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THE INSTITUTE MEETING.

Now that the smoke of battle has cleared away, it is apparent that the Twelfth Annual Meeting of the Canadian Mining Institute was eminently profitable. It is evident, also, that the Institute bulks larger in the public eye than ever before. This is true, not merely because of its large membership, but more particularly for the reason that it is developing and following a more or less definite policy, and is not too timid to give formal expression to its opinions. Whilst entire unanimity of thought cannot be expected of any aggregation of human beings, yet the members of the Institute are generally of one mind on matters affecting the good name of the profession or the public status of the industry.

This is illustrated by the fact that the resolution correcting certain errors in Mr. Sifton's now historic address was not rescinded, despite the warm and, perhaps, impolitic efforts of the Secretary of the Commission on Conservation. The obvious purpose of the Institute was not to censure Mr. Sifton, but to draw attention to the unintentional inaccuracy of his statements. As a matter of fact, no society is in a better position to appreciate and assist Mr. Sifton in his magnificent task. Mr. Sifton is no super-sensitive lily. He is embarking upon a work that will bring him buffets and abuse—also it will bring him name and fame. He may count upon the whole-hearted support of the Canadian Mining Institute. That support would be meaningless if it consisted merely in blind approval.

The address of the retiring president, Dr. W. G. Miller, was comprehensive, lucid, and inspiring. His general review of railway development in relation to new mining regions was full of meat. Dr. Miller during his term of office has exercised an exceedingly potent influence on the Institute. It is comforting to know that his successor, Dr. F. D. Adams, is in every respect fitted to fill the exacting requirements of the presidency.

Especially notable amongst the papers read was that of Mr. P. McN. Bennie, on "Recent Developments in Electro-Siderurgy." The pleasant facility with which Mr. Bennie categorically answered the numerous questions put forward by his audience was, to say the least, unusual. Edifying, also, was the entire absence of the first person singular.

The audience, owing largely to the lateness of the session, did not appear to be adequately impressed with the importance of Dr. Stansfield's announcement concerning the direct production of steel from iron ores in the electric furnace. Dr. Stansfield's paper described the work of Mr. J. W. Evans, of Belleville, Ont. Illness

prevented Mr. Evans from being present. Dr. Stansfield is himself an authority on electrometallurgy. Hence the fact that Mr. Evans' results appeal to him is encouraging. We proffer our sincere congratulations to Mr. Evans.

All of the papers read by the visitors from the United States are eminently worthy of mention. Space will not permit this. But we cannot refrain from dwelling upon the addresses of Professor R. H. Richards and Dr. James Douglas. Professor Richards held his audience for a whole morning session. He gave us a glimpse of the means and methods that he has employed in searching out the whole philosophy of ore-dressing. Dr. Douglas spoke of his own early and unsuccessful attempts to mine copper in Quebec. To both of these gentlemen, as indeed to all the other visitors, the Institute should be specially grateful.

The business sessions were heated. The proposed by-laws were murdered—and without anesthetics. It is a matter of regret that the discussion became vitriolic. This is totally unnecessary. However, it is not likely that any further attempt will be made to limit the membership of the Institute. The consensus of opinion appeared to be that, within decent limits, the doors should be wide open.

The proposed Nominating Committee also fell by the wayside. Here again the discussion was one-sided and quite insufficient. We must confess to a good deal of sympathy for those gentlemen who spent time and thought upon the proposed amendments. The reception offered them was scarcely courteous.

The smoker, under the capable guidance of Mr. G. G. S. Lindsey, assisted by Mr. W. E. H. Carter, was a howling success. The dinner, likewise, was a well-managed and pleasant event.

Glancing back over the three days, we see little to criticise and much to praise. We still believe, however, that discussions should be organized carefully before the reading of each paper, and that, except in extraordinary circumstances, papers should be presented in synoptical form. Sooner or later, of course, the Institute will be forced to resolve itself into sections so as to permit of the simultaneous reading of papers on diverse subjects.

To the president, to the committees, and especially to Secretary Lamb and Treasurer Lecky, we proffer our felicitations upon having arranged and carried out so smoothly the best series of meetings of the Canadian Mining Institute on record.

THE EIGHT-HOUR DAY.

The Government of Nova Scotia has given much evidence of an enlightened desire to encourage trade

and industry. Some time ago it framed enactments for the furthering of gold mining by means of specific cash subsidies. Latterly, under the guidance of Dr. B. E. Fernow, an inventory has been made of the province's timber resources, with a view to conservation and reforestation.

One of the most significant acts of the Government, however, was the appointment of a commission to report upon labour conditions and upon the practicability of an eight-hour day. The commission's report is reproduced in part on another page. The section referring to coal mining, and this more directly concerns us, while not remarkably explicit, is sufficiently definitive to provide much food for thought.

While the commission recommends reduction in the hours of employment in certain classes, it pronounces strongly against a general and compulsory eight-hour law. This, the report declares, "would be at present a fatal blow to the industrial prospects of Nova Scotia. . . . So far as coal mining is concerned, the commission would gladly report in favour of the shorter day if the facts permitted them to do so. But the existing market for Nova Scotia coal presents features of a grave character. The coal industry is fundamental to the welfare of the province, and before enacting legislation that would undoubtedly add to the cost of operating the mines, or seriously reduce wages, further consideration should be given to the features referred to."

We have no reason to think that the commission was in the least degree partizan. The members were independent citizens, chosen because of their fitness. Hence the report cannot be regarded lightly. Thus, also, it is gratifying to place on record the implied fact that, in comparison with clerks, shop-keepers, factory-hands and others, the coal miner of Nova Scotia secures better treatment from his employer. This is something to be taken to heart by our legislators. The eight-hour agitation will crop up constantly. Eventually it will become an accomplished fact. But it is the duty of our governments to see that the currents of our commercial life are not too rudely disturbed by premature concessions to agitators.

PROSPECTING IN ONTARIO.

The bona-fide and efficient prospector has always our admiration and support. Unfortunately, in the rush to stake something, many hundreds of inexperienced men have been sent north. Either through ignorance or through laziness, these men waste the season by loitering around established camps, or by following the beaten trail and the easy water route.

Mr. W. M. Goodwin's article, "Notes on Prospecting in Ontario," sets forth these and other truths, and, further, supplies timely hints to the novice.

EDITORIAL NOTES.

The Canadian Northern Pacific Railway Company, the name chosen for the British Columbia section of Mackenzie & Mann's system, is authorized by its charter to purchase and operate coal mines in the province.

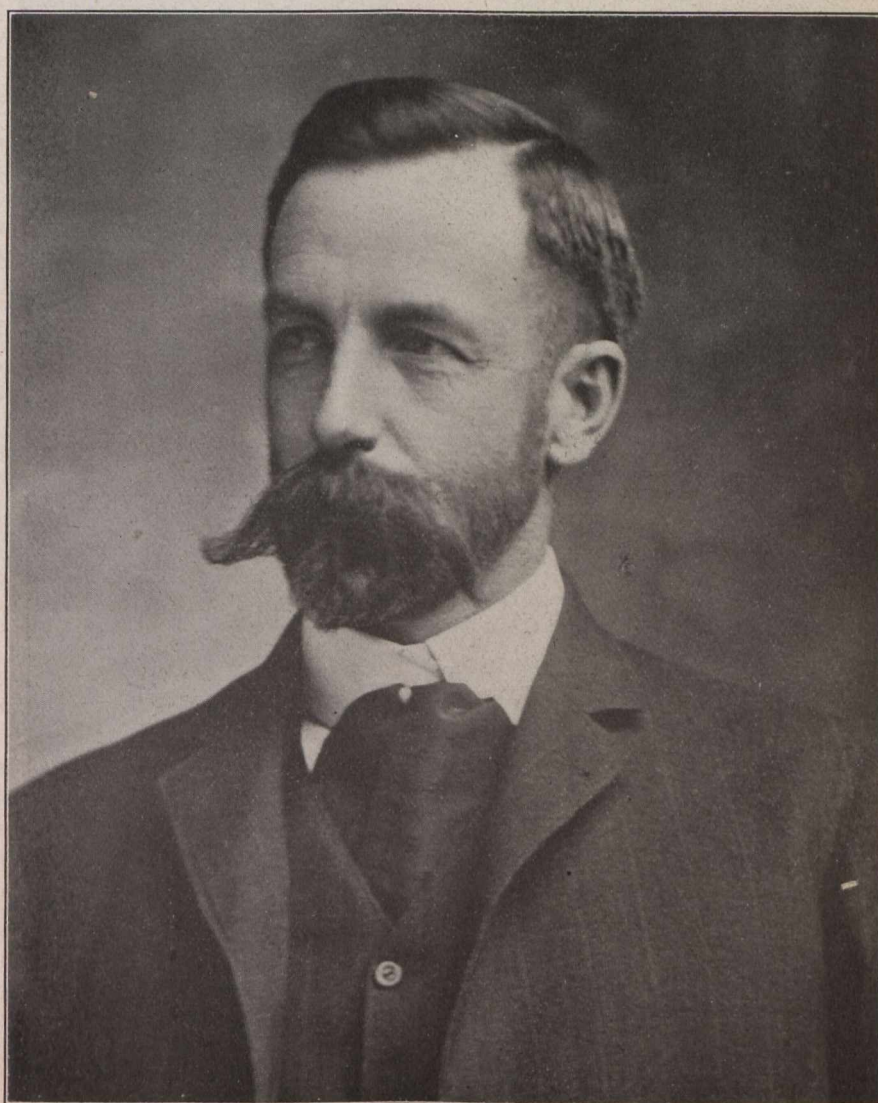
The troops have been withdrawn from Glace Bay and Dominion. The expense of maintaining the contingent since the strike began amounts to about

\$75,000. This will be shouldered by the two towns mentioned and by the municipality of Cape Breton County.

On February 24th the Privy Council reserved judgment in the case of the Florence Mining Company vs. the Cobalt Lake Mining Company.

According to the Hon. Mr. Fielding, the Dominion Government has no present intention of renewing the bounties on iron and steel.

Proceedings of the Twelfth Annual Meeting of the Canadian Mining Institute, Toronto, March 2nd, 3rd and 4th, 1910.



DR. W. G. MILLER.

The twelfth annual general meeting of the Institute was held at the King Edward Hotel, Toronto, on Wednesday, Thursday, and Friday, March 2nd, 3rd, and 4th, 1910.

Wednesday Morning Session.

The proceedings were opened at 10.30 a.m. The president, Dr. W. G. Miller, introduced Alderman McGuire, chairman of the Reception Committee of the City of Toronto, who, on the unavoidable absence of His Honor Mayor Geary, extended a civic welcome to

the delegates. Alderman McGuire's speech was brief and felicitous.

The presidential address, the text of which appears elsewhere in this issue, was then read.

The following resolution was then read by Mr. R. Brigstocke, and seconded by Mr. J. E. Hardman:—

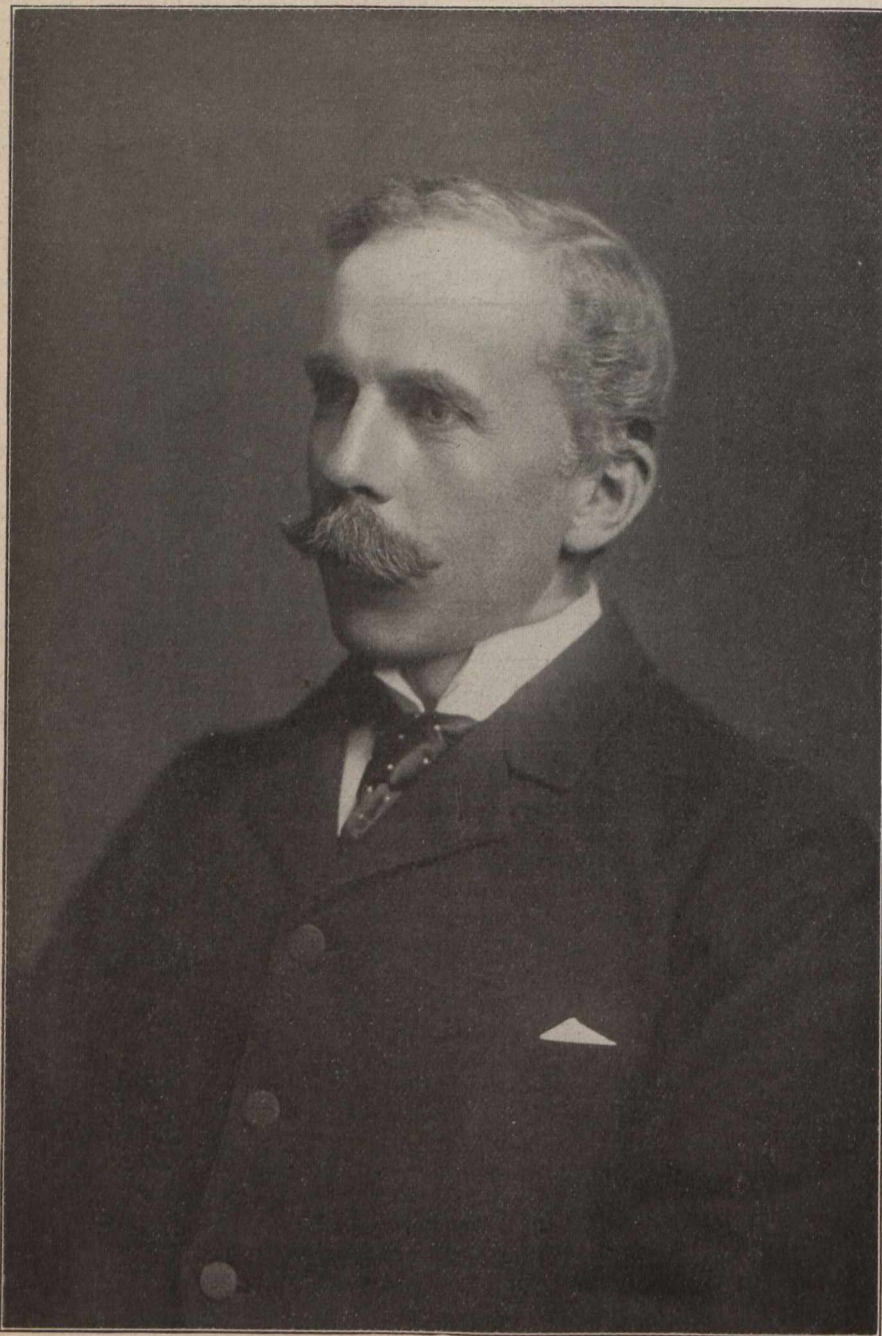
“Resolved, That the Canadian Mining Institute regrets that the chairman of the Conservation Committee should have publicly made statements reflecting on the mining and metallurgical practice of Canadian

companies, without having been fully informed as to the actual facts and conditions."

The reference here was to the speech of the Hon. Mr. Clifford Sifton, which appeared in the Toronto Globe of January 22nd, and has already been commented upon in these columns.

In the discussion that followed, Mr. W. J. Dick, mining engineer to the Conservation Commission, ex-

and all the non-producing mines and prospects. For instance, two men were killed at Rib Lake pyrite mine. One was killed at a gold prospect, and so on. It is impossible to secure complete returns of men employed in these numerous non-producers and prospects, as there are daily changes and constant fluctuations. Hence it is totally unfair to charge up the total fatalities to the producing mines, especially as conditions at these latter



DR. F. D. ADAMS.

plained that he had been engaged to look into these matters, not, however, until a date later than that of the speech. While he found that Mr. Sifton had been wrongly informed in the matter of Canadian smelters, he also found that the fatality rate at Cobalt was, according to the figures reported by the Bureau of Mines, 27.7 per thousand.

Then, at a later session, it was fully explained that the returns for men employed applied only to the producing silver mines. The fatalities cover a wide region

are incomparably better than they are in the scattered prospects.

The resolution was carried.

The president now called upon Mr. J. McLeish, Statistician of the Mines Branch, Ottawa, to present the statistics of the mineral production of the Dominion for the year 1909. These will be found in full on another page. It is pleasant to record that Mr. McLeish was able to report a total output valued at more than \$90,000,000. This is a substantial increase over 1908.

Mr. Theo. C. Denis, Superintendent of Mines, Quebec, followed with a statement of the mineral production of Quebec during 1909. Whilst a slight falling off occurred, yet Mr. Denis spoke most cheerfully of the future. One of the main causes, he stated, of the lower figure was the fact that extensive preparations were under way for increased production of asbestos. He felt confident that a much higher figure would be reached during the current year.

The secretary then presented statements from Nova Scotia, Alberta and British Columbia, all of which exceeded previous outputs.

In the absence of Mr. T. W. Gibson, Dr. Miller referred briefly to the record output of Ontario. The session then adjourned.

Wednesday Afternoon Session.

In opening the afternoon programme, the president drew attention to a fine collection of specimens from Porcupine, secured and displayed by Mr. H. P. Davis, who, incidentally, spent about 48 hours in more or less continuous dog-sled travel in getting them hurriedly together.

The secretary read Mr. Kendall's paper on "Mining Engineers and Mining Institutes." This paper has already appeared in our columns.

Both the secretary, who favoured restricted and classified membership, and the president, who openly advocated the inclusion of all reputable persons interested directly or indirectly in mining, gave expression to their views.

A paper by Director R. W. Brock followed. It was entitled "The Necessity of Distinguishing between Prospecting, Developing, and Mining."

Mr. J. B. Tyrrell, after speaking appreciatingly of Mr. Brock's paper, suggested the possibility of forcing the promoter to expend, in actual mining, at least 75 per cent. of all moneys received.

A paper by Mr. R. W. Seelye on the Helen iron mine, and one by Mr. Einar Lindeman on "The Iron Ores of Vancouver and Texada Islands," evoked most interesting discussions.

An excellent paper "Mining Literature," written by Mr. Allan Greenwell, Editor of the Colliery Guardian, London, was read by Mr. Frederick Hobart. This concluded the session.

Wednesday Evening Session.

Mr. P. McN. Bennie's paper, "Recent Development in Electro-Sederurgy," was listened to with not a moment's loss of interest. From first to last Mr. Bennie held his audience. In his introductory remarks, he explained that the laboratory work was at an end, and that commercial work was being undertaken. "It used to be said that the electric furnace had a future. It has something more than that. It has a past. We have taken off the cloak of experimentation, and we think that we now wear the royal purple of facts accomplished."

Full discussion followed both Mr. Bennie's paper and that of Dr. Stansfield on "Steel from the Electric Furnace." Dr. Stansfield described the production of tool steel direct from iron ore, as accomplished by Mr. J. W. Evans, of Belleville, Ont.

Thursday Morning Session.

At this session Dr. A. E. Barlow presented a general outline of his investigations into the origin of asbestos, and emphasized the vital bearing of such researches upon the economic development of the industry.

Professor Dresser followed with a dissertation on "The Distribution of Chromite and Asbestos Deposits of the Eastern Townships." There now ensued a lively debate in which Dr. Walker, Dr. Coleman, Prof. Baker, Dr. Adams and Dr. Irving took part.

"Criteria of Downward Sulphide Enrichments," a paper read by Dr. Ransome, of the U. S. Geological Survey, was now brought on.

Thursday Afternoon Session.

The afternoon session was taken up partly with routine business. When this had been disposed of, Mr. James Douglas was called up to give some reminiscences of copper mining in Quebec.

It is possible here to reproduce Dr. Douglas' entertaining and informing address. It must suffice to say that Dr. Douglas spoke not unhopefully of the possibilities of the industry. Mr. Hardman, Dr. Wilson, and Mr. Dresser spoke on the same topic.

Friday Morning Session.

After Professor Haultain had read his paper on "A Wet Sample Cutter," Professor R. H. Richards delivered his address, illustrated profusely with lantern slides on "Some Directions in Which Improvements in Concentration May be Looked For." The presentation of Professor Richards' paper occupied the whole of the morning session. It is to be regretted that no time remained for discussion.

Friday Afternoon Session.

The visitors, officers and reception committee of the Institute were tendered a luncheon at the Legislative Buildings by the Hon. Mr. Cochrane, Minister of Mines.

Several members took the opportunity of expressing their sincere gratitude to Prof. Richards for his kindness in attending the meeting.

The Chairman then called up Mr. B. B. Lawrence to read his paper "Remarks Upon Two Well-Known Mines," to which Dr. Ledoux added some apposite comment.

Mr. R. W. Thompson's "The Portland Canal Region," and Dr. Ries' "The Clays of Nova Scotia," were the last papers read. Many other meritorious contributions had, through lack of time, to be omitted.

The scrutineers reported a vote of only 175 ballots—a contrast to former elections.

The election results were as follows:—

President—Dr. Frank D. Adams, of Montreal.

Vice-Presidents—Mr. A. B. Cole, Charles Fergie, J. B. Tyrrell, John A. Dresser, G. G. S. Lindsey, O. E. S. Whiteside, S. C. Blaylock, R. A. Bryce, R. T. Hopper and J. J. Penhale.

The session then adjourned.

The dinner was notable for the succinctness of the speeches. Among the guests were Mr. F. Congdon, M. P., Hon. Frank Cochrane, Mr. Ralph Smith, M. P., Mr. B. B. Lawrence, Prof. Richards, Dr. A. R. Ledoux, Dr. James Douglas, Dr. Irving, and Dr. Ransome.

An heroic rescue-party, equipped with Draeger and Shamrock helmets, saved a valuable official life. The premature explosion of a flash-light completely prostrated the person in question. His intrepid rescuers, whilst they applied some unorthodox methods of resuscitation, nevertheless succeeded in carrying the victim beyond the danger zone. It must be added that the victim was guilty of more than passive resistance. Hence the test was unusually severe.

The dinner was a fitting climax to three days of hard work. Mentally, if not physically, the delegates are lions refreshed.

PRESIDENTIAL ADDRESS OF DR. W. G. MILLER.

Gentlemen,—It gives me pleasure to welcome you to this the Twelfth Annual Meeting of the Canadian Mining Institute. On two former occasions, 1904 and 1907, we residents of Ontario had the privilege of meeting our fellow-members from other provinces in annual gatherings of the Institute in this our capital city. Since the earlier of these meetings Toronto has become one of the important mining centres of the continent.

While the Institute has a history of only twelve years, a period that has witnessed great progress in our industry in this country, its lineage can be traced some years further back through its immediate predecessor, the Federated Institute, and those provincial mining societies by the coalescing of which the Federated Institute was formed.

In my presidential address last year I gave a brief account of some of the work that the Institute has accomplished. This year it will be appropriate to refer briefly to the progress of the mineral industry during the past year, and to recent developments in Canada that materially affect the industry, together with certain objects that we should strive for in the future.

Progress in 1909.

The year has been a period of steady and substantial industrial growth and activity, although no developments of a sensational character have been witnessed. Almost every year sees the exploitation of new mining camps in Canada. Those to which most attention was directed during the last year were the alliterative twins—Porcupine and Portland Canal—the one on the Pacific coast and the other in the great central region. Perhaps the most striking feature of the past year has been the tendency on the part of large industrial concerns to consolidate their interests, which, provided the industries are not unduly handicapped by over-capitalization, should make for increased efficiency and economy in management and operation. This would especially apply in the case of the amalgamation of the coal and steel interests in Nova Scotia, which industries are largely dependent on one another. In Quebec the amalgamation of the asbestos mines has at least served to stimulate mining activity throughout the Eastern Townships. In Alberta, as a result of railway construction, great activity has been displayed in connection with the acquisition and development of coal areas. In British Columbia good general progress has been made. The Ontario mineral output was the largest on record.

Notwithstanding the lower prices of metals during 1908, the value of the mineral production for 1909 should show a gain of a few million dollars. For this gain, I believe, Ontario is chiefly responsible, although British Columbia is credited with an increased production of about a million dollars, and possibly the increased output of coal in Alberta will, to some extent, offset the decrease in Nova Scotia due to the protracted strike there.

Canada has become less and less dependent on foreign smelters and refiners. The Granby copper smelter in British Columbia is now the largest in the British Empire. Important work is being done in the refinery at Trail, while the plants erected during the last few years in Ontario—at Copper Cliff, Deloro and Thorold—have greatly advanced metallurgical work in this province.

The Dominion Mint at Ottawa is gradually increas-

ing its usefulness. Heretofore it has been turning out copper and silver coins and British sovereigns. Now it is to mint Canadian gold as well. It is to be hoped that ere long Canada will have a pure nickel coin, since this metal has been proved by several countries in Europe to be well adapted for use in coinage. Surely the country that supplies most of the metal to commerce can afford to make use of it in coinage!

Of the four great industries in Canada, agriculture, mining, forestry and fisheries, that deal with natural resources, mining stands second only to agriculture in value of annual production. The value of the output of our minerals is greater than that of forestry and fisheries combined.

Railways.

It is said that about 65 per cent of the freight carried by the railways of the United States consists of minerals or of mineral products. This is absolute evidence that the mineral industry is very important from the railway point of view and vice versa. Hence it is encouraging to the industry in Canada to find such extensive railway construction being carried on. It is rumoured that the three greatest railways of the country will expend sixty million dollars or more in the building of new lines or in double tracking during the present year.

The building of these new lines is making a vast territory accessible to the prospector and miner. For instance, the National Transcontinental, in its course through the northern parts of the provinces of Ontario and Quebec, is doubling the accessible territory in both provinces. The Grand Trunk Pacific has about the same effect on northern British Columbia. Other lines are opening up, or will open up within a few years, vast areas in British Columbia and the other provinces.

The Dominion Government, it appears, has definitely decided to have a railway built to Nelson Harbour on Hudson Bay. The primary object in building this road is the shipment of grain, but even if the road never carries grain it is well worthy of construction. When one looks at the enormous coast line of Hudson Bay with the tributary rivers and considers the promising character of the rocks from the mineral point of view that are accessible to the coast, he must feel that there is likelihood of a very large mining industry being established by the construction of this railway. When the road is built one will be able to reach Port Nelson in a day or so from Winnipeg and there will be steamers running from this port to various points on the bay. This will give a comparatively long season for prospecting and exploring. Fisheries in these northern waters are also promising.

Still another railroad that in all probability will be constructed will run from Edmonton to Fort McMurray on the Mackenzie River waters. This will make the vast northern interior of Canada easily accessible. The great territory along the Mackenzie and tributaries in the vicinity of the Great Slave and Great Bear Lakes is known to possess promising mineral deposits, but, under present conditions, it is almost impossible to explore this territory satisfactorily.

From the brief consideration of the railroad building now in progress I think that we may feel confident that there will be an immense extension of our mineral industry within comparatively few years, the readily accessible areas being more than doubled.

Water Powers.

In many parts of Canada, and especially in the great central region, the presence of water powers has an important bearing on the mineral industry. This is shown by the use that has already been made of these powers in the greatest metallic areas that have as yet been developed, the Boundary district of British Columbia and the Sudbury and Cobalt districts of Ontario. In British Columbia the plant at Bonnington Falls supplies power to the mines at Rossland, Phoenix and Greenwood and to the smelters at Trail, Grand Forks, Greenwood and Boundary Falls. In Ontario the Canadian Copper Company has developed a water power which supplies with electric energy its large mines at Creighton and Crean Hill and the plant at Copper Cliff. Other mining companies in the Sudbury district Victoria mines, North Nickel range, and Moose Mountain are using or are preparing to use electric power generated by water falls.

Power is now being delivered at Cobalt from the Montreal River and in a short time the camp will have an abundant supply from this river and from the Matabitchuan. The benefits that are being conferred on these great metal camps by water powers illustrate the value of this source of energy to our industry. Without the results that have been accomplished by our fellow engineers, electrical and mechanical, during recent years, this employment of power would not have been possible. Twenty-five years ago our industry in many parts of the country could not have made the advance it has during recent years simply because electrical and mechanical engineers could not have supplied the power.

But when one thinks of what electricity has accomplished in other branches of the mineral industry during comparatively recent years, the consideration of water power for merely mechanical purposes seems prosaic. The inventions of Hall, Acheson, Willson and others in the production of metals and artificial minerals have made this age famous. Fifty years ago aluminium was little more than a scientific curiosity. It sold for two dollars an ounce. During the last year it has sold as low as fifteen cents a pound, and it is now one of the common metals of commerce and the arts. The production of carborundum and other artificial abrasives has done much to assist the manufacturers of machinery. Artificial graphite has become an important article of commerce. Artificial rubies are produced on a commercial scale. The manufacture of various alloys, that are now considered necessary in metallurgical work, is due to the advances in electrical knowledge in recent years. Calcium carbide, a product of the electrical furnace, is used as a source of light. Electricity is employed also in the refining of several metals and in the concentration of certain ores. But the most recent commercial achievement of electro-chemical engineers, the fixation of the nitrogen of the air, is the one that appeals most strongly to the imagination and may have vast, and at present unseen, beneficent results to our race. Certain compounds of nitrogen are essential as plant food. A few plants possess the power of abstracting free nitrogen from the air but the majority are dependent on extraneous nitrogenous compounds for their food supply. The store of mineral nitrates, which have long been in demand as fertilizers, is limited. Recently the electric current has come to the rescue of agriculture and nitrogen is taken from the air and made into various compounds. Fifteen million dollars are already invested in the works in little Norway, where

water powers are as abundant as they are in our own country.

While what I have said may be commonplace, still it shows the important influence that water powers have on our industry, both as a source of energy for purely mechanical purposes and in the refining of metals and the manufacture of mineral products. Canada is well situated to take advantage of the great development along modern lines, and it is encouraging to see the keen spirit evinced in this country in connection with the proper utilization of our water powers.

Forestry.

While water powers have a very important bearing on our industry, forestry is scarcely of less importance. Mining men are sometimes accused of taking little interest in the preservation and the proper utilization of the forest. The accusation is seen to fail when it is tried simply by the test of self interest. Since little mining can be carried on if forest products at reasonable cost are not available, mining men generally are interested in seeing that forests are protected. The present general movement in Canada for the protection of forests will receive the support of those associated with the mineral industry.

Mining Legislation.

Our secretary is to present a paper at this meeting dealing with mining laws and regulations. The paper will deal with the regulations of various countries for the sale and development of government lands. Ideal regulations will probably never be framed by any state, but a little discussion now and then does no harm. In all mining legislation two classes have to be considered, namely, the poor man or prospector, and the capitalist. If only the development of an industry in a country is considered, without the encouragement of individuals, the mining laws of Mexico, for example, are almost ideal. Briefly, individuals or companies in Mexico can acquire areas from the government, and so long as they keep up the annual acreage tax they control the lands. Of course, this acreage tax, under conditions obtaining in Canada, would often work a hardship on the poor man, and would make it difficult for anyone but a wealthy individual or company to hold land. The tendency is, when laws are made with the object of preserving both the rights of the prospector and the rights of the capitalist, for confusion to arise. The weaknesses in the mining laws of the various provinces of Canada are due to this. If only one class of persons had to be considered, the laws could be made much simpler. For instance, in some of the provinces of Canada, and in some of the states of the Union, working conditions are imposed upon the holders of mineral lands instead of an annual tax as in Mexico. It is considered to be easier for the man without capital to do a certain amount of work yearly than to pay an annual tax. Working conditions are also thought to tend to the more rapid development of an industry, but it is the writer's belief that working conditions have never been very successful in any state or province in North America. In fact, the insistence on work frequently leads to fraud.

The mining laws of British Columbia and Ontario have, owing to the development of the metallic industry during recent years, attracted more attention than those of the other provinces. It has been found that, in both provinces, one of the great weaknesses is blanketting. This is due largely to permission to stake by proxy. A man is not only permitted to stake two, three

or more claims on his own license, but, by getting licenses in the names of his sisters, aunts and other individuals, he may stake ad infinitum. One would think that if a man succeeded in staking, say, three good claims in a year, he should be satisfied. Some people, however, seem to think that a prospector is capable of staking many more good claims in one season, hence he has been given great latitude. Moreover, staking by proxy often reacts against the interests of legitimate prospectors. So many claims are offered for sale that prices are lowered and there is difficulty in separating the wheat from the chaff. British Columbia has an acreage tax which is good so far as it goes, and Ontario imposes a nominal tax on claims in unorganized territory; but the results achieved by this acreage tax in these two provinces are not nearly so important as that achieved by the larger one of Mexico. An acreage tax is the best preventive of blanketing and tying up of mineral lands.

Another point that is often discussed is the question as to whether governments should dispose of lands in fee simple or on lease. In Mexico and Nova Scotia, for instance, the leasing system is practically universal, and it does not seem to have had any bad effects on the industry. Large foreign companies are constantly starting undertakings in Mexico. In some of the provinces of Canada, however, great objection has been raised to leases. It has been claimed that it is often impossible to raise money on property that is not held in fee simple.

The Quebec law was changed about a year ago, and its enactments came into full force at the beginning of this year. These Quebec regulations seem to me to be well adapted to the conditions existing in that province. Of course, the regulations may not be ideal, but, if one or two slight changes are made, they would be about as good as can be expected. The price per acre, running from \$10 to \$20, depending on distance from railway, is higher than that charged in any other country. In fact, it seems to me to be too high, for the reason that the government will receive less revenue than it would if the price were lower, and to some extent it will have a tendency to discourage poor men. Then, since it is not the intention, as I understand it, of the Quebec authorities to inspect "discoveries," it seems to me that "discovery" should be left out of the requirements in making application for mineral lands. This requirement will serve no useful purpose, and may lead to trouble in certain cases.

As to the change in the Quebec law, I may say, and I feel that I am expressing the opinion of all the mining men who know of him or of his work, that Mr. Denis' recent appointment as Superintendent of Mines for Quebec has given great satisfaction. The government is to be congratulated upon its choice.

Dominion Legislation.

During the last year the Dominion Government has done much to encourage the industry. The appointment of the Select Standing Committee on Mines and Minerals was a move in the right direction. Hereafter the mineral industry will no doubt receive still greater recognition. As a result of their last session's labours the committee recommended that the government enact a code of mining regulations applicable to Dominion lands. The committee was strongly of the opinion that the present method of dealing with these lands by orders-in-council should be done away with. It is to be hoped that this recommendation of the committee will be acted on in the near future. All mining men will agree that a code of

mining laws for the Dominion lands is urgently needed. The committee further recommended that the management of the Dominion mining lands should be transferred from the Department of the Interior to the Department of Mines.

During the past year the Dominion Government has appointed a National Conservation Commission. This commission should have a wide field of usefulness. Unfortunately, when new subjects come up, or old subjects under new names, such as that of conservation, faddists sometimes become active, and it takes time to get on a solid foundation. This has been to some extent the case with forestry and with our own industry. This Institute, and organizations of like character in other countries, have, it seems to me, been dealing effectively with conservation problems in the past, and, in so far as the mineral industry is concerned, the Institute will continue to be the organization in this country that is the most competent to give advice on such problems. The membership of the Institute embraces many men to whom the prevention of accidents, the refining of ores so as to prevent waste, and all the other problems connected with the industry, have been subjects of life-long study. There are some subjects with which governments can give assistance, and their assistance is always welcomed. But the mineral industry is one that does not flourish under paternalism, and advice such as has sometimes been offered in this country is not welcomed.

"How small a part of all that we endure

Is that which governments can cause or cure."

The prevention of mine accidents is a subject that has received careful attention in Canada. With regard to the inspection of the metal mines of Ontario, with which I happen to be familiar, I may say that I do not know of any metal-mining state in the Union where the inspection has been more systematic. Accidents will always be more numerous where there are many small mines or prospects than where the same number of men are employed in a few large mines. Inspection, including analyses and other tests of explosives, is a subject with which mine managers cannot be expected to deal. It offers a field of work for the government.

Changes are needed in connection with sanitary regulations for new mining camps. Many mining men feel that these new camps should not at first be organized on municipal lines, but that they should be governed by commission. Sanitary precautions could be taken from the beginning, and money raised by taxation could be expended with better results than it usually is by municipal officers in the hurly-burly period of a camp's existence.

As regards the prevention of waste in the handling and refining of ores, I think it can be said without fear of contradiction that Canadian metallurgists are fully alive to the subject. I do not think that a government can lead the way for private metallurgists.

The Dominion Government has apparently decided to appoint a commission to deal with technical education. This subject all mining men will admit has a very important bearing on their industry. The government is to be congratulated on its decision. It has been suggested for some years that technical education, being so closely connected with trade and commerce, should be dealt with by the Dominion Government, although education is, by the British North America Act, left to the various provinces. It is to be hoped that the broader view will prevail, and that the Dominion Government will see its way to assist very materially in the work of technical education.

There has been a great change in the views regarding education in Canada during the last twenty years or so. Most of us will remember that in our college days the type of education prescribed was that which had proved acceptable in the past, especially in Great Britain. This educational system was transplanted bodily to Canada, and was supposed to be adapted to the needs of a country entirely different from Britain. Fortunately, during the last two decades scientific and technical education has received much more attention, and it is now considered by many that a man with technical knowledge can be of as much service to his country as can one who has pursued merely one of the older courses of learning. Former ages have excelled the present in art and literature; but the present stands pre-eminent in the utilization of the forces of nature for the comfort and happiness of mankind.

Mining Taxation.

I have referred under mining laws to one kind of mining taxation, namely, the acreage tax. Most mining men will agree that this form of taxation has beneficial results on the industry, in that it tends to keep titles clear and to prevent the tying up of lands by speculators. It can, I think, be said to be a unique tax, since I never heard of another that was welcomed by those who had to pay it!

While those engaged in the mineral industry are desirous of bearing their fair share of the expenses of government, they frequently feel that they are unjustly discriminated against. If a mine or metallurgical works has a large equipment, or if the profits are even moderately large, the cupidity of those not connected with the industry is aroused, and there is a tendency to levy disproportionate taxes on the mine or works.

There are, broadly, two methods of taxing output, viz., on the gross or on the net profits. A tax on the gross is rarely fair. No consideration is given to costs of production. A tax on profits is much more equitable.

But the point in connection with mine taxation that needs most consideration is that which concerns the capital itself. If the net earnings of a mine are taxed at the same rate as ordinary income, the tax can be shown to be unfair to the mine owners, since the net earnings of a mine represent to a large extent capital. As ore is taken from a mine from year to year the property becomes constantly less valuable, until finally, when the ore has all been mined, the property is valueless. It is easy, therefore, to show that the net income from a mine should not be taxed on the same basis as income derived from other sources. This phase of taxation of mines is now receiving considerable attention in certain parts of the United States.

Our Mines Abroad.

No country has larger undeveloped promising mineral fields than Canada. It is important, therefore, if the mineral industry in this country is to make the progress it should, that capital be available. Heretofore most of the capital invested in mining enterprises has been furnished by Canadians themselves or by the people of the United States. If one reads the mining journals and the transactions of technical societies in Great Britain, he cannot but be struck with the small amount of attention the Canadian mineral industry attracts in the mother country. Pages are devoted to the industry of Australia and Africa, while paragraphs or sentences are given to that of Canada.

It was chiefly with the object of making the mineral resources of this country better known in Britain and

on the Continent that the Canadian Mining Institute, with the assistance of the Dominion and the Provincial Governments, organized the trans-Canada excursion of 1908. Sufficient time has now elapsed to determine some of the results of the excursion. Not to enter into details, I may say that the results have been all that could be desired. Some important investments of capital have been made, and several Canadian mining engineers have been asked by British investors to make reports on properties. During the excursion leading mining engineers from abroad had the opportunity of visiting our mining camps and becoming acquainted with our mining men. Very cordial relations now exist between a number of mining societies in Britain, notably the Institution of Mining and Metallurgy, and the Canadian Mining Institute.

It seems to me that no more important work can be done by this Institute than that of making the mineral resources of the country better known in Great Britain and of encouraging the exchange of views between the technical men on the two sides of the Atlantic.

The Future of the Institute.

When we consider the work that the Institute has been able to accomplish in the past we have hope for its usefulness in the future. It can be said, I think, that the Institute's influence has been exerted on broad lines with the view of developing the industry in our own country, and of advancing the science and art of mining generally.

The members have been encouraged in their work by the recognition that has been extended to the Institute. One recognition that we have had is the acceptance of invitations to our annual meetings by distinguished fellow-workers in the United States. I can assure those gentlemen from the great Republic who have honoured us by attending this annual meeting that their presence is most highly appreciated, and that it affords us much encouragement.

As my presidency of the Institute ends with this annual meeting, I may be permitted to say that I hope the policy of the Institute will be the same in the future as it has been in the past. The field of work is vast. One-third of a continent awaits development.

For my successor in the presidency I can hope for nothing better than that his term of office will be as pleasant as mine has been.

According to A. A. Steele, writing in the bulletin of the American Institute of Mining Engineers, the Washington County, Missouri, barite is dug mostly from the residual clay. The common plan is to sink a pit, 3 feet in diameter, to a depth of from 6 to 9 feet, to the first lean clay below the upper barite layer. The miner then selects the richest side of the shaft, which he digs out beneath the upper clay, which is somewhat barren for from 3 to 6 feet below the surface. In this way he "drifts" as far as he thinks is safe, usually from 4 to 8 feet. Up to this stage all of the clay, flint and barite loosened is hoisted in a small bucket by a primitive hand windlass; but the miner usually sorts out the barite, which he recognizes from flint only by its greater weight, since it is completely covered with tough red clay. When the first drift is finished, all the waste from the new drifts is shovelled into it, and the miner digs other drifts wherever the ground looks good, so that the working soon resembles an inverted mushroom.

PRELIMINARY REPORT OF THE MINERAL PRODUCTION OF CANADA DURING THE CALENDAR YEAR, 1909.

Prepared by John McLeish, B.A.,
Chief of the Division of Mineral Resources and Statistics.

THE MINERAL PRODUCTION OF CANADA IN 1908.

(Revised.)

Product.	Quantity. (a)	Value. (b)
METALLIC		
Antimony ore (exports).....	Tons. 148	5,443
Copper (c).....	Lbs. 63,702,373	8,413,376
Gold.....	Ozs. 476,112	9,842,105
Pig iron from Canadian ore (d).....	Tons. 99,420	1,664,302
Lead (e).....	Lbs. 43,195,733	1,814,221
Nickel (f).....	" 19,143,111	8,231,538
Cobalt.....	" 113,423	113,423
Silver (g).....	Ozs. 22,106,233	11,686,239
Zinc ore.....	Tons. 452	3,215
Total.....		41,774,362
NON-METALLIC		
Arsenic.....	"	58,566
Asbestos.....	Tons. 66,548	2,555,361
Asbestos.....	" 24,225	17,974
Calcium carbide.....	" 6,864	417,150
Chromite.....	" 7,225	82,008
Coal.....	" 10,886,311	25,194,573
Corundum.....	" 1,089	100,398
Feldspar.....	" 7,877	21,099
Graphite.....	" 251	5,565
Graphite, artificial.....	" 214	"
Grindstones.....	" 3,843	48,128
Gypsum.....	" 340,964	575,701
Limestone for flux in iron furnaces.....	" 418,661	289,705
Magnesite.....	" 120	840
Mica.....	" 436	139,871
Mineral pigments—Barytes.....	" 4,312	19,021
Mineral pigments—Ochres.....	" 4,746	30,440
Mineral water.....	"	151,953
Natural gas (h).....	"	1,012,660
Peat.....	Tons. 60	180
Petroleum (i).....	Brls. 527,987	747,102
Phosphate.....	Tons. 1,696	14,794
Pyrites.....	" 47,336	224,824
Quartz.....	" 44,741	52,830
Salt.....	" 79,975	378,798
Talc.....	" 1,016	3,045
Tripolite.....	" 30	195
Total.....		32,142,784

- (a) Quantity of product sold or shipped.
- (b) The metals, copper, lead, nickel and silver are for statistical and comparative purposes valued at the final average value of the refined metal in New York. Pig iron is valued at the furnace and non-metallic products at the mine or point of shipment.
- (c) Copper contents of ore, matte, etc., at 13.208 cents per pound.
- (d) The total production of pig iron in Canada in 1908 was 630,835 short tons valued at \$8,111,194, of which it is estimated about 99,420 tons valued at \$1,664,302 should be attributed to Canadian ore and 531,415 tons valued at \$6,446,892 to the ore imported.
- (e) Lead contents of ore, matte, etc., at 4.200 cents per lb.
- (f) Nickel contents of matte shipped at 43 cents per lb.
- (g) Silver contents of ore, etc., at 52.864 cents per lb.
- (h) Gross return from sale of gas.
- (i) Deduced from the amount paid in bounties and valued at \$1.413 per barrel.

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THE MINERAL PRODUCTION OF CANADA IN 1908—Concluded.

(Revised.)

Product.	Quantity. (a)	Value. (b)
STRUCTURAL MATERIAL AND CLAY PRODUCTS.		
Cement, natural.....	Brls. 1,044	815
" Portland.....	" 2,665,289	3,709,139
Clay Products—		
Bricks, Common.....	No. 408,305,768	2,982,255
" Pressed.....	" 53,480,764	517,180
" Paving.....	" 3,719,961	59,456
" Moulded and ornamental.....	"	18,535
Fireclay and fireclay products.....		110,302
Fire-proofing and architectural terra-cotta.....		170,211
Pottery.....		200,541
Sewer pipe.....		514,362
Tiles, drain.....	No. 20,100,261	298,561
Lime.....	Bush. 3,601,468	712,947
Stones—		
Building stone.....		1,800,067
Flagstones.....	No. 61,200	6,293
Granite.....	Tons. 282,320	282,320
Slate.....	Squares. 2,950	13,496
Sand lime-brick.....	No. 17,288,260	152,856
Sand and gravel (exports).....	Tons. 298,954	161,387
Total, structural material, etc.....		11,710,556
" all other non-metallic.....		32,142,784
Total, non-metallic.....		43,853,440
" metallic.....		41,774,362
Estimated value of mineral products not reported.....		300,000
Total value, 1908.....		85,927,802

PRELIMINARY REPORT ON THE MINERAL PRODUCTION OF CANADA IN 1909.

(Subject to revision.)

Product.	Quantity. (a)	Value. (b)
METALLIC.		
Copper (c).....	Lbs. 54,061,106	7,018,213
Gold.....	"	9,790,000
Pig iron from Canadian ore (d).....	Tons. 149,444	2,222,215
Iron ore (exports).....	"	21,956
Lead (e).....	Lbs. 45,857,424	1,959,488
Nickel (f).....	" 26,282,991	9,481,877
Cobalt.....	"	66,319
Silver (g).....	Ozs. 27,878,590	14,358,310
Zinc.....	"	250,000
Total value, metallic.....		45,188,387
NON-METALLIC.		
Arsenic.....	Tons. 1,129	64,100
Asbestos.....	" 63,349	2,284,587
Asbestos and asbestos sand.....	" 23,951	17,188
Chromite (exports).....	" 7,994	20,868
Coal.....	" 10,411,955	24,431,351
Corundum.....	" 1,491	157,398
Feldspar.....	" 10,286	35,694
Graphite.....	" 730	37,624
Grindstones.....	" 3,965	80,944
Gypsum.....	" 468,551	667,816
Magnesite.....	" 330	2,508
Mica.....	"	154,106
Mineral pigments—		
Ochres and Barytes.....	" 4,119	29,213
Mineral water.....	"	177,304
Natural gas (h).....	"	1,205,943
Petroleum (i).....	Brls. 420,755	559,604
Phosphate (apatite).....	Tons. 597	4,618
Pyrites.....	" 57,038	196,312
Quartz.....	" 50,541	63,032
Salt.....	" 84,037	415,219
Talc.....	" 4,506	12,172
Total value, non-metallic.....		30,587,591

- (a) Quantity of product sold or shipped.
- (b) The metals, copper, lead, nickel and silver are for statistical and comparative purposes valued at the final average value of the refined metal in New York. Pig iron is valued at the furnace and non-metallic products at the mine or point of shipment.
- (c) Copper contents of smelter products and ores exported, at 12.982 cents per pound.
- (d) The total production of pig iron in Canada in 1909 was 757,162 tons valued at \$9,581,864, of which it is estimated 607,718 tons valued at \$7,359,649 should be credited to imported ores.
- (e) Refined lead and lead contained in base bullion exported at 4.273 cents per pound.
- (f) Nickel contents of matte produced, at 36 cents per pound (the lowest quotation for nickel in New York less 10 per cent). The value of the nickel contained in matte was, as returned by the operators, \$2,810,748 or an average per pound of 10.7 cents.
- (g) Estimated recoverable silver at 51.503 cents per ounce.
- (h) Gross returns for sale of gas.
- (i) Quantity on which bounty was paid and valued at \$1.33 per barrel.

* Additional returns increase this item to \$90,950.

PRELIMINARY REPORT ON THE MINERAL PRODUCTION OF CANADA IN 1909—Concluded.

(Subject to revision.)

Product.	Quantity. (a)	Value. (b)
STRUCTURAL MATERIAL AND CLAY PRODUCTS.		
Cement, Portland.....	Brls. 4,010,180	5,266,008
Clay products—		
Brick.....		4,200,000
Sewer pipe, fireclay, drain tile, etc.....		1,300,000
Lime.....	Bush. 5,163,874	1,049,473
Sand and gravel (exports).....	Tons. 481,584	256,166
Stones—		
Granite.....		340,047
Limestone for flux in blast furnaces.....		328,091
Marble, limestone and sandstone.....		1,600,000
Total structural material and clay products.....		14,339,785
All other non-metallic.....		30,587,591
Total value, non-metallic.....		44,927,376
Total value, metallic.....		45,188,387
Estimated value of mineral products not reported.....		300,000
Total value, 1909.....		90,415,763

Annual Mineral Production in Canada since 1886.

1886.....	\$10,221,255	1898.....	\$38,412,431
1887.....	10,321,331	1899.....	49,234,005
1888.....	12,618,894	1900.....	64,430,953
1889.....	14,013,113	1901.....	65,304,611
1890.....	16,763,353	1902.....	63,211,634
1891.....	18,976,616	1903.....	61,740,513
1892.....	16,623,415	1904.....	60,073,897
1893.....	20,035,082	1905.....	69,525,170
1894.....	19,931,158	1906.....	79,057,308
1895.....	20,505,917	1907.....	86,865,202
1896.....	22,474,256	1908.....	85,927,802
1897.....	28,485,023		

The preliminary table of mineral production in Canada given herewith, shows the total value of the production in 1909 to have been in excess of \$90,000,000. Compared with the total value for 1908, which was \$85,927,802, the production of 1909 shows an increase of a little over 5 per cent. The actual increase in the mining industry in 1909, was however, somewhat greater than is indicated by this comparison. Owing to a slight increase in the method of compiling statistics of the quantities of metals produced the values for 1909 are less than they would otherwise have been.

Of the total production in 1909, \$45,188,387—or 49.9 per cent. of the total—is credited to the metals, and \$44,927,376—or 49.7 per cent.—to non-metallic products; a small allowance being made for mineral products not reported. Amongst the individual products coal is still the most important, its value constituting 27 per cent. of the total; silver occupies second place with 15.9 per cent.; gold and nickel come next with 10.8 and 10.5 per cent. respectively; copper contributes 7.8 per cent.; cement 5.8 per cent.; clay products 6.1 per cent.; asbestos 2.5 per cent.

The metals nearly all showed an increased output compared with 1908. The average prices remained fairly steady throughout the year, differing but slightly from those of the year before: copper, nickel and silver, being lower in price, while lead, spelter and tin were higher.

Average monthly prices of metals, 1906-09.

	1906.	1907.	1908.	1909.
	Cts.	Cts.	Cts.	Cts.
Copper.....	19-278	20-004	13-208	12-982
Lead.....	5-857	5-325	4-200	4-273
Nickel.....	41-84	45-000	43-000	40-000
Silver.....	66-791	65-327	62-864	51-503
Spelter.....	6-198	5-982	4-720	5-503
Tin.....	39-519	38-156	29-465	29-725

In the non-metallic class there is a larger number of products showing increases than those showing decreases. The coal production was seriously reduced by the labour troubles in Nova Scotia. The asbestos shipments were slightly less and petroleum production shows a considerable falling off. In nearly all of the other items, however, there were important increases: particularly in corundum, gypsum, natural gas, salt, and in the structural materials, cement, clay products, lime and stone.

Smelter Production.—General statistics of smelter production were collected by this Branch for the first time in 1908 and the aggregate results of these operations during the past two years are shown in the accompanying table. It should be explained also that the figures include the results of the operations at the smelter at Northport, Wash.,—treating chiefly Canadian ores.

Smelter and Refinery Production in Canada, 1908 and 1909.

	1908		1909.	
	Refined Products.	Metals contained in matte, blister, base bullion, and speiss exported.	Refined Products.	Metals contained in matte, blister, base bullion, and speiss exported.
Gold.....	Ozs. 15,436	203,300	18,241	200,129
Silver.....	" 11,168,689	3,271,899	14,242,545	4,845,920
Lead.....	Lbs. 36,549,274	1,116,792	41,883,614	3,973,810
Copper.....	" 203,379	51,965,289	51,405	53,328,583
Copper sulphate.....	"			
Nickel.....	" 19,506,251			27,041,857
Cobalt.....	" 692,170			1,721,083
White arsenic.....	" 1,431,052		2,288,087	
Arsenic.....	"	436,787		1,074,516

The total ore charged to the furnaces in 1909 was 2,377,780 tons, of which slightly over 40,000 tons were imported. The smelter products exported for refining included, in 1908, copper matte, 7,649 tons; blister copper, 15,418 tons; Bessemer nickel-copper matte, 21,210 tons, and silver-cobalt-nickel speiss 1,326 tons. In 1909 these smelter products were base bullion 2,010 tons; copper matte 11,597 tons; blister copper 14,239 tons; Bessemer nickel-copper matte 25,845 tons; silver-cobalt-nickel speiss 2,660 tons.

Gold.—A preliminary estimate shows a slight decrease in gold production in 1909. The total production in 1908 was \$9,842,105, to which the Yukon district contributed \$3,600,000; British Columbia, \$5,929,880; Nova Scotia, \$244,799. In 1909 the Yukon shows a further increase, the value of the gold being estimated at \$3,960,000. The total gold exports on which royalty was paid, were, according to the records of the Interior Department, during the calendar year, 239,766.35 ounces.

Complete statistics are not yet available as to the gold production in British Columbia, but the returns received appear to indicate a reduced output. The production in Nova Scotia will not differ much from that of the previous year.

Silver.—The rapid growth of Canada's silver production which has taken place during the past few years, continued during 1909. Increased production is reported from both British Columbia and Ontario. In the first mentioned province the silver is recovered with the lead from the galena ores of that province, of which there was an increased production in 1909. The metal also constitutes an important value in the gold-copper-silver ores smelted.

In British Columbia silver is recovered as fine metal at Trail and is contained in the matte and blister exported. In Ontario, where the production is practically all from the Cobalt district, a portion of the ores (8,384 tons in 1909) is treated in Canadian metallurgical works producing silver bullion, white arsenic, and a speiss containing silver, cobalt, nickel, etc.; the balance of the ore being exported for treatment abroad. The total production of recoverable silver in Canada is estimated at 27,878,590 ounces, valued at \$14,358,310, the average price of silver for the year being 51.503 cents.

The price of refined silver varied between a maximum of 53⁷/₈ cents per ounce on May 5, and a minimum of 50¹/₄ on March 3.

The production from the Cobalt district again shows a considerable increase over the previous year, but not so large an advance as was made in 1908 over 1907. According to returns received from 31 shipping mines, there were shipped during 1909 about 28,042 tons of ore and 2,967 tons of concentrates, a total tonnage of

31,000. The silver contents of ore shipped are returned as 22,581,788 ounces, or an average of 805.284 ounces per ton, and for the concentrates shipped 3,639,475 ounces, or an average of 1,226.651 ounces per ton. Bullion shipped from the mines contained 143,440 fine ounces of silver.

The total silver contents of ore, concentrates and bullion shipped from the mines was 26,364,703 ounces. The mine owners receive payment for only 93 to 98 per cent. of the silver contents; and in valuing the production a deduction of 5 per cent. is made from silver contained in ore and concentrates to cover losses in smelting and refining. On this basis the silver recovery is estimated at 25,128,590 ounces, and valued at \$12,941,978. Payments for cobalt contents were reported as \$90,750, and the total value of the year's output was a little over \$13,000,000 without deduction for freight and treatment charges.

The number of men employed in shipping mines was reported as 2,768, and wages paid \$2,396,742. Incomplete returns of concentration showed 127,271 tons of ore treated, producing 3,213 tons of concentrates.

In 1908 the shipments were 25,682 tons of ore and concentrates containing 19,398,545 ounces of silver, or an average of 755 ounces per ton.

The exports of silver in 1909, for the whole of Canada, as reported by the Customs Department, were 31,126,504 ounces, valued at \$15,719,909.

Copper.—Although refined copper is not produced in Canada, the copper ores are mostly reduced to matte or blister copper carrying additional values in the precious and other metals. Some copper pyrites ore is mined in Quebec province, from which the copper is recovered after the ore has been used as a source of sulphur, and a small quantity of copper ore is exported from British Columbia coast mines to United States smelters for treatment.

Statistics are not available at the present time to show the total quantity of copper contained in ores shipped from the mines. The total production of copper, however, contained in blister and matte produced and estimated as recoverable from ores exported,* was in 1909 approximately 54,061,106 pounds. In 1908 the production of copper estimated on the same basis was 52,928,386 pounds, an increased production of about 2 per cent. being, therefore, shown in 1909.

Of the production in 1909, Ontario is credited with 15,746,699 pounds, and British Columbia with 37,314,407 pounds. The latter figure may be subject to more or less variation as complete returns had not been received of all ore exported.

The New York price of electrolytic copper varied between the limits of 12 cents and 14½ cents per pound, the average monthly price being 12.982, as compared with an average monthly price of 13.208 cents in 1908.

The total exports of copper contained in ore matte and blister, according to Customs Department returns, were 54,447,750 pounds, valued at \$5,832,246.

Lead.—The total production in 1909 of pig and manufactured lead and lead contained in base bullion exported was 45,857,424 pounds, valued at the average price of refined lead in New York at \$1,959,488.

It is possible that there was also some lead ore or lead concentrates exported, of which no record has yet been received. Customs Department statistics indicate such an export of upwards of 2,000,000 pounds.

The production of refined lead, and lead contained in base bullion exported in 1908, was 37,666,066.

Customs Department statistics in this year also in-

dicate an export of lead ore or concentrates, and the total production in 1908, of lead available for consumption was estimated at 40,891,448 pounds, an increased production in 1909 is, therefore, shown of from 5,000,000 to 7,000,000 pounds. This production in both years was all from the province of British Columbia.

The total amount of bounty paid during the twelve months ending December 31, 1909, on account of lead production, was \$346,527.98.

The exports of lead in ore, concentration, base bullion, etc., during the year, were 3,116 tons, and of pig lead 5,650 tons, or a total of 8,766 tons. From 14,000 tons to 15,000 tons of domestic production were, therefore, available for home consumption.

The price of lead in New York during 1909 averaged 4.273 cents per pound, varying between 3.95 cents in March and 4.70 cents in December. In 1908 the average was 4.200 cents per pound. The London price per long ton varied between £ 12 10s. and £ 13 16s., averaging £13.049.

Nickel.—The nickel industry was particularly active during 1909, the largest production on record being shown. Although important quantities of nickel are contained in the cobalt silver ores of Coleman township, the Sudbury district continues to be the chief source of nickel production. The same companies are carrying on active operations: the Mond Nickel Co., at Victoria Mines, and the Canadian Copper Co., at Copper Cliff. The ore is first roasted and then smelted to a Bessemer matte containing from 77 to 82 per cent. of the combined metals, copper and nickel; the matte being shipped to the United States and Great Britain for refining.

The total production of matte in 1909 was 25,845 tons, valued at the furnaces at \$3,913,012. The metallic contents were copper 15,746,699 pounds, nickel 26,282,991 pounds.

The aggregate results of the operations on the Sudbury district nickel-copper ores during the past four years are as follows:—

	1906.	1907.	1908.	1909.
	Tons of 2,000 lbs.	Tons of 2,000 lbs.	Tons of 2,000 lbs.	Tons of 2,000 lbs.
Ore mined.....	343,814	351,916	409,551	451,892
Ore smelted.....	340,059	359,076	360,180	462,336
Bessemer matte produced.....	20,364	23,041	21,197	25,845
" shipped.....	20,310	22,025	21,210	7,873
Copper contents of matte shipped.....	5,255	6,996	7,503	13,141
Nickel.....	10,745	10,595	9,572	
Spot value of matte shipped.....	\$4,628,011	\$3,289,382	\$2,930,989	\$3,913,012
Wages paid.....	1,117,420	1,278,694	1,286,265	1,234,903
Men employed.....	1,417	1,660	1,690	1,735

Exports of nickel contained in ore, matte, etc., as compiled from Customs reports were for the twelve months ending December 31, as follows:—

	1906.	1907.	1908.	1909.
	Pounds.	Pounds.	Pounds.	Pounds.
To Great Britain.....	2,716,892	2,518,338	2,554,486	3,843,763
To United States.....	17,936,953	16,857,997	16,865,407	21,772,635
	20,653,845	19,376,335	19,419,893	25,616,398

Nickel contained in silver cobalt ores:—The mine owners received no payment for nickel contents and complete statistics are not available as to the total quantity of nickel contained in these ores, of which about 31,009 tons were shipped during 1909. Of the total shipments, 8,384 tons were treated in Canadian metallurgical works at Copper Cliff, Deloro and Thorold, producing silver bullion and white arsenic, the remaining speiss or residues amounted to 2,660 tons and contained silver, cobalt, nickel and arsenic, the nickel con-

tents totalling 758,966 pounds and the cobalt contents 1,721,083 pounds.

The price of refined nickel in New York was quoted at from 40 to 50 cents per pound, the quotations in December being "large lots; contract business 40 to 45 cents per pound. Retail spot from 50 cents for 2,000 pound lots up to 55 cents for 500 pound lots. The price for electrolytic is 5 cents higher."

Nickel is quoted on the London market at prices equivalent to, or slightly in excess of those in New York.

Iron Ore.—The total shipments of iron ore from mines in Canada in 1909 were 268,043 short tons, valued at \$659,120, as compared with 238,082 tons, valued at \$568,189 in 1908. The shipments in 1909 may be classified as magnetites, 73,420 tons; hematite, 190,473 tons; bog ore, 3,330 tons; titaniferous magnetite (sand) for experimental purposes, 820 tons. In 1908 the ores shipped included magnetite 49,946 tons; hematite 173,164 tons; carbonate ore, 4,869 tons; bog ore, 10,103 tons.

Exports of ore from Canada during 1909, as recorded by the Customs Department, were 21,956 tons, valued at \$61,965.

Although not a portion of the Dominion of Canada, it may be of interest to state the iron ore shipments from Newfoundland during 1909. The two Canadian companies operating the Wabana mines shipped during the year 991,115 gross tons, or 1,110,049 short tons, of which 697,068 tons were shipped to Sydney and 412,981 tons to the United States and Europe.

Pig Iron.—An increase of 20 per cent. is shown in the production of pig iron in Canada in 1909 as compared with 1908, despite the fact that the Londonderry furnace was out of commission during the whole year. The total production during 1909 was 757,162 short tons, valued at \$9,581,864 as compared with 630,835 tons, valued at \$8,111,194, in 1908. These figures do not include the output from electric furnace plants, making ferro products, which are situated at Welland and Sault Ste. Marie, Ontario, and Buckingham, Que.

Of the total output of pig iron during 1909, 17,003 tons, valued at \$371,368, or \$21.84 per ton, were made with charcoal as fuel, and 740,159 tons, valued at \$9,210,496, or \$12.44 per ton, with coke. The amount of charcoal iron made in 1908 was 6,709 tons, and iron made with coke 624,126 tons. The classification of the production in 1909, according to the purpose for which it was intended, was as follows:—Bessemer, 222,931 tons; basic, 400,921 tons; foundry, including miscellaneous, 116,307 tons.

The amount of Canadian ore used during 1909 was 231,994 tons, imported ore, 1,234,990 tons; mill cinder, etc., 25,508 tons. The amount of coke used during the year was 919,271 tons, comprising 412,016 tons from Canadian coal and 507,255 tons imported coke or coke made from imported coal. The consumption of charcoal was 1,782,258 bushels. Limestone flux was used to the extent of 526,076 tons. In connection with blast furnace operations there were employed 1,486 men and \$879,426 were paid in wages.

The total daily capacity of 16 completed furnaces was, according to returns received, 2,735 tons. The number of furnaces in blast on December 31, 1909, was 11.

The production of pig iron by provinces in 1908 and 1909 was as follows:—

Province.	1908.			1909		
	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.
		\$	\$ cts.		\$	\$ cts.
Nova Scotia.....	352,642	3,554,540	10.08	345,380	3,453,800	10.00
Quebec.....	6,709	171,383	25.55	4,770	125,623	26.34
Ontario.....	271,484	4,385,271	16.16	407,012	6,002,441	14.75
Total.....	630,835	8,111,194	12.86	757,162	9,581,864	12.65

Steel.—Returns were received from eight steel plants at which 2,073 men were employed and \$1,284,940 paid in wages during 1909. The total production of ingots and castings was 754,719 short tons, with an estimated value of \$14,359,710, as compared with 588,763 tons, valued at \$10,916,602, in 1908.

Details of production during the two years are as follows:—

	1908.		1909.	
	Tons.	\$	Tons.	\$
Ingots—Open hearth (basic).....	443,442	7,684,277	535,988	9,372,615
Bessemer (acid).....	135,557	2,535,287	208,715	3,829,012
Castings—Open hearth.....	9,051	617,126	14,013	1,043,370
Other steels.....	713	79,912	1,003	114,713
Total.....	588,763	10,916,602	754,719	14,359,710

Iron and Steel Bounties.—Following is a statement of the bounties paid on iron and steel during the calendar years 1908 and 1909, as kindly furnished by the Trade and Commerce Department. As no bounty is paid on iron made from mill cinder or ingredients other than ore, the figures do not show the total output of the furnaces but only those quantities on which bounty was paid.

	1908.		1909	
	Quantity on which Bounty was paid.	Bounty.	Quantity on which Bounty was paid.	Bounty
	Tons.	\$ cts.	Tons.	\$ cts.
Pig iron made from Canadian ore.....	101,647	213,458 34	126,297 55	214,705 80
Pig iron made from imported ore.....	517,427	569,196 93	607,718 09	425,402 64
Total, pig iron.....	619,074	782,628 27	734,015 64	640,108 44
Steel ingots.....	556,289	917,876 63	729,189 37	766,470 41
Steel wire rods.....	49,630	297,778 08	81,405 42	488,432 70
Total bounty paid on iron and steel.....		1,998,283 58		1,895,011 55

White Arsenic.—The total output of white arsenic as reported by three firms making this product was 2,258,187 pounds, valued at \$64,100. In addition the residues or speiss from these works exported contained 1,074,511 pounds of arsenic. This is all obtained from that portion of the Cobalt ores treated in Canada. No record is available of the total arsenical contents of these ores. The exports of arsenic are reported as 3,111,249 pounds, valued at \$119,673. The production of white arsenic in 1908 was 1,431,000 pounds, valued at \$41,060, and of arsenical ore and concentrates 986 tons, valued at \$17,506.

Asbestos.—A feature of special interest in connection with the asbestos industry during 1909 has been the consolidation of interests amongst a number of the larger producers, resulting in the formation of the Amalgamated Asbestos Corporation, Limited.

While the actual shipments of asbestos were somewhat less in 1909 than in 1908 the stocks on hand at the end of the year are reported considerably larger than on December 31, 1908.

The total shipments of crude and mill stock in 1909 were 63,349 tons, valued at \$2,284,587, as compared with shipments of 66,548 tons, valued at \$2,555,361, in

1908, the decrease being 3,199 tons, or 4.8 per cent. The stocks on hand December 31, 1909, were about 20,920 tons, valued approximately at \$1,179,679, as compared with stocks on hand December 31, 1908, of 8,669 tons, valued at \$596,095.

The total shipments, showing details of crude and mill stock were in 1908 and 1909, as follows:—

	1908.			1909		
	Short Tons.	Value.	Per ton.	Short Tons.	Value.	Per ton.
		\$	\$ cts.		\$	\$ cts.
Crude, No. 1.	8574	257,752	300 59	912-3	246,655	270 37
2.	2,488	411,480	165 38	2,162	328,855	152 11
Mill Stock, No. 1.	5,2824	425,448	80 54	14,776	785,731	53 18
2.	45,545	1,345,750	29 33	32,417	800,728	24 70
3.	12,374	114,931	9 29	13,082	122,618	9 37
Total asbestos.	66,548	2,555,361	38 40	63,349-3	2,284,857	36 06
Total asbestic.	24,225	17,974	0 74	23,951	17,188	0 72
Grand total.....	90,773	2,573,335		87,300-3	2,301,775	

Exports of asbestos according to Customs returns were:—

	Tons.	Value.
		\$
Twelve months ending December, 1907.....	56,753	1,669,299
1908.....	61,210	1,842,763
1909.....	56,971	1,729,857

Corundum.—The quantity of corundum ore treated during the year was 35,894 tons, from which was produced 1,579 tons of grain corundum. The total shipments were 1,491 tons, valued at \$157,398, or an average of a little over 5 cents per pound.

Coal and Coke.—The total coal production in Canada, in 1909, comprising sales and shipments, colliery consumption and coal used in making coke, is estimated at 10,411,955 short tons, valued at \$24,431,351. This is a smaller production than in either of the two preceding years, though the total may be slightly increased when more complete returns are received. The western provinces each show an increased production of coal in 1909, but not sufficient to counteract the reduced output in Nova Scotia, which resulted from the coal miners' strike. The aggregate decrease for the whole of Canada was about 474,356 tons, or 4.36 per cent., while Nova Scotia alone showed a falling off of 968,789 short tons, or 14.56 per cent.; the aggregate increase in the western provinces being 505,404 tons, or 12.11 per cent.

Of the total production Nova Scotia contributed 54.5 per cent., Saskatchewan and Alberta 20.5 per cent. and British Columbia 24.3 per cent.

The production by provinces was approximately as follows, the figures for 1907 and 1908 being also given:—

Province.	1907.		1908.		1909.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
Nova Scotia.....	6,354,133	12,764,999	6,652,539	13,364,476	5,683,750	11,418,240
British Columbia.....	2,364,898	7,390,306	2,333,708	7,292,838	2,638,004	7,931,263
Alberta.....	1,591,579	3,836,238	1,685,661	4,127,311	1,978,843	4,730,270
Saskatchewan.....	151,232	252,457	159,556	283,790	163,329	253,073
New Brunswick.....	34,584	77,814	60,090	135,000	49,029	98,496
Yukon Territory.....	15,000	60,000	3,847	21,158		
Totals.....	10,511,426	24,381,842	10,886,311	25,194,573	10,411,955	24,431,351

The total production of oven coke in 1909 was about 875,080 short tons, valued at \$3,557,147, being a slight increase over the production in 1908. At the ovens of the Dominion Iron and Steel Co. at Sydney a quantity

of imported coal was used, the supply of domestic coal being insufficient on account of the strike. The Atikokan Iron Company at Port Arthur uses imported coal exclusively. At all other ovens Canadian coal is used. At the end of the year there were in Nova Scotia 670 ovens in operation, 64 idle and 120 building. In Alberta 226 were in operation and 40 idle, and in British Columbia 767 in operation and 753 idle. The ovens of the Dominion Iron and Steel Co. are of the Otto Hoffman by-product type and there were recovered as by-products 4,016,824 gallons of tar and 3,351 short tons of sulphate of ammonia.

Feldspar.—Total shipments are reported as 10,286 tons, valued at \$35,694. This includes a quantity of high grade "dental spar" shipped from the Villeneuve mine, Quebec, and valued at from \$16 to \$20 per ton at Buckingham.

Petroleum and Natural Gas.—The production of crude petroleum was as usual nearly all derived from the Ontario peninsula. Direct returns from the producers have not been obtained, but the production upon which bounty was paid, ascertained by the Trade and Commerce Department, was 14,726,433 gallons, of which 3,328 gallons were produced in New Brunswick. This is equivalent to 420,755 barrels, and at an average price of \$1.33 per barrel was valued at \$559,604. The production in 1908 was 527,987 barrels, valued at \$747,102, an average per barrel of \$1.34, showing a decrease of about 20 per cent. in the quantity produced. The total bounty paid in 1909 was \$220,896.50 as compared with \$227,193.21 in 1908 and \$414,157.89 in 1907.

While the production of petroleum has been falling off the receipts from natural gas sold have been increasing. The producing gas wells are located in the counties of Welland, Haldimand, Norfolk, Kent, Essex, and Bruce, in Ontario, and at Medicine Hat and vicinity in Alberta. The total receipts from gas sold in 1909 were about \$1,205,943, the figures representing, with one or two exceptions, the total values paid by the consumers.

The quantity of gas sold or used during the year was over 6,000,000 M. feet. Of the total value about 95 per cent. is to be credited to Ontario. The total receipts in 1908 were \$1,012,660.

Phosphate.—The price of this mineral has been increasing. There is a growing demand for it and a revival of phosphate mining appears to be imminent.

Salt.—Complete returns of salt production received show total sales of 84,037 tons, valued at \$415,219 for the salt alone. Packages used were valued at \$175,612; stock on hand at the end of the year was reported as 2,671 tons; 185 men were employed, and \$96,116 paid in wages.

Lime.—Fairly complete statistics of lime production have been received for 1909. The total sales and shipments are reported as 5,163,874 bushels, valued at \$1,049,473, or by provinces as follows: Nova Scotia and New Brunswick, 747,696 bushels, valued at \$179,380; Quebec, 1,155,167 bushels, valued at \$277,253; Ontario, 2,434,686 bushels, valued at \$404,782; Western Provinces, 826,325 bushels, valued at \$188,058.

Portland Cement.—Complete statistics have been received from all but two cement manufacturers in 1909. These, however, will not increase the totals by more than 2 or 3 per cent. Subject to this correction the total quantity of cement made during the year was 4,089,191 barrels as compared with 3,495,961 barrels in 1908, an increase of 593,230 barrels, or 17 per cent.

The total quantity of Canadian Portland Cement

sold during the year was 4,010,180 barrels, as compared with 2,665,289 barrels in 1908, an increase of 1,344,891 barrels, or 50 per cent.

The total consumption of Portland cement in 1909 including Canadian and imported cement, was 4,152,374 barrels, as compared with 3,134,338 barrels in 1908, an increase of 1,018,036 barrels, or 32 per cent.

Detailed statistics of production during the past three years have been as follows:—

	1907.	1908.	1909
	Barrels.	Barrels	Barrels.
Portland cement sold.....	2,436,093	2,665,289	4,010,180
" manufactured.....	2,491,513	3,495,961	4,089,191
Stock on hand January 1.....	299,015	383,349	1,093,493
December 31.....	354,435	1,214,011	1,172,504
Value of cement sold.....	\$3,777,328	\$3,709,063	\$5,266,008
Wages paid.....	956,080	1,274,638	1,182,090
Men employed.....	1,786	3,029	2,411

The average price per barrel at the works in 1909 was \$1.31, as compared with \$1.39 in 1908.

The imports of Portland cement into Canada during the twelve months ending December 31, 1909, were 497,678 cwt., valued at \$166,669. This is equivalent to 142,194 barrels of 350 pounds, at an average price per barrel of \$1.17. The imports in 1908 were 469,049 barrels, valued at \$531,045, or an average price per barrel of \$1.13. The duty is 12½ cents per hundred pounds.

As there is very little cement exported from Canada, the consumption is practically represented by the Canadian sales together with the imports.

Following is an estimate of the Canadian consumption of Portland cement for the past five years:—

Calendar Years.	Canadian		Imported.		Total	
	Barrels.	Per cent.	Barrels.	Per cent.	Barrels.	Per cent.
1905.....	1,346,548	59	918,701	41	2,265,249	.....
1906.....	2,119,764	76	665,845	24	2,785,609	.....
1907.....	2,436,093	78	672,630	22	3,108,723	.....
1908.....	2,665,289	85	469,049	15	3,134,338	.....
1909.....	4,010,180	97	142,194	3	4,152,374	.....

CONSERVATION WORK OF THE GEOLOGICAL SURVEY FOR THE YEAR ENDING MARCH 4, 1910.

During the last twelve months the conservation work of the United States Geological Survey has included investigations relating to coal, oil, and phosphate deposits, and to water-power sites on the public domain.

Public Coal Lands.

Coal land withdrawals were made covering 7,675,000 acres not previously withdrawn, and the form of withdrawal affecting an additional 9,000,000 acres was changed to cover all forms of entry instead of coal entry alone. The new regulations of April 10, 1909, for the classification and valuation of coal lands, ma-

terially increased the sale price of these lands and fixed more definitely the standards of coal classification. Thus, for example, under the old regulations, in eight widely separated townships the total area classed as coal land was 66,320 acres, and the sale price was fixed at \$2,088,600, whereas, under the new regulations, the area in the same eight townships classed as coal land is 126,663 acres, and the sale price is \$15,777,668—an increase in area of over 100 per cent., and in price over 600 per cent.

Under the old regulations the maximum price per acre for coal land was fixed at \$75; under the new regulations the maximum price per acre thus far fixed for any particular area is \$465. The maximum valuation of a single township under the old regulations was \$949,600; under the new regulations it is \$9,206,894. Special efforts have been made to release from existing withdrawals all noncoal areas, and of the total area classified during the year, amounting to 17,200,000 acres, much the larger part, or about 14,000,000 acres, has been classed as noncoal land. The sale price of the 3,436,000 acres classed as coal land has been fixed at \$191,490,000. The same land, if sold at the minimum price fixed by law, would have yielded \$62,477,000.

Public Phosphate Lands in Wyoming, Idaho, and Utah.

Phosphate land withdrawals in force March 4, 1909, covered all vacant public lands in an area comprising 4,493,551 acres in Wyoming, Utah, and Idaho. During the year areas covering 2,389,141 acres were restored to entry, for the field work showed that they contained no phosphate. Additional withdrawals including 399,693 acres have been made, and the form of withdrawal has been changed so as to cover entered as well as vacant lands. All unpatented lands in an area of 2,504,103 acres are now affected by phosphate withdrawals.

Western Public Oil Lands.

The California oil-land withdrawals made prior to March, 1909, aggregating 2,313,482 acres, prevented the acquisition as oil or as mineral lands as well as for agricultural land laws. All lands covered by these withdrawals could be legally exploited for oil or other minerals. During the year these lands were excepted from acquisition as oil or as mineral lands as well as for agricultural use. New withdrawals were made in the States of California, Colorado, Oregon, Utah, and Wyoming of a total area of 2,130,510 acres. In California there were restored to entry 956,916 acres that field examination had shown to be nonoil land. The area now covered by oil withdrawals is 3,487,076 acres.

Public Power-Site Withdrawals.

On March 4, 1909, power-site withdrawals were in force covering vacant public lands on twenty-nine rivers in nine states. These withdrawals have since been reviewed by the Geological Survey, the form of withdrawal has been changed to include all entered as well as all vacant lands, and the lands that were found to be not valuable for the purpose for which the withdrawal was made have been restored to entry. New withdrawals have been made along ninety-seven rivers covering land not involved in previous withdrawals and increasing the total number of states affected to eleven. These power-site withdrawals now cover about 1,300,000 acres of vacant public land and 200,000 acres of entered land.

PRELIMINARY STATEMENT OF THE MINERAL PRODUCTION OF THE PROVINCE OF QUEBEC DURING THE YEAR 1909.

By Theo. C. Denis, Superintendent of Mines.

Preliminary statement of the mineral production in the province of Quebec during the calendar year 1909.

(Subject to revision.)

The total value of the mineral production of the Province of Quebec for the calendar year ending December 31st, 1909, according to the returns received by the Bureau of Mines of the Province, amounted to \$5,424,808. This is a slight decrease as compared with the previous year, the figures for which are given in an adjoining column.

Asbestos.—The total shipments of asbestos and asbestic during the year totalled 88,315 tons, 2,000 lbs., valued at \$2,315,816, as follows:—

Crude asbestos, tons	3,298	\$ 581,618
Mill stock, tons	60,556	1,713,876
	63,854	2,295,494
Asbestic, tons	24,461	20,322
	88,315	\$2,315,816

This is a slight decrease as compared with the shipments of the previous year, but this is not to be taken as a decrease of activity of the industry. In fact, one of the main causes of this lower figure has been that preparations were being made for a higher production in 1910. Several mills either curtailed their production, or even stopped operations, during more or less extensive alterations and improvements for greater activity. There are at the present time four new large mills being erected.

(Subject to revision)

	Quantity.	Value 1909	Value 1908
		\$	\$
1 Bog Iron Ore.....	Tons 2,900	3,200	30,757
2 Ochres	" 3,940	28,093	19,940
3 Chromite	" 5,000	55,000	83,740
4 Copper ore	" 35,000	130,000	159,588
5 Asbestos	" 88,315	2,295,494	2,551,596
6 Asbestic	" 24,461	20,322	
7 Mica	lbs. 62,516	26,834	95,311
8 Phosphate	Tons 45	445	1,610
9 Graphite	lbs. 193,320	8,699	165
10 Mineral Waters	galls. 32,537	17,246	
11 Slate		24,000	20,056
12 Cement	barrels 1,011,194	1,314,551	1,127,335
13 Magnesite	Tons 330	2,508	520
14 Marble		130,000	
15 Flagstone		8,500	3,600
16 Granite		149,064	250,000
17 Lime		98,989	96,000
18 Limestone	M. 114,942	114,942	223,580
19 Bricks	89,091	512,521	525,000
20 Tiles and Pottery of Canadian clay, (partly estimated)		100,000	270,000
* Estimated value of products not returned	84,409	84,400	
		5,424,808	5,458,998

* Made up of 5 % of value of products Nos. 16-17-18 and 10 % of value of No. 19.

It sounds already like ancient history to mention that the great feature of the asbestos industry during the year 1909 has been the consolidation of various companies into two large companies, viz.: the Amalgamated Asbestos Corporation, Ltd., and the Black Lake Consolidated Asbestos Co., Limited. The Amalgamated Asbestos Corporation was formed with a capital of \$25,000,000, to take over and operate the mines and mills of the following companies: King's Asbestos Mines, Ltd., of Thetford; Beaver Asbestos Company, of Thetford; British Canadian Asbestos Co., of Black Lake; Standard Asbestos Company, Ltd., of Black Lake; Dominion Asbestos Company, of Black Lake.

The Black Lake Consolidated Asbestos Company, Limited, was formed with a capital of \$5,000,000 to take over the properties of the Union Asbestos Mine, Black Lake; the Black Lake Chrome and Asbestos Company, of Black Lake; the Dominion Chrome Company, of Black Lake; the Imperial Asbestos Company, of Black Lake. This amalgamation did not produce any asbestos during the year 1909, but it is at present erecting one of the largest mills of the district, which is expected to start operations in May.

The following companies made returns of production for the year 1909:—

Amalgamated Asbestos Corporation, Ltd., Thetford and Black Lake.

Asbestos and Asbestic Company, Ltd., Danville.

Bell Asbestos Mines, Thetford.

Broughton Asbestos Fibre Co., East Broughton.

Eastern Townships Asbestos Co., Thetford.

Jacobs Asbestos Mining Co., Thetford.

Johnson's Asbestos Company, Thetford and Black Lake.

Ling Asbestos Company, East Broughton.

Robertson Asbestos Mining Co., Robertsville.

Mica.—The mica industry was very inactive during 1909, and the market for this product was unsatisfactory. At the prices offered by buyers the producers could not make ends meet, and as a result the figures of production are considerably below last year's.

Cement.—The production of cement in the Province of Quebec in 1909 shows a substantial increase as compared with 1908. This industry was also characterized by a consolidation of interests, national in scope. The Canada Cement Company took over the three largest plants in the Province of Quebec, as well as others in Ontario and in the western provinces. It is said that very substantial savings in freight and in management can be effected by the amalgamation, and the company claims that the consumer will derive benefit from such savings.

Other Building Materials.—These comprise building stones, lime, marble, bricks, tile and pottery manufactured from Canadian clay. It is, of course, very difficult to gather complete figures of production of these materials. In past years it has been the custom of the Quebec Bureau of Mines to adopt the figures given by the last Dominion census, but this year we made an attempt to get returns direct from the producers. The figures for 1909 are not, therefore, comparable with the production of the previous year. The results of our endeavour have been very gratifying, as will be seen by glancing over the table for 1909, which is compiled from direct returns. I must say, however, that our work in this respect has been considerably lessened by the use which we freely made of the lists of producers of stone, bricks, lime and pottery given in the Report on the Mining and Metallurgical industries issued by the Mines Branch of Ottawa, and of the lists compiled by Mr. McLeish, which are printed in leaflets.

Mining for wood is the rather unusual industry found at Mongtze, Upper Tonkin, by the French Consul. At some time a pine forest was swallowed up, and the trees—lying in a slanting direction and some of them a yard in diameter—are covered by eight or ten yards of sandy soil. The perfect preservation of the tops indicates that the trees were buried at a comparatively recent period. The timber supplied seems to be imperishable, and is especially prized by the Chinese as coffin-making material.

NOTES ON PROSPECTING IN ONTARIO.

Written for the Canadian Mining Journal by W. M. Goodwin.

The Director of the Geological Survey has pointed out in one of his reports that what is probably the greatest remaining region in the world unexplored by the prospector lies in Canada. A considerable part of this area, a part comparatively easy of access, lies in Ontario, and consists of pre-Cambrian rocks, a geological horizon considered to be specially favourable for mineral deposits of economic importance.

The National Transcontinental Railway runs from end to end of New Ontario through a stretch of country that is unprospected, except in a few special localities, and along the banks of the main rivers. All the territory north of this line is marked on maps as unprospected; but even south of it the country down as far as the C. P. R. has been very little explored in the manner that has brought to light deposits such as Cobalt, Gowganda, and Porcupine. Except for the first accidental discovery at Cobalt, these discoveries have been the result of patient, careful, and systematic prospecting, a style of prospecting that is even yet not followed by any great number of men outside of certain camps.

Up to the present far too great a proportion of prospectors have done their "work" from their canoes, along the banks of the rivers, on the shores of the lakes, and along the old portage trails of the Indians and Hudson Bay Company's trappers. The probability is that every traveller interested in rocks and minerals, since the time of the earliest explorer, has examined these self-same spots. Thus the prospector, though he may indeed be following in the footsteps of the pioneer, is not likely to "find a mine" unless he sidesteps a little and gets on new ground.

To do really effective prospecting, one must get off the principal routes of travel and well-used trails, and dive right into the bush. Wise prospectors adopt this method of finding a place to work, leaving the nice rocky shores of our beautiful lakes to the appreciative attention of the man who is taking a summer outing.

To strike out into the green bush without a map—for there are no maps of our unsurveyed lands that show more than the main topographical features—is not nearly so hazardous an undertaking as one not accustomed to it might imagine. By using a fair amount of common sense and providing himself with a proper and adequate outfit, an ordinary man, even though his experience in the bush may not have been very extensive, can travel quite comfortably and explore localities that have never been looked at before. Common sense every man has to provide for himself; but a few hints about methods of working and outfit may prove useful to those prospectors or prospective prospectors who have not found something better for themselves.

To make a trip a long distance away from a railroad means a lot of food to use on the road to and from. Consequently, as the capacity of one's canoe and one's back is limited, the length of time spent in actual prospecting diminishes as the distance from the railroad increases. This necessarily makes smaller the chances of finding a mineral deposit. Besides, it is only occasionally that deposits of ore at any considerable distance from a railroad or easily navigable water route are of immediate value; and it is ordinarily only large corporations that can afford to hold such distant deposits until a railroad is built to them.

Hence it behooves the prospector to take advantage of the numerous openings on "good ground" not too far from railroads already built, in process of construction, or about to be built. A man who has not looked into the matter will be surprised to find how much promising ground near the railroads has not been touched by the prospector. The townships of Whitney and Tisdale were surveyed before the T. & N. O. R. had reached Cobalt, and were even then considered to be not so very far from a source of supplies. Yet it is only now, several years after the railroad has been in operation only a comparatively few miles from Porcupine Lake, that careful searching has revealed the presence of gold deposits there. The National Transcontinental Railway and the C. N. R. from Sudbury to Port Arthur will make accessible for prospecting areas that will keep great numbers of men busy for many years.

Considering the matter in a broad way, it may be said that the same conditions of topography, climate, and accessories such as flies, exist throughout that part of Northern Ontario accessible to the prospector. Hence the outfit found best in one district will probably be best in the others. The canoe is usually the most important item; but if a man is working near a railroad he may not have a great deal of use for one. Canvas-covered canoes, as manufactured by the Chestnut Canoe Co., are much used now, and have many points of superiority over basswood or cedar. The tough, well-filled canvas resists abrasion to a remarkable extent, and the wide cedar ribs make the bottom the next thing to puncture-proof. The good wearing qualities have been demonstrated beyond a doubt, and offset the higher price. By leaving a canvas canoe out in the sun, water absorbed by the cedar sheathing and ribs is evaporated, and its weight can be kept about the same as when it left the factory, a thing that is impossible with the ordinary wooden canoe. Patching is very easy with shoemaker's tacks and pitch or spruce gum. A 16-foot canoe is the one most commonly used, and, if of a good stout model, is in ordinary waters about as safe as a canoe can be. The writer has used for a whole season a 12-foot canvas, and although it proved rather too short for rapids, the ease with which it was packed through the bush without cutting portages—a thing that is next to impossible with a 16-foot canoe—bears great weight in his opinion of its usefulness to the prospector. On one trip this canoe carried two men and a 300-lb. load without being overloaded. Of course, no canoe is safe in inexperienced hands, and the smaller the canoe the greater is the risk, if one is not thoroughly familiar with the use of canoes of every sort.

The prospector generally uses a small canvas tent, in which he rolls up his blankets, dunnage, cooking utensils and grub when on the march. An outfit that is more conducive to comfort than this one, though more expensive, is a silk tent and oiled canvas tarpaulin. The tarpaulin is just as serviceable and handy a receptacle for dunnage as the canvas tent, and with the silk tent weighs no more than the canvas outfit. The advantage of its use is that it will keep the blankets dry even if the ground or brush bed over which it be spread be quite wet. This will give a man a dry and comfortable bed even when he has made camp in a rainstorm.

A necessary addition to the tent of the prospector in Ontario who wants to spend the fly season (the latter

part of June, July and the first part of August) at his work, is a fly net. This is best made of cheese cloth or some other porous material with mesh smaller than mosquito netting, which latter lets the black flies through. If made so full at the bottom that it can be lifted up over the head to enter, it will be found most satisfactory. A sod-cloth round the bottom edge of the tent, on which rocks, poles, or the blankets can be spread on the inside, is another adjunct of the completely provided tent. Some prefer a complete little tent of cheese-cloth, to be hung up inside the other tent. With a safe and sure place of retreat of this sort and a liberal supply of a good fly oil, a man with a very ordinary amount of restraint over his tongue can pass the whole season in the bush without rendering himself liable to eternal damnation. A very effective as well as pleasant fly oil is made from 2 parts of olive oil with 1 part of oil of citronella. This mixture is the best the writer has found among dozens tried.

The prime necessity for the prospector, as for everybody else, is food. A very liberal allowance is 100 lbs. per man per month; usually two-thirds of this will do. The old rule is one-third pork, one-third flour and the rest beans, rice, dried apples, oatmeal, tea, sugar, salt, and baking powder. With the addition of desiccated potatoes, concentrated soup tablets, butter, condensed cream, dried eggs, and cocoa, an almost luxurious bill of fare can be prepared. Such supplies as flour and fruit are best put up in small cotton bags with tie strings attached. It is a good practice to carry this grub in a stout water-proofed canvas bag.

For cooking, one uses a frying-pan, a nest of four or five small tin pails with covers, and perhaps a reflector or Dutch oven for baking beans and bread. A spoon per man is necessary, and a fork each is handy, but a table-knife is superfluous, as each man carries a good jack-knife. A tin plate and bowl each completes this part of the outfit. An extra frying-pan is easily made by putting a split stick an inch or so in diameter of handy length for a handle on the edge of a plate. The culinary art is learned only by experience, and a man soon becomes proud of his flapjacks, bacon, and baked beans.

If a trip is not to be of more than a few weeks' duration, a change of underclothing, three or four pairs of socks (one usually burns a few), a pair of short oiled moccasins for "house slippers," and a sweater or short jacket should be taken extra. The ordinary clothing is woollen underwear, thick woollen socks, high boots or shoe-packs, stout canvas or cloth trousers, a flannel shirt, and slouch hat. All-important to the man who goes off the beaten trails is his pocket compass. The writer keeps his compass tied to his trousers, and never parts with the former unless the latter go too. The sun gives you your direction when not directly overhead; but the compass is a sure guide, fair weather or foul, except in rare cases when influenced by a large magnetic ore body. A water-proof matchesafe and a pocket lens are very useful.

A handy outfit for repairs is found in the old-fashioned "house-wife." This is a little cloth or leather roll with pockets containing needles, pins, thread, yarn and buttons. If you add a roll bandage, adhesive plaster, a few assorted pills, a brad-awl, a small file, tacks of various sizes, wax-end and cobbler's thread, you have the essentials of a tailor and a shoemaker, and with axe and knife, a carpenter's outfit, so far as needs in the bush are concerned, all in a little bundle weighing between one and two pounds.

With an outfit as indicated above, two men can start off with four or five weeks' grub and have the whole outfit made up into canoe and three bundles of 75 to 85 lbs. each. This means two trips on the portages until most of the grub is eaten, unless the man with the canoe can take a little load besides, and the other man stiffens up his neck so that he can carry a good heavy pack on his tump-line.

For portaging, the tump-line is far better than anything else, and it pays the novice to endure for a few days the sufferings from a squashed neck rather than to be forever tied down to shoulder-straps. The tump-line is very easily changed from one pack to another, and it is easy to get the pack in position on your back. If you stumble you don't need to wear yourself out trying to get up again without disengaging those much-qualified straps; and if you fall into a creek you are not drowned; for the tump-line drops off automatically as you fall.

If our two men are wise, they won't waste much time in the immediate vicinity of Porcupine this spring. They may go there for a few days to study the occurrence of the gold-bearing quartz; then they will strike off into the bush, outside of the winter-staked area, and travel from one small lake to another, either using the little streams to guide them or following an overland course by compass. It is necessary for them to pitch camp on a stream or lake sufficiently large or well marked to be sure of finding it again if they intend to wander far from it. They will take a look at whatever exposures of rock they see. If it is intrusive granite, they may keep an eye open for tinstone. If the post-Huronian diabase intrudes, they may hope for silver. If the old Keewatin rocks appear, gold quartz, magnetite and hosts of other minerals may reasonably be expected. By means of associations of this sort the man who has studied the occurrence of ore bodies can save a lot of time and energy; he won't search crevices in a big patch of even-grained granite for a cobalt-silver vein, nor will he climb along the face of a big diabase cliff prepared to find a mica deposit.

Our men will probably meet few others, if they are in a good place; for, as noticed before, it is sad but true that most so-called prospectors prefer to ornament the banks of the rivers and lakes used as highways, or to add to the populations of the numberless little "rush" camps, rather than do patient, persevering, independent work, the kind that will give the best results in the long run.

The recent conclusion that all boiler corrosion is a result of galvanic action is being questioned, and another cause has been brought to the notice of the Society of Chemical Industry by K. N. Huntley. In this case sulphur appears to have produced the pitting of a boiler. Increase in the caustic soda used had no effect, and the water was slightly alkaline, but blisters formed—especially near the water-line—proved to contain ferrous sulphate with a slight excess of sulphuric acid. The investigation has suggested an explanation of the curious acid corrosion in alkaline water. The sulphur contained in the water seems to be first oxidized to sulphuric acid, and this attacks the metal about it, depositing oxides that form a membrane permeable to oxygen, but not to alkali. Thus the acid continues its work of corrosion, while protected against neutralization by a shield of its own construction.

OUR EUROPEAN LETTER.

Coal-cutting Machines in Scotch Collieries—A New Electrically-driven Cutter—Internal Combustion Engines for Haulage Work in Mines—Tardy Use in England—Experts' papers at Institution of Mining and Metallurgy—Vacuum Process in Cornish Tin Mines—Belgian Limitation of Coal Miners' Hours.

Exclusive Correspondence of the Canadian Mining Journal.

London, February 17th, 1910.

Mining engineers are continually urging coal-cutting machines upon our colliery owners. In a number of Scottish collieries working the long-wall system of mining such machines are now working on an inclination of 27 degrees, cutting uphill and downhill for 390 feet per shift. These machines on the Continent are working on even steeper seams. I would like to see British colliery owners go in for a larger number of coal-cutting machines, as therein is believed to lie the remedy of the Eight Hours Act. The output of coal is increased by fewer men at a lower cost.

A new machine on the market is the Simplex Bar coal-cutting machine, electrically driven and built at Wolverhampton. In this the cutter-bar is coupled direct to the motor shaft without gearing, and the machine can cut both ways without alteration in the position of a main frame. By tilting the machine a cut can be made practically at floor level, while by raising it on elevated brackets, which are made in various sizes, the type which has its motor suspended below the frame can work at heights up to 2 feet 6 inches, while that in which the motor is above the frame can be used up to a height of 5 feet or even 6 feet in certain cases.

The absence of gear wheels gives increased mechanical efficiency with reduction of current consumed and a saving in maintenance charges. The machine is advanced to a new face in a few minutes by means of a simple arrangement, which consists of four special axle pins formed on the elevating slides at right angles to the ordinary rail-wheel pins. The elevating slides are raised one by one by means of the screws, and the rail-wheels are then changed onto the special axle-pins. When all four wheels have thus been changed, the complete machine is moved along cross rails until it is in position for cutting the newly exposed wall of coal. The cutting-bar is of best forged wrought-iron, and the cutters are pick-shaped, with shanks tapered to correspond with the holes, so as to fit tightly when driven in. The electric equipment consists of motor, control switch, resistance and inter-connecting cables.

The use of internal combustion engines for haulage work in mines is very slow in maturing here, and it has been left to various mining companies in Germany and Austria to give the lead. There has been just placed on the market here the New Century internal combustion locomotive, and its producers have endeavoured to give it all the features that are desirable for mining service. I refer to such things as compactness, small wheel base, and the property of being apparently safe when used in gaseous mines. These locomotives can be secured in various sizes ranging from 6 to 30 h.p., with one, two, or three speeds, according to requirements.

The makers direct attention to the fact that the centre of gravity of the motor is lower than is possible with a vertical engine, a point of considerable importance

when the gauge is narrow and has curves of 15 ft. radius. The engine works on the ordinary Otto cycle, and its fuel may be petrol, benzine, or benzol, the latter being a coal tar product and even cheaper than tar, and hence the reason for its use in a number of mines. Against the use of benzol, however, are the disadvantages that the combustion is not so complete as that obtained with benzine or petrol, and it is also liable to attack the cylinder walls and valve seats.

Low-tension magneto ignition is fitted, and a feature worthy of note about this is that the circuit is not earthed, as is customary on motor cars. The return path to the magneto is provided by means of a separate insulated lead. This arrangement has been adopted in order to comply with the new Austrian Mining Regulations, since the locomotive is being used extensively in that country. The cables are metal woven on the outside, thus reducing the chances of fraying to a minimum. The engine has no carburetter; the petrol, after having passed through a filter, has free access to the inlet valve, a jet of petrol and another of water and the requisite supply of air being introduced into the cylinder. The incoming air mixes with the petrol vapour inside the cylinder, after passing through a double-gauze chamber, which, it is claimed, ensures a perfect mixture and also prevents any flame passing into the inlet pipe.

The double-gauze chamber is fixed to the inlet valve, and moves with it. The injection of water naturally assists in cooling the cylinder. The cooling water in the jacket circulates on the thermo-syphon system. Water is also ejected from the lower face of the exhaust valve, in order to keep the latter cool and also to condense the exhaust gases. This arrangement, it is claimed, renders it impossible for any flame to pass into the exhaust box. As an additional precaution wire gauze is placed in the latter.

With regard to the method of transmitting the power from the engine to the driving wheels, on each of the parallel shafts at the extreme right there is a chain pinion which can be set free or caused to revolve with the shafts by means of a clutch. A Renolds driving chain passes over these in opposite directions, and also over the sprockets on the axles. Forward and backward movements of the locomotive are obtained by clutching in either the top or bottom pinion. This form of transmission, it is claimed, is both efficient and reliable. The transmission shafts are on the same frame as the main engine. Sanding boxes are provided, and they can be operated from the cab in the usual manner.

On account of the special arrangements above referred to, a 12 horsepower locomotive of this type has a total length of only 12 ft. 6 in., a height of 4 ft. 9 in., and a width of about 3 ft., which enables it to be used in the narrowest and lowest mine roads. As regards fuel consumption I am informed that this has been found to be about two-thirds of a pint per horsepower hour at full load. It has been found from practical experience that a 12 horsepower locomotive working at its full output only uses five gallons of fuel on a ten-hour shift. It is claimed that this form of haulage, when everything is taken into account, such as maintenance, interest and capital, and so forth, has proved to be from 30 to 50 per cent. cheaper than horse haulage.

Interesting papers were read at the last meeting of the Institution of Mining and Metallurgy here. A. T. French reviewed in his paper on "Copper Blast Fur-

nance Slags and the Determination of Their Melting Points" the work on record which has been done with double and ternary silicates recently, and augmented these by the results of his investigations with slags made in the actual practice of copper smelting. The determinations of the melting points were accomplished by comparison with a series of Seger cones of standard melting temperatures, and from tables quoted it appeared that the slag of highest melting point contained least silica and highest alumina of the series, whilst another with least alumina was the most fusible. The "oxygen-ration" was shown to be a valuable factor in considering the slag to be aimed at, and debating the part played by alumina, the author considered there was a fairly wide range through which the slag composition might vary, with very little change occurring in the melting point.

Arthur R. Andrew contributed in a paper on "The Detection of Minute Traces of Gold in Country Rock" the results of his research for a reliable method of determining the presence of gold in the shales and greenstones of the auriferous district of Merionethshire, North Wales. The usual method includes the use of large charges and the measurement of the gold bed got by a powerful microscope, which can detect as little as .0007 grain of gold per ton. The chief point of difficulty was in obtaining fluxes of sufficient purity, and he in particular found that the litharge on reduction when fused with soda and borax often yielded as much gold as the stone was supposed to contain. The result of his working after repeated failures to purify the lead led him to doubt the present possibility of getting any salt of lead so free from gold and silver as to warrant its use in the assay of country rock.

An interesting process in operation upon the famous Dolcoath tin mine of Cornwall is the Elmore vacuum process. In certain parts of the mine the ordinary tin ore of Cornwall is found, but impregnated with varying proportions of sulphides, principally copper. This ore is crushed in the usual crushing stamp battery and then passed to one unit of Elmore plant. Almost the whole of the sulphides are floated out and recovered as a high-grade copper concentrate, saleable as such.

This copper concentrate contains a remarkably small proportion of tin, probably not more than two or three pounds per ton of concentrates on the average. Subsequently the whole of the tin oxide is left in the tailings from the Elmore plant. These tailings are afterwards treated by Frue vanners, etc., in the ordinary way for the recovery of the tin oxide. Many mines in other parts of the world contain ore similar to the Dolcoath, so that the process will probably soon extend beyond England.

The recent adoption by the Belgian Senate of the law limiting the hours of work in coal mines to nine a day, counting from the time when the first men of a gang go down to the time when the first men of the same gang come up to the surface again, has considerably altered the technical conditions of the work in the pits, and an extended use of machinery will be necessary to compensate for the loss of effective work by the men.

At present more than 50 per cent. of the companies have no underground power, except for the emptying of the trucks. But the new law changes the aspect of affairs, and for several companies the adoption of mechanical appliances will be a matter of life or death. The solution of the problem will be difficult. Existing types of machines are mostly designed for use in rich seams on a large scale, but in Belgium the coal mining industry is divided up between a large number of little

independent concerns, whose capital is small and whose resources do not permit of large expenditure.

Moreover, the nature and composition of the seams are not favourable to the employment of machinery. Their formation is peculiar in that they are split and wrinkled everywhere—here almost flat, there sloping steeply, as if they had been subjected to a series of powerful pushes. These folds and wrinkles are most numerous in the southern portions of the coal-bearing area, but, while they are still well marked in the centre, they become less noticeable towards the north, in the low parts of the country. These conditions present obstacles to the utilization of coal-cutting machines which in that part of the Belgian coal-field known as the Couchant de Mons will be impracticable on account of the twisted and crooked character of the deposits.

In a report on the technical consequences of the loss of one or two working hours imposed by the law, a leading mining engineer, Mr. Denoel, states that it will be impossible to avoid a falling off in the production in regions where the miners work exclusively on poor, thin, or difficult seams, and that the only remedy for the blow which the new legislation strikes at the mining industry is amalgamation in order to secure more efficient working. The only hope for some of the smaller concerns is absorption by the larger, as it will be impossible for them to stand alone.

LEGAL COLUMN.

On Selling Mining Stock at a Discount.

Ontario is the only Province of the Dominion in which mining companies are in a class by themselves, free from one vulgar bond that fetters ordinary commercial companies. Ontario mining companies are the only companies of Canadian origin that enjoy the right of issuing shares at a discount. This boon is created by Sections 139 and 140 of the Ontario Companies Act:

"S. 139. A mining company heretofore incorporated or hereinafter incorporated under this Act and made by the Letters Patent subject to the provisions of this part of the Act, may issue its shares at a discount or at any other rate in the manner herein provided.

"S. 140. No shareholder of such company holding shares issued as herein provided shall be personally liable for nonpayment of any calls made upon his shares beyond the amount agreed to be paid therefor."

This provision first appeared in a Mines Act passed in 1894. I have not discovered where the Legislature of 1894 got the idea.

Mining companies of Ontario also have the right in the event of a purchaser making default in calls on stock of selling such stock at public auctions to the highest bidder for cash (S. 144).

One may be permitted to wonder just how advisable this legislation is.

It is laid down very clearly in England that companies there cannot issue their stock at a discount. The leading case on the subject in the House of Lords is, by coincidence, regarding a mining company, the Ooregum Gold Mining Company of India, Limited, vs. Roper, 1892 Appeal Cases, p. 125. There Lord Halsbury said: "I think that the question which your Lordships have to solve is one which may be answered by reference to an inquiry: What is the nature of an agreement to take a share in a limited company? And that question may be answered by saying that it is an agreement to

pay the company the amount for which the share has been created. That agreement is one which the company itself has no authority to alter or qualify, and I am therefore of opinion that the company were prohibited by law from doing that which is compendiously described as issuing shares at a discount."

And this is the general law regarding all companies, except Ontario Mining Companies. Applying this principle, it has been held that the issue of stock at a bonus is illegal, or the issue at a discount of debentures which contain the provision allowing them to be exchanged for stock. (The one exception to this principle is the provision under which payment for shares may be made otherwise than by cash—for services or for the assets or good-will of an existing business. To this, reference will be made again.) The principle of the Ontario law, except for mining companies, is shown in the memorandum of agreement required to be signed by the original shareholders of the company, "And we do hereby severally and not one for the other subscribe for and agree to take the respective amounts of the capital stock of the said company set opposite our respective names as hereunder and hereafter written, and to become shareholders in such company to the said amounts."

A fundamental principle of the law is violated by the privilege of issuing shares at a discount. The capital stock of an industrial company indicates, or is supposed to indicate, the value of the assets of the company. In a mining company it has no significance whatever. The very word "Limited" itself was hit upon to indicate that the liability of shareholders was limited by the amount of the stock subscribed. For our mining companies we should change this phrase to "Obliterated."

A share at a discount is a legalized illusion. Selling shares at a discount is the old coin trick where you put three coins on the table, make a few mystic passes, turn over the coins and announce that there are now four coins. The other fellow says there are only three. "Oh, indeed," you say. "Well, I'll bet you the odd coin that I'm wrong." So he bets, and then there are four coins, for of course you're wrong.

Seriously, what possible advantage can there be in this privilege, except the gulling of the public? Presumably, the argument is, that mining stocks are a gamble anyhow, and couldn't be sold at par. That was the argument in the Ooregum case above cited. The company's 20 shilling shares were selling in the market at 2s 6d, and the new stock was issued at 5s fully paid, with a 10 per cent. preference. It was argued that no one would pay 20s for a stock selling at two and six. But the judges pointed out that the same result could be obtained by selling the shares at 20s. with a 40 per cent. preference. There is not a single problem apparently solved by the discount method that cannot be really solved without it. For it is simply a question of arithmetic. As said before, a share at a discount is an illusion. A share is not so much money. It is a thousandth—or whatever fraction you choose—share in the company's assets. If the set assets are \$500, the share is worth 50 cents; if they are \$100,000, the share is worth \$100.

A share at a discount is an illusion. An illusion is something that deceives. We are all deceived. The stock of the Oleaginous Mining Company (capital \$1,000,000) is offered this week at 50 cents, positively going to 60 cents next week, and 75 cents the 1st of April, and we buy, thinking we are getting a dollar's worth at half price. If the capital were \$500,000 and

were offered at par, next week 20 per cent. premium, next month 50 per cent. premium, we wouldn't think of buying unless it were a bank or a golf club—the mirrors are down and you see through the maze.

Here, I am confident, is a source of more evil than is prevented by prospectuses and licenses to do business and annual summaries and the other complicated paraphernalia of the Companies Act, themselves a maze. Here is a chance to simplify and improve at the same time.

THE LEONARD PRIZE.

The committee selected to award the Leonard Prize of \$100 for the best collection of Ontario minerals has decided that the collection sent in by Mr. Frederick Ransom, B.Sc., of Deloro, Ont., is worthy of the prize.

Three collections were submitted, the winning one, collected largely in Eastern Ontario, the second collected from the region north of North Bay, and the third from the Lake Superior region.

Owing to the limitations in connection with the competition, viz., that the specimens must have been personally collected in Ontario during the year 1909 by the competitor, the collections were necessarily restricted in the number of specimens.

The members of the committee congratulate Mr. Ransom on the superiority of his collection.

Signed T. L. WALKER,
University of Toronto.

Signed WM. NICOL,
School of Mining, Kingston

RICHARDS.

Ore dressing is a big field. When one begins to consider the details of its varied ramifications it appears a vast region. The beaten paths are few and by most mining engineers they are trodden in haste.

We have had with us a pioneer who not only has explored and mapped new routes, but who has shown us very much that we had overlooked along the beaten paths. Richards has conducted more experiments in ore dressing than any other man, he has written on the subject more, and he has devised and constructed a greater variety of ore dressing devices than any other man. He has devoted his life to the study and the teaching of dressing. He is the Master in research.

He came to discuss with us "Some Directions in Which Improvements in Concentration May be Looked For." For two hours he gave us in wonderful succinctness an outline of the beaten paths and of some of his new paths—two hours of preface, thought-clearing, idea-crystallizing, inspiring discord—and then we went to lunch without question or discussion. Too bad! But such is the tyranny of local conditions. And we were left with only such answers as we could find in the preface.

The meeting was an excellent one, good in many ways, possibly an epoch-marking occasion, but it would have been well worth while if we had had nothing but Richards, and it is to our disgrace that we did not reap to the full the benefits to be bestowed. L'embarras de richesse—there were too many good things—we could not take care of them—we must remodel our methods for the future.

His books are good, are enduring monuments, and truly show the work and the research of the man, but Richards himself is a different proposition. He is

greater than his books. He inspires. His personality compels and it is delightful. His earnestness, his modesty, his enthusiasm, his thoroughness, his originality, his outspoken delight in his results which he describes so impersonally as "gift from the gods"—these explain somewhat the control over students and assistants that has compelled to long, tedious, wearisome gathering of data. It is hard to tell what his chief monument will be. By manner, by method, by activities, he is still young, really only on the start of his pioneer work. It may be, it promises to be, that his name will be to the ordinary millman as Wilfley or Frue (and such is their position that we almost spell them without capitals). Up to the present he is more known to the student, and his guiding work has been in his methods of research. His milling devices are the product of cold, calculating analysis. They have not yet clinched themselves into the every-day mill design, as have Wilfley's, but they are getting there.

What were the answers to the question in the title of his paper?

One doubtless was—"In the perfection and the adoption of lindrical settling classifiers." What are the other answers? It is our misfortune that time did not permit of these answers. May we hope to have them embodied in complete printed form at an early date.

Is the question an important one? Is there room for much improvement? The room for improvement appears in the losses incurred in ore dressing operations. Richards did not tell us to what they amounted. In most cases—in almost all cases on this continent outside of Cobalt—the losses in the mill are greater than the dividends of the company. In no part of the operations of the company is there greater room for improvement. The room for improvement is represented by more than a hundred million of dollars annually poured into creeks and rivers and lakes in the form of ore that has been mined, and transported and crushed and treated and thrown away. The room for improvement is great, the need of the man is great. That Richards inspires others to work with him may be not the least of his characteristics.

H. E. T. HAULTAIN.

A PROCESS FOR SMELTING NICKEL-COBALT-SILVER-ARSENIC ORES.

For smelting ores carrying from 300 to 10,000 ounces of silver per ton, 10 to 30 per cent. nickel and cobalt, and 3 to 40 per cent. arsenic, Mr. C. C. Cito, Irvington, N.Y., has patented a process. A percentage of copper, not less in total amount than the silver contained in the ore, and equal to two-thirds of the nickel and cobalt, and, further, not less than the amount of arsenic, is added to the ore. On smelting, a copper alloy is obtained, containing all the silver, nickel, and cobalt, and nearly all the arsenic. The slag contains very small amounts of silver, nickel, and cobalt. The alloy is next separated by electrolysis, and the slag is used as flux in the furnace.

Calcium cyanamide, the new artificial "lime salt-petre," has serious drawbacks in its causticity and the emission of ammonia and hydrocyanic vapours. An Italian method of making it inoffensive consists in making it slightly acid with dilute sulphuric acid, then drying and pulverizing.

AN ARGUMENTATIVE OUTFIT.

By John Ravenor Bullen.

I will tell you a tale of an outfit
That drilled fer old Giggle McGree;
A gang as consisted of "Jail John,"
"Knock-'em-down Jimmy" and me;
Three of the all-firedest experts
That ever took swigs of cold tea!
Three of the ding-dangedest drillers
As never could ever agree.

We was plunking her down fer old Giggle,
And things was a-going quite slick.
The last as we said to old Giggle
Was, "Week more'll finish the trick."
Last words as we heard from old Giggle
Was, "Boys, but that's drilling her quick."
And then he druv home, did old Giggle,
To his farm in the township of Ziek.

Now "Jail John" was up in the scaffold
Whistling a "Glory Be" song;
And "Knock-'em-down Jimmy" was stoking,
Coaxing the engine along;
While I was a-blowing the bellows,
Heating a weld that went wrong,
When there started the all-firedest mix-up
That ever I joined in among.

'Twas "Jail John," he comed down the ladder
And started in telling a tale
Of the time that he helped drill a duster
In the yard of Coop-'em-'up Jail;
When they struck—a big flowing bonanza?—
Well, no, 'twas a showing of shale;
And about as much oil in the sand-pump
As 'ud pay for a tenpenny nail.

Well, I never knowed how the thing started,
Or who 'twas as said 'twas a lie,
But inside a couple of minutes
John biffed me a bang in the eye.
Then the things in that little old shanty
Growed wings, and just started to fly.
Oh, you bet we was elegant fighters
When we once fixed our minds fer to try.

'Twas a week that the fight must have lasted,
And that I will swear by old Nick;
For we still was a-fighting ferocious
When there comed from the township of Ziek
The man we was plunking her down fer,
Old "Boys-but-that's-drilling-her-quick,"
And he looked at the ruins around him,
And he said: "Gosh, that's finished the trick!"

And that is the tale of the outfit
That drilled fer old Giggle McGree;
The gay gang consisting of "Jail John,"
"Knock-'em-down Jimmy" and me;
Three of the all-firedest experts
That ever took swigs of cold tea!
Three of the dingdangedest drillers
As never could ever agree.

PERSONAL AND GENERAL.

Mr. G. L. Fraser, formerly of Phoenix, who opened up and operated the International Coal & Coke Co.'s property at Coleman, Alberta, has been engaged as manager by the Columbia Coal & Coke Co., which recently acquired the coal deposits stretching from Granite Creek to Coleman's Gulch. He is accompanied by Mr. W. G. Norrie, who served with him at the International and was later engaged as engineer by the McGilvray Creek Coal & Coke Co. The work of developing the property into a productive mine will be pushed forward with all possible speed, inasmuch as Granite Creek will soon have railway connection with Princeton and the Boundary country.

Mr. S. S. Rosenstamm has been elected a director of the Kerr Lake Mining Co., and also of the Wettlaufer Co., both Lewisohn enterprises.

The Cobalt branch of the Canadian Mining Institute has elected officers for 1910 as follows: Mr. T. R. Jones, Chairman; Mr. A. A. Cole, Secretary; Messrs. J. E. Leckie, C. O'Connell, H. Park, C. Campbell and John Macdonald, Committee.

Mr. W. J. Loring, of Messrs. Bewick, Moreing & Co., has just left London for a visit to the properties of the Burma Mines, after which he will proceed to Australia for a tour of the numerous mines in that continent in which his firm is interested.

BOOK REVIEWS.

A Text-Book of Ore Dressing. By Robert R. Richards, S.B., LL.D., assisted by Earl S. Bardwell and Edwin G. Goodwin. In one volume. Illustrated profusely with diagrams and half-tones. 702 pages. Price \$5.00. McGraw-Hill Book Company, New York, 1909.

One of the most serious criticisms that can be made of Professor Richard's four volumes on ore dressing is that they are bulky—too bulky for use outside the library. Of course, it is scarcely possible to have them otherwise. But we welcome the compact volume before us. It embraces all the essentials of the four older books, and has the advantage of conforming to the size and character of the ordinary text-book.

A new and profitable chapter on coal dressing has been added. This is distinctly a gain.

The actual work of condensing was done by Messrs. Bardwell and Goodwin.

Professor Richards' Canadian admirers will find this compendium just what they need.

The Chemistry of Cyanide Solutions Resulting from the Treatment of Ores. By J. E. Clennell, B.Sc. (Lond.). Second Edition, corrected and enlarged. Price \$2.50. McGraw-Hill Book Company, New York, 1910.

Modern laboratory tests for determining the constituents of cyanide solutions are fully described and discussed in this treatise. The second edition, just off the press, is brought up to date and former omissions and inaccuracies are rectified.

In view of the growing importance of cyanidation, Mr. Clennell's book calls for renewed notice. A synopsis of its contents will best serve to shew the reader the ground covered.

In the order named, the following subjects are taken up:—

1. Active Cyanogen Compounds.
2. Alkaline Constituents.
3. Reducing Agents.
4. Auxiliary Agents.
5. Inactive Bodies.
6. Noble Metals.
7. Base Metals.
8. Suspended matter.
9. An Examination of Various Methods for the estimation of Ferrocyanide.

Lengthy appendices are subjoined. These treat of alternative methods of estimating free cyanide, protective alkali, etc.

As a laboratory guide for the competent chemist the "Chemistry of Cyanide Solutions" is indispensable. The writer's object has been to meet all probable combinations of circumstances. A cursory perusal of the book gives one the impression that the cyanide chemist is not likely to run up against any working complications for which he cannot find here a key.

EXCHANGES.

Metallurgical and Chemical Engineering, March, 1910.—Our contemporary gives Connellsville coke operators a sound scolding. After accusing them of entire ignorance of the developments in retort coking and the use of the by-products, it goes on to tell of their disastrous attempt to keep prices up.

Last September the price of furnace coke was pushed up to \$3 per net ton at the ovens. Now prices have tumbled and much stock is accumulating. "The pushing of the price to \$3 merely on the supposition that blast furnaces would have to pay the price or not make pig iron, was a command to the industry to seek other fuel. When another fuel has been found, the customer does not return to Connellsville. . . . They [the producers] have failed utterly to realize that the day of by-product coking is fully arrived. . . . They are killing their own business and writing an enormous depreciation upon their coal reserves."

The Engineering and Mining Journal, January 29, 1910.—To this number Mr. E. M. Weston contributes the second of a series of articles entitled "Analysis of Mine and Mill Practice on the Rand." Mr. Weston refers to the Holman pneumatic stamp as the only serious competitor of the gravity stamp on the Rand to-day. One Holman stamp is crushing 80 tons per day. Its total cost of installation is said to be half that of ten gravity stamps.

ELECTROLYTIC AMALGAMATION.

A recent patent covers the electrolytic amalgamation of finely divided gold. The apparatus is essentially a sluice box whose bottom is a continuous amalgamating plate, with pockets occurring at intervals. Amalgamating plates extending across the sluice box are anodes. Swinging carbon anodes are also supplied. The bottom plate is the cathode. The finely divided ore is fed in with a suitable quantity of water along with small amounts of solutions of potassium cyanide and mercuric chloride. It is claimed that savings of 95 per cent. can be made, and that the process is decidedly cheaper than cyanide treatment.

The ruling New York price for iron pyrites is from 12¼ to 12½ cents per unit, according to point of delivery.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay.—The output from the mines of the Dominion Coal Company during February was approximately 200,000 tons, which is practically the same as obtained last February. Towards the end of the month the output improved in an encouraging manner, and for several days together exceeded 10,000 tons.

At the time of writing, a very commendable effort is being made by the clergymen of the mining districts to bring about a cessation of the useless struggle which has been going on here since last July, and an appeal is being made to the men on strike to return to work. Whether the well-meant efforts of these reverend gentlemen will bring about this much to be desired event is not at the moment possible to forecast, but there is a decided optimism in evidence in this regard. The strike has been a huge mistake. It was called with a wanton disregard of the probabilities, and it has never been effective. In an open letter written by president Plummer to Mr. T. L. Lewis, the president of the United Mine Workers, Mr. Plummer states that the conditions of work at the mines of the coal company "are in any case, acceptable to the large number of men who are now at work, and they are the outcome of years of experience and negotiation." With reference to a return of the strikers to their work, Mr. Plummer writes: "I can only suggest that when a line of action has been adopted which is found to be mistaken, the really honourable way is to begin afresh." Many of the strikers are taking Mr. Plummer's advice, and the number of men at work is steadily augmenting, as the increased outputs show.

Just at the moment when the counsels of peace and prudence are beginning to be listened to around the mining towns, it is a little unfortunate that Prof. McGill—if he is correctly reported—should have seen fit to strike a jarring note. The Montreal Star has the following: "They told us to go to the Devil," said Prof. McGill, speaking of the treatment the Nova Scotian Royal Commission received at the hands of many employers, who were against all kinds of state interference on matters of hours, etc. There is at least one large corporation in Nova Scotia, and we could name many others also, at whose hands Prof. McGill received nothing but courtesy and reasonableness. The coal-owners of the British Isles, and the coal miners also, could say a few things about the effects of state interference in the matter of hours, etc. The aftermath of the Eight Hours Bill for Mines in England is proving more menacing than even the strongest opponents of the bill dared to prophesy. At the very moment when trade is showing a decided revival, the British coal exporters are being hindered and embarrassed. The "Colliery Guardian" in an article on the "Folly of the Eight Hours Act," summarizes the result of this Act so far, as a "reduction in output, a rise in prices, and an impairment of competitive power abroad." German and American coal is being sold as a result of this Act in markets which were regarded as belonging to South Wales; the Rhenish-Westphalian Syndicate is raising its tonnages, English exporters are losing ground in France and the Mediterranean, and, to again quote the "Colliery Guardian," "all these troubles coming on the brink of what appears to be a genuine revival in trade, must accelerate all the miseries and difficulties that are the undoubted offspring of this Act." This indictment, coming from the recognized mouthpiece of the English coal-trade cannot be lightly esteemed, and it is not to be wondered that Nova Scotian coal operators do not always receive with open arms the gentlemen who propose "state interference in matters relating to hours, etc." Prof. McGill is also stated to have said that "amazing ignorance of the industrial problems of the day, prevailed among the employers he had met." Such

sweeping indictments of our Nova Scotian industrialism are unfair and ill-considered, because, actually, the condition of the working classes of Nova Scotia is infinitely better than in the large industrial centres of the United States and the Old World, and nowhere perhaps in the globe, can one find so many workmen who own their own freeholds and have money in the savings bank, or who are so democratically independent as the men of Nova Scotia. A great many of the captains of Nova Scotian industry are men of the people, risen from the ranks of the "common people," and instinct with the sympathies of their origin, and there is no reason why they and their workmen cannot work harmoniously together. Prof. McGill sees the greatest industrial conflict that Eastern Canada has yet witnessed, looming ahead. If Nova Scotians would, for a little period refrain from "knocking" their own province and their own industries, and would concentrate their energies on the advancement of these same, there is in view the greatest industrial development that Eastern Canada has yet seen.

EAST VS. WEST.

Recently a party of German and Belgian miners were refused entrance into Canada through the port of Halifax because they did not possess the sum of \$25.00 in cash. These men were all physically fit experienced miners, holding a through ticket to their destination, possessed of baggage and sums of money up to ten dollars per man. They were held in the Detention Hospital in Halifax for deportation by the next available steamer. In the meantime, however, application was made for writs of habeas corpus, and an order was granted by the Courts releasing these men, who thereupon proceeded to their destination in Cape Breton. Every man had a guarantee of work and possessed the qualifications which should admit any emigrant into Canada, namely ability to work, freedom from disease and an industry requiring his services. Had these men been farm labourers, they would have been allowed to proceed, but being merely miners, it was not thought the country had need of them. The farming industry of Canada and the needs of the Great West are being insisted upon a little too monotonously to please the people of Nova Scotia. That the whole emigration policy of the Government should be framed from the Western and Upper Canadian standpoint is distinctly unfair to Nova Scotia. Happenings of this kind but serve to further show the desirability of adequate representation of our mining industries in Canada. The coal mining industry of the Dominion is but in the first stages of infancy. The number of men now employed in coal mining is barely adequate for present needs. The present generation of miners are not bringing up their sons to work in the pit, and the only possible source of supply is from Europe, because the United States mines are in a similar position to those of Canada. There are many reasons why a strict supervision should be kept over immigrants intended to work in the mines. Such diseases as miners' ophthalmia, ankylostomiasis, and various other parasitical diseases incidental to European coal-mining, should not be allowed to gain a footing in Canada. But the possession of a set sum of money is not the true basis of qualification for fitness to enter the Dominion. If free from disease, the experienced coal miner should be welcomed to Canada, because he is needed quite as much as the farm-labourer. We are probably correct in saying that when the West asks for coal miners they will get them. It is a little strange that the agents of Nova Scotia should flood the British Isles with alluring prospects for the agriculturist, and apparently forget the mining industry from which it gathers the bulk of its revenue.

At the February term of the Supreme Court in Sydney, some heavy sentences were meted out to strikers who have disturbed

the peace in the mining districts. Seven men were given two-year terms in the penitentiary, and some thirty others were fined sums varying from \$20.00 to \$30.00, with the option of from one to three months in jail. The aggregate fines of these men amounted to one thousand dollars. The offences mostly arose out of the intimidatory tactics which have been followed by the U. M. W. leaders, the charges being such as assault, unlawful assembly, etc. The foolish men on whom the punishment was inflicted thought that the great and powerful U. M. W. would pay the fines and save them from imprisonment. However, this was not done, and the offenders will be required to serve their jail terms. When the late Vice-President of the U. M. W., Mr. E. S. McCullough, was exhorting the miners during the summer to stay out on strike, he published a letter in the local newspapers in which he set forth the enormous resources of the American union, and stated that they could without difficulty raise from six to eight million dollars, and that every cent of this sum would be used, if necessary, to fight the battles of the U. M. W. in Nova Scotia. The men who are now serving their terms in prison will have time to reflect on the hollowness of Mr. McCullough's promises, but there is a glaring injustice about the law which allows the originators of the Glace Bay trouble to go free while their tools and dupes suffer for the things to which the leaders incited them. Just before the recent municipal elections in Glace Bay many of the strikers were saved from disfranchisement by the action of the U. M. W. in paying their poll taxes but when the last strike pittance was doled out, the strikers found that 25c of the regulation \$2.00 per week had been deducted, leaving them with the meagre sum of \$1.75 with which to face the necessities of the winter. Ever since the beginning of last year, various officers of the U. M. W. have been living at the Glace Bay Hotel, faring on the best that the town affords. And yet the irony of the situation does not appear to have been appreciated by the dupes of these men. It has been an interesting study to watch the issuing of the successive lies by which the courage of the strikers has been maintained. As fast as the untruthfulness of one false report has become apparent, another fabrication has been set afloat and one must really give the U. M. W. credit for a considerable ingenuity in this regard.

In the March number of McClure's Magazine is a sympathetic account of the Cherry Mine disaster, by Edith Wyatt, illustrated by photographs which convey to the mind much more vividly than the printed word the mingled heroism and horror of these too often repeated catastrophies. Miss Wyatt refers to the oxygen breathing apparatus which were used, and remarks: "A man wearing one of these helmets with their great tanks and impedimenta, is said to have about one-eighth of his strength left for other purposes." The article is so lucidly written from a non-technical standpoint, that we would not wish to be censorious, but the statement is hardly a correct one. The oxygen apparatus unfortunately does weigh more than is pleasant, but trained men can do a great deal of work with them. Indeed the amount of physical exertion which can be accomplished while wearing these apparatus is remarkable, and can only be accounted for by taking into account the stimulating effect of the oxygen which is breathed. The article ends with a recapitulation of the appalling figures relating to the loss of human life in the coal mines of the United States, as compared with other countries, and a plea for a lessening of the swollen roll of fatal accidents in the mines of the United States.

ONTARIO.

[Editor's Note.—We cannot concur with our correspondent as to the satisfactory character of the Temiskaming annual meeting. Discounting the future by paying unearned dividends out of capital is inexcusably bad business.]

Cobalt, Mar. 5, 1910.—At the annual meeting of the Temiskaming Mining Company held in Toronto a short time ago, the

affairs of the company came in for a great deal of discussion. Complete explanations relative to the affairs of the company were demanded of the officials. The officials gave apparently satisfactory explanations to justify the management, showing that they had acted to the best of their judgment in the interests of the shareholders. The advisability of declaring the last dividend was fully gone into and the president gave a complete explanation of the reasons that led to its declaration. He also explained the falling off in revenue that necessitated an overdraft on the bank to pay the dividend. Although the financial statement showed a deficit of \$97,000, the outlook for this year is considered very good. The manager estimates a profit from the concentrator amounting to \$300,000 a year from the low grade ore; and he states that there is already enough low grade ore in sight to keep the mill running for four years. The charge that the directors of the company used their inside knowledge of the property to enable them to sell their stock before the break in prices, was also discussed, and was satisfactorily explained. Detailed information was given regarding the conditions on the lower levels of the mine, which are promising. The ore on the upper levels has, however, been disappointing, as the low grade has not been very continuous. The falling off of gross receipts is also stated to be partly due to the fact that it was considered advisable to block out ore preparatory to milling the regular veins, rather than to incur the expenditure of stopping operations to mill the comparatively small amount of high grade ore contained. The amount of high grade ore in sight is estimated at 220 tons, containing 660,000 ounces of silver. The milling ore reserves are estimated as follows:

	Tons.	Ounces of Silver.
Ore in sight	40,000	1,200,000
Ore in dump	34,000	1,438,000
	74,000	2,638,000

An important discovery was made a few days ago, when an additional round was taken out of the bottom of the main shaft. The shaft has been going down a quartz and calcite vein, which contained only milling values. The last round, however, threw out high grade ore. This ore was found at a depth of 425 feet and if the shoot is of any extent, it will have a most important bearing on the future of the property. This working is the second deepest in the camp. A station was cut at a depth of 400 feet and a cross-cut is being run to cut the No. 2 vein, which is expected to lie within twenty-five feet of the shaft.

Good reports continue to come from the Elk Lake district, where several promising properties are being systematically developed. The recent find of high grade ore on the 120-foot level of the Moosehorn, has shown the necessity for more extensive development, and as a consequence, an addition to the present plant to consist of a six-drill compressor and two 75-horsepower boilers has been decided on. The Lucky Godfrey has considerable high-grade ore on hand and a small shipment could be made at any time. The Boland Thompson has also considerable ore sacked, and it is understood will make a shipment shortly. The Hitchcock has found some silver and it is stated that the Elk Lake Cobalt and the Tee Arr have some ore sacked. The Tee Arr was formerly known as the Downey claim. The good winter roads that have been available this winter have aided materially in getting in supplies and machinery. Some good finds have also been made, and on the whole, the district is looking much better than it has for some time.

The Munro Power Company is now definitely promising power on or before the fifteenth of March. They will probably turn their machinery over in a few days, and it will take a day or two to tune it up. The company has made astonishing progress with its work, as it was only last June that it was started. As there was no railroad near their plant with the exception of the Cobalt substation, the progress made is even more astonishing. The installation of this plant represents one of the largest, if not

indeed the largest investment of capital in Northern Ontario. The entire system is practically duplicate throughout, and the chances for a shut-down through lack of power are reduced to a minimum. The electric power is generated on the Matabitchouan River from the falls of the same name. The power plant is distant twenty-four miles from Cobalt and at the latter place two substations have been built. In these substations large electrically driven compressors have been installed, with specially designed intercoolers and aftercoolers to reduce the moisture in the air to a minimum. The system has been installed with the greatest care throughout, and is expected to give excellent satisfaction. The cost of power will be materially reduced throughout the camp and many companies that are now lying idle will start work. Other companies such as the McKinley-Darragh, Nipissing and La Rose will largely increase their present equipment. The development work on the Lawson has been held back for months on account of lack of power and many other properties are in the same shape. It is expected that the Gillies limit will also be opened up to a greater extent than at present, and it is to be hoped for the future sales of the government, that more veins will be discovered than have been up to date. So far only one vein of any commercial importance has been discovered. This is the vein originally discovered on the Waldman property which was subsequently traced upon the Wyandote. There is one other vein, but it was traced from the Red Jacket, and can hardly be classed as distinctively belonging to the Gillies limit. The Waldman is now mining good ore from the east stope. In the top of the stope from the seventy-five foot level there is about seven inches of ore. There is also some ore in the west stope, but it is not as good as toward the east. The Wyandote has sunk its shaft over 100 feet, and is preparing to cross-cut to the vein which dipped from the shaft about eighteen feet below the surface. This property is equipped with a complete plant. On the Sagdola a contract has been let for a shaft 100 feet deep. Considerable work has been done on the O'Brien-Glidden property, on which a shaft was sunk on a vein showing some cobalt. A shaft has been sunk over 40 feet on the Rex Flynn property, and a small steam plant installed. A small steam plant is shortly to be installed on the Webb lot which is near the Red Jacket. A shaft is being sunk by hand on a promising lead. Work will also shortly be started on the old Ross lot, which is now incorporated in the Victor Silver Mines, Limited.

The annual report of the Cobalt Lake Mining Company shows a debit balance of \$191,783.62; but during the past year a considerable quantity of high grade ore has been mined, and there is a good tonnage in sight. The manager's report states that during the past five months two new veins carrying native silver were discovered. From these veins two shipments have been made which returned to the company a profit of \$40,737.38. The quantity of water that was coming into the workings decided the management to sink the winze to the 250-foot level, and drifting has been stopped until this work is finished. Test pits sunk on the veins about 100 feet apart showed the veins to be about six inches in width of high grade ore. Since the end of last July the total shipments amount to 133½ tons, which returned 111,597 ounces of silver. Three hundred tons of second-class ore were also treated in one of the custom concentrators which gave a profit of \$3,696.03.

At the Colonial a winze is being sunk 50 feet below the tunnel level, which, when completed, will give a total depth of 240 feet. From this point drifts will be run on the veins and ore blocked out. At the present time the mill is being supplied by stoping above the tunnel level.

A new vein was discovered on the Hudson Bay some time ago that shows about two inches of high grade ore. All the veins that are produced in mining operations are treated in a jig and table, and so satisfactory are the results obtained, that the company has practically decided to erect a small concen-

trator in the spring. The ore can very easily be treated by concentration and there are about 10,000 tons at present on the dump and in the stopes. Some time ago a winze was sunk near the Nipissing boundary at the 200-foot level on a junction of the No. 2 and No. 3 veins, and when down 50 feet, a drift was run and some good values were picked up. This winze is now being continued and will be put down a total of 100 feet.

Good news still continues to come from Gowganda and the shipments that have already been made show a promising state of affairs. Up to date the Millerett Company, formerly known as the Blackburn, has shipped 94 tons, making 156 tons of high grade ore in all. Other cars will probably be despatched shortly, which will considerably augment the amount already shipped. One injustice under which the operating companies in that district labour lies in the fact that the Government exacts a royalty of fifty cents a cord for wood cut on their own property. Of course these properties are in the Timber Reserve, but, the conditions under which work is carried on are bad enough without this additional imposition.

A very important and far-reaching amendment to the Criminal Code, passed the Senate a short time ago. This amendment, which has been agitated for years, will assist materially in checking high-grading operations that have been so prevalent, particularly in Cobalt. It promises that, in the future when any person is found to have ore in his possession, he must account satisfactorily for it, or prove his right to the possession of the same. The amendment also provides that the ore must have a minimum value of seven cents a pound before any action can be taken. There have been several attempts in both the Provincial and Dominion Houses to frame a bill that would put an effectual stop to high-grading operations. There has always been opposition until the exposure of ore stealing in Cobalt, when public opinion was greatly changed. The passage of this bill was strongly advocated in this camp, a deputation having gone to Ottawa to urge its being passed.

Two more ore shoots have lately been opened upon the Crown Reserve on the 100-foot level. They were cut by a cross-cut from the Carson drift, and although narrow, contain high grade ore.

The South Lorrain Development Co. has let a contract for 200 feet of tunnel work on its property, which is situated near the Silver Centre, on the shore of Lake Temiskaming. Several promising veins showing cobalt with small assays of silver have been found on the surface, and these will be cut by the tunnel. Work will be started immediately.

At the present time the McKinley Darragh is probably treating the lowest grade ore of any mill in Cobalt, and at the lowest working costs. For the year 1909 the milling costs were \$1.98½ per ton. The first few months of the year the mill had only started, and the cost was consequently higher. The latter part of the year it cost \$1.62 per ton, while for the first month of 1910, the cost was only \$1.48. It is estimated that when the addition to the mill is completed and running, the capacity of the mill will be increased by fifty per cent.

According to reports from Elk Lake free gold has been found in the vicinity of Fort Matachewan. This district was first staked last December, and since that time a number of outfits have gone in.

It is stated that a plant will shortly be ordered for the Wright and Forneri properties in the Porcupine, upon which some good gold showings have been made recently. There are nine claims in all and they lie just west of the boundary line of Whitney and Tisdale in Tisdale township. The plant for the Timmins is going in and in a short time will all be on the ground.

The annual report of the Otisse Mining Company shows that since work was started, a total of \$86,730.37 has been spent. It has been demonstrated that the rich ore, such as was found on the surface, extends to greater depth, but unfortunately it is

very variable in quantity. The report states, however, that so far no ore of sufficient extent has been exposed to warrant stopping. The results obtained, however, are sufficiently favourable to warrant the company in continuing its operations to greater depth. Up to date, the aggregate of underground workings amounts to 1396 feet.

Some good ore has lately been found on the Bailey Cobalt, below the tunnel level. When the Cobalt Central had a lease on the Bailey, a large tonnage of milling ore was taken out, but since that time the latter company has done practically nothing. Operations will be started, however, on quite an extensive scale as soon as they get electric power to run their machinery. The shaft will be continued to a depth of 200 feet in an effort to reach the Huronian slates that have proved so productive on the Cobalt Central.

The Right of Way has declared another dividend of two per cent. on the new stock issue, payable the end of March. This company is now devoting all its energies to that part of its property which lies between the McKinley Darragh and the Silver Queen. A winze has been sunk 45 feet below the 175-foot level, and the vein shows a good width of ore. Another car of high grade ore will shortly be shipped.

In connection with the exposure of high-grading operations as they existed in Cobalt the Crown Reserve and other mines are bringing an action for the return of the money held by Dr. Wilkinson, being the balance on the payments of ore said to have been turned over to Dr. Wilkinson by the high-graders. The companies are also working hard to get the necessary evidence to obtain convictions for all those who were implicated in the stealing and disposal of ore.

The townsite lots that the Government has had surveyed in the Porcupine district are to be sold by tender. Tenders will be received up till March 15th. There are 571 lots, and the recorder's office and post office will probably be located there.

BRITISH COLUMBIA.

Rossland.—The developments of the past couple of weeks have made a marked improvement in the ore reserves of the property of the Consolidated M. & S. Co. of Canada, here. A new deposit of good shipping ore has been located on the ninth level of the War Eagle mine that it is thought may develop into an important shoot. Assays taken from this vein have given \$35 per ton and over. Work on the eighth level has, it is thought, located the continuation of this vein, which would mean a large stopping area. Another strike of importance has been made on the third level of the Centre Star mine where a five-foot shoot has been opened up. Development work is now being carried on to open up the finds which were located with the diamond drill. The Centre Star group is shipping about 4500 tons of ore per week to Trail smelter and the outlook for the summer's work is bright.

The situation at the Le Roi Mine remains the same as for the past several months. Shipments of three or four hundred tons of select ore are being made per week to the Trail smelter and diamond drilling still goes on. It is said that the diamond drilling contract will be finished in ten days or two weeks, when no doubt the future plans of the company will be divulged.

The Le Roi 2, Ltd, still remains in the dividend-paying field and has now declared a dividend of two shillings per share, payable March 8th. The annual report of this concern for the year ending September 30th, 1909, shows a balance in favour of profit and loss of £49,384 2s. 11d., which is considered a very satisfactory showing. During the year the sum of £14,991 0s. 2d. was written off as depreciation on development, plant, etc., and £5,814 13s. 6d. on the Van Roi preference share account. Six shillings in dividends was paid during the year, free from income tax, which absorbed £37,700 and it has been recommended that £5,000 be added to the reserve. During the reviewed period 48,421 tons of ore was mined, of which 29,874

was shipped to the Consolidated smelter at Trail. The average value of the mineral content proved to be \$23.54. The mining cost per ton was \$3.35; smelting, \$5.70; making a total cost for mining, smelting, development, depreciation, etc., of \$10.56, this figure being 29c. below the same cost for 1908. Thus a profit of \$12.98 per ton is shown. Development work in the mine averaged \$14.35 per ton, and 9,820 feet of diamond drilling was done, which cost \$1.96 per foot. Over \$267,500 was sent to the London office of the company as a result of the year's work. The outlook for 1910 is very good.

It is rumoured that the Blue Bird mine in the South belt will resume development work at an early date. The lessees of the Mayflower mine, also in the South belt, have opened up a new ledge on the hilltop above the old shaft. This ore assays about \$47 per ton and it is the intention to begin small shipments within a few weeks.

The Boundary.—The British Columbia Copper Co., Ltd., made a very good record during 1909, when the shut-down and other draw-backs are taken into consideration. And even at that it is not necessary to consider those things in order to see the favourable side of the thing. During its fiscal year, ended Nov. 30th, 1909, this concern treated 373,336 tons of ore at its Greenwood smelter, making 6,325,000 lb. blister copper, 18,244 oz. gold and 64,234 oz. silver. The cost of making copper was 9.829 cents per lb, including all charges. It is shown that the profits for the period reviewed were \$236,338, being \$142,378 more than for the preceding year. An average of 13.08 cents per lb. was received for copper sold. The work of enlarging the smelter capacity so that the ore from the mines of the New Dominion Copper Co. may be freely treated at that plant, will shortly begin, and it is expected that the Rawhide mine of the Dominion Co. will be making preliminary shipments within a couple of weeks.

The Conciliation Board failed to reconcile affairs between the B. C. Copper Co. and its men, so that the matter still remains smouldering. A strike has been threatened, but it is the desire of all that trouble will be averted in this section, so that considerable pressure is being brought to bear to smooth matters over.

The Snowshoe mine of the Consolidated Co. quietly but steadily makes its weekly output of 4,500 to 5,000 tons of ore to Trail smelter.

The Granby Mines are being examined at the present moment by Dr. Sussman, of New York, and Mr. Wm. Yolen Williams, of Spokane, who is consulting engineer for the company. Mr. A. B. W. Hodges, the local manager, has resigned his position with the Granby Co. to take up work with a company in Peru, which has offered him the enticing figure of \$50,000 per year. As to whether there will be a change in the policy of the Granby when Mr. Hodges leaves, it is doubtful, although some minor changes may be made by his successor, of course. The weekly shipments from the property are running from 26,000 to 28,000 tons and have been steady since the first of the year.

Vancouver.—The Ikeda Bay mine, on Moresby Island, of the Queen Charlotte group, has been taken over by a syndicate of Vancouver capitalists, closely related to the Nical Valley Coal & Coke Company, and of which J. S. Castleman is the leading figure. It is understood that the bond is for \$250,000 on which a couple of early payments have been made. Pursuant to a recent examination and report on the property by A. G. Larson, Superintendent, Le Roi mine, a campaign of diamond drilling will be started about the middle of March, and a sum near \$20,000 will be expended on this work. Of all the promising showings on Moresby Island the most work has been done on the Ikeda and the new bondholders are confident that future development will make a mine of the property. It is possible that a smelter will be erected at Ikeda Bay to treat the product of this mine, and of others now being opened up on the island.

Arrangements are being made by A. E. Rand, of West-

minster, to open up the Dundee mine at Ymir, in which he is interested. The Guggenheims have started work on a \$400,000 plant at Concrete, which will furnish cheap power to a very rich district on Baker River. The Sullivan group of copper claims on Moresby Island has been sold to a Vancouver syndicate for \$50,000.

The Canadian Mining Institute has recently made a couple of requests of the Government, of which there can be no doubt but they are economically reasonable. These are that the Provincial Government make an annual grant toward the move-

ment and that the Dominion Government remove the duty from life-saving apparatus for mines. The benefits of an organization that fosters an important industry are too well known to repeat, while every inducement rather than impediment, should be made to the mining men of the country, that life-saving apparatus may be found in all the mining camps of the Dominion. Of course, this particularly applies to the coal-mining industry, but deaths from powder, gas etc., are not infrequent in the metal mines. To this end it is hoped by those interested here that these two resolutions of the Mining Institute will bear fruit.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax.—Lieut.-Gov. Fraser, in opening the House of Assembly, made the following references to mining and other cognate matters: The adjustment of difficulties between the coal and steel industries of the eastern section of the Province is a matter of profound satisfaction. The amalgamation of the conflicting interests will, I am assured, result in the continued and more extended development of these industries. The immediate realization of the full benefits to be derived therefrom has been much retarded by the continuance of an unfortunate and prolonged strike. It is a matter of sincere hope that some means may shortly be found for the satisfactory settlement of this deplorable affair, which affects so large a section of our population and has so important a bearing on the industrial growth of our Province.

The output of our coal mines, owing chiefly to the results of strikes, was materially less than last year. Notwithstanding the temporary reduction in output, the work of developing our coal fields has been carried steadily on, and the same high efficiency as regards the safety to life of those engaged in mining maintained.

It is gratifying to note that there has been during the past season a vigorous development of our iron mines and gypsum quarries, and that the yield of gold shows an improvement over last year.

During the past year, the Technical College was completed, and is now offering courses in Civil, Electrical, Mechanical and Mining Engineering. I am pleased to observe that a satisfactory number of students is in attendance from this Province and the neighbouring province of New Brunswick. Free Scholarships have been established for every county in the Province, so that any ambitious boy may now secure the highest type of engineering training. The coal mining schools and engineering schools have retained their firmly-established position in the colliery district, and the local technical schools have enjoyed a largely increased attendance. In the public schools in coal mining districts practical courses designed to train boys for practical life in a colliery have been introduced as subjects for some of the general courses. It is a matter of gratification to learn that the Nova Scotia system of technical education has attracted wide attention and much favourable comment.

ONTARIO.

Ottawa, Ont., March 5.—Since the opening of the Royal Mint on January 1, 1908, according to a return produced yesterday, there has been a net profit to the Dominion of \$63,857.86, after allowing \$13,100 as interest on the cost of construction.

The profit on the coinage of silver was \$172,244.79, on bronze \$21,565.11 and miscellaneous, \$1,148.80, giving a total gross profit of \$194,958.71.

Deporting United States silver from Canada involves consid-

erable expense. The experiment was first tried in 1906. In that year the value of coin returned to New York was \$580,224.16, and the cost of removal \$7,383.20. The policy then lapsed for three years.

It was started again August 30, 1908, and from then to January 19, 1910, it cost \$5,197.95 to deport coin valued at \$561,760.49.

Ottawa.—It is not the intention of the Government to renew iron and steel bounties which finally expire at the end of the coming fiscal year. The bounties have now been in force for fourteen years, and the Government believes that the iron and steel industries are now established on sufficiently firm basis to do without the annual subsidy from the Federal treasury. The dividends paid and the increasing outputs of the large industries that have been built up since 1896 are an evidence of this. The total amount paid in bounties last year was on pig iron, \$693,423; on steel, \$838,100, and on manufactures of steel, \$333,091. Since 1906 the total bounties on iron and steel have amounted to over fourteen million dollars.

Cobalt.—Arrangements have been made with the Northern Customs Concentrators whereby forty tons of the dump ore from the City of Cobalt mine will be treated daily in their large mill. The City of Cobalt have some 12,000 tons running twenty-five ounces on their dumps, and it is hoped to put all this through the mill. The recovery is about 85 per cent., and the rate about twenty to one. The company has loaded the first high-grade car for the year, although three cars of screenings, running 300 ounces to the ton, have been shipped since January 1st. Manager Southworth employs four drills underground and a force of fifty men.

Cobalt.—The Little Nipissing Co. has just shipped 60 tons of medium grade ore to New York, bringing their total shipments in February up to 84 tons.

Port Arthur.—The Mining Recorder at Port Arthur is a very busy man. Many claims are being recorded, especially in the vicinity of Savant Lake. The Recorder complains that prospectors make the mistake of sending mere statements by letter as to the work done, whereas the law requires a regular report along with a sworn affidavit.

BRITISH COLUMBIA.

Fernie.—The output of the Crow's Nest Pass Coal Company for the month of January reached the total of 95,000 tons. Of this, 25,000 was mined at Coal Creek and 43,000 at Michel. This is an average of 4,100 tons daily, and is the record for these mines. The total tonnage of the Crow's Nest mines for 1909 was 899,045, of which 425,659 tons were mined at Coal Creek, and 437,317 at Michel. The Fernie coke ovens turned out during the year 131,339 tons and the Michel plant produced 118,914 tons, a total production of coke for the year of 250,254 tons. At the present rate of increase the company's mines will pass the million and a quarter mark this year. But fast as the product of its mines grows, it does not keep pace with the demand. The

Hillcrest mines began last week the delivery of 25,000 tons of Hillcrest coal to the Great Northern Railway at Michel, where it is being transferred to the tracks of the Great Northern for delivery to various points on the Hill system.

Rossland.—Shipments continue to be made each week from the Le Roi, of ore of good grade, and the proceeds derived from its sale materially aid in keeping the mine in operation. Diamond drills continue to explore the territory of the Le Roi for new bodies and the borings have reached the territory 1,000 feet below the 1650-foot level. While the results are encouraging, no very large bodies of pay ore have been encountered so far, still some medium-sized bodies of pay ore have been located.

Work on the Mayflower is making good progress and there has been found in the main ledge a foot and a half of steel galena that goes from \$40 to \$60 to the ton. This is being extracted, and within a few days a shipment will be made to the Trail smelter. The lessee is very much pleased with the manner in which the Mayflower is developing.

Following is the report of the Le Roi Two for the month of January, which was cabled to London by Ernest Levy, the mine manager: "Josie Mine Report for January: Shipped 2,440 tons. The receipts from smelter are \$42,358 (£8,734), being payment for 2,200 tons shipped, and \$1,515 (£312), being payment for 58 tons concentrates shipped. In all \$43,873 (£9,040).

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

The legislative programme of the Miners' Federation for the present session is to be restricted to the introduction of the Checkweighers Bill, which proposed to improve the law as affecting checkweighers by compelling the provision of adequate shelter on the pit bank for the accommodation of the checkweigher and a protection against the weather. There are also clauses designed to give the checkweigher greater freedom of action in taking part in meetings of the men off the colliery premises and as an official of the trade union. The programme is the most modest which the miners have submitted to Parliament for many years.

The Miners' Conference, representative of the South Wales coalfield, sitting at Cardiff on February 19, decided to continue the negotiations with the coal-owners for the making of a new wage agreement. It was a contest between the cautious and statesmanlike policy of the Executive, who recommended the men to resume the negotiations with the employers, and the extreme policy of the more hot-headed who desired the calling of a national conference of the Miners' Federation to take national action—in other words, a national strike. The moderate counsel of the Executive was affirmed by a majority of five to one, and the negotiations with the employers will be resumed in Cardiff on Thursday next.

RHODESIA.

The working of the full plant of the Giant Mines is giving every satisfaction.

The sinking of the main shaft on the New Found Out mine is being proceeded with, and is expected shortly to reach the fourth level.

The Exploring Land and Minerals Company has arranged with Mr. F. P. Mennell to make a complete geological survey of their large mineral properties in the Matabeleland and Mashonaland, especially with reference to the rich properties situated midway between the Globe and Phoenix and Ivanhoe mines.

The Rhodesia Gold Explorers is negotiating an option on the Juanita property in the Bulawayo neighbourhood. The assays range from 6 to 24 dwts. There are five shafts, already down a considerable depth and numerous old workings.

SOUTH AFRICA.

Before the Powers Commission recently held at Johannesburg, Mr. Ryersbach made the following statement as to the savings which would be effected by individual mines by taking power from the supply company in preference to erecting generating plant for themselves: "The saving in capital cost can best be illustrated by one or two examples. It is estimated that the City Deep, Ltd., after having spent £223,000 on plant, will require to spend a further £436,000 if power is purchased. If the company erects its own power plant, the further expenditure

to be incurred is estimated at £560,000, being a difference of £124,000 in favour of the electric scheme. The estimate is based on a capacity of 65,000 tons per month; that is, the saving per 1,000 tons monthly capacity in this instance is estimated at £1,900. Similarly, in the case of the Nourse Mines, Ltd., and the Jumpers Deep, Ltd., for both of which increases in plant to deal with an additional 23,000 tons monthly have been sanctioned, it is estimated that the capital expenditure will amount to £25,100 for the former and £23,800 for the latter. It will be seen that the saving per 1,000 tons per month is considerably greater in the case of a new plant than where additions only are being made."

MEXICO.

The El Oro Mine earned a net profit of £18,158 in January, which may be regarded as quite good. Both mills are still running, but one mill may shortly be put out of service now that the tube mill plant is completed. The ventilating plant has made connection with the 1,000-foot level, and within a month or so encouraging developments at the lower levels should be reported. The Mexico Mine earned £12,558 during the past month, which is rather under the average of previous months. This has had no effect on the shares, which are now standing at 8%.

UNITED STATES.

Los Angeles, Cal.—The 1910 convention of the American Mining Congress will be held in Los Angeles, beginning September 26 and continuing through the week, ending October 1, The Sierra Madre Club has already guaranteed the sum of \$10,000, half of which is to be applied to furtherance of the legislative programme in Washington, and will now endeavour to increase the entire fund to \$25,000. The supervision of the convention will be in the hands of an advisory board, including representation from all public bodies in Los Angeles and every important mining and oil town in Southern California, Arizona and Nevada, while the details will be in charge of an executive committee of three, with Sidney Norman acting as managing director.

Washington, D. C. Feb. 25.—An interesting light was thrown upon the Alaskan mining land situation yesterday when Delegate Wickersham told the House committee on territories that the miners hold their claims by force of firearms.

"Every acre of mining land in Alaska is held by a rope of sand," declared Wickersham. "Every claim is open to litigation."

Houghton, Mich. March 4.—It is reported that, for the double purpose of defeating the designs of the Western Federation of Miners, whose organizers have been active in this district lately, and of reducing the copper output, all mines in the Lake district are preparing to close down at once for an indefinite length of time, or until the ends aimed at by the managers can be attained.

Whether the Calumet and Hecla is included in the plan has not as yet been definitely made public, but from reliable sources it is said that they are.

If the plans are carried to their fullest execution, many thousands of men will be out of employment and a reduction of copper production effected that cannot but have an immediate effect on the price of the metal.

Coupled with the entailment at Butte on account of labour troubles, and the general tendency to reduce output in the western mines, far-reaching and immediate results are looked for in connection with the latest move of the big Lake producers.

Company Notes

The annual meeting of the shareholders of the Intercolonial Coal Mining Company took place on March 2, in Montreal.

The output of coal and coke for the year ending 31st December, 1909, amounted to 296,999 tons. The following were elected directors: Messrs. James P. Cleghorn, W. M. Ramsay, R. Mac, D. Paterson, K. W. Blackwell, E. Goff Penny, D. Forbes Angus and Duncan Robertson. At a meeting of the Board, Mr. Jas P. Cleghorn was re-elected president; Mr. D. Forbes Angus, vice-president and managing director, and Mr. C. A. Down, secretary-treasurer.

The Granby directors met in New York on March 1st, and no action on the dividend was taken. The statement was made that nothing would be done in the matter until all the new stock has been issued. In December a dividend of 2 per cent. was declared.

The Dominion Iron and Steel directors declared a dividend of 31½ per cent. on the company's preferred stock. This dividend includes 28½ per cent. of deferred payments, and 3½ per cent. for the current quarter. The entire amount of deferred dividends will consequently be wiped out when the 31½ per cent. payment is made on April 1.

Ninth Annual Report of the Nova Scotia Steel & Coal Co., Directors' Report.

Your Directors herewith submit their Ninth Annual Report with statement of assets and liabilities, and abstract of profit and loss account for the year ended December 31st, 1909.

The profits for the year amounted to \$907,949.00, as compared with \$734,701.53 for 1908. In view of the depressed condition of business during the greater part of the year, this result should be regarded with satisfaction by the shareholders.

The amount at the credit of profit and loss account on January 1, 1909, was \$1,219,221.07, against which the stock dividend of \$1,000,000.00, declared in December, 1909, was charged.

The various amounts transferred to the reserve fund and fire insurance fund, and written off for improvements and betterments, are shown by the accounts.

A sum of \$184,453.54 for premium and commission on redemption of old and issue of new bonds has been paid out of the profits of the year.

The balance carried forward to the credit of profit and loss account is \$336,807.38.

The sum of \$362,653.17 has been expended during the year on capital account, in the development of the submarine iron ore

areas at Wabana, and for improvements, plant, etc., elsewhere.

The volume of business transacted by the company during the year shows a substantial increase, and is in excess of any previous year, and it is expected that there will be a still further increase in 1910.

The development of our submarine iron ore areas at Wabana was continued, the main stope being extended through these areas a further distance of 1,470 feet. The stope is now about 1,650 feet into our own areas from their southern boundary. The development work carried on has fully confirmed the estimates previously made as to the vast quantity of ore contained in, and the great value of these areas. The plant for the operation of these submarine mines is now being installed.

Considerable extensions and improvements have been made to the mills at New Glasgow, and further extensions and improvements will be made in 1910, with a view to increasing the output of finished steel.

The re-organization of the finances of the company, authorized by the shareholders, has been carried out. A new issue of \$6,000,000.00 5% First Mortgage Bonds, and an issue of \$1,000,000.00 6% Debenture Stock were made; \$3,500,000.00 of the bonds and the \$1,000,000.00 6% Debenture Stock were sold in Canada, and the two former issues of 6% bonds were paid off and cancelled. The balance of \$2,500,000.00 of the bonds remains in the treasury. No portion of the premium on the retirement of the old bonds, nor of the commission on the new issue has been charged to Property Account.

The regular dividend of 2% quarterly has been paid on the preferred shares, and on January 15th a quarterly dividend of 1% was paid on the ordinary shares, and the directors have declared further dividends of 1% on the ordinary shares, and 2% on the preferred shares, payable on April 15th, to shareholders of record on March 31st, 1910.

All of which is respectfully submitted.

February 18th, 1910.

ROBERT E. HARRIS,

President.

The annual meeting of the shareholders of the Western Coal and Coke Company was held at the head office of the company, 501 Power Building, Montreal, on Monday, February 14th, when the following directors were re-appointed: E. B. Greenshields, Senator Mackay, J. B. Ferguson, Charles Fergie, H. A. Lovett, J. W. McConnell, G. B. Woods, J. N. Lake and J. E. Woods. The managing director, Mr. Charles Fergie, reported that development work was making rapid progress, and that the mine would be in a position to produce 800 to 1,000 tons a day by the end of the year, also that the coal was of excellent quality and had recently been tested by the Canadian Pacific Railway Company on their engines with satisfactory results.

At the subsequent meeting of the directors, Mr. J. B. Ferguson, who had held the office of president for the past two years, resigned the office owing to ill-health and the fact that he would be somewhat out of touch with the head office as he now resided at St. Catharines, Ont. Mr. Ferguson nominated Mr. E. B. Greenshields, who is largely interested in the company, as president. Mr. Greenshields was elected by unanimous vote; and Hon. Robert Mackay and J. B. Ferguson were elected vice-presidents. Mr. Chas. Fergie was re-appointed managing director.

STATISTICS AND RETURNS

TRAIL SMELTER.

The Consolidated Mining & Smelting Company of Canada, Limited, ore receipts at Trail Smelter for week ending February 26th, and year to date, in tons:—

Company's Mines.

Centre Star 3,623 29,471

St. Eugene (concentrates)	194	3,209
Snowshoe	4,822	31,288
Richmond-Eureka	67	861
Sullivan	278	1,183
Other mines	2,009	15,239
Total	10,993	81,251

MINERAL PRODUCTION OF ONTARIO IN 1909.

Product.	Quantity.	Value.
Metallic—		
Gold, ounces	2,042	\$32,445
Silver, ounces	25,737,037	12,382,689
Cobalt, tons	1,533	94,965
Nickel, tons	13,907	2,709,798
Copper, tons	7,933	1,127,015
Iron ore, tons	263,777	645,622
Pig iron, tons	407,013	6,301,528
Zinc ore, tons	895	8,950
		<u>\$23,303,012</u>

Less value Ontario iron ore (220,307 tons smelted into pig iron) 537,549

Net metallic production \$22,765,463

Non-metallic—		
Arsenic, refined, tons	885	\$61,039
Arsenic, crude, tons	4,599	
Brick, common, number	246,308,000	1,916,147
Tile, drain, number	27,418,000	363,550
Brick, pressed, number	53,166,941	490,571
Brick, paving, number	4,067,620	73,700
Building and crushed stone		459,730
Calcium carbide, tons	2,349	151,676
Cement, Portland, bbls.	2,303,263	2,897,348
Corundum, grain, tons	1,508	140,817
Feldspar, tons	11,001	36,204
Graphite, refined, tons	730	37,624
Gypsum, crude, tons	11,488	23,604
Iron pyrites, tons	28,946	78,170
Lime, bushels	2,633,500	470,858
Mica, tons	350	73,124
Natural gas		1,188,179
Peat fuel, tons	60	240
Petroleum, imp. gals.	14,723,105	559,478
Phosphate of lime, tons	272	1,904
Pottery		43,214
Quartz, tons	63,172	75,329
Salt, tons	77,490	389,573
Sewer pipe		311,830
Talc, tons	4,350	8,700

Non-metallic production \$9,852,600

Add net metallic production 22,765,463

Total production \$32,618,072

Total for 1908 \$25,637,617

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending March 4, and those from Jan. 1, 1910, to date:—

	Week ending Mar. 4.	Since Jan. 1 Ore in lbs.
Buffalo	56,619	292,453
City of Cobalt		193,970
Cobalt Central	40,900	165,286
Cobalt Lake		132,000
Colonial		63,660
Coniagas	51,600	295,757
Crown Reserve	146,034	951,359
Drummond		664,200
Hudson Bay		62,365
Kerr Lake		1,074,489
King Edward		93,129
La Rose	303,312	2,051,901
McKinley-Darragh	63,063	271,860

Nipissing	456,433	1,949,053
O'Brien	129,900	328,806
Peterson Lake	120,850	170,450
Right of Way	62,643	253,436
Silver Cliff		66,010
Temiskaming	60,000	180,000
Trethewey		127,000

Ore shipments for week ending March 4, were 1,491,354 pounds, or 745 tons.

Total shipments from Jan. 1. to March 4, were 9,387,184 pounds, or 4,693 tons.

Total shipments for 1909 were 30,098 tons.

GOWGANDA SHIPMENTS.

Following is a list of the shipments of ore from Gowganda for the present year:—

Jan. 1 Millerett	30
Jan. 14 Reeves-Dobie	30
Jan. 22 Reeves-Dobie	32
Jan. 29 Millerett	29
Feb. 12 Millerett	30
Feb. 12 Burke-Remy (test shipment)	2
Feb. 24 Millerett	26

The Buffalo Mines, Ltd. reports for January: Mill ran 558 hours and milled 2,770 tons of ore; silver recovered, 103,549 ounces; milling expenses, \$6,572. The ounces of silver paid for during the month shipped previously, 97,721 ounces.

The February output of the Nova Scotia Steel & Coal Company was 61,000 tons of coal, 6,800 tons of steel and 5,000 tons of pig iron.

BRITISH COLUMBIA ORE SHIPMENTS.

Nelson, B. C., February 19.—The weekly output of the mines and the smelter ore receipts continue very satisfactory, but otherwise there has been no special mining news during the past seven days. Appended are the details:

Boundary—	Week.	Year.
Granby	25,794	181,476
Mother Lode	9,500	65,805
Oro Denoro	300	1,920
Snowshoe	3,426	26,466
Other mines		120
Total	39,020	274,787
Rossland—	Week.	Year.
Centre Star	3,405	25,848
Le Roi No. 2	503	3,911
Le Roi	164	1,999
I. X. L.	5	13
Other mines		220
Total	4,077	31,991
Slocan Kootenay—	Week.	Year.
St. Eugene	404	3,015
Richmond-Eureka	124	794
North Star	72	677
Blue Bell	137	677
Whitewater	80	371
Queen	25	118
Ethel	30	60
Emerald	238	670
Yankee Girl	81	1,285
Nugget	24	103
Granite-Poorman	31	94
Molly Hughes	13	116
Van Roi	31	202
Sullivan	111	905

Standard	25	153
Utica	23	37
Central	42	80
Bonanza	19	19
Monarch	114	114
Other mines .....	.....	1,752
Total	1,624	11,245
Grand Total	44,721	318,023

SMELTER RECEIPTS.

Granby	25,794	181,596
Consolidated Co.	9,223	70,258
B. C. Copper Co.	9,800	66,725
Total	44,817	318,579

SHARE MARKET.

Courtesy of Warren, Gzowski & Co.

Miscellaneous.

	Bid.	Ask.
Amalgamated Asbestos .....	..	.30
Dominion Coal, common	80½	80¾
Dominion Steel, common	68½	69
Nova Scotia Steel	88¾	88¾
Granby	87	88
Consolidated Smelting	75	77
Crow's Nest Pass	85	94

Cobalt Stocks.

Wettlaufer .....	..	1.12 1-16
Amalgamated .....	.07	.07½
Beaver Consolidated .....	.34¼	.34¾
Buffalo	2.20	2.60
Chambers-Ferland .....	.37¾	.38
City of Cobalt .....	.39¾	.41
Cobalt Central .....	.18¾	.19¼
Cobalt Lake .....	.20½	.20¼
Coniagas	6.00 off.	
Crown Reserve	3.70	3.73
Elkhart .....	.167½	.17½
Poster .....	.27	.29
Green-Meehan .....	.07¾	.08¼
Great Northern .....	.10½	.11
Hudson Bay	107.00	110.00
Hargraves .....	.36	.38
Kerr Lake	8.75	9.00
La Rose	4.53	4.55
Little Nipissing .....	.28	.28¼
McKinley-Darragh-Savage .....	.87½	.90
Nancy Helen .....	.10¾	.11½
Nipissing	10.25	10.30
Nova Scotia .....	.36	.37½
Otisse .....	.077½	.08
Peterson Lake .....	.26¼	.26½
Rochester .....	.205½	.207½
Silver Leaf .....	.10	.10½
Silver Bar .....	.13¼	.14½
Silver Queen .....	.19½	.21
Temiskaming .....	.64¾	.65
Trethewey	1.38	1.40
Watts .....	.13½	.15
Ophir .....	.53	.64

New York Curb.

Boston Copper	20¼	205½
British Columbia Copper	067½	07½
Butte Coalition	26½	27¼
Chino Copper	14½	14¾
Davis-Daly Copper	03½	03¾
Ely Consolidated	01½	015½

Gila Copper	08½	08¾
Giroux Mining	10	10½
Goldfield Consolidated	8 7-16	8 9-16
Greene-Can.	10¾	10¾
Harcuvar Copper	41	44
Inspiration Copper	087½	08 15-16
Miami Copper	24¾	247½
New Baltic Copper	07½	07¾
Nevada Con. Copper	24	24¾
Ohio Copper	04¾	04½
Rawhide Coalition	23	25
Ray Central	24	24½
Ray Consolidated	03¾	03 13-16
Union Mines	017½	01 15-16
Yukon Gold	04 9-16	045½

TORONTO MARKETS.

Metals.

Mar. 8.—(Quotations from Canada Metal Co., Toronto.)

- Spelter, 6 cents per lb.
- Lead, 3.75 cents per lb.
- Antimony, 8 to 8½ cents per lb.
- Tin, 34.75 cents per lb.
- Copper, casting, 14¼ cents per lb.
- Electrolytic, 14¼ cents per lb.
- Ingot brass, 9 to 12½ cents per lb.

Mar. 8.—Pig Iron.—(Quotations from Drummond, McCall Co.)

- Summerlee, No. 1, \$23.50 to \$24.00 (f.o.b. Toronto).
- Summerlee, No. 2, \$23.00 (f.o.b. Toronto).
- Midland, No. 1, off the market.
- Coal, anthracite, \$5.50 to \$6.75.
- Bituminous, \$3.50 to \$4.50 for 1¼-inch lump.

Coke.

- Mar. 4.—Connellsville coke (f.o.b. ovens).
- Furnace coke, prompt, \$2.00 per ton.
- Foundry coke, prompt, \$2.50 to \$2.75 per ton.

Mar. 4.—Tin (Straits), 32.85 cents.

- Copper, prime Lake, 13.75 to 13.85 cents.
- Electrolytic copper, 13.50 to 13.60 cents.
- Copper wire, 15.25 cents.
- Lead, 4.60 to 4.70 cents.
- Spelter, 5.85 cents.
- Sheet zinc, 8.25 cents.
- Antimony, Cookson's, 8.50 cents.
- Aluminium, 23.00 to 25.00 cents.
- Nickel, 40.00 to 49.00 cents.
- Platinum, ordinary, \$29.00 per oz.
- Platinum, hard, \$34.50 per oz.
- Bismuth, \$1.75 per lb.
- Quicksilver, \$50.00 per 75-lb. flask.

Silver Prices.

	New York.	London.
	Cents.	Pence.
February 22 .....	..	23 15-16
" 23	52	24
" 24	52	24
" 25	50¾	23 7-16
" 26	505½	23¾
" 28	50½	23 5-16
March 1	50¼	23 3-16
" 2	50½	23 5-16
" 3	50¾	23 7-16
" 4	50¾	23¾
" 5	50¾	23¾
" 7	507½	23 7-16