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Editor:

J. C. MURRAY, B.A., B.Sc.

Business Manager:

J. J. HARPELL, B.A.

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CIRCULATION.

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SPECIAL CONTRIBUTORS.

Geology: Dr. Frank D. Adams, McGill University; Dr. A. E. Barlow, late of Geological Survey of Canada; Professor Willett G. Miller, Provincial Geologist of Ontario; Dr. J. E. Woodman, Dalhousie University, Halifax, N.S.

Chemistry: Dr. W. L. Goodwin, Director School of Mining, Kingston, Ontario; Milton Hersey, M.Sc., Official Analyst Province of Quebec.

Mineralogy: Professor W. Nicol, School of Mining, Kingston, Ontario.

Mining: S. S. Fowler, M.E., Nelson, B.C.; Frederick Keffer, M.E., Anaconda, B.C.; A. B. Willmott, M.E., Sault Ste. Marie, Ont.; J. C. Gwillim, M.E., School of Mining, Kingston, Ont.; J. Obalski, Inspector of Mines, Quebec; J. Bonnal Porter, M.E., McGill University; H. Mortimer-Lamb, Sec. Can. Min. Inst.; John E. Hardman, M.E., Montreal; Fritz Cirkel, M.E., Montreal; George W. Stuart, M.E., Truro, N.S.

Metallurgy: Stafford F. Kirkpatrick, School of Mining, Kingston, Ontario; A. P. Scott, Dominion Iron & Steel Company, Cape Breton.

Natural Oil and Gas: Eugene Coste, M.E., Toronto, Ont.

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THE CANADIAN ANNUAL REVIEW OF PUBLIC AFFAIRS, 1907.

Mr. Hopkins' labors are of immediate use and of future value. The Annual Review gives a comprehensive account of the political, financial and industrial progress of Canada during the past year.

Part of Section IV. is devoted to mining. The operations of boomsters at Larder Lake and the aid vouchsafed these malign operators by the Toronto newspapers, are the text of a considerable part of the chapter.

Mr. Hopkins states, in referring to the case of Law & Co., that proceedings were initiated by the Provincial Secretary's Department. This is an error. The Canadian Mining Journal succeeded, after weeks of futile effort, during which several Toronto newspapers refused to take up the question in any manner, in instituting proceedings against Law for breach of the Ontario Companies Act. The whole work of investigation fell upon the Journal. Later, when at the instance of the Journal more serious charges were laid, the Department acted promptly.

Any opinion, separated from its context, may take on a meaning that it was not intended to have. The Annual Review quotes us as declaring that Larder Lake would never be anything but a low-grade camp at best. This opinion was accompanied by a statement that so little was known of the district that no final opinion could be formed. While we have but slight reason to modify this dictum, the known occurrence of bonanza ore on one or two claims lends a more cheerful aspect to the yet undeveloped region.

We note with pleasure the amount of space devoted by the editor of the Annual Review to the industry whose welfare is our especial object. Incidental errors are bound to occur; but in the main Mr. Hopkins summary is broad and accurate.

Mr. Hopkins has some words of praise for our banking system. As the mining industry is, to a marked extent, dependent upon the attitude and policy of the banks, it is not amiss to notice a few facts not mentioned in the Annual Review. The public generally has little conception of the true conditions that underlie "tight money." It is a condition that could not prevail were our banks true to the interests of the country. Moreover, the enormous current of money that finds its way out of Canada and into New York in the shape of call loans is a constant handicap to the progress of our industries.

A startling feature of our banking system, one that makes absurd all loud boastings as to inherent stability and soundness, is the little known fact that our paper currency has no gold reserve behind it. It is true that the Government paper notes of low denomi-

nation are supported by a reserve of gold and Imperial bonds. But our bank notes are absolutely devoid of gold backing.

Thus, while Mr. Hopkins is perhaps just in his praise of the prevision of certain bankers who warned the public early in 1907 to restrict their operations, he could truthfully add that this warning would not have been needed did we not possess one of the most lamentably weak, illogical and flimsy systems of banking that the world has ever seen.

The public usually believes what it is told to believe, especially if its information comes from dignified sources. How it has been led into accepting the totally inaccurate impressions that are current regarding Canadian banking methods is hard to imagine. If our insurance companies needed investigation, and even Mr. Hopkins does not affirm to the contrary, then the banking corporations also needed probing. Not until the evils that are sapping the foundations of our national health have been rectified will our industries progress as they should. With a sound banking system, a currency that is not merely paper, and legislative restraint on the exportation of our earnings, panics and depressions would not occur with such mathematical regularity.

It is apparently impossible to induce our newspapers to take up questions of this sort. The overwhelming influence of corporations converts most of our writers and publicists into phonographs and tickspittles. The man who dares to speak his mind is systematically blackened in reputation and can get no hearing. Therefore our principal need, as a nation, is a plentiful supply of fearless and informed writers who will neither sell their souls for that which is not, nor bow the knee to Baal.

All of which has little to do with Mr. Hopkins' excellent, painstaking and inoffensive volume. Mr. Hopkins may be neither a prophet nor the son of a prophet. It is wildly improbable that upon so industrious and appreciative a person as he, will fall the disagreeable burden of writing of things as they are—not as we are told they are. Rather is Mr. Hopkins an ardent believer in constituted authority, in the divine right of banks and the eternal usefulness of buncombe.

THE BOSTON-RICHARDSON.

Readers of the Canadian Mining Journal are familiar with the operations of the Boston-Richardson gold mine.

For some years this mine has been a steady producer. The ore worked is low grade, the gold content averaging not more than \$3.00 per ton. The equipment consists principally of a sixty-stamp mill (we are informed that forty additional stamps are being installed), six Wilfley tables and a bromo-cyanide plant.

During the year ended September 30, 1907, 43,456 tons of ore were crushed, yielding 6,504 ounces of gold,

an average of about \$2.85 per ton. The total cost of operation, per ton of ore milled, amounted to about \$1.90. Thus a net profit of \$41,283 should be expected. However, during the past year large sums have been expended in enlargement of plant. Moreover, during July of this summer, the ore suddenly dropped in value. The drop was not sufficiently pronounced to have affected operations vitally at a time when the company was not embarrassed. For instance, if the mine had been working normally with its enlarged plant in full operation for a period of twelve months, working profits could have been counted upon to straighten matters out. For, although the margin of profit is small, it has heretofore been constant, and the company was acting in accordance with sound business principles in adding to their plant.

But a combination of misfortunes, including tight money, has crippled the operators of the Boston-Richardson and, unless immediate steps are taken, gold mining in Nova Scotia will have received a fatal blow.

The avowed policy of the Government of Nova Scotia has been to encourage gold mining by all legitimate means. On certain deep mining operations actual financial aid has been offered. But very few operators, if any, have availed themselves intelligently of the Government's offer.

In the case of the Boston-Richardson, we have an example that is worth dwelling upon. The operators have put up an arduous and plucky fight. The sturdy faith of the management in themselves and in the mine has been justified by several years of successful operation. They have met difficulties and discouragements with fortitude and equanimity. Their mine has been a bright spot in the recent history of Nova Scotia gold mining. If that bright spot be now eclipsed the consequences will be disastrous in the extreme.

In view of all this we venture to submit that this is an opportune moment for the Government of Nova Scotia to step in and proffer its assistance. Such a course is fully warranted by precedent. The action of the Ontario Government in helping the Sault Ste. Marie industries is a case in point; and there are many other analogous incidents.

Just what form such assistance should take we can not presume to say. There are several possible channels. A temporary loan might meet the requirements; Australian governments have sanctioned this expedient. Or, as an alternative, the Government might become a permanent partner in the enterprise. If justification is required for this course, the attitude of the Ontario Government may be cited.

But whatever may be decided upon, it is absolutely certain that allowing the Boston-Richardson to be set down as a failure will prove the most costly and unprofitable step of all.

We have no doubt that the enlightened and progressive Government of Nova Scotia will investigate the situation thoroughly.

GAS PRODUCERS—THEIR PRESENT LIMITATIONS.

For at least thirty years gas engines have been in use. Only within the last decade, however, have large engines been put into service. The general adoption of the gas engine depended upon the production of cheap gas and the modern gas producer has provided the key to this problem.

The first producers were of the suction type, in which the suction stroke of the engine develops its charge of gas in the producer. No tarry or bituminous fuels could be used in these. Hence the only fuels available were anthracite coal, coke and charcoal. Although these limitations are being overcome, they have been and are characteristic of suction gas producers.

The pressure gas producers, in which the gas is generated under pressure and stored in a holder before being used, thus affording an opportunity for removing the impurities, is capable of utilizing bituminous coal and lignite. Peat also can be safely used, although it has not until recently proved a commercially successful fuel.

The invention of the pressure gas producer was followed by the appearance of a third type—the down-draft producer. The latter consumes completely the hydrocarbons resulting from the destructive distillation of coal.

Although in all three types of producers anthracite coal has been most commonly used, yet the tendency of late has been towards the use of bituminous coals, lignite, and peats. Suction plants are confined to small units. The larger gas producers are of either the pressure or down-draft type.

Comparing results obtained at highly efficient plants, when 10.3 per cent. of the energy stored in coal is utilized at a steam plant, the results are considered highly satisfactory. Good gas producer practice calls for the utilization of 24 per cent.

Under equal conditions, tests to determine the relative efficiency of steam plants and gas-producer plants have resulted uniformly in favor of the latter. In addition to this it has been found that low-grade coals of little or no value under the boiler, will give good results in the gas producer. This is an important point, perhaps the weightiest argument that can be adduced when many of the coals of the Dominion are to be dealt with.

Despite the various advantages of the gas producer all is not plain sailing. Several considerations militate against its more general adoption; and it may be worth while recounting a few of these.

There is no doubt that the best makes of gas producers are reliable and highly efficient. Unfortunately there are many poor and untrustworthy makes being sold and installed. The failure of these machines has created much prejudice. Moreover, equally bad results have been noted when inexperienced men have been placed in charge of thoroughly good installations.

These are probably the chief causes of public prejudice against or indifference to the claims of the gas producer. But the limited range of fuels that can be used in certain types of producers, the high initial cost as compared with steam-power plants, the inability of most types of producer to use bituminous coals, and the imperfect or unsuitable design of many gas engines—all these factors contribute to delay a wider demand.

It may be safely concluded that both manufacturers and purchasers need more light. Manufacturers are far too prone to drop all responsibility after a plant has been sold. On the other hand, purchasers do not take the trouble to investigate for themselves.

FERNIE.

The first appeal of the sufferers in the Fernie fire has met with a hearty response. Money and supplies have been forthcoming from all parts of Canada. The catastrophe was unique. It was spectacular. It caught and held public attention for a longer time than is usually the case.

Generously as help has been given, the situation at Fernie is by no means relieved. Winter is approaching and unless much larger donations are received by the Relief Committee there will be lamentable suffering with the advent of cold weather.

There is no need of urging the neighboring towns of Southern British Columbia to do more. They have already given unsparingly and are continuing to give.

But upon the cities and towns of Eastern Canada there will rest a stigma if they do not voluntarily come to the assistance of the stricken townspeople of Fernie. Especially is it the duty of mining centres, such as Cobalt, Sudbury, Glace Bay and Thetford to contribute according to their means. In Glace Bay there is already a movement on foot to raise money for the Relief Fund. Let other mining towns follow her good example.

Quite apart from all considerations of sentiment, it is the duty of every citizen of Canada to see that Fernie gets a fair start in her brave attempt to rehabilitate herself.

THE SUMMER EXCURSION.

A few days after this number of the Canadian Mining Journal has been distributed the Canadian Mining Institute excursionists will reach Toronto. Before arriving here the members and their guests will have visited the Dominion coal collieries at Glace Bay, the Dominion Steel Company's large works at Sydney, the Nova Scotia Steel and Coal Company's plant, the Picou coal fields, and the iron ore deposits and workings of the Drummond interests at Torbrook, Nova Scotia. On their way through Quebec they will have surveyed the famous asbestos districts of that province. Therefore, the foreign delegates will have received a fair, though quite incomplete, impression of the directions in which our eastern mining industries are to expand.

After being entertained at Niagara and Toronto for two days the excursionists will proceed to Cobalt, Sudbury, Moose Mountain, in Western Ontario, through Alberta and, finally, through Southern British Columbia.

Extensive as is this itinerary, and numerous as are the mining districts to be visited, there are as many, or more, equally interesting and not less important, that the excursion cannot touch. Among the list of unvisited sections are the gold, antimony, manganese and gypsum districts of Nova Scotia; the manganese, iron, and gypsum bearing areas of New Brunswick; the vast hinterland of Northern Quebec, whose mineral possibilities we yet can only guess at; the varied deposits of Frontenac, Hasintgs and Renfrew counties in Eastern Ontario; the oil and gas fields to our south, and the gold, mica, antimony, coal and copper of Northern British Columbia; not to mention the reviving gold industry of the Yukon.

Therefore, it will be well for our visitors to bear in mind the fact that they are touching but the fringe of Canada's mineral belts, and that her mineral wealth is most inadequately known even by Canadians themselves.

SAFETY LAMPS AND COAL DUST.

Mr. James Ashworth, in his evidence before the British Royal Commission on Safety in Mines, developed the view that each floating particle of coal dust is sustained by a quantity of occluded hydrocarbon gases, and is capable of passing completely through both sides of the gauze of ordinary safety lamps. This is taken to be the cause of many hitherto unexplained explosions in coal mines.

The Colliery Guardian, for August 1, publishes as a supplement a digest of the Reports of H. M. Inspectors of Coal Mines. This is the second annual supplement of the sort. A few notes abstracted from the digest appear on another page of the Canadian Mining Journal.

The July Bulletin of the Canadian Mining Institute reflects credit upon the secretary, Mr. H. Mortimer Lamb. That he has been energetic and importunate in pressing his requests for technical articles is evident from the number of papers included. The Bulletin is an improvement upon its predecessors in the matter of editing. This is the more creditable when we remember that arrangements for the present summer excursion must have taken up much of the secretary's time.

THE GREAT WAIHI MINE.

Written for The Canadian Mining Journal by J. M. Bell, Director of the Geological Survey of New Zealand, and Colin Fraser, Mining Geologist.

(Continued from last issue.)

Origin of the Veins.

The formation of the Waihi veins, which was contemporaneous with the propylitisation of the dacites enclosing them, was evidently the result of hydrothermal activity. Since the rhyolites super-imposed on the dacites contain in this locality no quartz veins, it is presumed that the formation of the veins and the propylitisation of the dacites preceded the outpouring of the rhyolites. It is interesting in connection with the hydrothermal origin of the veins to note that notwithstanding the general percolation of cold water from the surface and good ventilation, the temperature of the mine waters is considerably above the mean average temperature at the surface. The latter is about 54° Fahrenheit, while temperatures of the mine waters as high as 85° Fahrenheit have been recorded.

Vein formation as the result of the circulation of heated mineralized waters appears to have been due to:

(1) The complete or partial metasomatic replacement of the country rock by the materials brought in solution in the ascending waters.

(2) The deposition in open spaces of vein material brought in solution by the ascending waters.

These two phases of vein formation appear to have taken place along a rather complicated system of zones of multiple fracture or faulting. Metasomatic replacement of the country rock may be considered to have proceeded gradually from the more or less parallel fissure

of each individual zone. The metasomatic replacement, rather than the filling of pre-existing open spaces, seems to have been the more important.

As mentioned before, the banded sulphide ores which were deposited in small, irregular fissures, carry high values in gold and silver—higher values than the replacement sulphide ores. Since these rich veins are in the main later than the replacement ore, it is possible that the richness of their values may be the result of a concentration of the values formerly in the replacement ore, by later ascending solutions. On this point, however, the writers of the present paper do not feel prepared to commit themselves until more detailed macroscopic and microscopic work than that already done has been completed. Apparently the propylitized dacite which forms the wall rocks in all the veins has not exercised any particular influence on the actual position in the veins of the pay ore deposited, since the values, though occurring more frequently on the foot-walls in the higher levels, are found elsewhere on both hanging and foot walls and throughout the veins.

It is significant that the deposit of richest ore in the Waihi Mine occurs in the Edward, near its junction with the Empire and the Welcome, and not far from the horizon where the latter and its two branches, the Regina and the Magazine, join the Martha. This bonanza may indicate an enrichment by mingling of ascending solutions.

The somewhat distinct separation of the non-payable vein material from the sulphide ore would seem to indicate that the deposition of the two was not contemporaneous. However, there is no very direct evidence on this point.

The presence of silicious sinters at the surface of the Martha lode, the absence of a gossanous outcrop, and the fact that many of the veins of the Martha system do not reach the surface, all show how limited has been the removal of auriferous material by erosion.

Mining and Treatment of the Ore.

Method of Mining.—The topographical features of the area enclosing the great gold-silver veins of the Waihi Mine admitted of only a limited amount of the ore being mined from open cuts or adits, and the supply from these workings is now almost exhausted. Principal access to the extensive underground workings is afforded by five vertical shafts, located as shown on the plan. Sinking is still proceeding in certain of these shafts, the deepest (No. 5) now extending to 1,020 feet below the surface. Drainage is effected from the most centrally situated shaft (No. 5) by means of two powerful pumps of the Cornish type. The volume of water raised has heretofore shown a gradual increase with depth, and at the lowest (850 ft.) level, which intersected all

ground," and filling material is run in to replace it. Any ore left as small cone-shaped heaps between the closely-spaced passes is finally drawn off by temporarily cutting away a slab or two in the roof of the level under these particular points.

The propylitized, much silicified, dacite of the Waihi Mine, is fairly hard, breaking frequently with an almost splintery fracture, and is characterized by singular uniformity throughout the mine. The country rock in the cross-cuts and along the vein, and the vein material itself, usually stands remarkably well. The good standing qualities of the vein material is well exemplified in the stope on the Edward lode, just above the 850 ft. level. Here a width of 75 ft. of ore is exposed overhead for a considerable distance on the course of the vein without support of any kind from below.

Air-driven rock drills, mostly of the Ingersoll type, are employed both in the cross-cuts and drifts and in the stopes.

The transit of the ore from the passes in the levels to the winding shafts is effected in large trucks. Until quite recently all these trucks of ore were raised in cages to the surface, and the ore was there dumped into large hoppers. The substitution of self-dumping three-ton skips for cages at No. 6 shaft has effected a marked advance in the lifting of the ore to the surface. On the



MARTHA HILL AND RIDGE LOOKING WESTWARD.

Key—A—Waihi Grand Junction Co.'s No. 1 Shaft; B—Waihi Co.'s No. 2 Shaft; C—Waihi Co.'s No. 1 Shaft; D—Open Cut on Martha Hill
E—Waihi Co.'s No. 6 Shaft.

the veins, amounted to 900 gallons per minute. The conditions, however, at the 1,000 ft. level now in course of excavation are suggestive of less water existing in the deeper ground.

The principal working levels, of which there are nine below the adit, are spaced at vertical intervals ranging from 60 ft. to 150 ft. apart. Both the cross-cuts and the drifts along the lodes in these levels are provided with single or double tramways.

Timbering in the mine is reduced to a minimum owing to the good standing qualities of the ground. Only along the drifts on the veins stoped, or to be stoped, are the sets of heavy squared timber (kauri or rimu—New Zealand conifers) in evidence.

The ore was in the past mined by the usual system of rising and overhand stoping, followed by the filling in of the stoped ground with soft weathered rock excavated in open cuts and sent down through special passes. Now, however, the "shrinkage" method of stoping, a modification of the Alaska-Treadwell caving system, is employed wherever the vein walls are good and the ores require no sorting. The passes from the stopes to the levels below in this case are never more than 10 ft. apart, and are placed in zig-zag arrangement along the floors of the stopes. When stoping is completed in a block the ore is drawn off as required, starting from the "end of

12th May, 1908, the record amount of 1,559 tons of ore was lifted from the mine, and 750 tons of filling-in material sent down.

Railway lines equipped with light locomotives and side-dumping steel cars connect the surface ore bins at the various winding shifts with the metallurgical plants to be later described.

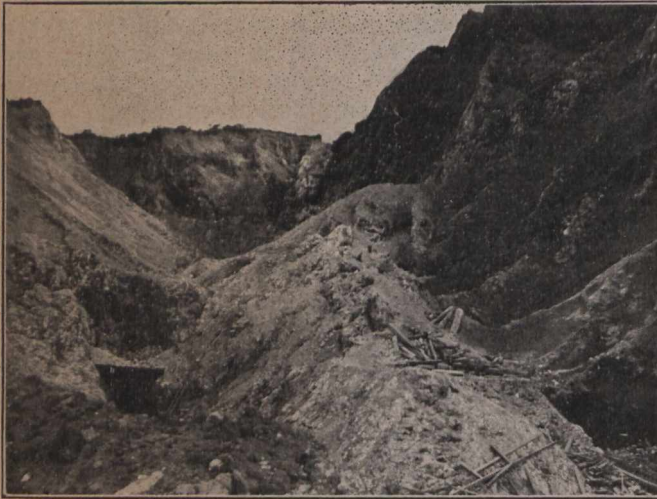
Steam is the motive power employed at the mine for all purposes, the fuel being lignite of fair quality railed from the collieries of the Waikato, some 70 miles distant.

The Metallurgical Works.—The metallurgical works comprise three separate mills, containing in all 330 stamps, rock-breakers, tube-mills, concentrating machinery, cyanide plants, melting, assaying, and refining plants, and all accessories. The three separate mills are known as the Martha (90 stamps), the Union (40 stamps), both situated at short distances from the mine, and the Waikino (200 stamps), situated at the village of Waikino, some five miles from Waihi.

The Martha, which may be taken as a type of the three mills mentioned, will be briefly described.

The ore railed from the mine is first dumped into an elevated hopper in the back of the mill. From this hopper the ore is screened on a "grizzly" and the coarse material passed through two rock-breakers of the Gates type—a large one and a small one—working in series.

The crushed ore from the breakers and the fines from the grizzlies fall on to a belt conveyor which delivers it into a series of bins located behind the stamps. The stamps are fed by Challenge ore-feeders with the broken ore from the bins mentioned. These stamps, each weighing 1,000 lbs., fall with a six-inch drop 103 times per minute, and have a duty of 3,794 tons per day. The ore is wet-crushed, the discharge screens of the stamp-boxes having a 10, 20 or 25 mesh, according to the tube-mill capacity available. The pulverized ore from the



OPEN CUT ON MARTHA LODE.

The clean-cut face is the footwall of the lode.

stamps is conveyed by launders to classifiers of the Spitzkasten type, the coarse material from these being subjected to further grinding in tube-mills.*

The product of these wet-crushing tube-mills is itself subjected to classification, the fines joining those directly obtained from the stamps, while the coarser sands are elevated back to the mills for further comminution and subsequent classification.

The whole of the pulverized ore from the stamps and the tube-mills is conveyed in launders to the amalgamating room. Here it passes over silvered muntz-metal tables, where recovery of that portion of the gold-silver which exists in a free state is effected by amalgamation with mercury.

Classification of the ore is the next process, and is effected in "Spitzkastens," the slimes, to which finely ground lime is added, settling in large steel vats, and the fairly clear overflow water returning for use in the stamp mortars.

The sands only are conducted in launders to the vanners, which are mainly of the Union, but partly of the Wilfley type.* The concentrates, which amount to 1.56% of the ore and carry 18.14% of its total value** are, together with those from the Union 40-stamp mill, railed to Waikino for treatment. Reference will be made later to the process employed in dealing with the concentrates at Waikino.

The sands deprived of their concentrates are carried along in launders and delivered through Butter's distributors to the cyaniding vats. Here they are subjected to the usual direct treatment, which for each charge

takes about seven days. The vats are mainly about 22 ft. in diameter, and 4 ft. 6 in. in depth.

In the cyaniding of the slimes from the Spitzkastens the agitation method, coupled with the employment of vacuum filter frames or baskets, has superseded all other methods. In this process the liquid slimes are run into vats, where they are kept from settling by agitation with compressed air. Into these vats the baskets, hung from a travelling overhead crane, are lowered. On the application of the vacuum, each basket takes up its load of slimes practically free from water, and on being raised, conveys it to an adjoining compartment. Here the pulped slime is blown off, thoroughly disintegrated and mixed with cyanide solution, after which it passes into vats, and is there kept in constant agitation by compressed air. When the leaching of the gold-silver contents of the slimed ore has been completed, the leached slimes and the solution are transferred to vats, where the slime is extracted as pulp by baskets, and, after being washed free from solution, is blown off the baskets and sluiced into the tail race.

The method of the treatment of the concentrates at the Waikino Mill consists in further comminution of the material in tube-mills until it is reduced to an exceedingly fine slime. The slimed concentrates are then cyanided by a compressed air agitation method, a stronger solution of potassium cyanide being employed here than in dealing with the ordinary sands and slimes.

The gold and silver is in all cases recovered from the cyanide solutions by the usual method of precipitation on zinc in extractor boxes; partially spent sulphuric acid from the refining plant, to be later described, is employed instead of the usual roasting for the elimination of the zinc. The precipitated bullion, which on being melted is cast into thin, flat plates, is passed on to the refining works. According to assay, 89.0% of the total gold values of the Waihi ores, and some 70.3% of the total silver values, were extracted in 1907.



THE EDWARD VEIN—850 FT. LEVEL—WAIHI MINE.

Vein is 30 feet wide here. It attains a maximum width of 92 feet, and affords throughout sulphide ore of bonanza richness.

Power for both the Martha and the Union Mill is derived partly from water and partly from steam. The Ohinemuri River and one of its tributaries have separately been harnessed to supply power to the large Waikino Mill. This hydraulic power, however, is insufficient

*A special feature in the mechanism of the Waihi Company's tube mills are the "Honeycomb" liners—slabs of silicious sinter or hard chalcidonic quartz obtained in the vicinity of the mine being cemented into honeycombed steel frames.

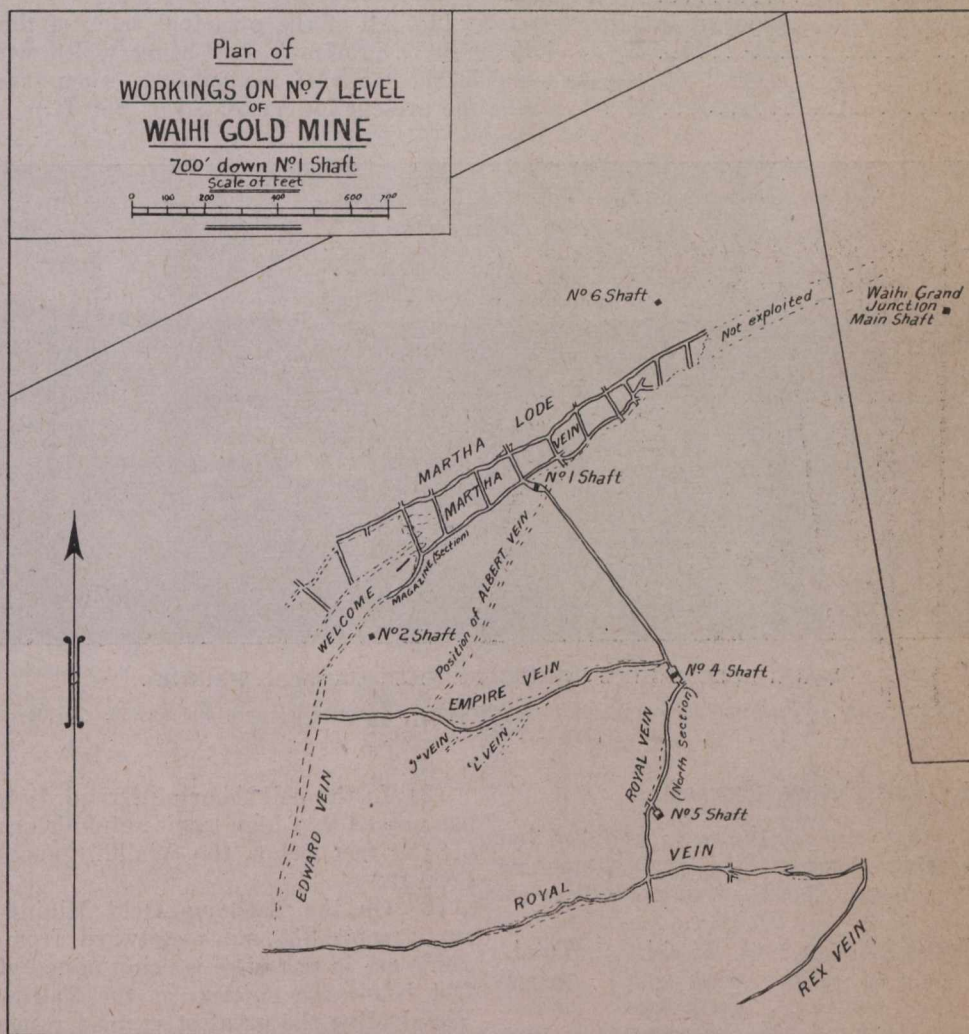
*Twenty-three of these in the Martha Mill are Union and one Wilfley.

**1907 Annual Report of the Waihi Gold and Silver Mining Company.

to meet the ever-increasing demands, and steam is employed as at the other two mills. To the Waikino steam plant has recently been added a 2,000 horsepower producer gas plant, Waikato lignite being used in the manufacture of the gas. This gas power plant, which is in three units—one of 1,000 h.p. and two or 500 h.p.—is proving both economical and efficient.

In conjunction with the Waikino Mill are both a foundry and engineering works, and a saw-mill. The former is of considerable capacity, and turns out a great part of the new mining and milling machinery, and effects all the necessary repairs and renewals. Fine milling timber, both kauri and rimu, is derived from sev-

duced to the metal by the passage through it of a solution of ferrous sulphate, the silver precipitate being washed, dried, and melted into bars. The ferric sulphate formed in the re-action between the silver sulphate and the ferrous sulphate is again reduced to ferrous sulphate by the addition of metallic iron. The gold remaining in the three crucibles is brought together in the central one, and there receives a final heating with strong sulphuric acid to further purify it. The gold, now in a granular state, is washed, dried and melted into ingots, which range from .990 to .993 fine. A little copper is added if necessary to increase the malleability of the gold. Since the output per month is about 15,000 ozs.



eral forest reserves which are in possession of the Company.

The Refining Works.—A plant for the refining of the whole of the Waihi Company's gold-silver bullion by the sulphuric acid process has recently been installed at the Martha Mill. The bullion in the form of thin plates is heated with concentrated sulphuric acid in three large iron crucibles, each holding 7,000 ozs. The mother liquid containing the silver, after being siphoned off into a settler, is passed on to a cistern, where it is diluted with steam and cooled. Here the silver sulphate crystallizes out, forming a thick incrustation on the sides and bottom of the cistern. This silver sulphate is re-

duced to the metal by the passage through it of a solution of ferrous sulphate, the silver precipitate being washed, dried, and melted into bars. The ferric sulphate formed in the re-action between the silver sulphate and the ferrous sulphate is again reduced to ferrous sulphate by the addition of metallic iron. The gold remaining in the three crucibles is brought together in the central one, and there receives a final heating with strong sulphuric acid to further purify it. The gold, now in a granular state, is washed, dried and melted into ingots, which range from .990 to .993 fine. A little copper is added if necessary to increase the malleability of the gold. Since the output per month is about 15,000 ozs.

of gold, and from 120,000 to 130,000 ozs. of silver, the total weight of bullion handled in this period is between four and five tons. As a by-product in the gold-silver refining process, a certain amount of selenium which occurs in the bullion is recovered. The last shipment of this element exported sold for about £80.

Cost of Mining, Treatment, Etc.

The total expenditure (£357,674) of the Waihi Company for the year 1907, when 356,974 short tons of ore were treated, gives the approximate cost per ton as under:—

	£	s.	d.
Mining—			
Stoping and general mining expenses....	7	2	36
Development work	1	4	52
Transport of ore to mills			3.67
Metallurgical treatment of the ore, from the initial crushing to the production of the refined gold and silver bars	7	11	39
Freight, insurance, and expenses of realising bullion			4.93
Repairs and renewals to plant, building machinery, and water-races			3.68
Export duty on gold, and rent paid to the N. Z. Government	1		0.08
Salaries, office rent, and miscellaneous expenses in New Zealand	1		0.95
Directors' fees, salaries and expenses in London			4.88
Total	£1	0	0.46

amount paid in dividends, bonuses, etc., up to the 31st December amounted to £2,871,328, or 45.64% of the total value of the gold-silver produced. The company's reserve amount at date mentioned stood at £140,000. In 1907 the total distribution to shareholders was 80% on the capital, or 8½% on present share values. Ore in sight at the end of the year 1907 was estimated at 1,299,979 tons, or about four years' supply at the present rate of milling. This calculated reserve exceeded that of the previous year by 270,321 tons. Its average value may be assessed at £2-14-0 per ton.

Certain of the figures just cited indicate that the prosperity of the Waihi Company is well assured for several years to come.

In speculating upon the future of the Waihi Mine, the following points are of interest:—

(1) All of the principal veins of the Waihi Mine exhibit a gradually increasing width without diminution in the tenor of the pay ore, when traced downward to the present lowermost level (850 ft.)



WAIHI GOLD MINING COMPANY'S VICTORIA MILL, WAIKINO.

Comprises 330 stamps, tube mills, concentration and cyanide plants; also foundry and engineering works and sawmill. The Government Railway passes in front of the mill.

Statistics and Future Prospects.

The total amount and value of the ores produced by the Waihi Gold Mining Company, Limited, from the date of its formation to the 31st December, 1907, is as under:—

	Tons (2,000 lbs.)	Yield.	Total.
To Dec., 1891 ... (not recorded)		50,086	50,086
1892-1899 (incl.)	394,374	1,152,138	
For year 1900....	125,453	317,902	
For year 1901....	178,444	461,205	
For year 1902....	201,023	521,574	
For year 1903....	259,082	658,393	
For year 1904....	291,176	683,888	
For year 1905....	298,531	728,521	
For year 1906....	328,866	837,927	
For year 1907....	356,974	878,486	

2,433,923 tons valued at £6,240,034

Total value of output..... £6,290,120

The Waihi Gold Mining Company, Limited, is capitalized at £500,000, in 500,000 shares of £1 each, which have a present market value of about £4,750,000. The

(2) In the neighbouring Grand Junction Mine boring has proved that high grade sulphide ore exists at a depth of 150 feet below the Waihi Company's lowest level (850 ft.)

(3) On the Talisman Gold Mining Company's property, some 8½ miles eastward from Waihi, rich sulphide ore in andesites is being mined at a depth of 2,000 feet below the outcrop of the Talisman vein. In the Waihi Mine the greatest vertical range yet exploited on the outcropping Martha vein is 1,055 feet.

(4) Since, as already mentioned in this paper, many of the veins in the Waihi Mine do not reach the surface, while some of the outcrop quartz has the character of sinter deposits, it may be inferred that there have been but little erosion of the surface and little removal of auriferous vein-stone since the formation of the lodes. Consequently there can have been only slight secondary enrichment by descending surface water. Thus it may be concluded that the present values of the lodes are practically original, and may be expected to continue to considerable depths.

These facts, taken in conjunction with the increasing output, augur favorably for the future of the great Waihi Mine in depth.

Annual Report of the Coal Mines Branch, Department of Public Works, Alberta, for the Year 1907.

The report of the Coal Mines Branch states that, with the exception of a short period of idleness following a general strike, the year 1907 was one of steady activity and substantial progress. The total output of coal was 32.47 per cent. greater than in 1906.

Year.	Output of coal in tons.	Per cent. increase over previous year.
1905.....	811,228	.....
1906.....	1,385,000	70.73
1907.....	1,834,745	32.47

The coal output for 1906 and 1907 is thus classified:

	1906. Tons.	1907. Tons.
Lignite.	602,780	639,335
Bituminous.	546,623	939,295
Anthracite.	235,597	256,115
Coal used in coke production.	103,936	112,887
Coke produced.	69,844	73,782
Briquettes produced. . . . .	.....	49,585

It will be noticed that for 1907, by far, the largest increase is assigned to bituminous coal. As the quantity of coal converted into coke is not materially larger than that recorded in 1906, it is evident that domestic household and industrial (other than metallurgical) markets absorbed the balance.

A summary of statistics for the two last years offers a fair means of estimating the growth of the industry:

	1906.	1907.
Number of new mines opened.....	16	35
Number of old mines reopened....	..	2
Number of mines abandoned	2	6
Number of tons of coal produced. .	1,385,000	1,834,745
Number of tons of coke produced. .	69,844	73,782
Number of tons of briquettes produced. . . . .	.....	49,585
Average number of persons employed inside the mines.....	2,000	2,700
Average number of persons employed outside the mines.....	800	900
Number of fatal accidents inside the mines.	9	17
Number of fatal accidents outside the mines.	1	2
Number of non-fatal accidents inside the mines	31	75
Number of non-fatal accidents outside the mines. . . . .	..	11

While in 1906 there were 61 coal mines known to be in operation in 1907 there were 98 in all, of which 15 produced no coal during the year.

Coal is being mined in the south at many points along the Crow's Nest branch of the C. P. R., from Medicine Hat near the eastern boundary to Coleman near the western boundary. On the main C. P. R. line extension coal deposits are being worked at Canmore and Bankhead. In the Edmonton district numerous mines are in operation and at many outlying points remote from railways small mines, worked during the winter, supply local requirements.

put of about 1,500 tons per day, drawn from three veins. The briquetting plant installed by the Zwoyer Fuel Company, has been doubled in capacity and now produces 400 tons of briquettes per day. The anthracite breaker plant has been duplicated and other improvements made.

The H. W. McNeill Company, Limited, Canmore, has carried out large improvements. The main roads have been enlarged to allow the introduction of compressed air locomotives.

The International Coal and Coke Company, Limited, Coleman, has a daily output of 1,570 tons, which is soon to be increased. Two additional locomotives have been added to the haulage plant. Incandescent lighting has been introduced in the main gangway on No. 2 and No. 4 seams.

The Hillcrest Coal and Coke Company, Limited, Hillcrest, has installed a new fan to ventilate the whole of their mine. The capacity is 30,000 cubic feet of air per minute.

At the property of the Maple Leaf Coal Company, Bellevue, a new coal chute has been installed capable of handling 500 tons of coal per day. This mine is rated among the large future producers.

The reorganized Galbraith Coal Company, Lundbreck, has erected a tipple of 1,000 tons daily capacity. Many other companies report progress.

Accidents.

All serious accidents in coal mines were carefully investigated during the year. Six lives were lost on account of a fire that started in surface buildings, but not a single fatal accident due to fall of roof or sides was reported. The number of accidents due to explosions of gas has been greatly reduced since the introduction of safety lamps into many of the mines. Accidents caused by mine cars were numerous, but in most cases not serious.

Many of the accidents reported are so slight as not to incapacitate the injured party for more than a few hours or a day at most.

Fatal accidents numbered 17 below ground, and two above. Serious accidents numbered 17 below ground and one above ground. Six of the serious accidents were due to falls of roof and sides, five to mine cars and three to explosions.

Taken in its entirety the list is by no means a large one, although the rate of fatalities underground per thousand men employed is excessively large, being 6.30 as against 4.5 for the preceding year. These high rates are of course due to the large number of mines opened, the crudeness of much of the mining and the extensiveness of the territory to be covered by the inspector.

Inspection.

Mr. Norman Fraser, Provincial Inspector of Mines, reports that he and his assistant made a continuous round of inspection of all the large mines and endeavored to visit the small outlying mines at suitable periods.

The use of locked safety lamps in mines where there is any danger of explosion from gas or dust has been enforced throughout the province. The introduction of

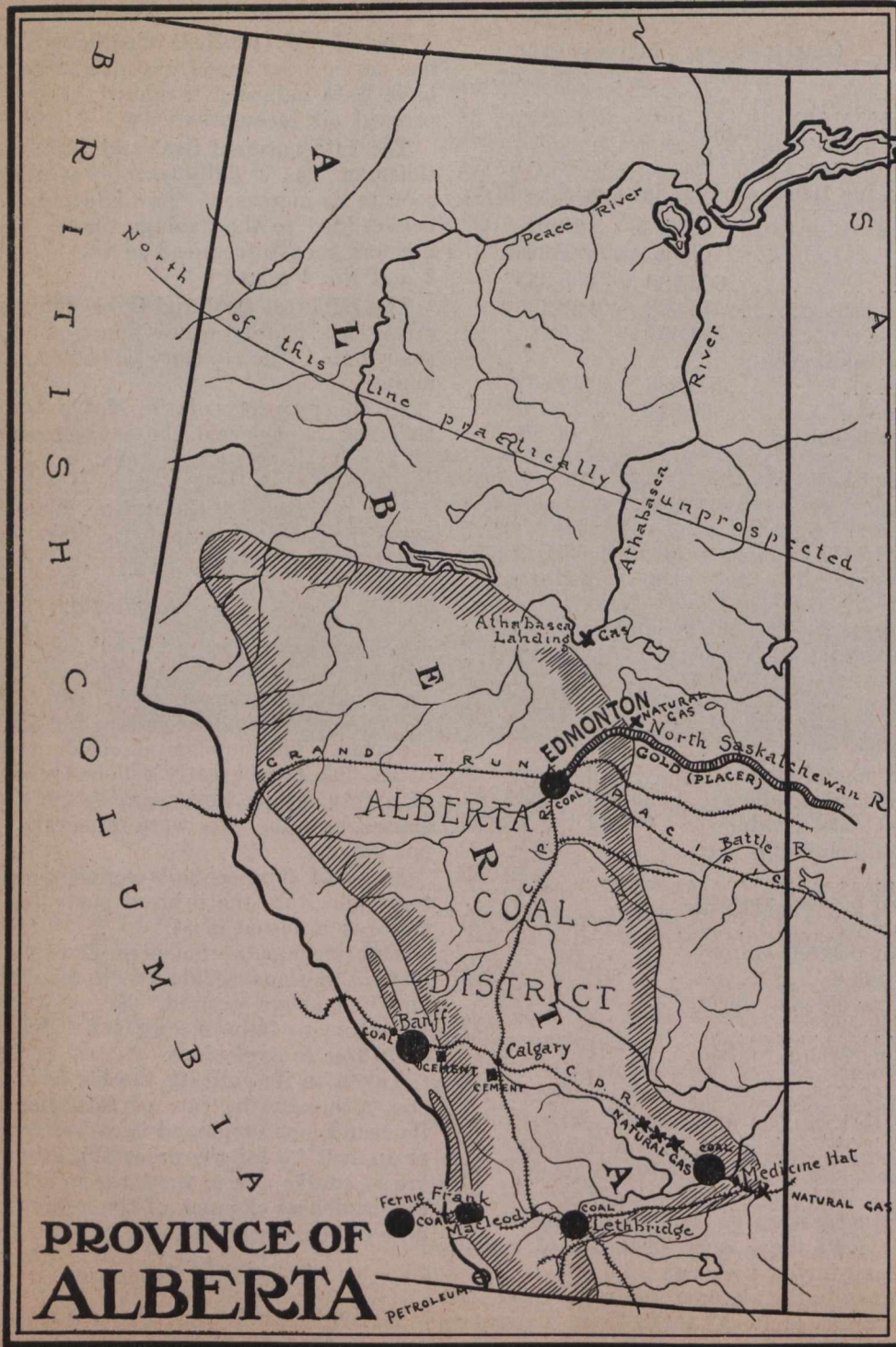
safety lamps has been opposed by some of the mines, but events have justified the measure.

The inspector alludes to the absence of any provisions in the Coal Mines Act bearing on the regulation of the use of explosives in dry and dusty mines. The keeping of necessary plans, records, registers and report books, is to be enforced.

COAL BRIQUETTING.

Development of the Industry in 1907.

The coal briquetting industry should make rapid progress in this country during the next few years, according to E. W. Parker, of the United States Geological Survey. Although the production in the United



Four prosecutions for breaches of the Coal Mines Act were undertaken by the department and in each case a conviction was obtained. These are the first prosecutions undertaken in the Province under the Coal Mines Act.

States in 1907—63,153 short tons, having a value at the plants of \$244,942—seems insignificant when compared with the output of briquetting plants in Germany in 1906—about 16,000,000 short tons—it is of great importance as indicating that a beginning has been made

and that consumers are being gradually educated in the advantages of briquets for efficiency, ease of handling and cleanliness.

There were ten plants in operation in 1907, although one of these, at Pittsburg Landing, Cal., was burned in July and up to the close of the year had not been rebuilt. The location of the plants and the character of the fuel and binder used in the operation are reported by Mr. Parker in a paper just published by the Survey as an advance chapter from "Mineral Resources of the United States, Calendar Year 1907." In the introductory paragraphs to this report Mr. Parker says:

"There can be little doubt that the interest aroused through calling attention to the waste in the past of the country's natural resources, represented by the non-use of slack and culm produced in our coal mining operations, and the aggressive policy of President Roose-

velt in seeking to throw light upon it and to correct the abuses into which we have largely unconsciously fallen, are, to a great extent, responsible for the present prospect of a development of coal briquetting as an important industry in the United States. It may not be long before the governments of the States, under whose jurisdiction the matter comes, will enact legislation against the accumulation of slack and culm heaps or their useless destruction by burning and prohibit this waste, as they have in some cases interdicted the waste of natural gas.

"Legislation which would prohibit 'shooting from the solid' at mines, when slack coal is not a marketable product, and which would provide penalties for excessive use of powder would have, as one result, a larger percentage of lump coal, and thus, in part at least, enable operators to assume the additional expense involved in the briquetting of such slack coal as is unavoidably produced."

ALBERTA GOVERNMENT EXAMINATION FOR MINE MANAGERS, ETC.

Examinations.

Two examinations for fire bosses and one for mine managers and pit bosses have been held at each of the centres in the province. A large number of candidates presented themselves for examination. In the fire boss and pit boss classes most of the candidates came up to standard but in the managers class the majority of the candidates did not come up to the required standard.

The following are the questions set at the examinations in Banff, November 28th and 29th; Frank, December 2nd and 3rd; and Edmonton, December 5th and 6th, 1907.

Fire Boss Examination.

Paper No. 1. Time Allowed, Two Hours.

The value attached to each question is given in brackets. Candidates must obtain 60 per cent. of the allotted marks to pass.

Coal Mines Act.

1. What is required by the General Rules re fencing of places not in use in the mine? (10)
2. What is required by the General Rules re fencing of shafts? (10)
3. What does the Act require in the way of man-holes on planes worked by machinery? (10)
4. What does the Act require in the way of man-holes for travelling roads when the travelling roads are worked by horses or other animals? (10)
5. What does General Rule 2 state regarding ventilation and the daily inspection of mines by a competent person? (20)
6. What does General Rule 3 state regarding the daily inspection of mines by a competent person? (15)
7. Give a full description of the daily duties of a fire boss and write out an imaginary report on the conditions prevailing in a mine. (25)

Fire Boss Examination.

Paper No. 2. Time Allowed, Two Hours.

The value attached to each question is given in brackets. Candidates must obtain 60 per cent. of the allotted marks to pass.

Ventilation.

1. What is meant by ventilation and why is ventilation necessary in a mine? (10)
2. Describe fully all the gases found in mines. (20)
3. What is the essential difference between a safety lamp and an open light? (20)
4. Under what conditions may a safety lamp become dangerous? (15)
5. Describe with sketches all the different methods you know for conducting air to the face of rooms or rock tunnels when the face of these rooms or tunnels has got a considerable distance away from a cross-cut. (15)
6. How would you proceed to examine a mine for explosive gas, say fire-damp? (15)
7. Is it possible to have an explosion in a mine when a safety lamp test does not show any indication of fire-damp? Explain fully. (15)

Fire Boss Examination.

Paper No. 3. Time Allowed, Two Hours.

The value attached to each question is given in brackets. Candidates must obtain 50 per cent. of the allotted marks to pass.

Practical Work.

1. Sketch and describe the mine in which you are at present employed. Show the direction of the ventilating currents and note the number of men employed and the average output for the day. (25)
2. In shot lighting a mine, what direction with relation to the direction of the air current would you travel in going your rounds? Give reasons. (20)

3. What precautions are necessary in handling dynamite and what precautions should a shotlighter take before firing any shot in a mine where safety lamps are used? (20)

4. Sketch and describe any two methods of timbering with which you are acquainted. (20)

5. Sketch and describe a good form of ventilation door to be used on a main haulage road. (15)

Fire Boss Examination.

Paper No. 4. Time Allowed, One Hour.
The value attached to each question is given in brackets. Candidates must obtain 50 per cent. of the allotted marks to pass.

Arithmetic.

1. Divide 554.553 by 14.1 and multiply the result by the difference between three thousand and fifty-four and two thousand nine hundred and seventy-eight. (20)

2. What weight of coal will be produced from a level six feet high and eight feet wide and 1,000 feet long, supposing one ton in the solid occupies the space of 29 cubic feet? (20)

3. What is the area of an airway 6 feet 3 inches high by 10 feet 4 inches wide? (20)

4. If 100 cubic feet of air per minute is required for each man in a mine, how much air is required per minute in a mine working two shifts with 100 men on each shift? (20)

5. How many rails each 24 feet long will be required to lay double track in a main gangway 552 yards long? (20)

Pit Boss Examination.

Paper No. 1. Time Allowed, One and one-half Hours.
The value attached to each question is given in brackets. Candidates must obtain 60 per cent. of the allotted marks to pass.

Coal Mines Act.

1. What is the meaning of "mine" in the Coal Mines Act and to what mines does the Coal Mines Act apply? (15)

2. State all the provisions of the General Rules with regard to the inspection of mines. (20)

3. What are the provisions of the Act as to the use of safety lamps? (15)

4. What are the provisions of the Act governing the use of explosives below ground? (20)

5. What are the provisions of the Act regarding ropes and chains? (15)

6. State all the requirements of the Act regarding pit bosses and shotlighters. (15)

Pit Boss Examination.

Paper No. 2. Time Allowed, Two and one-half Hours.
The value attached to each question is given in brackets. Candidates must obtain 60 per cent. of the allotted marks to pass.

Ventilation.

1. Describe the various gases met with in mines, giving their chemical symbols and specific gravities. (20)

2. What methods would you adopt to obtain a large volume of air with the least possible mine resistance. (15)

3. What are the general requirements in regard to the use and construction of doors, overcasts and stoppings? (15)

4. Sketch and describe the water gauge and explain its use in ventilation. (15)

5. What dangers to life and property are to be guarded against when the ventilating current is produced by a furnace? (15)

6. In a mine the quantity of air passing is 25,000 cubic feet per minute, and the horse power of ventilation is 8. Find the water gauge. (20)

Pit Boss Examination.

Paper No. 3. Time Allowed, Three Hours.
The value attached to each question is given in brackets. Candidates must obtain 50 per cent. of the allotted marks to pass.

Practical Work.

1. Sketch and describe how you would lay out and work a 5-foot seam of lignite with a soft roof under a cover of 200 feet. (20)

2. Sketch and describe how you would sink and secure a shaft through 6 feet of quicksand at a depth of 60 feet. (15)

3. Sketch and describe how you would timber a level running in a five foot seam of coal, pitching at an angle of 45 degrees to the horizontal. The level has to be 7 feet high from the low side rail and the coal is of a soft nature. (15)

4. What is your experience with explosives in mines, and what improvements do you think can be introduced regarding the class of explosives to be used in gaseous mines? (20)

5. Explain with sketches how you would extract pillars in a flat lignite seam with a clay roof and also in a pitching vein with a hard rock roof. (15)

6. If a fire breaks out suddenly in the downcast shaft of a mine what means would you adopt to secure the safety of the men in the mine underground? (15)

Pit Boss Examination.

Paper No. 4. Time Allowed, Three Hours.
The value attached to each question is given in brackets. Candidates must obtain 50 per cent. of the allotted marks to pass.

Machinery.

1. What size and kind of rope would you put in a shaft for hoisting a load of 3 tons? Give weight of rope per foot and state size of pulley you would use for this rope. (20)

2. What is a syphon and what is the principle on which it works? (15)

3. Find the horse power of an engine having a 2 foot 6 inch stroke, diameter of cylinder 14 inches, effective steam pressure 60 pounds per square inch. (20)

4. Sketch and describe a fan suitable to ventilate a small mine. (15)

5. Describe with sketches some method of boring suitable for putting down test holes to a depth of 300 feet. (15)

6. What precautions would you take to ensure the safe and proper handling of boilers and what are the requirements of the Coal Mines Act regarding boilers? (15)

Pit Boss Examination.

Paper No. 5. Time Allowed, Three Hours.
The value attached to each question is given in brackets. Candidates must obtain 50 per cent. of the allotted marks to pass.

Surveying.

1. What is the cubic content of a mine car 5 feet long, 2 feet 2 inches wide and 20 inches deep. What weight of coal will this car hold when levelfull? (15)
2. What experience have you had in mine surveying? (15)
3. Plot the following survey.
 - (1) s. 20 degrees w. 220 feet.
 - (2) n. 40 degrees w. 140 feet.
 - (3) n. 20 degrees e. 220 feet.

Find the length and bearing of the closing line between points 1 and 3. (15)

4. What are the various reasons why plans should be kept of the workings of a mine? (20)
5. How do you put up points or plumbs to be used in keeping main roads straight in a mine? Describe fully how you line off these points afterwards, and take sights by them to the face of the road which has to be kept straight. (20)
6. What would be the cost of driving a tunnel 45 yards long, 8 feet wide and 7 feet 6 inches high, the price per cubic yard being \$2.25? (15)

Mine Manager's Examination.

Paper No. 1. Time Allowed, One and one-half Hours.
The value attached to each question is given in brackets. Candidates must obtain 70 per cent. of the allotted marks to pass.

Coal Mines Act.

1. What is the interpretation of "mine" as laid down by the Coal Mines Act and to what mines does the Act apply? (15)
2. State fully the provisions and exceptions relating to the appointment of certificated managers. (15)
3. What are the provisions of the Act governing the use of explosives below ground? (20)
4. Name all the books, registers, reports, etc., required to be kept at the mine to comply with the Coal Mines Act. (20)
5. In what manner and to whom has notice of fatal and non-fatal accidents to be sent? What form is set out in the Coal Mines Act for the use of those making returns of facts relating to accidents or explosions? (15)
6. What does the Act say in connection with the appointment of inspectors by workmen? (15)

Mine Manager's Examination.

Paper No. 2. Time Allowed, Two and one-half Hours.
The value attached to each question is given in brackets. Candidates must obtain 70 per cent. of the allotted marks to pass.

Ventilation.

1. Name and describe the gases met with in coal mines and give the chemical symbol and specific gravity of each. (15)
2. Would there be any danger in a mine where the ventilating current contained 1 per cent. of CH₄ and also a considerable amount of fine coal dust? Give reasons for your answer. (10)
3. The old workings in a mine cover 20 acres, and the average height between roof and floor over this area is 2 feet. If this area is filled with CH₄ how much of that gas will be given off into the roadways of the mine if the barometer falls from 27.5 inches to 27 inches? (15)

4. The quantity of air passing in an airway 10 feet by 10 feet is 50,000 cubic feet per minute. In the airway there is a right angle bend and in coming against this bend the air is supposed to be brought momentarily to a standstill. Calculate the horse power lost. (15)

5. The air entering a deep dry mine is at all seasons completely saturated with moisture. At one season of the year the air entering is at 20 degrees F. and at another 80 degrees F. while the mine is at a constant temperature of 60 degrees F. Discuss the results, if any, affecting the safety of the mine due to these changes of temperature. (15)

6. If we have 25,000 cubic feet of air passing through an airway 5 feet by 6 feet, what quantity will pass through an airway 10 feet by 6 feet, pressure and length remaining the same? (15)

7. A pumping chamber in which works a steam pump has its only outlet to the upcast shaft. This shaft is 700 feet in depth and the pumping chamber is exactly half way down. Discuss fully how you would ventilate the chamber. (15)

Mine Manager's Examination.

Paper No. 3. Time Allowed, Three Hours.

The value attached to each question is given in brackets. Candidates must obtain 60 per cent. of the allotted marks to pass.

Practical Work.

1. Is there any danger in the panel system of mining coal? Give reasons. (10)
2. Discuss the question of using coal cutting machinery under the various conditions under which coal is found in Alberta and show the advantage and disadvantages. (15)
3. Describe the general design of plant you would instal above ground to deal with a fairly large output of domestic coal and state the considerations governing your choice. (15)
4. Explain with the aid of sketches how the pressure of the overlying strata may be utilized in the getting of the coal. (15)
5. How would you proceed to open a mine after an explosion? (15)
6. How and of what material would you construct a dam in solid strata? What thickness of dam would you put in to withstand a head of 500 feet of water? (15)
7. Describe with sketches how you would work a flat lignite seam with a soft clay roof lying under 300 feet of cover. (15)

Mine Manager's Examination.

Paper No. 4. Time Allowed, Three Hours.

The value attached to each question is given in brackets. Candidates must obtain 60 per cent. of the allotted marks to pass.

Machinery.

1. Sketch and describe the "Indicator." Draw a diagram taken from a condensing engine and point out the various features of the diagram. (12)
2. Explain fully the benefits of compounding engines and also the benefits of compressing air by different stages. (10)
3. What size of pump would you put in to pump 500 gallons of water per minute against a head of 300 feet? (15)
4. What are economizers as applied to boilers? Describe such an appliance. (12)

5. What are the various appliances which have been invented to prevent overwinding? Sketch and describe one of them. (15)

6. What size of hoisting engine would you put down to raise 800 tons of coal from a depth of 600 feet in 8 hours? (18)

7. What size of engine would you instal to work an endless rope haulage 6,000 feet long to deliver 800 tons in 8 hours hauling up a grade of 1 in 10? (18)

Mine Manager's Examination.

Paper No. 5. Time Allowed, Three Hours.

The value attached to each question is given in brackets. Candidates must obtain 60 per cent. of the allotted marks to pass.

Surveying.

1. Explain the difference between the transit and the miner's compass and discuss their respective uses in mine surveying. (10)

2. Plot the following survey and find the area of the enclosed figure:

Station.	Bearing.	Distance
1—2	N. 35.00 E.	147'
2—3	N. 59.15 E.	135'
3—4	S. 54.45 E.	237'
4—5	S. 36.15 W.	270'
5—2	N. 28.00 W.	323'

(20)

3. From a level, the course of which is N. 53.00 E. rooms are driven S. 68.00 E., width of room 28 feet and width of pillar 42 feet. What should be the distance on the level from centre to centre of rooms? (15)

4. If a triangle has one angle 61 degrees 10 minutes and another angle 62 degrees 15 minutes, what is the size of the third angle? (10)

5. Plot the following notes of a level book:

Back sight.	Intermediate sight.	Fore sight.	Distance in feet.
4.40	.....	6.35	230
5.20	.....	11.85	160
6.04	10.26	.....	190
.....	.....	13.95	180
5.12	.....	9.65	110
11.49	.....	4.92	225
13.96	7.50	.....	200
.....	.....	4.03	100

(20)

6. Explain the construction and use of the vernier as applied to surveying instruments. (15)

7. Draw to scale a mine car to hold one ton of coal when level full, mark on sides and show the car in plan, end elevation and side elevation. (10)

WAGES.

Fire bosses are still scarce although judging by the number of men coming up for examination for fire boss certificates the supply ought soon to reach the demand. In the early part of the year certain classes of mine workers obtained a slight increase in wages which increased scale is still maintained. The average coal diggers' wage, mining coal on contract, varies from \$75.00 to \$180.00 per month. The general wage schedule for day labor is as follows:

Inside Men.

	Hours.
Fire bosses.	\$3.50 8
Shot lighters.	3.00 8
Bratticemen.	3.00 8
Bratticemen helpers.	2.50 8
Timbermen.	3.00 8
Timbermen helpers.	2.75 8
Drivers.	2.75 8
Drivers, wet places.	3.00 8
Team drivers.	3.00 8
Tracklayers.	3.00 8
Tracklayer helpers.	2.75 8
Rock miners.	3.50 8
Miners.	3.00 8
Miners, wet places.	3.50 8
Locomotive engineers.	2.75 8
Switchmen.	2.75 8
Chute loaders.	2.75 8
Laorers.	2.50 8
Timber handlers.	2.75 8
Machine men.	3.50 8
Machine men helpers.	3.00 8
Switch boys.	1.50 8
Door boys.	1.00 8
Hoist men.	2.75 8
Rope riders.	2.75 8
Couplers, boys.	1.50 8
Couplers, men.	2.50 8
Pushers.	2.50 8

Outside Men.

Pitheadman.	2.50 10
Slate pickers, men.	2.00 10
Slate pickers, boys.	1.25 10
Car oilers, boys.	1.25 10
Car oilers, men.	2.00 10
Tally boys.	1.25 10
Teamsters.	2.50 10
Blacksmiths.	3.50 10
Blacksmith helper.	2.50 10
Mine carpenter.	3.50 10
Mine carpenter helper.	2.50 10
Car repairers.	3.00 10
Power house engineers.	3.50 10
Tipple engineers.	3.25 10
Locomotive engineer.	3.25 10
Locomotive helper.	2.80 10
Firemen.	2.50 8
R. R. car handlers.	2.25 10
Fanmen.	2.50 12
Outside laborers.	2.00 10
Fan fireman.	3.00 12
Lampman.	2.50 12
Machinists.	3.20 10
Machinists' helpers.	2.50 10
Couplers.	2.00 10
Sawyer.	3.00 10

MINERAL WATERS.

Carbonate mineral waters, as agents in geologic changes, fall into two main subdivisions. Calcium is the important base in one, sodium in the other. Carbonic acid is usually present in sufficient quantity to form bicarbonates, thus making it possible for calcium, magnesium and iron to remain in solution. Upon evaporation calcium carbonate and magnesium carbonate are deposited, while ferrous bicarbonate is broken

up, and insoluble ferric oxide, or some insoluble hydroxide of iron, is formed by oxidation. The anhydrous residue contains no bicarbonates except in some cases when sodium is predominant.

Carbonate waters carrying a relatively large proportion of silica are common. In volcanic waters, especially in geyser waters, the silica may reach half a gram to the litre, and sometimes even more. For instance, the waters of the Great Geysir, Iceland, carry 1.131 part of solid per million. Of the total solids, silica constitutes 45.04 per cent.

PRODUCTION OF LEAD IN 1907.

Advance Statement by United States Geological Survey.

The total domestic production of refined lead in 1907, according to C. E. Siebenthal, of the United States Geological Survey, was 414,189 short tons, of which 314,241 tons was desilverized lead and 99,948 tons was soft lead. In 1906 the production of desilverized lead was 313,886 short tons; of soft lead, 90,783 tons; and the

total refined lead was 404,669 short tons. The increase in production of 1907 over 1906 was therefore 9,520 short tons. The total for 1907 embraces all desilverized lead produced in this country and the pig lead recovered from the Mississippi Valley lead ores, but is exclusive of 9,910 tons of antimonial lead reported by refiners. Of the pig lead from Mississippi Valley ores, 29,809 tons were desilverized and are therefore not included under "soft lead."

The product of refined lead can not be apportioned according to the sources of ore from which it was derived, because the lead refineries treat also products that are secondary and are derived from diverse sources. The identity of ore, and thus its original source, is preserved only as far as the smelters. The following table, showing sources of lead produced in the United States, is therefore based on smelter figures. It includes "pig lead" reported by all known smelters running on Mississippi Valley lead ores and "lead" produced at all other known smelters in this country. No lead ores from the United States were treated elsewhere in 1907.

MANGANEZE ORES.

By E. C. Harder.

(Abstracted from Advance Chapter from Mineral Resources of the United States.)

Introduction.

The manganese-mining industry in the United States is at present, as for several years past, very small. In 1907 less than twenty manganese mines were in operation, and not half that number operated steadily. Of the large manganese districts of the United States, namely, the Valley and the Piedmont districts of Virginia, the Cartersville and the Cave Springs districts of Georgia, and the Batesville district of Arkansas, only the first two produced manganese ore in 1907. For this lack of activity there are three reasons—(1) the discontinuous and scattered nature of the deposits, (2) the crude mining methods naturally resulting therefrom, and (3) the low prices paid, which prevent attractive profits to operators under these conditions. All of the ore mined has to be either washed or sorted, and often both. Single pockets as a rule are small and are soon exhausted, so that the erection of expensive concentrating plants is discouraged, except in cases like the Crimora basin in Virginia, which is not at all typical of known American manganese deposits. In short, under present conditions domestic manganese can not compete with the foreign high-grade product. The larger part of the ore mined in this country was used in the brick, plant, and chemical industries, about one-sixth (947 long tons, valued at \$6,747) being used in the steel industry, as against the 209,032 long tons imported for this purpose. The main reason for this seems to be that, although the demand in the former industries is limited, the prices paid are higher and ores can be used which would be undesirable in steel manufacture. Besides, the mining is on such a small scale that the supply does not run far ahead of the demand in these industries.

Uses.

The uses of manganese in the industries may be classified as follows: (1) Metallurgical, in the manufacture of alloys and in copper and silver reduction; (2) chemical, as an oxidizer and as a coloring material.

The manganese ores used in the manufacture of alloys are dependent in value on the percentage of metallic manganese present and on the absence of injurious substances like phosphorus and sulphur. The latter condition is especially true in the case of the alloys with iron. Spiegeleisen and ferromanganese are alloys of iron and manganese. The former contains below 20 per cent manganese, while the latter has a manganese content ranging from 20 per cent to 90 per cent, above which the alloy becomes unstable. Silicon and carbon are present in varying quantities. Spiegeleisen and ferromanganese are used in the manufacture of steel in the following ways—(a) as reducers of iron oxide in the final melting, in which case the manganese oxide formed goes into the slag; (b) as recarburizers of steel, in which case they contain considerable carbon; (c) for counteracting the effects of phosphorus and sulphur by the formation of manganese compounds with these elements; (d) in the manufacture of manganese steel, used for railroad and street-car rails on curves, for burglar-proof safes, for car wheels and for other purposes. The addition of small quantities of manganese gives to steel hardness, ductility and strength.

Manganese is also used to form alloys with copper, zinc, aluminium, tin, lead, magnesium, and silicon, and with combinations of these metals.

Manganese oxides are used to a slight extent in copper and silver reduction as a substitute for iron oxides.

As an oxidizer manganese oxide is used in the manufacture of chlorine, bromine, and oxygen, and of disinfectants like potassium permanganate; as a drier in paints and varnishes; as a decolorizer of glass, and in the Leclanche battery. In these cases the value of the ore depends on its available oxygen content—that is, on its percentage of pyrolusite or manganese peroxide.

As a coloring material manganese is used in calico dyeing; for coloring bricks, glass, and pottery, and in the manufacture of green and violet paints.

Compounds of manganese are used in a small way for medicine, and the mineral rhodonite, a silicate of manganese, is used rarely for ornamental purposes on account of its beautiful pink color.

Prices.

The prices of manganese ores used in the steel industry vary from \$5 to \$15 per long ton, according to the grade of the ore. They are governed by the following schedule of prices established by the Carnegie Steel Company:

Schedule of prices paid per ton of 2,240 pounds for domestic manganese ore delivered at Pittsburg or Bessemer, Pa., and South Chicago, Ill.

Prices are based on ores containing not more than 8 per cent silica or 0.25 per cent phosphorus, and are subject to deductions as follows: For each 1 per cent in excess of 8 per cent silica there shall be deduction of 15 cents per ton; fractions in proportion.

For each 0.02 per cent, or fraction thereof, in excess of 0.25 per cent phosphorus there shall be a deduction of 2 cents per unit of manganese per ton.

Percentage of metallic manganese in ore.	Price per unit, in cents.	
	Manganese.	Iron.
Over 49	30	6
46 to 49	29	6
43 to 46	28	6
40 to 43	27	6

Ores containing less than 40 per cent manganese or more than 12 per cent silica or 0.27 per cent phosphorus are subject to acceptance or refusal at the buyer's option.

Settlements are based on analysis of sample dried at 212° F., the percentage of moisture in the sample as taken being deducted from the weight.

The manganese ores for oxidizing and coloring purposes are valued according to the quantity of manganese peroxide present, their consistency, etc., and prices range up to \$25 per ton for the better grades of ore.

Production.

The production of manganese in 1907, amounting to 5,604 long tons, exceeded that of any year since 1902 except 1906. Toward the close of 1902 there occurred a sudden drop in production due to the cessation of mining operations in northwestern Georgia, after which there was a steady increase from the 2,825 tons produced in 1903 to 6,921 tons in 1906.

The bulk of the production was, as usual, in Virginia. South Carolina joined the ranks of producers for the first time since 1903, and produced more ore than in any previous year. Tennessee also showed an increase and a fair promise of becoming something more than a mere intermittent producer. California produced more ore than in any year since 1902. On the other hand, Georgia and Arkansas, which contain some of the most important manganese deposits in the country, were not on the list of producers of manganese in 1907, although Arkansas produced considerable manganese-iferous iron ore. The Utah mines, which gave fair promise for several years, were again idle.

OCCURRENCE.

Vermont.

Manganese ore occurs near the towns of South Wallingford and Brandon, in Otter Creek Valley, Vermont. In both localities the deposits are on the west slope of the Green Mountains at or near the contact of a "Lower Cambrian" quartzite, which forms ridges along the west slope, and an overlying limestone of approximately the same age, which underlies the valley to the west. The deposits are mainly brown hematite with subordinate manganese.

Virginia.

Manganese deposits occur in Virginia in the Piedmont region and in the Appalachian Valley.

The ore of the Piedmont region occurs in the James River Valley north and south of Lynchburg. There are a number of old mines in this district, but only one, that of the Piedmont Manganese Company, is at present producing. The deposits occur in residual clay and sand derived from ancient crystalline rocks. This material is still in place and often only partly decomposed, so that the texture and structure of the original rocks is clearly distinguishable. In general the ore occurs in nodular masses, ranging in weight up to 500 pounds and scattered through a yellowish-brown micaceous clay forming a nearly vertical layer between decomposed granite and quartzose mica schist residuum. The original nature of this ore-bearing layer is unknown.

Tennessee.

The manganese ores of Tennessee are the southward continuation of the Appalachian Valley deposits of Virginia. As in Virginia, they occur near the eastern border of the valley. The best known of the Tennessee deposits occur in the vicinity of Newport and Del Rio, Coker County, and in Shady Valley, Johnson County.

The Yellow Springs mine, on English Mountain, 5 miles southwest of Newport, consists of an open pit in brown and red clays and sand, residual from Cambrian quartzite. The ore is both soft and hard, the former generally occurring in irregular pockets and seams associated with manganese-iferous clays, and the latter in small kidneys and irregular masses scattered through the clay and the soft ore pockets. There are numerous surface indications of manganese for several miles east of this mine, but little or no development work has been done.

Georgia.

Manganese ores occur in Georgia in three horizons: (1) The ancient crystalline rocks, (2) Weisner (Cambrian) quartzite, and (3) Knox (Cambro-Silurian) dolomite. The following is a general succession of rocks for northwestern Georgia from top to bottom: Knox dolomite; Conasauga shale; Beaver limestone; Weisner quartzite; Crystalline rocks.

In the crystalline area ores occur at Mount Airy, Habersham County; Bowersville, Hart County; Blue Ridge, Fannin County; and Draketown, Haralson and Paulding counties. All of these deposits are small, and none of them have been worked to any extent.

The ore is of four varieties: (1) Kidney ore, either amorphous, blue psilomelane, or a succession of concentric layers of psilomelane and crystalline and granular pyrolusite; (2) irregular masses, either psilomelane or a mixture of psilomelane and pyrolusite; (3) breccia and replacement ore with chert or sandstone fragments,

and (4) seams and irregular pockets of soft ore with local hard masses, a large portion of which must necessarily be lost during washing. The clays of the district are yellowish brown or red, according as they are derived from the Weisner quartzite or the Beaver limestone. The ores are generally associated with the former, and signs of manganese are present throughout the area covered by them, although only locally are there deposits rich enough to work. The breccia ores occur in residual sandstone or chert masses in the clays.

Arkansas.

Manganese ores of commercial importance have long been known in the Batesville district, in northern Arkansas. Smaller deposits occur in the southwestern part of the State, but these have not produced up to the present.

The Batesville district is located north of Batesville and east of Cushman, in Independence County. The country rock ranges from Cambrian to Carboniferous in age, and is in horizontal beds. The following is the general succession of rocks for the district:

General section in phosphate region of northern

Arkansas.

Boone chert, St. Joe marble (Carboniferous).

Chattanooga shale and Sylamore sandstone (Devonian).

St. Clair limestone (Silurian).

Cason shale, Polk Bayou limestone, Izard limestone, Key sandstone (Ordovician).

Manganese ores occur in three different associations in the Batesville district, but all of them at very nearly the same geological horizon, namely, between the Boone chert and the Polk Bayou limestone, or locally the Izard limestone, where the Polk Bayou is absent. (1) The Cason shale locally becomes red and sandy and contains an abundance of small lenticular manganese iron nodules constituting a low-grade manganese iron ore deposit. This bed where exposed is 10 feet or more in thickness. (2) In most of the mines of the district the horizon normally occupied by the formations given above, between the Boone chert and the Polk Bayou limestone, is occupied by a manganese-bearing bed of varying nature, which appears to be partly residual from the erosion of other rocks formerly occupying this horizon and partly deposition of new material. This bed is also called the Cason shale, and although occupying a wider horizon is presumably equivalent to (1). It varies in thickness from a few inches to many feet because of the irregular surface of the underlying Polk Bayou limestone. The formation consists sometimes of clay with manganese ore fragments, sometimes of a solid bed of sandy, low-grade ore with associated sediments, and at other times of partial replacement of sediments. (3) The remaining forms of manganese deposits are associated with residual clays on the slopes of hills below the main manganese horizon above mentioned. These deposits consist of masses of psilomelane, pyrolusite, and braunite, and are reconcentrations from the manganese bed above. Only one mine in the district, the Cason, was a producer in 1907, but several deposits have been worked recently, among them the Reeves, Bales, Roach, and Meeker mines. The principal old mines are the Southern, Polk-Southerd, Turner, Adler, Trent, Baxter, and Montgomery mines.

COKE MAKING IN VIRGINIA.

As a result of the financial stress during the closing months of 1907, the production of coke in Virginia was less by 32,379 short tons, or 2.1 per cent. than in the preceding year, amounting to but 1,545,288 short tons in 1907, as against 1,577,659 short tons in 1906, according to E. W. Parker, chief statistician of the United States Geological Survey, whose report on the manufacture of coke in 1907 is now in press. Owing, however, to the better prices that prevailed during the greater part of the year, the value of the coke produced in 1907 shows an increase of \$154,074—from \$3,611,659 in 1906 to \$3,765,733 in 1907. The number of establishments increased from 18 in 1906 to 19 in 1907, and the total number of ovens from 4,641 in the earlier year to 5,333 in the later. One establishment of 400 ovens was idle throughout the year. All of the coal used in the manufacture of coke in Virginia in 1907—2,264,720 tons—was unwashed; 1,271,518 tons was run-of-mine and 993,202 tons slack.

All the coking coals of Virginia are contained within a few counties in the extreme southwestern portion of the State, the coal fields being within the Appalachian province. The greater part of the development which has resulted in actual production during the last few years has been carried on in Wise County, on the Clinch Valley branch of the Norfolk and Western Railway. The coke in this district is the only coke made at the present time from coal mined exclusively within the State. There are two plants in Virginia, one at Lowmoor and one at Covington, the coal for which is drawn from the mines in the New River district of West Virginia. The coal for the ovens at Pechahontas and part of the Flat Top district of Tazewell County is obtained from mines whose workings extend across the State boundary line into West Virginia, and a part of this coal production should properly be credited to West Virginia. The openings of the mines, however, and the coke ovens are in Tazewell County, and it is customary to credit the coal as well as the coke to Virginia. The total production of coke in Wise County in 1907 amounted to 1,353,225 short tons, or 87.6 per cent of the total for the State.

It seems probable that the development work that has been in progress in the Black Mountain region of Lee County and in Wise County during the last few years will before long result in marked increase in the coke production of Virginia.

MOLYBDENUM.

Molybdenum is one of the rarer metals. It is most frequently found in granite in the form of the sulphide, molybdenite. The molybdates of iron, calcium, and lead, are also known as mineral species. Molybdenite often appears as a primary mineral in igneous rocks.

Molybdenite, the sulphide, is the principal ore of molybdenum. Wulfenite, the molybdate of lead, is a rare material; so also is powellite, calcium molybdate.

Molybdenite is usually a fairly pure compound, although a variety carrying 28.37 per cent. bismuth has been found, evidently a mixture of molybdenite and bismuthinite. In Canada molybdenite occurs in granite but also in veins cutting limestone and associated with pyroxene, calcite, quartz, mica, pyrite, etc.

BOOK REVIEWS.

GOLD AND SILVER.—Comprising an Economic History of Mining in the United States, etc. By Walter R. Crane, Ph.D., Instructor in Mining, School of Mines, Columbia University. 8 vo., X + 727 pages, illustrated. Cloth, \$5 net (21s. net). John Wiley & Sons, New York.

The preparation of this work occupied two years. It is intended to form a part of the Economic History of the United States, which is to be published by the Carnegie Institution of Washington. Special permission was granted by the authorities of that institution to the author whereby publication of this volume was made possible.

The economic history of the precious metals is a subject at once complicated and extensive. The student is led into many by-paths. The halo of romantic interest that pertains to the earlier days of gold and silver mining must be a standing temptation to any writer.

However, Dr. Crane sticks manfully to his course.

Chapter I. delineates the bearing of precious metal mining upon the industrial growth of the United States. One sentence in this chapter, touching the relation of transportation facilities to mining development, has caught our eye:—"Gibbons regarded the Romans as the most remarkable road builders of the world, but the people of California had in fifty years done more road building within the confines of their State than had the Romans in their entire empire in fully ten centuries."

Chapter II. is an historical account of the discovery of gold and silver, followed by sketches of recent history of mining in each of the producing states and territories. The chapter concludes with a chronology of gold and silver mining.

Chapter III., on the occurrence and association of gold and silver, is a concise and useful summing up of the theory of ore formation, and the actual vein occurrences in the various states, etc. Gold in granite is given similar treatment.

In Chapter IV. the geological distribution of gold and silver is considered. Chapter V. deals, historically and descriptively, with the several methods of gold and silver ore mining. Chapter VI. takes up the extraction of the metals from their ores. The chapter is entitled "Extraction of Values." Mr. T. A. Rickard has alluded to the inaptness of word "values" when it is used in this sense. Here it is obvious that the word "metals" would be far more suitable.

Chapter VII. is mainly statistical.

Useful data are presented in tabulated form in six appendices. Diagrams and half-tones are interspersed throughout the text.

In addition to interesting material collected and used, and the satisfactory manner in which it is presented, we wish to commend particularly the plan of this work. The volume has a well articulated backbone.

LEAD AND ZINC IN THE UNITED STATES.—Comprising an Economic History of the Mining and Smelting of the Metals and the Conditions Which Have Affected the Development of the Industries. By Walter Renton Ingalls, Editor of the Engineering and

Mining Journal. Illustrated. Cloth, 6 $\frac{1}{8}$ x 9 $\frac{1}{8}$. 368 pages. Price, \$4 net. Hill Publishing Company, New York, 1908.

The author, than whom few are more competent to attack the subject, has endeavoured to describe the economic influences that have contributed to the development of the lead and zinc mining and smelting industries in the United States. But brief mention is made of early discoveries; but the economic forces, called into play by the growth of the nation and by modern requirements, are adequately outlined.

The book was prepared at the request of the Carnegie Institution of Washington, and with its assistance. It is to form a part of the Economic History of the United States, which is to be published by the Carnegie Institution.

In his introduction the author gives us a glimpse of the history of lead and zinc mining in the United States. "Up to 1901 it might have been possible to consider independently the lead and zinc industries of the United States, but from the economic standpoint it will never more be possible to do so."

From 1720 to 1820 the total production of lead amounted to about one-seventh the output of a single year at the beginning of the twentieth century. South-eastern Missouri was, up to 1821, the principal producer. From that year on to 1870, Wisconsin played the leading part. Since 1871, Utah, Nevada, Colorado and Idaho have become prominent.

Zinc was first made in the United States about 1838. It was produced from the red zinc ore of New Jersey, for use in the preparation of brass for standard weights and measures ordered by Congress. The process was not commercially profitable. Richard Jones, in 1850, began the manufacturing of zinc at Newark, N.J., but failed to make it pay. In the succeeding year Samuel Wetherill produced zinc oxide direct from the ore, on a commercial scale. In 1860 spelter works were put in successful operation. The Joplin mines became productive in 1873, and now are responsible for the greater part of the United States output.

Chapter I. deals with the occurrences of lead ore in the producing districts of the United States. Many useful facts have been compressed into this chapter. Chapter II. is a chronology, presenting the outstanding events in the history of lead mining. After the first date, 1621, is the following record:—"Lead was mined and smelted near Falling Creek, Va., to supply the local demand for bullets and shot. This was the first mining and smelting of lead in what is now the United States." After the last date, 1906, comes a paragraph that forms a striking contrast:—"The Guggenheim interests practically secured control of the National Lead Company, thus bringing the major part of the lead-consuming industry of the United States into direct affiliation with the American Smelting and Refining Company."

Chapter III. is a strong and complete outline of the metallurgy of lead. Then follows a section on refining, marketing, and uses, after which the producing States are taken up in detail. Statistics of production, consumption, and prices, commercial conditions, the tariff on lead, labour and trade conditions, trade combinations, are the subjects of the concluding chapters of Part I., which comprises more than two-thirds of the volume.

Part II. treats the zinc industry in the same manner.

Mr. Ingall's point of view is wide and comprehensive, while his intimate knowledge of lead and zinc mining and smelting enables him to write profitably on the technical phases of his subject, his broad grasp of commercial conditions has made possible the excellent chapters on the economic phases. The plan followed has been wisely conceived and skillfully executed.

THE ANALYSIS OF ASHES AND ALLOYS. By L. Parry, A.R.S.M., Assayer and Consulting Metallurgist. 143 pages.. Price 5s. net. .Published by "The Mining Journal," 46 Queen Victoria Street, London E. C., 1908.

Although of wider scope than indicated by its title, this book is intended to meet first the requirements of those who have to deal with "all sorts of complicated metalliferous mixtures . . . ashes, drosses, scrap, fume, precipitate, slag, etc."

Section I. embraces the determination of individual metallic elements; Section II., the analysis of various "ashes," or metalliferous residues; Section III. comprises a summary of methods and a descriptive list of chemicals, standard solutions, etc.

"Analysis of Ashes and Alloys" will be found most serviceable by practicing analysts. It is not intended for the instruction of beginners, nor for class-room use. The author's aim has been to condense a complete summary of his subjects into as brief form as practicable.

COAL. By James Tonge. 275 pages. Price, \$2 net. D. Van Nostrand Company, 23 Murray and 27 Warren Streets, New York, 1907.

As a general introduction to a fascinating subject, Mr. Tonge's new book will, we think, serve a useful purpose.

There are many controversial and debatable points in the study of the origin, classification, and uses of coal. Many of these are touched upon by the author. The space limitations of a small elementary volume preclude the possibility of discussing these questions, and the author must, perforce, become somewhat dogmatic. Hence the reader may be given impressions that will be changed by later reading. This, however, is an unavoidable feature of nearly all elementary treatises.

The history, occurrence, mode of formation, paleobotany, classification, valuation, uses, waste, preparation for market, are among the subjects treated interestingly. Both British and foreign coal-measures are described. The economic and geographical importance of the world's coaling stations is treated. The book is well illustrated.

THE GEOLOGY OF COAL AND COAL-MINING.—By Walcot Gibson, D.Sc., F.G.S. Pages 341. Illustrated. Price 7s. 6d. net. Edward Arnold, 41 and 43 Maddox Street, London, W. 1908.

This is the first of a series of works on economic geology, to be published by Edward Arnold.

There is no study that has been more generally neglected than economic geology; and there is none that

so little deserves this neglect. The prodigal waste of the world's mineral resources may justly be credited to our ignorance as nations and individuals of the necessity of conserving those resources.

Education by means of such books as Dr. Gibson's is the best and most direct means of awakening the public to the importance of developing wisely and utilizing sanely our mineral deposits. The general diffusion of a knowledge of economic geology is, therefore, the best preventive of waste and the most effective remedy for indifference.

The first chapters of the book take up the chemical, geological, and paleontological characteristics of coal. These are succeeded by chapters of much practical value, on prospecting and investigation. The coalfields of Great Britain then receive detailed attention, and in conclusion the coalfields of both hemispheres are described briefly.

Throughout the volume, the close relation of geology to mining is impressed upon the reader. The interpretation of fossils is not neglected. Two particularly good chapters are given on the study of "exposed" and of "concealed" coalfields.

We have no hesitation in commending this excellent little volume.

EXCHANGES.

The Colliery Guardian, August 7, 1908.—The British Home Office some time ago appointed Mr. Ernest Aves to investigate the workings of the Wages Boards and Industrial Conciliation and Arbitration Acts of Australia and New Zealand. The Colliery Guardian describes Mr. Aves' report upon these subjects as being of great value.

These efforts at industrial legislation, remarks our contemporary, have been the result of a sincere desire to maintain a fair wage and to preserve industrial peace. They are fairly open to criticism because they are first attempts to meet a complicated industrial situation and because they have not been in service long enough to have lost their first imperfections.

Mr. Aves found that the original acts are in constant process of amendment to meet difficulties that are only revealed by actual working. Dissatisfaction on the part of employers and employees was evident everywhere. Nevertheless public opinion is increasingly opposed to a reversion to former methods of settlement of industrial difficulties and there is "a growing tendency in favor of facilitating voluntary agreements, and, failing these, of compulsory reference to a third party for investigation and report."

"The whole theory of compulsory arbitration," continues the Guardian, "stands or falls by the power of the Government to enforce its awards. This is where the New Zealand act has proved a lamentable failure." In the case of the Blackball coal mine, the miners openly defied the law because the award was not to their liking. The men remained on strike for two months after the dispute had been compulsorily settled, and the fines have not yet been collected by the sheriff. In this instance the law-breakers had the support of labor unions all over New Zealand.

Mr. Aves' conclusion is that the industrial disputes legislation in New Zealand and Australia has not been sufficiently successful to be taken as a model in other countries.

PERSONAL AND GENERAL.

Mr. R. R. Hedley, formerly of Hedley, B.C., visited Sudbury about the middle of August.

Mr. W. Dixon Craig, mine examiner for Drummond Mines, Limited, passed through Toronto on August 15.

Mr. G. F. Vasey, eastern representative of Jacques, Baszanger & Co., importer of diamond drill carbons and bortz, passed through Toronto on his way to Sudbury on August 21.

The Hon. William Templeman, Minister of Mines, accompanied by Mr. Reginald W. Brock, acting director of the Geological Survey, is visiting the mining districts of British Columbia.

Mr. John Kerr, the discoverer of the Tilbury oil field, died at Detroit on the morning of August 17, at the age of 45 years. Mr. Kerr sunk the first well on his own farm and had the courage to stick to the work in the face of ridicule and indifference.

Mr. John Ashworth, president of the Manchester Geological Society, has been spending some weeks in Canada. He will join the summer excursion of the Canadian Mining Institute on September 3 at Toronto. Ten years ago Mr. Ashworth examined and reported upon the Wright lead mine on Lake Temiscamingue.

Mr. Edmund B. Kirby, manager of the Federal Lead Company, Flat River, Mo., will retire on October 15th next, and devote his time thereafter to consulting work with headquarters at 701 Security Building, St. Louis, Mo. His successor to the management is to be Mr. H. A. Guess, who is at present milling superintendent of the American Smelters Securities Company.

INDUSTRIAL SECTION.

Solignum—Wood Preservative.—Solignum is a preservative for wood, stone and brickwork. It protects against decay, fungus, dry rot, insects and vermin, and the action of the weather. Solignum is not only a preservative, but a stain also. A gallon will cover 250 to 350 square feet. It does not increase the inflammability of the wood. For lengthening the life of all wooden structures and implements solignum has been used all over the world with excellent results. It is of especial service in preventing the decay of mine timbers. Its value in this respect deserves the attention of Canadian mining men. The British Agencies Company, 32 Church street, Toronto, are the sole agents for Canada.

Bulletin No. 27.—Improved Huntington Mills.—Power and Mining Machinery Company, Cudahy, Wis., U. S.A.

The Huntington mill is a centrifugal roller crusher and grinder. It can be used in place of stamp mills wherever hard or soft rock is to be reduced to a fineness of from 20 to 80 mesh, but it is especially designed for crushing clayey ores and for the reduction and amalgamation of gold and silver ores.

While resembling the Cornish rolls in certain respects, the Huntington mill differs in that the rolls are set vertically and that they work in water. The advantages claimed for it are:

1. Low cost of machine.
2. Low freight charges.

3. Low cost of installation.
4. Easily accessible and cheaply replaceable wearing parts.
5. Low consumption of power.
6. Large discharge area, quick delivery, and minimum sliming.
7. Clean and efficient amalgamation.
8. Simplicity of construction and operation.

The 3' 6" Huntington should not be fed with ore larger than 1/2" in diameter. The 5' and 6' machines can handle rock as large as 1". But on account of the high speed at which the rollers are driven, the material fed should be as fine as practicable, and when coarse ore is fed the machine should be slowed.

The improvements effected by the Power and Mining Machinery Company are briefly these: In place of the wood frame for supporting the mill, a heavy cast iron base is supplied. This presents loss of alignment and does away with vibration.

The countershaft bearing is supported by a heavy bracket which is an integral part of the base.

The mortar has been strengthened all over and the centre cone is fitted with removable phosphor bronze bushing. The curb is a heavy casting made in halves securely bolted together and also batted by heavy through bolts to the motor and base. The shafts and roller spindles are forged from mill steel and are extra heavy. The gearing is cast from semi-steel and is extra heavy.

The roller heads are bored full length and have a large recess for lubricant on top. The scrapers are made reversible and of hard white iron, and are so shaped as to pick up readily the pulp from the bottom and throw it against the ring-die.

These and other improvements give color to the claims of the manufacturers.

The 3 1/2" Huntington mill is sectionalized for mule-back transportation. A rigid yoke with two bearings for the countershaft and a seat for the stepbox is substituted for the base casting.

Useful working diagrams of complete Huntington mill plants are included in the Bulletin.

The Grand Trunk Railway System have placed an order for a ten-ton hand power travelling crane with the Smart-Turner Machine Company, Limited, to be placed in their shops at Stratford.

The Smart-Turner people are also supplying an automatic feed pump and receiver for the heating system of Lansdowne school, Toronto.

Fourteen persons were killed and one injured in an explosion at the Washington "Glebe" Colliery, Durham, England, on February 20, 1908. The seam where the explosion occurred was moderately dusty and the workings were dry. The permitted explosive, Bellite No. 1, was used and fired by electric battery. The report of an investigation that followed the accident recommends that the necessity of further precautions be considered: (a) The necessity of shot-firers understanding fully all the conditions of danger; (b) the provision of some more satisfactory means of testing for fire-damp; (c) the removal of any doubt on the subject of watering, removing or otherwise rendering harmless, coal dust on the floor of working places before shots are fired.

LIST OF CANADIAN OPERATING MINING COMPANIES

COMPILED SPECIALLY FOR THE CANADIAN MINING JOURNAL.

NOVA SCOTIA.

NOVA SCOTIA GOLD MINING COMPANIES.

Boston-Richardson Mining Company, Isaac's Harbour, Guysboro county.
 Beaver Hat Golding Mining Company, Lower Seal Harbour, Guysboro county.
 McDonald and Copeland, Forest Hill, Guysboro Co.
 California Gold Mining Company, Cochran Hill, Guysboro county.
 Wine Harbour Gold Mining Company, Wine Harbour, Guysboro county.
 Harrigan Cove Gold Mining Company, Harrigan Cove, Halifax county.
 Dominion Mining Company, Tangier, Halifax county.
 J. H. Anderson, Lake Catcha, Halifax county.
 Oxford Gold Mining Company, Lake Catcha, Halifax county.
 F. W. Hanwright, Lake Catcha, Halifax county.
 Dixon Mine, Caribou, Halifax county.
 Baltimore and Nova Scotia Mining Company, Caribou, Halifax county.
 Consolidated Mines of Canada, Limited, Moose River, Halifax county.
 Nova Scotia Gold Mines, Montague, Halifax county.
 Chester Basin Gold Syndicate, Gold River, Lunenburg county.
 Reardon Reeves Property, Gold River, Lunenburg Co.
 Micmac Gold Mining Company, Leipsigate, Lunenburg county.
 Eagle Mining Company, Renfrew, Hants county.
 Great Bras d'Or Gold Mining Company, Middle River, Victoria county.

GYPSUM.

The following is a list of those engaged in this very important industry:
 The Wentworth Gypsum Company, Windsor.
 The Victoria Gypsum Company, St. Anns, C.B.
 The Maritime Gypsum Company, Amherst.
 The Windsor Gypsum Company, Windsor.

ONTARIO MINES.

List of mining companies who make yearly returns to the Bureau of Mines:

ARSENIC FROM MISPICKEL ORE.

Canadian Gold Fields, Limited, Deloro, Ont.
 Atlas Arsenic Company, Deloro.
 Major R. G. Leekie, Sudbury.
 Temagami Mining and Milling Company, Limited, Charles L. Beckwith, Pres., 346 Broadway, New York.

ACTINOLITE.

American Asbestos Company, New York.
 International Asbestos Company, Ralph H. Waggoner, Pres., 309 Broadway, New York.

PORTLAND AND NATURAL ROCK CEMENT.

Belleville Portland Cement Company, Belleville.
 Canadian Portland Cement Company, Marlbank.

The Nova Scotia Gypsum Company, Three Mile Plains.
 Albert Parsons, Walton and Cheverie.
 W. B. O'Brien, Noel.
 Lorenzo Ettinger, Noel.
 Lewis M. Smith, Cheverie.
 George Hamilton, Noel.

PRINCIPAL OPERATING COAL MINES OF NOVA SCOTIA.

Dominion Coal Company, Glace Bay, C.B.
 Nova Scotia Steel Company, Sydney Mines.
 Cumberland Railway and Coal Company, Springhill, N. S.
 Fundy, Lower Cove, N.S.
 Port Hood Coal Company, Port Hood, C.B.
 Inverness Railway and Coal Company, Inverness, C.B.
 Mabou and Gulf Coal Company, Mabou Mines, C.B.
 Joggins, Joggins, Cumb., N.S.
 Scotia Coal Company, Maccan, Cumb., N.S.
 Minudie Coal Company, River Hebert, Cumb., N.S.
 Aecadia Coal Company, Stellarton, N.S.
 Nova Scotia Steel Company, Marsh Colliery, N.S.
 North Atlantic Collieries, Port Morien, C.B.
 Stratheona Coal Company, River Hebert, Cumb., N.S.
 Gowrie Block House Company, Port Morien, C.B.
 Sydney Coal Company, North Sydney, C.B.
 Cape Breton Coal Company, New Campbellton, C.B.
 MacKay Coal Company, North Sydney, C.B.
 Chignecto, Chignecto, Cumb., N.S.
 Intercolonial Company, Westville, N.S.

IRON.

Londonderry Iron & Mining Company, Torbrook, N.S.
 Dominion Iron & Steel Company, Sydney, N.S.
 Nova Scotia Steel & Coal Company, New Glasgow, N.S.

COPPER.

The Colonial Copper Company, Cape d'Or, N.S.

ONTARIO.

Imperial Cement Company, Limited, Owen Sound.
 Hanover Portland Cement Company, Limited, Hanover.
 Lakefield Portland Cement Company, Limited, Lakefield.
 National Portland Cement Company, Limited, Durham.
 Owen Sound Portland Cement Company, Limited, Owen Sound.
 Ben Allen Portland Cement Company, Limited, Owen Sound.
 Superior Portland Cement Company, Limited, Orangeville.
 Western Ontario Portland Cement Company, Limited, Atwood.
 Ontario Portland Cement Company, Limited, Brantford.
 Colonial Portland Cement Company, Limited, Warton.
 Grey and Bruce Portland Cement Company, Limited, Owen Sound.

Sun Portland Cement Company, Limited, Owen Sound.
Estate of John Battle (Natural Rock), Thorold.
F. W. Schwendimann Cement Works, Limited, Hamilton.
Toronto Lime Company, Limited, 34 Yonge street, Toronto.
I. Usher & Sons Cement Works, Limited, Queenston.

GOLD.

St. Anthony Gold Mining Company, A. L. McEwen, Ignace, Ont.
Redeemer Mining and Milling Company, Gust. Larson, Mgr., Dryden, Ont.
Golden Reed Mining Company, Menso Gates, Pres., 402 Carrie street, Sault Ste. Marie, Mich.
Argenteuil Gold Mining and Milling Company, Limited, J. W. Lewis, Secy., Saginaw, Mich.
Rush Bay Golden Horn Mining Company, A. McMee-kin, Box 24, Kenora, Ont.
Magpie Gold Mining and Development Company, Limited, Chas. M. Sayles, Secy., Sault Ste., Marie, Mich.
Camp Bay Mining Company, W. C. Penpz, DuBois, Pa.
Volcanic Reef Gold Mining Company, Limited, W. A. McBernie, Cannonsburg, Pa.
Detola Development Company, Chas. J. Rescher, Sec.-Treas., 919 Nicolas Bldg., Toledo, Ohio.
Olympia Gold Mining Company, Limited, Geo. H. Vernon, Secy., 308 National German-American Bank Bldg., St. Paul, Minn.
English River Gold Mining Company, Limited, James N. Walker, Secy., St. Catharines, Ont.
Imperial Gold Mines, Limited, Anthony Blum, 43 Tremont St., Boston, Mass.
Empire Gold Mining and Milling Company, Herman B. Singer, 375 Williams St., Buffalo, N.Y.
The Regina Gold Mine, Lt.-Gen. Sir Henry C. Wilkinson, K.C.B., Kenora, Ont.
Northern Light Mines Company, W. H. Barnhart, Secy., 629 Prudential Bldg., Buffalo, N.Y.
Big Dipper Mining and Milling Company, Limited, J. S. Waldron, Secy., 3771½ George St., Peterboro, Ont.
Ideal Gold Mining Company, Wm. Johnston, 109 Charlotte Ave., Detroit, Mich.
Craig Gold Mining and Reduction Company, H. B. Whitney, Pres., Phelps, N.Y.
Shakespeare Gold Mining Company, Limited, B. W. Dunn, Pres., Webbwood, Ont.
The Grace Mining Company, Limited, Andrew Holz, Secy., 872 Ellicott Sq., Buffalo, N.Y.
Sultana Gold Mining Company, Limited, John F. Caldwell, Director, Winnipeg, Man.

GRAPHITE.

The Ontario Graphite Company, Limited, Rinaldo McConnell, 175 Cooper St., Ottawa, Ont.
The Globe Refining Company, Limited, Rinaldo McConnell, 175 Cooper St., Ottawa.
J. G. Allan, 211 Bay St. S., Hamilton, Ont.

IRON.

Wilbur Iron Ore Company, Limited, F. V. Clisdall, Secy., 308 Stair Bldg., Toronto.
The Lake Superior Power Company, Sault Ste. Marie, Ont.
Mineral Range Iron Mining Company, Limited, H. L. Bingham, Secy., Bessemer, Ont.
The Breitung Iron Company, Edward N. Breitung, Sec.-Treas., Marquette, Mich.

Atikokan Iron Company, Limited, Fred Rodda, Port Arthur, Ont.
T. B. Caldwell, M.P., Lanark, Ont. (Calibogie Iron Mine.)
Williams Iron Mines, Limited, Chas. C. Williams, Secy. and Gen. Mgr., Sault Ste. Marie, Mich.
Canada Iron Furnace Company, Limited (Radnor Mine), J. M. Roy, Canada Life Bldg., Montreal.

IRON PYRITES.

The Nichols Chemical Company of Canada, Limited, C. U. Nichols, Pres., 25 Broad St., New York.
Lake Superior Power Company, Sault Ste. Marie, Ont.
Canadian Pyrites Company, Felix A. Vogel, 25 Broadway, New York.
Northern Pyrites Company, John Webb, Jr., Supt., Dinorwic, Ont.
Northland Mining Company, Limited, John Smallman, Secy., London, Ont.

CALCIUM CARBIDE.

Ottawa Carbide Company, Ottawa, Ont.
Wilson Carbide Works, St. Catharines, Ont.

COPPER.

Massey Station Mining Company, Massey Station, Ont.
Consolidated Copper Company, Limited, Parry Sound.
Superior Copper Company, Sault Ste. Marie, Mich.
International Gold and Copper Company, Limited, 433 Mooney-Brisbane Bldg., Buffalo, N.Y.
Parry Sound Copper Mining Company, Otto Monson, Secy., St. Paul, Minn.
Martin Pattison & Co., Superior, Wis.
Black Bay Mining Company, N. B. Carlson, Secy., Willmar, Minn.
Calumet and Sault Ste. Marie Development Company, N. F. Kaiser, Secy., Calumet, Mich.
Hermina Mining Company, S. H. Bryant, Mgr., Massey Station, Ont.
Calumet & Algoma Mining Co., Lucas Herman, Secy., Calumet Mich.
Tip-Top Copper Mine, S. W. Ray, Port Arthur, Ont.
Madina Copper Company, Col., Cole Saunders, Pres., Eldorado, Ont.
Northern Ontario Consolidated Copper Company, T. E. Crawford, Secy., Sault Ste. Marie, Ont.
The Cobden Mining Company, Sault Ste. Marie, Ont.

CORUNDUM.

Canada Corundum Company, D. A. Brebner, Secy.-Treas., 23 Scott St., Toronto.
The Ashland-Emery Company, Burgess Mine P.O., Ont.

FELDSPAR.

Kingston Feldspar Mining Company, Kingston, Ont.
Verona Mining Company, 706 Girard Trust Bldg., Philadelphia, Pa.
Charles Jenkins Feldspar Mine, Tishborne, Ont.

LIST OF OPERATING MINES AT COBALT.

Standard Cobalt Mines, Limited, Thomas J. Maloney, Treas., 37 Wall St., New York.
Coniagas Mines, Limited, J. J. Mackan, Secy., St. Catharines, Ont.
Right of Way Mining Company, Limited, E. A. Larmouth, Secy.-Treas., Central Chambers, Ottawa.
Trethewey Silver Cobalt Mining Company, Limited, D. A. Brebner, Secy., 1428 Traders Bank Bldg., Toronto.

Buffalo Mines, Limited, Geo. C. Miller, 1012 Fidelity Bldg., Buffalo, N.Y.
 Cobalt Silver Queen Mining Company, Limited, J. H. Stephens, Secy., 730 Traders Bank Bldg., Toronto.
 Temiskaming and Hudson Bay Mining Company, Limited, F. L. Hutchinson, Secy., New Liskeard.
 McKinley-Darragh-Savage Mines, W. L. Thompson, Treas., 100 Sibley Block, Rochester, N.Y.
 Nipissing Mining Company, Limited, F. S. Whitworth, Cashier, Cobalt, Ont.
 O'Brien Mine, Fred W. Rouse, Secy.-Treas., Cobalt.
 Foster Cobalt Mining Company, Limited, Geo. Foran, Home Life Bldg., Toronto.
 Colonial Mining Company, Limited, G. W. McCaskell, Mgr., Cobalt.
 Kerr Lake Mining Company, J. A. Jacobs, 171 St. James St., Montreal.
 Drummond Mines, Limited, J. Gouldthorpe, Acct., 70 Canada Life Bldg., Montreal.
 Silver Leaf Mining Company, Limited, D. F. Maguire, Secy., 18 King St. W., Toronto.
 Silver Bar Mining Company, Limited, J. H. Hubbell, Supt., Box 531, Cobalt.
 Temiskamingue Mining Company, Limited, Norman R. Fisher, Gen. Mgr., Cobalt, Ont.
 Cobalt Townsite Mining Company, Limited, B. W. Leyson, Supt., Cobalt, Ont.
 Nancy Helen Mining Company, Limited, J. F. Black, Mgr., Cobalt.
 Green-Meehan Mining Company, Limited, J. G. Langton, Secy., 28 Manning Arcade, Toronto.
 Cobalt Lake Mining Company, Limited, D. B. Rochester, Man. Dir., Cobalt, Ont.
 Crown Reserve Mining Company, Limited, J. Carson, Pres., Royal Bldg., Montreal, Que.
 Chambers-Ferland Mining Company, Limited, Haileybury, Ont., Alex. Fasken, Secy., Toronto.
 King Edward Silver Mines, G. W. McCaskell, Mgr., Cobalt, Ont.
 La Rose Consolidated Mines Company, B. E. Rodden, Auditor, Cobalt, Ont.

LEAD.

Ontario Mining and Smelting Company (Holandia Mine), Chas. B. Wolfe, Treas., Fuller Bldg., New York.
 The Stanley Smelting Works, R. E. Cushman, Secy.-Treas., Perth Road, Ont.

PETROLEUM.

Imperial Oil Company, Sarnia, Ont.
 Canadian Oil Refining Company, Limited, B. Dunlop, Supt., Petrolia, Ont.
 The Union Oil Company, Limited, W. P. Bull, Holiss & Wilson, Temple Bldg., Toronto.
 Rainsberry & Co., Sarnia.

QUEBEC.

List of companies in the Province of Quebec in operation, or in position to work, with their addresses:

MAGNETIC SAND.

Quebec Iron Ore Company, 75 St. Peter St., Quebec.
 H. C. Bosse, 112 St. Peter St., Quebec.
 W. Robertson, 233 St. James St., Montreal.

CHARCOAL PIG IRON.

Canada Iron Furnace Co., The, Canada Life Bldg., Montreal.

COPPER-NICKEL.

Canadian Copper Company, Copper Cliff, Ont. (International Nickel Company).
 Mond Nickel Company, C. V. Corliss, Mine Supt., Victoria Mines, Ont.

PRESSED BRICK AND TERRA COTTA.

Beamsville Brick and Terra Cotta Company, G. Crain, Secy., Beamsville, Ont.
 Don Valley Brick Company, Toronto.
 Toronto Pressed Brick and Terra Cotta Company, Milton, Ont.
 Port Credit Brick Company, Port Credit.
 Brampton Pressed Brick Company, Brampton.
 Ontario Paving Brick Company, Limited, West Toronto.
 Terra Cotta Pressed Brick Company, Alfred Cornwell, Gen. Mgr., 1070 Bathurst St., Toronto.
 Milton Pressed Brick Company, Limited, Milton.

SEWER PIPE.

W. J. Anthutle, 309 Cromwell St., London, Ont.
 F. D. McFie, 316 Bunnell St., London, Ont.
 Hamilton and Toronto Sewer Pipe Company, 77 York St., Toronto.
 Dominion Sewer Pipe Company, Swansea, Ont.
 Ontario Sewer Pipe Company, Limited, 60 Victoria St., Toronto.

SALT WORKS.

E. S. Henderson, Canadian Salt Company, Limited, Windsor.
 Parkhill Salt Company, Parkhill, Ont.
 Messrs. R. & J. Ransford, Clinton.
 The Gray, Young & Sparling Company, Wingham, Ont.
 George McEwan Salt Works, Hensall, Ont.
 Exeter Salt Works Company, Exeter.
 J. Tolmie, Ontario People's Salt and Soda Company, Limited, Kincairdine.
 Peter McEwan Salt Works, Goderich.
 Carter & Kittermaster Salt Works, Moooretown.

TALC.

A. A. Robbins Mining Company, Chris. Henderson, Madoc, Ont.
 Stephen Wellington, Madoc, Ont.

BLAST FURNACES.

Hamilton Steel and Iron Company, H. H. Champ, Secy., Hamilton, Ont.
 Deseronto Iron Company, F. B. Gaylord, Mgr, Deseronto, Ont.
 Canada Iron Furnace Company, J. J. Drummond, Midland, Ont.
 The Algoma Steel Company, Limited, J. S. Wynn, Gen. Auditor, Sault Ste. Marie, Ont.
 Ontario Iron and Steel Company, Welland.
 Atikokan Iron Company, Port Arthur, Ont.

TITANIC IRON.

G. Gagnon, 87 Artillery St., Quebec.

OCHRE.

Canada Paint Company, Limited, 572 William St., Montreal.
 Champlain Oxyde Company, Lucien Carignan, Three Rivers.
 Thomas Argall, Three Rivers.

CHROMIC IRON.

Black Lake Chrome and Asbestos Company, Black Lake.
 American Chrome Company, Black Lake.
 Star Chrome Company, Colrairie.
 Canadian Chrome Company, St. Hyacinthe.

COPPER.

Eustis Mining Company, Eustis.
 Nichol's Chemical Company, Limited, Capelton.
 J. McCaw, Sherbrooke.
 A. O. Norton, Coaticook.
 G. E. Smith, Sherbrooke.
 A. F. Foss, Lennoxville.

GOLD.

Cie des Mines d'or de Pontiac and Abitibi, Limited, Montreal.
 C. A. Parsons, South Dudswell.
 Louis Mathieu & Cie., Beauceville.
 Louis Gendreau, Jersey Mills.
 C. E. Kennedy, Beebe Plain.
 Marsboro Gold Mining Syndicate, Sherbrooke.

GRAPHITE.

The Bell Mines, Buckingham.
 Diamond Graphite Company, Buckingham.
 Buckingham Graphite Company, Buckingham.
 Calumet Mining and Milling Graphite Company, Calumet.

MANGANESE.

Magdalen Islands Development Company, Montreal.

ASBESTOS.

Bell Asbestos Company, Limited, Thetford Mines.
 King Asbestos Mines, Limited, Thetford Mines.
 Johnson Asbestos Company, Thetford Mines.
 Beaver Asbestos Company, Thetford Mines.
 American Asbestos Company, Limited, Black Lake.
 Standard Asbestos Company, Limited, Black Lake.
 Dominion Asbestos Company, Limited, Black Lake.
 Union Asbestos Mine, Black Lake.
 Megantic Asbestos Company, Black Lake.
 James Reed, Reedsdale.
 Broughton Asbestos Fibre Company, Limited, East Broughton.
 Quebec Asbestos Company, East Broughton.
 Eastern Townships Asbestos Company, East Broughton.
 Frontenac Asbestos Mining Company, East Broughton.
 Boston Asbestos Mining Company, East Broughton.
 Asbestos Mining and Manufacturing Company, Chrysolite.
 Asbestos and Asbestic Company, Danville.
 R. H. Martin, New York, U.S.
 Colrairie Asbestos and Exploration Company, Limited, Colrairie Station.
 Premier Mining Company, Colrairie Station.
 Beauceville Asbestos Company, Beauceville.
 Ottawa Asbestos Mining Company, Ottawa.

MICA.

Blackburn Bros., 46 Sussex St., Ottawa.
 Wallingford Mica and Mining Company, 41 Duke St., Ottawa.
 Wallingford Bros., Limited, 24 Central Chambers, Ottawa.
 Fortin & Gravelle, Hull.
 General Electric Company, Isabelle St., Ottawa.
 Laurentides Mica Company, corner of Bridge and Queen, Ottawa.

Vavassour Mining Association, E. F. Nellis, 22 Metcalfe St., Ottawa.
 Comet Mica Works, 398 Wellington St., Ottawa.
 Lila Mining Company, D. L. McLean, 6 Sparks St., Ottawa.
 Allan Gold Reefs Company, Limited, Victoria Chambers, Ottawa.
 Webster & Co., 274 Stewart St., Ottawa.
 Thomas J. Watters, Metropolitan Bldg., Ottawa.
 Brown Bros., Cantley.
 Lewis MacLaurin, East Templeton.
 Richard Moore, Picanock.
 Joshua Ellard, Picanock.
 Glen Almond Mica and Mining Company, Buckingham.
 Kent Bros., Kingston, Ont.
 Henry F. Flynn, Maniwaki.
 Chabot & Cie., Ottawa.
 Gatineau Valley Mica Company, H. H. Moore, Cantley.
 C. W. Berry, 424 McLeod St., Ottawa.
 Calumet Mica Company, Bryson.
 Cawood Mica Company, 38 Sparks St., Ottawa.

WHITE MICA.

Canadian General Mining Company, Limited, P.O. Box 253, Montreal.

PURCHASERS OF MICA.

Laurentides Mica Company, Limited, Bridge and Queen Sts., Ottawa.
 Eugene Munsell & Co., 332 Wellington St., Ottawa.
 General Electric Company, Isabella St., Ottawa.
 Webster & Co., 274 Stewart St., Ottawa.
 F. D. Moore, 354 Wellington St., Ottawa.
 Ottawa Mica Company, Hull.
 A. Roy Macdonald, Jr., 68b St. Urban St., Montreal.

PHOSPHATE.

J. F. Higginson, Buckingham.

FELDSPAR.

W. A. Allan, Victoria Chambers, Ottawa, Ont.

MAGNESITE.

E. J. Waters, 554 Rideau St., Montreal.

KAOLIN.

F. R. Lanigan, 23 Cote St., Montreal.

TALC.

C. V. M. Temple, 175 Spadina Rd., Toronto, Ont.

SULFATE OF BARYTA.

Canada Paint Company, 572 William St., Montreal.

COMBUSTIBLE NATURAL GAS.

Canada Gas and Oil Company, Three Rivers.

PEAT.

Imperial Light, Heat and Power Company, Limited, Liverpool, London and Globe Bldg., Montreal.

SLATE.

Rockland State Quarry, New Rockland.

FLAG STONES.

F. R. Bishop, Bishop's Crossing, Co. Wolfe.

CEMENT.

International Portland Cement Company, Limited, Hull.
 The Lakefield Portland Cement Company, Limited, Pointe aux Trembles.
 Vulcan Portland Cement Company, Limited, Longue Pointe.

GRANITE.

Stanstead Granite Quarries Company, Limited, Beebe Plain, Co. Stanstead.
 S. B. Norton, Beebe Plain.
 James Brodie, Graniteville, Co. Stanstead.
 The Whitton Granite Quarry Company, St. Victor de Tring.
 M. Fitzgerald, Sainte Cecile, Co. Compton.
 Fortunat Voyer, Riviere a Pierre, Co. Portneuf.
 Joseph Perron, Riviere a Pierre.
 M. P. Davis, 48 Central Chambers, Ottawa.
 The Laurentian Granite Company, Limited, Montreal.
 J. A. Nadeau, Iberville.
 Montfort Granite Company, Limited, Montreal.

BRICKS—(The principal companies).

Thomas W. Peel & Co., Montreal.
 J. Burnet & Cie., Montreal.
 Chs. Sheppard & Son, Montreal.
 Joseph Bernier, Montreal.
 Joseph Descarrie, Montreal.
 Laprairie Brick Company, Limited, Laprairie.
 Narcisse Blais, Quebec.
 Paradis & Letourneau, Quebec.
 Laliberte & Fils, Saint Jean Deschaillons, Co. Lotbiniere.
 Victor Charland, Saint Jean Deschaillons.
 D. G. Loomis & Son, Sherbrooke.
 The Eastern Townships Brick and Manufacturing Company, Lennoxville.

LIME—(The principal companies).

Dominion Lime Company, Sherbrooke.
 Cyrille Gervais, Montreal.

Olivier Limoges, Montreal.
 Montreal Line Company, Montreal.

BUILDING STONE.

The Terrebonne Quarry Company, St. Francois de Sales, Co. of Laval.
 The Louis Labelle Quarry Company, Limited, St. Francois de Sales.
 Joliette Limestone Quarry Company, Joliette.
 Standard Lime and Quarry Company, Joliette.
 Frelighsburg R. and Quarry Company, Philipsburg, Mississiquoi.
 Harrisson Quarry Company, Montreal.
 Dominion Quarry Company, Montreal.
 O. Limoges, Montreal.
 Grondine Stone, Lime and Brick Company, Three Rivers.

COMPANIES USING CERTAIN PRODUCTS OF THE MINES TO BE MANUFACTURED IN THIS PROVINCE.

The Electric Reduction Company, Limited, Buckingham, ferrochrome and phosphorus.
 The Chemical and Fertilizer Company, Buckingham, superphosphate.
 Electro Manganese Reduction Company, Shawenegan.
 Standard Chemical Company, Coaticook, acetate of lime.
 The Standard Drain Pipe Company, Limited, St. Jean d'Iberville.
 C. E. Dubord, Beauport, refractory clay.
 Geo. Belanger, Beauport, refractory clay.
 The Montreal Terra Cotta Company, Limited, Maisonneuve.

ALBERTA.

MINES OPERATED IN ALBERTA DURING 1907.

Canmore, H. W. McNeill Co., bituminous.
 Lethbridge, Alta. Ry. & Irr'n. Co., lignite.
 Clover Bar, Daly & Lindsay, lignite.
 Clover Bar, Clover Bar Coal Co., lignite.
 Namao, C. G. Carnegie, lignite.
 Stratheona, Wetaskiwin Coal Co., lignite.
 Namao, Frank Smith, lignite.
 Stratheona, White Star Coal Co., lignite.
 Lineham, Cooper & McPherson, lignite.
 Cardiff, Cardiff Coal Co., lignite.
 Medicine Hat, Crockford Bros., lignite.
 Taber, Reliance Coal Mining Co., lignite.
 Hillerest, Hillerest Coal and Coke Co., bituminous.
 Edmonton, Wm. Humberstone, lignite.
 Edmonton, Milner-Benner Coal Co., lignite.
 Stratheona, Stratheona Coal Co., lignite.
 Frank, Canadian-American Coal and Coke Co., bituminous.
 Edmonton, Edmonton Standard Coal Co., lignite.
 Carbon, Knee Hill Coal Co., lignite.
 Lethbridge, James Asheroft, lignite.
 Lethbridge, Geo. F. Russell, lignite.
 Pincher Creek, W. H. Wall, lignite.
 Lundbeck, Galbraith Coal Co., lignite.
 Medicine Hat, Fred Scott, lignite.
 Lille, West Canadian Collieries, bituminous.
 Clover Bar, Keith & Fulton, lignite.
 High River, Wm. Ellis, lignite.
 Gleichen, Blackfoot Indians, lignite.

Edmonton, Milner-Benner Coal Co., lignite.
 *Namao, Watson Bros., lignite.
 Lundbreck, Alberta Coal and Coke Co., lignite.
 Lundbreck, Alberta Fuel Co., lignite.
 Bankhead, Bankhead Mines, Limited, anthracite.
 Taber, Duggan, Huntrods & Co., lignite.
 Bellevue, West Canadian Collieries, bituminous.
 Coleman, International Coal and Coke Co., bituminous.
 Edmonton, Western Coal Co., lignite.
 Clover Bar, Byers Bros., lignite.
 Clover Bar, P. Ottewell, lignite.
 Lethbridge, Royal Collieries, Limited, lignite.
 Clover Bar, Byers Bros., lignite.
 Stratheona, Fraser & Freeman, lignite.
 Namao, Lindsay Bros., lignite.
 *Carstairs, S. Downie & Sons, lignite.
 Lethbridge, Diamond Coal Co., Limited, lignite.
 Taber, Canada West Coal Co., lignite.
 Taber, Domestic Coal Co., lignite.
 Edmonton, Parkdale Coal Co., lignite.
 Namao, Charles Carnegie, lignite.
 Taber, Stevens Bros., lignite.
 Three Hills, Three Hills Coal and Development Co., lignite.
 Three Hills, Nichols & Bothamley, lignite.
 Taber, John Howells, lignite.
 Carbon, Dodds, Currie & Hoding, lignite.
 Three Hills, Jarvis & Bowden, lignite.
 *Three Hills, C. F. Bothamley, lignite.
 *Medicine Hat, J. Evans, lignite.

*High River, C. E. McIntosh, lignite.
 Nanton, B. Parton, lignite.
 *Carbon, Carbon Brick and Coal Co., lignite.
 Woodpecker, J. Marsh, lignite.
 Edmonton, Ketchum Coal Co., lignite.
 Burmis, Leitch Collieries, Limited, bituminous.
 *Stratheona, Larry Garneau, Jr., lignite.
 Edmonton, Rosedale Coal Co., lignite.
 *Morinville, Alberta Coal Mining Co., lignite.
 *Taber, Central Coal Co., lignite.
 Taber, Fox & Simms, lignite.
 Taber, Canadian Pacific Railway, lignite.
 *Bellevue, Maple Leaf Coal Co., bituminous.
 *Brant, S. Wadsworth, lignite.
 Lethbridge, W. Stafford, lignite.
 Bowville, Henry Therriault, lignite.
 Reidhill, James Ashmore, lignite.
 *Taber, International Land Development Co., lignite.
 *Woodpecker, Thomas Patterson, lignite.
 Woodpecker, John Marsh, lignite.
 Namao, Namao Coal Co., lignite.
 Three Hills, Geo. Watson, lignite.
 Claresholm, W. J. Bell, lignite.
 Pincher Creek, Scott & MacLane, lignite.
 Pincher Creek, Pincher Creek Coal Mining Co., lignite.
 Edmonton, United Collieries, Limited, lignite.
 Edmonton, Frank Coal Co., lignite.
 Tofield, P. F. Ingram, lignite.
 Tofield, Tofield Coal Co., Limited, lignite.
 Thigh Hill, S. J. Henry, lignite.
 Grassy Lake, H. A. Driggs, lignite.
 Burmis, East Crow's Nest Coal Co., bituminous.
 Grassy Lake, Grassy Lake Coal Co., lignite.
 *Edmonton, Dawson Coal Co., lignite.
 Edmonton, Rupert's Land Coal Co., lignite.

Taber, Bucknam & Henderson, lignite.
 Taber, Marsh Bros., lignite.
 Taber, Imperial Coal Co., lignite.
 High River, John Thorne, lignite.
 Lethbridge, James Perry, lignite.
 Magrath, Magrath Coal Co., lignite.

(*) Indicates "no coal produced."

MINES ABANDONED DURING 1907.

Mine No. 76—Operated by Alberta Coal and Coke Co., Lundbreck. Shaft on N.E. ¼ Sec. 25, Tp. 7, Rge. 2, west 5th Mer. Abandoned in December, 1907.
 Mine No. 18—Operated by Ramsey & George, Edmonton.
 Mine No. 134—Operated by Samuel Wadsworth, Brant, Alto.
 Mine No. 138—Operated by International Land Development Co.
 Mine No. 57—Operated by W. R. Welsh, Pincher Creek. No. 2 tunnel abandoned December, 1907, by W. H. Wall.
 Mine No. 139—Operated by Thos. Patterson, Woodpecker.
 Mine No. 118—Operated by John Evans, Medicine Hat.

MINES REOPENED DURING 1907.

Mine No. 57—Formerly operated by Wm. McFarlane, Pincher Creek. Sold to Western Oil and Coal Consolidated and leased by them to W. H. Wall. Released December 9, 1907, to Wm. R. Welsh, Pincher Creek.
 Mine No. 70—Formerly operated by Riley & Thompson, High River. Reopened 1907 by Wm. Ellis, High River.

BRITISH COLUMBIA.

BRITISH COLUMBIA COAL MINES.

Western Fuel Co., Northfield Mine, Nanaimo, Thomas R. Stockett, George Wilkinson.
 Wellington Colliery Co., Limited, Extension Colliery, Cranberry District, Andrew Bryden. Union Colliery, Comox District, John Matthews.
 Macgowan & Co., Gilfillan Colliery, Wellington, John John.
 South Wellington Coal Mines, Limited, Fiddick Colliery, South Wellington, Geo. Wilkinson.
 Vancouver-Nanaimo Coal Mining Co., Limited, New East Wellington Colliery, Vancouver, J. J. Grant.
 Nicola Valley Coal and Coke Co., Limited, Middlesboro Colliery, Coutlee, Alex. Fauls.
 Crow's Nest Pass Coal Co., Limited, Chas. Simister, Gen. Supt., Fernie. Coal Creek Colliery, Coal Creek, Robert Strachan. Carbonado Colliery, Carbonado, Evans. Michel Colliery, Michel, James Derbyshire.

METALLIFEROUS MINES OF BRITISH COLUMBIA SHIPPING IN 1907.

FORT STEELE MINING DIVISION.

North Star Mining Co., Limited, Kimberley, lead, silver.
 Maurice Quain, Cranbrook, silver, gold.
 Con. M. & S. Co. of Canada, Moyie, lead, silver.
 Sullivan Group Mining Co., Kimberley, lead, silver.

GOLDEN AND WINDERMERE MINING DIVISIONS

J. Lake, Athlmer, lead, silver.
 J. C. Pitts, Windermere, lead, silver.
 Geo. M. Willard, Wilmer, lead, silver.
 Wm. Haupt, Wilmer, silver, lead.

NELSON MINING DIVISION.

Hall M. & S. Co., Nelson, silver, copper.
 Hastings (B.C.) Explor. Sy., Ltd., Nelson, gold, silver.
 R. Legault, Nelson, copper, gold, silver.
 Hall M. & S. Co., Nelson, silver, gold.
 John Waldbeser, Salmo, lead, silver.
 J. J. Malone, Nelson, gold, silver, copper.
 The Fern Gold M. & M. Co., Nelson, gold, silver.
 M. Davys, Nelson, copper, silver.
 Frank Finney, Erie, gold, silver, lead.
 Bell Bros., Salmo, gold, silver.
 La Plata Mines, Ltd., Kokanee, silver, lead.
 J. C. Devlin, Nelson, copper, silver.
 Thos. Bennett, Nelson, gold, silver.
 Geo. T. Matthews, Salmo, gold, silver.
 Duncan United Mining Co., Williams Siding, gold, silver, copper.
 William Waldie, Nelson, gold, silver.
 Second Relief Mining Co., Nelson, gold, silver.
 Hall M. & S. Co., Nelson, silver, copper.
 N. J. Cavanagh, Nelson, copper, silver, gold.
 D. Grobe, Ymir, gold, silver.
 Ymir Gold Mines, Ltd., Ymir, gold, silver, lead.
 Patrick Daly, Ymir, gold, silver, lead.

AINSWORTH MINING DIVISION.

Wm. English, Kaslo, silver, zinc.
 H. J. Wright, Ainsworth, silver, lead.
 Neil McKay, Kaslo, silver, zinc.
 Bank of B. N. A., Kaslo, silver, lead.
 A. C. Van Moerkerke, Whitewater, silver.
 Dr. J. Gibson, Nelson, silver, lead.
 C. E. Lyons, Sandon, silver, lead.
 A. D. Wheeler, Ainsworth, silver, lead.
 Eric Johnson, Kaslo, silver, lead.
 Krao Silver-Lead Mining Co., Kaslo, silver, lead.
 G. H. Barnhart, Nelson, silver, lead.
 H. Giegerich, Kaslo, silver, lead.
 H. Giegerich, Kaslo, silver, lead.
 G. H. Barnhart, Nelson, silver, lead.
 H. Giegerich, Kaslo, silver, lead.
 Province Mines, Ltd., Kaslo, silver, lead.
 Pacific Bullion Mining Co., Nelson, silver, lead.
 Erl Syndicate, Nelson, silver, lead.
 Whitewater Mines, Ltd., Nelson, silver, lead, zinc.

SLOCAN MINING DIVISION.

Brandon Bros., Silvertown, silver, lead.
 American Boy Mining Co., Spokane, silver, lead.
 Arlington Mines, Ltd., Slocan, silver, lead.
 E. Watson, Silvertown, silver, lead.
 C. & Clipper Silver-Lead Mg. Co., New Denver, silver, lead.
 Brandon Bros., Silvertown, silver, lead.
 A. D. Coplen, Spokane, silver, lead.
 Geo. T. Gormley, Sandon, silver, lead.
 Lorenzo Alexander, Victoria, silver, lead.
 J. Marten, New Denver, silver, lead.
 A. H. Blumeneur, Spokane, silver, lead.
 Oleott Payne, Nelson, silver, lead.
 Idaho-Alamo Cons. Mines, Ltd., Three Forks, silver, lead.
 Thos. Trenergy, Kaslo, silver, lead.
 L. Pratt, Sandon, silver, lead.
 Geo. R. Petty, Three Forks, silver, lead.
 G. W. Hughes, Kaslo, silver, lead.
 A. H. Bigney, Sandon, silver, lead.
 C. E. Lyons, Fernie, silver, lead.
 J. T. Tipping, Slocan City, silver, lead.
 Thos. Avison, New Denver, silver, lead.
 G. H. Aylard, New Denver, silver, lead.
 Vancouver Group Mining Co., Rossland, silver, lead.
 Howard Thompson, Vancouver, silver, lead.
 J. E. Tattersall, Slocan City, silver, lead.
 E. Shannon, New Denver, silver, lead.
 J. B. Faley, Slocan City, silver, lead.
 Payne Cons. Mining Co., Sandon, silver, lead.
 Queen Dominion Mining Co., Kaslo, silver, lead.
 Rambler-Cariboo Mines, Ltd., Kaslo, silver, lead.
 Reo Mining & Milling Co., Ltd., Sandon, silver, lead.
 Cons. M. & S. Co. of Canada, Sandon, silver, lead.
 The Ruth Mines, Ltd., Kaslo, silver, lead.
 G. H. Aylard, New Denver, silver, lead.
 J. B. Smith, New Denver, silver, lead.
 Slocan-Sovereign Mines Co., New Denver, silver, lead.
 G. W. Hughes, Kaslo, silver, lead.
 Geo. McNicol, Slocan, silver, lead.
 Vancouver Group Mining Co., Rossland, silver, lead.
 S. Watson, Silvertown, silver, lead.
 The Washington Mine, Ltd., Kaslo, silver, lead.
 Westmont Silver M. Co., Ltd., Slocan City, silver, lead.

LARDEAU MINING DIVISION.

Beatrice Mines, Ltd., Fargo, North Dakota, silver, lead.
 Eva Gold Mines, Ltd., gold.
 Edward Baillie Syndicate, Ltd., Nelson, silver, lead.
 J. M. Miller, Seattle, silver, lead.

TROUT LAKE MINING DIVISION.

Ferguson Mines, Ltd., N.P.L., Ferguson, gold, silver, lead.
 A. Hansen, Poplar Creek, silver, lead.

TRAIL CREEK MINING DIVISION.

Con. M. & S. Co. of Canada, Rossland, gold, silver, copper.
 A. K. Heidler, Rossland, gold, silver, copper.
 LeRoi Mining Co., Ltd., Rossland, gold, silver, copper.
 LeRoi No. 2, Ltd., Rossland, gold, silver, copper.
 Not given, gold, silver, copper.
 Nest Egg & Firefly G. M. Co., Rossland, gold, silver, copper.
 Con. White Bear M. Co., Ltd., Rossland, gold, silver, copper.

GREENWOOD MINING DIVISION.

H. A. Fuller, Spokane, Wash., gold silver.
 W. T. McCluig, Sandon, gold, silver, lead.
 G. S. McNicol, Phoenix, gold.
 Wallace Mountain M. Co., Ltd., Greenwood, silver, lead.
 B. C. Copper Co., Greenwood, gold, silver, copper.
 B. C. Copper Co., Greenwood, gold, silver, copper.
 B. C. Copper Co., Greenwood, gold, silver, copper.
 B. C. Copper Co., Greenwood, gold, silver, copper.
 Granby C. M. S. & P. Co., Grand Forks, B.C., gold, silver, lead.
 Providence Mining Co., N.P.L., Greenwood, gold, silver.
 Dermody & Sater, Greenwood, gold, silver.
 Vancouver & Boundary Ck. M & D. Co., Greenwood, silver, lead.
 Skylark Development Co., Ltd., Phoenix, gold, silver, lead.
 Con. M & S. Co. of Canada, Ltd., Phoenix, gold, silver, copper.
 Alex. Miller, Greenwood, gold, silver, lead.

GRAND FORKS MINING DIVISION.

Dominion Copper Co., Boundary Falls, silver, copper, copper.
 Dominion Copper Co., Boundary Falls, silver, copper.
 Dominion Copper Co., Boundary Falls, gold, silver, copper.
 Dominion Copper Co., Boundary Falls, gold, silver, copper.
 Granby Cons. M., S. & P. Co., Ltd., Grand Forks, gold, silver, copper.
 W. A. Calder, Edgewood, silver, lead.

OSOYOOS MINING DIVISION.

H. A. Bowerman, Fairview, B.C., gold, copper.
 Yale Mining Co., Hedley, B.C., gold.
 Yale Mining Co., Hedley, B.C., gold.

SIMILKAMEEN AND VERNON MINING DIVISIONS.

J. Graham, Contlee, silver, copper.

YALE AND KAMLOOPS MINING DIVISIONS.

Kamloops Mines, Ltd., Kamloops, gold, silver, copper.

ASHCROFT MINING DIVISION.

Not given, Ashcroft, copper.

LILLOOET MINING DIVISION.

Nat Coughlan, Lillooet, gold.

NANAIMO, ALBERNI, NEW WESTMINSTER AND VICTORIA MINING DIVISIONS.

Copper Cliff Mining Co., Heriot Bay, silver, copper.

Jas. Raper, Van Anda, gold, silver, copper.

Cornell Operating Co., Van Anda, gold, silver, copper.

E. M. Cox, Van Anda, gold, silver, copper.

Little Billy Operating Co., Van Anda, gold, silver, copper.

Tacoma Steel Co., Tacoma, Wash., U.S.A., gold, silver, copper.

Not given, silver, copper.

Britannia Copper Co., Ltd., Vancouver, B.C., gold, silver, copper.

Not given, silver, copper.

Not given, silver, copper.

Lenora Mine, Mount Sicker, gold, silver, copper.

C. H. Dickie, Duncan, B.C., gold, silver, copper.

Tyee Copper Co., Ltd., Victoria, B.C., gold, silver, copper.

SKEENA MINING DIVISION.

Awaya Ikeda & Co., Ltd., Ikeda Bay, Q.C.I., gold, silver, copper.

Brown Alaska Co., Hadley, Alaska, copper.

FOREIGN SOURCES OF SULPHUR.

Sicily.—For ten years prior to August, 1906, more than three-quarters of the sulphur industry of Sicily had been in the hands of the Sicilian Sulphur Company (Limited), of London, which virtually controlled the sulphur business of the world during that period. When the contract between the English company and the Sicilian sulphur producers came to an end on August 1, 1906, the former had a large stock of sulphur (estimated at 450,000 tons) on hand. To avoid a reduction in the price of sulphur, which would doubtless have involved disastrous results to the industry in Sicily, the Italian Parliament passed a law requiring all Sicilian sulphur to be sold through the "Consorzio Obligatorio," presided over by a royal commissioner, with Government resources behind it. At a conference between representatives of the Sicilian and the American sulphur interests held in July, 1907, the Italians insisted that American sulphur should be kept out of the European market. The American interests declined to entertain such a proposition, and in August, 1907, the situation in Sicily became decidedly threatening as a result of the Italian Government's attempt to reduce wages. About the same time it was decided to throw upon the American market the stock of sulphur accumulated in Sicily. With this end in view a first cargo of 3,000 tons was sent over, and it was understood that more was to follow. In October, 1907, prices on prime Louisiana sulphur to New York, Boston, and Portland were quoted at from \$19 to \$19.50 per long ton, a drop from \$22.25, the price which had obtained during the early part of the year. Early in January of the present year, 1908, the Consorzio and the American producers came to an understanding and prices were again advanced to \$22 per ton and have remained at this figure up to the time of writing (June, 1908).

In spite of the fact that quotations have been more than \$22 per ton the greater part of the year, it is significant that the exportation of Sicilian sulphur to the United States has shown a constant and marked decline. Four years ago the importation of Sicilian sulphur amounted to more than 100,000 long tons. With the growth of the Louisiana sulphur industry, Sicilian sulphur in the United States has become almost a negligible quantity, as will be seen from the importation from Sicily of but 3,393 long tons in 1907. The following table, reported by Messrs. Emil Fog and Sons, of Messina, of exports of sulphur from Sicily, by countries, during the past four years, indicates the falling off in exports to the United States. This statement shows that 9,476 long tons were shipped from Sicily in 1907, but only 3,393 tons reached the United States during that year. Of the 9,476 tons shipped to this country in 1907, 8,598 tons were best unmixed seconds and 878 tons were refined sulphur.

ABRASIVE MATERIALS IN THE UNITED STATES.**Production in 1907.**

The domestic abrasive material industry was in much better condition in 1907 than in any previous year, according to a report by W. C. Phalen, just issued by the United States Geological Survey as an advance chapter from "Mineral Resources of the United States, Calendar Year 1907."

The total value of all the natural abrasives produced during the year—including millstones and buhrstones, grindstones and pulpstones, oil stones and scythe stones, corundum and emery, abrasive quartz and abrasive feldspar, garnet, infusorial earth, tripoli and pumice—was \$1,680,737. Compared with the value of the output for 1906—\$1,473,393—this is an increase of \$207,344. There was also a large increase in the production of artificial abrasives—carborundum, alundum and crushed steel—14,632,000 pounds, valued at \$1,027,246, having been produced in 1907, as compared with 11,774,300 pounds, valued at \$777,081, in 1906, a gain of \$250,165. The total gain in value of abrasives of both classes was therefore nearly half a million dollars; there was, however, a decrease in value of imports of natural abrasives of \$155,824, making a net increase in the domestic consumption of abrasives of all kinds for the year of \$301,685, as compared with an increase of \$376,437 in 1906.

Natural abrasives were produced in 23 States in 1907, as compared with 25 States in 1906.

The following table shows the value of the different kinds of abrasives produced in the United States in 1906 and 1907.

Value of Abrasives Produced in the United States in 1906 and 1907.

	1906.	1907.
Oilstones and scythe stones.....	\$268,070	\$264,188
Grindstones and pulpstones.....	744,894	896,022
Buhrstones and millstones.....	48,590	31,741
Pumice.	16,750	33,818
Infusorial earth and tripoli.....	72,108	104,406
Abrasive quartz and feldspar....	121,671	126,582
Garnet.	157,000	211,686
Corundum and emery.....	44,310	12,294
Artificial abrasives	777,081	1,027,246
	<hr/>	<hr/>
	\$2,250,474	\$2,707,983

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Halifax.

Mr. Franklin Playter, of Boston, who is the treasurer and general manager of the Boston-Richardson Gold Mine, has given out a statement for publication. In the summer of 1907 the company commenced building and equipping large additions to their plant. This involved heavy expenditure and large obligations. The bulk of the ore mined carries not more gold than \$3.00 per ton. To work this at a profit the large plant was essential. The financial depression made the company's creditors urgent in their demands. The mine, whilst it is easily able to produce many times the requisite amount of ore to pay off all obligations, cannot do this in a few months. The treasurer advanced \$15,000 of his own money, but this was insufficient to tide over the difficulty. Hence the company has been placed in the hands of a receiver.

THE BOSTON-RICHARDSON.

Goldboro.

A correspondent has provided the Canadian Mining Journal with a constructive suggestion as to the manner in which the Government can most profitably assist the Boston-Richardson Mine, which has recently gone into the hands of a receiver.

The mine is in good shape physically. If the management could be relieved temporarily from the burden of accrued liabilities, and could be supplied with, say, \$20,000, for current operating expenses, then success is a moral certainty.

As a guarantee for any money advanced there is a reserve of 18,000 tons of ore, broken in the stopes, which will yield a net profit of at least \$1.00 per ton.

There is also a live contract for the arsenic contents of the concentrates. This contract, despite the low current prices paid for arsenic, yields a net profit of \$2,000 per month. The material accumulated in the tailing pile will supply shipping material for at least two years. This contract has been arranged recently. Fifty tons of arsenic concentrates is the monthly output.

If the Government, after due investigation of the above statements, would guarantee an issue of Receiver's Certificates for the necessary amount, the money could be raised with no difficulty.

The mine, as stated above, is in excellent shape. The plans for enlarged plant have been almost carried out. New machinery is on the ground with which a capacity of 8,000 tons of ore per month will be reached. The mine is well developed for this production. The costs per ton, during the last eight months, were below \$1.80 per ton.

Considering all these facts and the additional fact that the closing of the Boston-Richardson will be of incalculable injury to the Province, it is not asking too much of the Government to request that an adequate sum of money be appropriated as promptly as possible.

The Government need have no fear of buying a pig in a poke. The amplest investigation will be welcomed.

Glance Bay—August 19.

Things have been rather slack around the collieries during the month of August. The usual succession of picnics and holidays have demoralised the routine and very considerably reduced outputs, which will be much lower than they have been throughout the preceding months of this year.

As announced some time ago, Mr. Charles Fergie has resigned the position of Superintendent of Mines for the Dominion Coal Co., and, following on this, several changes and promotions have taken effect in the official staff. Mr. Richard Kirby, late of England has been appointed Mining Engineer to the Coal

Company. The whole of the mines are now separated into three districts, each of which will be in charge of a Divisional or District Superintendent, reporting directly to the General Manager. Mr. Alexander McEachern, the late Manager of Reserve Mines, is promoted to be District Superintendent of No. 1 District, comprising Mines Nos. 1, 5, 10 and 8. No. 2 District, comprising Mines Nos. 2, 9 and 7 remains as before under the superintendence of Mr. Norman MacKenzie. Mr. Peter Christianson is District Superintendent of District No. 3, which comprises Nos. 6, 3, 4, 12 and 14.

The North Atlantic Collieries Co. have decided to sink a shaft to the Blockhouse Seam at Port Morien, which they have just proved by a borehole. Our metropolitan newspapers gave prominence to the fact that the Blockhouse Seam had been "found." We did not know that it had ever been lost. Surely in its old age the Blockhouse is not going to play hide and seek like the giddy "Mullins" seam.

The Town of Glance Bay has acted with commendable promptitude in answer to the appeal of the Mayor of Fernie for funds to relieve the distress caused by the recent forest fires. The Mayor called a public meeting, and it was decided to send \$1,000 and collect the money afterwards, and this was done. The impulsive generosity of mining populations is proverbial. They realize that some day they themselves may have to ask outside assistance. The city of Sydney is still considering "ways and means," and many of its citizens feel that their city has been outdone by its neighbor, and feel ashamed.

In a recent conversation with a Sydney newspaperman the president of the Dominion Coal Company recalled the fact that when he first took charge of the Coal Company the output of that corporation was in the neighborhood of 2,000,000 tons per annum, and that during the seven years which have since elapsed this output has been raised to 4,000,000, or figures in that neighborhood. Mr. Ross went on to say that within the next septennial period he anticipated an equally great advance in outputs. This would mean that in 1915 the output of the Coal Company's mines may be around 8,000,000 tons, or equivalent to the present total annual production of Canada. Coming from such a man of deeds as the president of the Dominion Coal Company this is a very pregnant prediction, and its true significance requires a little study to become fully apparent. An increase in outputs of 4,000,000 tons in seven years would mean a capital outlay of between ten and fifteen million dollars in the development and equipment of new mines, the provision of rail facilities and rolling stock, of new coal freighting steamers and loading and discharging plants. It would mean the doubling of the present mining population with all the attendant growth that comes with increase of population. It means the opening up of new avenues of work, and wealth and promotion for the people of the "Far East" of Canada.

Although over 300 years have elapsed since the pioneers of civilization came to Cape Breton, this island is only just coming into its own, for there never was anything phenomenal about Cape Breton. Somehow progress in the East seems to be slower than in the West, but such growth as we have is solid as it is slow. Although in the rush for the wealth of the West, this corner of the Dominion has been overlooked, yet we have our compensations. Our climate is equable, we are out of the hurricane belt, cataclysms and earthquakes never trouble us; floods and fires and blizzards and other vagaries of Nature, such as vex the untamed West, come but once in centuries to this island, and although Cape Breton is not exactly the land of the Morning Calm, yet we have some advantages and compensations that make up for a less spectacular wealth and a growth that is slower than that of the West.

It is rather a coincidence, in the light of to-day, that Sydney might have been named Pittsburg. This was the name chosen for it by Governor DesBarres when Sydney was laid out by British soldiers in the days of the Georges. Some day it may rival in importance its Pennsylvania cousin, who can tell.

Stirred to definite action by the dreadful loss of life which marked the year 1907 in the mining annals of the United States, the Government of that country has appropriated the sum of \$150,000 to establish experimental galleries and rescue stations in the coal regions of Pennsylvania and Virginia, and has called a convention of mining experts from Europe to meet in Pittsburg on September 1st.

The "Montreal Gazette" in commenting editorially on this action of the authorities in the States says: "The experimental work which is to be inaugurated at Pittsburg, dealing as it will with conditions similar to those to be found here, should therefore prove of decided value to the Canadian miner of the future. The courtesies of the United States Bureau of Public Documents seems to know no international boundaries, and we have no doubt that the monthly bulletins of progress that are promised by the new Bureau of Safety will be welcomed in Canada as additions to existing Canadian literature on this general subject." But the "Gazette's" comment is open to misapprehension. Are Canadian mining conditions similar to those in the United States? Does the "Gazette" know that the rate of fatalities in the mines of the United States is the highest in the world, and that the same rate in the mines of Nova Scotia is the lowest? We do not think that the public press of Upper Canada realizes the status of Canadian coal mining. To a Canadian mining company belongs the honor of having had the courage and the humanity to erect the first completely equipped "Rescue Station" on this continent. The Dominion Coal Company have had such a station for a year, and they have at the present time 39 complete sets of Draeger apparatus, housed in a brick building, with all the accessories of a modern rescue station. They have also a practice building, in which men are trained to wear the apparatus and work with it under conditions closely approximating to those underground, and in entirely unbreathable atmospheres. They employ a paid instructor specially engaged in England, and the work of training men is continuously going on, necessitating constant expenditure on oxygen and other supplies.

We think also it is fair to point out that the pioneer of experimental work of the nature to be undertaken by the United States Bureau is an Englishman, Mr. W. E. Garforth, of the Normanton Collieries, Yorkshire. Mr. Garforth for many years, entirely at his own expense, has carried on experiments of a costly and extensive nature to determine the explosive properties of coal dust, the effect of detonation and mine blasts on the flame of safety lamps, and he is the inventor of an approved type of oxygen breathing apparatus. Recently the British Home Office granted Mr. Garforth a subsidy to aid him in his valuable work, and the most accurate and up-to-date information on the subject is to be found in the British Blue Books and the Transactions of the English Institution of Mining Engineers. It may be of interest to remark that the original prototype of oxygen regenerative breathing apparatus intended to facilitate rescue work in mines was invented twenty-seven years ago by Mr. Henry Fleuss, of Newcastle-on-Tyne, and this apparatus, very little modified, is manufactured at the present time by Siebe-Gorman of London.

As has been previously pointed out in the columns of the Canadian Mining Journal, the provision of property equipped rescue stations and the training of men to act as special rescuers is one that is national in its character. This fact has evidently been recognized in the States, and it must eventually be recognized here. In the meantime, as was the case in England, no doubt the pace will be made by individual and corporate effort. Although Canadian miners will heartily welcome any informa-

tion that can be given them by their confreres in the United States, we think they will have to work out their own salvation, and we further think they are doing it remarkably well. One of the gentlemen who is soon coming to visit us with the English delegates from the Institution of Mining Engineers has recently been telling his colleagues through the columns of the "Colliery Guardian" that Canadian miners were being taught to "hustle" by their rivals in the States. We venture to assert that the average Canadian miner needs no lessons in "hustling," as this gentleman will find when he reaches Glace Bay.

Judge Russell, of the Supreme Court of Nova Scotia, has recently given a judgment which is of more than ordinary interest to the owners of coal areas in the Province. The suit in question was a very bare-faced attempt to deprive the Dominion Coal Company of their ancient title to the Point Aconi submarine coal leases near Sydney Harbour. The general manager of the coal company, in a communication to the "Montreal Star," stated that suit was inspired by the Dominion Iron and Steel Company, and was regarded by the coal company as "an unblushing act of piracy on the part of the steel company." The original leases were granted by the Mines Office in 1866, and have been renewed at intervals of twenty years since. The claim of Mr. Burchell, who acted for the steel company in this matter, was based upon alleged inaccuracies in the official plan and upon technicalities so trifling as to be practically unexplainable. The main leases of the Dominion Coal Company were secured to them by Act of Parliament at the time of incorporation for a period of ninety-nine years, but outside this blanket lease all other Nova Scotian coal leases are based upon the plans of the Mines Office, which the steel company endeavored to prove incorrect. Had the contentions of the coal company's opponents been upheld it would have put all other coal owners in a position of embarrassment and incertitude as to the validity of their titles. From olden times men have invariably respected ancient landmarks, and have regarded the remover of such as the common enemy. Although the judgment given in this case will give claim jumpers pause, yet it is very disconcerting to find that original grants from the Crown of such ancient standing can be so easily and wantonly attacked.

One of the Montreal newspapers in referring to the Elk River fire, which it was said at one time might involve the coal mines of the Crow's Nest, quoted some one in the Geological Department at Ottawa as having said that the outcroppings of the coal seams along the Cape Breton shore had been deliberately set on fire by the French before they evacuated the country at the time of the British occupation. This is certainly a very long time ago, yet we should be glad to learn where the geological gentleman in question obtained his information. No one in Cape Breton seems to have heard this version before, and it is not referred to in that *vade mecum* of early days of coal mining here, Mr. Richard Brown's history. It is very generally understood these outcrop fires were started by coal smugglers in the days when it was an offence to mine coal in Cape Breton. In this year of the Tercentenary, and the culmination of the entente cordiale in the Franco-British Exhibition, it is only right to call in question such an aspersion on the memory of the gallant gentlemen who sleep at Louisburg, and who fought their last for the fair lilies of France.

ONTARIO.

Cobalt.

Crown Reserve.—Returns from a car of 23 tons, consisting of 400 bags of screenings and 150 bags of No. A1 ore, the shipment averaged 5,300 ounces of silver or nearly \$65,000 for the car. Approximately 85 per cent. of the values were in the 150 bags of high grade ore.

Trinity Cobalt.—The new plant on the Trinity Cobalt is in operation. The shaft, which is being sunk to 100 feet is now down 35 feet.

Viceroy Cobalt.—Work will be started at once on the property of this company, located in Lot 8, Concession 4, Coleman. The control of this company has passed to a syndicate of Ohio oil men.

Red Rock.—On Friday, July 24th, work was stopped here. Supt. W. R. Thompson has left the camp. It is understood that the suspension of work was due to lack of funds.

Nipissing.—The surface prospecting which has been carried on by this company on their property within the limits of the town of Cobalt, has given the town the appearance of a mining town in the fullest sense of the word. Twenty-five men have been employed trenching across vacant lots, between houses and along the streets for two weeks. In one case a trench was dug for several hundred feet with no result. Argente street was reached, the street was skipped to be prospected at some later date and the trench continued for some distance. During the noon hour the foreman of the trenching gang, while

Progress.—Operations will be resumed at once on the Progress property, situated south of the Temiskaming. A new boiler and hoist will replace the ones destroyed in the recent fire and a new three-drill compressor will be installed.

There are now eleven mines on the list of regular dividend payers, the Buffalo City, City of Cobalt, Coniagas, Crown Reserve, Kerr Lake, McKinley-Darragh, Nipissing, Right of Way, Silver Queen, Temiskaming and T. & H. B. The Trethewey and the La Rose Consolidated will undoubtedly be added to the list in the near future.

In the first six months of 1908 these mines paid a total of \$1,504,591, making the total dividends paid by Cobalt companies to July 31, 1908, \$5,551,701. This does not include the O'Brien, Drummond and La Rose mines which are close corporations. These properties have paid approximately \$2,500,000 in profits to their owners.

Maple Mount District.

Montreal River.—Supt. R. W. Foster, of the Canadian Ores, Limited, states that he has sacked 130 bags of high grade ore from the 30-foot shaft on the main vein. The work this summer has been principally confined to prospecting. Twenty-four veins have been located, five of which have been trenched. A new cobalt vein six inches wide, was found last week. Mr. Foster expects to sink the No. 1 shaft 200 feet and develop all of the veins from this shaft. He is at present operating one drill, a small boiler and hoist. A seven drill compressor, new boiler and 10 x 12 hoist have been purchased and will be installed this winter. Silver has recently been found on both the Enright and Gillies properties in this section.

Miller Lake.—The reports of important discoveries in the vicinity of Miller Lake, a small body of water lying five miles southwest of Bloom Lake, have been confirmed. There is every indication that this area will prove to be richer than the Silver Lake section. The most valuable discovery so far made is on the Gates claims, originally staked last May by Cartwright and Le Heup. The vein, which is three to four inches wide, is smaltite and silver and has been traced 240 feet. Several good discoveries have also been made on the Bonsall claims.



NUGGET FROM GROVER-ADLEN SMITH.
Property in S. Lorrain. Weight 147½ lbs.

waiting for his men, noticed some cobalt bloom on an outcrop by the roadside and with his pick uncovered an 8 to 10 vein of smaltite and silver, which assayed 10,000 ounces. This vein is numbered 100 on the map of the Nipissing. A few days later vein 101, a narrow but very rich vein of calcite and silver was found in a cross trench 200 feet distant. Four shafts are being sunk within the town limits, one of which, known as the Promise shaft, is expected to locate the extension of the La Rose Right of Way vein.

The quarterly statement of the Nipissing Mining Company compares with the last statement as follows:

	July 1, '08	April 1, '08
Cash in bank and bullion on hand.	\$705,400	\$614,974
Ore in transit and at smelters....	169,096	158,491
Ore sacked.	112,235	200,030
	\$986,731	\$972,495

Approximately 13,000 shareholders received checks for the quarterly dividend.

BRITISH COLUMBIA.

Rossland.

The three leading mines of this camp, the Centre Star group, the Le Roi and the Le Roi 2, Limited, are making an exceptionally good showing when it is considered that the market price of silver and copper is at such a low figure. While the gold is the chief value found in Rossland ore, the fluctuations in the price of copper and silver affects the profits of the mines to quite an extent. It is said that the Centre Star group is earning a net profit of \$35,000 to \$38,000 per month; the Le Roi falls considerably under this but are yet putting money aside each month and, to be brief, the Le Roi 2, Limited, continues to pay a two shilling dividend every few months.

The lessees of the Blue Bird and those who have been operating the Evening Star have made a nice sum of money of their enterprise, but the men who have had several of the other small properties hereabouts under lease have earned very little over expenses. Nothing undaunted, however, a number of the miners are looking about for new showings to delve in, their bosoms full of the hope that possesses nearly every prospector.

At the Centre Star they are shipping second class ore from the dump. This ore was placed on the dump seven or eight years ago when the smelting charges prohibited its shipment to a reduction works, but it is thought that a margin of profit can be made on it under present treatment and freight rates.

The ore shipments from the local mines are averaging from 5,200 to 5,800 tons per week from the large mines with an occasional car of hand picked ore from the small mines. The lessees of the Evening Star are shipping about a car per week and have installed a small steam plant to facilitate the work of getting out ore. The lessees of the Homestake and Sunset have each shipped a car of good ore in the last week.

Boundary.

The shipments from the Boundary's leading shipper, the Granby, have not been as heavy during the last two weeks as they could have been, as they have had several furnaces cold at the smelter connecting them up to the newly installed blowing engines. During the week ended August 15th, for instance, they only shipped 16,039 tons. This, however, was partly owing to the wave of uncertainty that passed over the Boundary district with the news that a devastating forest fire had disabled the coke making apparatus of the Fernie mines. It was feared for a time that the local supply of coke would be used up and the Fernie supply unavailable for many weeks to come, but at this writing no serious delay is apprehended.

The B. C. Copper Company have been shipping from 14,000 to 14,500 tons of ore per week and expected to augment these soon, but they will no doubt delay the increasing of their output until the coke situation is more settled.

The Dominion Copper Company has been shipping over 3,000 tons of ore per week, but as this company did not have a very large store of coke on hand they closed down both mines and smelter in consequence of the Fernie fire. They have now arranged to get a supply of coke from the Pacific Coast if the Fernie mines cannot supply them and will resume work in a few days. The machine shop of the Dominion Copper Company, situated at Boundary Falls, was burned last week. This will cause the company considerable inconvenience. The shop was an up-to-date one. Up to Wednesday, August 12th, for that week the Dominion Copper Company treated 2,204 tons of ore from their Brooklyn, Rawhide, Sunset and Mountain Rose mines.

The Boundary mines are beginning to realize the result of their efforts to keep the cost of ore and copper production down to as low a point as possible. The Granby Company is making copper for a fraction over eight cents per pound, and the B. C. Copper Company have got their costs down so that they can land copper in New York for about 9¼ per pound, and they intend to lower this figure when they increase their output.

Work on a number of the smaller properties is progressing favorably. Good results are being obtained on the Diamond-Texas, E. P. U., Tip Top and other growing properties around here and operations will shortly be resumed on the Skylark, Prince Henry and two or three other prospects. A tunnel is

being driven on the Golden Eagle. It is expected that sufficient ore will be taken out during the course of the work to pay expenses.

The Humming Bird has been bonded to New York capitalists. An average shipment of 468 tons of ore from this property recently returned \$26.66 per ton.

W. Y. Williams, consulting engineer for the Granby Company, has just returned from a trip to the Similkameen district, where, among other things, he looked over the work now being done on the copper property at Bear Creek. A large body of good ore has been blocked out at this mine and shipments will be made as soon as the railway, now rapidly approaching that point, is in a position to handle ore.

The party of the Geological Survey of Canada are reported as making good progress with the survey at that point. This is valuable work from the standpoint of the mining men and the Government will be amply repaid for the work by the mining industry in years yet to come.

A force of twelve men is working at the Golden Zone, near Hedley, and the 10-stamp mill, with 5-stamp equipment at present, is working satisfactorily. Ore is being taken from a glory hole and dropped into the bins connected with the mill which are close to the work.

The fortunes of McKinley Camp fluctuates probably more than any section in this country. One day we hear of a strike of rich ore and the bonding of a group of claims by outside capitalists and later on the bond has been thrown up and things look dull again. This is largely due to lack of railway facilities and there is little doubt but that when the railway now being built reaches that camp it will make a name for itself. Assays from a 3-foot paystreak on the Victor at McKinley give \$80 in gold per ton, while samples taken from the C. P. R. claim have shown as high as 18 ounces gold to the ton.

Nelson.

The Kootenay Development Company has leased the Silver King mine and will operate the mining machinery hereafter with electric power.

The Van-Roi Mining Company of London will hereafter control the destinies of the Vancouver group, which the Le Roi 2, Limited, have been developing. The capital of the new company is £34,500.

The shipments of ore from this section averages 1,650 tons per week at present. This ore is mostly high-grade silver-lead or high grade gold bearing ore.

In the Reco, at Sandon, they have cut a two-foot ledge of good galena ore. Sixty men are now employed in the four stopes being worked at the Silver Cup. A strike has been made on the Nugget, Sheep Creek district, where a narrow shoot has been encountered giving high values in gold.

GENERAL MINING NEWS.

NOVA SCOTIA.

Sydney, August 13.—About ten days after commencing to sink a bore hole on the north shore of Cow Bay, near the old Blockhouse shipping pier, the North Atlantic Collieries Company has struck the Blockhouse seam at a depth of 120 feet. The seam is reported to be nine feet nine inches thick. The coal is clean and rich and will make a first-class metallurgical coke. The Dominion Coal Company owns part of the territory in which the seam lies.

Halifax.—The cornerstone of the new Nova Scotia Technical College was laid by Lieutenant-Governor Fraser on August 20. Prof. F. H. Sexton, Director of Technical Education, presided, and a number of distinguished citizens spoke.

ONTARIO.

Cobalt.—The management of the Silver Leaf mine has commenced diamond drilling on the north side of the property.

Cobalt.—The Temiskaming and Northern Ontario Railway Commission is advertising for tenders for certain mining leases of parcels of mining lands in and near the townsite of Cobalt. Tenders must be received before twelve o'clock noon on September 16th. The leases are for a term of 999 years. The first parcel comprises 13 acres around Cobalt Station; the second contains 4.04 acres of the townsite in the westerly portion of Lot 44; the third embraces Lots 338, 388 and 389 of the townsite, including the mining rights under one-half the streets adjoining said lots. A rental of \$1 per annum plus 25 per cent. of the gross value at the mouth of the mine of all ores mined will be reserved for Commission.

Parry Sound.—The discovery of a rich vein of bornite at the McGowan mine, about two miles east of this town, has led to a renewal of agitation for a local smelter. The Canadian Mining Journal will soon publish particulars of the discovery.

BRITISH COLUMBIA.

Fernie, August 12.—A wave of cool weather, followed by a fall of rain has improved conditions here to a remarkable extent. Refugees are returning by carloads from Cranbrook and adjoining towns. It is now possible to purchase meals, and the distribution of free food will be gradually reduced. Phenomenal progress is being made in building. Already several respectable business streets have sprung from the ashes of the obliterated town. The people of Cranbrook have earned the warmest gratitude of Fernie citizens. Their generosity has been boundless.

The Relief Committee has now \$80,000 in hand. Provisions and supplies arrive by every train. Premier McBride is expected here in a few days.

Phoenix.—During the first seven months of 1908 the ore shipments of the Granby Consolidated amounted to 619,316 tons, nearly double the tonnage recorded for a similar period in 1907. The monthly returns for 1908 have been as follows:

	Tons.
January	74,203
February	80,155
March	110,223
April	87,202
May	93,316
June	85,257
July	88,960
Total	619,316

For the same period in 1907 they stood thus:

	Tons.
January	34,192
February	32,465
March	63,826
April	70,158
May	5,072
June	72,820
July	80,216
Total	358,749

Greenwood, August 17.—What might have been a most disastrous fire occurred in the machine shop of the Dominion Copper Company's smelter at Boundary Falls. As it was, the fire entirely destroyed the machine shop and blacksmith shop, entailing a loss estimated by Manager Roosa at from \$25,000 to \$30,000. Only the hearty, well directed work of the men employed at the smelter and the company's excellent water supply saved the smelter and offices from going.

The building destroyed was a frame structure about 100 x 30 feet and was situated between the trestle and a temporary machine shop and quite near the blower room. The shop was equipped with a lathe 25 inches by 20 feet, a smaller lathe 16 inches by 10 feet, a Cincinnati radial drill, a threading machine, a planer, a shaper, and electric motor and a full equipment of tools and was considered to be, it is said, the best in the Boundary. The building was insured in one of the Ceperly-Rounsfell & Co. companies, but Mr. Roosa did not care to make any statement of the insurance, beyond that all their plant was sufficiently insured.

Nelson.—During the past two weeks of August in the district of which Nelson is the centre, there were 39 mining locations recorded. Eighteen of these were situated in the Sheep Creek and Salmon River districts, and 11 on the other side of the divide near or in the Bayonne country.

Vancouver.—The Guggenheim syndicate secured, on August 12th, an interim injunction against H. B. Hobson working the Cariboo mines. Hobson has a \$20,000 clean-up in sight.

Ladysmith.—A new coal mine is being opened by the Wellington Colliery Company, about three miles below Extension near the McLean ranch. The seam lies almost flat and is seven feet wide.

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

Coal has been discovered in Devon in the course of quarrying operations near Holsworking. It is not of good quality, but boring will be undertaken to ascertain whether it improves with depth.

The Scottish Coal Trades Conciliation Board have agreed upon a reduction of miners' wages by 12½ per cent.

In the Fife, Scotland, mining area, various extensions are in progress which will give employment to a large number of men.

About 70 coal miners were killed by an explosion which occurred in the Maypole coal mine at Wigan, England, on the 20th inst.

RUSSIA.

Gold discoveries continue to be made in the further East. A rich gold sand area has been discovered on the Tchukot peninsula on the shore of the Sviataya Chresta. The metal has been found at two points 250 versts apart, and the geological formation indicates that it is likely to be found at other places.

The gold and platinum mines on the rivers Tura, Issa, Aklaya and Barantchi in the Ural district, have been flooded and all work stopped. This industry has sustained a heavy loss.

GERMANY.

The existence of extensive lignite deposits near Merseburg has been ascertained by boring and a thick seam has been found in the bed of the River Elster.

The Gewerkschaft Konig Ludwig will construct 60 coke ovens with by-product recovery plant at Recklinghausen.

Thirteen men were killed and eight badly injured as the result of a firedamp explosion in the Dutweiler mine near Saarbrucken on August 11th.

ITALY.

The Sicilian sulphur industry is suffering from over-production. At two of the ports, Empedode and Licata, there is no room for new warehouses and the stocks held are enormous.

CONGO.

Two shipments of gold of the value of \$300,000 have passed through Uganda from King Leopold's Kilo mines in the Congo State. It is estimated that over 100 miles in Ituri province will yield gold ore, both allurial and quartz. Foreigners are rigorously excluded.

UNITED STATES.

Eighty per cent. of the coal mines along the Monongahela river are idle and thousands of men out of work, owing to low water in the Ohio river, which prevents shipments being made.

The Amalgamated Copper Company of Butte, Montana, produced in July 20,000,000 pounds of copper from the Washoe smelter, making a new record, at the lowest cost of production

per pound in the history of the plant. The cost is gradually being lowered by the introduction of new economies and the treatment of larger amounts of ore.

Work has been resumed on the properties of the Ohio Copper Company at Bingham, Utah. The concentrating mill will be equipped to treat 2,000 tons of ore per day, and when completed will represent an investment of \$1,250,000.

AUSTRALIA.

Labor conditions in the coal mining industry of New South Wales and numerous strikes are reported.

The State of New South Wales offers a reward of £500 to the person or company who shall first produce 50,000 pounds of quicksilver from cinnibar ores raised in the State.

Operations in several of the Wolfram mines in the Emma ville district, N.S.W., have been suspended for six months owing to the low price of the product.

SOUTH AFRICA.

The total output of gold in the Transvaal for the first six months of 1908 amounted in value to £14,442,000, of which £13,875,000 was produced by the mines of the Witwatersrand.

MEXICO.

Mr. William C. Seddon and other capitalists of Baltimore have obtained control of 1,500,000 acres of mining property tapped by the Cananea, Yaqui River and Pacific Railroad, and also of the Douglas Copper Company at Fundicion, Sonora, embracing a copper and gold smelting plant.

On July 27th two more furnaces were blown in by the Cananea Cons. Copper Company at Cananea, making a total of four in operation or half the capacity of the smelter. When the whole plant is running the output is expected to average 1,000,000 pounds per month for each furnace.

STATISTICS AND RETURNS.

Shipments from the collieries of the Cumberland Railway and Coal Company, Springhill, N.S., for the month of July were 24,590 tons.

DOMINION COAL OUTPUT TO AUGUST 15TH, 1908.

	Tons.
1.....	22,400
2.....	29,170
3.....	11,860
4.....	18,100
5.....	19,510
6.....	10,740
7.....	8,340
8.....	10,060
9.....	15,160
10.....	7,410
	152,750

COBALT ORE SHIPMENTS.

Following are the weekly shipments from Cobalt camp, and those from January 1 to date:

	Week end Aug. 15.	Since Jan. 1.
	Ore in lbs.	Ore in lbs.
*Coniagas.	63,780	778,260
*Cobalt Central.	46,170	293,685
City of Cobalt. . . . .	.....	.....
Drummond.	185,480	613,900
La Rose.	339,170	4,100,612
McKinley.	125,780	2,145,040
Nipissing.	174,360	2,650,550
O'Brien.	128,250	4,054,447
Silver Queen.	164,680	1,043,990
Temiskaming & H. B.	194,500	918,500

*Concentrates.

The total shipments for the week were 1,422,170 pounds, or 711 tons.

The output of the Crow's Nest Coal Company's collieries for the week ending August 14th was 20,819 tons, a daily average of 3,470 tons.

The output of the Crow's Nest Coal Company's collieries for the week ending August 21st was 16,327 tons, a daily average of 2,721 tons; week ending August 23, 1907, 19,199; a daily average of 3,200 tons; week ending August 24, 1906, 17,122 tons.

COBALT ORE SHIPMENTS.

Following are the weekly shipments from Cobalt camp, and those from January 1 to date:

	Week end Aug. 22. Ore in lbs.	Since Jan. 1. Ore in lbs.
Buffalo		759,950
*Coniagas		778,260
Cobalt Lake		341,683
Crown Reserve	54,000	182,000
*Cobalt Central		293,685
City of Cobalt		831,240
Drummond	611,400	675,300
Foster		238,400
Kerr Lake		522,974
King Edward		127,420
La Rose	244,000	4,344,612
McKinley		2,145,040
Nipissing	63,700	2,714,250
Nova Scotia		311,775
Little Nipissing		40,110
Nancy Helen		367,427
O'Brien	192,180	4,246,627
Peterson Laka		41,237
Right of Way	124,080	736,180
Provincial		143,210
Silver Leaf		258,000
Sliver Cliff		52,000
Silver Queen	80,000	1,123,996
Townsite		171,700
Temiskaming		645,680
Temiskaming & H. B.	62,000	980,500
Trethewey	125,870	790,166
Watts	60,100	481,090

The total shipments for the week were 1,007,330 pounds, or 533 tons. The total shipments from January 1st to date are 25,832,948 pounds or 12,916 tons.

*Concentrates.

BRITISH COLUMBIA ORE SHIPMENTS.

The shipments for the week ending August 8th have been slightly under the amount shipped weekly recently, although they are in excess of the average for the year. This has been due to the fear of a possible shortage in coke and also to changes still going on at the Granby smelter. However, the trouble is already over and during this week, it is authoritatively stated shipments of coke will have their normal proportions.

It may be noted that the Hewitt mine is now shipping concentrates and the Nugget is getting ready to mill at the earliest avail-

able opportunity and for this purpose is building a mill and putting up a short tramway.

The shipments from the various mines and receipts at the smelters for the past week and year to date were:

BOUNDARY SHIPMENTS.

Mine.	Week.	Year.
Granby	16,000	640,506
Mother Lode	10,406	89,034
Oro Denoro	3,970	29,388
Rawhide	930	9,230
Brooklyn	550	5,990
Sunset	621	3,439
Mt. Rose	60	330
Other mines		621
Total	32,537	778,548

ROSSLAND SHIPMENTS.

Centre Star	3,451	101,073
Le Roi	1,482	46,542
Le Roi No. 2	449	17,779
Homestake	14	14
Other mines		587
Total	5,396	166,115

SLOCAN-KOOTENAY SHIPMENTS.

St. Eugene	509	12,812
Whitewater, milled	280	8,820
Poorman, milled	250	7,100
Queen, milled	185	5,725
Richmond-Eureka	27	1,140
Arlington, Erie	24	927
Standard	22	824
Rambler-Cariboo	20	770
Vancouver	22	584
Silver Cup	61	531
Idaho	126	219
Hewitt	21	220
Reco	22	207
Monarch	66	129
Grant	19	28
Other mines		18,379
Total	1,654	58,461

The total shipments for the week were 39,587 tons and for the year to date 1,003,124 tons.

SMELTER RECEIPTS.

Smelter—		
Grand Forks	16,000	640,506
Greenwood	14,376	120,912
Boundary Falls	2,161	18,889
Trail	6,465	170,895
Northport (Le Roi)	1,639	50,464

The total smelter receipts for the week were 40,641 tons and for the year to date 1,007,456 tons.

RECEIPTS OF LEAD ORE.

Following are the receipts of lead ore at the smelter of the Consolidated Company, at Trail, for the month of July and the

lead contents of the ore as furnished by G. O. Buchanan, supervisor of the Dominion lead bounty:

Mine.	Net weight lbs.	Lead cont's lbs.
Arlington, Erie.	228,204	5,975
Alpha.	39,939	16,620
Blue Bird, Rossland.	29,106	1,863
Blue Bell.	809,294	489,722
Curlew.	13,479	566
Empress.	2,138	17
Ferguson.	170,015	47,260
Golden Giant.	35,564	24,118
Keystone.	15,283	397
Little Robert.	1,040	172
No. 1.	27,432	823
Rico	81,162	33,982
North Star.	1,408,949	290,298
Ruth.	152,676	50,948
Sally.	38,352	2,148
Slocan Star.	46,586	17,796
Rambler-Cariboo.	122,396	552,980
Richmond Eureka.	347,425	70,179
Sunset.	163,407	110,274
Silver Glnce.	9,648	96
St. Eugene.	4,622,696	2,657,835
Standard.	372,769	241,730
Whitewater.	577,963	260,668
Whitewater Deep.	88,507	40,495
Westmount.	86,758	6,770
	<hr/>	<hr/>
	9,480,798	4,422,732

MARKET REPORTS.

Coke.

August 21.—Connellsville coke, f.o.b. ovens—
Furnace coke, prompt.
Foundry coke, prompt.

Metals.

Tin, Straits, 29.35 cents.
Copper, prime Lake, 13.70 cents.
Lake arsenical brands, 13.70 cents.
Electrolytic copper, 13.50 to 13.55 cents.
Sheet copper, 18 cents.
Copper wire, 15.25 cents.
Lead, 4.575 cents.
Spelter, 4.70 cents.
Sheet zinc, 7.50 cents.
Antimony, Cookson's, 8.20 cents.
Aluminium, 32 cents.
Nickel, 45 to 47 cents.
Platinum, \$23.50 per ounce.
Bismuth, \$1.75 per pound.
Quicksilver, \$42.50 per 75-pound flask.

SILVER PRICES.

	New York, cents,	London, cents.
Aug. 12.	51 $\frac{3}{4}$	23 $\frac{7}{8}$
Aug. 13.	52	24 1-16
Aug. 14.	54 $\frac{1}{4}$	23 11-16
Aug. 15.	51 $\frac{1}{8}$	23 $\frac{5}{8}$
Aug. 17.	51 $\frac{1}{4}$	23 11-16
Aug. 18.	51 $\frac{1}{4}$	23 11-16
Aug. 19.	51 $\frac{1}{8}$	23 $\frac{5}{8}$
Aug. 20.	51 $\frac{1}{8}$	23 $\frac{5}{8}$
Aug. 21.	51 $\frac{1}{2}$	23 13-16

The production of the principal copper-producing countries of the world in 1907 was as given in the accompanying table, in metric tons, the figures for 1905 and 1906 being added for comparison:

	1905.	1906.	1907.
Australasia.	34,483	36,830	41,910
Canada.	21,588	19,106	21,022
Chile.	29,632	26,157	27,112
Germany.	22,492	20,665	20,818
Japan.	36,485	40,528	49,718
Mexico.	70,010	62,690	61,127
Peru.	8,763	8,641	10,744
Russia.	8,839	10,658	15,240
Spain-Portugal.	45,527	50,700	50,471
United States.	397,003	416,226	398,763
Others.	397,003	416,226	398,763
Total.	699,514	715,535	723,807

It appears from the above table that the proportion of the total contributed by North America (exclusive of Newfoundland) was 66.44 per cent. in 1907, against 69.60 per cent. in 1906, and 69.85 per cent. in 1905.—Bradstreet's.

COMPANY NOTES.

In a statement of Cobalt dividends printed in our last issue Coniagas Mines, Limited, was not credited with the regular bi-monthly dividend, paid on July 1, 1908, and amounting to \$80,000. This omission will scarcely neutralize the pleasure of the stockholders.

The Right of Way Mining Company has declared a dividend of 7 per cent.

Since 1900 bar silver has fluctuated as follows:

	High.	Low.
1908.	58 $\frac{3}{4}$	51 $\frac{1}{8}$
1907.	70 $\frac{1}{8}$	53 $\frac{7}{8}$
1906.	71 $\frac{3}{4}$	62 $\frac{5}{8}$
1905.	65 $\frac{5}{8}$	55
1904.	62	53 $\frac{3}{8}$
1903.	61 $\frac{3}{4}$	47
1902.	56 $\frac{1}{2}$	47
1901.	64	54 $\frac{1}{4}$
1900.	65 $\frac{1}{8}$	58 $\frac{7}{8}$

COPPER DISTRIBUTION.

Though copper is of world-wide distribution and the United States alone has over 3,000 copper mining companies, W. H. Weed, the American geologist, points out that the world's supply is practically derived from less than 250 mines. This includes only localities supplying 100,000 pounds or more annually. Of such mines the United States contains 58; Japan, 38; Chile, 31, and Australia, 28; but three of these countries produce only 30,000 tons each. Mexico ranks next to the United States in production, while Spain ranks third. Five great mines yield three-fifths of the total production, and one mine alone contributes one-fifth.