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CONTENTS.

THE FIGURES of the mineral production of Canada in 1901, as prepared by the Mines Section of the Geological Survey, are given on another page of this issue. They show the large increase of $4,918,994, over the totals for 1900, notwithstanding decreases in the gold from the Yukon and in lead from British Columbia. Almost all the other items showed substantial gains, and the total of nearly $70,000,000 indicates the great progress which the Dominion has made in recent years and the important place which its mining industry now holds. Moreover, the growth has been of a kind which promises to continue, and we do not doubt that in a very few years a total of $100,000,000 will be reached.

The Mines Section deserves great credit for the promptness with which the returns have been collected from a vast territory over which the producers are widely scattered, and the early date at which they are presented in a compact and convenient form.

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SOME MINERS from Alaska recently brought to the State Mining Bureau of California what they supposed to be tungstate of iron, but which proved to be limonite. The material was found in the sluices where they had been washing out stream tin. While reticent about the exact locality, they stated it was in Northwest Alaska, somewhere on the Seward Peninsula, on which Nome is situated. It was found over a somewhat extensive area where the men were working certain creeks for gold. When they got any gold they found little or no tin, but on four different creeks they found so much tin that according to their representation each man washed out about 1,000 pounds per day. The specimens taken to the Mining Bureau were undoubtedly pieces of stream tin, in the opinion of the chemist of that institution. Should the information as to extent and amount prove authentic, other prospectors in Northwest Alaska will doubtless search for tin hereafter as well as for gold. There seems to be little doubt that tin does exist there; but the extent of the deposits is still, of course, entirely uncertain.

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THE PAPER given in another column on the iron ores of Kitchener, B. C., is an interesting one as describing a deposit of unusual size and purity; and it is moreover of importance as indicating the existence in that region of a supply of iron ores which may be of great importance hereafter in the development of the Pacific Coast. The Kitchener ore, so far as developed, is a high grade bessemer ore so situated that it can be smelted on the spot or transported without very great cost or difficulty to furnaces in the coast region of British Columbia, or to the vicinity of the coal mines and coke ovens of the Crow's Nest Pass country. One of the latter alternatives seems the more probable, if the analogy of all modern practice is to hold good; since it is the almost universal custom at present to carry the ore to the fuel rather than the fuel to the ore. The important point is that when the time comes to build up an iron industry to supply the Pacific Coast and the export trade to the East—which may not be far distant—the raw material will not be lacking and it seems reasonably certain that it will be among the best of its kind.

IT SEEMS rather unfortunate for our London friends who are interested in gold mining in Rhodesia, that just as several new mines were brought out and they were hoping to see the country go forward in gold production, one of the mines—the Dunraven—of which great things were expected, should shut down permanently. The mine was originally opened up six years ago and it was floated in London at the end of 1897. The milling plant worked for a year, from the summer of 1898 to the summer of 1899, but was then shut down owing to the supply of ore giving out. A good deal of development work was then done, providing ore for another year's milling. A few months ago the mill was again shut down and the property thoroughly prospected. Unfortunately the mining engineer in charge has had to report that the veins have petered out, and to recommend that no further development work should be undertaken. Pessimists are not wanting in London, and their sneers at Rhodesian mining in general are particularly annoying to the promoter at the present time. More hopeful people are not discouraged by this single example of failure. The only cause for worry is that it should come just now when Rhodesia is expected to boom.

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THE METAL production of Colorado for the year 1901 is officially reported by Mr. H. A. Lee, State Mining Commissioner, as below:

	Quantities.	Values.
Gold, fine ounces	1,339,112	$27,679,445
Silver, fine ounces	18,492,563	10,901,366
Copper, pounds	7,872,529	1,303,297
Lead, pounds	148,111,020	6,419,132
Total values		$46,303,240

As compared with the statement for 1900, there was some decrease, as shown in the following table, in which the changes in values are given:

	Changes.	Per Cent.
Gold	D. $1,082,591	3.8
Silver	D. 1,587,409	12.7
Copper	I. 10,285	0.8
Lead	D. 1,351,064	17.4
Totals	D. $4,010,779	8.0

The decrease in silver and lead was not unexpected, but the falling off in gold is a feature in the statement which was not looked for.

By counties, Teller, which includes the Cripple Creek District, led in the value of its production, which reached a total of $17,285,469. Lake County —Leadville—came second, with a total of $8,564,700; while Pitkin, Ouray, San Miguel, San Juan, Gilpin and Clear Creek counties made excellent records.

This statement, it must be remembered, does not include the entire mineral production of Colorado. The values of the large outputs of coal, iron, zinc ores, etc., remain to be added, and these will bring the total up to a very large figure.

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THE PRODUCTION of gold in the Klondike and the Canadian Yukon, according to the returns collected by the Geological Survey, showed some falling off last year, its total value being placed at $18,000,000. There has been some discussion as to the correctness of this statement and many people interested in the region are inclined to think that it is too low. The Survey, however, seems to have exercised great care in making up its figures, which have been corrected and checked in several ways—by the royalty returns made to the mining commissioner in the territory, by the returns of exports, by the receipts of the

Seattle assay office and the San Francisco Mint, and by the returns of the Canadian assay offices. The uncertain points, and those upon which the believers in a larger production base their claims, are the quantity of gold which escapes the payment of royalty, that which is carried out of the country and into the United States in private hands and is not recorded at the custom houses, and the amount which is retained in the Yukon to become part of the circulating medium there. Of course, it is difficult to obtain any exact information on these points. The Government officers in the region naturally claim that the amount which escapes record and royalty is comparatively unimportant. The quantity carried out in private baggage is simply a matter of conjecture. The individual amounts are small, as few people care to transport much in that way when the banks and assay offices offer greatly superior advantages in safe transportation, so that the aggregate is probably smaller than most people would be inclined to believe. As to the gold retained in circulation, a considerable amount was absorbed in that way in the first two or three years after the opening of the country, but it decreases every year, as the needs of business are already supplied in great part, while the use of bank bills has increased largely with the establishment of regular business in the country, and the fact that good banking facilities exist at Dawson and other points. After considering all the evidence we are inclined to think that while the estimate of the Survey is undoubtedly a conservative one, and care has been taken not to exaggerate or exceed the truth, the probability is that the real production differed very little from that reported. All statistics of this kind are necessarily compromises, but it looks very much as if in this case the average obtained was as near the truth as could be expected.

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A MINING DEPARTMENT FOR CANADA.

The meeting of the Canadian Mining Institute in Montreal last week was notable, not only for the large attendance and the lively interest taken in the proceedings, but also for the business brought forward and the nature of the topics discussed. The chief among these was the position which the Government sustains toward the mining industry and the extent to which that industry has been benefited by the Geological Survey and other public bureaus. The feeling expressed by the representatives of the different mining sections who were present was very strong and the whole debate, with the action taken, constitutes an important episode in the mining history of the Dominion. According to the figures prepared by the Mines Section of the Geological Survey, in the correctness of which all confidence can be placed, the total value of the mineral production of Canada has grown from about $16,000,000 in 1892 to very nearly $70,000,000 in 1901. While a very considerable part of this growth is due to the gold from the Yukon Territory, there has been outside of that a great and substantial increase in mineral production, while the Government appropriations for the Geological Survey have remained very nearly stationary, and in particular the Mines Section is expected to gather and present statistics with a force which served for the small output of ten years ago, but is entirely inadequate for present needs. It is very much to the credit of this division of the Survey, in fact, that it has done its work so well and so promptly.

In view of all this and of the very large contribution made by the mining industry to the national wealth, it was felt to be only fair that the Federal Government should deal more liberally with the industry. In discussing the question, it was recognized generally that much more ought to be done in the study of the mineral resources and industries of the country in order that information of all sorts, and especially of the economic class, should be more readily available. There was no disposition on the part of any of the speakers to decry the excellent work done by the Geological Survey in the past, but it was generally felt that greater attention to economic geology was now necessary. Not only should statistics of the mining industry be carefully studied and presented, but attention should be paid to the commercial possibilities and to the opening of markets for the various products; to the collection of information bearing upon these points and to its arrangement in such forms as would make it readily accessible to purchasers, merchants and probable investors, as well as to miners.

As to the best means for attaining this end, some differences of opinion were shown, as was only natural. The large majority favored the creation of a department of mines which should include the present Geological Survey as its scientific section, and should also have an active branch devoted to the economic and commercial side of the mining industry. With a sufficient appropriation it is believed that there will be no difficulty in organizing such a department, which will have the basis already provided by the Geological Survey to work upon, and the benefits which may result will undoubtedly be very great. The discussion, which, as we have said, turned rather upon the details than upon the general question of the establishment of such a department, ended in a general agreement and in the adoption of the resolutions which are given in the report of the meeting on another page. It is believed that with the strong backing of the Mining Institute, these resolutions will receive attention, and we certainly hope that they will result in securing the desired end.

For our own part, we have no doubt that the establishment of a strong mining department will be a great step in advance. Under proper management such a department should render most important aid in the development of the very extensive and important mineral areas of our sister State to the North. We have, moreover, a certain selfish interest in the matter since a large amount of capital from the United States is already invested in the Dominion, and more is likely to get there; so that information carefully collected and authoritatively presented, as it can be by the proposed arrangement, will be of very great value to us, as well as to Canada.

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THE TAXING OF MINES.

The special session of the Colorado State Legislature has been devoting its chief attention to the framing of a revenue law which will meet the increasing needs and expenditures of the State, and also fairly distribute the weight of taxation. With this purpose in view, the question of taxing mines naturally takes a very prominent place; hence, these deliberations have been followed with peculiar interest, and not a little anxiety by those identified with this great industry.

After exempting all mines from taxes of any character for a stated period after the organization of the State Government, and by this means undoubtedly fostering the industry in a marked degree, the time arrived when the farmers, manufacturers and merchants of Colorado believed that they were justified in demanding that as now the mining industry was no longer an infant one, but come well into man's estate, those profiting by it should stand their share of taxes in support of the State and local administrations. It does not appear that the owners of producing mines have seriously contended against this reasonable demand; yet it does appear that in the legislature of the leading mining State of the Rocky Mountain region a great difference of opinion exists as to the proper mode of appraisement or determination of the value to be taxed. On one side the extremists, mainly the farming element, demand "that the county assessors assess all mines at their full cash value." This seems simple enough—at least to the farmers. "Just find what a mine is worth and tax it on that basis."

"How would you find the full cash value of a mine?" timidly asked one of the skeptical legislators when this question was under discussion, to which the "Father of the bill" unhesitatingly replied: "Just as you would a hog, or a cow, or an acre of ground." It surely speaks well for the consideration and courtesy shown toward all opinions in Colorado that even this reply seemed worthy of deference and discussion, although a doubt was expressed as to the ability of a county assessor to decide on questions which often perplex and mislead the most learned and experienced of experts.

As it becomes evident that this view of values is not likely to prevail, substitutes abound in the place of it, and the middle way seems likely finally to prevail, this way being a compromise between the "hog and cow" system and the net output theory. Differing from these, what more just and consistent method could be suggested than a tax on the gross output—that is, a tax on all moneys received from the sale of the mineral product of the mine? To this might also be added a proper tax on the improvements, these improvements to be appraised the same as are those of any manufacturing, mercantile, or even residence property. The question of depletion of reserve values for each dollar of output is here met by a tax on the value as it appears of record. This tax on "gross output" as against "net returns" also removes any objections as to extravagant and needless expenditures in the form of salaries, development, or surface adornments, while an appraisement of improvements can be made on precisely the same principles as are generally practiced in kindred cases. As the final action of this legislative body may be cited as a precedent in other States, it is evident that the subject is one of more than mere local interest or concern.

The House of Representatives has approved the following section of the general revenue bill which is highly objectionable and deserves to be either defeated entirely or substantially amended by the Senate:

"That all mines and mining claims bearing gold, silver, lead, copper or other precious or valuable metals, and the gross proceeds of possession rights in unpatented claims, shall be listed and valued each year, and shall be assessed at their full cash value. All surface improvements and all machinery located upon any mining claim or claims shall be separately valued for taxation. Provided that a non-producing mining claim or claims shall be assessed and taxed like other property, according to the value thereof; and in ascertaining such value the assessor shall, in addition to other requirements of this act, take into consideration the location thereof, the proximity to other mines or mining claims, and any other matter which may tend to assist him in arriving at a fair and equitable valuation of such property."

As an instance of the way this section is considered by the mining men, Mr. James F. Burns, manager of the Portland Mine, is reported to have cancelled an order for $50,000 worth of new machinery and to have said that if the law as above quoted goes into effect the mine will be closed and kept closed until the law is repealed. Colorado cannot afford to have such an unreasonable provision in its statutes.

LEONARD LEWISOHN.

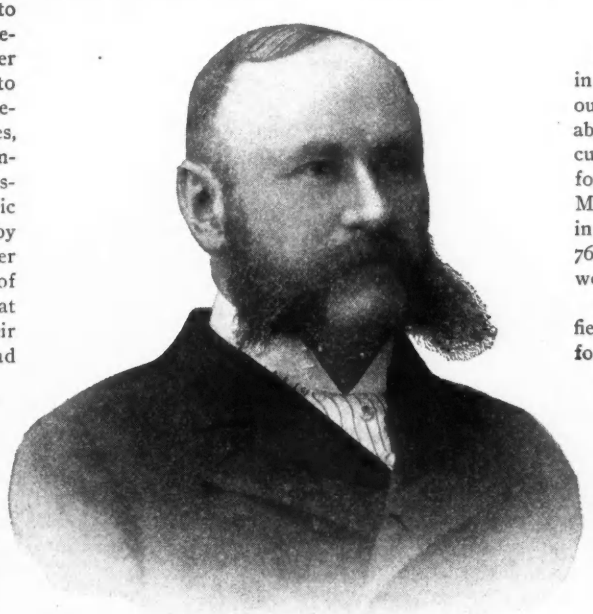
It was with deep regret that we reported in our editorial columns last week the death in London, on March 5, of Mr. Leonard Lewisohn, senior member of the well-known firm of Lewisohn Brothers. Mr. Lewisohn was on his way to Carlsbad to take the baths for his health, which had not been good during the past two or three years, owing to too close attention to business and to the death of his wife. While on the voyage to London, Mr. Lewisohn contracted a slight cold which developed into pneumonia, and in three days he died at the residence of his son-in-law, Mr. Charles S. Henry, who is a partner in the metal brokerage firm of C. S. Henry & Co., the European representatives of Lewisohn Brothers and the United Metals Selling Company.

Mr. Leonard Lewisohn was born in Hamburg, Germany, on October 10, 1847, and received his early education in that city. At the age of 14 years he became a clerk in the office of his father, Samuel Lewisohn, who was a prominent merchant. Four years later, in 1865, when 18 years old, Leonard was sent to New York to enter his father's branch office. In December of the same year Leonard and his elder brother Julius, whom he had induced to come to America, formed the firm of Lewisohn Brothers, beginning business as importers of feathers, bristles, etc., and acting as agents for the well-known Hamburg house of Samuel Lewisohn. The firm prospered with time, and being ambitious and energetic the brothers decided to increase their prestige by spreading out into other fields. In 1867 another brother, Adolph, became a partner in the firm of Lewisohn Brothers, and it was about this time that their attention was turning to the metal trade. Their first venture and one that was successful, was in lead in 1868. Prosperity was with the firm, and with each large transaction the profits grew until Lewisohn Brothers were recognized as an important factor in the metal trade. In 1879, when Lake copper was selling around 21½ cents per pound, the firm had many orders on hand that could be conveniently filled only by reimporting the metal from Europe. The idea was to draw on the stocks held by the Rothschilds and others, and at ruling high prices a good profit could be made. In this the firm was not mistaken, as they learned later.

So successful was the firm in dealing in copper, that its attention gradually turned to the operation of mines. Subsequently, in 1879, Mr. Leonard Lewisohn delegated his brother-in-law, Mr. Saly Raunheim, to get hold of several copper properties at Butte. The Montana Copper Company was formed under the management of Mr. Raunheim, who bought out two of the largest stockholders in the concern in the beginning of 1880. Smelting works were started, and concentration works were erected by Engineer Wartenveiler—the first of this kind in the United States. They proved a success and subsequently in 1881 the Parrot mines were opened and similar works built. The Anaconda mines were started in 1882. Undoubtedly Mr. Lewisohn's investments and operations formed the nucleus for the present large operations in the copper belt of Butte.

In 1886, after the Montana Copper Company properties had been developed to a stage where they would attract attention, Lewisohn Brothers began negotiations for consolidating the mines owned by the Montana Copper Company and the property adjoining, which was owned by Mr. Edward Larrabee. A year later, in 1887, the deal was consummated to the satisfaction of both parties and the Boston & Montana Consolidated Copper and Silver Mining Company organized. In this company Messrs. Clark, Bigelow, and their Boston associates took an active part, and elected Mr. Leonard Lewisohn a director. The Boston & Montana is one of the best copper properties to-day, having returned to its stockholders since incorporation, dividends to the amount of $26,225,000, which is equal to nearly 8 times the capital stock authorized. This was the first large mining company for whom Lewisohn Brothers acted as sales agents.

In 1899 Mr. Leonard Lewisohn, associated with Mr. William Rockefeller and H. H. Rogers, organized the Amalgamated Copper Company with $75,000,000 capital. This company obtained control of the Anaconda Copper Company, the Parrot Silver and Copper Company, the Washoe Copper Company, the Colorado Smelting and Mining Company, and other properties in Montana. A year later the capital of the Amalgamated Copper Company was increased from $75,000,000 to $155,000,000 for the purpose of acquiring control of the Boston & Montana and the Butte & Boston copper properties in Montana, the organization thus acquiring control of a large part of the copper production of the United States. This naturally helped Lewisohn Brothers who, owing to the rapid growth of their metal business, formed a few years ago the United States Metals Selling Company, which handles the output of the companies mentioned above, as well as that of the Osceola Consolidated Mining Company, the Tamarack Mining Company and allied Lake Superior copper mines, the Arizona Copper Company, the



LEONARD LEWISOHN.

Old Dominion Copper Mining and Smelting Company, the Highland Boy Gold Mining Company (Utah Consolidated Mines, Limited), the Santa Fe Copper Company, Tennessee Copper Company, etc.

Another enterprise in which Mr. Leonard Lewisohn was actively engaged was the organization of the American Smelting and Refining Company. The original capital of this company was $65,000,000, which has since been increased to $100,000,000 as a result of consolidation with an aggressive competitor, M. Guggenheim's Sons. Other important companies in which Mr. Lewisohn was one of the organizers are the Tennessee Copper Company, the Santa Fe Gold and Copper Company in New Mexico, and the Feather River Exploration Company. Mr. Lewisohn was financially interested in all these companies, and was also a large stockholder and director in the Osceola Consolidated Mining Company, the Tamarack Mining Company, the New York Dock Company, the Detroit Southern Railroad Company, the National Bank of North America, the Congress Brewing Company, the International Banking Corporation, the Raritan Traction Company and the United States Metals Selling Company, of which at his death he was president. He was also a member of the New York Stock Exchange and the New York Metal Exchange.

He had many other business interests, but these were subordinated to the metal trade. Of these in 1889 the feather and bristle house of Lewisohn Brothers was transferred to the Lewisohn Importing and Trading Company. In 1887 Mr. Julius Lewisohn retired from the firm and in the latter part of 1901 Adolph, the younger brother, also retired and was succeeded by Leonard's two sons, Walter and Frederick. Another son, Mr. Jesse Lewisohn, is manager of the United Metals Selling Company.

Mr. Leonard Lewisohn was a member of a number of societies, including the Engineers', Harmonie, Criterion, Fulton and Mid-day clubs and he was a director of the Educational Alliance in New York and a number of other charitable institutions. His charitable donations endeared him to many, while his wonderful ability as a business man cannot be forgotten; his connection with the metal trade gave him an unique position in the mineral industry.

He was for many years a personal and intimate friend of the late Editor and Manager of the ENGINEERING AND MINING JOURNAL Mr. R. P. Rothwell. He leaves a large family and many friends, who will sincerely regret his death.

DIAMOND FIELDS OF BRITISH GUIANA.

CONSULAR REPORT.

Mr. Geo. H. Moulton, U. S. Consul at Demerara, in his report to the State Department, says that the outlook for the new diamond industry is very favorable. Up to date, stones valued at $50,000 at the custom house have been exported. Ten men, at work for New York parties who located claims up the Mazaruni River a few months ago, recently collected in six weeks 8,227 small diamonds, weighing about 767 carats. The stones were valued at $9,600, and were shipped to New York.

Nearly every expedition that has gone up to the fields has found diamonds. It is not surprising, therefore, that local excitement is intense and that the discoveries have attracted the attention of the diamond interests of Europe and America. That the region is not overrun with prospectors at this time is due to the expense involved in outfitting, transporting and providing for an expedition. It costs $1,000 to get eight men up to the diggings, including the necessary prospecting implements and subsistence and pay for three months.

The route from Georgetown is up the coast 20 miles and then by steamer to Bartica, 50 miles up the Essequibo River. From there to San-San-Kopai landing, about 1½ miles above Putareng Creek, on the left bank of the Mazaruni, the route is covered in small boats in the average time of fourteen days. The navigation of the river is difficult and dangerous, on account of cataracts and rapids, and skillful boatmen are necessary .

The principal diggings now being worked are 5 miles back from the river, and all provisions and supplies are carried there on the heads of laborers. Over 1,200 of these laborers registered at the local department of mines this month and left for Bartica. Many of this number were doubtless destined for the placer gold diggings of the Cuyuni and Puruni.

There are about a dozen companies now in the diamond district, and new expeditions are being fitted out almost daily. Capital and mining experience will be needed to intelligently develop these fields and to provide adequate and safe communication with the seaboard.

Manufacturers of structural material should closely observe conditions here, with a view to supplying the machinery and electrical equipment which will be required.

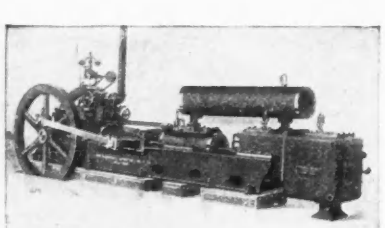
Mr. Moulton believes that now is a favorable time for anyone having capital, and the inclination to invest it in a British colony, to consider the inviting features presented in the construction and operation of an electric or steam railway up the Mazaruni River to the heart of the mining district.

MINING IN THE URALS.—Russian papers report that placer mining, both for gold and platinum, was very successful in the Urals last year. While no new fields were opened, there was a good supply of water, labor was plentiful and the weather favorable.

COMPRESSED AIR HAULAGE SYSTEMS.*

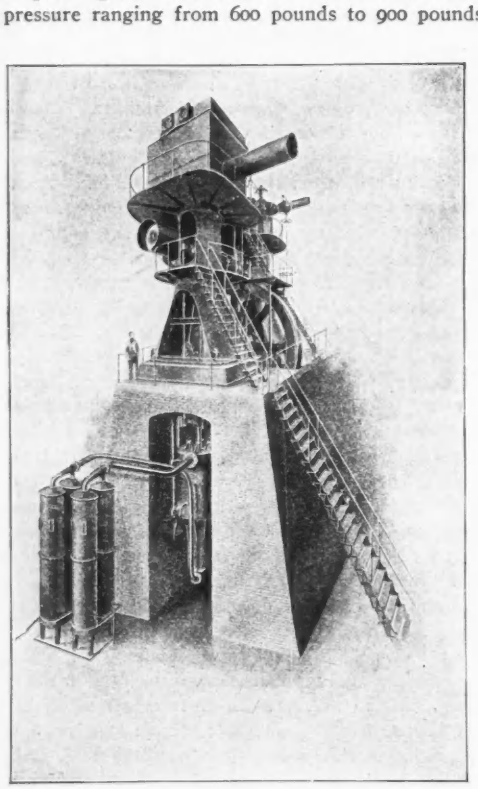
BY RICHARD HIRSCH, Pittsburg, Pa.

The rapid increase in the use of compressed-air locomotives during the last decade may be shown by the constantly increasing business of one of the largest builders of these machines. Of the total number of compressed air locomotives that have been built by the H. K. Porter Company, 12 per cent were built during the five years from 1892 to 1896 inclusive, and 88 per cent during the five years from 1897 to 1901 inclusive. Furthermore, over 30 per cent of all these locomotives were contracted for during the last 15 months. A period of ten years has seen the growth of the compressed air haulage system, almost from its introduction to its present proportions.



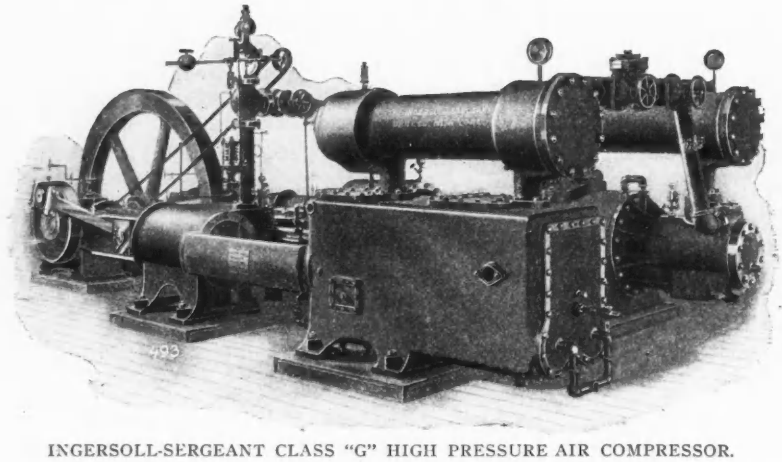
THREE-STAGE INGERSOLL-SERGEANT AIR COMPRESSOR.

The essential features of the compressed air haulage plant are now quite generally understood, and many details will be omitted in this paper. The air for operating the locomotive is carried in tanks at a pressure ranging from 600 pounds to 900 pounds per square inch. This pressure is reduced to about 140 pounds per square inch before passing to the cylinders, which, as well as the running gear, are of the usual locomotive type. Such a variety of conditions is encountered that no two motors of different plants are alike. These locomotives have been built in sizes running from a 5 by 10 in. to a 12 by 18 in. cylinder, and weighing from 9,000 pounds to 45,000 pounds. They have been restricted in height to 53 inches, and in width to 39 inches; gauge of track has been as narrow as 18 inches. The number of tanks may vary from one to three, and to obtain increased storage capacity, a separate tender is sometimes attached and connected to the motor by a flexible metallic coupling. These tenders have large tank capacity, and add greatly to the distance that the locomotive may run with one charge of air.



DUPLEX VERTICAL CROSS-COMPOUND ENGINE, WITH INGERSOLL-SERGEANT AIR COMPRESSOR. FOUR CYLINDER TYPE.
Built by E. P. Allis Company.

The air for charging the motors is supplied by specially designed steam driven compressors which deliver the air into a battery of tanks, but more frequently directly into a pipe line which parallels the tracks. At proper intervals in the pipe line, charging stations are placed, where the motor tanks are charged with air. The charging station is provided with a universal metallic coupling, which fits the check valve on the motor tanks; the entire operation of charging consumes but one or two minutes, and this is usually at the terminals of the road, where there is generally a lay-over before starting on the return trip. The size and type of motor, capacity of pipe line or storage tanks, together with the amount and pressure of air required, are all determined by the conditions met with in any particular case under consideration. The weight of train, together with the resistances due to rolling friction, grades, and curves, determines the size and weight of locomotive required. Frequently the restrictions in height and width are the determining factors, and when so restricted, the weight of train must be proportioned accordingly. The amount of free air required depends upon the amount of work to be done in terms of foot-pounds. The pressure in the motor tanks is governed by their volume and the amount of free air required between charging points. The cubical capacity of the storage tanks or pipe line, and the pressure carried therein, must together be sufficient to equalize, in the process of charging, to the pressure required in the motor tanks. All of these points are very carefully calculated, and an ample reserve is provided in the matter of air pressures and volumes to meet emergencies, future extension, or increased demands upon the plant.

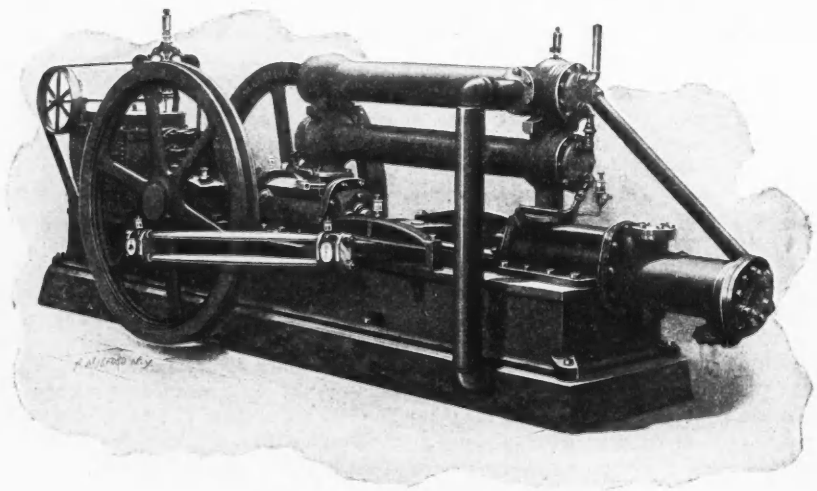


INGERSOLL-SERGEANT CLASS "G" HIGH PRESSURE AIR COMPRESSOR.

Pipe Line.—It must not be understood that it is necessary to parallel the entire system of tracks having a pipe line, with charging stations promiscuously located therein. When the earlier plants were built, storage tanks were used and the charging stations were supplied by lines of comparatively small diameter. These tanks were necessarily very large, heavily constructed and expensive. It was soon found that in most cases, by increasing the diameter somewhat, the pipe line could be made to serve the double purpose of storing and conveying the air; a much more economical construction than the heavy storage tanks, which were largely dispensed with. The pipe lines vary in diameter from 3 inches to 6 inches.

In mines, the pipe line follows the main entries only. The locomotive, when charged, acts as a perfectly free and independent motor, and all work on switches, branches, cross entries, etc., can be done without requiring branch pipe lines. Charging stations are generally located at each end of the pipe line, and it is never necessary to charge the motor at intermediate points, except where such a plan has been determined upon in the original design. Where unusually long and hard runs make this necessary an intermediate charging station is provided.

There is an economical feature in the construction of these pipe lines which should not be overlooked. This point can be brought out more clearly by comparison with an electric system. In the latter the weight of copper in properly designed conductors varies directly as the square of the length. If the distance is doubled, the sectional area of the conductor must be doubled, which increases the total weight four times; if the distance is three times as great, the weight of copper is increased by nine; the cost of conductors varies accordingly. In the compressed air system, the amount of storage required is determined by the amount of work to be done, and the diameter of pipe required to give the necessary storage is determined by its length. If the charging stations must be so located as to double the length of pipe line, the diameter is reduced accordingly. The

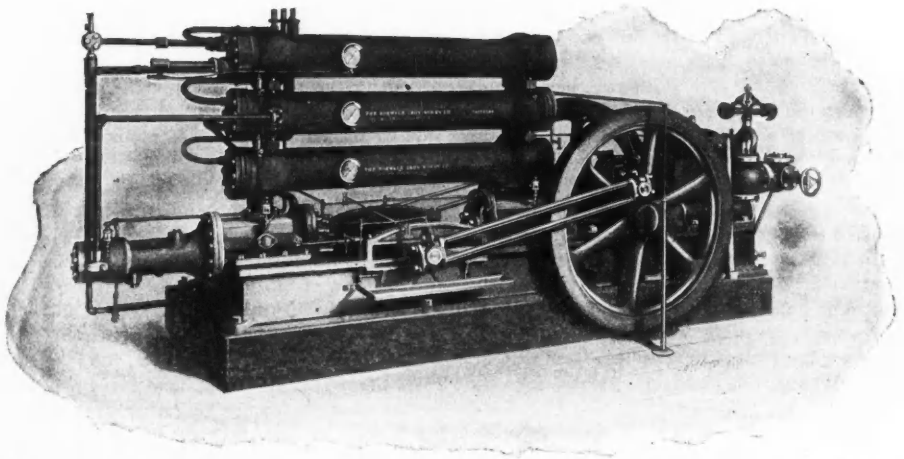


THREE-STAGE LOCOMOTIVE CHARGER.
Pressure 900 pounds per sq. in. Built by Norwalk Iron Works Company.

*Largely an abstract from a paper read before the Engineers Society of Western Pennsylvania.

following illustration will show this point more clearly:

A storage capacity of 550 cubic feet in a line 4,000 feet long will necessitate the use of a pipe 5 inches in diameter. If the length of line must be made 8,000 feet, we can use a 4 inch pipe having a capacity of 700 cubic feet. The 4,000 feet of 5 inch pipe would cost about $2,400, and the 8,000 feet of 4-in. pipe about $3,840 (for the material alone). We thus see that we can double the extent of the system and have 27 per cent more storage capacity at an increased cost of about 60 per cent.



THREE-STAGE LOCOMOTIVE CHARGER. Pressure 2,500 pounds per sq. in. Built by Norwalk Iron Works Company.

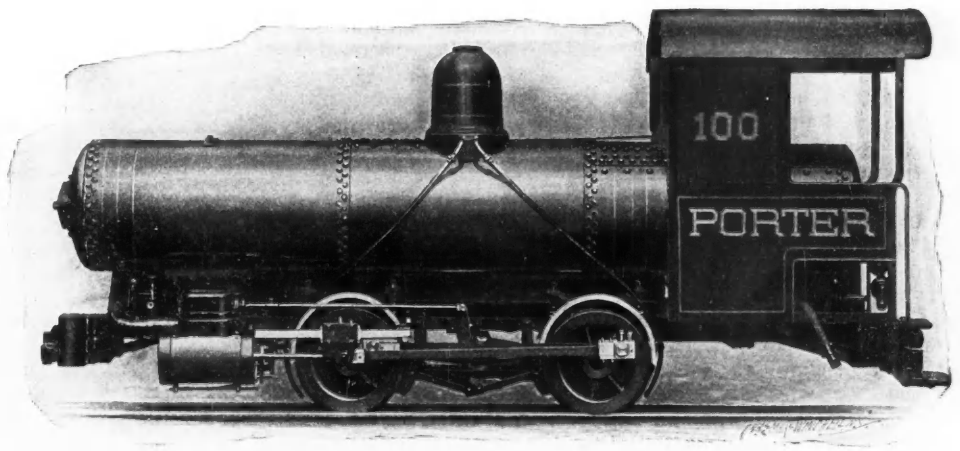
Compressors.—The subject of compressors will be passed with but few remarks. They are of many different types, but all are built on the multi-stage plan, in which the air is compressed in three or four stages before reaching the final pressure. The use of compound or multi-stage compressors is rendered necessary on account of the impracticability of producing high pressures in single cylinder machines, and also for the purpose of cooling the air between the several stages of compression. For pressure as low as 100 pounds per square inch, the heat losses are reduced more than one-half in a two-stage compressor, and for high pressures the saving by the three and four stage machines is very much greater. To derive the full benefit of compounding, the air should be thoroughly cooled between the several stages of compression. The steam end of the compressor may be simple, compound or triple expansion, depending upon the cost of fuel. The compressor in use at the Anaconda Copper Company's mines in Montana is a triple expansion corliss condensing engine, and the steam passes through steam heated receivers before entering the intermediate and low pressure cylinders. At coal mines where fuel is reckoned at fifty cents a ton, simple engines are generally used.

Special Features of the Compressed Air Haulage System.—This system of haulage is peculiarly applicable in industries where the matter of safety is of the utmost importance, such as gaseous mines, powder mills, cotton warehouses, lumber yards, magazines, etc. The danger of fire or explosion in plants of this nature preclude the use of steam locomotives or the electric trolley system. Serious accidents have occurred by people coming into contact with highly charged naked trolley wires in low mine entries, and the Pennsylvania Report of Bureau of Mines record many such accidents.

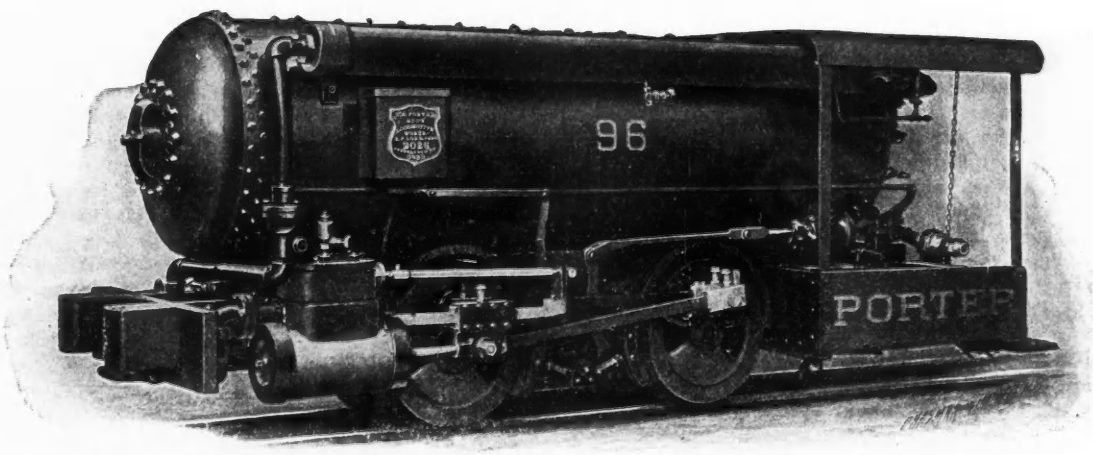
An air locomotive when charged can proceed with its train to the end of the run, and a temporary stoppage of the compressor does not tie up the system. The air stored in the pipe line can be drawn upon to keep the system in operation for a considerable time. In such an emergency the pressure would fall rapidly, and after the pipe line would have been drawn upon for one or two extra trips, the pressure obtained in the motor tanks would not be sufficient to make a full trip with the train; by placing one or two extra charging stations in the line, the locomotive could be recharged if it were found that the run could not be completed with the one charge at the lower pressure. Motors are often charged at night and retain the pressure without any appreciable loss until the next morning ready to begin the day's work.

On account of the simplicity of construction and ease of operation, unskilled labor can readily be trained to perform the duties of engineer. The entire work of operation consists in the manipulation of the throttle and reverse levers, the occasional application of brake or sand, and usual use of whistle or bell. The work of charging the motor tanks is a very simple operation and consumes but a few minutes' time as explained elsewhere. The cost of maintenance, repairs or renewals are small items as the moving parts are few and suffer but little wear.

The system can be compounded, but it then becomes necessary to heat the air before each expansion, which greatly complicates the mechanism of the motor. The construction of these machines should be reduced to the simplest possible form, to the end that they are easy to operate and require but little attention to keep in repair. There is far more economy in burning a little more coal to supply the compressor than there is in attempting to economize at the motor end of the plant by such complication of parts as the compound engine involves. But simplicity must not be construed to mean crudity. What we might term the refinements of engineering practice have been sacrificed for purely practical and business reasons, and the great number of successful plants built on these lines testify to the wisdom of that procedure. At the average rate of saving in one of these mining plants where mules had previously been used, the entire cost of the plant would be saved in 361 working days.

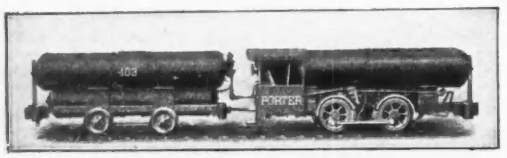


COMPRESSED AIR LOCOMOTIVE. Built by H. K. Porter Company.



COMPRESSED AIR MINE LOCOMOTIVE. Built by H. K. Porter Company for Commonwealth Iron Company, Cleveland, Ohio.

Compressed Air Haulage Plants of the United States Government.—There is an interesting haulage plant in operation at the United States Naval Magazine on Iona Island in the Hudson River, about 41 miles from New York City. The main track of the plant is laid out approximately in the form of a circle about 900 feet in diameter, and the dozen or more buildings comprising the magazine are grouped within it. These buildings are to be used for the storage of ammunition for the United States Navy, and are connected to the main circular track by switches, which in turn has connection with the tracks of the West Shore Railroad and with a dock on the eastern shore of the island.



COMPRESSED AIR LOCOMOTIVE WITH TENDER.
Built by H. K. Porter Company.

The plant consists of a Porter locomotive having 12 by 18 in. cylinders, and weighing 42,500 pounds. There are two motor tanks having a combined capacity of 240 cubic feet, and carry a pressure of 750 pounds per square inch. The air for the plant is furnished by a three-stage Norwalk compressor, having a capacity of 300 cubic feet of free air per minute compressed from atmosphere to 1,000 pounds per square inch. The air is stored in a battery of six steel tanks, each 36 inches in diameter and 17 feet long, having a combined capacity of 650 cubic feet. There is a 3-in. pipe line 300 or 400 feet long which carries the air to three charging stations. The motor is designed to haul two standard freight cars a distance of two miles, and portions of this haul occur on grades as steep as 5 per cent. The locomotive exerts a tractive force of from 8,300 to 8,900 pounds. Steam locomotives of the West Shore Railroad are not permitted to cross the Government property line.

A similar plant has just been completed at the United States Naval Powder Depot at Lake Denmark, N. J.

CHANGES IN THE SCOTCH PIG IRON TRADE.—The London *Colliery Guardian* of recent date says: "The Glasgow Pig Iron Trade Association has an important movement under consideration—a reduction of the existing Scotch warrant from 500 to 100 tons. At the same time difficulties stand in the way, for it should be explained that a Scotch iron warrant embraces 300 tons of No. 1 and 200 tons of No. 2 iron. As No. 1 iron is now passing to a large extent directly from the makers to the consumers, little is available toward the compiling of the full warrant of 500 tons. It is argued that a reduction in the existing warrant of 100 tons would open up the way for more outside interest in the dealing, for under present conditions a Scotch warrant means a passing of £1,200. At the moment the Scotch warrants in circulation total only 52,000 tons, and before any marked extension in business could be possible, more documents would be imperative. Another proposal is to make a warrant include only No. 3 iron, instead of the present mixed numbers. The leading Glasgow houses, however, are hostile to the latter alteration."

IRON EXPORTS OF GREAT BRITAIN.—Exports of iron and steel—including machinery—from Great Britain in January are valued by the Board of Trade returns as below:

	1901.	1902.	Changes.
Iron and steel.....	£2,185,776	£2,103,174	D. £82,602
Machinery	1,438,458	1,419,341	D. 19,117
New ships.....	449,667	584,240	I. 134,573
Totals.....	£4,073,901	£4,106,755	I. £32,854

The value of mining machinery exported during the month—included above—was £41,064, against £51,450 last year.

SOME LESSONS FROM THE RECENT FLOODS IN THE ANTHRACITE MINES OF PENNSYLVANIA.

By W. S. AYRES.

Among the results of the floods of the past winter in the Pennsylvania anthracite regions were: the loss of pumps suddenly submerged, and the consequent necessity of purchasing any sort of a pump, new or old, at high prices; the labor and supplies necessary to put in these pumps and to shift them from time to time as the water was lowered; the labor of cleaning up vast quantities of debris from gangways, working places and dumps; the extra timbering required by increased loads due to water-soaked soil and the loosening of joints in the rock-strata; the very great loss of time during which the colliery must be idle wholly or in part; the loss, by drowning of many mules; the loss of time to the miner and laborer; and finally the effect on the consumer who may feel that he cannot depend upon the anthracite mines for his supply of coal.

These results have been so serious and expensive as to place this flood-water problem heretofore imperfectly solved, and often neglected, on the list of things to be worked out thoroughly at once.

Some operators class drown-outs among unforeseen difficulties; others, who made extensive preparations admit frankly that they have not gone far enough or have overlooked some contingencies. The tendency to avoid expenditures necessary for adequate protection and to take chances on the recurrence of a flood is clearly an error in judgment, and "chancing" on flood-water is not economy.

The present extent of the underground workings of any mine in this section would at first sight seem to form a simple basis from which to estimate the increase of pumping capacity necessary to meet the greatest rainfall. But in robbed areas the overlying strata settle, and the loosened rock joints admit water in greatly increased quantities. Again, the stripping of the outcrops, as practiced in the Hazleton region, opens up direct communication with the mine below, and forms a catch-water basin which delivers all of its water into the mine. In addition the cutting of overlying and particularly of the underlying veins of coal by tunnels driven from the vein first worked, thus adding new areas from which the water is led to the established pumping plant in the old workings.

The one thought that seems to have governed the advance of mine operations was to provide for the water ordinarily met in running by leading it to the existing pumping plant, while no adequate preparation was made on the surface to take care of the largely increased amount that would surely run into the mine during an extraordinary rainfall.

In the recent drown-outs there is evidence that surface water is the more imperfectly taken care of. Even where attempts were made to provide for it by constructing canals at great expense removing to the edge the creek that usually passes over the middle of the basin and thereby cutting off all tributary waters, several failures are reported, either from the canal not being large enough, or from obstructions, such as trees, plank, small buildings, etc., lodging and causing the canal to overflow. These failures, however, were due to defects in details for the method was in the right direction.

There are, however, many basins where these old creeks cannot be diverted owing to the "lay" of the ground. In these cases other methods must be adopted, and when robbing is going on, particularly if directly beneath the creek, the problem is greatly complicated. Not only must the rainfall upon the immediate basin be provided for, but that upon the territory tributary to it.

Another condition that has in many cases caused most embarrassing and disastrous results is the fact that in many of the very old workings the barrier pillars between adjoining properties have been punctured either through the lack of surveys in the early days of the mine, or through inaccuracies in those made. These punctures have let in the flood-waters of adjoining properties that have been drowned out or abandoned. In many cases the openings are inaccessible, in others the damage to the barrier-pillar is irreparable, and in still others legal complications place the matter practically beyond the control of the operator suffering damage.

The remedies available are of two classes, those suitable to surface, and those suitable to underground conditions.

Among the most successful attempts to take care of the flood-waters on the surface is the canal outside of the outcrop, but this method can be applied at only a few properties as the outcrop is usually very much higher than the bed of the creek. Shifting the canal as far to one side of the basin as possible, (particularly while robbing is going on under the opposite side), and at the same time leading tributaries through flumes over the robbed and sunken ground have proved fairly successful.

In one case very familiar to the writer the cover over the vein was about 200 feet, the basin very narrow, the fall quite rapid and the surface was being lowered 25 feet by removing the entire remaining portion of the vein, and there was no opportunity to divert the creek from over the area being robbed. This method was pursued; flumes were built over the most treacherous portions, and where ponds were likely to form streams of water carrying silt from the operations on the adjoining property were turned in. Any depressions were soon filled, raising the surface to the level of the original bed of the creek. This silt over the caving ground hindered any great quantity of water running into the mine, by promptly filling any cracks from the settling of the strata beneath. It was deemed best to keep the creek as nearly over the trough of the basin as possible for two reasons, first, the cover was thicker there and consequently the surface would settle along this line more uniformly with less liability to "day falls," caves running to surface; second, the nearer to the outcrop the greater the pitch, and consequently the greater the liability of such caves occurring. A second channel or water-way was constructed through the silt at some distance from the main one, by making banks of alternate layers of brush and silt, as an emergency channel in case the main channel should break into the mine (which it has never done), or as a relief in case of a flood. This scheme during the recent floods proved very efficient.

Where the outcrop is above the bed of the stream and there is no possible way of diverting the creek outside it, even by a tunnel in the bottom rock, then the old practice of cutting ditches outside of and along the outcrop should be carried out and maintained with exact and rigid detail.

As to underground conditions, recent experiences indicate that pumps should not be placed in the main workings at the bottom of the mine, but in some side chamber having no communication with the mine except through the suction pipe and having an individual connection with the surface. This can be accomplished in the manner adopted by the Lehigh Valley Coal Company at its No. 40 Shaft at Hazleton, where the pump room is in an underlying vein dammed off from the rest of the mine and having a slope of its own communicating with the surface. Or some working in the main vein can be walled off or a pump chamber can be made in the underlying rock.

Still another method that is rapidly growing in favor outside of the anthracite coal fields is to pump by the compressed-air double-tank system in which two tanks at the bottom of the mine alternately fill with water which is forced out of them into the column pipe by compressed air from the engine room at the surface. The tanks can be in the main workings and can be submerged under many feet of water with but little risk from the "chipping" of the clacks, because these open and close only about once to each hundred times of those of the ordinary steam pump. In the individual chamber system the pumps can never be drowned out; with the double-tank compressed air system, the apparatus works just as well submerged under any depth of water as above it. In both the heavy expense of additional pumps and

supplies, and of shifting and removing them, is wholly avoided.

But all this does not prevent the workings themselves from being drowned out with consequent delays and loss of output. Several long tunnels have been recently driven through the mountains from adjoining valleys. These have saved much, but in some instances they have been made too small. Where properties cannot be drained profitably by tunnels because of too great a distance or lack of outlet, the natural conclusion is, protect as great an area as possible. Divide the mine into watertight compartments by dams. An objection to this, which has some weight and is always brought forward whenever a dam across any main traffic-way is suggested, is that it would cost too much and would interfere with the traffic, but there is no reason why an efficient, reliable and easy working device cannot be made and applied to the passageways of a mine.

The engineer may devise some efficient scheme for the protection of the mining operations against such disasters, but his difficulties are often prolonged by a long series of delays and by counter suggestions apparently cheaper, made by the commercial manager of the concern. The two may never agree and as a result some cheap temporary expedient that does not meet the emergency is enforced and ultimately results in expenses many times the cost of the needed improvement.

PROSPECTS FOR AMERICAN COAL IN FRANCE.

CONSULAR REPORT.

U. S. Consul Jackson, at La Rochelle, France, says: The first cargo of United States coal ever received at La Rochelle was unloaded at the basin of La Pallice the last week in January. This is the first installment on a contract for several thousand tons, and is to be used by locomotives.

The cargo, after its long voyage, was found to be in good condition, containing, it is estimated, from 40 to 50 per cent lump coal. Accordingly, the impressions made by it are favorable. The trials of this coal, which are not yet completed, are giving good results and promise to be satisfactory in every way. This lot of coal was sold to the French purchasers by a house at Cardiff, the transaction being greatly facilitated by exceptionally low freight rates.

Samples of United States coal have several times been sent to this consular district, but have always arrived in a poor condition—containing about 80 per cent dust—which has given American coal the reputation of being extremely friable. Even with this handicap, however, the coal proved to be of excellent quality.

Up to the present time, the coal supply for this region has come from Cardiff or Newcastle. On the arrival of a cargo, it is carefully assorted for the various uses to which it is intended—whether for locomotive, factory, or for domestic purposes. The dust, mixed with tar, is pressed into briquettes.

The general outlook for American coal is encouraging. A very slight diminution of price in many instances may secure important business. The quantity annually imported into this consular district is about 700,000 tons. Of this, the proportion of anthracite is small, on account of high prices. Bituminous coal, with the highest possible per cent of carbon and the lowest per cent of volatile matter, is in great demand. Prices should not exceed 23 or 24 francs ($4.43 or $4.63) per ton c. i. f. La Rochelle.

IRON ORE IMPORTS OF GREAT BRITAIN.

—Imports of iron ore into Great Britain in January are reported as below, in long tons:

	1901.	1902.	Changes.
From Spain.....	509,002	419,235	D. 89,767
From other Countries.....	86,023	80,671	D. 5,352
Totals.....	595,025	499,906	D. 95,119

Other countries included Sweden, Algeria, Greece and Newfoundland.

THE MOUNT BAKER MINING DISTRICT, WASHINGTON.*

BY GEORGE OTIS SMITH.

The Mount Baker mining district is in the north central part of Whatcom County, which is the northwestern county of Washington. The district is included in the Washington Forest Reserve, and lies in the heart of the Skagit Mountains, which form the western and wildest portion of the Cascade Range. These mountains constitute the divide between the head waters of branches of the Skagit, Chilliwhack, and Nooksak rivers. Mt. Baker, a volcanic cone, 10,827 feet high, and Mt. Shuksan, a granite pinnacle nearly as high, are the dominating peaks of this region, but several other mountains approach these both in height and in boldness of outline. The extremely rugged topography of the region and the glaciers that occur on many of the higher peaks make this district one of great picturesqueness, but also add to the difficulties of development of the mineral resources.

TWIN LAKES PASS, MOUNT BAKER DISTRICT, OREGON, IN SEPTEMBER.

The valley of the north fork of the Nooksak River furnishes the natural route of entrance into the district, but so luxuriant is the vegetation that the valleys in the Skagit Mountains, although rather broad and having moderately easy grades, are not easily traveled, and only within the past few years has this main valley been accessible. At first, the eastern part of this district was reached from the Canadian side, by the way of the Chilliwhack River and Silicia Creek. This past year the Bellingham Bay and British Columbia Railroad extended its tracks to Maple Falls on the North Nooksak, and from this station a wagon road continues up the river to Shuksan, a distance of about 25 miles. From Shuksan and other points on this road, trails of varying quality lead to the different mines and prospects. The road was constructed by the State, and considerable work has been done on it by the county authorities. Most of the grades are easy, but the trees of the magnificent forest through which this road passes stand so close together that long stretches of the road are never reached by the sun's rays, and this feature together with the heavy precipitation of the region makes it impossible to keep the road in good condition with the heavy teaming that is being done. An electric road has been projected to extend from the railroad to Shuksan. There would be no engineering difficulties to prevent the construction of such a road, while the falls of the Nooksak, about 100 feet in height, are so situated as to furnish abundant power for the economical operation of an electric road.

The geology of the Mt. Baker district has not been thoroughly studied. A rapid reconnaissance of the area was made the past season by the writer and Frank C. Calkins, Assistant Geologist, and the results obtained are embodied in this paper and the accompanying map. In the eastern part of the district, east of Silicia Creek, granitic rocks appear to predominate. Granite and diorite of varying composition with dikes of aplite and granite porphyry make up a complex which extends south, past Mamie Pass and across the Nooksak to Mt. Shuksan. West of this granite mass on Silicia Creek the rock most often exposed is slate, while further south on the Nooksak, gneiss and schist are in contact with the granite and diorite, and the relations indicate that the latter are intrusive. Around Hannegan Pass, volcanic rocks, green and purple lavas and breccias cap the ridges in this vicinity, and at the head of the Nooksak there is also a mass of schist and gneiss apparently enclosed and intruded by the granite.

In the vicinity of Twin Lakes at the head of Swamp Creek, the rocks are black shales and slates with cherty lenses, crumpled schists, limestone breccias and conglomerates, sandstones, and some small amounts of volcanic breccias apparently interbedded with the sedimentary rocks. The strike of these rocks is usually 10° to 30° either east or west of north, with very steep dips. As far as studied, the structure indicated is that of closely compressed folds, the axis of one anticline passing near Twin Lakes. Cutting these rocks are dikes and sheets of porphyries of acid and intermediate composition. Further west in the valley of the Nooksak, the rocks appear much less metamorphosed, and green sandstones and conglomerates are most often seen. The recent lavas from Mt. Baker reach as far east as Austin Pass, and at one point, about one mile above the falls, extend down even to the level of the Nooksak. Light-colored sandstones, with associated shales and coal seams occur on Cowap Creek, locally known as Canyon Creek, and also south of the river below Glacier Creek. The age of the metmorphosed sediments in the vicinity of Twin Lakes is quite probably Paleozoic, while the green sandstones further west resemble closely the Lower Cretaceous rocks found along the main crest of the Cascades in this same latitude. Fossils of Upper Jurassic age have been found near the head of Cowap Creek. The coal-bearing rocks lower on this same creek are probably

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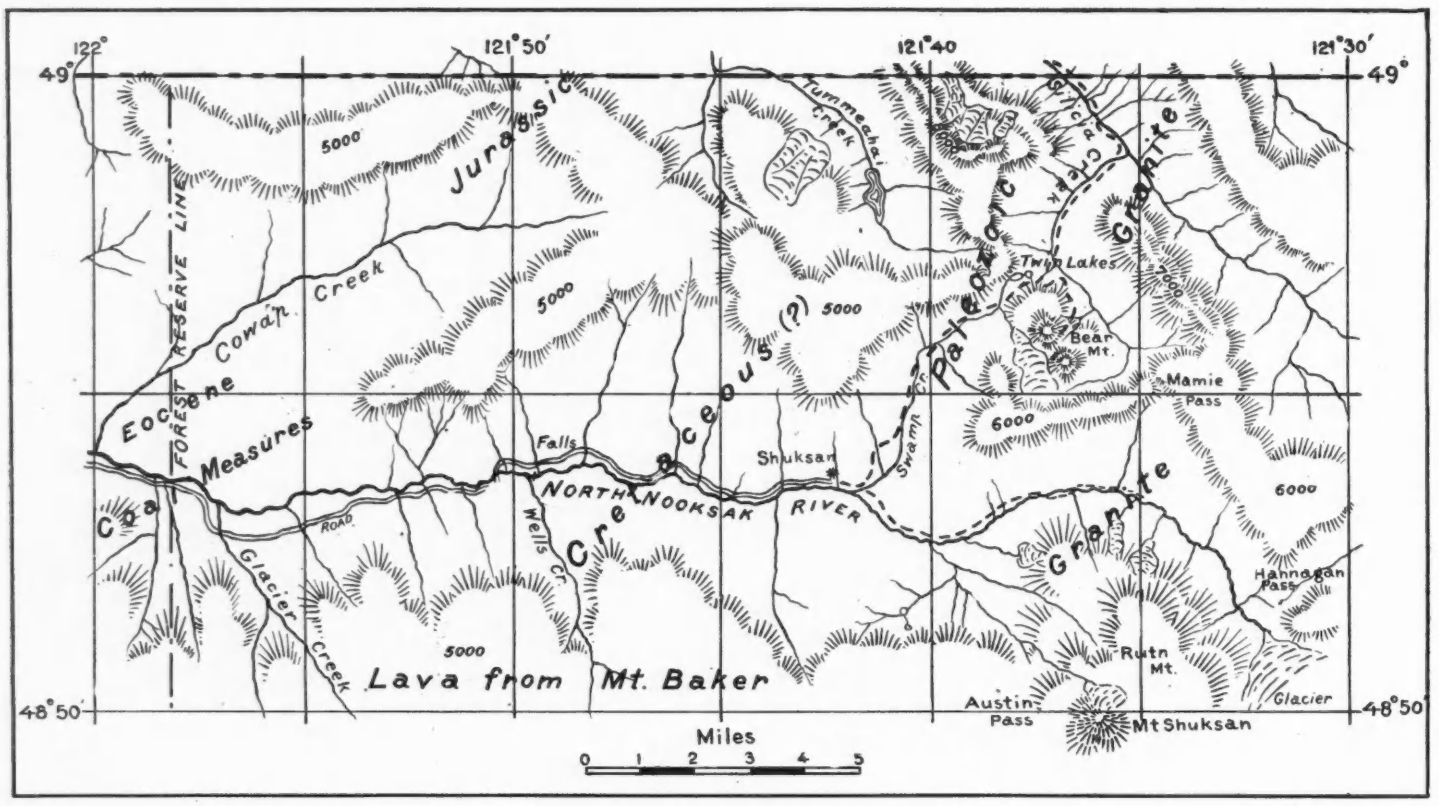
of Eocene age, like the coals of the eastern part of Whatcom County.

The mining industry is very much in its infancy in this district. As already suggested, the region is not such in its physical features as to encourage prospecting. The first find of importance was made as late as 1897, and this is the only mine in the district that could be said to be upon a producing basis in 1901. It is known as the Lone Jack mine, and is in the Post-Lambert group of claims on the eastern slope of Bear Mountain. The vein is 4 to 5 feet in width, of clean-looking, solid quartz, standing out on the mountain side so as to be readily seen from a distance. The ore is both telluride and free gold, and occurs throughout the vein, although usually concentrated in a paystreak, which lies near the hanging wall or in some cases near the footwall or even in the center of the vein. Samples can readily be taken from any part of the vein as exposed which will show the free gold. Many rich assays have been reported for picked ore from this mine, running as high as $850, and a two-ton smelter test is said to have netted $450. This fissure vein is quite regular, with some horses of country rock, but with no marked variations in width. The vein as exposed strikes a little west of north, and has an inclination of about 45° west, or into the mountain. The country rock here is a schist, with lenses and stringers of quartz which somewhat resemble small gash-veins, and often constitute so large a part of the rock as to make it gneissoid in appearance. There is, however, no evidence of transition between these and the large fissure vein.

Another type of ore deposit is at the Grand Excelsior Mine on Wells Creek, about one mile southeast of the bridge over the Nooksak. Here the work done has been in a mineralized zone in the green conglomerate and chert. Sulphides occur scattered through the rock, and the irregular body of mineralized rock appears to be near the surface and approximately parallel with the slope. No definite information could be obtained as to the values in this ore. Low grade gold ore is reported to be found in large bodies in the vicinity of Austin Pass. Veins carrying both gold and copper have been prospected north of Twin Lakes, but do not prove to be continuous for any distance. Prospecting is also being done on Tummeahai Creek, and in the vicinity of Hannegan Pass.

The future of this mining district is at present somewhat uncertain. Plainly the region has not been fully prospected, and even the ore-bodies at present located have not been developed thoroughly enough to afford any sure basis for an estimate of the worth of the district. Enough is known, however, to seem to justify more exploration work. The erection of a stamp mill on the Lone Jack, which was begun in 1901, will enable the owners of that property to determine its true value. In other cases, much more underground work is plainly advisable before mill-erection begins. The season of 1902 will doubtless see more development work done than has been done heretofore.

From the little that is known concerning the mining geology of this district it is difficult to make many suggestions that will be of value to the prospector. While in all parts of the district the strata have been tilted from their original position, the close folding of the Paleozoic rocks, which has metamorphosed them into schists and gneisses, is in some cases good evidence that conditions are here more favorable for mineralization. On this supposition the area to be prospected most thoroughly is that east of a line running southward from Tummeahai Lake to Austin Pass. In this area the rocks have been crushed and fissured and cut with dikes. The granite and allied rocks in the extreme eastern part of the district are younger than these Paleozoic rocks, and prospectors report less evidence of mineralization in that region.



SKETCH MAP OF MOUNT BAKER DISTRICT, OREGON.

PHOSPHATES ON OCEAN ISLAND.—On this island, in the Pacific, situated about 30 miles from the equator, and 200 miles west of Nonuti, one of the Gilbert Group, rich deposits of phosphates are being worked. There is no anchorage at the island, but mooring buoys are laid down, one on the northwest side, and the other in the southwest corner. Steamers make fast to either of these when loading, the phosphates being lightered off to the ship. There is deep water right up to the shore. The Pacific Islands Company, says the *North China Herald*, has a large plant at the island, and exports the phosphates in considerable quantities to Australia and New Zealand. The company holds exclusive rights in connection with the phosphate deposits, and employs a staff of 220 hands.

PIG IRON PRODUCTION IN CANADA.

The production of pig iron in the Dominion of Canada, as ascertained from the manufacturers by the American Iron and Steel Association, amounted in the calendar year 1901 to 244,976 gross tons, as compared with 86,090 tons in 1900, 94,077 tons in 1899, 68,755 tons in 1898, 53,796 tons in 1897, 60,030 tons in 1896, 37,829 tons in 1895, and 44,791 tons in 1894. The statistics of the association do not go back prior to 1894. Of the production last year 228,893 tons were made with coke and 16,083 tons with charcoal. The production of bessemer pig iron, included above, amounted to 29,577 tons. Neither spiegel nor ferro-manganese was made.

On December, 31, 1901, the unsold stocks of pig iron in Canada amounted to 59,472 gross tons, as compared with 12,465 tons at the close of 1900 and 9,932 tons at the close of 1899. Of the unsold iron on hand on December 31, 1901, 54,563 tons were coke pig iron and 4,909 tons were charcoal pig iron.

On December 31, 1901, there were 14 completed furnaces in Canada and 4 furnaces were in course of construction. Of the completed furnaces 7 were in blast and 7 were idle on the date named. During 1901 4 furnaces were erected by the Dominion Iron and Steel Company, at Sydney, Cape Breton, Nova Scotia, three of which were blown in in 1901. The fourth furnace was put in blast in January, 1902. Of the 14 completed furnaces 9 were equipped to use coke for fuel, 4 charcoal and 1 charcoal and coke.

DETERMINATION OF SILVER IN RESIDUUM FROM ZINC DISTILLATION.—The retort residues contain a considerable proportion of unburned carbon, the destruction of which by ignition is tedious and troublesome. K. Sander has described (*Zeitschrift fuer angewandte Chemie* 1902, xv, ii 32) a method by which the carbon is removed instantaneously. A mixture of 20 grams of the coarsely powdered residue with 40 grams of potassium nitrate and 10 grams of sodium peroxide is dropped in portions of 3 or 4 grams into a red hot iron crucible. When the reaction is finished a sufficient quantity of flux (14 parts sodium carbonate, 8 parts borax glass, and 2 parts of cream of tartar) is added, and then 10 grams of litharge. The lead button obtained from the fusion is cupelled in the ordinary manner.

THE CANADIAN MINING INSTITUTE.

SPECIALLY REPORTED.

The annual general meeting of the Canadian Mining Institute began in Montreal, March 4, with a large attendance of members. The original notice had named March 5 as the opening day, but some unavoidable changes in the local arrangements made it necessary to advance the date by one day. The meeting was notable, not only for the large attendance, but also for the great interest taken in the discussions and the value of the papers presented.

The opening session was held on Tuesday, March 4th, in the club room of the Windsor Hotel, where the headquarters of the Institute are located. Mr. Charles Fergie, the president, being prevented from attending the meeting by illness—much to the regret of all—Mr. J. E. Hardman, past president, was called to the chair. After the formal opening addresses the first business brought up was the bill now before the Ontario Legislature providing for the incorporation of the Canadian Society of Civil Engineers. The objections raised to the bill were that it proposed to confer special powers on the society, giving it in effect a censorship over the profession, which would constitute it a close corporation able to bar out anyone outside of its membership from practising as a civil engineer. It was felt that such exceptional powers should not be conferred, and that it would be unjust to the Mining Institute to have a sister association placed on an entirely different and really a semi-official level. The speakers generally expressed the most friendly feeling toward the Society of Civil Engineers, while they deemed the provisions of the bill unwise and unjust toward sister associations.

The discussion was a very general one, and at its close it was unanimously determined to wire the chairman of the Private Bills Committee of the Ontario Legislature, protesting against the bill.

The secretary, Mr. B. T. A. Bell, submitted his annual report. It stated that the past year's operations in mining and metallurgical enterprise had been greater than at any period in the history of the Dominion, and there had been a very remarkable expansion in the production of coal and coke, iron and steel, nickel, copper and asbestos; the mining industry in certain districts of the West suffered from a depressed market for silver and lead, due, perhaps, more to the natural and inevitable reaction following upon a period of speculation. At the close of the year the membership of the Institute numbered 331, as compared with 323 in 1900. It was gratifying to report that the student membership would be considerably reinforced by the affiliation, *en bloc*, of the members of the Mining Society of McGill University, under a special clause in the by-laws, recommended by the Council for adoption. Fitting reference was made to the members who had passed away during the year.

With reference to the act to amend the Mines Act, adopted by the Ontario Legislature in 1900, and for the disallowance of which the Institute had asked the Dominion Government, it was stated that its constitutionality would be made the subject of a special test case between the two governments at no very distant date.

The reading of the report was not concluded when an adjournment was taken. At the afternoon session Mr. Bell read the closing section of his report, which related to the mineral production of the Dominion. In opening this, Mr. Bell took occasion to refer to the monthly trade and navigation returns issued by the Government, which he held were unreliable. These returns showed that last year Canada exported about $41,000,000 or $42,000,000 worth of minerals; as a matter of fact, the mines produced $70,000,000 worth, and the great bulk was exported. Returns so loose as the trade and navigation returns were manifestly unfair and unjust to the mineral industries of the country, and it seemed a question upon which the Mining Institute could well express its opinion. The remainder of the report dealt at considerable length with the mineral production of the country during 1901, and its value. The figures for production will be found elsewhere.

After the conclusion of the report, the chairman, in a brief and appropriate address, made a formal presentation to the Geological Survey of Canada of portraits of Dr. Selwyn and the late Dr. George M. Dawson, two gentlemen who had shed so much honor on Canada as heads of the Survey. The presentation was made on behalf of the members of the Institute and a few other subscribers. The portraits, which hung upon the wall of the meeting room, were fine works of art, and were generally admired by the members.

Dr. Robert Bell, as acting head of the Geological Survey, accepted the gift on its behalf, and spoke briefly of the work done by the two eminent geologists. Dr. Selwyn was head of the Survey for 25 years, while Dr. Dawson was connected with it for an equal period, serving as director during the last six years of his life.

It was then announced that the president's gold medal for the best paper submitted by a student during the year had been won by Mr. E. V. Corless, of McGill University; and he received the same at the hands of the chairman.

A valuable paper was read by Mr. R. W. Brock, of Ottawa, on the Ores of the Boundary District, B. C., an abstract of which is given elsewhere.

At the evening session Mr. Christopher Shields, general manager of the Dominion Coal Company, was called to the chair. The subject of discussion taken up was the National Importance of Mining. It was opened by a paper read by Mr. J. E. Hardman, of Montreal, who referred to the rapid growth of the mining industry in Canada and to the support which it might reasonably expect from the Government, in view of the great work done and the important contribution made to the public wealth. As a guide to the aid which might reasonably be expected from the Government, he said that we might turn to Victoria and New South Wales in Australia, and to the United States. What was needed in Canada at the present time was a department devoted solely to economic geology, which was important to the country. The lack of proper economic geological work was largely responsible for the inflation in British Columbia in 1895-97, the collapse of which was so disastrous, not only to moneyed men, but to the good name of the country as a whole. No branch of the Dominion Government could do better work in connection with the economic side of mining than the Geological Survey, if it had properly attached to it a department which would deal with those economic questions which were important. The present statistical section, while ably conducted, was badly cramped by want of means.

The Government, he said, exacted a royalty on the ores in all the provinces, and, therefore, mining men had a right to ask it to spend a portion of the money so received in helping the industry forward. The establishment of a mining bureau was the most important rock in the foundation of the mining business, with sufficient funds to publish information promptly, so that it might be of use.

Dr. F. D. Adams, of Montreal, followed, reading a very instructive paper showing how the practical needs of the mining industry in Canada demanded the establishment of a department in connection with the Geological Survey. There was not the slightest doubt that most excellent work had been accomplished by the Survey, but it was not complete enough to deal with the large increase in the mining industry existing at the present time. More means and a general development were needed.

Mr. W. Blakemore then offered the following resolution: "That the Canadian Mining Institute, in annual session assembled, desires to direct the attention of the Federal Government to the magnitude and natural importance of our mining industry, which during recent years has developed so rapidly, and respectfully urges the increase of Government aid wherever possible, and the establishment of a strong and practical department of mines, believing that nothing will do more to develop the natural resources and promote the general prosperity of Canada."

Speaking in support of the motion, Mr. Blakemore touched on the growth of the mining industry, and said he was told that the Government grant to the Geological Survey was $100,000, and that it had been the same for twenty years. In other words, the Government, in its wisdom, had seen fit to continue the grant at the same figure, when the mineral production is $70,000,000, as it was when the production was only $16,000,000.

Mr. B. T. A. Bell thought that it should be the duty of a department of mines not only to prepare monographs, statistics and useful maps, but to develop the markets for the minerals, and to supply information to producers in relation to the markets, to opportunities for extending trade and other matters of the kind.

Dr. Robert Bell defended the Geological Survey, and held that its work had been eminently practical and that its first object had been to aid in the development of the mineral resources of the country. He did not think that a new department was needed, but rather that the present Survey should be given the means to enlarge its scope. Personally, he said, he had always—during his long service in the Survey—contended that something more should be done for economic minerals. Mr. Coste, of Toronto, remarked that there was no question that the Government should pay a great deal more attention to the mining industries of the country than it did, and should organize a proper mining bureau, either in connection with the Geological Survey or outside it.

After some further discussion Mr. Blakemore's resolution was referred to a special committee with directions to consider it and report at the next day's session.

On the second day—Wednesday, March 5—the attendance was large and there was a very lively debate. At the opening of the session the special committee to which was referred Mr. Blakemore's resolution on the establishment of a mining department reported that there had been some difference of opinion as to the best form for the resolution. Consequently the committee reported two alternative forms, leaving the members to decide which would best express the feeling of the Institute. A discussion followed in which a number of members took part, and opinions were very fairly and fully expressed. As to the need of a mining department, there was little or no difference; the points at issue were whether such a department should be a new organization entirely, or an expansion of the Geological Survey; whether it should have as its head a responsible minister—like the departments of Agriculture and Commerce; what the range of its work should be; and other points of detail. It was pointed out that while the mineral lands in the Northwest territories and the Yukon were under Dominion authority, those of the various Provinces were controlled by the provincial authorities, and that the provincial mining bureaus already existed and were doing excellent work. It was conceded, however, that with proper organization there should be no clashing between the proposed new Dominion department and any provincial bureau, but rather helpful co-operation.

Finally differences of opinion as to detail were gradually harmonized; the two resolutions reported by the special committee were merged and brought into the form given below:

"That the Canadian Mining Institute in annual session assembled, desires to direct the attention of the Federal Government to the magnitude and national importance of our mining industry, which, during recent years, has developed so rapidly, and respectfully urges the increase of Government aid wherever possible, and the establishment of a strong and practical department of mines, or a department devoted to the interests of the mining and metallurgical industries, and which shall include the Geological Survey and all other necessary branches."

This was adopted by a very large majority, and the secretary instructed to make the necessary presentation of the resolution to the Government and to Parliament.

The committee which had been appointed to con-

sider the civil engineers bill, which has been recently presented to the Ontario and Manitoba legislatures, submitted the following resolution:

"That the Canadian Mining Institute, having examined and considered the civil engineers' bill now before the Ontario and Manitoba legislatures, is of the opinion that this act should not be passed, since it gives powers to the Canadian Society of Civil Engineers which should not be given to any one branch or section in the present condition of the engineering profession; such powers should be retained by the Government itself, or reserved for a society or association representative of the whole profession."

This committee recommended that the secretary should hereafter be empowered to take such action as he should deem best touching bills of similar tenor which might be presented to the British Columbia Legislature. The resolution and the recommendations of the committee were unanimously adopted.

An able and instructive paper on "Gold Milling at Republic," descriptive of past and present conditions, was read by Mr. Fritz Cirkel, of Toronto. Mr. Cirkel described the ores of the Republic District in Washington and their peculiarities. He then referred to the various systems of treatment which had been tried, closing with a description of the large mill erected by the Republic Mining Company upon the designs of Mr. Jackling. This mill has heretofore been described in our columns.

The evening session was a very interesting one. It was opened by a paper on the "Varied Mining Interests of Eastern Ontario," by Prof. W. G. Miller, of Kingston. He referred to the iron mines, the newly-opened corundum mines and other resources of the country. This paper—of which we hope to present an abstract later—was illustrated by a number of maps and photographs presented by means of lantern slides. In conclusion, Prof. Miller said that Ontario was producing as great a variety of mineral substances as any part of the world of equal area, while as a whole Canada had a record as a mineral producing country of which she might justly be proud.

After the conclusion of this paper, Mr. F. B. Wade, of Dawson, addressed the Institute, by invitation, on mining in the Yukon. Mr. Wade was one of the pioneers in the first great rush to the Klondike, and was for three years chief law officer of the Dominion in that territory. In his address he adopted the method of contrasts, showing both verbally in his address, and by a large number of fine lantern slides, the different state of affairs in the North four years ago and to-day. The Chilkoot Pass in the first rush and the passenger train on the Yukon & White Pass Railroad—the roughly built barge of the prospector and the Yukon River steamer—the Dawson of tents and the brick-built city of to-day—with numerous similar contrasts, all effectively brought out by the photographs.

Unfortunately, however, Mr. Wade added, the Yukon had had the same experience as all the other mining camps in Canada, that at the outset, at any rate, it had to a certain extent failed to attract Canadian immigration. This, however, was commencing to correct itself, and he believed that the census would show that, though somewhat tardy, the Canadian was commencing to take an interest in the country and to share in the patrimony to which he was entitled. He spoke of the great gold output of the Klondike, and of the rapid growth of Dawson, which, four years ago, was only a place of a few tents, and to-day showed an assessment of $12,000,000. It was sincerely to be hoped that the time was not far off when Canadians would wake up to the fact that the Klondike was growing, and that the young man who went out to-day into the world to fight his way was in a very different position from the young man of a few years ago.

To one point especially the speaker referred with justifiable pride, and that was the excellent order preserved in the region and the absence of violence and lawlessness, which have been only too prevalent at Nome and in other mining districts which might be mentioned. This was largely due to the admirable organization and handling of the Northwest Mounted Police, a force of which Canada has just reason to be proud.

Mr. Wade expressed, in conclusion, his belief that the next excitement in the Yukon will be in quartz mining. Already there are many quartz locations, and two stamp mills are in operation on custom work, chiefly on test runs. The general opinion in the district is that the gold in the creeks has not been carried far, but has been very probably derived from the quartz ledges crossed by the streams, which are visible in many places in the form of narrow stringers. There are, he believes, many indications that intelligent prospecting will show substantial grounds for this opinion, and that quartz mining and milling will be prominent in future operations. At any rate, the gold industry of the Yukon promises to take on a permanent form, and to be an important factor in the mining industry of Canada for a long time to come.

At the conclusion of Mr. Wade's address a vote of thanks was unanimously passed, and the Institute adjourned until the next day.

At the business session on Thursday, March 6th, Dr. W. L. Goodwin, of Kingston, presented a resolution in favor of organizing local sections of the Institute in various mining centers. He explained that if his plan was adopted the sections would be organized under the charter and by-laws of the Institute; their members would be members of the Institute and the papers presented at the meetings would be regarded as Institute papers and find full record in the volumes of the *Proceedings*. He further explained that the object of this plan was to interest many who were unable to attend the annual meetings owing to the long distances to be travelled. Moreover, the local sections would be able to hold more frequent meetings, at such intervals as they might decide for themselves, and thus create and maintain an interest which would be of value to the society generally and also to local mining.

The recommendation was generally approved and the following resolution was unanimously adopted:

"That, in view of the great extent of the Dominion, and the long distances to be travelled by many members in order to attend the meetings of the Institute, it is expedient to organize local sections in mining towns and camps, and other centers, and the Council is hereby empowered to take such action as is necessary to carry out this recommendation."

A paper by Mr. W. Koehler on the Electro-metallurgy of Copper and Nickel as Applied to Canadian Ores and Mattes was then read. We hope to present a full abstract of this paper hereafter.

Dr. J. B. Porter, of McGill University, then read a paper on Gold Dredging which was illustrated by a large number of photographs, presented through the medium of lantern slides, and comprised the history of gold dredging from its first known beginning. He referred to the primitive dredges used in North Georgia, to the introduction of the dredge in New Zealand and its great success there, which first brought this method of mining into general notice. He then spoke of the work which had been done on the Fraser and Thompson rivers in British Columbia with varying success, and also to the work undertaken on the Saskatchewan River in the Northwestern Territory. He also referred to the commencement of dredging which had been made with a small machine in the neighborhood of Dawson.

The descriptions of machinery given were very full and interesting and some comment was made on the experience had and on the improvements gradually worked out.

A paper on gold dredging in British Columbia was also presented by Mr. F. Satchell Clarke, of Vancouver. An abstract of this paper is given elsewhere.

Following this paper, Mr. W. Blakemore, of Montreal, read a paper on the hematite iron ores of Kitchener, B. C.; this was also illustrated by maps and photographs shown on lantern slides. An abstract of this paper is given in another column. The third illustrated paper was then read by Prof. Mickle, of Toronto, on the iron bearing rocks of the Nastapoke Island, Hudson's Bay. It described a series of iron deposits found on the Nastapoke Islands, a chain of rocky islands on the east shore of Hudson's Bay. The examination of these deposits, while necessarily somewhat superficial owing to the short time allowed, showed that iron ore existed on these islands in considerable quantities, outcroppings having been found in many places. A further examination will be required in order to determine whether they are of economic value.

In the evening the annual dinner of the Institute was held in the banquet-room of the Windsor Hotel. It was an occasion most thoroughly enjoyed by all who were present. Past President J. E. Hardman, of Montreal, presided, and a number of speeches were made. In accordance with a time-honored rule of the Institute, the after-dinner speakers were limited to five minutes each and the addresses were generally brief and pointed and were thoroughly appreciated by all who were present. Prof. McLeod and Mr. Frechet responded for the sister societies. The mining industries of the different sections of the Dominion were well represented by Messrs. Shields, Kirkegaard, James, Drury, Aldridge and others. Dr. Robert Bell spoke for the Geological Survey, while other addresses were made by Secretary B. T. A. Bell, Dr. Haanel, Messrs. Ingall, Coste, Hobart and others. A message of sympathy and hope for early recovery was sent to President Fergie. The proceedings were pleasantly interspersed with music and songs and it was with a sense of a thoroughly well enjoyed evening that the members dispersed at an early hour in the morning.

The final meeting of the association was held at 10 o'clock on Friday morning when the result of the balloting for members was announced. The matter of sending a deputation to Ottawa to lay before the Government the Institute's claims for an increased grant was referred to the new Council, to whom was also referred the consideration of more commodious headquarters for the Institute. It was also decided that the Institute should offer a gold medal for the best paper on mining contributed during the year. The Council was authorized to make the selection and to omit the award in case none of the papers sent should appear to be of sufficient merit to warrant the award in any year.

The secretary was instructed to send a special telegram to Mr. Fergie announcing his re-election as president and hoping for his speedy recovery. The final adojurnment was then had, closing a most interesting meeting.

The full list of officers for 1902 is as follows: President, Charles Fergie, Westville, N. S. Vice-Presidents—Eugene Coste, Toronto, Ont.; R. R. Hedley, Nelson, B. C.; Dr. Frank D. Adams, Montreal, Que.; Graham Fraser, New Glasgow, N. S. Council—Frederick Keffer, Anaconda, B. C.; Frank Robbins, Kimberley, B. C.; W. F. Little, Anthracite, N. W. T.; John B. Hobson, M.E., Bullion, B. C.; George R. Smith, M.L.A., Thetford Mines, Que.; Dr. J. B. Porter, Montreal, Que.; B. Bennett, Thetford Mines, Que.; J. T. McCall, Montreal, Que.; R. E. Chambers, M.E., Bell Island, Newfoundland; C. Shields, Glace Bay, Cape Breton; D. W. Robb, Amherst, N. S.; W. L. Libbey, North Brookfield, N. S.; P. Kirkegaard, Deloro, Ont.; Prof. Courtenay DeKalb, Boston, Mass.; A. P. Turner, Sudbury, Ont.; E. A. Sjostedt, Sault Ste. Marie, Ont.; treasurer, J. Stevenson Brown, Montreal, Que.; secretary, B. T. A. Bell, Ottawa.

The summer meeting of the Institute will be held in August, and will include visits to the Sudbury and Hastings districts in Ontario, and probably to the new plants at the Sault Ste. Marie.

We give below abstracts of a number of the papers read at the meeting, and hope to present others in later issues.

THE IRON ORE DEPOSITS NEAR KITCHENER, B. C.

BY W. BLAKEMORE, M.E., MONTREAL.

These deposits consist of a series of parallel veins of hematite iron ore running continuously for a distance of 10 miles, the full length of a solitary mountain known as the Iron Ridge, and situate, at its

nearest point, a distance of 3 miles west of Kitchener Station on the Crow's Nest Pass Railway. Kitchener is 20 miles east of Kootenay Lake, 70 miles east of Nelson, which is the centre of the smelting industry of West Kootenay, and 120 miles west of the extensive coal-fields of the Crow's Nest Pass Coal Company at Fernie. The mountain is peculiar in formation, being entirely separate from the other ranges in the district, and presenting the appearance of an inverted boat. It starts from the level of the railway and Goat River 2,400 feet above sea level, rises gradually to an altitude of nearly 6,000 feet in a distance of 2 miles, continues with slight variations at this level for 6 miles and then dips down again at the extreme north end at about the same angle as at the south. The main direction of the mountain is 20° W. of N., and upon the east side Goat River flows parallel to it. At its base on the west side is a large creek known as Arrow Creek, and around the north end is a pass connecting the two. The original survey for the Crow's Nest line was around this pass, and it was only abandoned because it involved a detour of 20 miles. The possibility of constructing a railway of easy grade all around the mountain was demonstrated by the survey referred to. The character of the ore is chiefly hematite, and upon a few claims this has been found to be slightly magnetic, but over the bulk of the property it is pure hematite. The occurrence is in a large body of quartzite approximately 500 feet in width running longitudinally with the mountain, and along the eastern side co-extensive with the quartzite is a greenstone dyke of gabbro-diorite. The property consists at the present time of 50 claims, each 1,500 feet square, upon which the ore has been located, an area which embraces practically the whole summit of the mountain. The property has been held for some years as a copper proposition, and probably from $10,000 to $12,000 were expended in prospecting for that mineral. In the spring of 1901, however, the iron ore attracted attention, and for the first time the holders began to realize that it might possess an economic value. It came under my control last May, and from then until November I expended about $30,000 in prospecting and proving the property, the result being that the capitalists whom I represented have purchased 20 claims, and hold an option on the remainder. Our season's work has proved that the ore is of the highest quality, that there is sufficient to constitute an important property, and that the surrounding conditions are favorable to development. There still remains to prove the actual extent of the ore as development work would not justify a calculation of tonnage at present, but everything points to an enormous deposit. Owing to the large area to be prospected, much of the work consists of mere surface examinations and prospecting, it being important in the first instance to establish the area over which the iron extended. We soon discovered a 6-ft. vein upon the Keepsake claim near the north end of the property, and on putting the diamond drill to work found the iron continuous and good at a depth of 60 feet. On cross-cutting this vein we found that, in addition to the 6 feet of solid iron, there was an admixture of iron and quartzite running in alternate bands for a distance of nearly 100 feet. In some cases the quartzite and the ore were mixed, in others there were clean bands of ore. Meanwhile another vein 6 feet wide had been located upon the Maple Leaf claim, a little distance north; upon this claim a shaft was sunk 50 feet, and the iron at the bottom of the shaft continued of the same thickness and yielded the same assay as upon the surface, 67.2 per cent of metallic iron. About this time a vein was located upon the American Flag claim still farther north, and as it showed up nearly 20 feet in thickness, it was decided to put a trial shaft upon this. The shaft went down 30 feet and was then stopped in consequence of water, but the thickness and quality remain the same. Meanwhile the same vein was traced south to the O-Ray claim, upon which a shaft was sunk 50 feet. Here the vein was 18 feet thick and of uniform quality. In none of these veins was there the slightest admixture of quartzite or other impurity, the whole of the material taken out being put on to the dump for shipment. An average assay of the ore on the American Flag gave: Metallic iron, 67.4; silica, 1.7; sulphur, 0.16; phosphorus, 0.03; and upon the O-Ray, metallic iron, 64.7. In addition to these veins, one vein 15 feet wide was located at the end of the season 500 feet east of the American Flag claim and traced for several hundred feet north and south; also another claim upon the Golden Cap to the west, the latter being 8 feet thick, but upon neither of these veins was any work done beyond uncovering. It will thus be seen that in all there are five veins located up to date, aggregating 63 feet in thickness, and that actual exploration has proved these to a depth of 50 feet. Beyond the actual exploratory work done, there are other evidences upon which the extent of the iron may be fairly considered. In the gulches which are found upon the mountain side the same veins have been uncovered at a difference in elevation of 1,200 feet, and they maintain their uniformity at those points. The diorite dike referred to is continuous throughout the whole length of the mountain, and can be traced across the level ground and through a railway cutting on the Crow's Nest line. Having regard therefore to the character of the deposit, to the persistency of the greenstone dike alongside which the iron occurs, to the formation of the mountain, and to the fact that the measures are found regular at the base as well as at the summit, there is no reason why the iron deposits should not also continue to that depth, but whether this be so or not, sufficient has already been done to show that there is an enormous deposit of iron of the highest quality quite sufficient to justify great expectations for the future of the property. Work will be continued during the coming season until a thorough proof is made.

With reference to the quality, this is so surprising that I have some diffidence in placing the figures before you, but still they speak for themselves, and are the result of assays made by five or six independent authorities, including McGill University, Mr. Milton Hersey, of Montreal; and Mr. Robert W. Hunt, of Chicago; they have also been verified by practical tests made at the works of the Dominion Iron and Steel Company, and as they are the results of bulk assays and not selected samples it is believed that the ore is one of the purest and highest grade bessemer ores to be found anywhere. More than 100 assays were made; of these 60 were taken from the veins, and taking those only into account, excluding float, we got an average of 60 per cent of metallic iron, 5 per cent silica, 0.10 sulphur, and 0.03 phosphorus.

The question of interest in connection with this matter is the future of the property and its value to British Columbia. Of this it may safely be said that sufficient iron has already been discovered to determine the existence of a first-class fluxing proposition, and even for this purpose the property will in the future be valuable. But unless all expectations are baseless, we have here a property which when thoroughly proved will be shown to contain such an extensive body of hematite ore of the highest quality, that it will be possible, whenever the Province is ripe, to establish a large iron and steel making industry in the West, which will compare not unfavorably with that of the East. All the local conditions for cheap manufacture are favorable. The ore can be mined and shipped for $2 a ton. There is abundant limestone in the neighborhood upon the west side of Kootenay Lake, which can be delivered to a smelter at 50c. a ton. The high grade coal and coke of the Crow's Nest Pass is only 120 miles away, and can be brought to Kitchener at a cost of $3 for coal and $5 for coke. Allowing for the higher rate of wage prevailing in the West, pig iron can be made on this property at a cost not exceeding $10 a ton, and this iron can be delivered at a cost of $13 to $15 at the coast. At the present time pig iron delivered at any of the coast cities is worth $22 a ton, and even admitting that prices are above the normal, there would still be a wide margin in favor of the local product.

This paper was illustrated by maps, diagrams and photographs.

A METHOD OF MINING LOW GRADE ORES IN THE BOUNDARY CREEK DISTRICT.

BY FREDERIC KEFFER, M. E., ANACONDA, B. C.

It is the purpose of this paper to describe the methods of mining at the Mother Lode Mine in Deadwood Camp, near Greenwood, and the reasons which have led up to their adoption. The ore deposit here outcrops at intervals for a distance of about 2,000 feet, the width in explored portion averaging perhaps 140 feet, although the absence of any defined walls prevents exact measures being given. The dip is about 70° easterly, and pitch toward the south at an angle yet undetermined. Only the ground to the north of the shaft, which is located centrally, has been explored as yet. At the beginning of stoping operations, the ore body had been developed by a northerly drift from the shaft on the 200 level, the drift extending to apparent end of ore. The deposit was crosscut at intervals of about 100 feet. Similar work was also done on 300 level. A winze to surface, about 500 feet north of shaft, afforded good ventilation.

It was the original intention to sort all the ore from the mine, filling the stopes with the waste, and with other rock blasted from walls or elsewhere obtained. To this end a system of belt conveyors was arranged whereby the ore from the shaft was dumped into a No. 5 Gates crusher, thence passing over a 3-foot wide picking belt to the ore bins. The waste was dropped into side pockets falling upon another belt system, whereby it was conveyed to a bin at top of the winze, whence it was to be dropped into the stopes.

It may be said here that the term "waste" is, generally speaking, merely comparative, for the whole of the ore body (with exception noted below) contains copper, gold and silver in varying degree, and waste is merely rock with lesser quantities of these metals. The sorting and conveying belts worked to a nicety, but the smelter had been in operation but a short time when it became apparent that its capacity for these self-fluxing ores was much greater than had been thought possible, and consequently smelting costs were lower than had been figured. A direct result of this was that the definition "waste" was altered, and its quantity greatly diminished. And further, that the cost of sorting out this diminished waste was approximately equal to the cost of smelting it; for even the poorest of the rock contains some values to offset in part the smelting charges. These conditions necessitated the abandonment of the filling plan for stopes. Also the sorting of ores was suspended, save for certain ores from the 300 level, where the waste happens to be totally barren and easily sorted out.

The filling system having been dropped, it was then planned to timber the stopes in the ordinary fashion, but this plan was abandoned on account of high cost of timber compared with ore contents.

A third alternative was next adopted in one stope —that of timbering the whole of the floor of stope heavily, only the excess of ore from above being dropped through chutes conveniently placed. This plan was going nicely until the roof stope was some 20 feet over timbers, when a mass of ore became detached from the roof, which mass weighed some hundreds of tons. Everything in its path was crushed and the stope wrecked. Luckily no one was hurt.

A further and final plan was then adopted. The ore body was divided into stopes 30 to 40 feet wide, the length of stopes being the distance across the ore body. The crosscuts already existing were used, and others cut where needed under the centre of each stope. From these cross-cuts, upraises were made 30 feet apart. These were made 10 to 12 feet high, and were then connected by second and parallel cross-cuts. From these latter cross-cuts the stopes were opened out the proposed width, and then carried vertically upward, the short upraises being cribbed and furnished with gates for loading. Between the stopes, pillars 20 to 25 feet in thickness

were left, these being frequently pierced to allow intercommunication and ventilation.

In the stope where the wreck occurred a very heavily timbered passage corresponding to a cross-cut was built, chutes being placed at 30-foot intervals. The empty space was filled with porphyry blasted from a blanket dike, which extends through all the ground yet explored. These stopes will be carried up to a point 160 feet above the 200 level, where they will meet with the surface workings to be described. After this occurs, the ore remaining in stopes above the porphyry will be sent through the chutes, and as much of the pillars removed at same time as safety may dictate.

The ore below the porphyry may be removed at will, as this dike is thick and solid and will stand any pressure. In this method of working, nearly 50 per cent of broken ore must be left in the stopes for a considerable period, but to offset this, the interest on capital so tied up is but a fraction of the cost of timbering these great stopes. Moreover, the system is as safe as mining can be made, the roof of stopes always being near the men, and there can be no wrecks occasioned by a cave. Further, there being no danger from timbers giving way, tremendous blasts can be employed and the ore broken down in great quantities at a time. One drill will frequently break down 75 to 80 tons in 24 hours. On the 300 level, the pillars come directly below those on the 200, but in future levels the distance will be increased from 100 feet to nearly 175 to allow of less rock being left between levels, and less development having to be done.

To supplement the output from underground, a great amount of ore is now obtained by quarrying. In the hill, which rises some 260 feet over surrounding flat, a quarry (or "glory hole" as it is locally styled) is in operation, this quarry being 110 feet above flat and 50 feet above collar of shaft. Ore is at present run down a gravity tram to a No. 5 Gates crusher, and thence over conveying belts to bins on the flat. Experience has shown this crusher to be far too small to admit of economical work, the ore having to be reduced to 10-inch size in order to pass into crusher. This reduction has mainly to be effected by "bulldozing" with high per cent dynamite, the rock being too hard for hammer breaking. To obviate this difficulty, and to permit of cheaper handling, a tunnel has been driven into hill from level of flat. This connects by a 12 by 12 upraise. In a pit on flat next the railway an immense Farrell crusher, with jaw opening 2 by 3 feet, is now being installed.

Ore will be dropped down the upraise, and there loaded into cars having a capacity of 4 tons. Trains of these will be drawn by mules to the crusher pit, where they will be dumped, by compressed air, over a grizzly leading to the crusher. The screenings and crushed ore will be elevated to a bin beside the railway. As quarrying proceeds, other raises will be made, and the level of quarry floor at the same time be lowered until the flat level is reached and the tops of stopes encountered, when these latter may be emptied. The present Gates crusher will take care of all ore from shaft as at present, its capacity being from 400 to 500 tons per 24 hours when fed with ore properly broken.

A Few Notes Upon Gold Dredging.

By F. Satchell Clarke, Vancouver, B. C.

After preliminary notes on the general subject of dredging, the author says an enormous amount of money was wasted at Ruby Creek, upon the Fraser River, in trying to make a centrifugal pump dredge for gold. Next to the centrifugal pump came a giant clamshell dredge which was built some years ago at Lytton upon the Fraser River. This was the old mud dredger system applied by a pair of semi-circular steel plate self-shutting shells, very like its patronymic in appearance, and lowered to the bottom of the river by means of chains. On lowering these into the river, two almost insurmountable difficulties were met with; in the first instance, the strong current carried the clams under the bottom of the scow upon which the machinery was placed, and rendered it nearly impossible to bring it up full. The next trouble was that when the clams did bite into the gravels, a boulder or large stone would be held between the jaws, and by keeping them that distance apart would allow the whole of the finer gravels and gold to escape back into the river. This experiment cost the unfortunate shareholders $60,000 before they realized it was a failure.

After this came an attempt to exploit the gravels by means of a caisson or air-lock, by which men went down to the bottom of the river and by hand labor passed the gravel into an air-lock, and from there to the deck, where it was treated by means of an ordinary rocker. Owing to the writer being brought into a controversy over this machine by the promoters, the project was killed by the caustic remarks made about the enormous cost in labor and steam to bring up a yard of gravel yielding probably 25 to 30 cents from the bed of the Fraser.

The writer was working a ladder dredge upon ground over which a pneumatic dredge had passed and thoroughly prospected according to its ability and found too poor to work, which turned in to the shareholders for some years over 100 per cent per annum clear of all working expenses.

Later upon the scene of dredging operations came the dipper dredge. This, as far as working a hole in the gravel, is moderately effective, and many of this type have been built and launched upon the Fraser and the Sascatchewan rivers. Yet there are great stumbling blocks to the use of this type as a gold dredger. Chief among these are the want of mobility in handling it in a rapid river, the cost in working, the intermittent discharge, the comparatively small cubic measurement of gravel actually worked in a week's run, and worse than all, the inability to make a direct side cut across a river or bar, thereby enabling the ground to be worked upon a face and thus systematically clean up the bed-rock, or depth it is found necessary to go with the dredger. These points will always militate against it as a dividend-producing machine, except under very and exceptionally favorably circumstances.

All of this class of dredge which were built upon the Fraser and other places near have been started with a great flourish of trumpets only to end disastrously. One manager of these dredges told the writer that his ground averaged 25 cents to the yard, and in the lower depths considerably more, yet he could not pay dividends owing to his intermittent digging. I understand that at 20 feet the gravel ran to as much as $3 per yard, but he was unable to keep his cut open long enough to take more than an occasional bite at it, for the reasons mentioned above.

The first plant to work the Fraser River in its rapid current and heavy gravels successfully was one of the bucket and ladder type, built in 1899 in England under the writer's supervision upon New Zealand plans, altered slightly to suit the conditions met with in this country. This is known as the Cobbledick dredge, and is operated by the Fraser Dredging Company. This plant failed dismally the first year to pay anything, owing to want of experience, although quite an amount of gold was won. It was reorganized, and under the present management is paying moderately well.

Some Eastern capitalists, after seeing this plant work, decided to place a similar type, but of more powerful design, upon the North Thompson River, 15 miles north of Kamloops, and the writer was instructed to prepare plans for the same. The whole of this machinery was built in Canada by the Wm. Hamilton Manufacturing Company, of Petersborough, who to their credit made an improvement upon the New Zealand and British work. This dredge is capable of lifting from a depth of 40 feet below water, washing, treating, and stacking the coarse stones and boulders to a height of 30 feet astern of the dredge, a guaranteed capacity of 2,000 cubic yards of gravel per day, and cutting its channel through a flat of 20 feet in height. The girder, or ladder as it is known, for carrying the continuous bucket chain is of the box type, built of ½ in. by 3 ft. 9 in. steel plate, tapering from the centre to a depth of 3 feet at each end.

The lower or digging end carries a five-faced cast steel tumbler which weighs over 6,000 pounds (also cast in Canada). This ladder runs in a fore-and-aft line from a radius point 60 feet back from the forward end of the scow and extends forward and outside of the nose of the scow to a distance of 10 feet; this latter fact enables the dredge to cut its own way when necessary and keeps a channel open for the boat. The bucket chain, or belt, consists of 35 built up steel plate buckets, with their necessary connecting links, each having an approximate capacity of slightly less than 6 cubic feet. There are also at mid-distances upon this belt two large powerful rock-picks for tearing up bed-rock.

The belt travels along the ladder upon rollers fitted upon the ladder itself. The buckets have hard steel links riveted to the bottoms, which are bushed with manganese steel bushes to prevent abrasions; these bushes take the manganese steel coupling pins which connect the buckets to the connecting links between each pair of buckets. Manganese is the only metal so far known to be able to stand the enormous wear and tear that takes place in the couplings of the buckets. At the mouth of each bucket there is riveted a heavy steel reinforcement or cutting lip, which is detachable and renewable when worn out, thus prolonging the life of the bucket.

The upper tumbler, which is the driving sprocket, is square and also is a steel casting; this is driven by a heavy, half-shrouded, square-geared wheel of 4-inch pitch keyed upon the tumbler shaft, and then by means of pinion gear and belting from the main engine. The speed of the top tumbler is 6½ revolutions per minute, which gives a bucket speed of 13 per minute, or a theoretical delivery of 172 yards of gravel per hour. In practice it is found best to deliver about 120 yards per hour to enable the tables to clear themselves. The gear is driven by a 22-in. belt from a tandem compound surface condensing engine, 10-inch and 20-inch cylinders by 16-inch stroke, running 150 revolutions per minute.

The gravel drops into a heavy steel-lined chute and falls by gravitation into the revolving screens 5 feet in diameter by 24 long, and perforated with graduated holes from 5-16 to 7-16 inch. At the upper end of the screen is riveted a steel gear for driving it at the necessary revolutions, and this in turn is driven by a steel pinion keyed upon an intermediate shaft running from the main gear shafting. The screen is held in position by 4 rollers, 24 inches in diameter, which revolve against a steel wearing band riveted around the screen.

After the gravel has been sifted through this screen the refuse is delivered into the stacker buckets by gravitation, and is conveyed by the stacker to the distance of 20 feet astern of the dredge and clear of any trouble the plant may experience by sitting upon its tailings. The length of this stacker is 50 feet, and as it is little more than an ordinary elevator made much stronger for the large stones, etc., there need be no description given.

The water for washing the gravel, both in the screen and on the tables, is supplied by a 12-inch centrifugal pump, driven by a belt direct from the compound engine, and throws a body of water at the rate of 2,600 gallons per minute through the surface condenser, which has the effect of slightly warming the water to about 45°, thereby preventing it from freezing upon the tables in cold weather, thence through a perforated pipe leading down the whole length of the screen. The water and fine gravel carrying the gold then falls through the screen into a cast iron distributing box with shut-off gates each side, and through these gates evenly distributed to the tables set each side of the screen and at right angles to its length.

The tables for catching the gold are arranged in steps or drops similar to the deposition of a battery table, towards the sides of the pontoons, and the dirt is carried thence astern by a common launder. These tables have a width equal to the perforation of the screen, in this particular case 19 feet wide by 19 feet long, each respective table making a total superficial area of 361 feet exclusive of the launders and other catch-alls.

They are of wood, and in operation are first covered with calico, then cocoa-nut matting, overlain by expanded metal. This latter is found by long experience to be unexcelled for catching fine gold, in fact, the percentage of gold which is lost upon dredges equipped in this way is very small.

As the life and working capabilities of a gold dredge depends upon the ease and rapidity with which it can be handled, especially in a rapid current, a careful design was shown in the maneuvering winch. This is of a most powerful design and construction, consisting of six barrels, self-contained within one frame. The first barrel is a double-geared drum to carry the 1,500 feet of 1¼-in. steel cable for the headline, which keeps the dredge up to its position in the face of the dirt it is working. The second drum carries the ladder hoisting line, and lifts or lowers the buckets into the gravel, being used extensively by the winch operator. The other four drums are in pairs, and are used for bow and stern lines respectively. The whole are driven by a pair of vertical 8 by 10 engines with reversing gear, whose main shaft is coupled direct upon a 6-inch worm shaft running the whole length of the frame carrying the drums. The worm shaft has three Hindley patent worms cut out of the solid shaft opposite each pair of barrels, and these worms revolve a 48-inch tangent wheel keyed upon the shaft of the drums. Each drum has patent friction clutches, with powerful brakes attached also, and is therefore controlled independently of the others by the single operating winchman working a set of levers in a quadrant by the side of the frame.

The hull of this dredge is built of fir, and the frame is strengthened by heavy 10 by 16-inch chime logs running fore and aft, and braced by a semi-Howe truss of 6 by 8-inch timbers. The planking is 3 by 12, 4 by 12-inch, and 6 by 12-inch. The framing for carrying the top tumbler and gearing is brought up to a height of 40 feet above deck, and forms a main hogmast to both hold up the stacker and prevent the hogging of the pontoons, a frequent source of trouble with ladder dredges.

The total weight of the ladder, buckets, tumblers, and links is 43 tons, while the total weight of machinery is 150 tons.

The plant worked well, and although it did not pay it was not the management that was in fault, as latterly they had a first class dredge operator from the Snake River. The trouble lay in the paucity of the claim in gold. Beyond a thin layer of sand and gravel of about an inch in depth upon the surface, no gold was found, either disseminated through the gravel underneath this layer nor upon the clay bottom met with at a depth of from 15 to 20 feet. A further fact brought to light during the operations of this dredger, was that, with a few exceptions, no gravel is met with in the middle of the river, nothing but a bare clay bottom into which the dredger dug for a depth of 8 feet to see if there was gravel underneath the strata.

As showing how a dredger may fail with a fortune in sight, within a few miles was a mass of gravel which certainly carried a minimum of 25 cents per cubic yard, the working expenses of which under careful management should not exceed 3 cents per cubic yard. However, so disgusted were the owners with the financial results that as soon as winter came on they shut down without looking elsewhere.

As a matter of fact, there is no class of mining so profitable and so certain of financial results as gold dredging, provided the conditions given of gold present, workable ground and a good machine. These points can only be determined by the expert, and not by the average engineer, as is generally imagined. The business is then an industrial proposition, being merely a question of value of ground in gold, with a constant factor of cost in production. The average figure for handling gravels with a bucket and ladder dredge should not at the outside limit exceed 3½ cents per cubic yard, including labor, fuel, etc. The writer some years ago dredged gold gravels for over twelve months at the rate of 2 cents per yard. It may be stated as a proposition that given the actual value of gravels by expert prospecting it becomes merely the everyday industry of machine mining.

THE ORE DEPOSITS OF THE BOUNDARY DISTRICT, B. C.*

BY R. W. BROCK, OTTAWA.

The district treated of in this paper is that lying along the International Boundary line, in the neighborhood of and between the valleys of the North Fork of the Kettle River and Boundary Creek, B. C. Following upon the construction of the Columbia & Western Railway, a little over two years ago, and the installation of smelters at Greenwood and Grand Forks, a year and a half ago, the district at once took a foremost place in British Columbia lode-mining, and it now ranks as one of the most important factors in the production of copper in Canada.

While the mountains are not rugged, and the western and southern slopes are often open, prospecting has not been easy, on account of the covering of drift which conceals the rocks over a considerable portion of the surface, and on account of the complex geological structure of the district. Eruptive rocks, including granites, greenstones, lavas (and associated tuffs) and various intrusive dikes, have the widest distribution. More or less altered sedimentary rocks (limestones, argillites, quartzites), together with more highly altered metamorphosed rocks, including serpentine, are met with in all parts of the district; but do not, as a rule, have large dimensions in any one place, being usually nothing more than inclusions of older formations, caught up in the intrusive rocks.

The oldest rocks recognized in the district are the sedimentary and crystalline rocks. In the southeastern part of the district, just west of Grand Forks, some crystalline mica and hornblende schists and crystalline limestone occur, which resemble, lithogically, the rocks of the Shuswap series (Archean), but they may possibly merely represent, in a more highly metamorphosed form, the argillites and limestones found elsewhere in the district.

The argillites are normally dark or red, occasionally highly carbonaceous, but are often altered to gray knotted schist, or hornfels, or they may be largely silicified. The limestones are usually white and crystalline, but occasionally show an original black color. In places the lime is replaced by silica forming cherty or quartzite-like jasperoid rocks. True quartzite is only sparingly found. Closely associated with these is a serpentine, probably derived from a basic eruptive rock. It is frequently altered to a siliceous dolomite or magnesite. These rocks form a series closely resembling and probably of the same age as, the Cache Creek series described by Dr. Dawson, and ascribed by him to the carboniferous formation.

Somewhat younger than the sedimentary rocks is the greenstone, which has the greatest areal distribution of all the rocks of the district. Often it is altered, but where its structure is preserved, it appears to be an augite-porphyrite, sometimes agglomeratic, similar to that rock found in many parts of West Kootenay, notably around Rossland. It cuts and holds inclusions of the older rocks; indeed, in most of their occurrences the latter appear simply as islands in the greenstone, varying in size from small fragments, closely packed and almost filling the greenstone matrix, to bands hundreds of meters long. Under pressure it becomes schistose and difficult to detect from some of the included argillites. Occurring with it are bands of a tuff-like rock, filled with fragments of the older rocks, and interbanded with fine-grained ash-like bands.

Younger than, and cutting the greenstone, is a gray hornblende-biotite granite, which is exposed near Greenwood in Wellington Camp, and on Hardy Mountain. Gray granite porphyry dikes from it cut the older formations a long way from the parent masses. The white altered porphyry on McCarren Creek and at the City of Paris Mine may belong to this series of dikes. This granite will probably prove to be the same rock as the Nelson granite, of West Kootenay, and about Jurassic in age. Near Central Camp, and northwest of it, are bosses and dikes of a gray granitic rock, which closely resembles the Rossland monzonite, but until it has been carefully studied it is still uncertain that it is the same rock. Younger granites occur just outside the area described.

Beds of volcanic rock are found at several points overlying the rocks already referred to. These are remnants of a sheet of volcanics which once covered the entire country, but which, in this district, have been largely removed by erosion. The series consists of coarse and fine tuffs, ash beds and shales (in which coal is sometimes found), with sheets of andesites, basalts, and other volcanic rocks. These latter are sometimes locally termed "bird's eye porphyry." This series is probably of Tertiary age.

Dikes of a reddish or yellowish syenite-porphyry, having a fine-grained ground mass, with conspicuous rosette-like phenocrysts of feldspar and some biotite, are common in the mineralized portions of the district, though wanting in the unmineralized. On the Carbonates claim, this reddish porphyry is seen as a contact facies of a coarse syenite-porphyry similar to those observed east of the North Fork and in the Rossland District, where such dikes are known to be from the Rossland granite. They would appear to have the same relationship here, but it is yet to be proved that they have no genetic connection with the volcanic flows as well. Dark lamprophyric dikes and some of a brownish basalt-like rock also occur.

The ore bodies may for convenience be roughly divided into three classes: (1) The large low-grade copper-bearing sulphide deposits; (2) the oxidized copper veins, and (3) the small gold and silver-bearing quartz veins.

Undoubtedly the most striking characteristic of the deposits of the first class is their enormous size. In structure these deposits belong to composite-vein type, formed by mineralizing solutions traversing the country rock, principally along fissures or zones of fissures in which they deposit the economic minerals, and from which they replace with their mineral contents, particle by particle, sometimes only partially, sometimes completely, the original material of the country rock. On the outskirts of an ore body this substitution may be seen in all stages of development, the individual constituents of the country rock being one by one replaced. Sometimes, as on the Emma Claim, the replacement of the country rock has gone on so evenly that a completely banded ore has resulted. A banded structure cannot, therefore, be taken as a proof of open filling.

According to the most prominent mineral content, this class of deposits may be subdivided into a pyritic type, in which pyrrhotite, chalcopyrite, with some pyrite, are the chief minerals, and a magnetic type, in which magnetite, chalcopyrite, with some pyrite, are chief minerals. Excepting that the pyrrhotite of the one is represented by magnetite in the other, these two types appear to be identical. Both the magnetite and the pyrrhotite replace the constituents of the country rock in the same way, both seem to have been formed, on the whole, a little prior to the other vein minerals, holding them in little veins, or as points scattered through, yet sometimes interbanded with them; they are both accompanied by the same accessory and gangue minerals, and the country rocks show the same alterations in both cases. Rarely do both the pyrrhotite and magnetite occur in the same deposit.

Besides the metallic minerals already mentioned, some marcasite appears to occasionally be present, and sometimes arsenopyrite, galena, zinc-blende and molybdenite; but these are in all cases subordinate in quantity. Tetrahedrite has been found on the City of Paris. Specular iron is found somewhat sparingly, and bismuthinite occurs on one claim.

Calcite is a common gangue mineral, sometimes well crystallized, forming large masses, and also in the form of little seams through the ore and country rock. Seldom is it found in large quantities in those parts of a vein in which magnetite is heavily concentrated. Quartz is also an abundant gangue-stone, occurring in the same way as the calcite, though I have not observed it well crystallized. Silicification

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of the country rock to a cherty or quartzite-like (jasperoid) mass, is a common, though not invariable, phenomenon in the neighborhood of a vein. Red and green, garnet (probably grossularite and almandine) epidote are very abundant in and near the veins, both well crystallized and massive, often interbanded with the ores, and forming a very large percentage of the vein material. The progress of this formation may be observed at many points in all stages, not only when limestone, but also when greenstone and granite form the country rock. In the Mother Lode, where limestone seems to be the country rock, while these minerals are developed, the chief mass of the altered rock is made up of a felt-like aggregate of short green fibers apparently of actinolite. A beautiful white radial tremolite occurs in the limestone at the Morrison Mine. Kaolin, chlorite and serpentine are probably among the alteration products, but until the microscopic examination of the rocks has been made, an accurate account of the secondary minerals and their relative importance, cannot be given.

The ores occur in all rocks except the most recent, the latter being the youngest granites, the porphyry and basic dikes and the Tertiary volcanics. In age, then, these deposits are probably early Tertiary. So far as yet found, mineralization is confined to districts which show evidences of recent disturbance, more particularly where the older rocks are cut by the recent intrusives. Limestone in such a district seems favorable for the deposition of ores. In some cases the ore occurs in the limestone itself, but more frequently it is found in a rock along its contact with limestone. Thus, in a greenstone, where it holds inclusions of limestone, the ore often occurs in the greenstone along its contact with the limestone, while the latter may show little or no mineralization. The lack of mineralization in the limestone in such cases may be due to the fact that the limestone often flows and forms compact lenticular masses, instead of fracturing under pressure, and thus furnishes no channels for the mineralizing solutions. If attacked and replaced by them, it must have been along the contacts, and this must have taken place comparatively evenly, leaving a clean cut, unmineralized wall. While this may have been the case in some of the larger deposits, in many of the smaller veins occurring along such contacts, the mineralization shows a distinct preference for the greenstone, the limestone remaining unmineralized. That the contacts between lime and other rocks should be favorable may have been due in part to the chemical influence of the lime in precipitating the mineral contents of the solutions, but it was also due to the lack of firm cementing between the limestone and the contact rock, which left free channels that the solutions used as highways and bases for their operations; but while such contacts are favorable, mineralization is by no means confined to them. While most of the deposits are in greenstone, limestone or contacts between these, they also occur in the serpentine argillites and gray granite.

Porphyry dikes are usually to be found in close proximity to the ores; the ore lies parallel to a dike along its contact or in the immediate neighborhood. The dikes, while containing traces of metallic minerals, show no signs of mineralization. In age they are about the same or a little younger than the ore deposits, showing the deposits to have been formed during or before the close of the cooling of the eruptive magmas.

While the deposition of the mineral contents of the veins is evidently largely hydrothermal, many of the minerals formed are characteristic of contact zones, and there seems to be strong reasons for supposing the deposits to be connected with eruptive afteractions. The reasons for this belief cannot be discussed at length in the limits of a short paper. The magnetite appears to have been formed in the same way and under the same conditions as the pyrrhotite. It appears to be a primary constituent of the ore. Its formation seems to have depended upon a deficiency in sulphur, the available sulphur being seized upon by the copper and going to form chalcopyrite. On account of the variety of rocks in which the ores are found, it is evident that the source of the material veins cannot have been local. From the fact that the mineralized districts are much cut up by eruptive dikes, that areas of recent eruptions are close at hand, and vents from which the volcanic series were ejected are probably near by, and that magnetite has so far seldom or never been found to have resulted from the deposition of ordinary mineral-bearing underground solutions, while common in contact metamorphism and as the result of solfataric action, it seems fair to conclude that the deposits have a connection with the recent eruptive rocks, and that at least some of the material was derived from the magma of the eruptives brought up by the afteractions characteristic of vulcanism. This view is supported by the independence of the deposits with regard to the country rocks, the resemblance of some of their materials to that of nickel-pyrrhotite and other deposits considered to be the products of magmatic secretion, and others to the products of volcanic after-action; at the same time it is not claimed that deep-seated underground circulating waters have had no share in the mineralization. Indeed, the mingling of solutions from the two sources may have had a marked influence in the precipitation of their mineral contents.

There have been considerable movements since the ore was deposited; numerous slips, some with gouge or secondary filling, traverse the ore bodies. This broken nature of the ground, coupled with the original irregularity in the form of the ore body, makes the exploitation of the smaller deposits sometimes difficult and precarious. The slips so far encountered have not been sufficiently large to have seriously affected the larger deposits. The serpentine is particularly full of slips, some prior, but many subsequent, to the formation of the ores, which make it probably the least satisfactory country rock in the district.

The values in the ores are principally in copper and gold, sometimes with accessory silver. Further study is required to formulate the laws governing the distribution of gold values. Generally magnetite and pyrrhotite, when occurring alone, are almost barren, yet this is not always the case. Away from the chief centres of mineralization, while magnetite and pyrite are still sometimes found, the copper and gold are only sparingly present.

A striking feature in the deposits is the lack of surface oxidation or alteration. At most, a few feet below the surface of the ground, the ore exhibits the same characters as are found in depth. The soil overlaying a deposit is often quite unstained, offering no indication of the underlying ore, and consequently adding to the difficulties of prospecting. Sometimes the surface of the ore even retains the glacial polishing. The explanation of this feature is probably to be found in the heavy glaciation to which this region has been subjected.

In Copper Camp oxidized copper-bearing veins occur, forming at first sight a totally different type of deposit. One deposit is found at a contact between a dike of porphyry and crystalline limestone. Wedge-shaped tongues of the porphyry extend from the main dike into the limestone. Both the limestone and the dike are much fractured and traversed by little slips. These fractures cut the limestone into small blocks. In the limestone, and to a less extent in the fractures in the porphyry, along the contact, are deposited various oxidation minerals of iron and copper, including native copper. These embrace red, massive and earthy hematite and yellow limonite, crystallized and massive malachite and azurite, a black amorphous substance, a mixture containing copper oxide (melaconite, lampadite and chalcocite), cuprite, often in transparent crystals, native copper, chrysocolla and probably copper pitchblende. The edges of the small limestone blocks have often been dissolved, and the copper ores then occur as encrustations surrounding a core of lime. The main fissures are filled with the iron and copper minerals, the smaller principally with the copper. In the porphyry it is only the fractures near the contact which contain a thin film of copper ore, the rock itself remaining fresh and unaltered. So that this type of deposit is probably an oxidized and secondarily enriched form of a sulphide deposit similar to the first type of Boundary deposits, and produced by the action of surface waters. The iron of the sulphides has been removed or re-deposited as hematite and limonite, the copper has been more or less concentrated in the form of various oxidized minerals. At greater depth the unaltered iron and copper sulphides will presumably be found, although between the oxidized minerals and the unaltered sulphides it is quite possible that a zone of enriched sulphides will be found.

The quartz veins constituting the third type of deposit are found in the neighborhood of the first type, but seem more abundant on the outskirts of the areas of chief mineralization. They are sometimes parallel to the large sulphide bodies, but do not as a rule show the same regularity in their strike. In form they are more regular, and they are usually enclosed between well-defined walls. Chalcopyrite, pyrite, arsenopyrite, galena and zinc-blende are the chief metallic minerals. Tetrahedrite and some rich silver minerals are said to have been found in some of these veins. The principal values are in silver and gold. In age and mode of formation there may have been little difference between these and the previous deposits, though in that case they would probably represent the closing stage of mineralization.

Some of the practical deductions from an examination of the ore deposits may be summarized as follows:

Ores may be found in any of the older rocks where the other conditions for mineralization were favorable.

Districts which show evidences of late disturbances, through vulcanism, manifested by intrusions of recent eruptives and heavy diking, are promising fields for prospecting.

Limestone contacts in such areas should, in particular, be carefully prospected.

Since, with the exception of certain deposits in Copper Camp, there is no zone of oxidation, and secondary enrichment, in the main deposits, while the general conditions remain unchanged, no loss of values is to be expected in depth.

On account of the irregular form which the ore bodies may possess, and the complex nature of the rock formations, a careful and detailed study of the surface of the ground in the neighborhood of the mines would be of great practical assistance in the exploitation of the ore bodies. For the same reason, development work must always be kept well ahead of the actual mining. Cross-cutting must frequently be resorted to, to determine the actual limits of the deposit, and to prove the existence or non-existence of parallel ore shoots. The limits of mineralization must be actually proved, and similarly that ore can be with certainty reckoned on, which has been actually blocked out. In this connection diamond drilling can be used with advantage. Careful magnetic surveys would also be of great value in locating ore bodies under the covering of drift, and also in testing for ore in the mines themselves. Especially good results should be obtainable by this method in the magnetic type of deposit, but it should also prove successful in the pyrrhotitic deposits.

Where the ore occurs at a limestone contact the limestone wall may often be used for following the ore, it being kept in mind that the ore does not always follow strictly along the contact, and that the limestone may pinch out without causing the ore to likewise give out. The dikes, in some cases, may be used in the same way.

The pyrrhotite and magnetite should always be assayed, as barren-looking material may carry good values. The minerals in the ore and the conditions where pay values occur should be carefully studied with a view to ascertaining which carry the values, and what were the causes which produced the concentration of values.

The porphyry dikes, themselves, while not mineralized in the same way as the country rock, may in places prove auriferous.

In prospecting, it is to be remembered that float may have been carried a considerable distance, even

across valleys, by the former glacier. The general course of the latter was about S. 30° E., but it was influenced by the local topography.

In a promising deposit of the oxidized copper type, one would be warranted in testing the deposit to a sufficient depth to ascertain if a zone of enriched sulphides exists between the oxidized zone and that of the unaltered sulphides.

Below the limits of alteration, the deposit may or may not be rich enough to work.

THE MINERAL PRODUCTION OF CANADA.

We give below in full the preliminary statement of the mineral production of Canada for the year 1901, as prepared by Mr. Elfric Drew Ingall, head of the Department of Mines of the Geological Survey of Canada. The figures for the year are as follows:

Product.		Quantity. (a)	Value. (a)
Metallic.			
Copper (b)	Lbs.	40,951,196	$6,600,104
Gold, Yukon	$18,000,000	.....	.....
Gold, all other	6,462,222	.....	.....
		.....	$24,462,222
Iron ore (exports)	Tons.	306,199	762,284
*Pig iron from Canadian ore.	"	83,100	1,212,113
Lead (c)	Lbs.	50,756,440	2,199,784
Nickel (d)	"	9,189,047	4,594,523
Silver (e)	Oz.	5,078,318	2,993,668
Total metallic		.....	$42,824,698
Non-Metallic.			
Actinolite	Tons.	531	$3,126
Arsenic	"	695	41,676
Asbestos and asbestic	"	38,079	1,186,434
Chromite (exports)	"	1,759	25,444
Coal	"	6,186,286	14,671,122
Coke (f)	"	373,625	1,264,360
Corundum	"	435	53,115
Felspar	"	5,226	4,710
Fire clay	"	3,979	5,920
Graphite	"	1,440	28,880
Grindstones	"	5,701	55,690
Gypsum	"	293,799	340,148
Limestone for flux	"	169,399	183,162
Manganese ore (exports)	"	440	4,820
Mica	"	....	160,000
Mineral pigments—			
Baryta	"	653	3,842
Ochres	"	2,233	16,735
Mineral water		....	100,000
Moulding sand	Tons.	14,620	29,240
Natural gas (g)		....	312,359
Peat	Tons.	220	660
Petroleum (h)	Bbls.	588,528	953,415
Pyrites	Tons.	28,261	113,044
Salt	"	59,428	262,328
Talc	"	259	842
Structural Material and Clay Products.			
Cement, natural rock	Bbls.	133,328	94,415
Cement, Portland	"	297,066	535,615
Granite		....	155,000
Pottery		....	200,000
Sands and gravels (exports)	Tons.	197,302	117,465
Sewer pipe		....	250,115
Slate		....	9,980
Terra-cotta, pressed brick, etc.		....	278,671
Building materials, including bricks, building stone, lime, tiles, etc.		....	4,820,000
Total structural materials and clay products		....	$6,461,261
Total all other non-metallic		....	19,821,072
Total non-metallic		....	$26,282,333
Total metallic		....	42,824,698
Estimated value of mineral products not returned		....	300,000
Total, 1901		....	$69,407,031

*The total production of pig iron in Canada in 1901 from Canadian and foreign ores amounted to 274,376 tons, valued at $3,512,923, of which it is estimated 83,100 tons, valued at $1,212,113 should be attributed to Canadian ore and 191,276 tons, valued at $2,300,810, to the ore imported.

(a) Quantity or value of product marketed. The ton used is that of 2,000 pounds.

(b) Copper contents of ore, matte, etc., at 16.17 cents per pound.

(c) Lead contents of ores, etc., at 4.34 cents per pound.

(d) Nickel contents or ore, matte, etc., at 50 cents per pound.

(e) Silver contents of ore at 58.95 cents per ounce.

(f) Oven coke, all the production of Nova Scotia and British Columbia.

(g) Gross return from sale of gas.

(h) Calculated from inspection returns at 100 gallons crude to 54 refined oil, and computed at $1.62 per barrel of 35 imperial gallons.

The total values reported for 15 years have been as follows:

1886	$10,221,255	1894	$19,931,158
1887	11,321,331	1895	20,648,964
1888	12,518,894	1896	22,584,513
1889	14,013,913	1897	28,661,430
1890	16,763,353	1898	38,697,021
1891	18,976,616	1899	49,584,027
1892	16,628,417	1900	64,488,037
1893	20,035,082	1901	69,407,031

The only years showing a decrease during this period were 1892 and 1894, both years of unusual depression. The remarks on the figures given are as follows:

It is gratifying to note that the value of the mineral production of the country still increases, notwithstanding a considerable falling off in the gold output. The growth shown is equivalent to nearly 8 per cent addition to the total value for 1900. This is, of course, a much smaller proportional increase than those shown during the previous few years, but it is encouraging to find that it is due to the large expansion of the more permanent mineral industries, such as the metallic, including iron smelting, with coal, coke, asbestos, etc., among the non-metallic. All along the line the evidence of this growth has been quite marked, giving great promise for the future, so that the inevitable falling off which must occur from time to time in the output of gold from shallow placer workings bids fair to be made up by the growth of those mineral industries that are now becoming such a factor in the commercial life of the country. Leaving the Yukon District out of consideration, the permanent metal mining industries show an increase of nearly 37 per cent, notwithstanding a falling away of over 20 per cent in the value of the lead production. The above, taken in connection with the enlarged value of the output of coal and coke of over 14 per cent, gives an average increase of over 27 per cent for the more important industries of the country. The total value of the non-metallic products shows an increase of over 10 per cent last year, that of the whole metallic group nearly 6 per cent, while the structural materials remain about the same. The total value of the mineral production of Canada in 1886, when the statistics were first officially compiled, was but a little over one-seventh what it is to-day, although the population has only increased 17 per cent in that time. The per capita value is now $12.92 as compared with $2.23 in 1886.

In regard to their relative importance the metal mining industries led, contributing 61.70 per cent, the non-metallic following with 28.86 per cent, the structural class being credited with 9.31 per cent. Grouping the metalliferous class with coal and coke, over 80 per cent of the value is accounted for.

The following table gives the relative contributions to the grand total of the different mineral industries. A comparison of the two years given will show many interesting features.

	1900. Product.	Per cent. of total.
1	Gold	43.28
2	Coal and coke	21.62
3	Building material	7.48
4	Nickel	5.16
5	Copper	4.75
6	Lead	4.28
7	Silver	4.25
8	Petroleum	1.78
9	Asbestos	1.16
10	Cement	1.00
11	Pig iron (from Canadian ore)	0.90
12	Natural gas	0.65
13	Salt	0.43
	1901.	
1	Gold	35.24
2	Coal and coke	22.96
3	Copper	9.51
4	Building material	6.94
5	Nickel	6.62
6	Silver	4.31
7	Lead	3.17
8	Pig iron (from Canadian ore)	1.75
9	Asbestos	1.71
10	Petroleum	1.37
11	Iron ore (export)	1.10
12	Cement	0.91
13	Gypsum	0.49

The figures tabulated below give the growth of the various industries for 1901 as compared with 1900:

Product.	Quantity. Changes.		Value.	
		Per cent.		Per cent.
Metallic—				
Copper	I.	116.25	I.	115.27
Gold		...	D.	12.35
Pig iron (from Canadian ore only)	I.	134.83	I.	107.85
Pig iron (from both home and imported ores)	I.	184.11	I.	133.93
Lead	D.	19.65	D.	20.31
Nickel	I.	29.78	I.	38.07
Silver	I.	13.65	I.	9.24
Non-Metallic—				
Asbestos	I.	30.67	I.	58.52
Coal	I.	10.30	I.	10.39
Coke	I.	137.77	I.	94.77
Cement	I.	29.82	D.	2.44
Gypsum	I.	16.54	I.	31.33
Petroleum	D.	17.17	D.	17.17

Gold.—According to the figures kindly furnished by the United States mints of purchases of gold from the Canadian Yukon, there was a considerable falling off, over 12 per cent, the 1900 yield being less by $4,275,000. This was partly offset, however, by an increase of almost $1,000,000 in the output of British Columbia gold. In the other provinces there were no considerable changes.

Silver.—While the proportional increase in quantity is fair, there is less to record for the value, on account of the lower prices.

Lead.—The decrease is to be attributed to the difficulties encountered by the operators of the British Columbia mines, which produced all but a very small quantity of the output. Not only were the prices for the year lower, but the industry was seriously crippled by the difficulties encountered in profitably marketing the ores with the smelters in the United States.

Copper.—Commencing as they did in the latter part of December, 1901, the low prices for this metal hardly affected the figures of production. The output showed a very large increase over that of 1900. In the Sudbury District of Ontario the amount of the copper contained in the shipments of matte was greater by over 25 per cent. British Columbia produced over three times the amount credited to it during 1900, due chiefly to the large output of the mines of the Boundary Creek District.

Nickel.—An increase of nearly 30 per cent in production is recorded. The price of nickel, which, from 1895 to 1898, ranged from 33 to 36 cents per pound, was quoted in the New York market throughout the year 1901, at from 50 to 60 cents per pound. The better prices and increased demand have stimulated production at the Sudbury mines. The output in 1901 was 4,595 tons of nickel as compared with 2,872 tons in 1899 and 1,998 tons in 1897.

Iron Ore.—Owing to the exploitation of the large deposit of ore of the Helen Mine at Michipicoten, in Ontario, a considerable growth is evident in the country's production of this mineral. Part of the product goes to furnaces in Ontario, but the larger part is exported. Only the exports are credited in the table under this heading, the rest appearing under the item pig iron. Adding to the exports the 156,613 tons of Canadian ore, etc., charged to Canadian furnaces, we arrive at a total production of 462,812 tons. In the returns of ore charged, however, a small proportion of mill cinder is included.

Pig Iron.—In the production of pig iron in Canadian furnaces an increase of over 184 per cent in quantity is recorded, while the estimated production from Canadian ore alone increased nearly 135 per cent. These increases are due in a large measure to the successful completion and operation of the furnaces of the Dominion Iron and Steel Company, at Sydney, N. S. The Midland furnace of the Canada Iron Furnace Company is also to be credited with a considerable portion of the increase, since it only commenced operations in the latter part of 1900. The various other furnaces continued operations on about the same scale.

Steel.—For obvious reasons the value of the steel product is not included in the general table. There was made, however, in steel furnaces in Canada during the year, 41,948 tons (of 2,000 pounds) of steel ingots, etc., all of which was worked up into bars, etc. Work was continued on the steel rail plant at Sault Ste. Marie, and the manufacture of steel is said to have commenced during the present year (1902).

Cement.—The figures of production for cement represent the sales and shipments only. A large amount, some 70,000 barrels, remained in stock, however, at the close of the year.

AN ENGLISH STEEL RECORD.—The London *Iron and Coal Trades Review* says: "Bolckow, Vaughn & Company during the week ended February 1, obtained from one of their steel furnaces at Cleveland Works, the remarkable output of 563.45 tons of ingots, notwithstanding that the furnace has been in continuous operation since June 21, and the coal consumed was only 0.31 ton per ton of steel produced. The material consisted of 50 per cent pig-iron and 50 per cent scrap, and all of it was charged cold by hand. It is considered that this constitutes a European record for a basic-lined furnace."

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

BURDEN OF PROOF REGARDING DISCOVERY.—Where, in a suit to determine adverse claims to a mining location defendant's location rested on an alleged lode location prior to plaintiff's, the burden is on the defendant to establish the fact of actual discovery prior to the initiation of the plaintiff's location.—Sands v. Cruickshank (87 *Northwestern Reporter,* 589); Supreme Court of South Dakota.

OPERATOR BOUND BY MINIMUM ROYALTY PROVISION.—A lessee under a lease of coal in place paid each year the minimum royalty required by the lease, and at the end of his term had paid more royalty than would have been required by the coal actually mined, at the royalty per ton provided, except for the minimum royalty provision. Afterward without going out of possession he took a new lease. The court held that he could not set off, as against royalties under the new lease, the overpayments under the new one, on account of the minimum royalty provision. Dennison v. Haddock (50 *Atlantic Reporter,* 197); Supreme Court of Pennsylvania.

RIGHT TO RECOUP DAMAGES UNDER A COAL CONTRACT.—A party shipped coal to another, under a contract, which was refused as being of an inferior quality, and not from the mines of the shipper, as required by the contract. He sued and the other introduced in evidence proof that during a portion of the time covered by the contract coal had been shipped to them as coal from such mines, which was really inferior coal from other mines. The court held that in an action for refusal to receive coal the others might recoup damages sustained by them by reason of prior shipments of such inferior coal.—Jackson v. Du Quoin Coal Mining Company (62 *Northeastern Reporter,* 540); Supreme Court of Illinois.

RIGHTS AND LIABILITIES WHEN MINE OPERATIONS DAMAGE SURFACE.—The stipulation in a deed that the grantor reserves the exclusive privilege of mining under the land for coal, and for that purpose may extend such excavations under the same as shall be necessary or convenient for mining, subject to the condition that the surface shall not be broken or displaced, and that any damage to the lot by the exercise of such mining privilege shall be made good by the grantor, does not affect the common law liability of the mine operator for injury to the surface. The damage from subsidence of the surface in such cases is the actual loss sustained to the land, including the buildings, from the cave-in, and not the difference in the market value of the land before and after the injury. The duty of the operator being to leave proper support for the surface, the question of good or bad mining is immaterial on the issue of his liability, and evidence is not admissible to show a subsidence of the surface from removal of lateral support at other mines some distance from the lot in question. The fact that the supports had been removed prior to the date of the deed to the party suing does not affect his rights, the effect on the surface only appearing after he took the deed, but he cannot recover for defaults of the predecessor of the present operator against the latter.—Noonan v. Pardee (50 *Atlantic Reporter,* 255); Supreme Court of Pennsylvania.

DAMAGES FOR INJURIES FROM COMBINATIONS IN RESTRAINT OF COAL TRADE.—Only actual damages, established by the proof of facts from which they may be rationally inferred with reasonable certainty, are recoverable when one claims that his business has been injured by reason of an illegal combination in restraint of the coal trade; speculative, remote, or contingent damages cannot form the basis of any lawful judgment. The estimates, speculations, or conjectures of witnesses unfounded in the knowledge of the actual facts from which the amount of the damages could have been inferred with reasonable certainty will no more sustain a judgment than the conjectures of a jury. The general rule is that the anticipated profits of a commercial business are too remote, speculative and dependent upon changing circumstances to warrant judgment for their loss. Proof of the expenses and of the income of the business for a reasonable time anterior to and during the interruption charged, or of facts of equivalent import, is indispensable to a lawful judgment for damages for the loss of the anticipated profits of an established business.—Central Coal and Coke Company v. Hartman (111 *Federal Reporter,* 96); United States Court of Appeals.

RIGHTS OF CO-OWNERS OF MINING CLAIMS.—Under the laws of the United States (Revised Statutes, section 2324) providing that on failure of a co-owner of a mining claim to contribute his share of expenditures required by the statute, those who have made the improvements may, at the end of the year, give the delinquent personal notice in writing by publication, for at least once a week for 90 days, and if after 90 days he fails to contribute his interest in the claims shall become the property of such co-owners, a notice published every day except Sunday, from Monday, January 9, to Tuesday, April 2, inclusive is sufficient.—Elder v. Horseshoe Mining and Milling Company (87 *Northwestern Reporter,* 586); Supreme Court of South Dakota.

WHAT AMOUNTS TO WILFUL FAILURE TO COMPLY WITH LAW.—Where the "timber boss" of a coal mine, for several days previous to an accident in which a miner was injured by the fall of rock from the roof of the mine, that timbers and cap pieces had not been furnished for use by the miners as required, and repeatedly requested during that time, such knowledge and failure amounted to a wilful failure of the owner of the mine, within the laws of Illinois, requiring the furnishing of such timbers, etc., and renders the owner liable for the damage resulting from such injuries, including compensation for his suffering in mind and body.—Kelleyville Coal Company v. Yehnka (94 *Appellate Court Reporter,* 74); Appellate Court of Illinois.

RIGHT OF ACTION AND TO INJUNCTION AGAINST TRADE COMBINATION.—A retail coal dealer alleged that certain wholesale dealers controlled the local coal supply, preventing him from carrying on his business unless he could buy from such wholesale dealers freely and without discrimination; that they had entered into a conspiracy to sell to other dealers and to none others for the purpose of forcing out of the retail trade all retailers not in the combination—among these the party bringing the action, and that such conspiracy had been successful, and as a result his business had been destroyed. The court held that he had a right of action at common law, and also had a right to an injunction restraining the continuance of the operations of the conspiracy, under a law declaring that one may sue for all where the question is one of general interest to many persons.—Hawarden v. Youghiogheny Coal Company (87 *Northwestern Reporter,* 472); Supreme Court of Wisconsin.

WHEN FORFEITURE OF COAL LEASE WILL BE SUSTAINED.—Forfeiture of coal lease, therein provided for non-payment of royalties within stipulated time on coal mined, will be enforced; the lessor having given the 60 days' notice of intention to repossess as provided in the lease, and the lessee not having saved the forfeiture, as authorized by the lease, by the payment within said 60 days.—Walnut Run Coal Company v. Knight (50 *Atlantic Reporter,* 288); Supreme Court of Pennsylvania.

WHEN PATENT TO MINERAL LANDS WILL NOT BE CANCELLED.—Allegations in a bill for the cancellation of a patent for mineral lands that the several claims embraced therein were falsely and fraudulently represented to the land department to be quartz claims, when they were in fact placer claims, afford no ground for the cancellation of the patent, where the fact that they were placer claims would not have precluded the owner from obtaining a single patent for same, and it is not shown that the government was in any way injured by the false representation.

A patent for mineral lands, which has been in existence for 16 years, and which protects rights which have been continuously exercised by the patentee and his predecessors in interest for nearly 50 years, will not be declared void as to any portion of the premises granted solely for the reason that upon its face it purports to be based on a single mining location, and conveys more than may lawfully be included in one location, when in fact the claims were several and might have been united in a single patent upon a proper presentation of the facts. Where there might have been circumstances which, under the then existing laws, would have authorized the land department to include a patent for mining ground all the ground therein described, it will be presumed in support of the patent, when collaterally attacked, that such circumstances existed. A suit to set aside a patent for mineral lands on the ground of fraud practiced on the land department cannot be maintained by a private individual, who at the time had no claim upon any of the lands, but made a location on same subsequently, such ground having been available only to the Government.—Peabody Gold Mining Company v. Gold Hill Mining Company (111 *Federal Reporter,* 217); United States Circuit Court of Appeals.

ABSTRACTS OF OFFICIAL REPORTS.

Delaware & Hudson Company.

This company owns a large estate in the anthracite region in Pennsylvania. It owns and leases an extensive system of railroads, extending from its mines to the Hudson River at Albany and northward into Vermont as far as Rutland and through New York to the Canada line. The tidewater coal shipped by the company reaches New York harbor over the Erie Railroad. The canal which the company formerly operated was abandoned finally three years ago. The report is for the year 1901, and is the 72d annual report of the company.

The total earnings—including railroad lines—were $29,497,455; working expenses $21,847,707; net earnings, $7,602,748. The deductions to be made are: Depreciation railroad plant, $600,000; depreciation mining plant, $400,000; sinking fund of 5 cents per ton of coal mined, $233,369; interest and rentals, $2,998,602; total, $4,232,041; leaving a balance of $3,370,707, which is equal to 9.63 per cent on the capital stock.

The total shipments of anthracite coal reported for all companies for the year 1901 were 53,568,601 tons. Of this the property of the Delaware & Hudson Company produced 4,667,387 tons and that of the controlled Hudson Coal Company 388,006 tons; a total of 5,055,393 tons, or 9.4 per cent of the total. The coal transported over the company's railroads was 7,571,298 tons.

The additional lands acquired during the year are estimated to contain 10,025,700 tons of coal. The estimated quantity of coal in lands owned and controlled at the close of the year was 224,856,353 tons; being sufficient to last about 45 years at the present rate of mining.

The income statement is as follows for the Coal Department only:

	Total.	Per ton.
Sales of coal	$16,341,678	....
Coal added to stock	583,255	....
Total receipts	$16,924,933	$3.35
Mining and preparing coal	$7,723,306	$1.53
Coal purchased	75,867	....
Transporting coal	6,992,244	1.38
Handling expenses	215,693	0.04
General expenses, taxes, etc	570,570	0.10
Total expenses	$15,517,626	$3.07
Net profit	$1,407,307	$0.28

Of the coal sales $118,193 were at mines; $828,035 to the Railroad Department, and the balance to other points. The averages above given are calculated on the 5,055,393 tons reported in the statement.

The directors' report says: "Your property has been thoroughly maintained, and all the cost thereof

and of operation of the company have been charged to operating expenses. In addition thereto, and to the charges of $1,233,369 for depreciation and sinking fund, there have been charged to operating expenses $1,062,907 expended for betterments. All charges of that character amount to $2,370,321. Many of these betterments are of such a character that they should bring about a lower percentage of operating expenses for the year 1902. The cost of coal includes all expense of mining, preparing, general repairs and maintenance, and $574,553 expended for coal department betterments. No charge was made to coal department construction during the year. The expenses of the Railroad Department include all cost of operating and maintenance and $488,354 for betterments. . . .

"March 1, 1901, the company acquired through the Hudson Coal Company, control of additional coal property, the results from the operation of which are very satisfactory after charging $125,687 against the earnings for account of sinking fund to meet both principal and interest of the obligations of that company as they fall due. . . .

"Since the close of the year 1,386 shares of stock have been purchased and retired, so that the capital stock now stands at $34,507,100."

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.

Directory to the Iron and Steel Works of the United States; to which is Added a Complete List of the Iron and Steel Works of Canada. Fifteenth Edition; Corrected to December 31, 1901. Compiled by the American Iron and Steel Association, James M. Swank, General Manager. Philadelphia; Published by the Association. Pages 428. Price, $10.

The Cyanide Process in the Black Hills of South Dakota. Bulletin No. 5, South Dakota School of Mines. By Charles H. Fulton. Rapid City, South Dakota: Published by the School. Pages, 88; illustrated.

Victoria: Report on the Walhalla Goldfield. Prepared under direction of the Department of Mines. By H. Herman. Melbourne, Victoria: Government Printer. Pages, 68; with maps, plates and diagrams.

United States Geological Survey. Monography Volume 40. Adephagous and Clavicorn Coleoptera from the Tertiary Deposits at Florissant, Colorado; with Descriptions of a Few Other Forms, and a Systematic List of the Non-Rhynchophorous Tertiary Coleoptera of North America. By Samuel Hubbard Scudder. Washington: Government Printing Office. Pages, 148; illustrated.

Kansas Mineral Industries. By Professor G. P. Grimsley, Ph. D., Topeka, Kan.; prepared for the Kansas Midwinter Exposition. Pamphlet, 12 pages; illustrated.

United States Geological Survey, Bulletin No. 177. Catalogue and Index of the Publications of the Geological Survey, 1889 to 1901. By P. C. Warman. Pages, 858. *No. 178. The El Paso Tin Deposits.* By Walter Harvey Weed. Pages, 16; illustrated. *No. 180. Occurrence and Distribution of Corundum in the United States.* By Joseph Hyde Pratt. Pages, 98; illustrated. *No. 181. Results of Primary Triangulation and Primary Traverse Fiscal Year 1900-01.* By H. M. Wilson, J. H. Renshaw, E. M. Douglas and R. U. Goode. Pages, 240. *No. 183. Gazetteer of Porto Rico.* By Henry Gannett. Pages, 58. *No. 184. Oil and Gas Fields of the Western Interior and Northern Texas Coal Measures.* By George I. Adams. Pages, 64; illustrated. *No. 185. Results of Spirit Leveling Fiscal Year 1900-01.* By H. M. Wilson, J. H. Renshawe, E. M. Douglas and R. U. Goode. Pages, 220. *No. 186. On Pyrite and Marcasite.* By H. N. Stokes. Pages 50; illustrated. *No. 187. Geographic Dictionary of Alaska.* By Marcus Baker. Pages, 446. Washington: Government Printing Office.

Sulphur, Oil and Quicksilver in Trans-Pecos, Texas. Bulletin No. 2, University of Texas Mineral Survey. Austin, Texas: Published by the University. Pages, 44, with maps and illustrations.

NEW PUBLICATIONS.

Tasmania. Report of the Secretary of Mines for 1900-1901. W. H. Wallace, Secretary. Hobart, Tasmania; Government Printer. Pages, 360; illustrated.

This compact volume contains a great variety of information about the mines of the State of Tasmania, now a part of the Commonwealth of Australia. In addition to the statistics of production for the period covered, there are reports from the mine commissioners, the mine inspectors, the Government geologist, water boards and other officials. There are also a number of special reports on different mines and districts, which should be of much value to those interested. Like all the other Australian States, Tasmania gives much direct and practical aid to its mining interests, as the present volume shows. It is illustrated by maps, geological diagrams and a number of half-tone reproductions of photographs.

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.

Freight Rates on Anthracite Coal.

Sir: I do not know whether I am bringing up an old question, but I would like to know why the freight rate on anthracite should be so much higher than that on bituminous coal. My attention has been drawn to this by the report of the Delaware, Lackawanna & Western Company, given in the ENGINEERING AND MINING JOURNAL of March 8, where it is stated that the average rate per ton-mile on anthracite was 0.891 cent. I have your own authority for saying that bituminous coal has been carried for 0.25 cent per ton-mile, and though I believe the rate is somewhat higher now, it is probably not much more than one-third of the anthracite rate. Even allowing for the generally shorter haul on the anthracite and the consequent higher proportion of terminal expenses, the difference seems out of all proportion. Cannot you explain why it exists? I am not familiar enough with the coal trade to understand. J. H. T.

Providence, R. I., March 11, 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. Preferences will, of course, always be given to questions submitted by subscribers.

Books referred to in this column can be obtained from the Book Department of the ENGINEERING AND MINING JOURNAL.

Spelter Quotations.—Kindly inform us whether the London quotation on spelter, which usually appears in your JOURNAL each week, is the quotation of one certain day or an average of a week's quotations. This information will greatly oblige.—S. D. N.

Answer.—The London quotation for spelter, as given in our metal market columns, is usually the closing quotation of the week. As a rule the spelter price in the London market does not vary widely or at least suddenly, as the metal is not a speculative article, like tin. Should any unusual changes occur during the week, however, they are always referred to in the text of the report.

Lime and Lime Making.—1. What is meant by a rich or hot lime and what are its disadvantages, if any, in the making of mortar?

2. Can the carbon dioxide from a lime kiln be put to any practical use, on a small scale?—H. D.

Answer.—1. A rich or hot lime is a nearly pure lime, containing a low percentage of impurities. Naturally the purer lime slakes more quickly and generates more heat, or rather generates heat more quickly. As a rule, the purer the lime is the more sand it will take up in making mortar. Its use, therefore, will have advantages.

2. It might be possible to save the carbon dioxide from a limekiln, but we do not think it has ever been done in regular operation. At least we have never heard that it was done. Probably it would require some tests to determine whether saving the carbon dioxide would pay in practice.

Chrome Ore.—Can you tell us who are the principal buyers of chrome ore in this country?—F. T. S.

Answer.—There are a number of buyers of chrome ore. Among the leading buyers are the Baltimore Chrome Works, Baltimore, Md.; the Chrome Steel Works, Brooklyn, N. Y.; Dana & Co., 32 Broadway, New York. An advertisement offering chrome ore for sale would doubtless bring you a number of answers.

Self-recording Instruments.—I shall be greatly obliged to you if you could inform me of several firms who deal in self-recording instruments, such as the better class—aneroid barometers, etc.—S. H. B.

Answer.—Such instruments as you need can be obtained from all the large makers of surveying instruments. You will find the addresses of these firms in the advertising columns of the ENGINEERING AND MINING JOURNAL.

WISCONSIN GRAPHITE PRODUCTS.

Wisconsin Graphite Paint has earned a high reputation for all purposes for which a paint of this nature is used. It comes in six different shades, has a bright lustre and an even surface. It practically incorporates itself, so the manufacturer claims, into the iron and steel wherever applied. The Wisconsin Graphite Company, Pittsburg, has an excellent graphite preparation, known as the Wisconsin graphite stack paint, which will wear for years, and is being largely used by manufacturers and mill owners generally throughout the country. This company manufactures the well known Wisconsin flake graphite lubricant, which reduces friction to a minimum, being smooth and free from grit. Wisconsin graphite lubricant is especially adapted for powerful engines, dynamos and machinery, and the best results have justified the company's statement that Wisconsin graphite lubricant will reduce the expense of every flywheel, every motor, every shaft. Free samples will be sent to anyone upon request.

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 February 25, 1902.

693,835. METHOD OF HEATING MATERIAL.—Henry Campbell, Baltimore, Md. In heating material, such as asphalt or sand, a method which consists in gradually and repeatedly passing flames bodily into and through the mass of the material, and at the same time stirring the material.

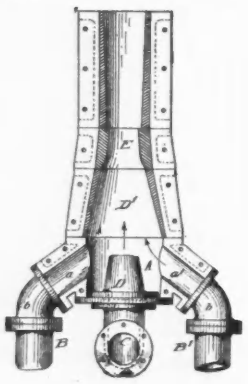
693,858. DUMPING-CAR.—Harry S. Hart, Chicago, Ill., assignor to Rodger Ballast Car Company, Chicago, Ill., a corporation of Illinois. In a car the combination of a frame portion, a central hopper-bottom, and two side hopper-bottoms arranged longitudinally of the car and provided with discharging doors to discharge material between and outside of the tracks.

693,906. MANUFACTURE OF ARTIFICIAL STONES, TILES, ETC.—Eduard Rott, Dassel, Germany. A process of making artificial-stone compound, which consists in mixing natural clay with cream of lime and subjecting the mixture to steam under pressure.

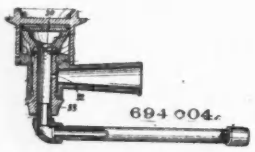
693,918. PROCESS OF FORMING BODIES BY ELECTRODEPOSITION.—Carl Steinweg, Ludenscheid, Germany. A process of forming bodies by electrodeposition, consisting in providing sheet metal matrices, partially dividing the same in several sections by a series of grooves, electrodepositing the metal upon the smooth surface of the matrix, and tearing out the several sections of the same.

693,964. MINER'S SQUIB.—Frederick H. Gross and Elwood Gross, Plymouth, Pa. A miner's squib having its match ends sealed by a closure composed of a plurality of fingers assembled by a suitable adhesive material.

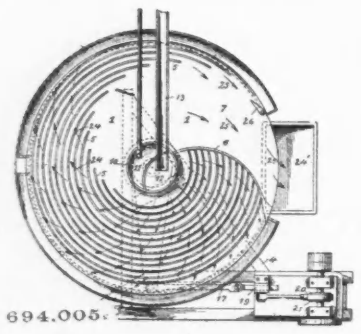
693,982. PROCESS OF REDUCING CARBONACEOUS ORES.—Robert McKnight, Philadelphia, Pa., assignor to Metallic Condenser Company, a corporation of Delaware. The art of treating ores containing precious metals and carbonates, which consists in heating the ore in the presence of sulphur, until the carbonates are converted into sulphur compounds, and continuing the heating in the presence of a haloid salt of an alkaline or alkaline-earth metal, with access of air, until the alkaline metal or alkaline-earth metal combines with the sulphur and with oxygen to form a non-volatile sulphur of the alkaline or alkaline-earth metal, and the liberated halogen unites with the precious metal, as a haloid salt or an oxyhaloid of said precious metal, and volatilizing and collecting said haloid or oxyhaloid salt.



694,002. MINING ELEVATOR.—Howard W. Davis, Auburn, Cal. In combination, an exterior casing formed in sections placed end to end, and each section formed of a plurality of arc-shaped parts placed edge to edge, and all formed with vertical ribs and horizontal flanges, whereby they are secured together to form a connected tubular structure, and an inner lining composed of a number of single-piece tubes abutting end to end and unsecured, but held and inclosed by the exterior sectional casing.



694,004. TUYERE.—Gerard Doan, Union Springs, N. Y. A tuyere-head provided with a perforated top-plate and an ash-hinge surrounding the same, a hollow base-piece secured to the bottom, a tubular air-plug extending through the said base-plate and open at one end and provided with a side orifice, a hollow oscillating headpiece secured to the top of the air-plug and provided with lugs coacting with lugs upon the base-piece, a lever connected with the air-plug for oscillating the same, a perforated air-distributing plate, and a tube for supplying air to the orifice of said plug.



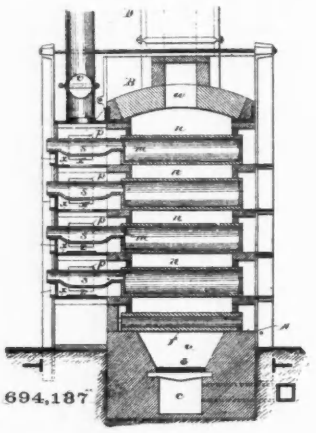
694,005. ORE CONCENTRATOR. Willis G. Dodd, San Francisco, Cal. An ore-concentrator comprising an oscillatory inclined table having an unriffled or plain surface adjacent to its discharge portion for the separated mineral, a series of curved riffles upon the working face of the table, said riffles extending from approximately a radial division and terminating at and discharging onto the plain or unriffled surface of the table.

694,022. FURNACE FOR HEATING BILLETS.—Charles H. Morgan, Worcester, Mass., assignor to the Morgan Construction Company, Worcester, Mass., a corporation of Massachusetts. In a furnace for heating billets, the combination with a heating-chamber, of a billet-support or track extending from one end of the heating-chamber partially through the same and adapted to support the billets transversely thereon, a pushing mechanism for pushing the billet along said billet-support or track by a sidewise movement, a second billet-support or track adapted to support the billets transversely thereon and extending from the first-named track, but in the same direction, toward the delivery end of the chamber, means for separating the billets as they pass from the first to the second of said tracks, and a second pushing mechanism for pushing the separated billets along said second track toward the delivery-opening.

694,025. ROLLING-MILL. Zachariah W. Onions, Wainfelin, Pontypool, England. In a continuous-roll train having upper and lower rolls whose passes are successively placed axially in opposing inclined positions, such passes having initial inclined surfaces.

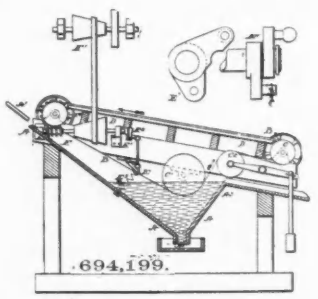
694,054. ANNEALING-FURNACE.—Frederick Danner, Tarentum, Pa. An annealing-furnace having in combination, a tunnel, a series of shafts arranged transversely of the tunnel, supporting-wheels adapted to turn freely carried by said shafts, rail-sections adapted to ride upon said wheels and carrying-bars secured to the rails at right angles thereto.

694,112. AMALGAMATING-MACHINE.—Gerard C. Scott, Columbus, Ohio. In an amalgamator, the combination with a casing having an inlet-opening at one end and an outlet at the other, of a shaft journaled in said casing, of copper disks mounted on said shaft and provided with radially-arranged openings, said casing adapted to contain a body of mercury and said disks adapted to travel through the mercury contained in said casing and casings mounted on said shaft and alternating with said disks.



694,137. ZINC-FURNACE.—George G. Convers and Arthur B. De Saulles, South Bethlehem, Pa. A zinc-furnace, provided with a retort-chamber for the circulation of products of combustion, a plurality of retorts or muffles arranged in vertical series within said chamber, a cooling-flue chamber common to all of said retorts and adjacent to the vapor-discharge openings of the retorts, zinc-condensers extending through the cooling-flue chamber, and means for creating a cooling-draft through said flue-chamber.

694,138 and 694,139. PROCESS OF AND APPARATUS FOR MANUFACTURING WHITE LEAD.—Frederick J. Corbett, Prahran, Victoria, Australia. A process of making white lead, which consists in mixing aldehyde and acetic acid in substantially the proportions specified, introducing lead oxid into the solution, agitating the mixture, simultaneously subjecting the same to contact with carbonic-acid gas, permitting the mass to settle, drawing off the supernatant liquid, and heating the precipitate to a temperature sufficient to expel the liquid remaining therein.



694,199. CONCENTRATOR FOR GOLD-BEARING MATERIAL.—George G. Sale, Dunedin, New Zealand. In combination with a concentrator employing an endless belt, of a beater mechanism for the belt, comprising a frame, a horizontal shaft carried by the frame and adapted to rotate said belt, means to transmit power to said shaft, a rigid crank mounted upon said shaft near the end thereof, a loose crank mounted upon the end of the shaft and adapted to be tilted at each revolution of the shaft by said rigid crank, a rod connected to said loose crank, a pivoted flapper connected to the under side of the frame and also to the rod, said flapper being adapted to be raised at every revolution of the shaft, and a spring for returning said flapper, rod and loose crank with a sudden jerk to beat the belt.

694,201. AMALGAMATOR.—John R. Sawyer, Arroyo Seco, N. Mex. An amalgamator, comprising a frame, a plurality of conical revoluble drums mounted one above the other in the frame with their ends projecting beyond the same, the axes of the drums being in horizontal planes and the said drums being arranged with the base end of one opposite the apex of the drum below, means for revolving the drums in unison, cups on the inside of the drums and adapted to contain mercury and arranged to discharge the mercury upon the material as the drums revolve, means for feeding the material into the projecting base end of the uppermost drum, and stationary pipes connecting the ends of the drums outside of the frame, each pipe leading from the apex of one drum to the base of the drum next below.

694,203 and 694,204. AMALGAMATING MACHINE.—Gerard C. Scott, Columbus, Ohio. The combination with a substantially horizontally-disposed casing having inlet and outlet openings, a shaft journaled therein and means for imparting motion to said shaft, of a cylindrical body mounted on said shaft and having surrounding separated compartments containing copper in a granular form, said cylindrical body having open-work ends and said casing adapted to contain a body of mercury in the lower portion thereof.

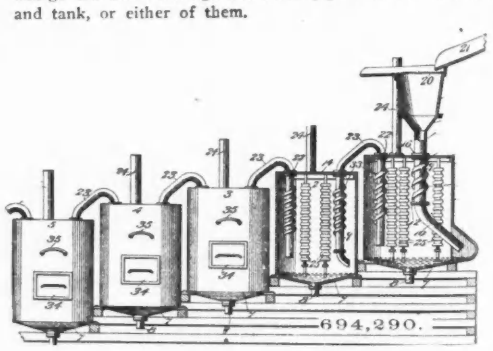
694,224. ALLOY.—Jacob S. Wolfe and Louis K. Englert, West Catasaqua, Pa. A composite metal resulting from fusing the following elements in approximately the following proportions by weight: Copper 85 parts, tin 4 parts, iron 6 parts, and salt 5 parts.

694,240. EXCAVATING-MACHINE.—James D. Blalock, Cross, Ala. An excavating-machine comprising a frame, an axle mounted on the frame, a bucket-wheel mounted on the axle within the frame and upon which the machine is balanced, constructed with a head at its inner side, and with buckets, an annular ring having laterally-extending teeth and secured to the head.

694,255. GOLD-SEPARATOR.—Arthur L. Dana, Colorado Springs, Colo. In a separator, a reciprocating pan, a plurality of traps arranged therein, a spreader-plate on each trap, and water-supply pipes leading into the traps.

694,271. BLASTING-FUSE.—Nicholas Harris and Joseph Bray, Russell Gulch, Colo. A fuse, comprising a longitudinal combustible member and a series of igniters extending laterally from the longitudinal member, and spaced at intervals thereon.

694,280. APPARATUS FOR COMPRESSING AIR.—Samuel P. Howe and Samuel M. Vauclain, Jr., Ithaca, N. Y. An improvement in apparatus for utilizing the operating parts of a steam-engine for compressing air for use in a system of which said engine forms a part, consisting of the combination with a steam-engine and its valve-chest, of a storage-reservoir for compressed air, a liquid-fuel tank, a branch pipe connecting the tank and reservoir, a valve in said pipe for controlling communication between said tank and reservoir, a check-valve between said controlling-valve and reservoir, a main pipe connecting the valve-chest of the engine with the branch pipe, a valve for controlling communication between said main pipe and the valve-chest, and a check-valve in said main pipe between its controlling-valve and the junction between the main pipe and the branch pipe, whereby when the steam is shut off from the engine, the latter may operate to compress air and discharge the same through the main pipe into the reservoir and tank, or either of them.



694,290. FINE-GOLD AMALGAMATOR.—Martin Lasswell, Spokane, Wash., assignor of two-thirds to F. T. Hill and Eugene Denzel, Spokane. A fine-gold amalgamator comprising a stationary container having a sloping bottom which provides a mercury-chamber in the base thereof, an inlet-pipe provided with a curved nozzle adapted to discharge water, sand and gravel laterally in one direction against the wall of the container above the surface of the mercury so as to cause the water, sand, and gravel to rebound in the opposite direction over the surface of the mercury avoiding agitation of the latter, an outlet-pipe, and spiral amalgam-plates encircling the inlet and outlet pipes.

694,299. AIR COMPRESSOR AND COOLER.—Oscar P. Ostergren, New York, N. Y. The combination with the air compressor, of a water-injecting pump, an annular inlet to the compressing-cylinder and an annular valve controlling said inlet.

PERSONALS.

Mr. Martin J. Heller, representing Capt. J. R. Delmar, is in Central Nevada.

Mr. J. P. Hower is general manager of the Dorcas cyanide mill at Florence, Colo.

Mr. William Farish, of Denver, Colo., has been examining the King-Barnes property at Kendall, Mont.

Mr. J. L. Butler, discoverer of the famous Tonapah Mines in Nevada, is spending a few weeks in San Francisco.

Mr. F. McM. Stanton, agent of the Atlantic and Phoenix copper mines in Michigan, was recently East on business.

Mr. A. Bohn, of Leadville, Colo., has been examining some mining propositions near the City of Mexico, Mex.

Mr. John Duncan, assistant superintendent of the Calumet & Hecla Mine, is traveling in lower California for his health.

Mr. W. H. Hall, of New York City, has been in Sonora, Cal., examining a power proposition on the Stanislaus River.

T. P. Rohlfing, formerly superintendent of the Horn Silver Mine at Frisco, Utah, is now examining properties in Wyoming.

Mr. D. S. Cochran has been appointed superintendent of the Bogan and Pesquira gold mines, near Arivaca, Sonora, Mex.

Mr. C. W. Pritchett, mining engineer of Denver, Colo., has returned from a professional trip to the Black Hills, S. Dak.

Mr. Arthur L. Pearse recently returned to London, Eng., after visiting Korea and China, where he has been examining mines.

Mr. Harry K. Wheeler, formerly with Capt. J. R. De La Mar, has located in Los Angeles, Cal., as a mining and civil engineer.

Mr. O. O. Saxhung has been appointed assistant manager of the Sonora Mining and Milling Company at Tubutama, Sonora, Mex.

Mr. Frank Stansfield, operating mining property at Russell Gulch in Gilpin County, Colo., has been in Tampa, Fla., on a vacation.

Prof. J. Dunraven Young of Chicago, Ill., has recently been in the Galena, Ill., district reporting on lead and zinc properties for Chicago men.

Messrs. W. A. Garrett and J. H. Johnson, of Holdrege, Neb., have been in Gilpin County, Colo., being interested in the P. K. Mine, near Black Hawk.

Mr. G. A. Duncan of Salt Lake, Utah, recently went to Boise, Idaho, to look after the interests of Boston men, for whom he is consulting engineer.

Mr. Sydney Chase has been elected president of the Boston & Montana Mining Company. He is a Boston stock broker, a member of Chase & Barstow.

Mr. William R. Todd, secretary and treasurer of the Quincy, Adventure and Rhode Island mining companies, recently visited the Lake Superior copper country.

Mr. George H. Dunham, general manager of the Chainman Mining Company, returned recently to Ely, Nev., after an absence of more than two months in the East.

Mr. Leo Von Rosenberg, of New York City, arrived at San Francisco, Cal., from the West Coast of Mexico on March 2. He examined mines in Sinaloa and Lower California.

Mr. V. V. Clark, formerly manager of the Higueras Gold Mining Company, at Agua Caliente de Baca, Sinaloa, Mex., has established a general mining office at Albuquerque, N. M.

Mr. B. V. Nordberg, of the Nordberg Manufacturing Company, Milwaukee, Wis., recently visited the Lake Superior copper district to superintend the installation of some machinery.

Messrs. J. H. Collins & Son, mining and metallurgical engineers, have moved their offices from Broad Street Avenue, to 702 Salisbury House, Finsbury Circus, London, E. C.

Mr. Max Baszanger, representing Jacques Baszanger & Co., of New York city, dealers in diamond drill supplies, recently visited the copper and iron mines of Northern Michigan.

Mr. Leigh Hunt, manager of the Iola Portland Cement Works, of Iola, Kan., who has been in ill health for some time, has been sojourning in Los Angeles, Cal., and rapidly convalescing.

Mr. J. F. Meals, of Oil City, Pa., a stockholder in the Cashier Gold Mining and Reduction Company, operating near Central City, Colo., was a visitor at the properties during the past week.

Mr. Lawrence W. Tatum, mining engineer, representing Prof. J. Dunraven Young of Chicago, Ill., is at present in New Mexico, to examine and report on mining property for Chicago men.

Mr. M. W. Tanner, manager of the Bertha Gold Mining and Milling Company, operating in Gilpin County, with headquarters at Idaho Springs, Colo., has gone to Hot Springs, Ark., for his health.

Mr. H. F. Fay, president of the Centennial, Old Colony, Trimountain, Union, Copper Land, Allouez, Mayflower and Elm River companies of Michigan, visited the properties under his management recently.

Mr. James McDonald, who has been identified with the Reddy Mines at Darwin, Inyo County, Cal., has leased the entire property for one year, and intends at once to erect jigs, and install rock crushers and Standard concentrators.

Mr. W. L. Honnold, formerly of Calaveras County, Cal., is on his way to Johannesburg, South Africa, to act as consulting engineer for the Consolidated Mines Selection Company, Limited. He left New York City for London March 12.

Mr. Jesse C. Scobey has resigned the position of general manager of the Colorado Zinc Company, in order to accept the appointment March 15 as general manager of the Pride of the West Mining and Milling Company, of Washington Camp, Ariz.

Mr. Thomas Kiddie has resigned the management of the Van Ande Smelter, B. C., to take a similar position with the Tyee Copper Company, Limited, of London, and will at once erect a 100-ton copper furnace at Ladysmith, Vancouver Island, B. C.

Mr. Philip Mixsell of Denver, Colo., recently returned from a trip to New York city on mining business, and in company with Mr. Arthur L. Pearse, a well known mining engineer of London, Eng., has been visiting mining property in Gilpin and Clear Creek Counties in Colorado.

Messrs. Sidney A. Witherbee, C. C. Hyatt, William Comstock, Wadsworth, Warren, Levi L. Barbour, Mark Stevens, F. G. Harris, Alex. McLaughlin, of Detroit, Mich., and G. J. Robinson and W. B. Comstock, of Alpine, Mich.; J. S. Ellis, of Ashland, Wis., and Josiah Quincy, of Boston, Mass., have been looking over mining properties in Durango, Mex.

Mr. Albert L. Waters, smelting and mining engineer, has resigned the management of the mines and smelter of the Colorado Ores department of the British Gold Mines of Mexico, Limited, near Matape Sonora, Mex., to become general superintendent of four mining companies in the State of Jalisco with headquarters at Guadalajara, Calle Palacio, No. 2.

Mr. Jacob Heimberger, of Leadville, Colo., who has been on a visit East after greeting his old acquaintances has returned to Leadville. He is confident that the great ore bodies of the "Cloud City" will be productive for years to come, in fact, that Leadville will be a mining center when mines at other camps now producing greater values are worked out and abandoned.

OBITUARY.

Robert Shoemaker, who died recently in Wilkes-Barre, Pa., had been for many years the district superintendent of the mines of the Lehigh Valley Coal Company. He was born in Forty Fort, Pa., on April 18,1845, and learned the machinist's trade at the Laning & Marshall Foundry, now the Dickson Works. He became later one of the best-known mining men in the Wyoming Valley. The cause of his death was meningitis. He leaves a widow and four children.

Rufus King Polk, mining engineer, and Member of Congress from Pennsylvania, died suddenly March 5 of heart disease while visiting friends in Philadelphia. Mr. Polk was born in Montgomery County, Tenn., August 23, 1866. His early education was obtained in the South, and in the fall of 1883 he entered Lehigh University, graduating in 1887, and taking the degree of mining engineer in 1888. Immediately upon graduation he entered the employ of the Montour Iron and Steel Company at Danville, Pa., as chemist and mining engineer, which position he resigned early in 1890 to become assistant superintendent of the Columbus & Hocking Coal and Iron Company, in the Hocking Valley, Ohio. A few years later he resigned this position to accept that of general manager of the North Branch Steel Company at Danville, Pa. At his death he was a member of the firm of Howe & Polk, manufacturing structural tubing at Danville, Pa.

During the Spanish-American war he served as first lieutenant in Company F, of the Twelfth Pennsylvania Volunteer Infantry. He was a delegate to the last Democratic National convenion, served in the Fifty-sixth Congress, and was elected to the Fifty-seventh Congress by a large majority. Because of his business interests he refused a nomination to a third term.

Mr. Polk was successful in business, and was a man of rare personal charm. His sudden death will sadden his many friends.

SOCIETIES AND TECHNICAL SCHOOLS.

AMERICAN ELECTROCHEMICAL SOCIETY.—The proposal to form a national society for electrochemists similar to the American Institute of Electrical Engineers and the American Chemical Society, has met with even more encouragement than was at first expected. Over 300 men have expressed their willingness to become members, and the formation of the society is assured. The first meeting will probably be held in Philadelphia April 3, and is to be followed on April 4 and 5 by sessions at the electrochemical lecture room of the University of Pennsylvania for reading and discussing papers. Twenty papers have been promised, and a large proportion of prospective members from the Eastern and Western States will attend. Friday evening, April 4, will be devoted to social intercourse and Saturday afternoon to visits to places of interest to electrochemists.

The detailed program of the meeting will be duly issued. Mr. Carl Hering, 929 Chestnut street, Philadelphia, is temporary secretary.

CORNELL UNIVERSITY.—The midwinter edition of the Cornell *Register* gave the first official and precise census for the current year. The figures are: Trustees, 39; teachers, 387; students, graduate department, 183; graduate students in undergraduate departments, 185; academic department, 817; law school, 197; medical college, 415; college of agriculture, 86; veterinary college, 51; college of forestry, 38; college of architecture, 50; college of civil engineering, 212; Sibley college (mechanical, including railway, electrical, marine, etc.), 784. The total of all classes and courses is 2,792 in the regular lists and about 500 in the summer schools. Of the total 1,679 come from New York State, the remainder from every State in the Union and from all parts of America and of the British Empire, from China, Japan, Russia, Switzerland, Austria, Turkey and Korea. Of the 784 students in the undergraduate courses of Sibley College, 62 are graduate students; there are also 14 candidates for the Master's degree and 2 graduate students not candidates for a degree.

Mr. John Birkinbine apologized for keeping the meeting waiting for his arrival, the delay having been due to his difficulty in returning to Philadelphia from Easton on account of the flooded condition of the Lehigh River. In view of the engineering interest which these unusual stream conditions of our streams must have, he moved that his paper upon "Changes in the Manufacture of Pig Iron" should be postponed in order that a general discussion might be held upon the "Influence of Flood Conditions in Stream Discharge." Mr. Birkinbine opened the discussion by describing conditions at Easton, Pa., on February 28, and comparing them with the high-water records of that locality for previous years, and also with the high-water conditions which prevailed at Johnstown, Pa., before the failure of the South Fork dam, in 1889, Mr. L. Y. Schermerhorn called attention to the usual overestimate of the velocity of flow in streams, and suggested that the overflow of affluents could be prevented by building obstructions in all the tributaries. Mr. John E. Codman described the flow-off into the Neshaminy Creek, Philadelphia, in accordance with measurements made February 28. He stated that the run-off through streams seldom equals one-half of the rainfall over the drainage area, and cited measurements and computations made. Mr. E. M. Nichols described an overflow in the State of Arkansas, when the Mississippi rose 4 ft. and flooded 40 miles of adjacent property.

Other members participated in the discussion.

ENGINEERS' CLUB OF ST. LOUIS.—At the meeting on March 5, the St. Louis Chapter of the American Institute of Architects and the St. Louis Architectural Club united with the Engineers' Club in a smoker and housewarming to celebrate the opening of the new quarters which have been jointly fitted up by the three associated clubs. About 150 members and guests were present.

The meeting was called to order by Prof. J. L. Van Ornum, chairman of the Governing Board of the Associated Technical Clubs. Prof. Van Ornum spoke of the work of the board and congratulated the clubs in the successful accomplishment of a long denied object.

The chairman then called upon Mr. W. L. Eames, president of the St. Louis Chapter of the American Institute of Architects; President J. H. Kinealy, president of the Engineers' Club; and Mr. G. F. A. Brueggeman, president of the St. Louis Architectural Club. Each of the presidents gave a short historical sketch of his club and of the steps leading to the association of the three clubs.

The chairman then called upon Prof. W. S. Chaplin, Chancellor of Washington University; Prof. C. M. Woodward, dean of the School of Engineering of Washington University; Mr. Robert Moore, president American Society of Civil Engineers; Mr. B. H. Colby, past-president of the Engineers' Club; Mr. William B. Ittner, commissioner of school buildings of the Board of Education, and Mr. Cope of Philadelphia. The hope was expressed that the associated clubs might ultimately include all scientific societies in the city, and that they might be housed in a fireproof building, which would afford a place for social gatherings and professional meetings as well as a safekeeping for libraries and archives.

INDUSTRIAL NOTES.

The E. L. Dupont de Nemours Company, for the manufacture of gunpowder and other explosives, capital $20,000,000, was recently incorporated at Dover, Del. The new corporation is expected to take in all of the Dupont powder mills.

The Fairfield Car Wheel Company, of Boston, Mass., recently took a charter under Maine laws with a capital of $500,000, for the purpose of manufacturing patent equipment for the manufacture of car wheels. Horace Mitchell and E. S. Abbott are the incorporators.

Adam Cook's Sons, of New York City, report that engineers who have tried a sample can of Albany grease, sent free of charge for testing, report most satisfactory results. A recent testimonial is from the engineer of the power plant of the American Fire Brick and Clay Company of Mineral City, O.

The American Vitrified Conduit Company, of Akron, O., with New York City offices, in the Taylor Building, has been awarded 2 South American contracts. One is for 500,000 ft. of vitrified conduit for telephone wires in Buenos Ayres, Argentina, the other for 250,000 ft. for telephone and electric light purposes in Chile.

The recent conference between representatives of the American Tin Plate Company and President Shaffer and ten other members of the Amalgamated Association of Iron and Steel Workers resulted in a signed agreement being reached, under which the present scale of wages will continue until July 1, 1903, and the mills will run during the summer months.

The Arthur Fritsch Foundry and Machine Company of St. Louis, Mo., is busy in both departments of its works—the bulk of the orders being for mining machinery—crushers figuring conspicuously in the list. The latest bookings include an order for crushers from British Columbia. The company is making a number of dry pans for the clay works at Cheltenham, Mo.

The Stilwell-Bierce & Smith-Vaile Company of Dayton, O., states that O. G. Smith is now manager of its branch office at 612 Arch street, Philadelphia. A. L. McClurg, who has been with the Harrison Safety Boiler Works for 6 years, has become a salesman of the Stilwell-Bierce & Smith-Vaile Company's pumps, feed-water heaters, etc., making his headquarters at Pittsburg, Pa.

The Federal Lead Company has now 75 men employed at the site of its new smelter, near Alton, Ill. Work on the foundation of the big stack has started. The stack will be of brick and over 300 ft. in height, making it the second tallest smoke stack in the United States. The stack will be 33 by 33 ft. at the base, and the concrete foundation for the brick work will be laid 13 ft. in the ground.

The Colorado Iron Works Company has established a Western office in Salt Lake City, at 342 South State street, under the management of Mr. H. R. Ayres. The company's impact screens have lately been put in the mill at Silverton, Colo., formerly known as the Stoiber Mill, to replace the old revolving screens. The Salt Lake office will look after the States of Utah, Nevada, Idaho, Montana, Washington, and Oregon.

The Monterey Iron and Steel Foundry Company of Monterey, Mexico, has begun to place contracts for equipment, etc. Manning, Maxwell & Moore of New York City have secured an order for 3 large punching and shearing machines, which are to be built by the Hilles & Jones Company of Wilmington, Del. The same concern has also obtained an order for 3 rail-drilling equipments, to be manufactured by the Newton Machine Tool Company of Philadelphia.

The recently incorporated Cherokee Foundry and Machine Company, a reorganization of the King-Goodman Foundry and Machine Company, Cherokee, Kans., manufacturing mining and smelting machinery, King gas and gasoline engines, King locomotives for underground haulage, etc., has elected these officers: W. C. Turkington, president; G. W. Pye, vice-president and treasurer; Geo. W. Stewart, secretary and general manager; J. N. Riley, superintendent of construction, and U. S. King, consulting engineer.

During the past few days the Colorado Iron Works, through its Denver office, has received the following orders for metallurgical machinery: 5 vibrating screens for the Union Copper Mining Company of Gold Hill, N. C.; 2 car-loads coke oven frames for the Denver & Rio Grande Railroad Company; 1 car-load cast iron water jackets for the American Smelting and Refining Company, to be shipped to Aguas Calientes, Mex., for the smelter at that point; 3 rubber top Bartlett tables sectionalized for mule-back transportation for the Batopilas Mining Company, Mex.

The Allis-Chalmers Company has given its 200 employes at the Milwaukee, Ill., plant an increase in wages of 5 per cent and a 9-hour day. This was demanded, in part, by the union machinists who struck last summer, except that the increase asked in wages then was 10 per cent. The notice which has been posted in the Milwaukee shops will be followed by similar notices at all of the company's plants in the United States. These are at Chicago, Milwaukee, Buffalo, Wilkes-Barre, Pa., and Scranton, Pa. The change in hours is granted in the way of a half-holiday Saturday.

The Sargent Company, of Chicago, Ill., heretofore operating an open-hearth steel plant at Fifty-ninth street, for the manufacture of draw bars, knuckles, coupler parts for repairs, and a plant at Chicago Heights, Ill., for the manufacture of Tropenas steel castings and steel and iron brake shoes, has transferred the plant at Chicago Heights, together with the classes of business done there, to the American Brake Shoe and Foundry Company, which company will hereafter conduct the business of this department from its offices at Chicago Heights. The Sargent Company will continue the operation of the open-hearth plant at Fifty-ninth street, where its general offices will be located.

The patent right for the manufacture and sale of silicate brick within the provinces of Nova Scotia, New Brunswick and Prince Edward Island has been purchased through H. F. McDougall by a company of men, among whom are Hiram Donkin, late manager of the Dominion Coal Company, and now consulting engineer of the Nova Scotia Steel and Coal Company; A. C. Bertram, North Sydney; J. A. Gillies, K. C., Sydney; John Vooght, North Sydney; John McCormick, Sydney Mines; C. M. Odell, for the Dominion Coal Company; A. N. McLennan, of Glace Bay, and others. The company has decided to erect a plant in Cape Breton at a probable cost of about $50,000, capable of producing 2,000 brick per hour.

At the recent annual meeting of the Empire Steel and Iron Company stockholders in Jersey City, N. J., the following were elected: Directors, Leonard Peckitt, Archer Brown, Frank M. Davis, Frank M. Jeffrey, David B. Gamble, Elverton R. Chapman, Junius S. Morgan, Mark T. Cox and Charles H. Zehnder. David B. Gamble, of Cincinnati, O.; Mark T. Cox, of New York City; Junius S. Morgan, of New York City, and Charles H. Zehnder, late president of the Scranton Locomotive Works, have been added to the board during the year as vacancies occurred. At the meeting of the directors the following officers were elected: President, Leonard Peckitt; vice-president, Charles H. Zehnder; treasurer, S. B. Patterson; secretary, J. M. Fitzgerald; assistant treasurer, J. S. Stillman; assistant secretary, A. F. Marmelstein, Jr. Executive Committee, Archer Brown, E. R. Chapman, Mark T. Cox. Finance Committtee, Mark T. Cox, J. S. Morgan, D. B. Gamble.

TRADE CATALOGUES.

Bulletin No. 124, published by the Stanley Electric Manufacturing Company, of Pittsfield, Mass., is on "Protective Devices." It describes fuses of various types, cut-outs, circuit-breakers, lightning protectors, etc.

"The Story of Human Progress," a 24-page pamphlet, issued by the Goheen Manufacturing Company, of Canton, O., calls attention to the value of "Carbonizing Compound" as a protective coating for iron and steel constructions, such as bridges, viaducts, buildings, etc. The pamphlet contains copies of testimonials from prominent firms that have used the preparation and also illustrations showing structures on which the coating has been used.

The J. D. Smith Foundry Company, of Cleveland, O., issues a little pamphlet of 16 pages on "Plumbago, its Mixing and Refining." The company manufactures foundry facings, stove backing, pipe and plate blacking, etc., and states that it uses pure Ceylon plumbago, while its various preparations contain this substance, mixed with American graphite, talc or other substance, to get the preparation best suited for the particular use desired.

Catalogue F issued by W. F. Stanley & Co., London, Eng., is an 80-page price list showing the firm's surveying and drawing instruments. The surveying instruments shown comprise micrometer theodolites, Stanley transits and transit theodolites, railway theodolites, mine surveying dials; also wye and dumpy levels, sextants, pocket levels, aneroid barometers, plane tables, tapes and chains, and chronometers. The list of drawing instruments is long. The drawing instruments are sold singly or in cases.

The Northern Electrical Manufacturing Company, of Madison, Wis., has issued a bulletin describing the Watson type of small motors and generators, which it has recently placed on the market. From appearances these little machines are a departure in design and construction from other small motors and generators. The frames are cast from electric steel and are multi-polar. The armatures are also built on the same plan as followed in the construction of larger machines. They have slotted laminated cores laid with form-wound coils and arranged for perfect ventilation. In appearance they are neat, compact and symmetrical. The Northern Electrical Manufacturing Company states that at present it is building them in sizes from ⅛ to 2 h. p.

Smith-Vaile power pumping machinery is described in Catalogue No. 40, a 95-page pamphlet, published by the Stilwell-Bierce & Smith-Vaile Company, of Dayton, O. These pumps are designed to be driven by belts, or geared to an electric motor, gas or steam engine; they are duplex or triplex. The company states that it has had an experience of over 20 years in designing and constructing pumping machinery, and that the styles shown in the catalogue are only those most in demand for ordinary service. The triplex pumps shown are of the crosshead type, with plungers having outside guides relieving the stuffing box glands and the packing of side thrust, and overcoming the difficulties of keeping the packing tight in pumps with trunk pattern plungers. For heavy mine service the company makes a horizontal triplex pump with massive bed plate in which the crank-shaft blocks are cast. The company also makes a horizontal triplex electric pump mounted on an iron truck that is adapted for unwatering flooded workings or handling water in remote parts of a mine.

Catalogue No. 2, issued by the Allis-Chalmers Company, Fraser & Chalmers Works, Chicago, Ill., is a pamphlet of 127 pages, treating of "Hoisting Engines and Appliances." The catalogue gives briefly information about hoisting in general and then describes the various types and forms of hoisting engines made by the company from its own designs or in accordance with the specifications of customers. The hoists using round ropes include those having simple drums, double drums or conical drums, either geared or direct acting. For hoisting from deep mines the company manufactures engines using the Whiting system, employing two drums similar to those used for cable railways, both drums being positively driven by the engine. To avoid unequal wear of the different grooves in the drums, Walker's patent differential rings are used on the drums instead of the ordinary wood filling. This system of hoisting was introduced by Mr. Whiting at the Calumet & Hecla mine, Michigan, and is in use at the Rand Mines, South Africa. The Allis-Chalmers Company makes reel hoisting engines, both geared and direct, acting with Corliss or slide valves. The company also manufactures windlasses, horse whims, skips, cages and cage chairs, landing dogs, sheave wheels, &c.

GENERAL MINING NEWS.

ARIZONA.

COCHISE COUNTY.

Black Diamond Copper Company.—This company owns 500 acres of ground, or 25 full claims in the Dragoon Mountains, 18 miles from Cochise Station on the Southern Pacific Railway. Development is by tunnels, the lower opening the ore bodies at a depth of 700 ft. The ore is reported to carry 7 per cent copper with silver and gold values. It is planned to put in an Otto aerial tramway to carry the ore on from the tunnel mouth to the smelter ½ mile distant and 820 ft. below. The smelter of 200-ton daily capacity is to be furnished by the Allis-Chalmers Company. It will include an auxiliary cupola furnace for smelting the matte. The company at present employs 90 men. The officers are: Frank H. Crockard, of Wheeling, W. Va., president; J. G. Hearling, Wheeling, W. Va., vice-president; James A. McBain, of New York, secretary, and N. O. Bagge, treasurer and general manager. These gentlemen together with Frank C. Hoffman, also of Wheeling, form the directors of the corporation.

MOHAVE COUNTY.

Philadelphia & Arizona Mining Company.—This company is operating the Minnesota-Connor mines at Chloride. The officers are Jas. N. Gazzan, Philadelphia, Pa., president; W. J. Cleeland, vice-president, and E. T. Loy, general manager of mine and mill. Wm. Miller is the foreman of the mine and C. N. Hassan of the mill. A. M. MacDuffee is assayer.

The new mill has a capacity of 200 to 250 tons in 24 hours. It is 2 miles from the railroad. The ore from the mine is dumped into a bin, whence it is automatically fed to a Blake crusher; a second crusher breaks the oversize to ¼ in., and the crushed ore passes through 3 sets of rolls and revolving screens, thence to 4 jigs and 9 Wilfley tables. The tailings from the tables are reground by a Chilean mill and the product is treated on 3 slime tables. The machinery is run by a 150 h. p. Corliss engine, steam being supplied by 3 boilers. Oil is used as fuel. A cement reservoir holds 235 gal. of water. The water from the mill goes to settling tanks and is used again. The deepest workings in the mine are 350 ft., but the shaft is being sunk to 550 ft.

CALIFORNIA.

AMADOR COUNTY.

(From Our Special Correspondent.)

Argonaut vs. Kennedy.—The suit between these two mines, which has been in the courts 8 years, will be heard by the United States Supreme Court in April.

Edinburg.—The tunnel is in 100 ft., and is to be extended 200 ft. further.

Kennedy.—This mine at Jackson, J. F. Parks, superintendent, has finished cutting stations and chutes at the 2400 and 2500 levels of the new East shaft, and cross-cutting toward the north shaft has begun. The new shaft is now down 2630 ft.

CALAVERAS COUNTY.

(*From Our Special Correspondent.*)

Beatrice.—Pipe and machinery are being placed at this mine, at Murphy's, to operate the Beatrice-Roble Tunnel.

Iowa Consolidated.—John C. Jens states that a 40-stamp mill will be erected on the mine at Rich Gulch. A cross-cut tunnel is being run.

Melones Consolidated.—The big turbine wheel for this mine, at Robinson's, is being put in, and the mill will soon be ready to run.

North Hill.—This hydraulic mine, near Milton, after a long idleness, has started up again.

Parnell.—This mine at Smith's Flat, owned by H. S. Messer of Altaville, is being pumped out.

Sugar Pine.—This mine, near Murphy's, belongs to the San Joaquin Mining Company, Joseph McClay, superintendent. The new mill is starting up.

Union.—This copper mine at Copperopolis, G. McM. Ross, superintendent, is being cleared of water, and the boarding houses, etc., are being repaired. A small amount of cement copper was made last year.

ELDORADO COUNTY.

(*From Our Special Correspondent.*)

Georgetown Mill.—A portable triple discharge mill has been set up at Georgetown by J. C. Moore, of Garden Valley, who will operate it as a custom mill.

South Slope Mining Company.—This company, A. S. Bosquit, superintendent, at Placerville, is opening an ancient river drift channel about 35 miles northeast of Placerville. The tunnel is the first run in this channel after 19 months of development work.

Vandalia.—At this mine below Shingle Springs, Chas. Seymour, the superintendent, is erecting extensive reduction works and buildings.

Zantgraft.—This mine belongs to the Montauk Mining Company, New York city. Edwin Goodwin, of Loomis, is superintendent. The main shaft is being retimbered and a new compressor and hoist have been installed.

FRESNO COUNTY.

(*From Our Special Correspondent.*)

Copper King.—The dismissal of the injunction suits brought by the county supervisors, because the company used traction engines on the roads, has justified the company in enlarging its shipping facilities. Three new Holt traction engines have been ordered, the combined capacity of the train being thus increased from 100 to 150 tons daily. The underground force at the mine has been increased to what it was before the litigation started.

KERN COUNTY.

(*From Our Special Correspondent.*)

Keyes.—The purchasers of this mine at Kernville, are Col. T. Spillacy and the State Bank of Sacramento. The mine had not been worked for 35 years, until the summer, when a prospector started in and found good ore, taking out between $10,000 and $15,000.

MADERA COUNTY.

(*From Our Special Correspondent.*)

Gambetta.—This mine, at Grub Gulch, formerly a good producer, is to be reopened by an Eastern company which holds a bond. Its mine is to be unwatered at once.

Josephine.—This mine, at Grub Gulch, is being reopened by the new owners. The property at one time produced largely.

Pioneer.—In building a trail to this mine, at Orleans, a new ledge has been discovered, about 200 yards from the original location, which prospects well.

Rittenhouse Group.—The Cripple Creek-Colorado Company has begun sinking, and it is understood that the 500-ft. shaft will go to 1,000 ft. before stopping. At present it is 500 ft. deep. This property is situated on Gold Hill, and formerly belonged to the Alamo Company.

MARIPOSA COUNTY.

(*From Our Special Correspondent.*)

Jas. H. Gifford has bonded the claims of Clay Austin at Whitlock, and is to start work in 30 days. Helm & Donovan also bonded their mine to Mr. Gifford.

Ellingham.—J. J. Ellingham, of Whitlock, has received a new 5-stamp battery. His mill runs on ore from his mine, and also does custom work.

Figel-Grimm Copper and Milling Company.—This company has been organized with Max Grimm, of Stockton, as president; H. Haman, of San Francisco, vice-president, and E. P. Figel, of San Francisco, secretary, to open copper mines in the copper belt, 7 miles northeast of La Grande. In development a good grade of ore has been uncovered.

Leasers.—The old mines on Texas and Green Gulches, near Princeton, are being reopened and worked by leasers.

Mariposa Electric and Power Company.—This company is to take water from the Merced River at McCabe's Flat, and carry it to a point where it will get 300 ft. fall to generate electricity, to be used on the mine of Capt. A. H. Ward, and perhaps at the Whitlock Mines. N. C. Ray, of Coulterville, is engineer of the company. Work on the flume is to start shortly.

NEVADA COUNTY.

(*From Our Special Correspondent.*)

Blue Tent.—The new ditch at Blue Tent, operated by C. L. Canfield, has been completed. A 20-stamp mill is to be started in the spring.

Champion.—This mine at Nevada City is making improvements at the Spanish 10-stamp mill.

Delhi.—This mine at Columbia Hill, near Nevada City, Aug. Kartschoke, superintendent, is to have chlorination works for working 4 tons of sulphurets daily. A new compressor plant is being put in with a capacity for 15 drills by the Compressed Air Company of San Francisco. Power will be supplied by a Peton wheel.

Franklin.—This mine, near Nevada City, is being put in order for starting up by Michael Hussey.

Gold Tunnel.—At this mine, near Nevada City, E. Lawrence, superintendent, arrangements have been made for a new hoisting rig.

Grass Valley Consolidated.—The shaft of this mine has now been freed of water by Superintendent Coffin.

Hampton & Gage.—Superintendent Bray of this mine, near Nevada City, has decided to sink a new shaft and a new hoist is to be erected.

Home.—At this mine, Nevada City, D. J. McFall, superintendent, the shaft is down 700 ft., and 30 stamps of the mill are kept busy.

Phil Curnow.—This mine at Columbia Hill, has been bonded by Samuel Jones, and work is to start at once.

PLACER COUNTY.

(*From Our Special Correspondent.*)

Bellevue.—From this mine, at Ophir, good rock is being milled from the late rich strike.

Black Canyon.—For this quartz mine, a 20-stamp mill that is being freighted from Washington is to be set up at the Black Canyon.

Cedar Creek.—This mine, near Blue Canyon, which has been idle the past 2 years, recently started up under bond to Tacoma, Wash., men. Repairs are now being made with 12 men at work under Superintendent Thos. A. Rodger.

Decker.—From this mine, near Auburn, G. L. Threlkel, superintendent, some good ore is being taken.

Shady Run.—At this mine, R. A. Watson, superintendent, a contract is to be let to run the lower tunnel 1000 ft. further.

SACRAMENTO COUNTY.

(*From Our Special Correspondent.*)

Perazzo.—Another mine will be shortly opened on the Perazzo ranch not far from Folsom.

Prosperity Gravel Mining Company.—This new company will begin mining at once on the P. C. Cohn ranch near the Grey Wing and Blue Ravine Mines at Folsom. The directors are J. H. Canard, E. B. Bullock, J. H. Whitmore, H. J. Piersol and J. K. Taylor. It will be a drift mining operation.

Teat's Flat Dredge.—The first carload of machinery for the new dredge has arrived at Natoma.

SAN DIEGO COUNTY.

(*From Our Special Correspondent.*)

Free Gold.—C. W. Pauly,, the receiver of this mine, at Hedges, is paying off the debts gradually from the proceeds of the mine. The disbursements for January were $23,284.

Iron Ore Locations.—Chas. A. Raber has located a deposit of iron ore near Potrero on the route of the proposed railroad between San Diego and Yuma. One of the claims was located years since as a copper mine and subsequently abandoned.

SHASTA COUNTY.

(*From Our Special Correspondent.*)

Bully Hill.—This company is working a full force of men at both mine and smelter.

McClure.—F. E. Ware has started 10 men at work on this copper property at Bully Hill.

Mount Shasta Gold Mines Company.—F. E. Ware, manager, has bonded 17 copper claims in the Flat Creek District. He also holds with C. D. Porter, a bond on the McClure group in Bully Hill District.

Mountain Copper Company.—It is reported that the fire which has been burning so long in this company's mine, at Fielding, has been extinguished. The burned workings will be retimbered at once.

Niagara.—This mine at French Gulch, formerly owned by the late Wm. T. Coleman, and since the property of Hollanders, has passed into control of Wm. T. St. Auburn, the former manager. The mine is to be reopened and some machinery has already been purchased. A new pumping and hoisting plant is to be obtained. The mine was formerly very productive.

Quartz Hill.—This mine, which has been some years idle, is to be reopened. A Polish company, of Chicago, owns the property. A. Kevasigood, the secretary, has been visiting the mine. The mill building was destroyed by fire about a year ago.

Summit.—This copper property in Backbone District is owned by M. E. Dittman and others of Redding and is being worked under bond by F. E. Ware.

Trinity Copper Company.—The rumor that the Bully Hill and Trinity Copper companies were to build a joint smelter at Kennett was incorrect. The Trinity Company will build its own smelter at Kennett. The power plant on the McCloud River is in course of construction and Austin H. Brown, general manager, says a railroad will be built up Pitt River to Bully Hill.

SIERRA COUNTY.

(*From Our Special Correspondent.*)

Balsam Flat.—A contract has been let to run a 1,000-ft. tunnel on this mine, near Alleghany.

Mabel Mertz.—A new tunnel is to be run on this mine, near Forest City, by Dr. F. M. Sponogle and other San Francisco men who hold the bond.

SISKIYOU COUNTY.

(*From Our Special Correspondent.*)

Blue Gravel.—This mine, near Yreka, is to be reopened by Cripple Creek, Colo., men, represented by J. C. Whipp. John Garvey, formerly foreman of the mine, is in charge. The mine has been closed down some time, but was formerly a producer.

Spangler Brothers.—This mine, at Humbug, A. Smith, superintendent, has again started up.

STANISLAUS COUNTY.

(*From Our Special Correspondent.*)

J. E. Doolittle, Alex. Brown and others have bonded land along the Tuolumne River, near La Grange, for six miles, and are boring to test the ground. The dredger to be built will cost $55,000. Thos. Donahue is manager.

TUOLUMNE COUNTY.

(*From Our Special Correspondent.*)

Dreisam.—It is reported that the old Yellow Jacket ledge has been struck in this mine at Carters. Victor Rosasco is superintendent.

Experimental Gulch.—At this mine, near Columbia, a good ledge carrying free gold has been found.

Garibaldi.—Operations at this Groveland mine are to be resumed under Superintendent Porter.

Maier.—This property consisting of 3 claims on the Tuolumne River has been bonded to H. M. Heath, of Boston.

Number Nine.—On this mine at Big Oak Flat, a crew of men is at work. C. Y. Delay has the claim under bond.

Star.—At this mine, near Columbia, the water is nearly all out.

TRINITY COUNTY.

(*From Our Special Correspondent.*)

La Grange.—The landslide which carried away the Sweepstakes ditch also injured the ditch of this company at Weaverville, and the property was temporarily closed down for repairs.

Sweepstakes.—A landslide recently carried away 800 ft. of the new ditch, causing great loss of water and considerable expense.

COLORADO.

CHAFFEE COUNTY.

(*From Our Special Correspondent.*)

Chance.—C. L. Arezon, John McConoghy and C. F. Rickey are reported as having purchased this mine at Whitehorne.

CLEAR CREEK COUNTY.

Silver Plume Board of Mines and Trade.—This association has been formed to call attention to the resources of the upper Clear Creek District, especially those of Silver Plume.

Wisconsin.—A rich strike of silver glance, ruby silver and gray copper is reported in this property, at Silver Plume. The mine after lying idle for years was recently taken under bond and lease by Higgins & Co., who have made some high-grade shipments.

(*From Our Special Correspondent.*)

Bertha Company.—This company on the line between Clear Creek and Gilpin Counties has opened several feet of pay ore in surface workings idle for over 20 years. Air drills are being worked on the company veins in the Newhouse Tunnel.

Central Tunnel.—Leyner drills have been put in. The power for the compressors is limited, owing to low water in Clear Creek. The tunnel is now being pushed to reach Bellevue Mountain and Virginia Canon.

Colorado Specie Payment Mining and Milling Company.—E. W. Williams, manager, says that the company has acquired the Champion Mine adjoining, and will operate the Champion plant of machinery by crosscutting 200 ft., at a depth of 1,000 ft., and opening the Specie Payment 500 ft. below the present workings. A tramway connects the Champion with the Donaldson Mill, which is to be almost rebuilt. The company is paying monthly dividends equal to 6 per cent per annum on the capital stock of $650,000.

Consolidated Alpine Company.—A new plant of machinery is installed, and sinking is to begin. In the surface workings some rich ore has been opened. The mine adjoins the Lamartine.

Gem Extension.—Options to Eastern men have been given by Mr. Renshaw. W. E. Renshaw is now East to close the deal. A plan for the consolidation of this with other claims is contemplated.

Little Mattie Mining and Milling Company.—The company in running the adit level on the Republic vein at Idaho Springs, has opened 5 ft. of pay ore. About 12 in. runs $100 per ton; the balance is mill ore. The company is also working the Newton and Silver Glance Mines, and will connect all the workings. The properties have a good record with over $3,000,000 output. The mill is being rebuilt on modern methods. The company has thousands of tons of mill ore in the stopes for treatment.

Mendota Mill.—This mill was erected 2 years ago by F. A. Maxwell, to treat ores from the Mendota Mine, but has never been worked. The owners of the Medota Mine have purchased the mill, and will run it on the low grade lead ores from the mine.

Memphis & Idaho Springs Mining and Milling Company.—A new plant of machinery has been installed, and sinking is under way.

Quito.—This Idaho Springs property is under option, and sinking has started. At 100 ft. below the adit level 2 ft. of ore running 4 oz. gold was opened.

Sun & Moon Mining and Milling Company.—This company is now working 120 men in development work in the shaft levels and in the Newhouse Tunnel. As soon as the drift in the Newhouse Tunnel has been driven 600 ft., a raise will be started to connect with the surface workings. About 1,200 tons of mineral will be moved for March.

Yankee Consolidated.—H. I. Seemann the owner, reports cutting a vein showing 4 ft. of ore. Machinery is to go in at the Manhattan Tunnel by April 1.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

Mining Transfers.—F. L. Fake to A. Simmons et al., the Continental lode and mill site, Illinois Central District; F. E. Norton to Mrs. J. W. Koons, half interest in Norton and Gordon lodes, Independent District; Calvin W. Little to the Pine Tree Mining Company, the Daisy and Pine Tree lodes, Pleasant Valley District; C. M. Krueger to the Golden Orion Mining Company, the Orion, Sunset and Helen Gould lodes, Lake District; E. Pulham et al., to Bruce M. Myers, the Continental lode and mill site, Illinois Central District.

New Stamp Mills.—St. Louis, Mo., and New York parties are figuring on a rapid drop 10-stamp mill, to be erected in Moon Gulch to treat ores from a property in which they are interested, and at Perigo, Kan., men who are interested in the Penobscot are contemplating the erection of a slow drop 25-stamp mill. It is expected, too, that a small cyanide plant will be put up in Gamble Gulch to treat some of the Perigo ores. The Stewart Gold Mining Company is going to erect a slow drop 25-stamp mill at Stewart Gulch this summer; James A. Gilmour, Central City, Col., is manager for the company. The Helen Gould Mining and Milling Company, running a big tunnel enterprise at Pine Creek, is getting estimates and plans for a 25-stmp mill, which is to be erected in the gulch below Colorado Hill. J. C. Heinz, 50 Arapahoe Building, Denver, is secretary and treasurer of the company.

Boston & Denver Consolidated Mining and Milling Company.—It is believed that the consolidation of the big group of mines in Gregory District will be effected this month, and that heavy developments will follow inside of thirty days. The intention of the company is to sink the Cook shaft 300 ft. deeper to connect with the 1,200 ft. workings of the Fisk and Gregory properties, and to do a considerable amount of development. It means that employment will follow for a large number of miners and a big output will ensue. The big mill is being thoroughly overhauled, and it is reported that M. P. Dalton, now of Denver, will be manager.

Cashier Gold Mining and Reduction Company.—A rich strike has been made in sinking the shaft. At 470 ft. assays 219 ozs. gold, 55 ozs. silver and 9 7-10 per cent copper, or a value of $4,421 per ton. Smelting ore shipments have been running from $75 to as high as $188 per ton, and the property is making an enviable record. B. L. Campbell, Central City, is superintendent.

Little Jemima.—Denver parties have taken a lease and bond on this property in Gregory District, and are preparing to install a gasoline plant and carry on active developments. W. Benelack, Jr., Central City, is in charge.

HINSDALE COUNTY.

(*From Our Special Correspondent.*)

Golden Fleece.—The upraise from the tunnel has made connection with the old surface workings. The work of opening the newly exposed ore bodies will be pressed.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

A. Y. & Minnie.—A late shipment of 200 tons zinc-lead ore to the A. M. W. Mill is being run over the tables in order to ascertain what grade of concentrates can be obtained.

Black Prince.—A fair vein of ore was encountered while sinking the shaft, none of which assays less than 1 oz. of gold.

Breece Hill.—Under present conditions siliceous ore running 8-10 oz. in gold can not be mined on account of the treatment charges of $9 per ton by the American Smelting and Refining smelters.

California Gulch.—A considerable tonnage of iron and carbonate ore is being shipped from the Rock, Stone and Dome properties.

Gold Basin.—A vein of rich gold-copper ore recently exposed is producing some splendid values. The shaft is now down 318 ft. and drifting has begun to cut the vein.

Leadville Home Mining Company.—A steady tonnage of 250 tons of iron is taken out daily, the Penrose shaft furnishing the main supply.

P. O. S. of A.—Operations are progressing rapidly at the 2 levels, one at 600 ft. and the other 540 ft. and the ore is reported running an average 18 oz. silver.

Searl Placer.—By a decision of the supreme court, this placer, in litigation for 20 years, will now go to patent. The decision is of great importance as it clearly establishes, as a principle, that there can be no valid location of lode claims discovered by a trespass on a valid placer location.

South Winnie.—Another vein of high grade ore places this property as one of the best small mines in the gold belt.

White Cap.—A 7-ft. vein of a good grade of sulphide has been opened in the bottom level.

Yak Tunnel.—At a recent meeting of the directors of the Ibex Mining Company the feasibility of extending the Yak tunnel to the property was discussed and is now being considered. To reach the Ibex ground the tunnel would have to be driven another 500 ft., but the large reserves of low grade ore could be handled much cheaper.

LARIMER COUNTY.

Wolverine.—This copper property is the most important mine at Pearl. The ore is hauled on wagons 30 miles to the Grand Encampment, Wyo., smelter. The Wolverine was discovered by George Elmes, formerly of Fort Collins, who sold it to a Pennsylvania company for $15,000. It is expected that the Laramie & Hahn's Peak Railway Company will construct a branch line from Collins, Wyo., to North Park, following the North Black River. It will pass within 15 miles of Pearl, reducing the hauling distance one-half.

MINERAL COUNTY.

(*From Our Special Correspondent.*)

Del Monte Leasing Company.—The long delayed settlement of claims between the New York Chance and the Del Monte Mines at Creede has been arranged, and this company will direct future development. The relations between the Humphrey and the Wooster tunnel and mill are likely to be strengthened. The ground set free for exploration is said to be of great richness.

PITKIN COUNTY.

Aspen Mining and Milling Company.—Julia F. Mackey of Denver has brought suit at New York in the United States Circuit Court against the company, and Robert S. Holt of New York city, asking for an examination of Holt and the officers of the company in connection with the bankruptcy proceeding of Jerome B. Wheeler last July. The chief accusations are that Wheeler persuaded the company to deposit with his banking company in Aspen, speculated with the bank's funds and ruined it, and then settled with the Aspen Mining Company, by transferring to it a lot of worthless property and accounts.

SAGUACHE COUNTY.

(*From Our Special Correspondent.*)

Home Mining Company.—Citizens of Sagauche have organized this company for the development of the Dixie, Gold Dollar and Crystal mining claims. The directors for the first year are Thomas Noland, James Slane, Harry Tarbell, Eugene Williams, W. A. McIntyre and George H. Davis.

SAN MIGUEL COUNTY.

Alta Mill.—This mill, in Alta Basin, near Telluride, is treating iron-lead sulphide ore from the Alta carrying silver, gold, lead and copper, averaging $7 per ton. The mill makes a saving of 76 per cent. From crushers, rolls and screens the material goes to Bartlett tables not coarser than 12 mesh. The table tailings pass over Bartlett slime tables. The concentrate product runs about 3 per cent copper, ½ oz. gold, 39 oz. silver, 12 per cent lead, 26 per cent iron and 12 per cent silica, the concentration being 5½ to 1.

SUMMIT COUNTY.

(*From Our Special Correspondent.*)

Puzzler Mining Company.—James F. Callbrath, Jr., and H. B. Achten, of this company, of Breckenbridge, have purchased the West Side concentrating mill. It is proposed to increase its capacity and use it in connection with the Puzzler properties.

TELLER COUNTY—CRIPPLE CREEK.

(*From Our Special Correspondent.*)

Elkton Consolidated Gold Mining Company.—A foundation for 2 280 h. p. boilers is being laid. It is expected that they will be completed by April 1. There will then be a battery of 1,680 h. p.. Sinking is progressing to the 900 ft. point, and will probably continue to the 1,000 ft. point, before any new drifting is done. It is understood that 2 new pumps are being built, each to have a capacity of 1,000 gal. a minute to a height of 800 ft. A good output is being maintained. The company recently declared its annual quarterly dividend of 4c. per share.

Findley Gold Mining Company.—At the annual meeting of the stockholders the following directors were elected: J. H. Hobbs, J. H. Tucker, G. R. Buckman, J. J. Key, W. K. Dudley, F. L. Ballard and E. A. Richards. The report of the treasurer shows the company to be in a better condition than it was a year ago. All litigation has been stopped by the purchase of the Mountain Beauty faction. A new plant of machinery has also been bought. The shaft is at present about 900 ft. deep and it is the intention to sink 100 ft. Mr. Hobbs was elected president and treasurer and Mr. Key vice-president and secretary.

Golden Cycle Company.—President Milliken's report shows the company to be in a fairly good condition. The output from the mine during the year was 19,583 tons which yielded the company an average of $10.05 a ton, after paying freight and treatment charges. During November and December, however, the average value of the ore was somewhat higher. During the early part of the year the ore was of very low grade and did no more than pay the expenses. During the summer a fire burned up the equipment and injured the shaft considerably, and it was necessary for the directors to incur an indebtedness of about $30,000 to complete the new equipment. A better grade of the ore during the last of the year enabled the company to get out of debt and establish a small treasury reserve. On January 1, 1902, there was $7,588 in the treasury. The gross value of the ore during the year amounted to $529,612, which gave about $50,000 net profit. The officers and directors of the company are as follows: President, J. T. Milliken; vice-president, G. E. Ross-Lewin; secretary and treasurer, L. E. Hill; general manager, F. J. Campbell. F. L. Ballard is also a director. Mr. Holman will continue as superintendent.

Lilly Gold Mining Company.—The upper workings are being leased by Thomas Fitzgerald and is making a fair return. The property is owned by an English Company, who got out a large amount of ore several years ago, but the shoot dipped out of their ground at not a very great depth. The shaft was then sunk to 1,500 ft., but no new ore shoots were encountered. Of late the property has only been worked by lessees. The property is on Bull Hill, joining the Vindicator Mine.

Stratton's Independence, Limited.—The output during February was 8,500 tons of an average value of $25 a ton. It is understood that a large pumping plant is being installed at the 1,400 ft. level. Developments are watched with interest, as the discovery of ore on the lower levels will mean much to the district.

Taylor & Brunton Sampler Company.—This company is erecting a new sampler close to the Y on the Midland Terminal Railway on Bull Hill which can be reached from all 3 roads in the district. At present

the company is operating a sampler on Battle Mountain, beyond the Portland Mine. The company also has sampling works at Aspen, Salt Lake and other places.

WELD COUNTY.

(From Our Special Correspondent.)

New Colorado Coal Company.—This company has completed putting in electric machines at the Tynon Mine at Erie. The machines are of a new pattern of the pick type. This is the first attempt in the Northern District to operate electric machines on less than a 6-ft. vein. The Tynon vein is from 3 to 4 ft. thick. All the buildings about the mine and the pit itself are lighted by electricity.

IDAHO.

CUSTER COUNTY.

(From Our Special Correspondent.)

Hartford Company.—This company is operating the Yankee Fork group at Estes Mountain, and has just shipped a car-load of concentrates to the South Omaha smelters, which returned $4,400. The company has another car-load of like mineral on the way to the smelter.

Lucky Boy.—This mine and mill at Custer has been in operation all winter with a full force of 75 men. The cyanide plant is giving higher results than ever before.

Riverview.—A body of high-grade lead-silver ore, 40 ft. wide, has been cut in this mine at Bayhorse, owned by O. J. Salisbury, of Salt Lake, Utah. The mine was a heavy producer formerly, but has been idle for several years. Recent development is due to the approach of the Oregon Short Line's New Salmon River Branch Railway.

Thunder Mountain.—The Dewey Mine, in this new district of Central Idaho, has been running its 10-stamp mill steadily since January 5 on the great body of gold-bearing rhyolite breccia; the company employs 38 men and the returns from the mill reported better than anticipated. Several other rich strikes are reported from Thunder Mountain.

White Knob Copper Company.—This company is making rapid progress on the 600-ton smelter; all the heavy parts of the machinery are in, and the plant is expected to be ready by May 1. The grade for the new electric tramway is completed. It is 10 miles long and has an average grade of 3 per cent. The company has received 2 powerful electric locomotives, also a Shay steam engine, which is used for laying track.

LEMHI COUNTY.

(From Our Special Correspondent.)

Dark Horse.—This mine, on the Continental Divide, near the head of Pratt Creek, shipped 2 carloads of sorted ore during January to the Butte smelters that sampled $90 per ton in gold and copper. The vein is 6 ft. wide; it is best exposed on the Montana side, but extends over the divide into Idaho. It is a new discovery and was only located last fall, but is making a very handsome showing for the amount of work done. The company employs 10 men.

Oro Cache.—This mine is working 15 men. It is equipped with a 10-stamp mill and treats $5 ore at a total cost of $2 per ton for mining and milling. A small shipment of bullion is made twice a month. Dan Kane, of Salmon City, is manager, and J. J. Cone, of Canyon City, Colo., is owner.

Pollard Coal Mine.—This property was recently bonded to New York men for $70,000. It has improved very rapidly on recent development, and has been selling about $1,200 worth of fuel monthly to the local market for several months.

SHOSHONE COUNTY.

Alder Creek Gold Mining Company.—At a recent meeting of the stockholders at Moscow, the following officers were elected: President, D. T. Denton, of Duluth, Minn.; vice president, Newton F. Hibbs, of Lewiston; secretary, J. H. Grannis, Duluth; treasurer, J. H. Vivian, Duluth. The company owns 640 acres of rich placer ground at the junction of Reed and Alder creeks, north of Pierce City, on which men have been at work throughout the winter. More than 400 rods of ditch have been dug and the company expects to have a little giant at work by April 1.

Crown Prince.—Suit to quiet title to this claim, in Yreka District, is before the United States District Court at Moscow, the title of the case being Coeur d'Alene Development Company vs. Patrick Flynn and James F. McCarthy, as administrator of the estate of Frank Ganahl, deceased. The petitioner, the Coeur d'Alene Development Company, is a Portland (Ore.) corporation, organized about 2 years ago by Frederick Burbidge, formerly connected with the Bunker Hill Company, and it is developing a group of claims in the Coeur d'Alene country.

King.—The litigation over this location between the Bunker Hill & Sullivan and Empire State-Idaho companies has been decided in favor of the latter company by the United States Circuit Court of Appeals at San Francisco. The fight originated through the location of the Viola and the San Carlos claims, the main ledge at Wardner. The south side-line of one claim and the north side-line of the other lie on the ledge, which is very wide. The 2 claims are owned by the Empire State-Idaho Company and are patented. At the east end, in a little vacant ground, formed by the angle of the end lines, the King claim was staked. It is a triangle, and its total surface is less than an acre. It is so located that if the side abutting the San Carlos and the Viola be considered end lines, it might cover an enormous quantity of ore at depth in the Likely and Skookum claims, through extralateral rights. The Bunker Hill & Sullivan, owning the King, claimed the ore and brought suit against the Empire State-Idaho, owning the Skookum and Likely.

The Bunker Hill & Sullivan demands $200,000 for ore already extracted, and got an injunction preventing the Empire State-Idaho from working the disputed ground. When the case came to trial before Judge Beatty, he decided in favor of the Bunker Hill & Sullivan. An appeal was taken to the Circuit Court of Appeals at San Francisco, and its decision reverses Judge Beatty and orders the case thrown out of court. It is expected that the Bunker Hill & Sullivan will make application for a writ of certiorari before the Supreme Court of the United States.

Ruth.—Oscar Wallace, of Wallace, is opening this claim in the Nine-Mile District. A tunnel is in 165 ft.

ILLINOIS.

Coal Miners' and Operators' Convention.—The coal operators and miners have been in state convention at Peoria, Ill., for 2 weeks, and are practically at a deadlock. There are many points of difference. The operators seem to feel that they have been badly imposed upon during the past year by an alleged failure of the miners to keep their side of the agreement.

KENTUCKY.

WHITLEY COUNTY.

Buck—This company, capitalized at $600,000, has been organized at Louisville, and will shortly begin active operations on the tract of 8,600 acres it owns. This new organization means the reorganization of the old Whitley Company, which operated near Halsey. The promoters are: Lutellus Smith, of Chicago, president; T. Lyon White, of Jellico, Tenn., vice-president; James M. Fetter, Louisville, secretary-treasurer, and B. R. Hutchcraft, Lexington, general manager.

MARYLAND.

Coal Miners' Wages.—The scale committee of the Miners' Convention of District No. 16, comprising mines in the Meyersdale and Georges Creek region, has adopted a scale for the year ending April 1, 1903. The scale fixes the price of pick mining for 5 ft. and over at 55c. a ton; less than 5 ft., 60c.; machine loading, 5 ft. and over, 35c.; under 5 ft., 33 5-9c; for other than miners, 9 hours constitute a day's work, the wages per day being as follows: Drivers, $2.15; trackmen, $2.45; inside labor, $2.10; dampsmen, $2; blacksmiths, $2.50; carpenters, $2.50; outside labor not specified in the scale, $1.90; chain machine runners, $2.65; runners of punchers, $3.00; scrapers, $2.50; motormen, $2.50; trip riders, $2.25; trolley boys, $1.25; trappers, $1; stationary engineers, $3; inside firemen, $2.10; outside firemen, $2.

The scale committee has asked the operators to express an opinion not later than March 20. The price per ton is the same as the present working scale, but the mine laborers and drivers have been advanced about 9 per cent.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(From Our Special Correspondent.)

Atlantic.—The February output was 275 1-5 tons of mineral.

Calumet & Hecla.—A large part of the equipment for the hoisting engine houses at the amygdaloid shafts has arrived.

Champion.—This company recently purchased 160 acres of timber land in this county from H. Dittler, of Hancock, Mich. The company has shipped 100 tons of copper from the Quincy Smelter. The mine is maintaining a uniform output of 250 tons of rock per day, and little change will be noted until the third Baltic head goes into commission.

Franklin.—The Junior branch is closed as a result of the miners going out on a strike. The miners have been employed on company account, but March 1 the management announced that all men would be employed on the contract system. Nearly 375 men are out, but no serious trouble is anticipated, unless the company attempts to substitute outside men. Two heads at the mill have ceased stamping, owing to lack of rock, and the output this month will be curtailed. The February output was 329 tons of mineral. At the old mine 25 air drills are in use. William Phillips, formerly of Ducktown, Tenn., has been appointed master machinist of the mine.

Tamarack.—No. 2 shaft is producing on a reduced scale owing to a cave in the shaft. During February the shaft was idle 2 days, the rock going to No. 1. Albert Butler, formerly at the Franklin, has been appointed master machinist.

Trimountain.—This property was recently inspected by President Fay. During February 23,000 tons of rock were treated at the head leased at the Arcadian Mill, and about 525 tons of mineral secured.

Wolverine.—Most of the rock is coming from Nos. 3 and 4 shafts. A cross-cut, starting from the 11th level north of No. 3 shaft, has been extended east 800 ft., and several lodes tapped. Underground work is pushed, as the new mill goes into commission within 2 months, and an increased output will be required. No. 3 shaft is sinking to the 23d level, and No. 4 to the 18th. The openings are being extended about 700-ft. per month.

COPPER—KEWEENAW COUNTY.

(From Our Special Correspondent.)

Allouez.—The old workings on the ashbed lode are being unwatered.

COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

Thirty-five barrels of heavy copper taken out under the Leopold option, have been refined at the Quincy smelters for the owners of the mine.

Adventure.—The new steel rock house at No. 3 shaft, being erected by the American Bridge Company, is well advanced. Most of the framework is up and ready to enclose. The building will cost about $30,000.

Belt.—The option on this property secured by W. A. Dunn has been turned over to a syndicate, including Capt. Dunn, Pickands, Mather & Company, of Cleveland, and Chicago men.

MINNESOTA.

IRON—MESABI RANGE.

(From Our Special Correspondent.)

A drill has been taken in to the state land of section 16-59-17, which lies 4 miles north of Virginia, where the explorers think they have indications of iron.

Drills have been started in section 22-58-19, in section 34 and 11, same town. There is as much work under way in this township at present as in any part of the range, and much is hoped for from it in the coming season.

Negotiations are under way for a sale of the entire holdings of the Mesaba Central Land and Exploration Company at about 300 per cent on the stock, which aggregates some $70,000. The company owns a mine or two and a considerable acreage of outside lands, part of which is fairly well located.

The Venus Gold Mining Co., with a capitalization of $500,000 divided into 500,000 shares of the par value of $1 each has filed articles of incorporation with the County Clerk. The officers are: J. F. Hittle, president; W. L. Scott, vice-president; C. T. Candish, recretary and treasurer. The company owns the Goodwin Pioneer and Volunteer lode mining claims.

The Duluth & Iron Range is building a number of water tanks and coal bins along its main line south of Allen Junction, the plan being to station pusher engines along the road at grades in order that ore trains of the largest possible size may be hauled. Experiments made last year prove that with the assistance of pushers at grades trains of 2,500 tons of revenue load might be hauled from mines to Lake Superior. If the amount of ore scheduled to be hauled from the Minnesota ranges is actually carried to the lake all the roads will require the utmost assistance to maintain their tonnages.

Genoa Iron Company.—This company has the largest stock pile it has ever had at this time of year, and shipments are expected to eclipse any preceding year. Genoa is a remarkably nice ore.

Republic Iron and Steel Company.—This company has filed the papers transferring to it the Grochau and Mesaba Central Company land in 14-58-19, bought some months ago under an examination. There are some 7,000,000 tons of ore in the purchase, part fee and part lease.

Sparta Iron Company.—This company is stripping for a larger output than ever. It is expected that the 2 mines of the Sparta and Malta Iron companies will make an output of from 400,000 to 500,000 tons.

IRON—VERMILION RANGE.

(From Our Special Correspondent.)

A final mandate from the U. S. Supreme Court, in the matter of the Eaton & Merritt lands in section 30-63-11, has been handed down and the state courts are charged with carrying out the provisions of the decree. The petition for a rehearing was disregarded by the Supreme Court. The Eaton & Merritt holdings now are settled as the lots 1 and 2, lots 3, 5 and 6, the sw. of the ne., the se. of the nw., the nw. of the se., in all about 320 acres. It is probable that the first work to be done in exploring the lands will be upon the latter named forty, which is called the "Hyde forty." It is understood that many offers

to lease the lands have been made, one of them running to a royalty of 50c. a ton, and another with a slightly less royalty, a minimum of 300,000 tons and a cash bonus of $500,000.

MISSOURI.

JASPER COUNTY.

(From Our Special Correspondent.)

Joplin Ore Market.—The past week was one of unusual activity. The weather permitted mining operations to be carried on to the limit, and the production of both ores was heavy. The price remained unchanged on top grade zinc ore but lower grades advanced steadily. Several contracts for the next week's production were made, and the price made for the coming week is the same as that paid during the last 2 days of the past week. It appears that the severe winter weather just passed has reduced the stock of ore which the smelters usually carry, and the demand for zinc ore will probably continue good for some weeks.

Many new strikes have been reported during the past week, especially in Dade, Christian and Ralls Counties, where zinc ore is being found in considerable quantities. Some deeper levels are being prospected in the immediate Joplin vicinity, and every indication points to a very large production during the coming summer.

The highest price paid for zinc ore during the week was $31.50 per ton. This price was paid during the preceding week, but the lower grades were advanced from 50c. to $2 per ton during the past week. Lead ore brought $21.75 per 1,000 lbs., delivered, as during the past two months.

During the corresponding week of last year zinc ore's top price was $27.50 per ton, and lead ore brought $23 per 1,000 lbs., delivered. Following is the turn-in by camps of the Joplin District for week ending March 6:

	Zinc lbs.	Lead lbs.	Value.
Joplin	2,917,330	525,040	$58,485
Galena-Empire	1,125,840	168,370	17,263
Carterville	1,799,170	383,580	31,732
Aurora	994,770	35,810	12,305
Oronogo	782,770	980	11,138
Webb City	596,050	25,440	8,302
Carl Junction	260,350	.....	3,645
Neck City, Alba	432,700	.....	6,491
Granby	249,000	71,000	3,689
Spurgeon	238,270	58,590	4,661
Zincite	352,220	9,680	5,217
Duenweg	258,250	102,980	5,985
Central City	185,010	6,720	2,360
Cave Springs	252,460	9,660	3,734
Sherwood	174,750	.....	2,447
Stotts City	108,160	.....	1,568
Roaring Springs	106,570	.....	1,172
Carthage	63,070	.....	987
Peoria	.....	42,580	926
Total	10,940,940	1,500,430	$180,504
Total, 10 weeks	101,242,200	11,917,430	$1,627,577

Zinc value for week.. $147,801; lead $32,703;
Zinc value, 10 weeks.$1,371,631; lead .....$253,94 .

MONTANA.

CASCADE COUNTY.

Boston & Montana Smelter.—It is stated that this plant's refinery at Great Falls, recently produced over 90,000 lbs. of ingot copper.

(From Our Special Correspondent.)

It is said that the old silver smelter belonging to the American Smelting and Refining Company at Great Falls is to be remodeled and placed in operation. The purchase of the Great Falls & Canada Railroad by the Great Northern System and changing its gauge to standard will enable, it is thought, the silver smelter to draw largely on Canada and British Columbia for a supply of ore.

LEWIS & CLARKE COUNTY.

Columbia, Winthrop and Railsback.—A bond and lease on these claims in Seven-Up Pete District has been given to John Longmaid. The property is well developed by a 300-ft. shaft and 1,000 ft. of levels, and is said to show a vein of quartz from 4 to 7 ft. wide running from $6 to $7 in gold. The ore is too low grade to ship to the smelter. There is a wagon haul of 26 miles to the railroad, and the distance to the smelter is, altogether, 60 miles. The ore contains some black tellurides. The property is owned by a number of people, T. C. Power being the largest holder.

JEFFERSON COUNTY.

(From Our Special Correspondent.)

Eva May.—The Montana Mineral Land Development Company, operating this property, recently made an assignment to its former superintendent, Geo. B. Drakenfield, who has filed with the Circuit Court at Boulder a statement of assets of the company and amount of indebtedness. Four mining claims owned by the company are listed at $25,000, the concentrator, mine machinery and surface improvements are listed at $28,834. Other mining property, water rights and a lot in the City of Helena are listed at $1,601. A claim against the First National Bank of Helena for $2,000 is valued at $250.

The list of creditors is as follows: First National Bank, of Butte, cash advanced, $3,824; Holter Hardware Company, $231; Anaconda Copper Mining Company, $1,947; Graves Mercantile Company, $113; D. Driscoll & Co., Basin, $5,527; California Powder Company, $572; Mitchell & Turner, Butte, $2,207; J. H. Baskier, Basin, $534. For labor performed during the last two months the mine was operated, 42 claimants, $4.762. The largest creditor is Geo. R. Best, of Milwaukee, president of the company, who has claims for money advanced on his own account and for assigned claims made to him amounting to $31,209. A movement is under way to raise money to pay off the indebtedness and resume work. The mine is developed 600 ft., and has recently been equipped with new hoisting machinery.

SILVER BOW COUNTY.

Amalgamated Copper Company.—Demurrers interposed by the company to the actions brought against it and the Boston & Montana Consolidated Copper and Silver Mining Company of Montana, and the company of the same name of New York State by James A. Forrester and John MacGuinness, have been sustained by Justice Beach of the Supreme Court of New York. The complaints charged that assets were unlawfully transferred by the Montana Company to the New York Company and it was asked that a receiver be appointed to take charge of these assets in an accounting for the benefit of the stockholders of the Montana Company, including the plaintiffs. It was alleged that the Amalgamated Copper Company was receiving dividends of the other companies. Justice Beach held that no cause of action is presented against the Amalgamated Copper Company in the Forrester case, saying that the mere receipt of regularly declared dividends, which may in part have come from other sources, results in non liability.

Minnie Healey.—For a second time the Montana Supreme Court has issued a writ of mandate commanding Judge E. W. Harney to pass upon the motion for a new trial which he has had under advisement nearly 50 days in the Minnie Healey Mine case, or show cause to the Supreme Court why he had not done so. The first writ was dismissed because there was not sufficient evidence that the Judge's time was not taken up with other matters.

Ophir.—The water in the shaft is down two hundred feet. The New Ophir Mining Company, who holds the lease and bond on the property, is composed of Chicago people, with Arthur B. Clark, of Butte, as superintendent.

(From Our Special Correspondent.)

Mining Conditions.—An improved condition is manifest in the copper situation. The smelter at Great Falls has increased its tonnage until all departments are busy; it is thought that all departments of the new Washoe works will be in operation during April. Mr. Heinze has the making of great producers in his 2 recently acquired properties. The Minnie Healey is producing 300 tons daily of first class ore. The Cora has large piles of ore on the surface.

Clark Properties.—The sale of the Colusa-Parrot property to the Anaconda Company, leaves Sen. Clark with the Original and West and East Stewart Mines to furnish ore for the Butte Reduction Works. These properties have been furnishing sufficient ore to keep the smelter going to capacity without the aid of the Colusa-Parrot for some months, the latter mine having had the "Blue Vein" tied up by injunction suits, and as that was the vein that furnished the ore, Sen. Clark has ordered extensive improvements to be made at both the Original and West Stewart properties; sinking of the main shafts is being pushed. New hoisting engines have been ordered for each, to be built by the Nordberg Manufacturing Company of Milwaukee. These engines will be first motion hoists, with cylinders 32 in. by 72 in., with double drums, each drum capable of winding 3,000 ft. of 1½ in. round rope. The plans for the new copper smelter contemplated for Sen. Clark are about finished, though the location will not be determined until the return of the Senator from Washington. Several sites are under consideration. It is understood that the plans contemplate a wire mill.

As this latter product will naturally seek the Pacific Coast and Oriental trade, that, coupled with certain inducements made for the transportation of crude ore, may induce favorable consideration of a location west of Butte. The crowded condition, lack of dumping ground, and the serious shortage of water, all tend to make the building of the new plant at some point outside of Butte imperative.

NEVADA.

ELKO COUNTY.

Dexter-Tuscarora.—The final clean-up from the Dexter-Tuscarora for February consisted of gold bullion valued at $4,500 and cyanides worth $1,600. About the middle of February $1,800 worth of bullion was shipped, so the total for the month amounts to about $7,900.

LINCOLN COUNTY.

(From Our Special Correspondent.)

De La Mar.—This mine, at Stockton Hill, is reported mining better ore.

Mineral Park.—There is a cessation of work in the turquoise mines of this camp, but work on the silver mines has increased. The Katie, Paymaster, Home Pastime and other claims have good shipping ores.

Searchlight.—This mine on the north side of the Colorado River is to have its workings lit by electric lights.

NEW MEXICO.

SOCORRO COUNTY.

Silver Bar Mining Company.—This company is working the Cooney Mine at Cooney. The main shaft is down 400 ft. and the main tunnel is in 900 ft. About 30 men are employed in the mine and concentrator under H. C. McCreery, general manager. The mill is shipping 50 to 75 tons of concentrates, said to run 50 per cent. copper, a few ounces silver and some gold monthly to the Silver City Smelter. The company is composed of Cripple Creek, Colo., men.

NORTH CAROLINA.

GRANVILLE COUNTY.

(From an Occasional Correspondent.)

Virgilina District.—It is stated that construction will soon be started on the railroad to run from Virgilina north to the High Hill Mine. This will be of great benefit to abutting property owners and afford cheap transportation. It is the intention to erect a smelter in the district, probably in the Hyco River when the road is completed.

Chapel Hill.—This property has recently been sold to Buffalo, N. Y., men.

Halloway.—The product of this mine has lately been very much reduced. All the ore goes to Norfolk, Va., where the company operates a smelter. The shaft is 400 ft. deep.

Person Consolidated Mining Company.—This company has let a contract for lumber for the new plant, which is going up rapidly. Development work is being pushed under the management of L. N. White.

Virginia Copper Company.—This company is extracting about 35 tons of ore per day from its No. 3 shaft which, with about 15 tons of screenings accumulated during development work, are being treated in the concentrator. The ore goes from the mine to the mill by an incline tramroad. It is crushed in a Blake crusher, falling onto a pickling belt where the water which has been turned into it on the crusher apron is drained off and the clean ore passes the pickers, who pick 2 classes. From the belt the fines are screened out and jigged.

Wall.—It is stated that this mine has been sold for $25,000 to New York people. The report, however, lacks confirmation. There is a shaft 150 ft. deep with about 200 ft. of drifts in the vein. The ore is bornite in a quartz gangue.

OREGON.

GRANT COUNTY.

Badger.—It is reported that this mine at Susanville has been taken under bond by F. W. Bradley of the Bunker Hill & Sullivan Company of Wardner, Idaho; most of the stock of the company owning the property is held in San Francisco.

PENNSYLVANIA.

ANTHRACITE COAL.

H. O. Prytherch, mine inspector of the Second Anthracite District, in his report for 1901 states that the total production for the year was 8,674,000 tons, of which is 2,244,048 more tons than during 1900. The number of accidents was 249, of which 63 were fatal.

Mine Inspector McDonald, of the Third Anthracite District, that about Pittston, has completed his annual report. The total production for 1901 was 6,925,598 tons. The largest producer was the Pennsylvania Company, 1,674,490 tons. The Lehigh Valley Company produced 1,420,477 tons. The average number of days worked in the district was 170¾. The total number of fatal accidents was 84, and the total number of non-fatal accidents was 173. The total number of men employed was 17,654. The total shipments by rail were 6,315,420, while 137,965 were used for local trade, and 472,212 for steam purposes about the mines. Falls of roof and coal as usual were the most frequent cause of accidents, resulting in 39 fatalities. Of the men killed, 31 were Poles, 18 Americans, 6 Slavs, and 7 Italians.

Inspector E. E. Reynolds, of the Fourth Anthracite District, comprising Wilkes-Barre and the mines in the Valley to Mocanqua, has finished his report for 1901. The report shows that the production is the largest in the history of the district. The actual figure is 9,669,516 tons, an increase over the previous year of 1,083,775 tons.

William H. Davies, of Tamaqua, inspector of mines in the Fifth Anthracite District, which includes the Panther Creek Valley, has forwarded his annual report to the Bureau of Mines and Mining at Harrisburg. The total production for the year was 6,374,939 tons, an increase of 204,155 tons over the previous year.

John McGuire, inspector of the Eighth Anthracite District, that about Pottsville, has completed his report for 1901. Total production of coal for the year was 5,172,530 tons, or 898,002 tons more than in 1900, and was the largest on record. The number of fatal accidents during the year was 35.

Preston No. 3.—Plans are about completed for sinking a water shaft at this colliery at Girardville. The opening will be made west of the breaker, whence a tunnel will be driven through the veins.

Royal Oak.—This colliery, at Shamokin, employing 300 men and boys, has passed into the control of the Philadelphia & Reading Coal and Iron Company. The plant until recently was operated by a company composed of Scranton and Wilkesbarre men.

Temple Iron Company.—About 50 men are at work on the excavations for the new breaker which is to replace the Northwest Breaker at Carbondale, destroyed by fire several weeks ago. The new breaker is to have a capacity of 2,000 tons per day, which is somewhat larger than the old colliery. The cars will be hauled up the plane to the head of the breaker by an endless rope and emptied by an automatic arrangement.

BITUMINOUS COAL.

Catsburg.—Five men were killed and several burned by an explosion of gas at this mine, near Monongahela, on March 5. Through the carelessness of a miner a fire had started in one of the entries several days before. This entry had been closed to smother the fire. The victims of the explosion were members of a party that was to ascertain if the fire was actually out.

UTAH.

BEAVER COUNTY.

(From Our Special Correspondent.)

Frisco Shipments.—The week's showing at the sampler at Salt Lake City, was 4 cars from Horn Silver.

JUAB COUNTY.

(From Our Special Correspondent.)

Tintic Shipments.—Mayday, 2 cars; Scranton, 4 cars; Star Consolidated, 3 cars ore; Ajax, 2 cars; Mammoth, 2 cars concentrates, 4 cars ore; Uncle Sam, 5 cars ore; Lower Mammoth, 2 cars ore; Victor, 5 cars ore; Yankee Consolidated, 6 cars ore; Bullion-Beck, 3 cars ore.

SALT LAKE COUNTY.

Bingham Consolidated Company.—Contracts have been awarded for material with which to increase the size of the converter building one-third. The works have been practically closed a few days to permit cleaning the flue of the accumulated dust. It is a year since it was last cleaned out, and the 1,000 tons or more of accumulated material is being removed and run through the briquetting machines. At the Bingham mines the electric tramway has been completed and 100 tons or more of ore per day are coming out of the Dalton & Lark and Miners' Dream workings. By May 15 the new converter plant will be in operation.

United States Mining Company.—The compressor plant that is to supply all the different mines of the company at Bingham with air and power for the drilling machines has been shipped from Chicago.

(From Our Special Correspondent.)

Alta Shipments.—For the week ending March 8, the Columbus has reported 1 car ore and the Grizzly 3 cars ore.

Bingham Shipments.—For week ending March 8 the shipments were: Commercial, 1 car ore; Tiewaukee, 1 car ore.

SUMMIT COUNTY.

(From Our Special Correspondent.)

Park City Shipments.—The shipments from this camp for the week ending March 8 are as follows: Ontario, 994,750 lbs. of ore; Quincy, 1,271,650 lbs.; Daly-West, 1,360,150 lbs. Anchor, 409,100 lbs.; Silver King, 1,495,600 lbs.

Bergan Mining Company.—This company's property, at Park City, has closed down, and the pumps are being drawn. The property is south of the Silver King. A shaft has been sunk 600 ft. and considerable drifting done.

TOOELE COUNTY.

(From Our Special Correspondent.)

Stockton Shipments.—Ophir Hill sent in 11 cars of concentrates for week ending March 8; Stockton Gold Mining Company, 3 cars ore.

SOUTH DAKOTA.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

Hidden Fortune Mining Company.—At the annual meeting of the stockholders in Denver, on March 4, the following directors were elected: A. M. Stevenson, H. J. Mayham and Herbert A. Shaw, Denver; Otto P. Th. Grantz, Deadwood; George M. Nix, Lead; A. H. Marble, Belle Fourche; J. P. Allison, Thomas J. Steel and E. W. Rice, Sioux City, Ia. The directors organized by electing A. M. Stevenson, president; Thomas J. Steele, vice-president; E. W. Rice, treasurer; H. J. Mayham, secretary; George D. Begole, assistant secretary and treasurer. George M. Nix resigned as general manager, and was succeeded by Thomas J. Steele of Sioux City. A committee of four was appointed to decide upon the location of the large stamp mill and cyanide plant that the company intends building.

Horseshoe Company.—Anson Higby has been appointed resident agent. D. E. Murphy, the new president is a purchaser.

Imperial Mining Company.—The new cyanide plant in Deadwood has started up. It has machinery sufficient to crush 200 tons a day, and tanks for 100 tons. The contract to haul the ore from the Blacktail gulch mines of the company has been awarded to Goulette Brothers.

PENNINGTON COUNTY.

(From Our Special Correspondent.)

Basil.—Thomas Tracy has sold this group to eastern men, receiving the first payment, $1,000 down. The purchasers will begin taking out ore, treating it at the Cuttysark Mill, and paying Tracy a royalty until the property is fully paid for.

Black Hills Copper Company.—The company has purchased the Benedict property of 200 acres, in Hornblende Camp. The company continues operations on the copper property.

Castle Creek Mining Company.—Free gold ore is reported taken from the bottom of the shaft. The company will sink 200 ft. further.

Grantz Gold Mining Company.—This company owns the St. Elmo Mine, and is a reorganization of the St. Elmo Company. The capitalization is $2,500,000, and the incorporators are George V. Ayres, Otto P. Th. Grantz, and Asa Baldwin. Machinery has been ordered capable of sinking 500 ft.

Montezuma.—A bond has been taken on this group, situated near Rochford, by Deadwood and Chicago men and development work will soon start.

Springfield Group.—Burt Heath has sold this property to the University Gold Mining Company. The ground consists of 200 acres, partially developed.

Tykoon Gold Mining and Milling Company.—The machinery is beginning to arrive for the stamp mill recently purchased of D. B. Ingram and C. E. McEachron, at Keystone, Much of the old machinery in the mill is being replaced.

WASHINGTON.

FERRY COUNTY—REPUBLIC.

(From Our Special Correspondent.)

Gold Ledge.—The tunnel is in 890 ft., but has not yet cut the vein. A hand-machine diamond drill has been ordered, and a contract let for the boring. The drill will be used for locating the vein.

Washington & Great Northern Railway Company.—It is stated that trains will be running into Republic by May 1, and the road will be turned over to the passenger department a month later.

OKANOGAN COUNTY.

(From Our Special Correspondent.)

Bodie.—Wm. McKinley and N. B. Knox, of San Francisco, Cal., are examining and sampling this mine for San Francisco men.

SPOKANE COUNTY.

Spokane Smelter.—This old plant was recently sold to Schuyler Grant, trustee for New York men, for $8,500. The suit which resulted in the sale was started by the late Col. Robert G. Ingersoll about 6 months before his death. He represented a number of the bondholders of the smelter company's bonds. After his death the suit was continued by the estate of Richard C. F. Flower, representing the Arizona, Eastern & Montana Company, which had the principal interest in the old bonds.

WEST VIRGINIA.

MARION COUNTY.

Weaver Coal Company.—This Chicago, Ill., company has purchased the Arbogast coal lands at Junior and will erect a tipple. The company is also operating a large plant at Bellington.

PRESTON COUNTY.

Austen Coal and Coke Company.—This company's property, at Austen, 3 miles east of Newburg, has been sold by Judge David W. Sloan and Malcolm Sinclair to Charles E. Bell and Murray Burrell, of Washington, D. C., and ex-Congressman Joseph E. Thropp, of Everett, Pa., who have taken possession. Messrs. Sloan and Sinclair 3 years ago bought the property from the heirs of Samuel Colgate. It consists of 3,000 acres of coking coal, with complete plant and 83 ovens in operation. It is understood the last purchase price was $140,000.

WYOMING.

CARBON COUTY.

Carbon Coal Mines.—Coal miners employed by the Union Pacific at Carbon are being sent to other mines along the road. It is proposed to close the mines as soon as the machinery can be taken out.

LARAMIE COUNTY.

Sunrise Iron Mines.—The iron mines at Sunrise now worked by the Colorado Fuel and Iron Company, under a 20-year lease from the Wyoming Railroad and Iron Company, are in litigation. David Wegg and C. A. Guernsey have brought suit at Cheyenne to have the court set aside the deed of the property made by E. S. Hosmer to his mother Amanda S. Hosmer.

In 1890 the property was deeded by the Wyoming Copper Company to William Sturgis of Cheyenne, and the following year by Sturgis to Edward S. Hosmer of New York. This deed was placed in escrow, pending the payment of $120,000 by Hosmer. Hosmer then made a contract with the Wyoming Railroad and Iron Company to transfer the property to it upon the payments being made and this corporation leased to the Colorado Fuel and Iron Company for a period of years. Seeing that he could not keep up the payments Hosmer entered into a contract with Wegg and Guernsey whereby they were to pay so much to Hosmer and so much to Sturgis. Last year, after $85,000 of the $120,000 had been paid, Wegg and Guernsey failed to make the payments, whereupon Hosmer immediately deeded the property to his mother, and the suit was instituted to set aside the deed upon the ground that Hosmer gave the plaintiffs to understand that there was no hurry about the payments and that they could have their time.

These royalties amount to $33,750, sufficient to pay the remainder of the $120,000 due. If the petition of the plaintiffs is sustained the title to the property will vest in Wegg and Guernsey as members of the Wyoming Railroad and Iron Company.

FOREIGN MINING NEWS.

AFRICA.

TRANSVAAL.

Crown Deep, Limited.—This company reports that from the resumption of work on December 23 to January 31 there were 50 stamps running, and 8,600 tons of ore were crushed. The yield was, from mill, 1,278 oz.; tailings, 505 oz.; slimes, 87 oz.; total, 1,870 oz. fine gold, or 0.22 oz. per ton.

Langlaagte Deep, Limited.—This company reports 50 stamps at work from January 6, when the mill was started, to January 31 The yield was, from mill, 1,129 oz.; from tailings, 399 oz.; from slimes, 30 oz.; total, 1,559 oz. fine gold. The ore crushed was 6,433 tons, showing an average yield of 0.24 oz. to the ton. Part of the run was on low-grade ore from the dumps.

CANADA.

NOVA SCOTIA—CAPE BRETON.

Dominion Coal Company.—The output for February was, 146,158 tons compared with 108,100 tons in 1901. The output for the fiscal year ending February 28 was 2,412,525 tons, compared with 1,957,300 tons in the previous year.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Granby Consolidated Mining, Smelting and Power Company.—The third furnace is at work, and the company is treating about 1,100 tons of ore daily. The fourth furnace should be ready within 3 weeks. The converter plant is reported working well, making a steady output of blister copper. The converter is treating matte from the Greenwood, Grand Forks, Nelson and Van Anda smelters.

YUKON TERRITORY.

Reports of rich gold strikes on a tributary of the Pelly River, 30 miles from Whalen's roadhouse, on the Yukon, below Fort Selkirk. The news came by way of Dawson and Tacoma. Reports of rich strikes in Alaska and the Yukon Territory are apt to be circulated as spring approaches, and there is a chance of a rush of prospectors. It remains to be seen whether the present news is of any value.

CENTRAL AMERICA.

COSTA RICA.

(From Our Special Correspondent.)

Abangarez Gold Fields, Limited.—This company is erecting a 40-stamp mill (900-lb. stamps) with a 300-h. p. electric transmission plant, that is expected to be in operation by August. The present mill of 20 (400-lb.) stamps has a capacity of only 500 tons per month. The output for January was $7,500, or $15 per ton of ore milled. Under the direction of C. H. Colburn, manager, an extraction of 91 to 92 per cent of the value of the ores have been saved through plate amalgamation and treatment of the tails with cyanide. A recent limited issue of treasury shares has been subscribed to furnish funds for constructing the mill. The ore opened at the 300-ft. level shows a 6-ft. vein said to assay $40 per ton.

MINING STOCKS.

(Complete quotations will be found on pages 403 and 404.)

New York. March 13.

The copper list is agitated as "tips" to sell have been frequent, owing to the expectation that dividends will be reduced all around. The most active stock has been Amalgamated, which has lost heavily, selling off $47⅞ to $64⅛ on Wednesday, when transactions amounted to 122,450 shares, the largest daily dealings in some time. The price mentioned compares with 60½ in December last, which was the lowest on record. Several reasons are given for this sudden fall in value, but the most likely seems to be the belief that the 1 per cent quarterly dividend will be cut. The dividend meeting is called for March 20, but as many of the directors are out of town, it is believed an adjournment will be had for want of a quorum. Anaconda was also pressed until $31½ was touched, but sales were unimportant. On curb the coppers have had a lively time, many selling orders being about. In Greene Consolidated, dealing was largest at prices that receded from $23 to $20¾. Tennessee was feverish, dropping from $12¼ to $11⅝ on heavier trading than for some time past. British Columbia was influenced by the report that the property is likely to pay dividends in the near future. Sales of the stock were made at $10½@$9.

Montreal & Boston, also of British Columbia, was fairly active at $4@$3¾, as it is said the company's smelter will soon be blown in. White Knob, of Idaho, reappeared at $21½, but buying was purely speculative. Union, of North Carolina, was dormant at $3½. Aberdeen Consolidated, of Lordsburg, N. M., was brought on the market at $35⅞, but no transactions were reported. This company has an authorized capital of $1,000,000 in $25 shares, and has paid a dividend of $1 per share, or $32,175 on the issued stock.

Of the gold stocks, those of Cripple Creek, Colo., are the favorites. Elkton Consolidated shows more trading at $1.21@$1.24, as the company has just announced its regular 4c. quarterly dividend, which is at the rate of 16 per cent annually on an issued capital stock of $2,500,000. A sale of Portland was made at $2.55. Isabella is featureless at 25c.

Comstocks are lower. Consolidated California & Virginia sold at $1.35@$1.30, and Ophir at $1.

Some business has been done in Quicksilver of California at $4⅛@$4 for the common and $11⅞@$11 for the preferred shares.

Coal stocks attracted much attention by the heavy trading in the specialties, notably Reading. This buying is the result of improved conditions in coal trade.

On March 10 there was sold on the New York Stock Exchange, 10,000 silver bullion certificates at 54⅝. This is the first transaction since April 12, 1901, when 60 was the price. The purchase is not considered significant.

An auction sale of $45,000 first mortgage 6 per cent bonds (due September, 1931) of the Seneca Lake Salt Company, N. Y., is noted at $4,000.

Boston. March 12.

(From Our Special Correspondent.)

There has not been such a market for mining shares for almost a year as that witnessed the past few days. Some particular stocks were kiting and the public was getting well interested until the issue of the Osceola Consolidated mining report Monday, which served to dampen the ardor of the trading public. To be sure the activity was in the second grade, or non-dividend paying class of stocks, but what cares the trades so long as prices move up?

Arcadian, which was thought to be beyond reprieve, and Centennial were the particular stars. The former touched $13 per share Monday, from which it reacted to $9 to-night. Centennial was heavily bought up to $28, but large liquidating orders succeeding in striking stop orders and the price easily fell back to $19 to-day. It is known that an estate which held a large block of Centennial has sold on the bulge. Trinity came in for honors, rising to $17.25, but has fallen back to $13.75.

In contrast to the general market is the bad break in Osceola. This stock has fallen $12.50 to $61 during the week. The annual report was thoroughly disappointing and the management is being severely censured. Tamarack has fallen in sympathy and is off $29, touching $181 to-day. A report very similar to that of the Osceola is expected to issue very shortly. Calumet & Hecla, $10 to $590. In fact the higher priced stocks have not participated in the market at all.

Dominion Iron & Steel made a record by touching $48.25 Tuesday. In less than an hour the stock was back to $43.25 and back to $48.25 in another hour. This shows what a wild market has been witnessed. The stock closed at $43, against $38 a week ago. Dominion Coal has been less animated, yet a record price of $108.50 was touched Monday, with the close $103.50. It is considered that there has been more manipulation in these stocks than almost any on the list. Both are traded in on the Montreal Stock Exchange so that a chance for arbitrage is furnished.

Copper Range Consolidated ran up to $49.50, but yielded to $45.25 under the pressure. United States touched $19.37½, but reacted to $17.50. Isle Royale and Old Dominion were not taken hold of during the boom, but both have suffered declines, the former $2 to $19 and the latter $3.50 to $19. Proxies for the Old Dominion annual meeting to be held April 2, have been sent out by the management and in addition they are being solicited by the brokerage firm of Towle & Fitzgerald and by A. N. Amster, who is a stockholder and mining engineer. Mohawk rose to $38, reacting to $35, Mass to $20.12½, with reaction to $17.75, Bingham to $27.67½ with reaction to $24, Wolverine to $56 with reaction to $53, Michigan to $13.25 with reaction to $11.12½, Elm River to $5, with reaction to $4, and Atlantic touched $31, with reaction to $30.25. Utah has been heavy and closes at $22.50, with Parrot at $31.

It is figured that the Osceola Mine's copper cost 16.23c. last year, including the cost of construction, while the average price received was 13.9c. The Quincy Mine, which is managed apart from Amalgamated Associations, produced its copper for 9.63c., including construction, and received an average of 16.23c. for its product. The product of the Champion Mine, of which one-half is owned by Copper Range Consolidated, from January 10 to February 27 was 9,263 tons with 447,045 lbs. of masse and mineral recovered. The average yield per ton of rock stamped was 48.26 lbs. of mineral, or about 36 lbs. ingot.

Colorado Springs, Colo. March 8.

(From Our Special Correspondent.)

The Cripple Creek mining stock market took a decided turn for the better this week, after having experienced many weeks of low prices and contracting values. The advance averaged approximately 10 per cent on the medium-priced mining securities, and from 20 to 40 per cent on the preferred prospects and prospects so that the up-swing leaves the market on the whole on a much higher plane than it has occupied for some time. The advance is without doubt due to the continued high rate of production of the gold mines of the district and the appreciation on the part of local buyers that the securities are selling below their intrinsic value. The gains have not been confined to a few specialties, but are scattered along the entire list, which indicates a general change for the better in market conditions. Stocks have been down for fifteen months and a change had to come.

The specialties recording the most marked advances were as follows: Anaconda gained from 20 to 20½c., and the annual meeting on March 22, of this month, is not looked forward to as being likely to introduce any change into the market condition of this stock. Coriolanus sold up ¾c. during the week, the advance being caused by the improvement of the surface strike made three weeks ago. A week ago Doctor Jack-Pot was quoted 45@47c., and sold strong to-day at 47¾c. The opening of an entirely new ore shoot in the Smith-Riley vein, between the 550 and 700 levels, caused this advance. Elkton held firm during the week, selling at $1.28 and $1.28½. The declaration of the 4c. dividend, amounting to $100,000, did not materially advance the stock. Findley registered one of the strongest gains of the week, selling from 9½ to 11c. The annual meeting of this company was held this week, at which it was announced that the big shaft would be put to 1,000 ft. immediately to open up rich ore bodies left by the lessees in the 800-ft. level at the expiration of their lease two months ago.

Isabella is gradually strengthening on continued favorable reports received from the mine. The new management, which came into power at the January meeting, is wisely following up the policy of vigorous development throughout the entire mine with gratifying results. A week ago the shares sold at 22¼@22½c., and to-day at 23½c. Lexington made a strong gain during the week, selling from 5¼c. on February 27, up to 7c. to-day, at which figure considerable stock was disposed of. Portland held steady all week, being quoted, $2.50@$2.60. The monthly meeting of the directors was held in this city March 5, but nothing of importance is likely to develop until the April meeting, when the quarterly dividend of 6c. a share, amounting to $180,000, will be declared.

Among the prospects, C. K. & N. registered a marked advance during the week, selling from 3½c. up to 5c. on heavy eastern buying on the part of the backers of lessee Granfield, who is developing the company's Beacon Hill holdings. Progress advanced from 3 to 4½c. during the week on the general strength of the market.

Salt Lake. March 8.

(From Our Special Correspondent.)

The market for the week ending March 8 had a downward tendency and with few exceptions lower prices ruled at the close of the week. Some of the stocks more in favor were allowed to sag during the middle of the week and were brought back to the opening figures at the close. Daly-West was one exception and has risen all the week. The lowest price, $19.57½, was touched on Wednesday, but the top was $21.10 at the close. The heaviest trading has been in the following: Ajax, Carisa, Daly-West, Lower Mammoth, May Day, Uncle Sam, California, and West Morning Glory.

It is stated that the Colorado Springs Exchange has made application for some of our best securities for listing on their board and that a similar request has been made by the Spokane board. Just what will be done with the matter by the governing board is not determined.

San Francisco. March 8.

(From Our Special Correspondent.)

There is really very little to say about market for the Comstocks this week. Business was quiet and prices ratner weaker, but a slight revival was shown towards the close.

Consolidated California & Virginia sold around $1.30; Ophir, 96@98c., with recovery to $1; Silver Hill, 51c.; Hale & Norcross, 31c.; Mexican, 29c.; Best & Belcher, 25@26c.; Sierra Nevada, 13c.; Chollar, 8c.

On the Producers' Oil Exchange business was variable, closing very quietly, with small buying, and only a moderate interest in the market. Home sold at $3.85; Twenty-eight, $1.30; Monte Cristo, $1.25 @$1.30; Monarch, 19c.

London. Feb. 20.

(From Our Special Correspondent.)

The South African mining market has been quiet again this week. Speculators, who are wishful to buy for a rise, are aware that large numbers of holders who bought just when the war commenced are desirous of selling out, so they feel that for a long time the market will be weak. Consequently buyers do not come forward very readily. In the meantime, promoters are paying their attention to Rhodesia, and two new companies have been introduced to the public this week. One is the Federated Mines of Rhodesia, Limited, a company with a capital of £250,000, formed to acquire a miscellaneous collection of mining claims in various parts of that territory. No development work has been done on any of them, so that they are really only speculative prospects. The vendors take ...0,000 as purchase price, payable partly in cash and partly in shares, the relative proportions depending on the success of the flotation. The other company is the Imani Gold Mining Company, Limited, which has been formed with a capital of £200,000 to take over from the V. V. Gwanda Syndicate the Imani Mine and the Ibis, Glensmith and Doelfontein properties in the Gwanda District of Matabeleland. The Imani has been opened up and possesses promising quartz veins, while there is also a plant fixed up on the basis of 10 stamps. It is rather unfortunate that the Dunraven Mine should close down just now, to discourage other enterprises.

The companies of the Whitaker Wright group have been before the public again this week. At the meeting of the Le Roi Mining Company nothing new was elicited, though the old ground was gone over very thoroughly and the general situation fully explained. An interesting announcement by the directors was to the effect that the new controllers were disappointed with the mine. It is not at all probable that there will

DIVIDENDS.

Name of Company.	Latest Dividend—Date.	Per Share.	Total.	Total to Date.
*Central Lead, Mo.	Mar. 15	.50	5,000	280,000
*Daly-West, Utah	Mar. 15	.40	60,000	1,447,500
†Elkton Con., Colo.	Mar. 20	.04	100,000	1,404,461
*Empire State, Ida.	Mar. 15	.05	25,277	1,334,169
*Gold Coin, Colo.	Mar. 25	.03	30,000	1,050,000
*Gwin, Cal.	Mar. 17	.10	10,000	296,500
Imperial Oil, Cal.	Mar. 6	.20	20,000	60,000
*May Day, Utah	Mar. 20	.01	4,000	30,000
*Modoc, Colo.	Mar. 18	.01	5,000	245,000
†National Lead, pf.	Mar. 15	1.75	260,844	12,144,404
*N. Y. & Hond. Rosario	Mar. 22	.10	15,000	1,715,000
Ontario, Utah	Mar. 20	.30	45,000	14,782,000
*Pacific Coast Borax	Mar. 28	1.00	19,000	1,046,500
Petroleum Dev., Cal.	Mar. 10	.20	25,000	25,000
*Quincy, Utah	Mar. 15	1.00	125,000	1,100,000
†Republic I. & St. pf.	Apr. 1	1.75	355,371	3,909,080
†Sloss. Sheffield St. & I. pf.	Apr. 1	1.75	117,250	1,042,250
*Standard, Idaho	Mar. 25	.05	25,000	2,540,000
Thirty-three Oil, Cal.	Mar. 6	.10	10,000	30,000
‡Wolverine, Mich.	Apr. 1	2.00	120,000	870,000
Yankee Con., Utah	Apr. 1	.05	25,000	75,000

*Monthly. †Quarterly. ‡Semi-annual.

ASSESSMENTS.

Name of Company.	Location.	No.	Delinq.	Sale.	Amt.
Ajax	Utah	3	Mar. 20	Apr. 5	.05
April Fool	Utah	..	Mar. 24	.....	.05
Boss Tweed	Utah	5	Mar. 27	.....	.02
Brunswick Con.	Cal.	..	Apr. 3	.....	.03
Eureka Con. Drift	Cal.	34	Mar. 31	Apr. 31	.00½
Mexican	Nev.	70	Mar. 25	Apr. 15	.10
Northern Light	Utah	7	Mar. 10	Mar. 20	.02
Pilot	Cal.	..	Mar. 18	.....	.01
Sampson	Utah	..	Mar. 27	.....	.01
Sierra Nevada	Nev.	..	Mar. 25	.....	.10
Silver King	Ariz.	23	Mar. 11	Apr. 8	.25
Willietta	Cal.	4	Mar. 5	Apr. 7	.01
Yuba Con.	Cal.	6	Mar. 24	.....	.03

be many dealings in the shares unless some unexpected developments should take place. The meetings of shareholders in the Rossland, Great Western and the Kootenay Mining companies have also been held this week. As I mentioned in a previous letter, shareholders had expressed a strong wish that the old Whitaker Wright board should make way for new blood. At the meeting the directors wisely put themselves in the hands of shareholders and agreed to the nomination of an independent committee of investigation. At the same time they expressed their readiness to retire at any time if required. These two companies own lower-grade properties than the Le Roi, and it is a problem of mine management as to whether they will be made to pay or not. Anyhow, the shares will not be popular and we shall hear little of them on the market.

Another of the Whitaker Wright companies has come before the public this week. This is the Standard Exploration Company, which was formed some three years ago to take over a job-lot of failures in West Australia, and which went into compulsory liquidation a year ago. A committee of shareholders has just reported on a proposed scheme of reconstruction. They propose to form a new company with a capital of £500,000, just one-third of the old capital, and to offer the £1 shares with 14s. credited paid, leaving an assessment of 6s. per share. The experts who have examined the properties report they are worth working on again, and possibly they may be right, seeing that the old system of management in the Whitaker Wright group has been proved to be not of the best. But until detailed reports on the properties are received it is impossible to form any opinion.

COAL TRADE REVIEW.

New York. March 14.

ANTHRACITE.

A spell of mild weather—unseasonably warm, in fact—has come to the relief of producers, and the most destructive flood the anthracite region has ever known has resulted in little discomfort to producers. Had the weather for the past week been as cold and raw as a year before, there would have been a great howl for coal, and all manner of newspaper talk about a coal famine. As matters stand, consumers want coal only for immediate needs, and those who have a little on hand wait until that is gone before ordering more. As a result, the demand is not strong, and jobbers and dealers have been able to meet orders without much trouble.

Most of the railroads have repaired the washouts along their lines, and all are moving coal. The Reading, the Delaware & Hudson, and the Lackawanna are about in shape, so far as transportation is concerned, to get through their usual tonnages. The Lehigh Valley and the Central Railroad of New Jersey have done nothing toward replacing the destroyed bridges along the Lehigh River, but by using each other's lines they are getting coal through. It will take a long time to get some of the drowned collieries in running order again, but unless transportation is interrupted once more or labor troubles break out, there is no fear of a coal famine. As regards the prospects of a general strike at the mines, present indications are against it. The miners are making good wages, and there is every prospect that the companies will announce a continuation of the present wage scale for another year. At the same time, they will probably refuse to grant any such drastic demands as those made at the Mine Workers' convention at Indianapolis. There is no prospect of the companies announcing their spring prices until it is seen that there is no probability of a strike.

Trade in the Northwest is light. Demand has fallen off, and if mild weather continues, there will be a lot of coal on the docks when Lake navigation opens. In Chicago territory also trade has fallen off, and is now distinctly dull, with improvement dependent on colder weather. Receipts of all rail coal have been very light, but as the coal was not particularly wanted, short receipts have not affected the market. Along the lower lakes, and particularly in Canadian territory, there is some demand, principally for the small sizes. Along the Atlantic seaboard the market is practically on a weather basis, with consumers and dealers alike hesitating to lay in supplies. We quote for free-burning white ash, f. o. b. New York Harbor shipping ports: Broken, $4; egg, $4.25; stove and nut, $4.50. The steam sizes are in demand. Pea is quoted at $3; egg, $2.50; but prompt deliveries command a premium.

Mr. George A. Holden has retired as general coal sales agent of the Delaware, Lackawanna & Western Railroad Company, a position he had held since about January 1, 1899, when the control of the road changed hands. His retirement marks the final reorganization of the road under Mr. Truesdale's management and the end of the Sloan and Holden regime.

BITUMINOUS.

The Atlantic seaboard soft coal trade is suffering from the effects of the recent washouts along the main line roads and in fact was practically closed down temporarily. Some railroads got their trunk lines in shape earlier than others, but it is thought that the average check to shipments was considerable except on the Norfolk & Western and Chesapeake & Ohio, where the delay was 2 or 3 days. This check coming on top of the previous poor car supply has made coal short and many consumers have been scraping their bins to get enough to keep their plants going. As a result, prices have risen on spot coal and we hear of $3.25@$3.50 peing paid f. o. b., New York Harbor shipping ports. This scarcity of coal with no improvement in car supply makes producers cautious about closing contracts for the coming year, and comparatively few contracts have been taken for this time of March; meanwhile producers are slowly closing out the tonnages due old customers. It is not thought that anybody is going below the minimum prices named by the Association on new business and of the contracts already taken some are at higher prices than last year, perhaps 5@10c. higher and in certain cases more. The new contract year begins April 1 and it is now thought that a very large proportion of the contracts will be closed by that date. The railroads are not giving out any information as to what may be expected in the way of car supply later on, and this to most people seems ominous.

The far East is short of coal and is calling for all it can get, but a good tonnage is going forward from Chesapeake Bay ports. It is not thought that the longshoremen's strike at Boston will greatly hinder the movement as the coal instead of being consigned to Boston will go to other points on the railroad systems. Along Long Island Sound the trade is in need of coal. The supply of the lower grades was improving when the washouts stopped shipments from the mines. Now the lower grades are in as short supply as before and the better grades are even harder to get. At New York Harbor points contractors and others have been buying outside of their own coal and have been taking what they could find where they could find it. Consumers in the all-rail trade complain of short supplies and producers are having tracers put on cars to get the coal through as soon as possible.

Transportation from the mines to the tidewater shipping ports is just getting back to the old conditions; car supply is very short. The number of cars reaching the mines since the washouts is no greater than before. In the coastwise vessel market vessels offering are in excess of the number wanted and if the weather continues fair, rates will probably fall. We quote current freight rates from Philadelphia as follows: Providence, New Bedford and Long Island Sound, 85@90c.; Boston, Salem and Portland, 95c@$1; Wareham and Newburyport, $1.10; Portmouth, $1@$1.05. Rates from the further lower ports are about the same as from Philadelphia.

Birmingham, Ala. March 10.

(*From Our Special Correspondent.*)

Coal production is heavy. During the past week bids were presented by contractors for a railroad extension of 7 miles in Blount County to reach properties belonging to the Lehigh Coal Company, which proposes to open several mines. The Louisville & Nashville Railroad will build the extension. The contractors have to complete the work within 4 or 5 months, and by the time the railroad is ready it is proposed to have mines opened.

Prices remain steady. The railroads and larger consumers continue to have trouble in getting a full supply, and the railroads are still shy on cars. There are no indications of an improvement in car supply yet.

The miners will receive the maximum wage scale for March, the iron sales books of the Tennessee Coal, Iron and Railroad Company and Sloss-Sheffield Steel and Iron Company having shown that the average iron prices warranted it. The miners get 55c. per ton and will probably receive this sum until the expiration of the contract, June 30, the greater part of the iron to be shipped between now and then having already been sold.

Two fatal accidents happened in the mines during the week. In one case, a negro was killed by a blast, and in the other a white miner was killed by falling slate.

Ed. Flynn, president of the United Mine Workers in Alabama, reports nothing but petty disturbances to mar the industry.

Chicago. March 11.

(*From Our Special Correspondent.*)

Firmness of conditions and prices and general satisfaction among wholesalers characterize the market for soft coal in Chicago this week. There is a general betterment of the supply of all grades, with the approach of mild weather, though Hocking continues somewhat scarce and in active demand. Pittsburg and West Virginia coals are considerably easier. The tightness that has characterized the coal market for the last month is disappearing; the railroads are getting into better shape and causing less complaint, though a decided change will probably not be apparent before the first of May. Prices continue practically stationary, Hocking bringing $3.25, Indiana block $2.75 and Illinois mine run $2. West Virginia splint is quoted as $3.50; Youghiogheny lump, $3.40; lower vein Brazil block, $2.70; Indiana semi-block, $2.50; Clinton lump, $2.25. Of the smokeless grades, egg still brings $4, mine run, $3.50; lump, $3.90; Blacksmith's coal is scarce and in active demand at $3.50. In the northwest the scarcity continues and will doubtless continue until the opening of navigation on the lakes.

Anthracite shows practically no change, except a slight falling off due to the mild weather of the last few days. The price continues to stand; there is no notable scarcity of any grade.

Cleveland. March 12.

(*From Our Special Correspondent.*)

The coal shippers are beginning to look around some for boats for the movement of their coal on the lakes. No charters have been made as yet even for the first cargoes, but the time when business will be done is not far away. The shippers expect to meet in Cleveland next week to fix the prices at which the lake coal will be sold and when that matter is out of the way it is quite certain that the rate of carriage will be immediately fixed. There is some haste in this matter because the season of navigation will open presently. All this winter it has been apparent that there was to be a shortage of coal at the head of the lakes. This indication has been emphasized of late and the reports are that it will be necessary to send coal up as soon as possible. The weather conditions are favorable to that. The ice is honeycombing rapidly and will be out of the channels, it is thought, in time to permit the opening of navigation very early in April. This being the case the coal will reach the head of the lakes at least two or three weeks ahead of the usual time. There is some talk of re-establishing, upon the opening charters at least, the same rate as applied last year, 35c. to Duluth and 50c. to Milwaukee. A meeting of the traffic men of the railroads carry coal to the lakes was to have been held in Pittsburg Wednesday to fix the rates for the year but this has been postponed indefinitely. The domestic demand is quite heavy and the prices are holding firm. The consumption at the factories is so large that some have expressed fear that the railroads will not be able to handle a sufficient surplus to keep the boats and the factories going simultaneously.

Pittsburg. March 12.

(*From Our Special Correspondent.*)

Coal.—The railroad car supply is better this week and all the rail mines in the district are again in operation. The river mines are also running full and no further interruption by high water is anticipated. The local dead-work scale was finally settled after a conference lasting two weeks. It is practically the same as the one now in force except that the operators agree to the check-off system. As a result the Pittsburg District of the United Mine Workers, instead of collecting dues from about 10,000 miners who are members of the organization, will receive dues from fully 23,000 miners who are working in the district under the agreement. The dues and assessments under the system will be deducted by the operators from the pay of the men. A meeting of the railroads interested in the lake coal traffic is scheduled to be held in this city this week. There has been some talk of an increase in the rates over those of the past year but it is impossible to make any definite prediction as to the probable result. Soon after the freight rates are decided the two coal combinations and large independent producers will meet to arrange prices for the coming season.

Connellsville Coke.—The coke trade was not as seriously affected by the flood and the crippling of the railroads as was expected. Shipments under the circumstances were very satisfactory and none of the blast furnaces were forced to suspend on account of a shortage of coke, although but few received the full amount needed. Prices are firm and premiums are still being paid in some instances for prompt delivery. The circular price still remains at $2.25 for furnace and $2.75@$3 for foundry. The last issue of the *Courier* gives the production for the previous week at 215,209 tons. The shipments aggregated 10,985 cars distributed as follows: To Pittsburg and river tipples, 3,744 cars; to points west of Pittsburg, 5,212 cars; to points east of Connellsville, 2,029 cars. This was an increase of 209 cars compared with the shipments of the previous week.

Foreign Coal Trade. March 13.

Export trade continues rather quiet. Most of the business doing is to the West Indies and to Mediterranean ports.

A late charter report is at 7s. 6d. ($1.80) from Norfolk, Va., to Genoa, March or April sailing. This is a very low rate, showing a fall of $1.20 as compared with August or September, 1901.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of February 28 that the general

tone of the Welsh coal market is perhaps slightly steadier, but prices show little alteration. Quotations are: Best Welsh steam coal, $3.66@$3.72; seconds, $3.54; thirds, $3.36; dry coals, $3.24; best Monmouthshire, $3.30@$3.42; seconds, $3.30; best small steam coal, $2.04; seconds, $1.92; other sorts, $1.68.

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 general tone of the freight market is easier, with tonnage offering more freely. Rates, however, show little quotable change. Some rates noted from Cardiff are: Algiers, $1.30; Marseilles, $1.40; Genoa, $1.44; Naples, $1.44; Singapore, $2.64; Las Palmas, $1.50; St. Vincent, $1.68; Rio Janeiro, $2.58; Santos, $2.88; Buenos Aires, $2.52.

San Francisco. March 7.

(*From Our Special Correspondent.*)

Receipts of coal at San Francisco by water in February were 100,914 tons, or considerably less than in January. For the two months ending February 28 the receipts were as follows:

	1901.	1902.	Changes.
Eastern U. S.	4,221	1,025	D. 3,196
Oregon	6,605	5,080	D. 1,525
Washington	121,036	84,478	D. 36,558
Total domestic	131,862	90,583	D. 41,279
British Columbia	81,150	52,214	D. 28,936
Australia	13,738	40,880	I. 27,142
Great Britain	2,492	37,096	I. 34,604
Total foreign	97,380	130,190	I. 32,810
Totals	229,242	220,773	D. 8,469

This does not include the coal received from California mines, nor that from Wyoming and Utah mines by rail.

Yard prices for Coast coals to dealers are quoted as follows, per ton: Roslyn, $7.50; Wellington, $9; Seattle, $6.50; Southfield, $9; Coos Bay, $5.50; Bryant, $7; White Ash, $5. Firm cargo prices for Eastern and foreign coals are: Anthracite, $14; Cumberland, $12; Welsh anthracite, $12; Cannel, $9; Wallsend, $8.

IRON TRADE REVIEW.

New York. March 14.

The March returns of the furnaces show a decrease of about 10,000 tons in the weekly capacity of those in blast. This is chiefly the result of transportation difficulties, which have limited activity and have delayed the blowing in of a number of stacks which were expected to start up before this. The unsold stocks of merchant furnaces, as reported by the *Iron Age*, were only 125,348 tons on March 1.

The story of the continued activity in all sections of the iron market is told in the local letters which follow. Transportation difficulties resulting from the weather are slowly passing away.

The extent of the import movement in pig iron and steel billets is still uncertain. Those who have contracted for foreign supplies seem reluctant to furnish facts. It seems probable, however, that a very considerable quantity has been provided for, and that options are held on large additional lots of German material.

Birmingham, Ala. March 10.

(*From Our Special Correspondent.*)

Furnacemen state that they have very little iron to sell, and immediate delivery is out of the question in several quarters. The blowing in of furnace No. 2, of the Woodward Iron Company's furnaces during the week, will aid the situation, but the statement is made that this is practically but a drop in the bucket. There are not many sales being made for speculation, inasmuch as furnaces have been sold ahead as far as August or September. No. 2 foundry is very strong and is not easily obtained. A sale of many thousand tons could be made at an advance of from 50c. to $1, with delivery within 5 or 6 weeks, but the furnacemen are unable to deliver the iron in justice to contracts on hand.

The shipments are hindered only by the scarcity of railroad cars, which shows but little improvement.

The definite announcement is made that the new furnace of the Republic Iron and Steel Company will be about ready on April 1. The success of this furnace will hasten the erection of a big steel plant at Thomas by the Republic Company.

Quotations continue very strong. The following prices are given: No. 1 foundry, $12.50; No. 2, $12 @$12.50; No. 3, $11.50; No. 4, $11; gray forge, $10.50@$11; No. 1 soft, $12.50; No. 2, $12@$12.50.

The steel situation in Alabama is improving. The plant at Ensley, belonging to the Tennessee Coal, Iron and Railroad Company, which met with a couple of accidents week before last, is now in operation. Shipments are increasing monthly. The rail mill department of the steel plant is not yet turning out much, but rail billets are being rolled. The manufacture of steel rails on a large scale will start in the next few weeks.

There is a great amount of activity in finished iron and steel circles. More men are being given employment in the rolling mills and more are wanted. Every department is now working on double and treble turns, and it is said that the Birmingham mills have orders on hand to last pretty near through the year.

There is an unprecedented trade in cast-iron pipe, and all the pipe plants are exceedingly busy.

Buffalo. March 12.

(*Special Report of Rogers, Brown & Co.*)

Both consumer and producer are looking for the promised relief, but it does not yet appear from which point of the compass it is to come, nor the season. Just for variety the good old days would be welcomed, when the seller did the hustling instead of the buyer, as now. The distress of the market situation has been accentuated this week by crippled railroads and banked furnaces. Every curtailment of this kind makes large inroads on possible production for the year. There is no panic, fortunately, but at this writing no marked signs of excessive production appear on the horizon of the year 1902. There are no regular offerings of iron for delivery before July. The prices given below are for shipment during the last few months of the year. We quote on the cash basis, f. o. b. cars, Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, $18.25; No. 2, $17.75; Southern soft No. 1, $17.75; No. 2, $17.25; Lake Superior charcoal, $20.50.

Chicago. March 11.

(*From Our Special Correspondent.*)

The market for pig iron continues strong, with indications that it will grow stronger constantly. Inquiries for all grades of iron and sales are very heavy. Sales are confined to the last half of the year, practically the entire production for the first half having been disposed of. Prices continue nearly stationary, to-day's quotations being: For Northern No. 1, $18@$18.50; Northern No. 2, $17.50@$18; Southern No. 1, $16@$16.50 and Southern No. 2 $15.65@$16.15.

Coke continues at $5.50@$5.75 for immediate delivery, and $5.00@$5.25 for delivery in the last half of the year. There is considerable buying for the last half, though most of the purchasers want deliveries as soon as they can get them. The railroad situation continues to be a subject of constant complaint; the effect of storms and washouts appears to be continuing into this week, making coke scarce everywhere in and about Chicago.

Cleveland. March 12.

(*From Our Special Correspondent.*)

Iron Ore.—The delays in coming to a decision as to season rates for the big shippers are explained by the statement that the Wall street owners of mines for which Hanna & Co. are agents, have dictated 75c. as the rate to be paid. The United States Steel Corporation being unwilling to have another shipper obtain a less rate, is holding out for the same, even though it is favorable to the 80c. rate as the more equitable. Efforts are now being made to line Hanna & Co. up on the better rate. This contention is preventing any chartering other than that done by the smaller shippers. The sales of ore are now comparatively light but the old prices prevail. They are: $4.25 for bessemer; $3.25 for non-bessemer old range and bessemer Mesabi; and $2.75 for non-bessemer Mesabi.

Pig Iron.—The market this week has eased up some as to demand but the supply is still very short. The coke supply has not improved much and the furnace men are not at all sure that their supply at any time will be sufficient to keep the plants going. Iron for immediate use is very scarce and any one having material of which to make disposition can almost command his own price. The sales this week have been confined almost entirely to contracts entailing deliveries into the fourth quarter, as about all of the foundry iron that will be produced before that time has been sold. On these contracts the price holds at $17.50 for No. 1 and $17 for No. 2, Valley furnace. Spot sales command a premium of $2 easily. Bessemer and basic sales are very light, as no one seems to have any uncovered capacity short of the fourth quarter. Nominally, however, the quotation is still $16 in the Valleys.

Finished Material.—The demand for structural material is the leader this week. Sales for quick shipment are mostly out of store and this iron is being rushed so rapidly that there is hardly a halt in transit between the mill and the consumers. The dealers, therefore, are permitted to collect no stock. Mill sales command 1.70c. and store sales 2.75@3c. Sheets are not quite so largely in demand. The spring trade has hardly started but all are preparing for the big business which seems to be immediately ahead. Quotations do not change from 3.45@3.60c. for No. 27 one pass cold rolled, full cold rolled bringing 10c. extra. Bars in big demand and it looks now as if bar steel might advance in price soon again. Mill sales are based on a quotation of 1.60c., Pittsburg, for bessemer steel and 1.70c., Pittsburg, for open-hearth steel bars and 1.70c., Pittsburg, for iron bars. Deliveries are promised on larger sizes after four or five monthse only and on the smaller bars in four or five weeks. The plate trade is quiet and the quotation remains unchanged at 1.70c. Billets and sheet bars are as scarce as ever and the users of them are in much distress for want of material.

Old Material.—The speculators are operating freely in the scrap trade, just now being under the belief that there will be a large advance soon. Those who have material to sell are asking big prices for it of the dealers. The latter are not able to obtain a corresponding advance from the consumers and business is lagging. The prices are: Steel rails, $17; old car wheels, $17; old iron axles, $22; old iron rails, $22; heavy steel, $17; cast scrap, $14; No. 1 wrought, $18; cast borings, $8; wrought turnings, $13.75.

Philadelphia. March 13.

(*From Our Special Correspondent.*)

Pig Iron.—A good deal of uneasiness has been developed during the past few days in this city and Eastern Pennsylvania both as to the difficulty of obtaining foundry iron for prompt delivery and to the rumors concerning its advances. A good deal of correspondence has been had with the South and some business has been done and more is likely to be done very soon. Bulk purchases have been quietly made abroad, the extent of which at present is unknown. Further dependence will be had on foreign sources unless things change very much and very soon. Quotations are given for No. 1 foundry at $20@$21; No. 2X at $19@$20; No. 2 plain at $18.50@$19; standard gray forge $18@$18.50; basic $18.50@$19; bessemer, $20. These quotations cannot be relied upon with exactness owing to the anxiety of certain buyers who have been paying premiums and are willing to pay premiums for later deliveries.

Steel Billets.—There is a great deal of uncertainty as to the situation in steel billets. As to quotations, $32.50@$33.50 is mentioned. The situation in regard to billets is rather critical.

Bar Iron.—The advances in bar iron are surprising the trade. Iron and steel bars have sold at 1.90c. and as high as 2.10c. and mill men are loathe to give definite quotations owing to the unsettled condition of the market. All mills are busy and production is being strained to the utmost.

Plates.—While there is nothing strictly new in iron and steel plates, the requirements are considerably ahead of demand and that there are several large consumers in trouble, owing to their inability to obtain promised supplies. A good deal of fire-box material is wanted and quotations are 2@2.10c.; universals, 1.80@1.85c.; sheared, 1.80c.; flange, 1.90@2.10c.

Structural Material.—Quotations outwardly continue the same, but it is of no use to go by appearance. Those who represent structural interests here are very reticent. Deliveries are still difficult. Three or four railroad companies who are considering the propriety of putting in a good deal of bridge work have simply dropped the whole question until things change.

Steel Rails.—Steel rails are nominally $28 for standard and quotations for girders are not given to-day.

Old Rails.—The demand is very urgent but supplies are not at hand. Quotations are as high as $23 for iron and $20 for steel.

Scrap.—All kinds of scrap are very scarce and choice railroad is quoted at $23 with none to be had. Heavy steel has sold as high as $20 and there is call for much more. Choice heavy is quoted at $14@$15 and very little to be seen. Old car wheels are nominally $17.50. Light forge scrap for springs $15, but $16 is asked. Fancy prices are being paid for most scrap that is sold and these figures cannot be had.

Pittsburg. March 12.

(*From Our Special Correspondent.*)

The demand for iron and steel products continues heavy and prices are higher and firmer. While bars were advanced by agreement $2 a ton and quotations remained nominally at the former price no formal action was taken by manufacturers until this week and all quotations are now being made at the advance. No reduction may be expected this year as mills are sold up beyond July 1 and have specifications that will keep them busy for at least 60 days. Muck bar has advanced and some sales during the week were made at $31.75. It is not likely that any further business can be done at less than $32 for a month or two at least.

The pig iron market is quiet and no sales of bessemer are recorded. While no furnaces were forced to bank on account of a shortage of coke due to interruption of shipments by the flood, many were operated irregularly and production was restricted.

Deliveries of coke were up to the requirements of the furnaces on Monday and yesterday and the full capacity is again being turned out. Basic iron is easier and quotations are made at a lower figure than a week ago. It is intimated that consumers of steel have brought more basic iron than they required and are using the surplus in conversion deals. The continued heavy demand for gray forge has resulted in an advance of 50c. a ton for deliveries throughout the year. Foundry iron is quiet, but few sales being made, while prices remain about the same as last week.

Very little new business is being accepted in structural material and manufacturers are evidently trying to avoid taking orders, particularly large contracts, as they are well sold up to the end of the year. This is done to enable them to take small business that is likely to turn up on which big premiums can readily be obtained. All mills and furnaces seem to be sold as far ahead as they desire to sell. The sheet market is very firm. Production of iron sheets is heavier than a year ago and prices are about $2 a ton lower than on steel sheets. Bessemer steel billets are still scarce and are nominally quoted at $31.50. A large consignment of foreign sheet bars is expected in the Pittsburg District this week which will go to the independent sheet mills. A local concern is importing the steel and claims to have options on a large tonnage which it is said can be laid down in the market here at a lower price than is quoted by home manufacturers.

The wire mills are pretty well filled up with business and it is likely that at the meeting to be held during the latter part of the month wire will be advanced $1 a ton and nails from $2.05 to $2.10. At the meeting of the cut nail manufacturers held during the week prices were advanced from $1.95 to $2.

The Pennsylvania Company on Monday let contracts in connection with the elevation of the tracks of the Pittsburg, Fort Wayne & Chicago Railroad through Allegheny. The American Bridge Company will furnish the steel for overhead crossings and H. S. Kerbaugh, of Philadelphia, and Frederick Gwinner, of Allepheny, were awarded the contracts for masonry and concrete work. The total cost of the work awarded will approximate $2,000,000.

The bi-monthly examination of the bar iron sales sheets of the Republic Iron and Steel Company and the American Steel Hoop Company for January and February, in order to determine the wages of iron workers for March and April under the Amalgamated Association scale, was made at Youngstown on Monday. The average, while above 1.50c. was not quite 1.60c. and present wages will continue for another two months. Owing to the recent advance in bar iron prices the puddlers are assured an advance of 25c. a ton and the finishers an increase of 2 per cent at the next bi-monthly examination. The examination of the sales sheets of the American Sheet Steel Company and the American Tin Plate Company will be made during the week. No advance in wages is possible as prices have not advanced above the base of the scale.

Pig Iron.—No sales of bessemer pig iron were made this week but quotations remain at $16.50@$16.75, Valley furnaces. Basic iron is quoted at $17.25, Pittsburg and Southern basic at $17.65@$18.15. A sale of 500 tons of gray forge was made at $17.50, Pittsburg, for the third quarter and one of 1,500 tons at $17.25, Pittsburg, for the fourth quarter. Foundry iron is quiet and No. 2 is still quoted at $17@$17.50, Pittsburg, for the second half.

Steel.—The price of steel bars has been advanced to 1.60c. and no sales are likely to be made at a less price this year. Bessemer steel billets are offered at $31.50 but no sales are noted this week. Tank plate remains firm at 1.60c.

Sheets.—The sheet market is very firm but prices remain unchanged. The American Sheet Steel Company prices for No. 28 gauge range from 3.10 to 3.20c. and galvanized sheets are 70 and 10 per cent off.

Ferro-manganese.—The price remains unchanged, 80 per cent domestic being quoted at $52.50.

New York. March 14.

Pig Iron.—Northern irons are still higher and anyone having any spot Northern to sell can get pretty near his own price for it. We quote for tidewater delivery: No. 1X foundry, $18.50@$19; No. 2X, $18@$18.50; No. 2 plain, $17.50@$18; gray forge, $17@$17.50. For Southern iron on dock, New York, No. 1 foundry, $16.25@$16.75; No. 2, $15.75@$16.50; No. 3, $15.25@$15.75; No. 4, $14.75@$15.25; No. 1 soft, $16.50@$16.75; No. 2, $15.75@$16.25.

Bar Iron and Steel.—Demand shows no prospect of abatement and prices are higher. We quote 1.70c. for common bars in large lots on dock; refined bars, 1.83c.; soft steel bars, 1.83c.

Plates.—The market is very strong. Prices have not been advanced but the mills have decided to do away with the differential of $3.50 or $4 per ton export business. We quote for tidewater delivery in car-loads: Tank, ¼-in. and heavier, 1.78c.; flange, 1.88c.; marine, 1.98c.; universal, 1.78c.

Steel Rails.—There is little of interest in the markets except for reports of sales for 1903 delivery. Standard sections are still quoted at $28 at Eastern mills; light rails at $30@$33, according to weight.

Structural Material.—Demand continues strong and anything like prompt delivery commands a good premium over quotations. We quote for large lots at tidewater as follows: Beams, 1.80@1.95c.; tees, 1.85c.; angles, 1.80c.

Nails.—The market is firm. We quote wire nails in carloads on dock, $2.13; cut nails, $2.20.

CHEMICALS AND MINERALS

New York. March 14.

Heavy Chemicals.—Continued interference with transportation has stiffened spot prices, and as demand is generally good sellers obtain what they ask. Of course this condition is only temporary, and with better transportation facilities the market will again recede. High-test domestic alkali sold at 80@85c. per 100 lbs. f. o. b. works for prompt delivery, while future orders have been taken at 75@80c., f. o. b. works. Foreign alkali is neglected at 90@92½c. per 100 lbs. in New York. Domestic caustic soda of high test is in short supply for early delivery, though makers quote $1.95@$2 per 100 lbs. f. o. b. works for future shipments, $1.90@$1.95 is asked. Some export business is doing in bicarb. soda on basis of domestic delivery at $1 per 100 lbs. for ordinary f. o. b. works, and $3 up per 100 lbs. for the better grades. Sal soda sells at 55c. per 100 lbs. f. o. b. works, while foreign holds at 67½c. per 100 lbs. in New York. Bleaching powder is scarce here, prime Liverpool selling at $1.87½ per 100 lbs., and other makes at $1.70@$1.80. Chlorate of potash is firm for prompt delivery at $8½ per 100 lbs. for crystals, and $8@$8⅛ for powdered, while new contracts can be booked at $7¾ per 100 lbs. f. o. b. works.

The American Alkali Company, which was incorporated in 1899 with a capital of $30,000,000 to produce caustic soda and bleaching powder by the Rhodin electrolytic process, is in difficulty. Four stockholders, owning 13,920 shares of the 120,000 preferred stock, and 700 of the 480,000 common, claim fraud in promoting and managing the company, and have asked that it be dissolved by the United States Circuit Court at Trenton, N. J. Soon after incorporation the company organized the Canadian Electro-Chemical Company, Limited, through which it established at Sault Ste. Marie, Canada, a plant costing $246,143, which went in operation in January, 1901, and continued until September 25, 1901, at a great loss. A test was made of the bleaching process, and it was demonstrated, it is said, that it was an absolute failure. The works are not now in operation.

Acids.—Deliveries are slow, as high water near some of the plants has damaged stocks and interfered with transportation. Now that better weather is promised we may expect a freer movement of acids. Oxalic acid, which has been selling at rather low prices, owing to competition, is firmer for shipment. The higher copper market has strengthened blue vitriol.

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

Acetic, com'l 28%.....	$1.80	Oxalic, com'l.....	$4.75@5.00
Blue Vitriol....	4.37½@4.62½	Sulphuric, 50 deg., bulk ton.....	14.00@16.00
Muriatic, 18 deg.....	1.50	Sulphuric, 60 deg.....	1.00
Muriatic, 20 deg.....	1.62½	Sulphuric, 60 deg., bulk	18.00@20.00
Muriatic, 22 deg.....	1.75	Sulphuric, 66 deg.....	1.20
Nitric, 36 deg.....	4.00	Sulphuric, 66 deg., bulk	21.00@23.00
Nitric, 38 deg.....	4.25		
Nitric, 40 deg.....	4.50		
Nitric, 42 deg.....	4.87½		

Brimstone.—Quiet at ruling high prices. Spot best unmixed seconds holds at $24 per ton, and shipments $22.90@$23. Best thirds are quoted at $2.50 per ton less than seconds. Exports of brimstone from Sicily in January aggregated 41,692 long tons, showing an increase of 9,098 tons as compared with the same month last year. Stocks in Sicily on January 31, 1902, were 315,634 tons, as against 245,527 tons at the same time in 1901; an increase of 70,107 tons, owing partly to a smaller consumption in countries where pyrites can be had cheaply and used advantageously for industrial purposes.

Pyrites.—Imports are quite large, and recently 4,193 tons Spanish iron pyrites arrived at this port and a like quantity at Baltimore.

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. New York and other Atlantic ports. Spanish pyrites contain from 40 to 51 per cent of sulphur; American, from 42 to 44 per cent.

Sulphate of Ammonia.—Business is slow, and prices for 24@25 per cent gas liquor are easier at $2.90@$2.92½ per 100 lbs. to arrive, and $2.95 for prompt delivery.

Manganese Ore.—A cargo of Russian ore has been sold for Baltimore at 20c. per unit delivered (about $10 per ton). This is rather low considering the high freight rate of 21s. 3d. ($5.10).

Chrome Ore.—Buying for Baltimore account has been good of late, and some large cargoes have already been received from Turkey. Latest sales are on a basis of $21 per ton for 50 per cent ore.

Nitrate of Soda.—Stronger, with tendency to advance, owing to comparatively small stocks. Spot is held at $2.30 per 100 lbs., and to arrive at $2.25, while future shipments range from $2.02½@$2.10, according to position. On the west coast of South America the market is higher and moving upward. The Chilean Government has been agitating an advance of 12c. per 100 lbs. in the export tax, but from latest advices it has decided not to change the duty. Freight rates are easy, and among the charters recently booked, we note 20s. ($4.80) to Hampton Roads, or 19s. ($4.56) to Galveston, Texas, and 20s. to New York on steamer cargoes, while the rates by sailing vessel to North of Hatteras are 17s. 6d.@18s. 9d. ($4.20@$4.50). These are lower rates than were booked a year ago.

Phosphates.—Market is quiet. Operations at mines are improving with mild weather, and preparations are being made for exporting some large lots of rock to Europe.

Tennessee producers exported from Pensacola in February 11,596 tons of rock, which compares with 2,454 tons in January, and 11,318 tons in February, 1901.

Charters booked for this month's sailing include Tampa and New Orleans to Bremen, Germany, or Rotterdam, Holland, at 10s. net ($2.40), 6d. (12c.) extra if both ports; Tampa to Helsingborg, Sweden, at 16s. 6d. ($3.96); Fernandina to Glasgow, Scotland, at 10s. 7½d. ($2.55), and Fernandina to Stettin, Germany, 14s. 3d. ($3.42).

Exports of Florida high-grade rock from Savannah in February amounted to 13,005 tons, and England the balance. These shipments are considerably larger than were reported in January, but show a decrease of 4,101 tons from February, 1901.

The decreased output of blast furnace slag in Europe has initiated an advance in price for fertilizer use. Germany and France consume large quantities of slag, and should the supply continue to shrink, which seems likely, there ought to be an increased demand for other fertilizer material, especially for phosphates.

Liverpool. Feb. 28.

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

The market for heavy chemicals is still dull, but prices are steadily maintained.

Soda ash is firm. We quote spot range as to market as follows: Leblanc ash, 48%, £5 15s.@£6; 58%, £6 2s. 6d.@£6 7s. 6d. per ton, net, cash. Ammonia ash, 48%, £4 5s.@£4 10s.; 58%, £4 10s.@£4 15s. per ton, net cash. Bags, 5s. per ton under price for tierces. Soda crystals are in good jobbing demand for home consumption, but export demand is quiet. For barrels, £3 7s. 6d. per ton, less 5%, is generally quoted, or 7s. less for bags, with special terms for certain export markets. Caustic soda is in moderate request at steady rates. We quote spot as follows: 60%, £8 15s., 70%, £9 15s., 74%, £10 5s., 76, £10 10s. per ton, net, cash. Bleaching powder is rather slow of sale at £6 15s.@£6 17s. 6d. per ton, net, cash for hardwood packages, with special term for continental and a few other export quarters.

Chlorate of potash is dull at 3@3⅛d. per lb, net, cash.

Bicarb soda is in fair request 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 terms for a few favored markets.

Sulphate of ammonia is less active and a shade easier at £11 13s. 9d.@£11 15s. per ton, less 2½% for good gray 24@25% in double bags f. o. b. here.

Nitrate of soda is still held on spot for £10 10s.@£10 15s. per ton, less 2½% for double bags f. o. b. here, and a moderate trade is passing.

METAL MARKET.

New York. Mar. 13.

GOLD AND SILVER.

Gold and Silver Exports and Imports.

At all United States Ports in January and Year.

Metal	January. 1901.	January. 1902.	Year. 1901.	Year. 1902.
Gold.				
Exports....	$8,221,159	$1,973,675	$8,221,159	$1,973,675
Imports....	4,265,626	1,404,787	4,265,626	1,404,787
Excess.	E. $3,955,533	E. $568,888	E. $ 3,955,533	E. $ 568,888
Silver.				
Exports....	$4,790,239	$4,509,213	$ 4,790,239	$ 4,790,239
Imports....	3,189,318	2,107,681	3,189,318	3,189,318
Excess.	E. $1,600.921	E. $2,401,532	E. $1,600,921	E. $2 401,532

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 March 13, 1902, and for years from January 1, 1902, 1901 and 1900.

Period.	Gold.		Silver.		Total Excess Exports or Imports.
	Exports.	Imports.	Exports.	Imports.	
Week ...	$4,935,296	$270,931	$721,674	$21,144	E. $5,364,895
1902.....	13,735,220	782,038	8,662,764	255,144	E. 21,360,802
1901.....	9,145,520	629,473	7,775,073	728,103	E. 15,522,017
1900.....	2,396,206	1,029,283	8,845,219	936,599	E. 8,888,543

Most of the gold exported this week went to France; the silver went chiefly to London. Imports were mainly from Central and South America, and the West Indies.

Financial Notes of the Week.

Business continues steady, and the effects of stormy weather and interruptions in transportation are slowly passing away. The money tension in New York has been somewhat relieved, and it is reported that some large loans have been placed here by French bankers. This has also had the effect of lowering exchange, and no more gold exports are noted.

The statement of the New York banks, including the 63 banks represented in the Clearing House, for the week ending March 8, gives the following totals, comparison being made with the corresponding weeks of 1901 and 1900:

	1900.	1901.	1902.
Loans and discounts	$763,203,100	$918,789,600	$935,102,100
Deposits	829,425,700	1,011,928,500	1,005,666,700
Circulation	18,931,900	31,469,000	31,366,600
Specie	152,729,600	191,134,100	184,529,500
Legal tenders	60,303,200	72,565,300	70,845,600
Total reserve	$213,032,800	$263,699,400	$255,375,100
Legal requirements	207,356,425	252,982,125	251,416,675
Balance surplus	$5,676,375	$10,717,275	$3,958,425

Changes for the week, this year, was an increase of $127,900 in circulation, decreases of $3,089,100 in loans and discounts, $11,821,600 in deposits, $7,904,000 in specie, $1,068,900 in legal tenders, and $6,017,500 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 is made with the holdings at the corresponding date last year:

	1901.		1902.	
	Gold.	Silver.	Gold.	Silver.
N. Y. Ass'd.	$191,134,100	.....	$184,529,500	.....
England	181,573,945	.....	186,807,625	.....
France	475,527,700	$218,963,510	500,926,865	$220,932,280
Germany	151,105,000	73,585,000	191,595,000	70,865,000
Spain	70,005,000	82,725,000	70,260,000	88,450,000
Netherlands .	25,269,500	28,779,000	28,654,000	32,691,000
Belgium	14,430,000	7,215,000	15,293,335	7,646,665
Italy	77,085,000	9,321,000	79,965,000	10,602,500
Russia	368,870,000	33,805,000	363,420,000	37,530,000

The returns of the Associated Banks of New York are of date March 8, and the other March 6, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

Shipments of specie by water from San Francisco for the two months ending February 28 were as follows:

	1901.	1902.	Changes.
Silver bars	$155,760	$885,500	I. $729,740
Mexican dollars	207,633	75,586	D. 132,047
South American coin	3,765	4,574	I. 809
U. S. coin	123,312	....	D. 123,312
Total, silver	$490,470	$965,660	I. $475,190
Gold bars	....	$732,000	I. $732,000
Gold coin	$491,145	845	D. 490,300
Total, gold	$491,145	$732,845	I. $241,700
Totals	$981,615	$1,698,505	I. $716,890

Shipments of gold coin to New York are not included this year. The destinations of the total shipments this year were as follows: China, $961,201; Japan, $732,000; Pacific Islands, $5,304. The shipment of gold bars to Japan was an extraordinary one.

Shipments of silver from London to the East for the year up to February 27, are reported by Messrs. Pixley & Abell's circular as follows:

	1901.	1902.	Changes.
India	£1,483,500	£1,347,320	D. £136,180
China	74,875	11,500	D. 63,375
The Straits	48,976	250	D. 48,726
Totals	£1,607,351	£1,359,070	D. £248,281

Arrivals for the week, this year, were £143,000 in bar silver from New York, £22,000 from the West Indies, and £7,000 from Australia; total, £172,000. Shipments were £95,000 in bar silver to Bombay, and £250 to Singapore; total, £95,250.

Indian exchange has been steady, and the Council bills offered in London have been taken at an average of 16.03d per rupee. The purchasers of silver for Indian account have been moderate only. An increased demand is reported for China, however.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	$0.43½	$0.45½
Peruvian soles and Chilean pesos	.40	.44
Victoria sovereigns	4.85	4.88
Twenty francs	3.86	3.88
Twenty marks	4.74	4.85
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

Feb. Mar.	Silver: Sterling Exchange	Silver: N. Y. Cts.	Silver: London Pence.	Copper: Lake Cts. per lb.	Copper: Electrolytic per lb.	Copper: London £ per ton.	Copper: Tin, cts. per lb.	Lead cts. per lb.	Spelter: N.Y. cts. per lb.	Spelter: St. L. cts. per lb.
7	4.87⅝	54½	25⅛	12¼ @12½	12 @12⅛	54⅝	26	4.05 @4.10	4.25	4.10
8	4.87⅝	54¼	25	12¼ @12⅛	12 @12⅛	....	26½	4.05 @4.10	4.25	4.10
10	4.87⅜	54⅜	25/16	12¼ @12½	12 @12⅛	53⅞	26½	4.05 @4.10	4.25	4.10
11	4.87⅜	54⅛	25⅛	12¼ @12⅛	12 @12⅛	53⅞	26¾	4.05 @4.10	4.25	4.10
12	4.87⅜	54⅛	25⅛	12¼ @12⅛	12 @12⅛	54¼	26¾	4.05 @4.10	4.25	4.10
13	4.87⅜	54¼	25	12¼ @12⅝	12 @12⅛	54⅛	26¾	4.05 @4.10	4.25	4.10

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 has ruled very quiet indeed throughout the week, transactions being few and far between. Quotations are unchanged and rather nominal, at 12¼@12½c. for Lake; 12@12⅛c. for electrolytic in cakes, wire bars and ingots, 11¾@11⅞c. in cathodes; 12@12⅛c. for casting copper.

The foreign market, which closed last week at £54 12s. 6d., declined sharply upon the publication of the news regarding British reverses in South Africa, £53 17s. 6d. being the lowest point reached. At the close the tendency has become somewhat firmer, spot being quoted at £54 2s. 6d.@£54 5s., three months at £54@£54 2s. 6d.

Refined and manufactured sorts we quote: English tough, £57 10s.@£58; best selected, £58@58 10s.; strong sheets, £68@£69; India sheets, £67@£68; yellow metal, 6⅛@6¼d.

Exports of copper from New York and Philadelphia in the 5 days ending March 11, were 3,830 tons, of which Great Britain received 1,521 tons, Germany, 417 tons, and Holland, 1,257 tons. There was also shipped to Great Britain 376 tons of matte. Imports were 611 tons copper from Mexico.

Tin.—The scarcity of spot tin mentioned in our last report became more pronounced at the beginning of the week, but subsided again later on upon receipt of advices that the tin on the steamer *Acara*, which foundered a little while ago, would probably be delivered early next week. We quote spot at 26¾c.; March 25¾@26¼c.; April, 25¼c.; May, 25c.; June, 24¾c.

The foreign market, which closed last week at £115, advanced on Monday to £116, but declined again, and the closing quotations are cabled as £115@£115 2s. 6d. for spot, £111 15s.@£111 17s. 6d. for three months.

Lead is dull and unchanged. The ruling quotations are 4@4.05c., St. Louis; 4.05@4.10c., New York.

The foreign market is again easier, Spanish lead being quoted at £11 7s. 6d.@£11 10s.; English lead at £11 10s.@£11 12s. 6d.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is quiet, but rather dull. Soft Missouri metal sells at 4.02½c., and desilverized lead at 4.10c.

Spelter remains in fair demand. We quote the market about 4.10c. St. Louis, 4.25c. New York.

The foreign market is somewhat easier, good ordinaries being quoted at £17 15s., specials at £18.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter is firm and fairly active, with the quotation at 4.10c. here.

Silesian Spelter Market.—Herr Paul Speier reports from Breslau under date of February 28 that a light domestic demand has been somewhat offset by heavy exports. The quotation for good ordinary spelter is 17.40@17.75 marks per 50 kgs., f. o. b. cars at Breslau. This is equal to 3.53c. per lb. The imports and exports in Germany for the month of January were, in metric tons:

	Imports 1901.	Imports 1902.	Exports 1901.	Exports 1902.
Spelter	2,619	3,682	5,598	10,625
Zinc sheets	14	19	1,669	2,485
Scrap zinc	132	177	310	489
Zinc ores	7,133	6,619	6,495	12,355
Zinc white	506	344	1,811	2,731
Lithopone	....	11	679	1,324

The large increase in exports was chiefly to Great Britain and Austria. The output of zinc ores in the Silesian District in 1901 is estimated at slightly over 500,000 tons.

Antimony.—Is unchanged. We quote Cookson's at 9¾@10c.; Hallett's, 8@8⅛c.; Hungarian, Japanese, Italian and U. S. Star, 7¾c.

Nickel.—The price continues firm at 50@60c. per lb., according to size and terms of order.

Platinum.—Consumption continues good. Ingot platinum in large lots brings $19.50 per oz., in New York.

Chemical ware (crucibles and dishes), best hammered metal from store in large quantities, is worth 82c. per gram.

Quicksilver.—The New York price continues $48 per flask for large lots, with a slightly higher figure for small orders. In San Francisco quotations are firm at $47.50@$48 for domestic orders, and $44 for export. The London price is £8 15s. per flask, with the same figure quoted from second hands.

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

Aluminum.	Per lb.	Aluminum.	Per lb.
No. 1, 99% ingots	33@37c.	Ferro-Tungsten (37%)	28c.
No. 2, 90% ingots	31@34c.	Magnesium	$2.75
Rolled sheets	4c. up	Manganese (over 90%)	1.00
Alum-bronze	20@23c.	Mangan'e Cop. (20% Mn)	32c.
Nickel-alum	33@39c.	Mangan'e Cop. (30% Mn)	38c.
Bismuth	$1.50	Molybdenum (Best)	$1.82
Chromium (over 90%)	1.00	Phosphorus	50c.
Copper, red oxide	50c.	American	70c.
Ferro-Molyb'um (50%)	$1.25	Sodium metal	50c.
Ferro-Titanium (10%)	90c.	Tungsten (Best)	62c.
Ferro-Titanium (20%)	$1.10		

Variation in prices depend chiefly on the size of the order.

Average Prices of Metals per lb., New York

Month.	Tin. 1902.	Tin. 1901.	Lead. 1902.	Lead. 1901.	Spelter. 1902.	Spelter. 1901.
January	23.54	26.51	4.000	4.350	4.27	4.13
February	24.07	26.68	4.075	4.350	4.15	4.01
March	....	26.03	....	4.350	....	3.91
April	....	25.93	....	4.350	....	3.98
May	....	27.12	....	4.350	....	4.04
June	....	28.60	....	4.350	....	3.99
July	....	27.85	....	4.350	....	3.98
August	....	26.78	....	4.350	....	3.99
September	....	25.31	....	4.350	....	4.08
October	....	26.62	....	4.350	....	4.23
November	....	26.67	....	4.350	....	4.29
December	....	24.36	....	4.153	....	4.31
Year	....	26.54	....	4.334	....	4.08

Average Prices of Copper.

Month.	New York—Electrolytic. 1902.	New York—Electrolytic. 1901.	New York—Lake. 1902.	New York—Lake. 1901.	London—Standard. 1902.	London—Standard. 1901.
January	11.053	16.25	11.322	16.77	48.43	71.78
February	12,173	16.38	12,378	16.90	55.16	71.17
March	....	16.42	....	16.94	....	69.54
April	....	16.43	....	16.94	....	69.61
May	....	16.41	....	16.94	....	69.66
June	....	16.38	....	16.90	....	68.83
July	....	16.31	....	16.61	....	67.66
August	....	16.25	....	16.50	....	66.34
September	....	16.25	....	16.54	....	65.97
October	....	16.25	....	16.60	....	64.11
November	....	16.224	....	16.33	....	64.51
December	....	13.845	....	14.36	....	52.34
Year	....	16.117	....	16.53	....	66.78

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.

Month.	1902. London. Pence.	1902. N. Y. Cents.	1901. London. Pence.	1901. N. Y. Cents.	1900. London. Pence.	1900. N. Y. Cents.
January	25.62	55.56	28.97	62.82	27.30	59.30
February	25.41	55.09	28.13	61.06	27.40	59.76
March	....	....	27.04	60.63	27.59	59.81
April	....	....	27.30	59.29	27.41	59.59
May	....	....	27.43	59.64	27.56	59.96
June	....	....	27.42	59.57	27.81	60.42
July	....	....	26.96	58.46	28.23	61.25
August	....	....	26.94	58.37	28.13	61.14
September	....	....	26.95	58.26	28.85	62.63
October	....	....	26.62	57.59	29.58	63.83
November	....	....	26.12	56.64	29.66	64.04
December	....	....	25.46	55.10	29.68	64.14
Year	....	....	27.11	58.95	28.27	62.33

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

STOCK QUOTATIONS.

NEW YORK.

Company and Location.	par val	Mar. 6. H.	Mar. 6. L.	Mar. 7. H.	Mar. 7. L.	Mar. 8. H.	Mar. 8. L.	Mar. 10. H.	Mar. 10. L.	Mar. 11. H.	Mar. 11. L.	Mar. 12. H.	Mar. 12. L.	Sales
Alice, Mont.	25			.49										300
Amalgamated c.,Mont	100	69.75	67.88	69.38	68.50	69.75	68.63	69.50	68.00	69.25	68.50	68.75	64.13	206670
Anaconda c., Mont.	25	32.50	32.13	33.25	33.00	34.50	32.88	33.00	32.88	33.00	32.50	32.25	31.50	2,900
Anaconda Gold, Colo.	5									.22				500
Argentum-Jun., Colo.	2	.05		.05				.05				.04½	.04	4,000
Brunswick, Cal.	1							.09						1,000
Chrysolite, Colo.	50	.04				.04								400
Comstock T., Nev.	2½	.03		.06						.05½		.05½		5,500
Comstock Bonds, Nev.	100			.06								.05½		4,000
Con. Cal. & Va., Nev.	2½							1.35		1.30				200
Creede & C. C., Colo.	1					.09	.08½	.09						2,500
Crescent, Colo.	10					.10								300
CrippleCr. Con., Colo.	1													
Crocsus, Colo.	1			.10										300
Crown Point, Nev.	2													
Dunkin, Colo.	1			.14										200
Elkton, Colo.	1	1.26	1.25					1.24	1.23	1.21				1,100
Golden Fleece, Colo.	1													
Greene Con., Mex.	10											21.50	21.13	
Homestake, S. Dak.	100													
Iron Silver, Colo.	20					.80						.78		500
Isabella, Colo.	1	.27	.26					.25				.26	.25	3,500
Jack Pot, Colo.	1									.35				500
King & Pemb., Ont.	10							.12						1,000
Leadville, Colo.	10	.06				.12								600
Little Chief, Colo.	1	.12												600
Mexican, Nev.	3	.30										.30		600
Mollie Gibson, Colo.	5			.13		.13				.13		.12		2,700
Ontario, Utah	100			8.13		8.00						8.00		220
Ophir, Nev.	3	.96	.95							1.00				300
Portland, Colo.	1					2.50								200
Quicksilver, Cal.	100					4.51	4.25	4.13		4.00		2.85		1,200
Quicksilver pf., Cal.	100					11.00		11.88	11.00	11.25	11.00			2,400
Small Hopes, Colo.	20	.45				.50	.45					.50		800
Standard Con., Cal.	10													
Tenn. C., Tenn.	25	13.38	13.13	13.88	13.25	13.88	13.25	13.50	13.00	12.75	12.25	12.00	11.75	
Union Copper, N. C.	10	3.75	3.50	3.75	3.50	3.75	3.50	3.75	3.75	3.75	3.50	3.75	3.50	
White Knob, Ida.	100	23.50	23.00	24.00	23.50	24.00	23.50	22.00	21.50	22.50	21.50	22.00	21.50	
Work, Colo.	1	.08										.08		1,300

Coal and Industrial Stocks.

Am. Agr. Chem., U.S.	100	23	22½	23	22½	23	21	22	21	23	22½			100
Am.Agr.Chem.pf,U.S.	100	89	85	89	85	99	95	89	85½	89	84½			
Am. Car & Fdy., U.S.	100	31¾	31¼	31½	30⅝	31½	31	31½	30¾	29⅝	29½	31	30⅜	37,300
Am. Car & Fdy. pf,U.S.	100	89½	89	89½	89	89⅜		89¼	88¼	88½		88⅞		3,533
Am. Sm. & Ref., U.S.	100	46⅝	46⅜	46⅝	46⅛	46¼		46½	46¼	47⅛	46½	46⅜	46⅛	5,569
Am. Sm. & Ref. pf,U.S.	100	98⅜	98¼	98½		98¾		99⅛	98½	98⅜		99		3,773
Col. Fuel & I., Colo.	100	98	88	98	92	95⅜	92	96	92½	88	86½	93⅛	92½	77,150
Col. & H. C. & I., Colo.	100			18	17½	17½	17¼			17½		17	16¾	2,300
Int'l S. Pump, U.S.	100	54¾	53	54½	54	54½		54½		52¾		53⅛		2,350
Int'l S. Pump pf, U.S.	100	90½	89¼					91		91	89½	90¼		600
Mong. R. Coal, Pa.	100	13⅜	13⅜	13¾	13½	13⅜	13½	13⅜		13¼				4,635
Mong. R. Coal pf, Pa.	100	42½	42⅜			42½	42⅜	42½	42⅜	42⅜	42	43	42¾	5,580
National Lead, U.S.	100	17	16⅞	17	16¾	17	16¾	17¼	17	17⅛		17⅛	16¾	960
National Lead pf, U.S.	100			82	80			82	81	83¼	80	84	81½	500
National Salt, U.S.	100	30				23				23				100
National Salt pf, U.S.	100	70	60	67	60					67	60			
Pittsburg Coal, Pa.	100	25		25				25		25⅛	25	25⅛	25	664
Pittsburg Coal pf, Pa.	100	90⅜	90¼	90⅜	90¼	90¼	90⅛	90⅜	90¼	90¾	90¼	90⅜	90½	3,385
*Pressed Steel Car, Pa.	100	40⅛	39⅝	40⅛	40	40		40⅛	39⅜	40	39¼	39⅝	39½	4,400
Republic I & S., U.S.	100	16⅞	16½	17⅛	16⅞	17⅛	17⅜	18⅛	17½	16⅜	16½	18¼	17¾	36,490
Republic I.&S.,pf,U.S.	100	72	71½	72½	72	72½	72	73⅜	72½	71¾	71½	74	73	14,040
Sloss-Shef S. & I., Ala.	100	34	33	34	33	34½	34	34		33¾	33½	34½	34	1,429
Sloss-ShefS.& I.pf,Ala.	100	84½	83	84¼	84	84¼	83¼			83¼		84	83¼	200
Standard Oil, U.S.	100	650	648	648	640	648	640	650	645	650	649	645	640	
Tenn. C. I. & R. R., Ala.	100	70⅞	68⅝	71	69⅜	69⅞	69	69⅝	67¾	69¾	68	68¼	67¾	61,650
U. S. Red. & Ref.,Colo.	100	44	43¾	44½	43¾	44⅝	44½	44¼	43½	44⅜	42½	44¼	44	5,030
U.S.Red.&Ref.pf,Colo	100	68	65⅞	67¼	66⅛	67⅜	67¾	67¼		65⅞		66⅛		1,900
U.S.Steel Corp.,U.S.	100	43¼	42⅞	43¼	42¾	42⅞	42¾	42⅞	42¼	43½	43	42¼	41⅜	89,850
U.S.Steel Corp.pf,U.S.	100	94⅞	94⅝	94⅞	94⅝	94¾	94⅝	94⅝	94⅛	95⅞		94⅛	93⅞	65,159
Va.-Car Chem., U.S.	100	64¾	63	66⅜	64	66	65	65⅜	64½	62½	62¼	69	67	17,150
Va.-Car Chem. pf,U.S.	100	123½	123	124		123½		125	124	123	121	131	128¼	3,260

Total sales 697,167 shares. * Ex-dividend.

PHILADELPHIA, PA. §

Name and Location of Company.	par val	Mar. 6. H.	Mar. 6. L.	Mar 7. H.	Mar 7. L.	Mar. 8. H.	Mar. 8. L.	Mar. 10. H.	Mar. 10. L.	Mar. 11. H.	Mar. 11. L.	Mar. 12. H.	Mar. 12. L.	Sales
Am. Alkali	$50	.50						.43		.50		.38	.25	1,756
Am. Cement	10			5.75				5.75		5.63		5.75	5.50	615
Beth. Iron, Pa.	50													
Beth. Steel, Pa.	50													
Cambria Iron, Pa.	50	48.00								48.00				191
Cambria Steel, Pa.	50	23.38	23.12½	23.38	23.24	23.50	23.38	23.38	23½	23.25	23¼	23.25	23½	2,364
Susq. S. & S., Pa.	10	2.00		2.00	1.93	2.00				1.93		2.00		790
United Gas I., Pa.	50	119¾		120¼				120½	119¾	119¾		119¾	119¼	508

§Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 6,218 shares.

MEXICO.

Feb. 22.

Name of Company.	Shares.	Last div'd	Prices. Bid.	Prices. Ask.
Durango:				
Ca.Min. de Penoles.	2,500	$50.00	$4,150	$4,250
Augustias, Pozos	2,400	5.00	60	70
Guanajuato:				
Cinco Senores y An., aviada	2,000	15.00	245	248
Cinco Senores y An., aviada	400	10.00	200	220
Providencia,Sanduan de la Luz	6,000	2.00	200	205
Guerrero:				
Gardeno y Anexas.	7,200		30	50
Hidalgo:				
Amistad y Concordia.	9,600	4.71	52½	53
Carmen, aviada	1,100		250	300
Ca. Real del Monte	2,554		450	550
El Encino, aviador	1,120		40	50
Guadalupe Fresnillo y Annexas.	1,000		220	300
La Blanca, aviada.	1,536		455	
La Blanco, aviada.	768		220	230
Maravillas y An., aviador	1,680		300	320
Maravillas el Lobo	1,000		300	325
Palma y An., aviador	1,800		15	25
Sta. Gertrudis y An., aviador	9,600		7	9
Sta. Gertrudis y An., aviador	28,800	0.50	61	62½
Santo Tomas Apostol aviador	5,100		9	
San Rafael y An., aviada.	1,200	12.00	670	680
San Rafael y An., aviada.	1,200	8.00	340	350
Solodad, aviada.	900	5.00	270	280
Sorpressa, aviada.	900	5.00	195	210
Mexico:				
Alacran	2,400		$60	$70
La Esperanza (El Oro)	3,000	$10.00	850	870
Socovon de S. Fern.	2,500		20	30
Michoacan:				
Luz de Borda, aviador	3,000		20	25
Luz de Borda, aviada	1,000		23	28
San Luis Potosi:				
Concepcion y An.	3,000		160	140
El Barreno, aviador.	2,000	2.00	22	25
Sta. Maria de la Pa.	2,400	15.00	550	560
Santa Fe.	2,400		20	30
San Diego y Annexas.	2,400	4.00	75	80
Zacatecas:				
Candelaria y Pinos	2,500		350	380
San Carlos y Annexas	2,500	10.00	310	315
Sta. Maria de Gaud.	2,500	10.00	345	350
Miscellaneous:				
Bartolome de Medina	2,000	2.00	50	55
Guadalupe Hacienda	10,000	3.00	215	220
La Luz Hac. (Pachuca)	3,750		68	
La Reina (Chihuahua)	192		2,500	3,500
Naica (Chihuahua)	100		4,000	5,000
Natividad (Oaxaca) aviador	1,800	4.00	480	520
National (Oaxaca) aviador	1,800	4.00	400	500
San Francisco Hac.	6,000	2.00	180	185
Santa Ana Huantla Morelos.	4,000		50	70
Union Hacienda	3,000	5.00	200	220

BOSTON, MASS.

Name of Company.	par val	Shares listed.	Mar. 6. H.	Mar. 6. L.	Mar. 7. H.	Mar. 7. L.	Mar. 8. H.	Mar. 8. L.	Mar. 10. H.	Mar. 10. L.	Mar. 11. H.	Mar. 11. L.	Mar. 12. H.	Mar. 12. L.	Sales.
Adventure Con., c	$25	100,000	22.00		23.00						23.50	22.50	23.00		445
Allouez, c.	25	80,000	4.38	4.00	4.50	4.25	4.50	4.38	4.50	4.25	4.50		4.75	4.38	4.50	4.25	
Amalgamated, c	100	1,500,000	69.50	68.13	69.75	68.63	69.50	69.00	70.00	68.63	69.50	68.00	68.50	64.00	22,101
Am. Gold Dreg.	5	90,000	1.50						2.00						20
Am. Z. L. & Sm.	25	60,000			10.00								9.50		75
Anaconda, c.	25	1,200,000													
Arcadian, c.	25	150,000	8.75	7.75	9.00	8.50	9.00	8.50	13.25	8.88	12.25	10.50	11.00	8.63	46,536
Arnold, c.	25	60,000			1.00						1.00		1.00		1.70
Atlantic, c.	25	40,000	39.00				48.88	48.38	49.00	48.50	31.50	30.00	30.25		935
Baltic.	25	100,000	47.00			47.38			47.00		48.00		47.00	46.75	345
Bingham, Cons.	50	150,000	25.00	24.50	25.00	24.75	25.25	25.00	27.63	25.00	26.00		25.00	24.00	5,875
Bonanza Dev.	10	300,000	1.05	.90	1.00	.95	1.00						.85		6,305
Boston, q.	10	100,000													
British Columbia.	5	250,000									10.50	9.88	10.00		1,180
Cal. & Hecla, c.	25	100,000			600.						610.	605.	610.		52
Catalpa	10	300,000													
Centennial, c.	25	90,000	23.25	17.38	25.00	23.00	16.50	24.25	28.00	24.25	26.63	24.50	24.00	19.00	73,401
Central Oil	25	60,050	7.00												200
Cochiti, g.	10	182,250													
Cons. Mercur, g.	5	1,000,000	1.93		1.93		2.00	1.88	1.93	1.69	1.93	1.88	2.00		2,485
Con. Zinc & L. M. S.	10	110,000									2.63	2.38			100
Copper Range Con.	100	285,000	48.00	46.50	48.00	47.50	49.00	48.00	49.50	48.25	49.00	47.50	45.50	45.25	17,727
Copper Range,	25	100,000	71.50												2,965
Daly-West.	20	150,000	20.50	20.00	20.50		21.00	20.38	20.50	20.00	20.00	19.75	20.00	19.25	1,070
Dominion Coal.	100	150,000	104.	101.	104.	103.	104	101¼	103½	103.	106½	105½	1.05	1.03	10,955
Dominion Coal, pf.	100	30,000									117.				14
Elm River, c.	12	100,000	4.63	4.00	4.25	4.00	4.88	4.50	5.00	4.25	4.75	4.25	4.00		9,820
Franklin, c.	25	100,000	14.00		14.00		14.50	13.50	14.50	14.00	13.50				730
Guanajuato Cons.	5	385,000	4.00		4.00		4.50	4.25	4.25	4.13	4.50	4.25	4.00		1,330
Humboldt, c.	25	40,000													
I. Royale Con., c.	25	150,000	21.00	20.50	20.50	20.25	21.00	20.50	20.50		20.06	19.00	19.50	1.900	3,605
Mass. Con., c.	25	100,000	20.00	18.50	20.38	19.50	20.25	19.75	20.13	19.50	19.75	19.60	19.50	19.00	3,605
Mayflower, c.	25	100,000	2.88		3.25	3.00	3.00		3.38	3.00	3.38	3.13			1,640
Merced.	15	100,000													
Michigan, c.	25	100,000	11.00		11.75	11.60	11.50		13.25	11.50	12.50	11.25	11.75	11.13	5,410
Mohawk, c.	25	100,000	37.50	35.00	38.50	37.50	37.75	37.50	38.00	37.50	36.50	35.50	35.50	35.00	2,805
Mont. C. & C.	25	200,000	4.00	3.75	4.50	4.00			4.50		4.50		4.50		880
Mont'l & Boston	5	570,000	4.25	3.75	4.38	3.88	4.50	4.13	4.75	4.00	4.50	4.00	4.25	4.00	20,170
National.	25	100,000													
N. E. Gas & Coke.	100	100,000					5.25	5.00	5.25	5.00			5.00		399
Old Colony, c.	25	100,000	4.00		4.25	3.75	4.25		4.50	4.25			4.00		1,855
Old Dominion, c.	25	150,000	23.00	22.50	23.50	22.75	23.00	22.00	22.00	21.00	21.00	20.25	20.00	19.25	2,342
Osceola, c.	25	96,150	75.00	71.00	74.75	72.00	74.00	72.00	72.00	68.00	69.00	63.75	65.00	61.00	15,702
Parrot, s. c.	10	229,850			32.00		32.00		31.50		32.00	31.00	32.75	31.00	416
Phoenix Con., c.	25	100,000			4.00	3.75			3.75	3.50	3.75	3.50	3.50		921
Quincy, c.	25	100,000	135.		138.		140.	138.	138.		135.		136.		96
Rhode Island, c.	25	100,000			3.00		1.88		3.00	2.88	3.00	2.88	2.75	2.50	915
Santa Fe, g. c.	10	250,000	3.75										3.75		1,590
Santa Ysabel	5	130,000	.50												100
Shawmut Oil.	25	50,000													
Tamarack, c.	25	60,000	210.		220.	210.		210.	215.	210.	210.	195.	190.	181.	1,698
Tecumseh, c.	25	80,000					215.								100
Tennessee.	25	175,000	14.25	13.38	13.50										810
Trimountain, c.	25	100,000	104¾	100.	100.		108.	101.	105.		103.	100.			1,735
Trinity, c.	25	160,000	17.25	15.00	17.00	16.00	16.75	16.00	17.00	16.00	16.25	15.00	15.75	13.75	21,030
United States, g.	25	250,000	18.25	17.50	18.75	17.88	18.75	18.25	19.38	18.75	19.00	18.25	18.25	17.50	18,094
U. S. Oil.	25	100,000			12.00		12.25	11.88			12.00		12.50		120
Utah Con., g.	5	300,000	23.7.	23.00	24.00	23.50	24.00		24.00	23.00	23.50	22.75	23.00	22.00	2,473
Victoria, g.	25	100,000	5.85		6.13	6.00	6 13	6.00	6.75	6.00	6.25	6.00	5.88	5.75	5,789
Washington, c.	25	60,000													
Winona, c.	25	100,000	2.00	1.75	2.00				2.00				1.63		305
Wolverine, c.	25	60,000	53.50	53.00	56.00	55.00	56.00	55.00	56.00	55.00	56.00	55.00	55.00	53.00	923
Wyandot, c.	25	100,000	1.25		1.06						1.00	1.13			150

Official Quotations, Boston Stock Exchange. Total sales, 328,866 shares. †Ex-dividend. §Ex-asst. paid.

ST. LOUIS, MO.*

Feb. 24.

Name.	Shares.	Par	Bid.	Ask.	Name.	Shares.	Par	Bid.	Ask.
Am.-Nettie, Colo.	300,000	$10	$1.00	$1.05	Doe Run Lead Co.	10,000	$100	$128.00	$135.00
Catherine Lead, Mo.	50,000	10	3.00	4.00	Granite Bimet, Mt.	1,000,000	10	2.60	2.70
Central Lead, Mo.	10,000	100	130.00	135.00	K. & Tex. Coal, Mo.	25,000	100	51.50	53.00
Columbia Lead, Mo.	50,000	10	11.50	12.00	Renault Lead, Mo.	30,000	10	9.00	10.00
Con. Coal, Ill.	50,000	100	19.25	21.00	St. Joe Lead, Mo.	300,000	10	16.00	18.00

*From our Special Correspondent.

SPOKANE, WASH.*

Feb. 28.

Name of Company.	Par Val.	H.	L.	Sales.	Name of Company.	Par Val.	H.	L.	Sales.
Black Tail.	$1	.13¼	.13¼		Quilp.	$1	.37		
Den Hur.	1	.16	.15¾		Rambler Cariboo.	1	.90	.87½	
Gold Ledge.	0.05	.02¾	.02	7,500	Republic.	1	.10¾	.10¼	1,000
Lone Pine-Surp. Con.	1	.07¾	.07½	4,000	San Poil.	1	.32	.31	1,000
Morning Glory.	1	.03½	.03½		Sullivan.	1	.10½	.09¼	5,700
Mountain Lion.	0.10	.33½	.33		Tom Thumb.	1	.23⅝	.23½	3,000
Princess Maud.	1	.04	.03½	11,000	Trade Dollar.	1	.12	.11	500

Total sales 33,700 shares. * Reported by Hunner & Harris.

SALT LAKE CITY.*

Mar. 8.

Name of Company.	Location.	Shares.	Par Val.	Quotations. High.	Quotations. Low.	Sales.
Ajax.	Tintic	300,000	$10	$0.20¾	$0.18	43,850
Anchor	Park City	150,000	10			
Bullion Beck	Tintic	100,000	10			
Carisa.	Tintic	500,000	1	.30	.24	69,000
Con. Mercur.	Mercur	1,000,000	5	1.94	1.87½	6,100
Creole.	Park City	150,000	1			
Daly.	Park City	150,000	20			
Daly-West.	Park City	150,000	20	21.10	19.57½	5,095
Dexter.	Tuscarora	200,000	5			
Eagle & B. Bell.	Tintic	250,000	1	.79	.75	200
Grand Central.	Tintic	250,000	1			
Horn Silver.	Frisco	400,000	25			
L. Mammoth.	Tintic	150,000	1	.66½	.63	11,800
Mammoth.	Tintic	400,000	25	.80	.80	300
May Day.	Tintic	400,000	.25	.55	.49	64,300
Ontario.	Park City	150,000	100	8.50	8.50	200
Sacramento	Mercur	1,000,000	5			
Silver King	Park City	150,000	20			
Star Con.	Tintic	500,000	1	.16	.14	39,000
Swansea.	Tintic	100,000	5	.95	.95	100
So. Swansea.	Tintic	300,000	1			
Showers Con.	Tintic	400,000	5			
Sunshine.	Mercur	250,000	10	.28	.20	8,000
Tetro	Tintic	500,000	5	.21	.09	27,000
Tesora	Tintic	400,000	1	¾	.05¾	500
U. Sunbeam.	Tintic	150,000	1			
Uncle Sam.	Tintic	500,000	1	.44	.31½	39,500
West Mng. Glory	Tintic	500,000	.10	.04	.03⅜	42,500
Victor	Tintic	500,000	1	.20	.19	2,100
Yankee Con.	Tintic	500,000	1	2.28	2.07¼	8,700
Ben Butler.	Bingham	500,000	1	.08	.06½	20,000
Boss Tweed.	Tintic	250,000	1	.43	.34⅜	1,300
California.	Park City	300,000	1	.34¼	.13	118,400
Century	Park Valley	150,000	1	.22	.10	7,800

*By our Special Correspondent. Total number of shares sold, 515,745

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.

Name of Company.	par val	Mar. 3. H.	Mar. 3. L.	Mar. 4. H.	Mar. 4. L.	Mar. 5. H.	Mar. 5. L.	Mar. 6. H.	Mar. 6. L.	Mar. 7. H.	Mar. 7. L.	Mar. 8. H.	Mar. 8. L.	Sales
Acacia	$1	.10½	.10¼	.11	.10⅝	.10¼	.10	.10½	.10	.10½	.10¼			
Alamo	1	.02½	.02¼	.03⅛	.03⅛	.03⅛	.03⅛	.04		.04	.04			4,000
Am. Con	1	.02½	.02¼	.02¾	.02¼	.02¼	.02¼	.03	.02½	.03	.02½			
Anaconda	1	.23	.20	.23	.20	.22½	.20	.22¼	.20½	.22¼	.20			1,000
Anchor	1													
Antelope	1													
Aola	1	.01½	.01½	.01½	.01¼	.01½	.01¼	.01¼	.01½	.01¾	.01⅜			56,000
Argentum Jr	1	.04⅛	.03¾	.03¾		.04	.03¾	.04	.03⅝	.04	.03¾			4,000
Banner	1													
Battle Mt. C	1	.14	.12	.14	.12½	.14		.13	.12	.12				1,000
Ben Hur	1	.05				.05		.05		.05				
Black Bell	1	.06⅜	.04	.07		.07								1,000
Blue Bell	1	.09		.08¼	.08	.07½				.07½				1,000
Buckhorn	1	.02	.01½	.02	.01¾	.02	.01½	.02	.01½	.02				
But'fly Ter	1	.15		.15		.15		.17	.15	.20	.17			5,300
Cadillac	1	.02		.01½		.02		.01½		.02				
Cent'l Con	1	.07	.06	.07½	.05½	.06	.05	.06	.05½	.06	.05½			15,000
Champion	1													
C. K. & N	1	.04⅝	.04½	.04¼	.04⅛	.05⅞	.05	.04⅜	.04⅜	.04⅜	.04¾			
Columbine-Victor	1	.06¼	.05¾	.06½	.05¼	.05¾	.05¾	.06¼	.05¾	.06¼	.05¾			107000
C. C. G. Ext	1	.07	.05⅞	.07	.06⅛	.07	.06	.06¾	.06					2,500
C. C. & Mn	1	.04	.02⅝	.02½		.04	.03⅞	.03½	.03⅜	.03⅜	.03½			7,000
Cr'de & C. C.	1	.04		.09		.04		.04						5,000
C. C. Con	1	.08¼	.08	.08½	.08¼	.08¼	.07⅝	.08	.07¼	.08	.07¼			1,000
Dante	1	.03⅜	.03⅜	.03⅜	.03½	.03¼	.03½	.03½		.03⅜	.03½			4,000
Dr. Jack Pot	1	.47⅜	.47½	.49¾	.49	.48	.47⅜	.48	.47½	.47½	.47			2,000
Echo	1	.01⅜	.01⅜	.01⅜	.01⅜	.01⅜	.01⅜	.01⅝	.01⅜	.01⅜	.01⅜			18,700
Elkton, Con	1	1.28¼	1.28	1.27½	1.26½	1.27½	1.27	1.28¼	1.27	1.28	1.27½			13,600
El Paso, G	1	.55	.54	.52	.51½	.53¼	.52¼	.53¼	.53	.54	.53¼			36,450
Fanny Rawlings	1			.07				.07		.10	.07			
Findley	1	.10	.09½	.10	.09½	.10		.11	.10½	.11	.10½			5,000
Gold Dollar	1	.06	.05¾	.06	.05¾	.06½	.05¾	.06	.05¾	.0⅝				2,000
Gold Dollar Con	1													
Gold Cycle	1	.70	.68	.69½	.68	.68½	.68	.69	.68	.68½	.68			
Gold Fleece	1	.44	.35	.35		.40	.30	.45		.45	.38			
Gold Knob	½	.03	.02⅜	.03	.02½			.03	.02¾	.03	.02¾			
Gold Sov'n	1	.03	.01					.03	.02¼	.03	.02¼			3,700
Ida May	1	.15				.15		.15		.15				4,500
Ironclad	1					.04	.02¼	.20⅝		.03¼	.02⅝			
Isabella	1	.23¼	.22½	.23⅜	.23	.23½	.23	.23½	.22¼	.23¼	.23¼			
Jack Pot	1	.34	.33	.35	.33	.34½		.34½	.33	.34½	.33			
Key West	1													13,000
Last Dollar	1													4,000
Lexington	1	.06⅛	.06	.06	.05½	.07	.06¾	.07¼	.07	.07¼	.07			
Maton	1			.08½				.07						
Midway	1	.03¼		.03⅞	.03¼	.03¼		.04⅛	.03⅜	.03⅜	.03¼			1,000
M. J. T	1			.02		.01								
Mobile	1	.02	.01¼	.01¾	.01⅜	.01⅛	.01⅜	.02	.01⅛	.01⅞	.01⅜			1,000
Moll Dwyer	1							.02	.01	.02	.01			
Mol. Gibson	1	.11⅜		.13	.11	.12	.10	.18⅜	.10⅜	.10				2,000
Monarch	1			.02¼	.01⅜	.01								
Montreal	1			.01¼		.01½								
Moon A'c'r	1	.20		.30	.20	.20½		.20	.18	.20	.16			6,000
Morn'g Star	1	.03¼	.03	.03⅜	.03	.03	.02⅝	.03	.02⅞	.03	.02⅝			19,300
National	1	.01⅜	.01¼	.01⅜	.01¼			.02		.01⅜	.01¼			11,000
Nellie, V	1	.02½	.02¼	.02½	.02⅜	.02½	.02⅜	.02½	.02⅜	.02½	.02⅜			8,000
New Haven	1	.04	.03	.04	.03⅜	.03⅜		.04¼	.02⅞	.04⅜	.03⅝			
Olive Branch	1	.02	.01¾	.02½		.02	.01¾	.02	.01¾	.02	.01¾			2,000
Oriole	1	.01¾	.01⅜	.01¾	.01	.01¾	.01⅜	.01¾	.01⅜	.01¾	.01⅜			
Pappoose	1	.02				.02		.01½		.01⅜				
Pharmacist	1	.03⅜	.03½	.03⅜	.03½	.04	.03½	.04	.03⅜	.03¾	.03⅜			
Pinnacle	1	.07	.05½	.07	.05½	.06½	.05½	.06½	.05	.06⅜	.05½			4,000
Pointer	1	.03¼	.03	.03¼	.03	.03¼	.03	.03¼	.03	.03¼	.03			
Portland	1	257.	250	260.	250.	259.¾	250.	254.⅛	250	254.½	250.			1,000
Prince Alb	1	.03	.02½	.03	.02½			.03	.02¼	.03	.02½			3,000
Princess	1	.02	.01⅜	.02	.01⅜	.02	.01⅜	.01⅜	.01¼	.01¾	.01½			5,9·0
Progress	1	.04	.03¼	.03½	.03	.04½	.04⅜	.04¼	.04⅛	.04⅜	.04¼			
Pythias	1													1,000
Republic	1	.01¾		.02⅛	.01¾	.01¾		.02		.02⅛	.02⅛			97,000
Rob. Burns	1					.02		.01¾	.01					
Rose Maud	1	.04	.03	.03⅛	.02⅞	.04	.03	.04	.03½	.04	.03½			
Rose Nicol	1	.03⅜	.03½	.04	.03⅜	.04	.03⅜	.03¾	.03⅜	.05	.03¾			1,000
Sunset Eclipse	1	12¼	.12⅜	.12⅜	.12½	.12¾	.12½	.12½	.12½	.12⅜	.12½			3,000
Uncle Sam	1			.02	.01	.01⅜		.02	.01⅜	.02	.01			51,700
Vindicator	1	1.15		1.15	1.13	1.15		1.15		1.15				
Va. M	1	.02		.02½		.02		.02		.02	.01½			1,300
Work	1	.06¾	.06¾	.06¾	.06½	.06¾	.06⅝	.07⅜	.07⅛	.07¾	.07⅜			
Zenobia	1							.10		.10				8,000

Total sales 481,900 shares.

Colorado Springs (*By Telegraph.*)

Name of Company.	par val	Mar. 6. H.	Mar. 6. L.	Mar. 7. H.	Mar. 7. L.	Mar. 8. H.	Mar. 8. L.	Mar. 10. H.	Mar. 10. L.	Mar. 11. H.	Mar. 11. L.	Mar. 12. H.	Mar. 12. L.
Acacia	$1	.10½	.10¼			.10⅜	.10¼	.10⅜	.10½	.10¾	.10½		
Alamo	1	.04	.03⅞			.04⅜	.04	.04½	.03⅞	.04½	.03¾		
Anaconda	1	.22¼	.21			.20¾	.20	.22½	.21	.22½	.21		
Argentum	1	.04	.03⅞			.04	.03¾	.04½	.03⅞				
Battle Mt	1	.13	.12½			.14	.12	.15	.14	.15	.13½		
Butterfly Ter	1	.15	.13			.20	.17	.20	.14	.17	.14		
Cripple Creek Con	1	.08	.07⅞			.08	.07¾	.08	.07¼	.08	.07⅜		
Dr. Jack Pot	1	.47¾	.47			.47½	.47	.47½	.47	.47	.46¾		
El Paso	1	.55½	.55¼			.54	.53¾	.54¼	.54	.53⅞	.53¾		
Elkton, Con	1	1.28	1.27½			1.28	1.27½	1.23	1.22½	1.22	1.21		
Fanny Rawlings	1	.10	.08			.10	.07	.10	.07	.10	.07		
Findlay	1	.11	.10⅞			.11	.10½	.10⅛	.10⅛	.10⅛	.10		
Gold Dollar Cons	1	.16⅞	.16½			.17	.16¾	.16¾	.16⅜	.16½	.16		
Gold King	1	.55	.40			.55	.40	.55	.40	.55	.40		
Golden Cycle	1	.68	.60			.68½	.68	.69	.68	.69	.68		
Golden Fleece	1	.50	.38			.45	.38	.44	.36½	.50	.30		
Hart	1	.05	.04			.05	.04	.05	.04	.05	.04		
Isabella	1	.23½	.23¼			.23¾	.23¼	.23½	.23	.23½	.23		
Jack Pot	1	.35	.33			.34½	.33	.33	.32	.33	.30		
Katinka	1	.45	.30			.40	.35	.45	.30	.45	.30		
Keystone	1	.07	.05			.07½	.03	.08	.04	.07	.03½		
Last Dollar	1	.55	.30			.55	.30	.60	.30	.55	.30		
Lexington	1	.07⅜	.06⅞			.07¼	.07	.08	.07⅜	.08	.07⅜		
Mollie Gibson	1	.12	.11			.11	.10	.13	.11	.11¼	.11		
Moon Anchor	1	.20	.18			.20	.16	.19½	.18	.20	.18		
National	1	1.50	1.13			1.50	1.25	1.50	1.25	1.50	1.25		
New Haven	1	.04¼	.03⅞			.04⅜	.03⅞	.04⅜	.03⅞	.04⅜	.03⅞		
Pharmacist	1	.03⅜	.03½			.03¾	.03⅜	.03⅜	.03	.04⅜	.04		
Pinnacle	1	.06¼	.06			.06½	.05½	.06½	.05	.06¼	.05½		
Portland	1	2.60	2.50			2.54½	2.50	2.51	2.50	2.55	2.50¼		
Vindicator, Con	1	1.15	1.05			1.15	1.10	1.15	1.05	1.15	1.05		
Work	1	.07	.06⅞			.07¾	.07⅝	.08	.07⅜	.08½	.08¼		

MONTREAL, CANADA. Mar. 10.

Name of Company.	par val	H.	L.	Sales	Nome of Company.	par val	H.	L.	Sales
Big Three	$1	.01¼			Montreal-London	$0.24	.02½		
California	1	.04½	.04		Noble Five	1			
Can. Gold Fields	0.10				Novelty	1			
Deer Trail Con	1	.03½	.02¼		North Star		.24		
Evening Star	1	.04	.02		Payne	1	.32	.30	16,000
Golden Star	1	.04¼	.03		Rambler-Cariboo	1			
Gold Hills Dev	1	.01½			Republic Con	1	.10		
Knob Hill	1				Slocan-Sovereign	1	.02¼		
Monte Christo	1	.02			Virtue	1	.24	.23¼	500
Montreal, G. F	1	.02½			War Eagle	1			

LONDON. Mar. 1.

Name and Country of Company	Author-ized Capital.	Par value.	Last dividend. Amt.	Last dividend. Date	Quotations. Buyers.	Quotations. Sellers.
	£	£. s. d.	s. d.		£. s. d.	£. s. d.
Alasks-Treadwell, g., Alaska	1,000,000	5 0 0	1 6	Jan., 1902	4 0 0	4 5 0
Anaconda, c. s., Montana	6,000,000	5 0 0	8 2	Oct., 1901	6 15 0	6 17 6
Copiapo, c., Chile	200,000	2 0 0	2 6	Dec., 1901	2 5 0	2 10 0
De Lamar, g. s., Idaho	400,000	1 0 0	2 0	Dec., 1901	17 6	1 2 6
El Oro, g., Mexico	1,000,000	1 0 0	1 3	July, 1901	1 11 3	1 13 9
Enterprise, g., British Col	200,000	1 0 0			6 3	8 9
Frontino & Bolivia, g., Columbia	140,000	1 0 0	3 0	July, 1901	1 3 9	1 6 3
Hall, Mg. & Sm., c. s., British Col	325,000	1 0 0			6 0	7 0
Le Roi, g., British Col	1,000,000	5 0 0	5 0	Nov., 1899	3 12 6	3 17 6
Le Roi No. 2, g., British Col	120,000	5 0 0	5 0	July, 1901	3 10 0	3 15 0
Montana, g. s., Montana	660,000	1 0 0	6	April, 1899	4 3	4 9
Mountain Copper, California	1,250,000	5 0 0	5 0	Oct., 1901	3 15 0	4 0 0
Stratton's Independence, Colorado	1,100,000	1 0 0	1 0	Jan., 1902	8 9	11 3
St. John del Rev., g., Brazil	600,000	1 0 0	1 0	June, 1901	18 9	1 0 0
Utah Con., g., (High. Boy), Utah	300,000	1 0 0	5 0	May, 1901	4 10 0	5 0 0
Ymir, g., British Col	200,000	1 0 0	1 0	Mar., 1902	2 3 9	2 6 3
European:						
Linares, l., Spain	45,000	3 0 0	7 0	March, 1901	4 10 0	5 0 0
Mason & Barry, c., sul., Port'g'l	420,000	1 0 0	12 6	May, 1901	3 12 6	3 17 6
Rio Tinto, c., Spain	1,625,000	5 0 0	£1 15s	Nov., 1901	46 5 0	46 10 0
Rio Tinto, pref., Spain	1,625,000	5 0 0	2s 6d	Nov., 1901	6 0 0	6 10 0
Tharsis, c., Spain	1,250,000	2 0 0	12 0	May, 1900	6 17 6	7 2 6
Australia and New Zealand:						
Assoc. Gold Mines, W. Australia	500,000	1 0 0	1 6	Jan., 1900	1 5 0	1 7 6
Br'ken Hill Pr'p., s., N. S. Wales	384,000	8 0	1 0	Nov., 1901	1 13 9	1 15 0
Great Bo'd'r Pr'p., W. Australia	175,000	2 0	6	Jan., 1902	19 0	1 0 6
Hannan's Brownhill, g., W. Australia	140,000	1 0 0	7 6	Oct., 1900	2 11 3	2 12 9
Ivanhoe Gold C'p., W. Australia	1,000,000	5 0 0	3 0	Feb., 1902	7 10 0	7 12 6
Kalgurlie, g., W. Australia	120,000	1 0 0	rts.	Oct., 1899	3 11 3	3 13 9
Lake View Cons., g., W. Australia	250,000	1 0 0	5 0	Oct., 1901	3 10 0	3 12 6
Mt. Lyell M. E. R. L., c., Tasmania	900,000	3 0 0	4 0	Jan., 1902	3 15 0	4 0 0
Mt. Morgan, g., Queensland	1,000,000	1 0 0	3	Mar., 1902	4 0 0	4 2 6
Waihi, g., New Zealand	330,000	1 0 0	2 6	Mar., 1902	5 12 6	5 15 0
Indian:						
Champion Reef, g., Colar Fields	234,169	10 0	7 8	Jan., 1902	5 15 0	5 17 6
Mysore Gold, Colar Fields	265,000	10 0	5 0	Mar., 1902	6 5 0	6 7 6
Nundydroog, g., Colar Fields	242,000	10 0	1 6	Nov., 1901	1 18 9	2 1 3
Ooregum, g., Colar Fields	290,000	10 0	1 6	Dec., 1901	2 3 9	2 6 3
Ooregum, pref., g., Colar Fields	240,000	10 0	1 6	Dec., 1901	2 16 3	2 18 9
African:						
British S. Africa, ch'd S. Africa	5,000,000	1 0 0	rts.	May, 1899	4 2 6	4 3 9
Cape Copper, S. Africa	600,000	2 0 0	8 0	Jan., 1902	4 12 6	4 17 6
Cape Copper, pref., S. Africa	150,000	2 0 0	8 0	Jan., 1902	4 7 6	4 12 6
City and Sub'n (New), g., Transvaal	1,360,000	4 0 0	3 0	Aug., 1899	6 17 6	7 0 0
Crown Reef, g., Transvaal	120,000	1 0 0	18 0	Nov., 1899	17 7 6	17 12 6
De Beers Con., d., Cape Colony	3,950,000	5 0 0	£1	Sept., 1901	45 11 3	45 13 9
Ferreria g., Transvaal	90,000	1 0 0	10 0	Jan., 1902	24 0 0	24 10 0
Geldenhuis Est., g. Transvaal	200,000	1 0 0	10 0	Aug., 1899	7 0 0	7 5 0
Henry Nourse, g., Transvaal	125,000	1 0 0	10 0	Aug., 1899	9 7 6	1 2 6
Jagersfontein, d., Orange F. S	1,000,000	5 0 0	6 0	Dec., 1900	26 12 6	26 17 6
Joh'n'b'g Con. Invet., S. Africa	2,750,000	1 0 0	2 0	Nov., 1899	3 16 3	3 18 9
Jubilee, g., Transvaal	50,000	1 0 0	5 0	Aug., 1899	6 10 0	6 15 0
Langlaagte Est., g., Transvaal	470,000	1 0 0	3 0	Sept. 1899	4 7 6	4 10 0
May Con., g., Transvaal	290,000	1 0 0	0 6	Aug., 1899	4 17 6	5 0 0
Meyer & Charlton, g., Transvaal	100,000	1 0 0	3 0	Feb., 1902	5 15 0	6 0 0
Namaqua, c., Cape Colony	200,000	2 0 0	3 0	Feb., 1902	4 2 6	4 7 6
Primrose (New), g., Transvaal	300,000	1 0 0	6 0	Aug., 1899	4 15 0	4 17 6
Rand Mines, g., S. Africa	1,795,956	5 0	15 0	Aug., 1899	12 0 0	12 1 3
Robinson, g., Transvaal	2,750,000	5 0 0	8 0	Aug., 1899	10 12 6	10 15 0
Sheba, g., Taansvaal	1,100,000	1 0 0	5 0	Feb., 1902	1 6 3	1 7 6
Sim. & Jack (new) g., Transvaal					7 17 6	7 2 6
Wolhuter, g., Transvaal	860,000	4 0 0	2 0	Feb., 1899	5 12 6	5 17 6

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver. *Ex-dividend.

PARIS. Feb. 27.

Name of Company.	Country.	Product.	Capital Stock.	Par value.	Latest divs.	Prices. Opening.	Prices. Closing
			Francs.	Fr.	Fr.	Fr.	Fr.
Acieries de Creusot	France	Steel mfrs.	27,000,000	2,000	85.00	1,715.00	1,710.00
" " Firminy	"	" "	3,000,000	500	200.00	2,700.00	2,680.00
" " Huta-Bank	Russia	Iron and Steel		500		3,475.00	3,380.00
" " la Marine	France	Steel mfrs.	20,000,000	500	65.00	1,400.00	1,305.00
Anzin	"	Coal			320.00	5,250.00	5,175.00
Boleo	Lower Cal	Copper		500	176.00	1,960.00	1,920.00
Briansk	Russia	Coal and Iron		500		425.00	431.00
Champ d'Or	S. Africa	Gold	3,375,000	25	3.75	40.00	36.00
Courrieres	France	Coal	600,000	300	90.00	2,240.00	2,240.00
Dombrowa	Russia	"		500	75.00	980.00	980.00
Dourges	France	"	12,000,000	500	1,000	24,700.00	24,700.00
Dynamite Centrale	"	Explosives		500	19.00	714.00	745.00
Escombrera-Bleyberg	Spain	Lead		500	50.00	830.00	829.00
Fraser River	Brit. Col'mb.	Gold	250,000	25		7.00	6.25
Huanchaca	Bolivia	Silver	40,000,000	125	5.00	128.00	130.00
Laurium	Greece	Zinc and Lead	16,300,000	500	25.00	405.00	403.00
Malfidano	Italy	Zinc	12,500,000	500	12.50	455.00	449.00
Metaux, Cie. Fran. de	France	Metal dealers	25,000,000	500	22.50	430.00	428.00
Mokta-el-Hadid	Algeria	Iron	18,312,500	500	35.00	821.00	821.00
Napthe Baku	Russia	Petroleum				322.00	322.00
Napthe Nobel	"	"				442.00	500.00
" " parts	"	"				9,200.00	10,100.00
Nickel	N. Caled'nia	Nickel	10,000,000	250	20.00	554.00	535.00
Penarroya	Spain	Coal, etc		500	55.00	1,135.00	1,149.00
Rebecca	Colo'do, U. S.	Gold	5,000,000	25		1.75	2.00
Salines de l'Est	France	Salt		500	6.00	282.00	282.00
Salines du Midi	"	"		500	40.00	490.00	500.00
Vielle Montagne	Belgium	Zinc	9,000,000	30	30.00	555.00	560.00

TORONTO, ONT.

Name of Company.	par val	Mar. 4. H.	Mar. 4. L.	Mar. 5. H.	Mar. 5. L.	Mar. 6. H.	Mar. 6. L.	Mar. 7. H.	Mar. 7. L.	Mar. 8. H.	Mar. 8. L.	Mar. 10. H.	Mar. 10. L.	Sales
Ontario:														
Golden Star	1													
British Columbia:														
Cariboo McK	1	.28	.24¼	.28½	.23	.26½	.25	.26½	.21	.25	.23½	.25	.23	
Center Star	1	.38	.33	.38	.36	.43	.38½	.42	.38½	.43	.38½	.40	.38½	1,000
Crows, N. C	25													
Deer Trail	1	.03½	.02⅞	.03¼	.03	.03¼	.03	.03¼	.03	.03½	.03½	.03½	.03½	5,000
Fairview	1	.04¼	.03½	.04½	.03½	.04¾	.03½	.04½	.03½	.04¼	.03¼	.04½	.03¼	26,000
Morrison	1			.05	.02½	.06	.02¼	.04	.02½	.06	.02½	.06	.02½	
Mt. Lion	1	.36	.32	.38	.32½	.36	.32½	.38	.32	.36	.33	.38	.32½	
North Star	1	.25	.22	.25	.21	.26	.22	.25	.22	.25	.22	.24½	.22	2,000
Payne	1	.30	.25	.28	.22	.30	.25	.30	.25	.30	.25	.28	.22½	2,000
Rambler	1	.90	.80	.90	.80	.90	.75	.90	.80	.90	.81	.88	.75	
Republic	1	.10⅝	.10⅜	.11	.10¼	.11	.10½	.10½	.10¼	.10⅝	.10	.11	.10	15,500
Virtue	1	.25	.20	.25	.20	.24	.20	.26	.20	.25	.20	.25	.20	
War Eagle Cons	1	.12	.10¼	.12	.10½	.12	.10½	.12	.10½	.12	.10½	.12	.11	2,000
Winnipeg	1	.05½	.03½	.05½	.04	.05	.03¼	.05	.03	.05	.03	.05	.03	
Wonderful	1	.05	.02½	.05	.02½	.05	.02½	.04		.05		.05		
Develop. Co														
Can. G. F. S	1	.04¾	.03¾	.04¼	.03½	.04¼	.03¾	.04¼	.03½	.04⅜	.03¾	.04¼	.03¾	

Total sales, 43,500 shares. †Ex-dividend.