superintendent.

**Town Topics Gold Mining Company.**—The 6th dividend has been declared of ½c. a share, or \$5,000, making a total of \$30,000 for the company since it purchased the East Notaway property less than 2 years ago. The company contemplates installing an electric power, furnished by the Cascade Electric Company, which is stringing wires from Georgetown to Clear Creek. About 45 men are at work, and regular shipments are kept up, one shipment of smelting ores this week giving net returns of over \$200 per ton. M. D. Draper, of Central City, is superintendent.

#### LAKE COUNTY—LEADVILLE.

(From Our Special Correspondent.)

**Leadville Ore Output.**—The past week shows a slight increase by the iron sulphide producers, the heaviest shipper being the Moyer shaft of the Iron-Silver. A heavier zinc output is also noticeable, a large part coming from the A. Y. & Minnie, as well as the Moyer dump.

**Leadville Zinc Production.**—The zinc situation is controlled by the New Jersey Zinc Company, which ships much of its product to the works at Canon

City. Shipments are also made to Belgium through New York brokers, while Kansas and Wisconsin come in for a share. The A. M. W., through its Maid & Henrietta and A. Y. & Minnie claims, the Moyer and the Yak are furnishing about all the zinc. The New Jersey Company owns the Col. Sellers' dump, from which shipments will soon be made. The mill, erected for tests of the magnetic separation of Leadville zinc ore, has shut down. The company refuses to make any statement as to results.

**California Gulch Mill.**—After months of idleness this concentrating mill has resumed under the direction of Louis Virdin and is handling zinc ore from the Louisville Mine.

**Benton Combination.**—Several sets of lessees are working the Benton & Wingold properties. A large amount of prospecting and developing is being done by surface tunnels near the surface. Occasional shipments of gold ore are made.

**Big Evans Mining Company.**—The new shaft is down 130 ft.

**Bull Hill Combination.**—On this is Twin Lakes property, a vein lost several years ago, and shows 8 oz. gold.

**Houghton Placer.**—A lot of tailings accumulated on this ground from California gulch. They are washed by a number of lessees, who ship to the United States Zinc Works at Canon City.

**Iron-Silver Mining Company.**—The output is over 250 tons a day from the Moyer workings of low-grade iron. The straight sulphides are dumped direct into the railroad cars and shipped to the smelter, while the other material is sorted, and that which needs concentration goes to the Moyer Mill. The zinc is shipped to the works at Canon City and Cherokee, Kan. A new 3-compartment shaft is started 1,700 ft. north of the old one on Iron Hill. It will reach the present level at 600 ft., but will go to 1,000 ft. The Moyer pumps are handling 300 gal. per minute, and there are 200 men on the pay roll. The Moyer's 2 dumps, crude material and tailings, are now shipped at the rate of 250 tons daily to the Empire Zinc Company at Canon City. The heaviest shipments are from the tailings, which average 25 to 30 per cent zinc.

**Keystone Mining Company.** W. J. Whitecomb is in charge for Pittsburg owners, and work has been resumed after a temporary suspension.

**Starr Placer.**—Lessees are closing a very successful season. A large amount of territory has been washed, and much of the gravel showed \$1.50 to \$2 a yard.

**Valentine Mining Company.**—The water is being lowered to the lower stations, where new pumps will be put in.

**Yak Mining, Milling and Tunnel Company.**—About 200 tons a day of sulphide and zinc ores are produced, to be increased as soon as connections are made with the Rubie sulphide bodies. The tunnel is going towards the Ibez ground at the rate of 6 ft. daily.

#### SUMMIT COUNTY.

**French Gulch Company.**—This company, at Breckenridge, is putting in a tramway bucket lift to hoist gravel into the flumes when the water gets too low to afford pressure for the hydraulic lifts.

#### TELLER COUNTY—CRIPPLE CREEK.

(From Our Special Correspondent.)

**Acacia Gold Mining Company.**—The Falvey lease on the middle block of the Burns' claim has closed for the present on account of a disagreement with the Altman Water Company over furnishing water for the mine. The lease formerly shipped a large amount of ore, but is not now producing much. On the north end, on the block leased by McFarland & Ownbey, considerable development is being done. A new lease has also been granted on the south end of the property.

**C. O. D.**—This old property, in Poverty Gulch, is to be resuscitated. A number of leases have been let, and several more will be. The property is now controlled by T. B. Burbridge and associates, and is near the Gold King. It was formerly owned by a French company, but of late little work has been done, except by a few small leases.

**Copper Mountain Gold Mining Company.**—Some stockholders have redeemed the property, which was some time ago sold by the sheriff to satisfy a claim of about \$1,700, held by J. F. Burns. The property is on Copper Mountain, about 2 miles north of Cripple Creek, and, although it has never produced ore, it lies in the most promising of the outside districts. It adjoins the Fluorine Mine.

**Home Mining Company.**—The property and the franchise for mining under the streets and alleys of Cripple Creek have been deeded by the sheriff to E. C. Newcombe to satisfy a debt of \$2,639. This company some time ago sunk a shaft and did considerable drifting, but found no ore.

**Mary Cashen.**—The strike of ore on the 4th and 6th levels from all accounts is improving. This company owns the mineral rights of the Spicer claim, in Vic-



tor; also a small portion of the Mt. Rosa Placer, and several lots in Victor.

**Morning Star.**—It is now given out that a new option on the property has been given to C. C. Hemming. The price stated is \$50,000 for the 2 claims, and the option is understood to run till December 5. The property comprises the Morning Star claim, on Beacon and Guyot hills, and the Fleming, on Bull Hill, near the Wild Horse.

**Stratton's Cripple Creek Mining and Development Company.**—Work was suspended from the time of Mr. Stratton's death until after the funeral, but it has been resumed and the properties are working as usual. Practically all of the stock was held by Mr. Stratton. The company owns all the Stratton properties in the district, including a large amount of ground on Globe and Bull hills. Fred Johnson, of Cripple Creek, is general manager.

**Stratton's Independence, Limited.**—Everything is going smoothly under the new management, and the mine is producing the usual amount of ore.

**Theresa Gold Mining Company.**—A new ore house has been erected and a washer installed. A new boiler, 10-drill compressor and a large new hoist have been ordered. A fair amount is shipped. The property is near Goldfield and adjoins the Golden Cycle property. It is owned principally by Colorado Springs people.

**Wild Horse.**—From all accounts this property is in splendid condition and is producing a large amount of high-grade ore. A recent shipment of 50 tons gave returns of 25 oz. of gold per ton. The mine is now shipping from 25 to 50 tons per day. The property is on Bull Hill and is owned by the United Mines Company, which is controlled by the Woods Investment Company. F. M. Woods is general manager.

SAN MIGUEL COUNTY.

**La Sal Copper Mining Company.**—This company, in the Paradox Valley, has signed a contract with Laughlin & Hall to build a smelter, work on which will begin at once. It is expected the plant will be in operation within a few months. The mine is 80 miles from the railroad.

IDAHO.

CUSTER COUNTY.

**Lost Packard.**—J. A. Czizek has bought this group of gold-bearing claims beyond Mackay. The purchasing syndicate, besides Mr. Czizek, includes Josiah Barnett and C. A. Moulson, of Salt Lake, the vendor being C. E. Eddy. In addition to the Lost Packard group the purchasers have acquired considerable adjoining property. Work on a long tunnel has started.

IDAHO COUNTY.

(From Our Special Correspondent.)

**Seigel Creek District.**—Interest in the mines about Elk City continues to grow. Another strike of rich ore has recently been made not far from the Sherman Mine on a group of claims now being opened in a rush under a short working bond, held by Patrick Clark, of Spokane, Wash. Mr. Clark has 6 other groups under bond, and is working a small force on each, with promising indications at several other points.

**Wormack.**—A deal has been closed on the Stanley Creek placers by George T. Burroughs, Jr., of the Sweetser-Burroughs Dredge Company, and Mr. Burroughs is now putting in machinery for a dredge of the chain bucket type to have a capacity of 2,000 cu. yd. a day. The hull is already built, and the machinery will be ready to run before winter sets in. The ground covers the course of Stanley Creek for 2 miles, has been thoroughly tested, and found to carry an average value of 50c. per cu. yd. The pay channel is 200 to 400 ft. wide, and the ground is well adapted for dredging. Mr. Burroughs has successfully operated 2 heavy dredges on the Snake River for years, and is a mechanical engineer of ability.

KOOTENAI COUNTY.

**Rainbow.**—This mine, at Lakeview, has shipped a carload of concentrates to the Tacoma Smelter.

SHOSHONE COUNTY.

**Coeur d'Alene Mining Company.**—This company expects now that its 5-mile ditch, north of Murray, to carry water to Dream Gulch, will be completed before winter. The ditch will take water from 5 gulches and give a working pressure at the giants of 150 lbs. The company controls about 3,000 acres of land and is working 40 men in the bed of Pritchard Creek, below Murray. The recent strike of galena is reported improving.

**Paragon.**—At this company's property, 6 miles from Murray, a small concentrator may be erected next year. About 12 men are employed sinking a shaft, and a hoist and an air compressor will be put in. George S. Munson, of St. Paul, Minn., vice-president of the company, and C. M. Bailey, of Minneapolis, a director, recently inspected the property.

ILLINOIS.

The Chicago, Burlington & Quincy Railroad is said to have options on the coal rights covering 41,000 acres of land, and to have begun making payments. The land forms a parallelogram south of Springfield between the tracks of the Chicago-St. Louis lines of the Illinois Central and the Chicago & Alton Railway, reaching as far north on the Chicago & Alton as Virden. Girard is at the middle of the west boundary, and Nilwood is at the southwest corner. On the east line, along the Illinois Central Railroad, Divernor forms the northern point, Farmersville is at the middle of the eastern boundary and Waggoner is at the southeast corner. The whole tract is approximately 11 miles long by 7 miles wide. The deal has been engineered by A. G. Simpson. The option contracts procured will expire October 1.

(From Our Special Correspondent.)

The Executive Committee of the Illinois Coal Operators' Association and the National Brotherhood of Coal Hoisting Engineers met at Springfield September 18 and 19 to make a new agreement for the year beginning November 1. The present scale of prices, with very slight change in conditions, was readopted.

**Illinois Coal and Coke Company.**—Newton Jackson, of Philadelphia, Pa., the head of this company, was in Springfield last week, and he states that he confidently expects to have his consolidation thoroughly effected by November 1, the time limit on his options on the properties in the district.

INDIANA.

(From Our Special Correspondent.)

**Coal Mining Conditions.**—Reports from various coal fields indicate that conditions are more favorable than for some time. The miners at Clinton, Meca, Montezuma, Coxville, Fontanet, Brazil and Sullivan are working full time. Scarcity of cars is the only thing that threatens a day's suspension. Owing to the big demand and the advanced prices it is expected that the output will be greater this winter than ever before.

PIKE COUNTY.

(From Our Special Correspondent.)

**Winslow Coal Company.**—A controlling interest has been purchased for cash by C. B. Thompson and F. H. Wheaton, of Evansville, associated with H. A. Loby, of Petersburg, who will be local manager. Mines Nos. 1, 2, 3, 4 and 5, included in the sale, are in one of the richest coal fields in Indiana and comprise 1,200 acres of gas coal, averaging from 4½ to 6½ ft. thick. The sale includes 3 miles of railroad and equipments to handle a daily output of 450 tons. The new managers expect to increase the output. The consideration is not given, but the property is valued at over \$200,000.

VIGO COUNTY.

(From Our Special Correspondent.)

All of the coal mines around Terre Haute are working, the men are satisfied and a prosperous winter is expected. The chief difficulty is the lack of transportation. Strings of loaded cars are waiting for locomotives. Old engines have been resurrected from the scrap pile and are doing the best service possible, but there is still a lack of cars and locomotives to keep up with the capacity of the mines.

KENTUCKY.

HOPKINS COUNTY.

**Carbondale Coal and Coke Company.**—Paducah men have bought the interests of this company, at Hamby Station, and have taken charge of the same. The deal was effected by Secretary Hayden, of the Southwestern Land and Coal Mining Company, of Hopkinsville.

LOUISIANA.

ACADIA PARISH.

(From Our Special Correspondent.)

**Pelican Oil Company.**—This company's well is expected in any day. The screening required is being put in. The well is about 1,500 ft. north of present gushers, so that it is being watched with interest.

**Jennings Oil Field.**—The Prairie Mamon Oil Company and the Home Oil Company wells, abandoned as dry holes, are to be drilled deeper. The Northern Oil Company's 8-in. pipe line, from the field to Jennings, is under construction. Sand has been giving operators much trouble, and the production has seriously declined. Shipments during the past 30 days have not been up to previous months record.

MARYLAND.

ALEGANY COUNTY.

**Cumberland Basin Coal Company.**—This company has been incorporated with \$100,000 capital to develop mines at Wellersburg, near Mount Savage. Thomas F. McGlone, John O. Stanford, Dr. Leonard R. Coates, James Lawson, of Baltimore; Samuel C. Felltig, of Wellersburg, are the directors.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(From Our Special Correspondent.)

**Baltic.**—Nos. 3 and 4 shafts are down to the 8th level. Two compartments of No. 5 shaft are in commission, and sinking is under way to the 7th level. Additional equipment for the machine shop, including lathes, a pipe cutter and threader and a universal grinder, are installed.

**Calumet & Hecla.**—A new cooler for the Mackinac compressor is in commission. It is from the I. P. Morris Company, of Philadelphia, Pa., and is made of boiler plate. It is 30 ft. high, 6 ft. in diameter and weighs nearly 35,500 lbs. Two new Nordberg compressors have been installed, and as soon as the remaining Leavitt compressor is removed another Nordberg will be erected in its place.

**Champion.**—Work on the foundations for the new boiler and compressor houses is well advanced.

**Isle Royale.**—This company is having one grade of its mineral cast into anodes, which will be refined electrolytically to save the silver. Heretofore the mine has turned out lake copper. With the small difference between the price of lake and electrolytic, the silver more than pays for the difference.

**Lake Superior Smelting.**—This company is using coke in the cupola at the Dollar Bay works instead of anthracite, the supply of which at this point being exhausted. If satisfactory, coke may be used altogether hereafter.

**Tamarack.**—The roof of the steel shaft and rock house at No. 5 shaft is being renewed to prevent damage from falling ice next winter.

**Trimountain.**—Work on a new dam near No. 3 shaft has commenced. It will furnish water for the boiler plant 300 ft. distant. The steel work on the new boiler and engine house at No. 3 is advanced. The No. 3 steel rock and shaft house, purchased from the Arcadian Copper Company, is nearly completed. A steel brick-lined self-supporting stack, 150 ft. high, has been erected.

**Winona.**—The roadbed for a branch from the Copper Range Railroad to No. 2 shaft is completed, and rails will be laid at once. The spur will be 3,600 ft. long.

COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

**Adventure Consolidated.**—The new Allis-Chalmers hoisting engine at No. 1 shaft is in commission. It is a double-cone drum duplex Corliss direct acting engine, with steam cylinders 24 in. in diameter and 60-in. stroke, driving drums 10 ft. in diameter at the small end and 13 ft. 8 in. at the large end, grooved for 1¼-in. rope, each drum to take 2,000 ft. of rope. The drum is fitted with a single post brake 15 ft. 4½ in. in diameter by 12 in. face. This brake is of the parallel motion type, operated by means of an auxiliary steam cylinder fitted with oil check. Each drum is fitted with a rope take-up. The engine can hoist a maximum load of 12½ tons up an incline of 45 degrees at a speed of 2,000 ft. per minute.

**Michigan.**—Shaft A is now down 1,350 ft. and B shaft is sinking at nearly 1,400 ft. A drift at the 10th level, on the Calico lode, will be holed through shortly. The grading for the new hoisting plant to be erected between A and B shafts is completed.

**Victoria.**—Work on the steel and cement work of the dam across the west branch of the Ontonagon River is advancing rapidly. The dam is a mile from No. 2 shaft and will supply water to the mill and power house by steel pipe along the river bank. Shaft No. 2 is nearly 2,000 ft. deep. No. 3 shaft is being opened at several levels.

IRON—MARQUETTE RANGE.

**Fendill.**—It is reported that the Cleveland Cliffs Company is negotiating for this property, in Ishpeming. It includes the East Jackson, Lucy and McComb, the land formerly embraced in the Negaunee Mining Company's possessions, and the forties on which are located the Milwaukee and Davis mines. The Lucy has produced more ore than any of the other mines, but has not been wrought for a number of years.

MINNESOTA.

(From Our Special Correspondent.)

There are now under contract by the American Shipbuilding Company for delivery next year 34 large steel steamships, of an average capacity for about 5,500 gross tons. Another is to be completed this fall. These ships will carry 3,200,000 tons of ore in a season.

The Great Northern road is about to build a third dock at Allouez Bay, and will extend its double-track road as far as Stoney Brook this season. The road handles an immense wheat and grain traffic, and there is often serious congestion at Stoney Brook much of the time, where the grain and ore trains come together. It will also add a large number of locomotives and steel cars for next year. The road will haul

about 4,000,000 tons this season, closing about November 15.

The Duluth & Iron Range road, which has been experimenting with 70-car trains of ore, has abandoned its experiments and gone back to 46 and 48-car trains. No more 70-car trains will be hauled till the road has most of its rolling stock in steel cars.

#### IRON—MESABI RANGE.

(From Our Special Correspondent.)

Some manganese ore has been found in the southeast of the northwest of section 15, T. 58, R. 19, where the Great Northern road is exploring.

Ore is being found in section 11, T. 58, R. 18, where exploration has been under way for some time. The grade is fairly good.

Explorations are to begin in T. 59, R. 14 shortly, and drills will work close to the village of Mesaba.

About 1,000,000 tons of ore has been found in section, 4, T. 53, R. 15, on lands of the Longyear Mesaba Iron Company, and is being sold to an operating company. It is not high grade.

*Deering Harvester Company.*—This company has let a contract to McArthur Brothers, of Chicago, Ill., for stripping 250,000 yds. at the Hawkins Mine. The mine will be a milling property and will ship largely next year.

*Stevenson.*—At this mine recently more than 16,000 tons of ore were loaded into cars in one day by 2 105-ton shovels working a high ore bank.

#### MISSOURI.

##### JASPER COUNTY.

(From Our Special Correspondent.)

*Joplin Ore Market.*—A rise in spelter prices brought strength to the ore market, and the top price advanced 50c. a ton to \$37.50, which was paid for the output of the Doogin diggings, an exceptionally high-grade ore. The high-grade ore from the Perkins Mining Company at Zincite and from the Carnegie Company on the Dinkelbuhler lease at Joplin brought \$38 per ton, the same as the week before. All the other lots of high-grade ore in the district brought \$37 per ton. The assay basis was anywhere from \$33 to \$35 a ton. The general claim by those buying on an assay basis is that \$34 is the price for 60 per cent ore. Some of the straight bids accepted last week would make the basis \$35 per ton. Lead remains in strong demand at \$49 per ton. The Petraeus Smelter at Galena is gradually increasing its capacity and is handling a good percentage of the ore of the district.

During the corresponding week of last year the best grade zinc ore sold at \$27, \$11.50 less than last week, and lead sold at \$46.50 per ton, \$2.50 less. The zinc shipment was less by 559,730 lbs., lead sales greater by 297,780 lbs., and the total value less by \$50,780. For the corresponding 38 weeks of last year the zinc shipments were greater by 13,911,040 lbs., the lead sales greater by 3,022,470 lbs., and the value less by \$1,222,278.

Following are the sales from the various producing camps of the Joplin mining district for the week ending September 20, 1902:

Camp.	Zinc, lbs.	Lead, lbs.	Value.
Joplin	2,627,770	284,560	\$51,644
Galena-Empire	1,088,540	211,450	21,806
Webb City	1,994,240	307,270	38,285
Duenweg	961,880	119,850	18,266
Aurora	677,600	11,570	11,023
Oronogo	429,760	8,850	7,214
Carl Junction	407,240	.....	7,534
Neck-Alba	411,240	.....	7,534
Zincite	372,730	.....	6,709
Granby	353,000	33,600	5,125
Prosperity	257,680	15,340	4,749
Cave Springs	195,040	13,610	3,551
Central City	104,880	94,440	3,700
Carthage	186,110	6,200	3,305
Fortuna	.....	120,760	2,898
Spurgeon	132,310	8,530	1,532
Sherwood	51,950	.....	883
Total	10,252,050	1,221,340	\$195,240
Total 38 weeks	393,489,030	47,316,120	\$6,949,953
Zinc value, week,	\$104,942;	lead,	\$30,303;
zinc value, 38 weeks,	\$5,890,258;	lead,	\$1,059,695.

*Reducing Zinc Output.*—The Missouri-Kansas Zinc Miners' Association, which has at various times taken partly successful steps to keep up the price of zinc ore on account of the reductions in the last few weeks, has a call for a meeting of the operators to take action to check the movement of the smelters and ore buyers to reduce the price of zinc ore. It claims that the prices paid the past 2 months or so were at least \$2 a ton lower than a fair price, based on the metal market, and that the smelter profits have been enormous. The association advises mine owners to curtail output so that it will not exceed requirements, and to that end run only 5 days a week until conditions improve. The call for a meeting to be held September 23 was signed by John R. Holmes, chairman; John F. Wise, Wm. Houk, H. U. Dale, A. A. Cass and Temple Chapman.

#### MONTANA.

##### BEAVERHEAD COUNTY.

*Montana Copper and Gold Mining Company.*—A. P. Ballow, of Chicago, Ill., secretary, states that this company has not abandoned its claims on Stoney Creek, but has closed down temporarily to make arrangements for heavier machinery. The company has cross cut the main vein at a depth of 265 ft., finding it 90 ft. wide. A. G. Beaunisme is president of the company, and W. C. Heimbuecher vice-president. The capital stock is \$1,000,000.

##### CASCADE COUNTY.

Charles W. Clark, son of Senator W. A. Clark, is preparing for the location of additional smelting works on the property now owned by the Rainbow Land Company, at Great Falls. The land is the property of a company of local and Eastern men, and lies half a mile along each side of the Missouri below Rainbow falls. There are 1,000 acres in the tract.

##### FERGUS COUNTY.

*King-Barnes.*—Recently 682 oz. of bullion were shipped from the King-Barnes Mill, near Kendall, to the government assay office in Helena. The lot was valued at \$13,000.

##### GALLATIN COUNTY.

*Storrs Coal Mines.*—F. W. C. Whyte, in charge of these new coal properties, reports about 70 men employed by the company at the plant at Storrs, and that by Christmas the washer will be ready, and about 100 ovens in operation. It will probably be a year before the plant will be in full operation. It has not been decided whether to go into the manufacture of coke with the idea of saving the bi-products or not.

##### LEWIS & CLARKE COUNTY.

*Columbia Gold Mining Company.*—This company's mill and cyanide plant, at York, was burned on September 18. The loss is \$50,000. The plant was owned by Michigan people.

*Montana Mining Company.*—The output for August was 1,600 oz. gold and 10,800 oz. silver obtained from 2,050 tons of ore crushed, and 13,468 tons of tailings treated. The tailings yielded \$28,000, and the cost of treatment was \$15,500. The total estimated income was \$37,100, the expenses \$27,100, leaving a profit of \$10,000.

##### MADISON COUNTY.

*Gold Hill.*—This mine, near Parrot, belonging to Hugh Wilson and Tom Hinds, of Butte, and Alex. McKay, of Whitehall, is reported bonded to F. A. Heinze, of Butte. The consideration is said to be \$40,000.

##### MISSOULA COUNTY.

*Deep Creek Gold Mining Company.*—This controlling property, a few miles above De Borgia, has shut down its hydraulic elevator for the season. David Cromie is manager.

##### PARK COUNTY.

*Montana Coal and Coke Company.*—All construction work is expected to be done by October 1. A new washer and tippie are completed, and electric haulage has been installed in the mines. The company now has 225 coke ovens.

#### NEVADA.

##### LINCOLN COUNTY.

*Bamberger-De Lamar Gold Syndicate.*—At the new electric power plant at De Lamar the electrical equipment and machinery is beginning to arrive. The changes at the De Lamar Mill are being made as rapidly as possible.

##### WHITE PINE COUNTY.

*Lucky Girl.*—The Montana Mining Company reports that 20 stamps dropping 22 days reduced 1,420 tons of ore yielding bullion and cyanides estimated to realize \$6,900. The expenditure on revenue account was \$6,600 and on developments \$2,400, leaving a deficiency of \$2,100 for August. The mine shows improvement.

(From Our Special Correspondent.)

*Chainman Mining and Electric Company.*—All operations in the mine and mill have stopped except cross-cutting on the 300-ft. level, where slow progress is made owing to the hard country rock. In the mill some work was attempted by cyaniding the finer grades of the ore that required no crushing. The entire wet crushing process as designed was not employed, and straight leaching attempted, giving an extraction of 65 to 70 per cent, was made. Owing to the very poor showing, the property has closed down, and C. R. Corning, of New York City, has been engaged to advise the company as to its management. The last manager, George Dunham, of Warren, Pa., has resigned owing to his inability to manage successfully the affairs of the company.

*Ely Mining and Milling Company.*—The Robust Mine has been shut down and all work abandoned. When a small bunch of ore 900 to 1,100 tons from the 150-ft. level had been worked through the new cyanide

mill it was discovered that no ore existed in lower levels. The vein was only a cave filling in limestone.

#### OREGON.

##### BAKER COUNTY.

(From Our Special Correspondent.)

Messrs. Browne & Smith, mining engineers, have purchased the assay office, plant and entire business of C. F. Raht, of Sumpter. Mr. Raht has gone to Mexico. The new firm will entirely remodel the office and will either handle custom work or use the laboratory as a private adjunct to mining engineering work.

*Baisley-Elkhorn.*—This property, sold on judgment for less than \$4,000, was bought in by C. A. Johns, attorney for some of the Connecticut owners. Judgments above \$35,000 are still outstanding.

*Bonanza.*—Sinking the 3-compartment shaft proceeds rapidly, and the new hoist of 2,500-ft. capacity gives satisfaction. Station at 700 ft. is being cut and cross-cut driven. The shaft is down nearly 800 ft. It is expected that the 40-stamp mill will open about December 1.

*California.*—Rolls, boilers and engine for a 60-ton concentrating mill at Sumpter are arriving, work on a frame building has begun and a sawmill is installed for cutting the lumber. Jigs and tables have been ordered.

*Columbia.*—The company has received 13 Leyner drills with finishing set of steels for a 10-ft. hole, the first experiment in Sumpter with holes that depth.

*Cracker-Oregon.*—A rich streak 3-ft. wide is reported cut in lower cross-cut, 300 ft. from the mouth. Free gold is visible in the quartz. The Oregon Development Company is operating the mine. An order for a 10-stamp mill has been placed and work on a building will soon begin.

*Elkhorn Consolidated Gold Mining Company.*—This company has made a second payment of \$12,000 and began development in the adit of the Maxwell. This cross-cut opened a 5-ft. vein within 21 ft. of point where work started, showing good values. There are 12 tunnels on the property, 2 of which are 1,800 ft. long. The new management will drive the adit and upraise to surface and upper tunnels. Manager Sorensen is in the East to purchase concentrating tables for the 10-stamp mill.

*Malheur.*—J. F. Meikle, owning a 1/4 interest in this property, with Minnesota associates, is in California purchasing a 20-stamp mill, concentrators, engine, boilers and other machinery for a plant to treat low-grade free gold ore.

##### GRANT COUNTY.

(From Our Special Correspondent.)

*Baby McKee.*—A cross-cut 1,600-ft. tunnel is reported to have opened a 5-ft. blind vein that carries good values at a vertical depth of about 800 ft.

*Empire Company.*—The dredge constructed by J. H. Pomeroy on the New Zealand pattern, with a capacity of about 2,200 cu. yd. daily, is making its first run. The company owns 10 miles of placer ground along John Day Creek and tributaries. One of the owners, T. H. Crawford, states that work will soon start on a second dredger of greater capacity.

*Red Boy.*—The 3-compartment shaft is being sunk. A rich strike on the Golden Monarch vein is reported. Work has started on the Olive Lake water-power system to generate electricity for the Red Boy hoist and compressors, and for other mines in the district.

*Snow Creek Mines.*—This property, located in the Greenhorn Mountains, has been purchased by an Eastern syndicate, of which A. G. Pratt, of Hammondspont, N. Y., is trustee. Development work, consisting of drifting on the 75-ft. level and a 600-ft. tunnel to give 275 ft. depth, is under way. Arthur B. Browne is manager.

#### PENNSYLVANIA.

##### ANTHRACITE COAL.

*Taylor Coal Company.*—This company's washery, in North Scranton, was destroyed by fire on September 18. The fire is believed to have been started by friends of the striking miners. The plant had been in operation a month and is the third Scranton washery burnt since the strike began.

#### SOUTH DAKOTA.

##### CUSTER COUNTY.

(From Our Special Correspondent.)

*Black Hills & Duluth Copper Company.*—H. H. Francis is to sink 100 ft. further with a diamond drill on the Spring Creek property. The drill hole is down 200 ft.

*Clara Belle Mining Company.*—Good ore has been cut in the main working shaft. Preparations are being made to start the 2-stamp Tremain mill, which has been idle nearly a year.

*Golden Mortar Mining Company.*—This company is capitalized at \$1,200,000. The assets consist of 170 acres of mining ground 6 miles west of Custer.



**Grantz Gold Mining Company.**—Over 250,000 ft. of lumber has been sawed on the company's ground during the last 6 weeks, and a boarding house, shaft house, ore house, and several other buildings erected. The shaft is 90 ft. deep. The values occur in free gold, telluride of bismuth and calaverite.

**North Star Mining Company.**—Only 5 of the 10 stamps of the new mill are dropping owing to a low water supply. The averaged obtained during a run of the last 2 weeks is given as \$18 a ton in free gold and concentrates. A gasoline engine is being put in and water will be piped from French Creek.

**Saginaw Mining Company.**—The diamond drill in the fifth hole back from the outcrop at 500 ft. cut ore. The company has received new machinery and is sinking a 2-compartment shaft to strike the vein near where it was cut by the drill.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

**Deadwood-Standard Gold Mining Company.**—A partial clean-up at the new cyanide plant, the first since starting after a summer's idleness, resulted in a bar of bullion worth \$6,000, representing a run of about 20 days. The plant is handling 125 tons of ore a day. More tanks will be added in the spring, and by running the crushing machinery 2 shifts the capacity will be 300 tons. A large quantity of ore has been blocked out during the last few months, mostly on the Pryor Hill group.

**Golden Crest Mining Company.**—James Hartgering, who has the contract to build the cyanide mill near the head of Two Bit Gulch, is hauling in supplies. The grading is nearly finished for the foundation, and work has started on an assay office and ore sorting house. The mill will be a 10-stamp, wet crushing affair.

**Homestake Mining Company.**—Three clean-ups are made monthly at each of the stamp mills, each clean-up resulting in approximately \$100,000 worth of bullion, shipped out in 4 bars. The shipments have been made via the American Express Company for ten years until this month, when a change was made to the Adams Express Company. Each consignment is attended by a heavily armed guard. The cyanide plant at Lead cleans up about \$30,000 monthly.

**Spearfish Mining and Reduction Company.**—The last clean-up yielded \$15,000, after running the 300-ton plant 15 days. This clean-up puts the company out of debt.

**Wash No. 2 Mining Company.**—The cyanide plant on Yellow Creek is reported cleaning up \$15,000 a month.

PENNINGTON COUNTY.

(From Our Special Correspondent.)

**Cumberland Gold Mining Company.**—Contractors are running a drift from the 250-ft. level and also sinking the shaft on a stringer of ore.

**Empire State Mining Company.**—The 5-stamp mill is said to have yielded recently \$144 at a 5 hours' run, and \$520 after 18 hours, on ore from the 290-ft. level of the Golden Slipper Mine, on which the company holds a bond. A new 8-drill Ingersoll-Sergeant air compressor is being installed. The shaft is down 350 ft. deep, the ore is stoped on the 290-ft. and dropped to the bottom for loading. A new 10-stamp mill may be built in the spring.

**National Smelter.**—Both furnaces have been blown in by the Horseshoe Mining Company, which has purchased the plant. The ore is hauled from the Mark Twain and Lucile mines, in Lawrence County, 55 miles distant. The company may add 2 furnaces during the winter.

**Ohio-Deadwood Gold Mining Company.**—The main tunnel is nearly 200 ft. long. The new compressor plant is in use.

TEXAS.

BREWSTER COUNTY.

(From Our Special Correspondent.)

**Colquitt-Tigner Mining Company, Limited.**—This company has a Scott 10-ton furnace nearly completed at Terlingua, with 2,000 tons of ore on the dump. Development is active.

**Marfa-Mariposa Mining Company.**—This company, at Terlingua, is shipping 500 flasks of quicksilver monthly, and is figuring on building an additional furnace of 40 tons capacity.

**Terlingua Mining Company.**—This company has encountered a 9-ft. vein of cinnabar and is pushing work.

GALVESTON COUNTY.

(From Our Special Correspondent.)

**Atlantic & Pacific Company.**—This company's well, on Galveston Island, is down 1,200 ft., with no paying oil sand encountered. The company intends to sink 1,500 ft. before abandonment.

HARDIN COUNTY.

(From Our Special Correspondent.)

**Sour Lake Springs Oil Field.**—Sour Lake Oil Company's well No. 2, which caused much trouble on ac-

count of a blow-out, is under control, and its owners assert that it equals any in the field. Loose sand in the finished wells is giving much trouble and curtailing production.

JEFFERSON COUNTY.

(From Our Special Correspondent.)

**Beaumont Oil Field.**—The operators and owners can give thanks that the recent fire was confined to a portion of the Keith-Ward tract, and that the loss was so small. About 25 derricks and 15 pumping outfits and settling tanks were destroyed. The biggest losers were the Higgins Oil and Fuel Company, which lost some small tanks and a 37,500-bbl. iron tank and contents, and the Star Petroleum Company, which lost 10 pumping outfits and will suffer from delay in erecting new outfits. Among other losers are: The Flora Texas Oil Company, Keith-Ward Oil Company, Good Luck Oil Company, Becky Sharp Oil Company, Horseshoe Oil Company, A. B. Wood and T. C. Stribling. The actual monetary loss will not exceed \$75,000. Salt water is steadily increasing in the wells, and consignees of crude oil are clamoring for a rigorous inspection of tank cars and allowance for water in shipments.

**National Oil and Development Company.**—This company, of New York City, has purchased 2 wells in the Lone Acre tract from the Hart Oil Well Company.

UTAH.

(From Our Special Correspondent.)

**Ore and Bullion Settlements.**—The Salt Lake banks report settlements for the week ending September 20, \$543,100, as follows: Bullion, \$167,800; gold, silver, lead and copper ore, \$181,500; gold bars, \$193,800.

BEAVER COUNTY.

(From Our Special Correspondent.)

**Eric.**—On this property, just out of Milford, situated on the O. K. ledge, a 100-ft. shaft is rapidly sinking in a body of low-grade ore.

**Horn Silver.**—This mine at Frisco sent in its usual consignment of 2 cars for the week ending September 20. Superintendent Farnsworth reports about 60 hands now employed and shipments of about 200 tons of first-class ore monthly to the smelter.

**Ophir Mining Company.**—A cyanide plant is to be installed. Superintendent W. D. Parker, after tests, has made a saving of 90 per cent with the use of a mild roast.

JUAB COUNTY.

(From Our Special Correspondent.)

**Tintic Shipments.**—The following shipments are reported for the week closing September 20: Rabbit's Foot, 1 car ore; Mammoth, 10 cars ore; Eagle & Blue Bell, 2 cars ore; Grand Central, 27 cars ore; South Swansea, 3 cars ore; Bullion-Beck, 6 cars ore; Gemini, 12 cars ore; Lower Mammoth, 4 cars ore; Yankee Consolidated, 6 cars ore; Uncle Sam, 4 cars ore; Martha Washington, 1 car ore; Carisa, 8 cars ore; Ajax, 2 cars; Alaska, 4 cars ore; Dragon Iron, 26 cars ore; Centennial Eureka, 17 cars ore.

**Ajax.**—Some fine ore has been taken out in the 60-ft. winze below the 1,000-ft. level.

**Carisa.**—The management has renewed a contract with the Bingham Consolidated Smelter for smelting its output, finding such a contract cheaper than going on the open market, as was suggested by some shareholders.

PIUTE COUNTY.

(From Our Special Correspondent.)

**Annie Laurie.**—The first consignment of bullion has been marketed, consisting of a gold bar valued at \$10,000. Whether the mine will be sold will be determined by reports sent to London by an expert about to arrive.

SALT LAKE COUNTY.

(From Our Special Correspondent.)

**Alta Shipments.**—The Grizzly shipped 2 cars and the Montezuma 1 car in the week ending September 20.

**Bingham Shipments.**—In the week closing September 20 the Old Telegraph shipped 1 car of ore and the Utah Consolidated 2 cars of lead ore. The Highland Boy (Utah Consolidated) Smelter sent out 5 cars of copper bullion, aggregating 300,000 lbs.

**Bingham Consolidated Mining and Smelting Company.**—The weekly shipment of bullion was 4 cars, or 240,000 lbs., to Eastern refineries.

**United States Mining Company.**—In the Federal Court suits, making grave and sensational charges, have been filed. The plaintiffs are the Ivanhoe Company and Enos A. Wall. The property is located in the heart of the United States territory at Bingham, and the suits may interfere with the operations of the defendant company. One suit estimates damages to the extent of \$285,000 for the unlawful extraction of 19,000 tons of ore from the Ashland patented claim, and a second suit involves the apex rights of certain other claims.

SUMMIT COUNTY.

**Park City Superior Company.**—This company, which has a tunnel 1,100 ft. long, has awarded a contract for driving to the contact, a distance estimated at between 200 and 300 ft. The work will continue under the superintendence of H. P. Sappington.

(From Our Special Correspondent.)

**Park City Shipments.**—During the week ending September 20 the Daly West shipped 2,772,480 lbs. of ore to the Mackintosh Sampler; the Anchor, 254,260 lbs.; the California, 154,120 lbs., and the Ontario, 702,285 lbs.

**California.**—A large body of good ore is reported opened on the intermediate level. Superintendent Gitsch says he has drifted on it 80 ft., with but one wall exposed. Assays reported are 7 per cent lead, 17 oz. silver, 0.8 gold, with zinc reduced to 1.6 per cent. The milling average assay is 19 per cent lead, 7 oz. silver and 0.8 oz. gold per ton.

**Deer Valley Consolidated.**—This group of 6 claims has passed to R. J. Evans and W. D. Thompson on a year lease and bond. The group was formerly owned by the Barnes Brothers.

**Wabash.**—At the annual meeting of the shareholders, N. Treweek was elected president and manager, W. M. Ferry vice president and treasurer, and M. A. Dougherty secretary.

TOOELE COUNTY.

(From Our Special Correspondent.)

**Stockton Shipments.**—Shipments for the week ending September 20 from this camp are reported as follows: Mono, 1 car ore; Cygnet, 3 cars ore; Ophir Hill, 27 cars concentrates. The Utah, of Fish Springs, reports 1 car.

**Western Exploration Company.**—This company now has a bond on the Buckhorn group of 10 or 12 claims, adjoining the property of Senator Clark in Ophir Canyon, near Ophir.

VERMONT.

**New England Asbestos Company.**—G. Frank Allen, of Fall River, Mass., president of this company, has issued a circular letter to stockholders calling a meeting to vote on an increase of the capital stock from \$500,000 to not less than \$1,500,000, and to use the additional stock, or the proceeds of its sale, to acquire 3 Canadian asbestos mines—the Beaver, at Thetford; the Johnson, at Black Lake, and the Broughton, Que., mine. The purchase price of these mines is \$675,000, of which the present owners of the properties are willing to take \$330,000 in stock.

WEST VIRGINIA.

FAYETTE COUNTY.

**Victoria Coal and Coke Company.**—The power house and stables of the Victoria Coal and Coke Company, at Caperton, on New River, were destroyed by fire on September 18, involving a loss of \$25,000. The fire is believed to have been set by striking miners. The mines were flooded owing to the inability of the management to keep pumps at work during the strike.

MARION COUNTY.

**Stafford.**—An explosion in these mines, belonging to the New Central Coal Company, on September 22, killed 4 men and injured 6. All the bodies were recovered.

MINGO COUNTY.

A block of coal lands controlled by E. S. Doolittle and the Ensign estate, of Huntington, and Everett Leftwich, of Williamson, has been sold to a syndicate of Horace Chapman and Jones & Jewett. The tract contains 5,000 acres and lies on the Norfolk & Western about 3 miles west of Williamson. The purchase price is reported as \$100,000.

FOREIGN MINING NEWS.

AFRICA.

NATAL.

Coal output of the Natal collieries in July is reported at 47,604 tons, being 1,993 tons less than in July, 1901. No coal was exported in July, but 23,574 tons were sold to steamers in the port of Durban.

TRANSVAAL.

The gold output for the month of August is reported at 162,750 oz. fine, an increase of 13,571 oz. over July. The total for the 8 months ending August 31 was 968,771 oz., or \$20,022,497. In 1901 mining began in May, and the total up to the end of August was 81,690 oz.

ASIA.

INDIA—MYSORE.

**Kolar Gold-field.**—The output of the gold mines in this district for August was the largest ever reported for a single month. The total was 49,628 oz. crude being 5,781 oz. more than in July, and 7,580 oz.

more than in August, 1901. For the 8 months ending August 31 the total was 320,603 oz. crude, against 336,416 oz. for the corresponding period in 1901; a decrease of 15,813 oz. or 4.7 per cent. The total this year was equal to 288,543 oz. fine gold, or \$5,964,184. The water scarcity, which reduced the output in the earlier months of this year, is now over, and the mines are working at their full rate.

#### AUSTRALIA.

##### NEW SOUTH WALES.

The *Australian Mining Standard* says: "According to a return furnished by the Mines Department of New South Wales, the total value of the silver, copper, tin and coal exported from the State in the first six months of the current year was £1,738,289, as compared with £2,224,522 during the corresponding period of last year. The decrease is £486,233, or about 22 per cent. The export of silver and silver lead in matte, bullion and ores is valued at £708,747, against £1,071,192 for the corresponding period of 1901, the decrease being £362,445, or about 33 per cent. Exports of copper show a decrease in value of £67,555, of tin a decrease of £4,799, and of coal a decrease of £56,844. Movements in price are responsible for the decrease in value of the exports of the metals, but there has been no change in the price of coal. It appears, therefore, that the export of this commodity has fallen off by about 6 per cent as compared with that of the corresponding 6 months of last year, the respective totals being £798,930 for the first half of 1902, and £850,364 for that of 1901. It will shortly become a serious question whether it is possible to maintain the price of Newcastle at the advanced figure recently fixed by agreement between the miners and the colliery proprietors."

#### CANADA.

##### BRITISH COLUMBIA—BOUNDARY DISTRICT.

*Boundary Smelter.*—All the smelting plants in the district are now reported running full blast. The Granby, at Grand Forks, has 4 stacks; the British Columbia Copper Company, at Greenwood, has 2 and the Montreal & Boston, at Boundary Falls, has 1. The Granby Company's mines are shipping to the Grand Forks Smelter; the Greenwood Smelter is getting its supplies chiefly from the Mother Lode, with several cars each day from the Snowshoe; the Boundary Falls works is supplementing supplies from the Sunset with ore from both Snowshoe and the B. C. mines. While they were shipping the Jewel sent its ore to Grand Forks and the No. 7 to Greenwood. So far no ore from the Republic mines has come to either Greenwood or Boundary Falls.

##### BRITISH COLUMBIA—CASSIAR DISTRICT.

*Thibet Creek Mining Company.*—A landslide is said to have destroyed the hydraulic plant, including flumes, sluices, monitors, etc., which cost \$60,000.

##### ONTARIO—MANITOU DISTRICT.

(From Our Special Correspondent.)

*Consolidated Silver Mines of Lake Superior.*—This company has shipped 30 tons of high-grade silver ore, its last ore for the season, to Omaha, and is to make extensive improvements for next year. New engines, boilers, compressors, etc., are to be added, new buildings erected and 10 stamps added to the mill. Under ground the workings will be opened and the main shaft enlarged and retimbered. The company will refit in this way the old East and West End mines, now called the Silver Mountain property, and will later rehabilitate the old Badger, Keystone and Porcupine group. The company has in the past 4 years shipped about \$400,000 worth of silver ore, with a small force and inadequate machinery.

#### MEXICO.

##### DURANGO.

*Campania Minera de Penoles.*—The briquetting outfit of two No. 1 White briquetting presses, shipped to the smelter at Mapimi by the Henry S. Mould Company, of Pittsburg, Pa., will begin to operate on fine roasted copper ores in a few days.

##### SONORA.

*Greene Consolidated.*—The No. 1 White briquetting press, installed at the smelter at La Cananea, is about ready to begin work on copper fines.

#### NEW ZEALAND.

The exports of gold and silver from New Zealand for July and the 7 months ending July 31 are reported by the Mines Department as below, in ounces:

	—Gold—		—Silver—	
	1901.	1902.	1901.	1902.
July .....	31,365	47,051	48,000	34,256
Seven months.....	248,343	263,852	264,267	357,339

This shows an increase of 15,509 oz., or 6.4 per cent, in gold, and an increase of 93,072 oz., or 35.3 per cent, in silver exports.

(From Our Special Correspondent.)

A party of tributaries in the Bunker's Hill Mine, Coromandel, recently unearthed a very rich reef, from which in 7 days over 300 lbs. of specimen ore,

worth about £1,200, were obtained, and there is promise of much more. The South Kapanga Mine, an adjacent property, has also struck rich ore.

*Gold Dredging.*—During the past few weeks the South Island dredges have been obtaining very good returns, fully 50 per cent ahead of last year's, the total gold won per week approaching or exceeding 3,000 oz. Dividends are in consequence frequent, and the industry is in a healthy state. Viewed simply as a dredge, the present type of New Zealand machine is extremely efficient, and is manned, as a rule, by men of much practical experience, who often exhibit very great skill in overcoming the obstacles of rocky bottom, wash full of large boulders or tree trunks, rapid river currents, etc.; but the gold-saving appliances, though probably effective for fairly coarse gold, leave much to be desired as savers of fine gold.

*Waihi.*—The latest return is fully up to the average. It is reported that an entirely new lode has lately been struck in the northern section of the mine.

#### SOUTH AMERICA.

##### BRITISH GUIANA.

Exports of gold from the colony for the 8 months ending August 31 were 62,769 oz. crude, against 62,724 oz. for the corresponding period in 1901, an increase of 45 oz., or 0.7 per cent. The total this year was equal to 52,973 oz. fine gold, or \$1,094,946.

Exports of diamonds were 8,685 carats, valued at \$89,134. Exports of kaolin were 900 tons.

#### MINING STOCKS.

(Complete quotations will be found on pages 432 and 433.)

##### New York. Sept. 26.

Tight money has forced stock quotations down; transactions have not been large, holders anticipating some relief soon. In fact certain speculators think an improvement in the stock market is approaching, and so are waiting. Meanwhile the small investor wants to buy at low prices, yet has not the courage to venture in the present uncertain market.

Copper shares continue to attract most attention. Amalgamated, after touching \$67¼ on Monday, gradually fell to \$64.25 on Wednesday, when the largest sales for the three days were made. Anaconda is seldom heard of, and when the stock does change hands little interest is shown to influence prices. On Tuesday 107 per cent (\$26.75) was quoted, and on Wednesday 104 (\$26.00), on small trading. The curb coppers were sympathetically weak. United of Montana brought \$30@829; Greene Consolidated of Mexico, \$27@825½; Tennessee, \$16½@818; White Knob, of Idaho, \$19@818½; British Columbia, \$6@85¼; Montreal & Boston, \$3¼@82½, and Union, of North Carolina, \$3. The stock of the Bamberger-De Lamar Gold Company, with mines in Nevada, was introduced on curb this week at \$10¼. This is 75c. more than the subscription price a few weeks ago. The company is capitalized at \$5,000,000, divided into 500,000 \$10 shares.

A sale of Ontario Silver, of Utah, is noted at \$9. Standard Consolidated of California appeared at \$3.45.

Alice, of Montana, brought 25c. The Colorado stocks are sparingly traded in, with one or two exceptions. Isabella, of Cripple Creek, fluctuated between 33@31c., and Portland sold at \$1.85@1.90.

The Comstock stocks need nourishment. Consolidated California & Virginia sold at \$1.25, Ophir at \$1.05 and Hale & Norcross at 28@29c.

Auction sales were 200 preferred shares Joseph Ladue Gold Mining and Development Company, of Yukon, at \$1.05 per share; and 700,000 shares Canterbury Mining Company, of Leadville, Colo., par 10c., at \$19 for lot.

##### Boston. Sept. 23.

(From Our Special Correspondent.)

There have been no new developments of importance in the local situation during the week. Prices of mining shares have all fallen off, but no significance is attached to the declines. No pressure to sell stocks is noticeable, however. Brokers report that mining stocks are continually being taken up by customers, which shows that the owners are willing to go in for a long pull. Few copper shares are offered on loans, as there is a scarcity of stocks in brokers' offices, which is very significant.

The only important news items are the calling of assessments on Adventure and Mass mining shares, of \$2 each. Whether any deductions can be drawn from the almost simultaneous levying of these assessments is hard to say. It was said some months ago that a consolidation would be effected between these two, but as market conditions have not been right the matter was dropped. The Adventure assessment is payable October 15 on stock of record, October 6. No reason is given for this call, but it is surmised that it is for further underground development, which is the reason given for the Mass call. Adventure stock has lost \$2 during the week, closing at \$20. Mass broke

\$2 to \$16, but recovered to \$16.75 on the announcement of the new call. The Adventure Mill has gone into commission, with one head of stamps. In all, \$16 per share has now been paid in on Adventure and \$17 on Mass Consolidated. The latter's assessment is payable in two installments, \$1 on December 1 and \$1 on April 1, 1903. The Mass has taken out over 2,000,000 lbs. of copper in 8 months of this year, with but one head in operation.

From all indications Heinze will be badly beaten in politics in Montana this fall, which may be the forerunner of a lull campaign in Amalgamated; at least, this is the feeling in this center. In this connection two sales of his United Copper have been made; one was at \$30 for 15 shares, September 17, and the other at \$29.50, for 50 shares, September 23. The previous sale for a round lot was at \$34¼ on August 8 in this market.

There was quite an active market for Montana Coal and Coke stock during the week, and the stock advanced \$1.75 to \$5.50. The buying was by a house that has been prominent in it heretofore and was said to be for New York account.

Old Dominion has fallen \$1 to \$16.50. President Smith and party have gone to the property. The matter of wages will be taken up, as the miners were raised when copper was bringing 17c. Dominion Iron rose \$2.87½ to \$75.37½ during the week, but fell back to \$71.87½. Speculation in this stock has become a tame affair compared to what it was. Winona fell to \$4, but nothing was said. A mill test at the Atlantic Mill will be made on Winona ore next month. Amalgamated people are said to be considerable owners of Greene Consolidated through money loaned.

Copper Range has fallen \$2.50 to \$57; United States, \$1.25 to \$21.12½; Isle Royale, \$1 to \$13.50; Centennial, \$1 to \$17; Bingham, \$1 to \$29.50; Mohawk, \$1.75 to \$46.50; Osceola, \$2 to \$59; Tamarack, \$7.50 to \$172; Utah, \$1.75 to \$20.50; Quincy, \$5 to \$1.25, and Atlantic, \$1 to \$27. Copper Range has increased its Baltic rock to 1,300 tons per day. President Fay, of the Centennial group of mines, is at the Lake and will institute some radical curtailment.

##### Colorado Springs. Sept. 19.

(From Our Special Correspondent.)

There was practically no market this week, owing to the suspension of the calls on Wednesday and Thursday in respect to the memory of W. S. Stratton, whose funeral was on those days. The death of the multi-millionaire has also had a depressing effect upon Cripple Creek mining stocks in general, due in a large measure to sympathy, and also to the uncertainty regarding the disposition of his Cripple Creek estate. The will has not been made public to date, but it is generally understood that mining operations will continue upon the lines laid down by him 3 years ago. Mr. Stratton owned at the time of his death approximately 820 acres in the Cripple Creek District, which he had deeded to the Stratton Cripple Creek Mining and Development Company, with a capital stock of 20,000,000 shares, par value 50c. a share. None of the stock was ever issued, and it is one of the most important assets of the millionaire's estate. His fortune is estimated at \$15,000,000. He owned no stocks of consequence listed upon the Mining Exchange.

The heaviest trading of the week was on Saturday last, when the market presented a strong front both in point of number of shares sold and prices paid. Elkton about held its own during the week. El Paso sold at 72@72½c. on September 13, dropping to 70½@70c. to-day. Isabella sold from 35½@36¾c. during the week, with considerable trading. Portland sold at \$1.90½ September 13, and \$1.91 on the 15, with stronger quotations to-day. There was quite a variety of trading to-day in the prospect department, and a number of rises and falls in prices were recorded. Buying is largely local, although the indications still hold out for a good market for some time to come.

A meeting of all the principal mine owners of the Cripple Creek District has been called for September 26, to take up the subject of running a co-operative drainage tunnel to unwater the mines of the camp. It is proposed to form a company and run a bore 4,200 ft. to cut the El Paso at 620 ft., the Elkton at 970 ft., the Portland at 1,350 ft., the Mary McKinney at 800 ft., and other mines proportionately. The cost will be, it is estimated, \$100,000. This step already has the unqualified endorsement of a number of the big mining companies of the camp, and is a move in the direction of again putting the shippers, now retarded by the present expensive pumping operations, upon a profit-earning and dividend-paying basis.

##### Salt Lake City. Sept. 20.

(From Our Special Correspondent.)

The week has carried the general market upward, with several points gained in many stocks. Some registered lower prices at the close than at the opening, but they were few. Lower Mammoth made rapid strides upward, with sales of 6,600 shares, opening at



\$1.24 and closing at \$1.50%. Mammoth also climbed to \$1.97½, from an opening at \$1.57, with sales of only 1,200 shares. Ajax advanced from 38c. to 43½c., doing business to the extent of 10,300 shares. Yankee Consolidated sold 13,500 shares at prices ranging between the opening on Monday at 59¼c., to 75c. on Tuesday, with a reaction towards the close of the week. California did the great bulk of the business as measured by the number of shares, which was 144,883, at prices between 44c. and 38c., an advance over last week. Century sold 15,500 shares on a rising market, touching \$1.28 high and \$1.16 low. Carisa dropped a point, with 19,300 shares sold at 20½@19¼c. Consolidated Mercur retreated to \$1.98@2.04, with 11,525 shares exchanging hands. Daly Judge retreated a few cents, its limits being \$12.03@11.90, with 1,820 shares exchanged. Daly West dropped back to \$49.90@51.90, with sales of 1,610 shares. Grand Central remained steady at \$5.80@5.70, with 600 shares coming out, and Uncle Sam was quoted at 36¼@34c., with sales of 6,500 shares.

The total sales on the Exchange, including the Open Board, for the week were 253,069 shares, and advance over last week of 30,000 shares.

San Francisco. Sept. 20.

(From Our Special Correspondent.)

The market has been dull during the week, and a somewhat lower range of prices has prevailed. Consolidated California & Virginia was quoted: \$1.10@1.15; Ophir, \$1@1.10; Caledonia, 97c.@1; Best & Belcher, 13@14c.; Gould & Curry, 9c.

Business on the Oil Exchange was better than for several weeks past, though it can hardly be called brisk as yet. Prices were better sustained and the market had a firmer tone. Home sold at \$2.90; Sterling, \$1.55; Sovereign, 25c. Brokers are looking for better business.

London. Sept. 9.

(From Our Special Correspondent.)

There seems to be an inclination on the part of some of the leaders of the South African market to infuse a little life into affairs, and during the past week the quotations of the shares of some of the speculative proprietary companies have been moved up a few points by their manipulators. I do not find, however, that the public are going in, and the business done is purely nominal. The labor question still absorbs attention among people interested in Transvaal mining. The proposition now is to institute a system of piece work, and it is supposed that such a method of payment by results instead of days' wages will be attractive to the native. The leaders of this movement are Messrs. Albu and Mr. Denny, their engineer. These gentlemen are known as exceptionally good managers of mines and men, and the experiment is therefore in good hands. Hitherto it has been a continual surprise to American mining men going to the Rand to find that sinking and driving are not paid by the foot; but they soon find that the native is not equal to working with his head and that their labors at the face of the rock are confined to drilling the holes and clearing away the debris. It is extremely doubtful whether the native can be induced to work more quickly and continuously by payment at so much a hole. It is hardly possible to introduce piece work in any other part of the business, so that the applicability of the system is not very extended. Messrs. Albu and Denny's methods are, however, well worth a trial, for no stone must be left unturned in seeking for a solution of the present labor difficulty.

The other sections of the mining market have moved rather more this week, in sympathy probably with the South African market. Both Indians and West Australians have attracted some notice, but the amount of business is not great. The fact that Messrs. Bewick, Moreing & Co. have recently taken over the direction of quite a number of the big West Australian mines is to be reckoned a point in favor of the West Australian market, as the firm's representatives on the spot are reliable men and will remove the many causes of reproach that have made West Australian mine management and manipulation things to keep clear of. On the other hand, British Columbian mines still keep in the background, though the news from some of the leading mines seems more favorable. For instance, Le Roi is now shipping at an estimated profit, and arrangements have been made with the Great Northern to reduce substantially the rates for coke and ore. Le Roi No. 2 also reports shipments of ore for August at a profit, but the shares in neither of the companies have received as much attention as would be the case if similar estimates by previous managers had not been falsified by experience. The fact of the reduction of railroad freight should have attracted more attention than it did, as it is a substantial gain to the companies.

In the midst of the general stagnation the issue of an exhaustive report on the Ivanhoe Mine has passed quite unnoticed in the West Australian market. This report is by Messrs. Feldtmann, Prichard & Hollow, who examined the mine for Messrs. Bewick, Moreing & Co. It will be remembered that these gentlemen also examined the Lake View some months back and

staggered the market with their revelations. The report on the Ivanhoe is very complete and exhaustive, and shows the mine to be in as good a state as Lake View was in a bad. There is quite two years' supply of ore in sight, averaging over 1 oz. per ton, working with 100 stamps, and the developments do not show any sign of falling off in the veins. In addition, the ore is more free milling than that of the other mines in the district. The engineers consider that the mine will continue profitable for many years to come. This report, while comforting to shareholders, has had no effect on the market for the shares, and no demand for them is visible. This fact shows to what a low ebb the mining market has sunk.

A Central American mine that has suddenly sprung up into importance in the London mining market is the Aramecina Gold and Silver Mining Company, Limited, which owns properties in the Republic of Honduras. This company was formed so long ago as 1889, to acquire an extensive silver property, but for several reasons, chiefly the fall in the price of silver, no great headway was made. For some time the company lay practically dormant, though some prospecting was done, until a few years ago a particularly rich vein of gold-bearing ore was discovered. The vein averages 2 ft. wide and runs nearly 4 oz. to the ton. The directors were therefore encouraged to raise further funds for development and equipment. Another difficulty now beset them in the systematic thefts of gold by the native workmen, and it was only after the help of the English and United States governments had been invoked that the Government of the Republic could be induced to help stop the frauds. The works there are now on a satisfactory footing, and during the 18 months ended June 30 last 4,379 tons were treated and produced gold worth £69,856, in addition to which the tailings contained 6 to 10 dwts., to be recovered later. A profit of £37,000 was made, and this has been applied to wiping off debit balances, providing a new 10-stamp mill and building houses, etc. The old 10-stamp mill that was used on the silver ore is being moved to the mine, and shortly there will be 20 stamps at work. No precise information is given as to ore in sight, but the vein seems extensive, though much faulted. Another vein has recently been discovered that also has a high assay value. The company intends to take an interest in an adjoining property that has recently been acquired by the Consolidated Mines Selection Company, so that its prospects for the future are extremely favorable. The pluck with which this company has been managed reflects great credit on Mr. Oliver Wethered, the chairman. He is a well known city man in the mining business. He is director of some 20 mining companies, and is a leading spirit of the London & British Columbia Goldfields Company, that introduced the Ymir, Whitewater, Ruth, Enterprise and other British Columbia mines. West Australian land and mining companies are intimately associated with his name, and he is also vice-chairman of the Dolcoath Mine, so that his mining interests are varied. I fancy he is as pleased with his Aramecina results as with any of his other enterprises.

#### COAL TRADE REVIEW.

New York. Sept. 26.

##### ANTHRACITE.

The situation in the Pennsylvania anthracite regions is now distinctly up to Governor Stone, and he has shown a delayed recognition of the fact by declaring martial law in one county. The steady increase in production last week and the unchanging attitude of the operators made some of the strike leaders resort to desperate measures, assault, arson and possibly murder, have been of daily occurrence this week, with the result that production has been checked even in regions where the militia has been called out. It is doubtful if a Governor of Pennsylvania ever showed greater lack of nerve than Governor Stone when he refused Sheriff Bedell's request for troops unless the request was backed by 12 responsible citizens. Equally with condemnation is the assignment of militia regiments. The trade union feeling is very strong in the anthracite country, and sympathizers with other union men cannot be expected to do efficient duty in repressing acts committed by acquaintances or relatives. The whole situation now is a disgrace to the State, and is rapidly becoming so very bad that citizens who care for law and order are bound to ask that every man who wants to return to work shall be permitted, shall be protected while working, and shall have his family and property protected as well.

The demand for coal increases, and the market all over the country shows rising prices with small holdings, and at some points no anthracite at all. At the head of the Lakes supplies are now practically exhausted with little prospect of any great amount arriving by water before navigation closes. In Chicago territory supplies are waning fast, and consumers, realizing that no large shipments of anthracite can be expected for some time yet, are preparing to burn bituminous. Transactions at wholesale are limited, and the largest wholesale stock in the city is under

3,000 tons, and the largest retail stock is less than 2,000 tons. The total amount of anthracite in stock in the city is probably not over 12,000 tons. Retail prices are about \$12, for prepared sizes. Along the lower lakes and in Canadian territory conditions have become worse during the week, Buffalo being apparently the most favored city. Gas, soft coal and wood are in demand. Along the Atlantic seaboard a short supply of bituminous has accentuated the shortage of anthracite, and prices have gone still higher. At Baltimore dealers are entirely out of anthracite; and at many other seaboard points the situation is as bad. Meanwhile gas companies are doing a land office business. At New York gas companies are reported selling coke for even more than the coal (bought under contracts made in April) cost, and selling 40 per cent more gas than ever before. At retail the prepared sizes of anthracite are selling for \$15 at Boston and New York, while at New York pea is retailing at \$6.50, buckwheat at \$6 and rice at \$5.25, and small lots are reported taken at wholesale for these figures: Broken and egg, \$13.50; stove and nut, \$12.50; pea, \$7; buckwheat, \$5; rice, \$4.50.

##### BITUMINOUS.

The Atlantic seaboard soft coal market is suddenly nervous and panicky, and the oldest men in the trade find themselves unable to size up the situation clearly. Speculative prices have jumped up so fast in the last few days that speculators are scared, and many of them refuse to venture in the market. The situation is bad, and uncertainty makes it worse. Primarily the trouble may be laid on the railroads, or, to speak specifically, on the Pennsylvania Railroad. In a time of extraordinary demand car supply at the mines has slumped off, transportation is slow and irregular and less than a normal tonnage of coal is arriving at the shipping ports. The railroad officials cannot now allege summer excursion business as an excuse, though that was a stock excuse some weeks ago; in fact there is a paucity of excuses. It is even said that the matter of car supply and transportation was taken out of the hands of some of the lower railroad officials, and that those higher up who undertook to improve things have thrown up their hands at the size of the job. It is reported that the Pennsylvania Company has ordered 300 new locomotives for next year, but such reports do not comfort sales agents of coal companies with plenty of coal at the mines, and no means of supplying clamorous consumers. There is indeed a sinister report in circulation that the present situation is not impossible of solution, and that the railroads are in reality educating producers and consumers to a contemplated advance in through freight rates next April of 25c. per ton or more. This rumor may be baseless, but it reflects the general nervousness of the market, and is not incompatible with some recent developments.

The demand for coal has increased as means of supplying the demand have fallen off. The increase is due to bituminous coal supplanting anthracite for use in hotels, office buildings, factories and public buildings all along the Atlantic seaboard, also to a considerable tonnage being tied up for domestic purposes at such cities as New York, Boston and Philadelphia, and finally, it is said, to the Consolidated Railroad buying coal in the open market. This road, according to reports, contracted for a large tonnage with the Davis Coal and Coke Company, but owing to recent conflicts between the Pennsylvania and the Goulds over a new line from the West Virginia fields to tidewater the Davis Company has been unable to get cars, and the Consolidated consequently has not received the coal contracted for.

At New York Harbor shipping ports the speculative price for Clearfield grades has risen to \$6.35, and may be higher in certain cases. Bad as the situation is at New York, it is worse at the farther Long Island Sound ports and in the far East. Producers finding that speculators do not dare to venture into the market are giving attention to filling contracts, and thus the supply of coal available for consumers unprotected by contracts is still further curtailed. The speculative price for Clearfield grades, f. o. b. Boston on September 25, was \$7.50@8.50, and at Providence \$7.75@8.75.

Car supply at the mines is now about 25 to 40 per cent of the demand. Transportation from the mines to tidewater is slow and so irregular that consumers cannot tell when to expect arrivals. In the coastwise vessel market there have been no especial changes in vessel supply and freight rates from last week.

Birmingham. Sept. 22.

(From Our Special Correspondent.)

There is a good demand for fuel. The statement is made that the price of coal will advance during this week, or before the end of the month, from 25 to 50c. per ton. There is a strong inquiry for the product for delivery during the winter. At present the railroads are doing nicely in the way of furnishing cars for the transportation of the product.

The new mines of the Sloss-Sheffield Steel and Iron Company, at Flat Top Mountain, in Walker County, are beginning to have a steady output, and



the coal is of excellent quality. During the past week several cars of the coal were carried to Coalburg, and there manufactured into coke. A fine quality of coke was produced; in fact, samples brought to the city made a most favorable impression among those interested in the product. Contracts have been let for the construction of 200 coke ovens at Flat Top Mountain mines, and 100 of them are to be completed by the middle of December.

The Central of Georgia Railroad Company is interested in the purchase of 2,000 acres of coal lands in Jefferson County, and will shortly have development begun. The road at present gets its supplies of fuel from mines in this district on other roads.

Two hundred miners employed at the Coal City mines in St. Clair County mines in this State went out on a strike recently because of differences about taking down top in the mines. The president of the United Mine Workers of America in Alabama went over to Coal City, and there are indications that the differences will be adjusted shortly. There are no more than 450 miners idle in this State, including those enumerated above.

The demand for coke is strong. The commodity is bringing between \$4.50 and \$5.50 per ton, and is very scarce. Virginia coke is still being imported to help supply the needs in this State.

Chicago. Sept. 23.

(From Our Special Correspondent.)

As wholesalers dealing in bituminous coal see the market, there is nothing to complain of; prices are high, trade is booming and the prospects for the future are good for an indefinite period. Retailers and large consumers are laying in heavy stocks of the best bituminous grades and prices are fluctuating considerably in view of the brisk demand. There is now little prospect that, however soon the anthracite miners' strike may be settled, Chicago and the West will get coal other than bituminous next winter. The trade and the consuming public are acting on this theory. Smokeless and Hocking lead in demand; run-of-mine Pocohontas and New River have advanced to \$6, car price for the country; lump and egg of these two smokeless grades are practically out of the market. Hocking is very slow in coming forward, and sells at \$3.35, as last week. West Virginia splint is still \$4, but will probably advance 25c. to 50c. in a few days. Indiana block is hardly to be had, though nominally quoted at \$2.70; Youghiogheny lump sells at \$3.30, the only reduction from last week's prices: West Virginia lump remains at \$3.47, with daily prospect of a sharp advance; indeed, this statement is true of practically all grades received by rail from Eastern points. Blacksmith's coal is quoted at \$3.50@3.75; Brazil block, \$2.70; Indiana semi-block, \$2.10. Illinois coals have advanced 10c. to 40c. a ton, ranging from \$1.20 to \$2.30 at the mines; for Chicago delivery this means 65c. to \$1 additional for freight. "All prices are subject to change without notice" is a motto especially emphasized now on wholesale price lists.

Anthracite stocks are exhausted so far as wholesalers are concerned, and practically no anthracite remains in retail yards.

Cleveland. Sept. 23.

(From Our Special Correspondent.)

Toward the latter part of last week the receipts of coal at the Ohio ports, which until that time had been fairly good, fell away, and shippers were again left in the lurch. This came at an inopportune time, when the boats at the docks were plentiful, and when many of them were in need of cargoes. Failing to obtain them when desired, the boats had to hold over until this week. The week started out with no material bettering of conditions. The movement now is about 50 per cent of the requirements of the shippers, which, during the fall season and coming upon the heels of a light movement all summer, does not promise very well for the condition of the stock piles up above this winter. The sole dependence of the vessel owners for a bettering of rates and condition this fall is some anthracite may be shipped up the lakes this fall, although the amount of it will hardly be any appreciable relief to shipping. The domestic supply is quite limited, both of hard coal and of soft. During the last week only 77 tons of hard coal were received in this city, and the movement of bituminous coal has been so light that some of the railroads here are even finding themselves in a distressed condition, and have given big orders for material. Conditions have not been worse in this territory in years.

Pittsburg. Sept. 24.

(From Our Special Correspondent.)

Coal.—It is impossible to place an order with any certainty as to delivery at anything near the circular price. While the car supply has been better during the week, the producers are unable to catch up on old contracts and offers of new business at fancy prices cannot be taken. The Pittsburg Coal Company, the railroad coal combine, is straining every effort to meet its Northwestern contracts, but seems to be falling

behind. The Monongahela River Consolidated Coal and Coke Company, the river coal combine, is operating all of its mines in full and rapidly increasing its large tonnage. It still has a large number of empty coal boats and barges to load.

Connellsville Coke.—The promise of a better supply of cars by the railroads is being kept to a certain extent, and shipments show a considerable gain. The production continues to increase and all records have been broken during the past week. It is impossible to quote the prices being paid, as prompt shipments command unusually high premiums over the circular prices, which remain at \$2.25@2.50 for furnace and \$2.75@3 for foundry. The Courier, in its last issue, gives the production for the previous week at 256,351 tons, a gain of 1,300 tons over the preceding week. The shipments for the week aggregated 12,031 cars, distributed as follows: To Pittsburg and river tipples, 3,888 cars; to points west of Pittsburg, 5,750 cars; to points east of Connellsville, 2,393 cars. This was an increase of 355 cars compared with the shipments of the previous week.

San Francisco. Sept. 20.

(Special Report of J. W. Harrison.)

During the week there have been 2 coal arrivals from Oregon with 970 tons; 3 from British Columbia, with 10,304 tons; 3 from Newcastle, N. S. W., with 7,791 tons; 1 from Washington, with 2,600 tons; total, 21,705 tons. The deliveries of coal this week will assimilate very closely to the amount coming to hand the past week. There is ample coal on hand for all requirements, there being no scarcity of any particular grade. Some of the overdue Australian vessels are putting in an appearance, there being four yet overdue. With those four vessels coming to hand, there will be left but six cargoes of Colonial coal on the chartered list, which means that the total amount of coal that can arrive from Australia this year will not exceed 25,000 tons. This is an exceptionally small amount, yet it will not lead to any disturbance of values, as the coast collieries can more than make good any shortages in the deliveries of foreign grades. Prices remain unchanged, and judging from the activity of teamsters on the water front sales must be fairly large. There seems to be no evidence of any immediate settlement of the coal strike in the East, but as we receive small quantities from there, 90 per cent of which is for blacksmith uses, our prices for Eastern coals are varied but little. It may probably affect the value of Cumberland coal some few months hence, as some of the future cargoes of Cumberland must be loaded with high-cost coal.

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

Foreign Coal Trade. Sept. 25.

No change is to be noted in the export situation here, and business continues very quiet. Occasional inquiries are received.

A cargo of 4,000 tons Welsh anthracite, to which we referred recently, has arrived in New York, and another is on the way. This coal falls below the 92 per cent fixed carbon, which the tariff law makes the standard for anthracite, and will have to pay duty as bituminous coal.

Exports of coal and coke from Great Britain for the 8 months ending August 31 are given by the Board of Trade returns as below, in long tons:

	1901.	1902.	Changes.
Coal .....	27,851,828	27,588,766	D. 263,062
Coke .....	501,858	402,154	D. 99,704
Briquettes .....	726,942	719,324	D. 7,618
Totals .....	29,080,628	28,710,244	D. 370,384

In addition to these exports there were 9,885,812 tons of coal sent abroad for the use of steamers engaged in foreign trade, against 8,936,937 tons in 1901; an increase of 948,875 tons this year.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of September 13 that the general tone of the Welsh coal market is firm, and prices are well maintained both for prompt and forward delivery. Quotations are: Best Welsh steam coal, \$3.96 @ \$4.02; seconds, \$3.78; thirds, \$3.60; dry coals, \$3.66; best Monmouthshire, \$3.36@3.42; seconds, \$3.24; best small steam coal, \$2.10; seconds, 1.92; other sorts, \$1.80.

The above prices for Cardiff coals are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½ per cent discount.

The freight market remains about steady, and rates show little alteration. Rim plate rates are somewhat easier. Some freights noted from Cardiff are: Marseilles, \$1.05; Genoa, \$1.14; Naples, \$1.14; Port Said, \$1.20; Singapore, \$3.48; Las Palmas, \$1.38;

St. Vincent, \$1.56; Rio Janeiro, \$2.64; Santos, \$2.88; Buenos Aires, \$2.64.

## IRON TRADE REVIEW.

New York, Sept. 25.

The iron market remained comparatively quiet, the principal discussion this week referring to the tonnage of foreign material which is available. The imports, no doubt, have relieved the tension on the market to a considerable extent, but a good deal is being said about the defects found in this material. Some foundrymen are inclined to find a good deal of fault, while others seem to have had no difficulty. However, extensive orders are still being placed abroad, and there is little doubt a good deal more will come in.

The coke scarcity has been relieved to some extent in Western Pennsylvania by a better supply of cars, and it seems probable that conditions in this respect will improve from now on.

In finished material matters are running a little more smoothly. The great trouble at present is in the demand for structural material, and it seems quite probable that our own works will be unable to supply what is called for during the coming six months. There is also an unusual demand for iron bars and considerable premiums are being paid for early deliveries.

A report is being circulated in certain quarters to the effect that the United States Steel Corporation has decided to sell hereafter no more raw material, such as coke, iron ore, etc., to outside parties. As the company sold this year between 1,500,000 and 2,000,000 tons of iron ore from its Lake Superior mines and controls practically the output of the Connellsville coke region, such a decision would be of very great importance to the trade. It is not by any means certain, however, that the step has actually been taken, and it is impossible to verify the rumor.

Birmingham. Sept. 22.

(From Our Special Correspondent.)

There is no change in the pig iron market conditions in Alabama; the strong demand and the firm prices which have prevailed for some time now continue. Spot iron is now quoted straight at \$25 per ton, except when some regular customer needs 100 tons or less, and then it is from \$22 to \$23.50 per ton. Conditions such as now exist have never before been experienced in the south.

The furnaces in operation in Alabama are doing remarkably well. There is no hesitation whatever in the production, and the only trouble that is being experienced is in the supply of coke, which is somewhat scarce.

Shipments of pig iron from the Southern producing territory are steady. Railroad officials state that the furnaces are requiring considerable equipment, and every effort is being made to have the least delay. The furnace people appear to be anxious to fill long-due contracts of iron, and with that plea urge the officials of the railroads to rush them cars to be loaded with the furnace products.

The following quotations are given for pig iron: No. 1 foundry, \$19@20; No. 2 foundry, \$18@19; No. 3 foundry, \$16@17; No. 4 foundry, \$15.50@16.50; gray forge, \$15.50@16.50; No. 1 soft, \$19@20; No. 2 soft, \$18@19.

There is an urgent demand for finished iron, and steel is also in fair demand. The rolling mills and the steel plants are working at their best, and shipments are being made in regular order. The demand is being met quite promptly. There is yet a scarcity of employes in the puddling department. Good prices prevail for the product.

There is much work with the foundries and machine shops in this district, notwithstanding the strike of the machinists, blacksmiths and other employes. The men are firm in their demand for 8 hours to constitute a day's work.

There is some expectation that the Alabama Steel and Wire Company, which recently filed incorporation papers in Hartford, Conn., with capitalization at \$5,000,000, will begin the erection of its steel plant and big blast furnace in the near future. The company at present has a contract with the Tennessee Coal, Iron and Railroad Company for its supply of steel, but this contract will expire in less than 12 months. The work of repairing furnaces and building a new one at Gadsden continues. The Williamson and two Tennessee Coal, Iron and Railroad Company furnaces will be ready for operation by the last of next month.

Buffalo. Sept. 24.

(Special Report of Rogers, Brown & Co.)

Urgent demand for fuel continues and is accompanied by indications of increasing consumption of pig iron as the season advances. The market for imported iron is widening out, and the interest in it is now becoming quite general. Consumers of coke are beginning to look up the subject of supply for 1903. It is needless to say that prices of both coke and iron are very firm for both 1902 and 1903. We quote for



Cash f. o. b. cars, Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, \$25.75; No. 2, \$25.25.

Chicago. Sept. 23.

(From Our Special Correspondent.)

The scarcity of coke in the Chicago District is becoming alarming. Not only does the price continue to be double that normally paid for the fuel, but there is little coke to be had and the outlook for the winter was not an encouraging feature beyond the hope that the strike may in some unforeseen way be speedily settled. Additional foundries are reported closed daily, and the furnaces that were expected to re-open two or three weeks ago are still out of blast. Sales in consequence continue light for native pig iron, though fair orders are being booked for next spring's delivery after May. What little coke can be had commands \$10@15, depending on time of delivery and amount, most sales being made at \$12@13. Connellsville alone is in the market. Imports of foreign iron continue to be large and are increasing. There is little domestic iron to be had on speedy delivery lots, which command \$3 to \$6 premium. Most sales now being made are of Southern, which has not been handicapped by the advance in freight rates of 40c. a ton early in September. Very little Northern iron is in sight.

Prices quoted to-day for next spring's delivery are about 50c. higher on Northern and the same as last week on Southern. No. 1 Northern, \$24@24.50; No. 2 Northern, \$23.50@24; No. 3 Northern, \$23@23.50; Southern, \$22.65@24.65 for No. 2 (depending on date of shipment), and with No. 1 the customary 50c. higher and No. 3 the customary 50c. lower on lots for same time of delivery.

There is now no more Lake Superior charcoal obtainable.

Cleveland. Sept. 23.

(From Our Special Correspondent.)

**Iron Ore.**—Estimates made during the last few days indicate that the movement of iron ore during September will be 3,750,000 tons, which, with the 17,000,000 tons shipped to September 1, will equal the entire movement of last year. This will permit the shippers, if they desire, to rely entirely upon the contract boats during the months of October and November, and still bring down a handsome increase over last year, or, perhaps, more than is needed this winter. The rates of carriage, therefore, need not be increased this year, and promise to remain as they are at 75c. from Duluth, 65c. from Marquette and 60c. from Escanaba.

**Pig Iron.**—All of the furnaces in the two Valleys have resumed operations, because the supply of coke is better. The increased output is, however, being absorbed by those having contracts, and none is finding its way upon the open market. Those having no contracts are therefore compelled to depend upon importations. Nominal domestic quotations are \$25 for No. 2, Valley furnace; \$20 for No. 2 Birmingham, for Southern iron and \$23.50 delivered for foreign No. 1. On foundry iron future sales are made on the basis of \$22, Valley furnace, for No. 2, with a good deal of business being done and some inquiry being made for material into the third quarter. Basic for this year's delivery is offered at \$21, Valley furnace, the same price applying on sales for future delivery. Bessemer iron has been sold outside of the association furnaces for \$22, Valley furnace, for first half delivery of next year. The association still makes no quotation for the future.

**Finished Material.**—Structural steel has been a leader this week, with the American Ship-Building Company taking 13,000 tons of ship steel from mills in the Pittsburgh District. This order included plates and shapes, the material being for six ships recently ordered by J. C. Gilchrist, of Cleveland. The material about cleans up the supply of structural shapes and plates for delivery during the first half of next year's delivery. On structural steel the old price of 1.60c. Pittsburgh applies, while jobbers are getting 2.50c.@3c. Cleveland for what material they have, while outside mills are selling for this year's delivery at 2.60c. at the mill. Plate sales are also made at the old association price, of 1.60c. Pittsburgh on large orders, although some mills are getting 2@2.10c. for spot delivery, while the jobbers are asking 2.50c. Cleveland. Sheets are getting weak, and the mills are looking for business with further talk of a reduction of prices, although no such action has been taken officially. In lieu of such action the prices still hold at 3.10@3.20c. for No. 27 at the mill, as a base price, while jobbers are getting 3.35@3.50c. out of stock for No. 27 as a base. Bars are active, with most of the material for this year's delivery sold up and with some orders taken into next year. The prices hold at 1.60c. for bessemer and 1.70c. Pittsburgh for open-hearth steel bars, and 1.75c.@1.80c. Pittsburgh for bar iron.

**Old Material.**—The buying of both cast and mill scrap this week has forced an advance in the market, No. 1 wrought going to \$21 net. Other advances were: Cast borings, \$12 gross; wrought turnings, \$16.50 gross, and cast scrap, \$17.50 gross.

Philadelphia. Sept. 25.

(From Our Special Correspondent.)

**Pig Iron.**—Importers repeat the assertion made last week that the volume of business in foreign pig iron is increasing. Prices are firmer abroad and consumers here are taking alarm over the possibilities of a further advance before they have placed all the business they have in mind. Some negotiations have been closed within a day or so for small quantities of foundry iron, but the prospects of relief from this source are discouraging. In bessemer pig it is known that there are large requirements which would be covered if everything were favorable, but the buyers East are unable to decide at this time what is their best course. Word from forge iron makers is to the effect that business is practically nothing. Mills are fairly supplied for the present. There is said less about filling next year's requirements; in fact, every thought appears to be concentrated on doing the best we can with what iron we can get from abroad. Middlesboro iron is quoted at \$21; No. 2 iron would sell in large quantities at this time if furnace companies were more inclined to make suitable terms. Prices are as follows: No. 1 X, \$24.50; No. 2 X, \$22.50; forge, \$20; basic, \$21; low phosphorus, \$23.50; Scotch iron, nominally \$24.

**Billets.**—Ordinary bessemer billets are quoted as high as \$29 for sheet bars; open-hearth has sold at \$29.50, although the range of prices is much wider. The billet market is in a very unsettled condition. Buyers are endeavoring to get more precise information from abroad before taking action.

**Merchant Bar.**—The possibilities of greater scarcity for merchant bar has developed quite an active retail business since Monday. Some Western iron continues to arrive here and store orders are unimportant. Quotations for refined iron are from 2c. to as high as 2.20c.

**Sheets.**—The only business of any moment this week was in heavy sheet and that for only small orders.

**Merchant Steel.**—While there has been less business this week, agents have found more buyers who were inclined to talk about future deliveries.

**Skelp.**—The Eastern skelp iron market is unusually quiet, although the mill people say there is enough work at the mills to carry them along for some time to come.

**Pipes and Tubes.**—The demand for tubes appears to have fallen off if an opinion were formed from the orders placed, but mill men say that keeping the consumption in sight there will be no accumulation of pipe for a very long time.

**Plate.**—Rumors are current here from outside markets that some of the larger consumers have duplicated orders for quantities that look fabulous. The only business that we have done here since Monday has been for our local requirements. Universals range from 2c. to 2.10c.; flange, in the way we are selling it, brings 2.25c.; fire-box, 2.30@2.40c.

**Structural Material.**—The structural iron makers say that there is enough business in sight to load them up for months to come. Considerable material is being negotiated for in Western Pennsylvania for Eastern delivery, but the dates cannot be learned nor the quotations, although they are known to be not far from 1.90c.

**Scrap.**—Quite a little excitement has been raised in some quarters on scrap over the urgent orders of some large consumers to secure heavy scrap on the best rates that can be had for delivery in 30 to 60 days.

Pittsburg. Sept. 24.

(From Our Special Correspondent.)

There is a decided improvement in coke shipments, and as a result the production of pig iron is greater than it has been for some time. This, however, has not increased the supply, as it merely enables the furnaces to make better deliveries on contracts, and prices remain as stiff as ever. Despite the scarcity of pig iron, steel mills in this district have not been forced to suspend operations on account of a lack of raw material. There does not seem to be any probability of foreign iron being imported in large quantities for consumption here. One reason is that the price asked is no particular inducement, and another is that the quality is not as satisfactory as the home product. The principal market for imported iron and steel is in the East and in the West, where shipments can be made by water. During the week some small lots of German bessemer iron have been brought to mills in the Pittsburgh District. It was special low phosphorus, and the price was \$23, delivered here, which is about the same rate at which Valley iron of the bessemer grade has been sold for delivery this quarter. None can be had now for immediate shipment at that price, and the foreign article will only be used in an emergency.

There is no active demand for steel in this market except for bessemer sheet bars for early delivery, and the price is firmer than at any time this year. The demand for foreign steel is very limited and practically none has been contracted for this week. The plate market continues the most active in any line, but bars are in good demand, particularly common iron bars.

The mills are well sold up for the year, and while the official price of iron bars was recently advanced to 1.85c., it would be impossible to buy for immediate delivery at less than 2c. A stiff price for common iron bars has been well maintained throughout the year. This was evidenced by the fact that the Republic Iron and Steel Company, the bar iron combine, which made heavy sales for deliveries extending for a year, showed by its sales for the past two months that the average price was above 1.60c.

The weakness in sheets, wire and tin-plates continues, but in tin-plate it is more pronounced. A number of the most important plants of the American Tin-Plate Company are closed on account of a lack of orders, and it is estimated that the producing capacity is reduced about 50 per cent. During the week the Sharon Tin-Plate Company, operating a 20-mill plant at Sharon, Pa., shut down the works for an indefinite period. The product of this concern is handled by the American Tin-Plate Company. Another effort is being made by the combine to induce the workers to accept a reduction in wages in order that it may secure the export rebate trade, which amounts to about 1,500,000 boxes annually. The scale committee of the Amalgamated Association of Iron, Steel and Tin Workers was in session at headquarters for three days considering plans looking to an improvement of conditions. Representatives of the American Tin-Plate Company held a conference with the committee, at which another proposition was submitted. The nature of it is not made public, as it is to be voted on by the membership of the Amalgamated Association.

**Pig Iron.**—Sales of several small lots of bessemer pig iron are reported at \$22@22.50, Valley furnaces, or \$22.75@23.25 Pittsburg, for delivery before January 1. Foundry iron is not quite so strong this week and some lots of the No. 2 grade have sold at \$23@23.50, Pittsburg, for early delivery. A week ago it was difficult to get a quick shipment at less than \$25. For next year there is no change, and the price is firm at \$22.50@23, Pittsburg. The price of gray forge is well maintained at \$21.50@21.75, Pittsburg. A large contract for delivery during the first six months of next year has just been made at \$21, Pittsburg. Sales for delivery this year are limited.

**Steel.**—There is but little demand for bessemer steel billets, and the price remains at \$31. It is believed this could be shaded on a desirable order. Bessemer sheet bars are firm, and for early delivery command \$33 and better. The plate market is active, and while the United States Steel Corporation continues to quote the base price of 1.60c., all other mills are getting heavy premiums. Steel bars are quoted at 1.60c. in large lots.

**Sheets.**—The sheet market is decidedly dull. Black sheets of No. 28 gauge are still quoted at 3c., and galvanized sheets remain at 75 to 75 and 5 per cent off.

**Ferro-Manganese.**—There is no change in the market. No domestic 80 per cent is offered, and the price of the foreign product remains at \$51.50@52.25.

New York. Sept. 26.

**Pig Iron.**—But little new business is reported. Sales of foreign irons continue. We quote for 1903 delivery, Northern irons at tidewater: No. 1X foundry, \$23@25.50; No. 2X, \$22@23; No. 2, plain, \$21@22. For Southern iron on dock, New York, No. 1 foundry, \$23@23.50; No. 2, \$22@22.50; No. 3, \$21@22. Middlesboro pig is quoted at \$19.50.

**Bar Iron and Steel.**—Demand holds up well. We quote for large lots on dock: Refined bars, 2c.@2.05c.; common, 1.90c.@1.95c.; soft steel bars, 2c.@2.10c.

**Plates.**—Demand is good. We quote for tidewater delivery in car-loads: Tank, 1/4-in. heavier, 2@2.20c.; flange, 2.15@2.25c.; marine, 2.25@2.50c.; universal, 2@2.20c. Deliveries can be had in about 6 weeks from date of order at some eastern mills.

**Steel Rails.**—Several large orders have been placed by Canadian roads, the Canadian Pacific order going to German and English mills. Standard sections are still quoted at \$28, f. o. b. mills for 1903 delivery; light rails, \$30@35, according to weight. Relying rails are \$28@30 for heavy sections, and \$33@35 for light sections.

**Structural Material.**—Some large contracts for new office buildings are to be placed shortly, and the outlook favors a brisk demand for months. We quote for large lots at tidewater: Beams, angles, channels and tees, 2c.@2.20c. For small lots and prompt delivery good premiums are paid.

Cartagena, Spain. Sept. 6.

(Special Report of Barrington & Holt.)

Since our last report shipments have been at a complete standstill, owing to the impossibility of obtaining iron ore tonnage at anything like reasonable freights. On the other hand, the demand for every class of ore continues strong, and large quantities of mineral are being brought down from the mines. All the iron ore dumps, both on the railways and the stations, are in a congested condition, and if tonnage does not come along soon at a reasonable rate, it will be difficult to say where the mineral is to be stored.



Quotations are per ton, f. o. b. shipping port: Ordinary 50 per cent iron ore, 6s. 6d. @ 6s. 3d.; special low phosphorus ore, 50 per cent iron, 7s. @ 7s. 6d.; special ore, 50 per cent iron, 3 per cent manganese, 6 per cent silicon, 8s. 6d.; specular ore, 58 per cent iron, 9s.; magnetic ore, 60 per cent iron, 5 per cent silicon, 11s. 6d. for lumps and 9s. 6d. for smalls. For manganese ores quotations are: No. 1, 20 per cent iron and 20 per cent manganese, 14s. 3d.; No. 1 B, 25 iron and 17 manganese, 11s. 3d.; No. 2, 30 iron and 15 manganese, 10s. 3d.; No. 3, 35 iron and 12 manganese, 9s. 6d. All grades of manganese ores are rated at 11 per cent silicon and under 0.03 phosphorus.

**Iron Pyrites.**—Pyrites, 40 per cent iron and 43 per cent sulphur are quoted at 11s. per ton, f. o. b. shipping port. Exports for the week were 200 tons to Marseilles. A late sale noted is at 48 centimes per unit for delivery to Italian ports.

**CHEMICALS AND MINERALS.**

(See also wholesale prices-current on page 430.)

New York. Sept. 25.

**Heavy Chemicals.**—The demand for forward shipments continues good. New contracts are being made for alkali, caustic soda and bleaching powder at lower prices than have ruled for some time past. Keen competition is the only explanation.

Domestic chemicals, we quote, per 100 lbs. f. o. b. works, as follows: High-test alkali, in bags, 82½¢ @ 87½¢, for prompt shipment, and 77½¢ @ 85¢, for forward; caustic soda, high-test, \$1.90 @ \$1.95 for early delivery, and \$1.85 @ \$1.87½ for futures; bicarb. soda, ordinary, \$1, and extra, \$3; sal soda, 65¢; chlorate of potash crystals, \$7.75. For foreign goods we quote per 100 lbs. in New York: Alkali, high-test, 90¢ @ 92½¢; caustic soda, high-test, \$2.25; sal soda, 67½¢ @ 74¢; bicarb. soda, \$1.50 @ \$1.60; chlorate of potash, \$8.12½ @ \$8.25; bleaching powder, prime brands, Liverpool, \$1.75; Continental, \$1.60 @ \$1.65.

**Acids.**—Jobbers are doing the most business at present.

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

Blue vitriol.....	\$4.60 @ \$5.00	Oxalic, com'l.....	\$4.50 @ \$5.00
Muriatic, 18 deg.....	1.50	Sulphuric, 50 deg.....	1.20
Muriatic, 20 deg.....	1.62½	bulk, ton.....	13.50 @ 15.50
Muriatic, 22 deg.....	1.75	Sulphuric, 60 deg.....	1.05
Nitric, 36 deg.....	4.00	Sulphuric, 66 deg.....	1.20
Nitric, 38 deg.....	4.25	bulk.....	18.00 @ 20.00
Nitric, 40 deg.....	4.50	Sulphuric, 66 deg.....	1.20
Nitric, 42 deg.....	4.87½	bulk.....	21.00 @ 23.00

Exports of copper sulphate from Great Britain in August were 1,069 tons, against only 307 tons in the same month last year. In the 8 months ending August 31 the total exports were 39,333 tons, showing an increase of 4,912 tons as compared with the corresponding period last year.

**Brimstone.**—Buying shows some improvement. Spot best unmixed seconds sell at \$23.50 @ \$23.75 per ton, and shipments at \$22.50 @ \$22.75. Best thirds hold at about \$1.50 less than seconds. Imports of brimstone into Great Britain in August were 2,316 long tons, against 3,234 tons last year. During the 8 months ending August 31 the imports amounted to 16,566 tons, against 14,994 tons in the same period last year; showing an increase of 1,572 tons in 1902.

**Pyrites.**—The Pennsylvania Salt Manufacturing Company imported 3,315 tons copper pyrites at New York this week. Business is seasonably good, and prices are firm.

Quotations are f. o. b. Mineral City, Va.: Lump ore, \$5 per ton, and fines 10c. per unit; Charlemont, Mass., lump, \$5, and fines, \$4.75. Spanish pyrites, 13 @ 13½¢ per unit, New York and other Atlantic ports. Spanish pyrites contain 46 to 51 per cent of sulphur; American, from 42 to 44 per cent.

Pyrites imports into Great Britain in August aggregated 43,762 tons, against 66,193 tons last year. In the 8 months ending August 31, the imports were 418,164 tons, against 463,434 tons, showing a decrease of 45,270 tons, or 9.8 per cent in 1902.

**Sulphate of Ammonia.**—Second hands have been selling odd lots from dock at \$2.90 per 100 lbs., while importers ask \$3.15. Shipments continue at \$3.02½ @ \$3.05.

**Nitrate of Soda.**—A number of charters have been taken from the west coast of South America to North of Hatteras at 15s. to 18s. 9d. (\$3.60 @ \$4.50); to Hampton Roads for orders at 17s. 6d. (\$4.20), and to Savannah at 17s. (\$4.08), option Charleston, 18s. (\$4.32). The 15s. rate was taken by the British bark *Olivebank* of 2,647 tons, and is the lowest in a long time. Ocean freight rates at present are much lower than last year, and are about one-half what they were in 1900. The market for nitrate of soda continues firm, at \$1.90 per 100 lbs. for spot, and \$1.82½ @ \$1.87½ for futures.

Concerning the Chilean market, Messrs. Jackson Brothers, of Valparaiso, write us under date of August 23 as follows: "Transactions during the fort-

night have been very limited, due in a great measure during the first days to higher prices than producers generally ask after any sales are effected, and, latterly, to the total obstruction on the part of exporters to operate, owing to lower quotations from Europe. Sales of 95 per cent have been effected for September-October at 6s. 4d. @ 6s. 5d., for February at 6s. 1d. @ 6s. 1½d., and monthly lots, April-December, at 5s. 11d. @ 6s. 11½d., alongside terms. The production for the first 7 months has been 16,401,000 qtls., against 15,942,000 qtls. during the same period last year. We quote 95 per cent, August-September, 6s. 4d.; October, 6s. 3½d.; January, 6s. 1½d.; February-March, 6s. 1d., and 96 per cent, September-October, 6s. 6½d.; January-March, 6s. 3d., all ordinary terms sellers. The price of 6s. 4d., with an all-round freight of 18s. 6d., stands in 7s. 11½d. per cwt., net cost and freight, without purchasing commission. Reported sales are: 273,500 qtls., and resales, 143,000 qtls.

**Phosphates.**—Ocean freight rates to European ports are firmer. A charter from Tampa to Stettin, Germany, has been placed at 15s. 6d. (\$3.72), and one from Coosaw, S. C., to London, at 10s. 9d. (\$2.58), both sailing this month. An interesting charter is one from Tampa to Yokohama, Japan, at 23s (\$5.52), January sailing. This Japanese charter is \$3.48 less than was booked in February, 1901.

New business is slow in coming forward. Prices are unchanged.

A company with \$20,000 capital is to develop the guano beds of Lava, in Socorro County, N. Mex.

Exports of phosphates from Fernandina in August were the second smallest this year, amounting to 10,250 tons. In the 8 months ending August 31 the total exports were 129,825 tons, as against 128,754 tons in the corresponding period last year, showing an increase of 1,071 tons in 1902. The bulk of these shipments was destined to Germany.

Imports of phosphates into Great Britain in the 8 months ending August 31 were 239,799 tons, which shows an increase of 6,060 tons, as compared with the corresponding period in 1901.

Shipments of phosphates from the Tebessa region in Algeria in July were 17,523 tons, or something less than last year.

In the 7 months ending July 31 the movement through the port of Sfax, Tunis, aggregated 144,245 tons, showing an improvement over last year. A good part of these exports was for Germany, Italy and Great Britain.

According to report the Somme, France, phosphate producers have cancelled their agreement, causing a general demoralization in prices.

Phosphates.	Per ton F. o. b.	United Kingdom or European Ports.	
		Unit.	Long ton.
*Fla. hard rock (78@80%)	\$6.50 @ \$7.00	6½ @ 6¼d.	\$9.86 @ \$9.88
*Fla. land pb. (68@73%)	3.00 @ 3.25	4½ @ 5d.	6.65 @ 7.00
†Tenn., (78@82%) export	3.25 @ 3.50	5½ @ 6d.	8.58 @ 9.36
†Tenn., 78% domestic	3.00	.....	.....
†Tenn., 75% domestic	2.75 @ 3.00	.....	.....
†Tenn., 73@74% domestic	2.30 @ 2.40	.....	.....
†Tenn., 70@72% domestic	2.10 @ 2.25	.....	.....
180. Car. land rock	3.00	4½ @ 5d.	5.87 @ 6.30
180. Car. river rock	2.75 @ 3.00	.....	.....
Algerian (63@68%)	.....	5½ @ 6¼d.	7.15 @ 8.13
Algerian (58@63%)	.....	5 @ 5½d.	6.00 @ 6.90
Algerian (53@58%)	.....	4½ @ 5d.	5.32 @ 5.58

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

Liverpool. Sept. 17.

(Special Report of Joseph P. Brunner & Co.)  
For prompt delivery the market for heavy chemicals is quiet but steady. In bleaching powder for 1903 delivery a large business has been done for home trade requirements and prices are now rather firmer. Soda ash for tierces may be called about as follows: Leblanc ash, 48 per cent, £5 15s. @ £6; 58 per cent, £6 2s. 6d. @ £6 7s. 6d. per ton net cash; ammonia ash, 48 per cent £4 5s. @ £4 10s.; 58 per cent, £4 10s. @ £4 15s. per ton net cash; bags, 5s. per ton under price for tierces. Soda crystals are steady at generally £3 7s. 6d. per ton, less 5 per cent for barrels or 7s. less for bags, with special terms for certain export quarters. Caustic Soda is quiet but steady, as follows: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10 15s.; 76 per cent, £10 1s. per ton net cash. Bleaching powder is dull on spot and for hardwood £6 12s. 6d. @ £6 15s. per ton net cash is nominal range. For 1903 delivery the bulk of the home consumers have placed their contracts and at low prices. Manufacturers are now firmer in their ideas and for softwood f. o. r. works £4 per ton is now minimum quotation for 1903 delivery. Chlorate of potash attracts little attention, but 3d. per lb. net cash is still quoted. Bicarb. soda is firm at £6 15s. per ton, less 2½ per cent for the finest quality in 1 cwt. kegs, with usual allowances for larger packages; also special quotations for a few favored markets. Sulphate of ammonia is still offering very sparingly and £12 11s. 3d. @ £12 13s. 9d. per ton, less 2½ per cent, is nearest range for good gray 24 @ 25 per cent in double bags f. o. b. here, prompt delivery. Nitrate of soda is in moderate request on

spot at £8 15s. @ £9 per ton, less 2½ per cent for double bags f. o. b. here, as to quality.

**METAL MARKET.**

New York, Sept. 25.

**GOLD AND SILVER.**

**Gold and Silver Exports and Imports.**

At all United States Ports in August and Year.

Metal	August.		Year.	
	1901.	1902.	1901.	1902.
Gold:				
Exports.....	\$150,861	\$2,305,414	\$32,517,346	\$30,465,990
Imports.....	3,490,528	1,269,914	23,494,611	15,871,612
Excess, I.	\$3,339,667	E. \$1,035,500	E. \$9,022,596	E. \$14,594,378
Silver:				
Exports.....	\$4,390,497	\$4,741,968	\$39,653,246	\$30,941,816
Imports.....	2,598,578	1,763,134	20,265,917	16,440,479
Excess, E.	\$1,791,919	E. \$2,978,834	E. \$16,387,329	E. \$14,501,397

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

**Gold and Silver Exports and Imports, New York.**

For the week ending September 25 and for years from January 1, 1902, 1901 and 1900:

Period.	Gold.		Silver.		Total Excess Exports or Imports.
	Exports.	Imports.	Exports.	Imports.	
Week ...	\$310	\$114,401	\$916,313	\$21,000	E. \$781,222
1902.....	24,520,118	1,813,392	18,731,043	924,248	E. 40,513,521
1901.....	25,808,029	2,621,296	23,555,926	2,828,062	E. 43,915,667
1900.....	36,448,589	1,788,283	29,067,516	3,677,562	E. 60,050,210

Exports of silver were chiefly to London; imports of both gold and silver were from Central and South America and the West Indies.

**Financial Notes of the Week.**

General business continues steady, and the reports from all quarters are favorable. The stock markets have been unfavorably affected by the scarcity of money, and the necessity of curtailing speculative loans which has been imposed upon the banks by the withdrawals of currency for the purpose of moving the crops. The demand for money from the interior has been larger than usual this season—a favorable sign for business, though embarrassing to speculators.

Shipments of gold—all of domestic production—from San Francisco in August were: Nicaragua, \$500; Hong Kong, \$4,530; Japan, \$685,800; total, \$690,830. This compares with \$93,048 in August, 1901. Shipments of silver for the month were as follows:

	Domestic.	Foreign.	Totals.
Philippine Islands.....	.....	.....	\$37,500
Hong Kong.....	\$310,800	871,667	1,182,467
Totals.....	\$310,800	\$909,167	\$1,219,967

The total compares with \$1,597,504 in August, 1901. The domestic silver shipped this year was in silver bars; the foreign in Mexican dollars chiefly.

The statement of the New York banks, including the 59 banks represented in the Clearing House, for the week ending September 20, gives the following totals, comparison being made with the corresponding weeks of 1901 and 1900:

	1900.	1901.	1902.
Loans and discounts.....	\$823,141,000	\$865,949,200	\$887,534,400
Deposits.....	897,471,500	930,361,900	888,871,000
Circulation.....	29,662,400	31,098,300	34,761,300
Specie.....	173,798,800	175,401,800	150,007,200
Legal tenders.....	67,121,400	70,842,900	70,568,500
Total reserve.....	\$240,920,200	\$246,244,700	\$220,575,700
Legal requirements.....	224,367,875	232,500,475	222,217,750
Balance, surplus.....	\$16,552,325	\$13,654,225	*\$1,642,050
*Deficit.	.....	.....	.....

Changes for the week, this year, were an increase of \$493,800 in circulation; decreases of \$11,964,500 in loans and discounts; \$19,898,300 in deposits, \$5,768,100 in specie, \$1,563,600 in legal tenders, and \$2,357,125 in surplus reserve.

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

	1901.		1902.	
	Gold.	Silver.	Gold.	Silver.
N. Y. Ass'd.....	\$175,401,800	.....	\$150,007,200	.....
England.....	197,533,210	.....	188,116,960	.....
France.....	480,515,335	\$223,192,665	520,417,210	\$225,427,785
Germany.....	169,490,000	65,915,000	175,515,000	64,915,000
Spain.....	70,020,000	85,575,000	71,255,000	97,185,000
Neth'l'ds.....	31,261,000	28,139,000	23,709,000	32,727,500
Belgium.....	13,226,500	7,613,500	15,703,335	7,751,665
Italy.....	79,435,000	9,827,000	80,310,000	10,324,000
Russia.....	339,375,000	35,120,000	363,535,000	41,840,000

The return of the Associated Banks of New York



are of date September 20 and the others September 18, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

Supplies of silver have slightly diminished, but the Eastern orders have not responded, and the price has been dull, with slightly downward tendency.

The United States Assay Office in New York reports receipts of 76,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to September 11 are reported by Messrs. Pixley & Abell's circular as follows:

	1901.	1902.	Changes.
India	£5,585,410	£4,448,810	D. £1,136,600
China	590,212	149,550	D. 440,662
The Straits	100,726	254,120	I. 153,394
Totals	£6,276,348	£4,852,480	D. £1,423,868

Receipts this week were £136,000 from New York, £4,000 from Chile, and £12,000 from Australia.

Indian exchange has been steady under the influence of an increasing demand for money in the Indian business centers. The Council bills offered in London were all taken at an average of 15.94d. per rupee, offers for bills largely exceeding the amount to be sold.

The foreign merchandise trade of Great Britain for the 8 months ending August 31 is valued by the Board of Trade returns as follows:

	1901.	1902.	Changes.
Imports	£346,318,351	£347,172,166	D. 853,815
Exports	232,947,402	230,256,581	I. 2,690,821
Balance, imports	£113,370,949	£116,915,585	I. 3,544,636

There was an increase of £853,815, or 0.2 per cent, in imports; a decrease of £2,690,821, or 1.1 per cent, in exports, and a resulting increase of £3,544,636, or 3.1 per cent, in the balance of imports. The gold and silver movement for the 8 months was as follows:

	1901.	1902.	Changes.
Gold: Imports	£16,054,049	£14,272,669	D. 1,781,380
Exports	5,766,740	6,264,693	I. 497,953
Excess, imports	£10,287,309	£8,007,976	D. £2,279,333
Silver: Imports	£7,570,787	£5,455,053	D. £2,115,734
Exports	7,774,785	6,462,272	D. 1,312,513
Excess, exports	£203,998	£1,007,219	I. £803,221

Of the silver imported this year, £4,395,614, or 80.6 per cent of the total, is credited to the United States.

The gold and silver movement in France for the 7 months ending July 31 is reported by the Ministry of Commerce as below:

	1901.	1902.	Changes.
Gold: Imports	235,080,000	267,862,000	I. 32,782,000
Exports	33,311,000	28,068,000	D. 5,243,000
Excess, imports	201,769,000	239,794,000	I. 38,025,000
Silver: Imports	60,782,000	57,453,000	D. 3,329,000
Exports	87,409,000	60,089,000	D. 27,320,000
Excess, exports	26,627,000	2,636,000	D. 23,991,000

Imports of copper and nickel coins rated at their face or coinage value, were 51,000 fr., against 69,000 fr. in the corresponding period of 1901. Exports were 225,000 fr., against 188,000 fr. last year.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	\$0.404	\$0.42
Peruvian soles and Chilean pesos	4.38	4.85
Victoria sovereigns	3.85	3.88
Twenty francs	4.74	4.80
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

September	Silver			Copper			Spelter			
	Sterling Exchange	N. Y. Cts.	London Pence.	Lake Cts. per lb.	Electrolytic per lb.	London £ per ton.	Tin, cts. per lb.	Lead per lb.	N. Y. cts.	St. L. cts.
19	4.85 1/2	51 1/2	23 3/4	11 3/4 @ 11 3/4	11 1/2 @ 11 1/2	53	20 1/2	4.05 @ 4.10	5.45 @ 5.50	5.25
20	4.85 1/2	51 1/2	23 1/2	11 3/4 @ 11 3/4	11 1/2 @ 11 1/2	53	20 1/2	4.05 @ 4.10	5.45 @ 5.50	5.25
22	4.85 1/2	51 1/2	23 1/2	11 3/4 @ 11 3/4	11 1/2 @ 11 1/2	52 1/2	20 1/2	4.05 @ 4.10	5.45 @ 5.50	5.25
23	4.85 1/2	51 1/2	23 1/2	11 3/4 @ 11 3/4	11 1/2 @ 11 1/2	52 1/2	20 1/2	4.05 @ 4.10	5.45 @ 5.50	5.25
24	4.85 1/2	51 1/2	23 1/2	11 3/4 @ 11 3/4	11 1/2 @ 11 1/2	52 1/2	20 1/2	4.05 @ 4.10	5.45 @ 5.50	5.25
25	4.85 1/2	51 1/2	23 1/2	11 3/4 @ 11 3/4	11 1/2 @ 11 1/2	52 1/2	20 1/2	4.05 @ 4.10	5.45 @ 5.50	5.25

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

**Copper.**—The market throughout the week has ruled very quiet indeed. While consumers did not seem to care to take hold to any large extent, producers on the other hand have not pressed sales. Quotations are rather nominal at 11 1/2 @ 11 3/4 c. for lake; 11 1/2 @ 11 3/4 c. for electrolytic in cakes, wirebars or ingots; 11 1/2 @ 11 1/4 c. for cathodes, and 11 1/2 c. for casting copper.

The market for standard, which closed last week at £53, opened on Monday at £52 2s. 6d., and the closing quotations are cabled as £52 7s. 6d. @ £52 10s. for spot and £52 12s. 6d. @ £52 15s. for three months prompt.

Refined and manufactured sorts, we quote: English tough, £55 @ £55 10s.; best selected, £55 10s. @ £56; strong sheets, £68; India sheets, £66 10s.; yellow metal, 6 1/4 @ 6 3/4 d.

Exports of copper from Atlantic ports in the week ending September 24 are reported by our special correspondents as follows: Great Britain, 415 tons; Germany, 845; Holland, 492; Italy, 89; France, 700; Russia, 115; Denmark, 15; Argentina, 9; total, 2,680 tons. Imports were: Great Britain, 1,305 tons copper and 100 tons ore; Mexico, 136 tons copper; Tilt Cove, 2,613 tons ore.

Imports of copper into Great Britain for the 8 months ending August 31 were as follows, in long tons; the totals showing the approximate contents in fine copper:

	1901.	1902.	Changes.
Copper ore	64,089	64,008	D. 81
Matte and precipitate	59,762	48,577	D. 11,185
Fine copper	45,161	68,896	I. 23,735
Total, fine copper	81,446	99,586	I. 18,140

Of the imports this year 634 tons of ore, 11,474 tons of matte and 34,975 tons fine copper were from the United States; these figures comparing with 595 tons, 12,287 tons and 14,124 tons, respectively, in the corresponding period last year.

**Tin** has again been very flat indeed, and continues to sell below the parity, at which the metal can be imported. There is, however, a somewhat better consumptive inquiry. At the close we quote September delivery at 25 1/2 @ 25 3/4 c.; October, 25 1/2 c.; November, 25 1/2 c.

The foreign market, which closed last Friday at £121 10s., opened on Monday at £122 10s., but has been on the decline ever since, the closing quotations on Thursday being cabled as £117 @ £117 5s. for spot and £115 @ £115 5s. for three months prompt.

Imports of tin into Great Britain for the 8 months ending August 31, with re-exports, are reported as below, in long tons:

	1901.	1902.	Changes.
Straits	16,107	17,522	I. 1,415
Australasia	1,826	2,026	I. 200
Other countries	4,284	2,181	D. 2,103
Total imports	22,217	21,729	D. 488
Re-exports	14,428	15,438	I. 1,010
Balance	7,789	6,291	D. 1,498

The considerable decrease shown was due in part to dullness in the tin plate industry, though there was some decrease in stocks on hand.

**Lead** is quiet but steady, with prices unchanged at 4 @ 4.05c., St. Louis, and 4.05 @ 4.10c. New York.

The foreign market is again easier, Spanish lead being quoted at £10 15s. @ £10 16s. 3d., with English lead 5s. higher.

**St. Louis Lead Market.**—The John Wahl Commission Company telegraphs us as follows: Lead is firm, but very quiet. The nominal value for Missouri brands is 4.02 1/2 c., with 4.05c. quoted for desilverized lead.

Imports of lead into Great Britain for the 8 months ending August 31, with exports for the same period, are given in the following table, in long tons:

	1901.	1902.	Changes.
United States	31,331	38,900	I. 7,569
Spain	62,047	64,983	I. 2,936
Australia	41,816	38,184	D. 3,632
Other countries	8,727	11,387	I. 2,660
Total imports	143,921	153,454	I. 9,533
Exports	25,853	22,635	D. 3,218
Balance	118,068	130,819	I. 12,751

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

**Spanish Lead Market.**—Messrs. Barrington & Holt report from Cartagena, Spain, under date of August 30 as follows: The price of silver during the week has been 13.25 reales per ounce. Exchange has gone down by 4 centimos, making it 34.40 pesetas to £1. The local quotation for pig lead on wharf has been 60.75 reales per quintal, which, on above exchange, is equal to £9 17s. 6d. per ton of 2,240 lbs. f. o. b. Cartagena. Exports of pig lead have been: 1,015,026 kgs. to London; 123,700 kgs. to Marseilles; total, 1,138,726 kgs. Other exports have been 1,252 kgs. silver bars to Marseilles.

**Spelter** is in good demand, with prices firm at about 5 1/4 c., St. Louis, and 5.45 @ 5.50c., New York.

The foreign market is easier, good ordinaries being quoted at £19; specials, 5s. higher.

**St. Louis Spelter Market.**—The John Wahl Commission Company telegraphs us as follows: Spelter is rather firm on the basis of 5.20 @ 5.25c. Sales, however, are few and far between, and consumers continue to buy from hand to mouth, whereas producers claim the metal must go higher.

Imports of spelter into Great Britain for the 8 months ending August 31 were 62,794 long tons, against 43,303 tons for the corresponding period in 1901; an increase of 19,491 tons, or 45 per cent, this year.

**Spanish Zinc Ore Market.**—Messrs. Barrington & Holt, of Cartagena, Spain, write us under date of September 6 as follows: Zinc ores remain the same as last week, and 9 @ 11 reales per quintal is being paid for the blende at the mines for 30 per cent basis. Calamine is fetching 9 reales on the same basis.

**Antimony** is dull and neglected. We quote Cookson's, 9 1/2 @ 9 3/4 c.; Hallett's, 7 3/4 @ 7 5/8 c.; Italian, Hungarian, Japanese and United States Star, 7 1/4 @ 7 1/2 c.

**Nickel.**—The price is now quoted by leading producers at 40 @ 47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quality, runs as high as 60c. per lb.

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

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

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

Exports of quicksilver from San Francisco in August were: To Mexico, 380 flasks; Honduras, 60 flasks; Hong Kong, 1,000 flasks; total, 1,440 flasks. The exports to China are the first noted for a long time.

Imports of quicksilver into Great Britain for the 8 months ending August 31, with re-exports, were as follows, in pounds:

	1901.	1902.	Changes.
Imports	2,535,871	2,411,941	D. 123,930
Re-exports	1,372,865	1,128,227	D. 244,638
Balance	1,163,006	1,283,714	I. 120,708

The imports were mainly from Spain and Italy.

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

	Per lb.	Per lb.	
No. 1, 99% Ingots	33 @ 37c.	Ferro-Tungsten (37%)	29c.
No. 2, 90% Ingots	31 @ 34c.	Magnesium	32.75
Rolled sheets	4c. up	Manganese, pure (N.Y.)	60c.
Alum-bronze	20 @ 23c.	Manganese Cop. (20% Mn)	32c.
Nickel-alum	33 @ 39c.	Manganese Cop. (30% Mn)	38c.
Bismuth	1.50	Molybdenum (Best)	1.13
Chromium, pure (N.Y.)	80c.	Phosphorus	50c.
Copper, red oxide	50c.	American	70c.
Ferro-Molyb'dum (50%)	1.25	Sodium metal	50c.
Ferro-Titanium (10%)	90c.	Tungsten (Best)	62c.
Ferro-Titanium (20 @ 25%, N. Y.)	55c.		

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

Average Prices of Metals per lb., New York.

Month.	Tin.		Lead.		Spelter.	
	1901.	1902.	1901.	1902.	1901.	1902.
January	23.54	26.51	4.900	4.350	4.27	4.13
February	24.07	26.98	4.975	4.350	4.15	4.01
March	26.22	26.08	4.975	4.350	4.23	3.91
April	27.77	25.93	4.975	4.350	4.37	3.94
May	29.55	27.12	4.975	4.350	4.47	4.04
June	29.36	25.00	4.975	4.350	4.98	3.99
July	28.38	27.85	4.975	4.350	5.27	3.98
August	28.23	26.78	4.975	4.350	5.44	3.90
September	25.51	25.51	4.350	4.350	4.00	4.00
October	26.62	26.62	4.350	4.350	4.23	4.23
November	26.67	26.67	4.350	4.350	4.29	4.29
December	24.36	24.36	4.153	4.153	4.21	4.21
Year	26.54	26.54	4.384	4.384	4.00	4.00

LATE NEWS.

A cargo of Welsh anthracite, 4,800 tons, arrived at Philadelphia this week; another cargo of 4,000 tons is expected, and James D. Perkins, the importer, has arranged to take 8,000 tons more. The coal pays a duty of 67c. per ton, and is the first Welsh anthracite to be imported at an Atlantic seaboard point in many years.

Average Prices of Copper.

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

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

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

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Table with columns: Name of Company, Date, Share, Per, Total, to Date. Lists various companies and their dividend details.

\*Monthly. †Monthly. §Semi-annual.

ASSESSMENTS.

Table with columns: Name of Company, Location No., Delinq., Sale, Amt. Lists companies and their assessment details.

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies and their prices for various dates from Sept. 18 to Sept. 24.

†Assessment Paid.

Coal, Iron and Industrial Stocks.

Table of stock quotations for Coal, Iron and Industrial Stocks, listing companies and their prices for various dates from Sept. 18 to Sept. 24.

Total sales, 540,505 shares.

† Ex-Dividend.

BOSTON, MASS.\*

Table of stock quotations for Boston, Mass., listing companies and their prices for various dates from Sept. 18 to Sept. 24.

Total sales, 55,249 shares.

PHILADELPHIA, PA. §

Table of stock quotations for Philadelphia, Pa., listing companies and their prices for various dates from Sept. 18 to Sept. 24.

§Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 29,080 shares.



STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.\*

Table of stock quotations for Colorado Springs, Colo. listing companies like Anaconda, Am. Con., Anaconda, etc., with columns for par value, Sept. 15-20, and sales.

\*Colo. Springs Mining Stock Exchange. All mines are in Colorado. Total sales 316,189 shares.

Colorado Springs (By Telegraph.)

Table of stock quotations for Colorado Springs (By Telegraph) listing companies like Anaconda, Am. Con., Anaconda, etc., with columns for par value, Sept. 18-24, and sales.

MEXICO.

Sept. 13.

Table of stock quotations for Mexico listing companies like Durango, Ca. Min. de Penoles, Guanajuato, etc., with columns for shares, last dividend, and prices.

ST. LOUIS, MO.\* Sept. 22.

Table of stock quotations for St. Louis, Mo. listing companies like Nettie, Colo., Katherine Lead, Mo., etc., with columns for shares, par value, and prices.

TORONTO, ONT. Sept. 23

Table of stock quotations for Toronto, Ont. listing companies like Center Star, Fairview, Lone Pine, etc., with columns for par value, high/low, and sales.

\*From our Special Correspondent.

Total sales, 60,000 shares. † Ex-Dividend.

LONDON.

Sept. 13.

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

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

PARIS.

Sept. 4.

Table of stock quotations for Paris listing companies like Acleries de Crensoit, Firminy, Huta-Bank, etc., with columns for name and country, product, capital stock, par value, latest dividend, and prices.

SALT LAKE CITY\* Sept. 20

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

SPOKANE, WASH.\* Sept. 19

Table of stock quotations for Spokane, Wash. listing companies like American Boy, Ben Hur, Black Trail, etc., with columns for shares, par value, high/low, and sales.

All mines are in Utah. \*By our Special Correspondent. Total sales, 242,038 shares.

Total sales 65,000 shares. \*Reported by Hunner & Harris.

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

Abrasives—		Cust. Meas.	Price.	Barium—		Cust. Meas.	Price	Graphite—Am. f.o.b. Provi-		Cust. Meas.	Price	Paints and Colors—		Cust. Meas.	Price
Carborundum, f.o.b. Niagara Falls, Powd., F. F. F. F.	lb.		\$0.08	Oxide, Am. hyd. cryst.	lb.		\$0.0234	dence, R. I. lump.	sh. ton		\$8.00	Metallic, brown	sh. ton		\$19.00
Grains			.10	Sulphate (Blanc Fixe)	"		.02	Pulverized	"		30.00	Red	"		16.00
Corundum, N. C.	"		.07@.10	<b>Barytes—</b>				German, com. pulv.	lb.	.0134@.0114		Ocher, Am. common	"		9.25@10.00
Chester, Mass.	"		.0434@.05	Am. Crude, No. 1	sh. ton		9.00	Best pulverized	"		.0114@.02	Best	"		21.25@25.00
Barry's Bay, Ont.	"		.0714@.0914	Crude, No. 2	"		8.00	Ceylon, common pulv.	"		.0234@.0314	Dutch, washed	lb.		.0434
Crushed Steel, f.o.b. Pittsburg	"		.0514	Crude, No. 3	"		7.75	Best pulverized	"		.04@.08	French, washed	"		.0114@.0114
Emery, Turkish flour, in kegs	"		.0314	German, gray	"		14.50	Italian, pulv.	"		.0114	Orange mineral, Am.	"		.0734@.08
Grains, in kegs	"		.05@.0514	Snow white	"		17.00	<b>Gypsum—Ground.</b>	sh. ton		8.00@8.50	Foreign, as to make	"		.0814@.1114
Naxos flour, in kegs	"		.0314	<b>Bauxite—Ga. or Ala. mines:</b>				Fertilizer	"		7.00	Paris green, pure, bulk	"		.12
Grains, in kegs	"		.05@.0514	First grade	lg. ton		5.50	Rock	lg. ton		4.00	Red lead, American	"		.0534@.06
Chester flour, in kegs	"		.0314	Second grade	"		4.75	English and French	"		14.00@16.00	Foreign	"		.0034@.08
Grains, in kegs	"		.05@.0514	<b>Bismuth—Subnitrate.</b>	lb.		1.40	<b>Infusorial Earth—Ground.</b>				Turpentine, spirits	gal.		434@.49
Peekskill, f.o.b. Easton, Pa.	"		.0114	Subcarbonate	"		1.85	American, best	"		20.00	White lead, Am., dry	lb.		.0434@.0434
Crude, ex-ship N. Y.; Ab-	"		.0214	<b>Bitumen—"B"</b>	"		.0914	French	"		37.50	American, in oil	"		.0514@.0514
bott (Turkey)	lg. ton		26.50@30.00	"A"	"		.05	German	"		40.00	Foreign, in oil	"		.0734@.0914
Kuluk (Turkey)	"		22.00@24.00	<b>Bone Ash</b>	"		.0234@.0234	<b>Iodine—Crude.</b>	100 lbs		2.45	Zinc, white, Am., ex dry	"		.0434@.0434
Naxos (Greek) h. gr.	"		26.00	<b>Borax</b>	"		.0714@.0714	Green seal	"		.0614	American, red seal	"		.07
Garnet, as per quality	sh. ton		25.00@35.00	<b>Bromine</b>	"		.40	Foreign, red seal, dry	"		.0534@.0814	Green seal, dry	"		.0614@.0614
Pumice Stone, Am. powd.	lb.		.0134@.02	<b>Cadmium—Metallic</b>	"		1.40	<b>Potash—</b>				Caustic, ordinary	"		.0434@.05
Italian, powdered	"		.0114	Sulphate	100 lbs.		2.00@2.50	Elect. (90%)	"			Elect. (90%)	"		.0614
Lump, per quality	"		.04@.40	<b>Calcium—Acetate, gray</b>	"		1.30	<b>Potassium—</b>				Bicarbonate cryst.	"		.0814
Rottenstone, ground	"		.0214@.0414	"brown"	"		.90	Powdered or gran.	"			Powdered or gran.	"		.14
Lump, per quality	"		.06@.20	Carbide, ton lots f.o.b. Niagara Falls, N. Y. for Jersey City, N. J.	sh. ton		70.00	Bichromate, Am.	"			Bichromate, Am.	"		.0814@.0814
Rouge, per quality	"		.10@.30	Chloride	100 lbs.		.75@.90	Scotch	"			Scotch	"		.0814@.09
Steel Emery, f.o.b. Pittsburg	"		.07	<b>Cement—</b>				Carbonate	"			Carbonate	"		.0314@.0314
				Portland, Am., 400 lbs.	bbbl.		1.70@1.90	Chromate	"			Chromate	"		.35
				Foreign	"		1.65@2.25	Cyanide (98@99%)	"			Cyanide (98@99%)	"		.23
				"Rosendale," 300 lbs.	"		.75	Kainit	"			Kainit	"		9.05
				Slag cement, imported	"		1.65	Manure salt, 20%	100 lbs.			Manure salt, 20%	100 lbs.		.06
				<b>Ceresine—</b>				Double Manure salt, 48@53%	"			Double Manure salt, 48@53%	"		1.12
				Orange and Yellow	lb.		.12	Muriate, 80@85%	"			Muriate, 80@85%	"		1.88
				White	"		.1314	95%	"			95%	"		1.86
				<b>Chalk—Lump, bulk</b>	sh. ton		2.50	Permanganate	lb.			Permanganate	lb.		.0614@.10
				Ppt. per quality	lb.		.0314@.08	Prussiate, yellow	"			Prussiate, yellow	"		.1394@.14
				<b>Chlorine—Liquid</b>	"		.30	Red	"			Red	"		.36
				Water	"		.10	Sulphate, 90%	100 lbs.			Sulphate, 90%	100 lbs.		2.11
				<b>Chrome Ore—</b>				96%	"			96%	"		2.14
				(50% ch.) ex-ship N. Y.	lg. ton		24.75	Sylvinit	unit			Sylvinit	unit		.3914
				Bricks, f.o.b. Pittsburg	M		175.00	<b>Quartz—(See Silica.)</b>				<b>Quartz—(See Silica.)</b>			
				<b>Clay, China—Am. com., ex-</b>				<b>Salt—N. Y. com. fine</b>	sh. ton			<b>Salt—N. Y. com. fine</b>	sh. ton		2.00
				dock, N. Y.	lg. ton		8.00	N. Y. agricultural	"			N. Y. agricultural	"		1.50
				Am. best, ex-dock, N. Y.	"		9.00	<b>Saltpetre—Crude</b>	100 lbs.			Saltpetre—Crude	100 lbs.		3.30@3.40
				English, common	"		12.00	Refined	"			Refined	"		4.25@4.6214
				Best grade	"		17.00	<b>Silica—Best foreign</b>	lg. ton			Silica—Best foreign	lg. ton		10.00@11.00
				Fire Clay, ordinary	sh. ton		4.25	Ground quartz, ord.	sh. ton			Ground quartz, ord.	sh. ton		6.00@8.00
				Best	"		6.00	Best	"			Best	"		12.00@13.00
				Slip Clay	"		5.00	Lump quartz	"			Lump quartz	"		2.50@4.00
				<b>Coal Tar Pitch</b>	gal.		.08	Glass sand	"			Glass sand	"		2.75
				<b>Cobalt—Carbonate</b>	lb.		1.75	<b>Silver—Chloride</b>	oz.			Silver—Chloride	oz.		.65
				Nitrate	"		1.50	Nitrate	"			Nitrate	"		.85
				Oxide—Black	"		2.26@2.30	Oxide	"			Oxide	"		3.10
				Gray	"		2.28@2.40	<b>Sodium—</b>				Bichromate	lb.		.0614
				Small, blue ordinary	"		.08	Chlorate, com'l.	"			Chlorate, com'l.	"		.0734@.08
				Best	"		.20	Hyposulphite, Am.	100 lbs.			Hyposulphite, Am.	100 lbs.		1.60@1.65
				<b>Copperas—in bulk</b>	100 lbs.		.3714	German	"			German	"		1.70@1.90
				in bbls.	"		.4214	Peroxide	lb.			Peroxide	lb.		.45
				<b>Copper—Carbonate</b>	lb.		.18@.19	Phosphate	"			Phosphate	"		.0234
				Chloride	"		.25	Prussiate	"			Prussiate	"		.11@.1114
				Nitrate, crystals	"		.35	Silicate, conc.	"			Silicate, conc.	"		.05
				Oxide, com'l.	"		.19	Com'l.	"			Com'l.	"		.01
				<b>Cryolite</b>	"		.0614	Sulphate, com'l.	100 lb.			Sulphate, com'l.	100 lb.		75@8214
				<b>Explosives—</b>				Sulphide	lb.			Sulphide	lb.		.0114
				Blasting powder, A.	25 lb. keg		2.65	Sulphite crystals	"			Sulphite crystals	"		.0214
				Blasting powder, B.	"		1.40	<b>Sulphur—Roll</b>	100 lbs.			Sulphur—Roll	100 lbs.		1.85
				"Rackarock," A.	lb.		.25	Flour	"			Flour	"		1.90
				"Rackarock," B.	"		.18	Flowers, sublimed	"			Flowers, sublimed	"		2.15
				Judson R. R. powder	"		.10	<b>Talc—N. C., 1st grade</b>	sh. ton			Talc—N. C., 1st grade	sh. ton		13.75
				Dynamite (20% nitro-glycerine)	"		.13	N. Y. Fibrous, best	"			N. Y. Fibrous, best	"		10.20
				(40% nitro-glycerine)	"		.14	French, best	100 lbs.			French, best	100 lbs.		1.25
				(50% nitro-glycerine)	"		.1614	Italian, best	"			Italian, best	"		1.6214
				(60% nitro-glycerine)	"		.18	<b>Tar—Regular</b>	bbbl.			Tar—Regular	bbbl.		2.40
				(75% nitro-glycerine)	"		.21	Oil barrels	"			Oil barrels	"		4.50
				Glycerine for nitro (32 2-10° Be.)	lg. ton		.1334@.1334	<b>Tin—Crystals</b>	lb.			Tin—Crystals	lb.		.22
				<b>Feldspar—Ground</b>	sh. ton		8.00@9.00	Oxide	"			Oxide	"		.45
				<b>Flint Pebbles—Danish, Best.</b>	lg. ton		14.75	<b>Uranium—Oxide</b>	"			Uranium—Oxide	"		2.25@3.00
				French, Best	"		11.75	Zinc—Metallic, ch. pure	"			Zinc—Metallic, ch. pure	"		.07@.0914
				<b>Fluorspar—</b>				Carbonate, ppt.	"			Carbonate, ppt.	"		.09
				Am. lump, 1st grade	sh. ton		\$14.40	Chloride solution, com'l.	"			Chloride solution, com'l.	"		.0214
				2d grade	"		13.90	granular	"			granular	"		.414@.0414
				Gravel and crushed, 1st gr.	"		13.40	Dust	"			Dust	"		.0414@.0414
				2d grade	"		12.40	Sulphate	"			Sulphate	"		.0234@.0234
				Ground, 1st grade	"		17.90	<b>THE RARE EARTHS.</b>							
				2d grade	"		16.50								
				Foreign, lump	"		8.00@12.00	<b>Boron—Nitrate</b>	lb.			Boron—Nitrate	lb.		\$1.50
				Ground	"		11.50@14.00	<b>Calcium—Tungstate (Scheelite)</b>	"			Calcium—Tungstate (Scheelite)	"		.80
				<b>Fuller's Earth—Lump</b>	100 lbs.		.75	<b>Cerium—Nitrate</b>	"			Cerium—Nitrate	"		10.00
				Powdered	"		.80	<b>Didymium—Nitrate</b>	"			Didymium—Nitrate	"		35.00
				<b>Graphite—Am. f.o.b. Provi-</b>				<b>Erbium—Nitrate</b>	"			Erbium—Nitrate	"		40.00
				dence, R. I. lump.	sh. ton		\$8.00	<b>Glucinum—Nitrate</b>	"			Glucinum—Nitrate	"		20.00
				Pulverized	"		30.00	<b>Lanthanum—Nitrate</b>	"			Lanthanum—Nitrate	"		30.00
				German, com. pulv.	lb.	.0134@.0114		<b>Lithium—Nitrate</b>	oz.			Lithium—Nitrate	oz.		.60
				Best pulverized	"		.0114@.02	<b>Strontium—Nitrate</b>	lb.			Strontium—Nitrate	lb.		0634@.07
				Ceylon, common pulv.	"		.0234@.0314	<b>Thorium—Nitrate 49@50%</b>	"			Thorium—Nitrate 49@50%	"		4.50
				Best pulverized	"		.04@.08	<b>Uran</b>							