

EDITORIAL

THE SAFEGUARDING OF INVESTORS IN MINES

Mr. Alexander Gray in his comments in this issue, which we welcome, views the protection of the investor and the simultaneous encouragement of the prospector from a point of wide experience in mining matters, and he touches a vital point in suggesting that reputable newspapers should censor the mining flotation literature which now forms so large a part of the advertising columns of Canadian dailies. Some of the newspaper propaganda is so subtle that it would deceive the very elect. Recently we pointed out the apparent character of the investment afforded by the stock offering of the Little Gem Mining Company of Anchorage, Alaska, which had appeared in the Montreal "Star," and the very frank manner in which those who offered this stock admitted its speculative character. The writer was amused, when attending the Annual Meeting in Toronto, to note that the advertisement of this Company was appearing in the Toronto "Globe," but, either from an astute psychological insight into the Torontonians mind, or perhaps to conform to the code of morals professed by the "Globe" the suggestions to "ante up" and take a chance on winning a "big pot" were deleted. Instead, a statement was made as to the amount of stock that had been sold in Montreal. Now that is not bad, because no matter how Toronto may regard Montreal's moral character, it has a most wholesome respect for the business acumen of its civic rival.

As one example of the other little gems that stud our newspapers, we have had brought to our attention a despatch from the "correspondent in the mining field" of the Montreal "Standard" written from Dane, Ont., which refers to the Argonaut Mine. This gentleman, having summoned up sufficient courage to explore the vasty deeps of a gold mine found himself on the 200 ft. level, where, he writes, "one had great difficulty in getting about to see anything owing to the number of men at work. We are plaintively informed also that "one is allowed to understand that interruptions are not appreciated." We wonder what they did to the poor man. Perhaps they ran a mine car into him? It is very evident that our friend was out of his element. Yet, notwithstanding his obvious unfamiliarity with underground conditions, he proceeds to make this oracular statement, to wit, "It is estimated that the development work now in progress and, to be continued for the next few months will add

five million dollars to the known ore reserves in the mine." The gentleman can apparently see as far into the ground as the next man, and he finishes his letter by stating: "It is the general opinion up here that the Argonaut is fast developing into the richest gold mine in the country." What we like about these gentry is their lack of ambiguity.

It is quite possible that the Argonaut may be a rich mine, but this kind of thing is not playing the game squarely.

Those who really know mines are not deceived by the fake technical gibberish that disfigures so many of the financial pages of our most reputable newspapers, but those who do not know mines are greedy and credulous readers of it all. The Editor has on his desk a letter from such an investor, who says that through one of his real friends his attention was called to Canada. He says, truly enough, "I have been unfortunate in my investments so far. It was never any fault of mine, but invariably the dishonesty of the promoter."

The problem of protecting the "investor" against fraudulent mine flotations is, as Mr. Gray says, somewhat of an abstract science, but there is nothing abstract about the cash-down payments that our newspapers ask before they will print these dubious advertisements, nor is it making an unfair statement to declare that in allowing such advertisements to appear in their columns, our newspapers are inflicting upon their readers a deliberate dis-service, and are not playing cricket.

FLIN FLON DEPOSIT WILL BE DEVELOPED THIS YEAR.

It is announced that arrangements have been completed between the owners of the Flin Flon property and men associated with W. B. Thompson of New York that will insure vigorous development of the property this year. It is understood that the plant at the Mandy mine has been purchased for the work at Flin Flon mine and will be immediately moved. It is reported from The Pas that a number of men have already been engaged for the work of transporting and installing the machinery and putting the camp in shape for action.

It is common knowledge that the Flin Flon deposit is a very big one. The work that has been done has given information which makes it appear probable

that a very big mining industry will be founded on this deposit. Diamond drill exploration has indicated the presence of several million tons of sulphide ore that may reasonably be expected to be mined at a profit, if suitable transportation facilities are provided.

The surface stripping and 25,664 feet of diamond drilling has permitted sampling and assaying, from the results of which an estimate of 20,000,000 tons of ore has been made. This ore contains, according to the information now available, 1.69% copper and 3.49 per cent zinc as well as small but appreciable amounts of silver and gold. During the present summer shafts will be sunk and underground exploration carried on. It is said that the option is for one year and it may be expected therefore that work will be pushed ahead rapidly this summer.

The development of the Flin Flon property will have an important effect on mining explorations in Northern Manitoba. The work done this year will itself give an impetus to other operations in the district. If the results are satisfactory to the holders of the option and the bigger undertaking of mining and smelting of the ore follows closely on this year's development Flin Flon will soon be the centre of a flourishing mining industry—R.E.H.

WORK FOR THE CANADIAN MINING INSTITUTE

In the address of Mr. J. A. Campbell, M.P.P., before the Canadian Mining Institute, attention was directed to the attitude of Governments towards the mining industry. He particularly referred to conditions which are delaying development of the mineral resources of Manitoba. He pointed out that there is in Manitoba a peculiar situation; the Province does not own its mineral resources, but has a mining law; the Dominion owns the mineral resources of Manitoba, but has no mining law. The Dominion administers the mineral lands through the Department of the Interior, Properties are taken up and operated under regulations instead of under statutory enactments. The Minister of the Interior is empowered to enact royalties and the amount is not fixed.

There is good reason to believe that the Province of Manitoba wants its mineral resources developed and that the present government will do what it can to encourage capital to undertake exploration of properties. There is also good reason to believe that the Dominion Government, and particularly the Minister of the Interior, will be pleased if Manitoba should become an important producer of metals as well as of agricultural products. The prospective investor can be well advised not to overlook Manitoba in spite of the unsatisfactory conditions. There remains, however, a duty which those interested in the mining in-

dustry should not overlook. Unsatisfactory conditions are unnecessary and could be removed by united effort. To advise governments in such matters is obviously the duty of the organization which represents the mining industry of Canada. The Canadian Mining Institute is not functioning fully while it neglects to use its weight in removing obstructions which the pioneers in new districts find in their path.

A few years ago an unusually important discovery of copper-zinc ore was made at Flin Flon lake. Preliminary exploration has proven the deposit to be of great size. It has recently been announced that development of it will be carried on vigorously this year.

It may be taken for granted that the men who have undertaken the work have received ample assurance that they will get a fair deal from the governments concerned, if they proceed with mining and smelting operations and the big expenditure of money which the project will involve. That these men are going ahead with the venture should of itself be encouraging to others, for it is an indication that they feel reasonably certain of fair treatment. There remains, however, the fact that regulations and governments are subject to frequent changes. Statutory laws governing mining in this new district are much to be desired.

That the development of the Flin Flon deposit should prove a success is a matter of interest to the country generally, as well as to the present and prospective owners. If the establishment of a mining industry at Flin Flon is recognized as highly desirable, the respective governments will be supported by the public if they encourage the projects. Does it not seem to be a duty of the Canadian Mining Institute to use its influence towards obtaining recognition of the national and local advantages which a big metal mining industry in the prairie provinces would bring?—R.E.H.

It was intimated by one speaker at the Wednesday morning session of the Institute, that more resignations from the Geological Survey are likely to come soon, if provision for more adequate salaries for geologists is not made. It would be very unfortunate if disorganization should continue so rapidly as during recent months and it is to be hoped that action will be taken to hold together what remains of the Survey staff. Mr. Campbell in his address held out the hope that the revision of the classification, now being considered, may result in better salaries for the staff.

The question as to whether the Dominion Government should retain control of mining lands in the Prairie Provinces was not debated at the meeting. There seemed general approval of the statement made that mining will proceed under either control, provided that a definite understanding and proper protection for capital is obtainable.

Annual Meeting of the Canadian Mining Institute

Twenty-Second Annual General Meeting, Toronto, March 8th-10th, 1920

(Reported by the Editor.)

A Joyous Meeting.

Three things helped to make the Toronto Meeting a happy one, namely; the efficient spade-work of the Local Committee in preparation for the meeting and the entertainments; the presence and active participation in the meeting of a large number of members returned from the war; and the special care taken to ensure the presence and comfort of the ladies. The combination of these circumstances, with others that might be named, gave to the meeting from the first a keenness and elation that redeemed it from stodginess, and sustained the interest throughout an unusually full programme of work.

The reception of the Institute by the City of Toronto was most courteous and hospitable. The Institute was invited to luncheon by the Mayor and Civic Corporation, a mark of honour that has rarely, if ever before, been shown to it, and one which the retiring President, in thanking the Mayor and the City, accepted on behalf of the mining industry of the country as a recognition of the influential and representative position now generally accorded to the Canadian Mining Institute. The compliment paid to the Institute was not less marked than the appreciation it evoked from the members in attendance.

The Government of Ontario also, by the presence of Lieutenant-Governor at the Annual Dinner, and by the attendance of the Minister of Mines both at the opening session, and at the dinner, conferred distinction upon the Toronto meeting.

In addition, the most generous assistance was given by the Mines Department of the Province both before and throughout the course of the Meeting.

The sessions were so full, and the various events of the Meeting followed in such quick succession that the visitors did not see much of the city itself, but in no place has the Institute been more signally honored at its Annual Meeting than in Toronto.

OPENING SESSION, MONDAY 8th.

Address of the Minister of Mines.

The Minister of Mines, the Hon. H. Mills, welcomed the members as coming from the West and the East and as representing every province of Canada, and said he appreciated the honor conferred upon him by the Toronto Branch in recently electing him as an honorary member of the Institute. During the few weeks he had held office, Mr. Mills said he had been filled up with advice, so varied and extensive that he had decided it was safer during the coming session of the House to follow certain narrow trails. He had hoped to make changes in the Mines Act. The Act was, he believed, a good one, but not so good that it could not be bettered, and in detailing briefly what he hoped to accomplish during the Session, Mr. Mills said:

The prospector is responsible for the pioneer work of mining development. He is to the mining industry what the settler is to the farming industry, and should be encouraged in every possible way. The prospector does not know all about the game yet. He has a lot to learn.

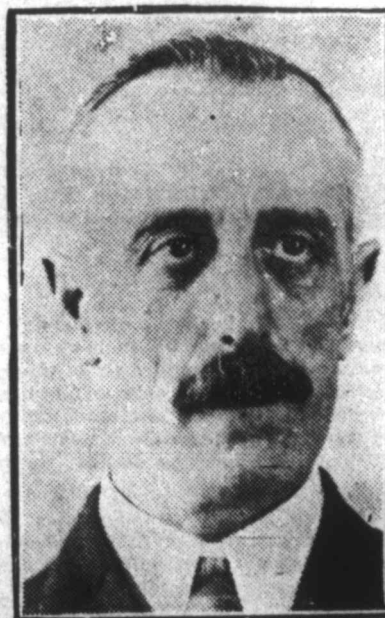
Valuable claims have been passed over by prospectors in the past because of the lack of proper information on the part of the prospector. The education of the prospector would be a step in the right direction, and the Government proposed to institute evening classes for prospectors in the various camps next winter. The provision of up-to-date geological maps and blue-prints of districts and mineral zones would be undertaken, and an office was to be opened at North Bay, for the preparation and issuance of such information to prospectors at cost.

The Government intended to assist in making trails and opening roads, and had included ten thousand dollars in the estimates for opening streams and trails and anticipated a large return on this investment.

Assistance would also be given to the prospector by reducing the license fee from \$10.00 to \$5.00. Requests had been made for even greater reductions, and a fee as low as \$1.50 had been suggested. It was possible that some people would accept a free license. Staking would be limited to three claims per man and three claims for two other parties, that is nine claims in all. Some persons may consider this limitation objectionable, but in the past too much land had been given away. One claim covered 6,400 acres, and another 9,300 acres. Would venture to say that not more than one per cent of the claims are developed. It is the development and not the granting of claims that is of interest to the Government.

The Government proposed to assist by granting free assays, for which two coupons would be issued to each person, covering gold, lead, silver and copper. The Department was considering enlargement of the Toronto Assay Office and extending operations to Cobalt. Two assays would be allowed for each recorded claim. In the matter of licenses, the Government hoped to encourage the small prospector, and make things more equitable without reducing its own revenue by charging a \$5.00 license fee to the actual prospector, and \$15.00 for the licenses taken out by proxy.

Requests had been received from the Great War Veterans Association, in its various centres, for everything. Fifteen



HON. H. MILLS.
Minister of Mines, Ontario.

hundred returned men claimed to hold claims before enlistment, and the Government had been asked to forgive all assessment work arrears, but this might run into a sum as large as four million dollars, and caution was necessary. The Government purposed to allow the non-payment of the statutory fee of three dollars per acre for unsurveyed claims and \$2.50 for surveyed claims, which would cost the Government from \$300,000 to \$500,000.

Iron Ore Bounties.

The Government had not committed itself to a policy of granting iron-ore bounties, and did not feel disposed to do this. In British Columbia, three dollars per ton had been offered as a bounty for pig-iron made from local ores. This offer has not been taken up as it should be and I believe that in the case of our own ores, the time will come when they will be of the utmost importance, if it is really necessary they should be developed. The electro-thermic process of reduction of iron-ores is stated by competent authorities to be a feasible one, but our drawback is lack of electric power. We have not, however developed more than one-sixth of our own water-powers in Canada, and it is most important that we should do this if we are to develop our iron-ores.

In regard to our place in Ontario as a producer of minerals, in regard to gold output we lead any province or state in America, except California. In silver production we have fallen down, owing to the decreasing yield of the Cobalt mines, a fact that is not either surprising or alarming, as all mines commence to die at birth. We have promising prospects elsewhere, and from the confidential information at our disposal, I believe we have other and undiscovered Porcupines, Cobalts, Sudburys and Kirkland Lakes.

Address of Mayor Church.

The Mayor of Toronto stressed the necessity to develop our water-powers, and referred to the enormous importance of the Chippewa scheme. The deepening of the St. Lawrence waterway, and the utilisation of the powers that can be obtained from its long and falling course to the Atlantic was worthy of all help.

Mr. Church asked the mining executives to assist in every possible way the education of university students, and particularly mentioned employment in the long vacation.

PRESIDENTIAL ADDRESS.

The retiring President, Mr. D. H. Mc. Dougall read the address, which follows:

It is the custom for a retiring President either to review the year's events, as they affect the business of the Institute, or to speak with particular reference to some phase of Canadian mining.

I propose at the dinner to say a word on Institute affairs, but today would ask your consideration of some circumstances connected with the economic utilization of our national resources.

First of all, I would propound two statements, as the text of my remarks, which, made from this Chair, may strike you as unusual, and possibly heretical. The statements that I would make are that the natural resources of Canada are:

- a. Very specialized.
- b. Not inexhaustible.

I am aware that it has been the custom for many years to refer to our national resources by such terms as "illimitable," "immense" and "boundless," and, while these phrases may have been warranted when our people numbered a few millions, is it not perhaps time to take stock of our national assets in the light of future population, which may within the lifetime of those present here be doubled, or maybe trebled?

Canadian views have possibly been colored by reflection of those of our friends in the United States, whose prodigal natural resources have been a revealed phenomena of modern times. The World has not been before, and cannot see again, such a treasure house as the territory now known as the United States of America was when the white man first commenced to mine those resources, without much thought of the future.

In coal, iron, gold, silver, copper, zinc and lead; in the great forests of oak, pine, cypress and walnut that formerly existed, in agricultural possibilities and variety of climate, there never was so fortunate a land seen by white men, nor ever can be seen again in its unspoiled and intact pristine wealth.

But, in Canada, have we so great an accumulation of potential wealth? It is much to be doubted. Our wealth is truly vast, but relatively, we have certain distinct limitations, which, if we will admit them now, and proceed in that wise and prudent manner which has become a proverb, to "cut our coat according to our cloth," we may to a large extent offset.

Three basic requirements of our national life are, in their natural order of importance, coal, iron and wood, and, if we enquire carefully into the extent of our national resources of these three essential materials, their limitations, so far of course as our prospecting and the progress of scientific research today have led us, will be disclosed.

To deal in order, and very briefly, with these three basic materials:

Coal

Our coal deposits do not include anthracite, barring some anthracitic coals of small tonnage quantity in the West.

Our bituminous coals are concentrated in widely scattered localities—not, as yet, the most populous parts of Canada—and the gap between is wide and important.

With the exception of the great coalfield of Alberta and eastern British Columbia, which is of course essentially one deposit, we have remaining only the coal deposits of Vancouver Island, New Brunswick and Nova Scotia.

The great reserve of the two coalfields of Vancouver and Cape Breton Islands is under the sea, and, in regard to both these widely separated localities, the extent of the coal reserve depends on the progress that science will make in providing the means to transport light, air and motive-power over long tracts of underground passages.

The limits to the mining of coal imposed by great depth of cover, and by distance from shore, are not known, because they have not been tested, but it may be confidently presumed that these limits will be widened as human knowledge is increased by experience, and I merely wish to emphasize that the limitation exists.

In the same manner the removal of the present obstacles to the utilization of the low-grade lignites of the West rests with the advances of applied science, as does also the means of making Canada independent—as far as may be—of importations of anthracite from the United States.

Iron.

Canada's position in regard to iron ore is deducible from the definition of commercial iron ore which is contained in the Encyclopedia Britannica article on "Iron and Steel" by Dr. Henry Marion Howe, of Columbia University, who writes:

"Whether a ferruginous rock is or is not ore is purely a question of current demand and supply. That is ore from which there is a hope that metal can be extracted with profit, if not today, then within a reasonable time."

Our iron-ores, so far as we know them consist of large occurrences of ore of relatively low iron content. Their utilization will depend on the progress made in concentrating these lean ores to compete economically with richer ores. This again is a matter for practical scientists, and some progress has already been made in this direction.

Wood.

The inroads that are being made upon our forests are a matter of notoriety, nor are these inroads accompanied by anything approaching adequate reforestation. Indeed, it is doubtful whether in some instances reforestation is practical.

Enquiry will prove that timber lands are daily increasing in scarcity, and therefore in cost, and our limitations in Canada in this regard are not only distinct, but actually alarming.

What I have said regarding these three basic materials is quite probably true of other essential things, but these do not so properly concern us as a Mining Institute.

One general conclusion we may draw, namely, that efficient and full use of our resources is dependent upon the progress of science, which, applied to their limitations, and supplementing their deficiencies, will have the effect of increasing their quantity and duration.

Dealing now with my second statement, and with those natural resources that I have called "specialized," I would direct your attention to the fact that Canada contains almost the world's reserve of nickel, asbestos and cobalt.

These minerals are chiefly important in being necessary to certain large industries, and, if this word is permissible, they are minerals possessing a "strategic" value, inasmuch as our almost exclusive possession of these minerals should enable us to drive a fair bargain with those nations that possess essential natural resources with which Canada is somewhat meagrely or unevenly supplied.

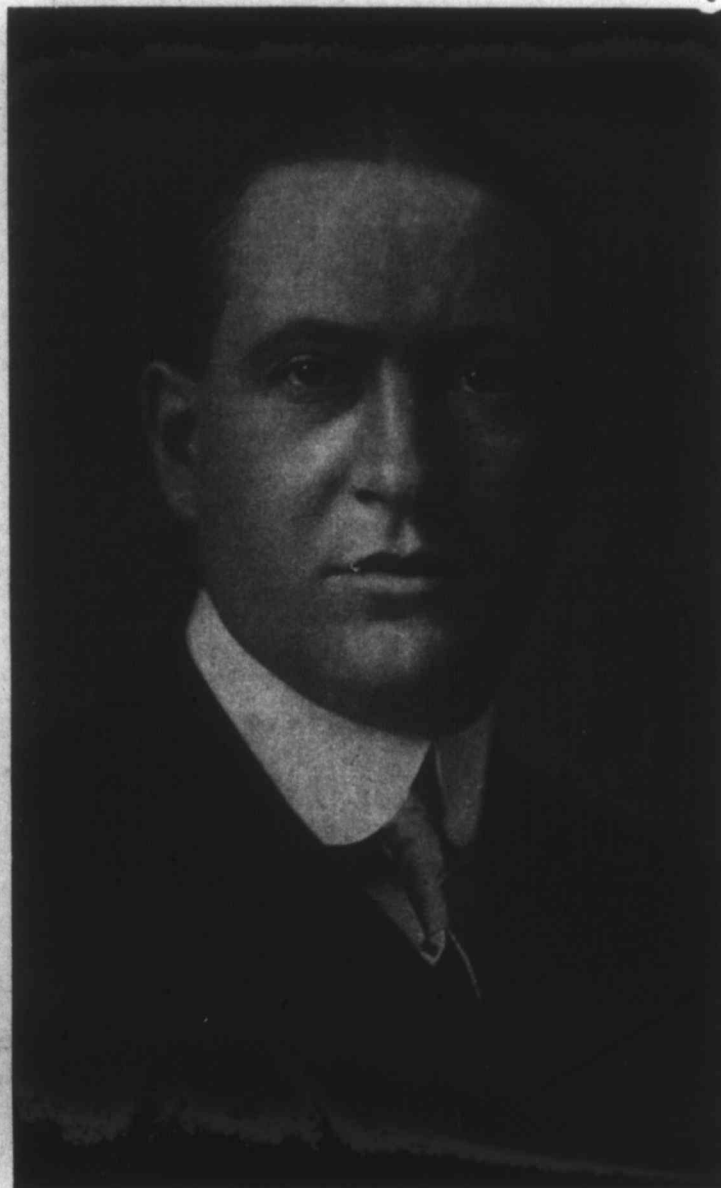
The members of the Iron and Steel Section of our Institute have not been slow to comprehend the growing importance of alloy steels, but this is an industry that Canada should strive to make a national speciality. We have large water-powers and the means of generating with comparative cheapness large quantities of electricity. Canada possesses, as

With reference to many of the ores of precious metals found in Canada it is well-known that their complexity of composition has been a deterrent to earlier profitable development of many deposits, but Canada today can boast of great strides in the processes of recovering the precious metals. So marked is this feature of Canadian mining, that during the past year, the members of the Canadian Mining Institute decided by a preponderating vote to change the name of the Institute as a recognition of the important status of the metallurgist.

What conclusion do these considerations lead us to? Inevitably, I think, and quite unmistakably, to a recognition of the importance of applied science to our young nation, and



MR. O. E. S. WHITESIDE.
President of the Institute 1920.
(Photo from the Bulletin by permission.)



MR. D. H. MCDUGALL.
The Retiring President.

mentioned, a preponderance of the world's nickel and cobalt, and in addition she is supplied with smaller quantities of chrome, molybdenum, and magnesite—from which magnesium is obtainable. As a producer of synthetic steels, the variety of which is now immense, Canada only requires for success the development of trained metallurgists, for she has all the natural resources necessary.

The dominance of Canada in asbestos production and her important contribution of amber mica, should enable us to take overshadowing position in the electrical industry, in which these two products find such varied and indispensable employment.

if this conclusion be admitted, then I think it will be necessary for the Canadian people to entirely revise their valuation of the scientific worker.

The Canadian Mining Institute in common with our sister societies, has for years urged greater recognition of students of science, of the universities and institutions of scientific learning, and of those civil servants charged with the development of the resources of the mines, the forest, the farm and the sea.

The salaries paid to those engaged in demonstrating in our Universities, and to civil servants engaged in scientific work, are so inadequate as compared with the rewards avail-

able by accepting employment with any of the large industrial companies in the country that the average scientific worker in our universities and Government service is compelled to choose between carrying on at a great personal sacrifice the work in which he is engaged or relinquishing it and accepting employment outside his present duties which will at least be sufficiently remunerative to provide the necessities of life.

Among others, there is one branch of the Civil Service—I refer to the Geological Survey—which has never been appreciated at its true worth. No Canadian Government has yet voted a worthy appropriation for the purposes of the Survey. It has always been hampered in its work by an inadequate number of workers, inadequately paid; and this deplorable, but I think undeniable fact, arises from a fundamental misconception of its importance. The Canadian people does not know what advantages flow from applied geological research, and, largely for this reason, it does not care. I suggest that here is a direction in which the Canadian Mining Institute can do useful work. We should fully consider the work of the Geological Survey and should present to the Government a memorandum of how we conceive its usefulness can be maintained and enlarged, and then back our recommendations by the entire influence of the Institute. Certain steps have already been taken and these steps should be supplemented to the fullest possible extent. Unless we ask for what we want, and ask plainly and urgently, we shall go wanting.

Canada is not a country where wealth is easily gained, but it is a country not yet fully known, not half-prospected where in the past sincere work has almost always reaped a satisfying reward. What we, and our children, will get out of Canada will be in exact measure to what we put into Canada in the way of brains and work. We have great national wealth, but none to waste. We have problems and limitations, but, if these are properly tackled we can lead the world in many things. Only, we must give up talking thoughtlessly of our "boundless" natural resources, and prepare, by fostering science and encouraging scientific workers, to get the best out of our country, which may well prove to be something that will not only pleasantly surprise ourselves, but more favored nations also.

Further, our problems should be studied in the light of what has been accomplished in other countries, and this should not be left to that small proportion of our people that can afford out of their resources and time to go abroad

MINERAL STATISTICS.

Mr. John McLeish, Chief of the Department of Mineral Statistics, Department of Mines, Ottawa, read an abstract from the Preliminary Report of the Mineral Production of 1919. An abstract, and commentary on 1919 production, was published in the "Canadian Mining Journal" of the last issue. (vide No. 10, vol. XII, page 189.) Mr. McLeish pointed out the transitional nature of 1919, and managed, as he always does, to make statistics interesting.

Mr. Theo. Denis, Superintendent of Mines for the Province of Quebec, was able to report that the mineral production of Quebec, "in the first after-war year, was the highest in history." Mr. Denis was felicitous in his presentation of Quebec's encouraging record, and while a more extended review of the Province's production may be reserved until a later time, the following abstract from the printed Report, contains all the necessary information. Mr. Denis's repeated warnings against fraudulent mining flotations are as commendable as they are necessary. An abstract follows:

MINERAL STATISTICS OF THE PROVINCE OF QUEBEC FOR THE YEAR 1919.

The mineral production of the Province of Quebec in 1919 reached a total value of \$20,701,005. This is an increase of \$1,993,243, as compared with the previous year when the value was \$18,707,762. The proportional increase in 1919 over

1918 is then 10.7 per cent. Therefore the past year has been prosperous and it is gratifying to observe that as regards value of output, the Quebec mineral industry has not suffered during the dreaded period of transition and readjustment from war conditions to a more normal peace régime. The Province produces several of the so-called "war-minerals," such as molybdenite, chromite, magnesite, the mining of which received a strong impetus during the hostilities, and the armistice strongly reacted on the activities of these materials. But fortunately, the great majority of our mineral products have so far, been substances used in peace industries, such as asbestos, mica, and building materials. Therefore, while in 1919 we record decreases in some of the items, these were more than compensated by greater production in the others, with the result that figures of production for the first after-war year are the highest ever recorded.

The high proportional increases in value which each year has shown over the other since 1914, have in a measure, to be attributed to higher prices rather than to increases in tonnage, for the various items. The quantities have not grown at the same rate, and as an extreme example, of this state of things, we may quote our main product, asbestos, which in 1919 figures for an increase in value of 279 per cent as compared with 1914, while the tonnage has only increased 33 per cent in the same period.

It is to be particularly a matter of congratulation that during this difficult period of transition, so generally marked throughout the world by industrial and social unrest, the Province of Quebec has been comparatively free from serious troubles as regards undue exigencies of labour, and there have been no strikes on a large scale, such as paralyzed production in many other parts of the world. The cost of labour of course, has increased in keeping with the cost of living, but the demands have never been such that they could not be amicably and satisfactorily settled between employers and employes, without prejudice to the industries.

The progress of mining in the Province of Quebec in the last twenty years cannot be more graphically illustrated than by a table of the annual value of the products of the mineral industries.



MR. THEO. DENIS.
Supt. of Mines, Quebec.

Table of Value of Annual Mineral Production of Quebec from 1900 to 1919.

Year	Value	Year	Value
1900	\$1,276,076	1910	\$ 7,323,281
1901	2,997,731	1911	8,679,786
1902	2,985,463	1912	11,187,110
1903	2,772,762	1913	13,119,811
1904	3,023,568	1914	11,732,783
1905	3,750,300	1915	11,465,873
1906	5,019,932	1916	13,287,024
1907	5,391,368	1917	16,189,179
1908	5,458,998	1918	18,572,595
1909	5,552,062	1919	20,701,005

The Quebec Bureau of Mines has repeatedly issued warnings to the investing public to put them on their guard against buying shares and stock certificates of mining ventures organized for the sole purpose of attracting and entrapping the hard-earned savings in rural and urban communities. The last few years have been prosperous, savings accounts have grown appreciably, and these conditions have caused the reappearance of the professional promoter, with his flock of peddlers of beautifully engraved stock certificates.

As we have repeatedly stated before putting money in ventures of which he knows little personally, the investor should make thorough enquiries from reliable sources, as to the value of such enterprises and investigate and weigh the chances of success. The Quebec Bureau of Mines is at the disposal of the public for technical information regarding the mines and the mineral resources of the Province. An enquiry on such subjects, addressed to the Department of Colonization, Mines and Fisheries, Quebec will, as a rule, bring to the writer information which will enable him to go into it with a better knowledge of the facts.

MINERAL PRODUCTION IN ONTARIO.

Mr. T. W. Gibson, the Deputy Minister of Mines for Ontario dealt with the mineral production for 1919. He referred to the falling curve of silver production, but this he forecasted would be flatter and more prolonged than its phenomenal rise from 1905 to 1913.

Mr. Gibson mentioned that the increased price of silver had the effect of increasing the value of silver properties to an extent which, while not predictable, certainly would be equivalent to prolongation of the life of the mines in proportion to the amount of low-grade ore thereby made mineable.

Gold production was becoming more important, and Kirkland Lake was a field of established value.

With regard to natural gas, the tendency was to use it in the coarser industries, for which of course it was a most desirable fuel. Now that the supply was decreasing, the Government considered it proper to confine its use to domestic requirements. The task had been a difficult one to undertake, but public opinion had sustained the policy. The result of restricted use had of course been a smaller production, and this had increased the cost of unit production, which may necessitate an increased selling price, but the expectation of a longer life for the wells, and the necessity to conserve natural gas to help the general problem of domestic fuel and heating in Southern Ontario, would offset the disadvantages which an increase in price brings with it.

The extent of variety of Ontario's mineral production does not permit of a satisfying abstract at this time, but some of the outstanding features of the Report may be mentioned.

The total production of silver from the Ontario silver mines since the discovery at Cobalt in 1903 to the end of 1919, is 303,610,836 ozs. valued at \$152,239,

972. Mines shipping over half a million ozs. in 1919 are given in order as follows:

New developments during 1919 include the completion of the British-America Nickel Company's refinery at Deschenes, near Ottawa, and the new smelter of this Company at Nickelton. Radium-bearing minerals have been found in encouraging quantity near Maberly. The production of soda ash at Amherstburg by the Brunner Mond, Canada, Ltd., is a development of 1919, and its importance is properly emphasised in the Report.

Status of the Engineer.

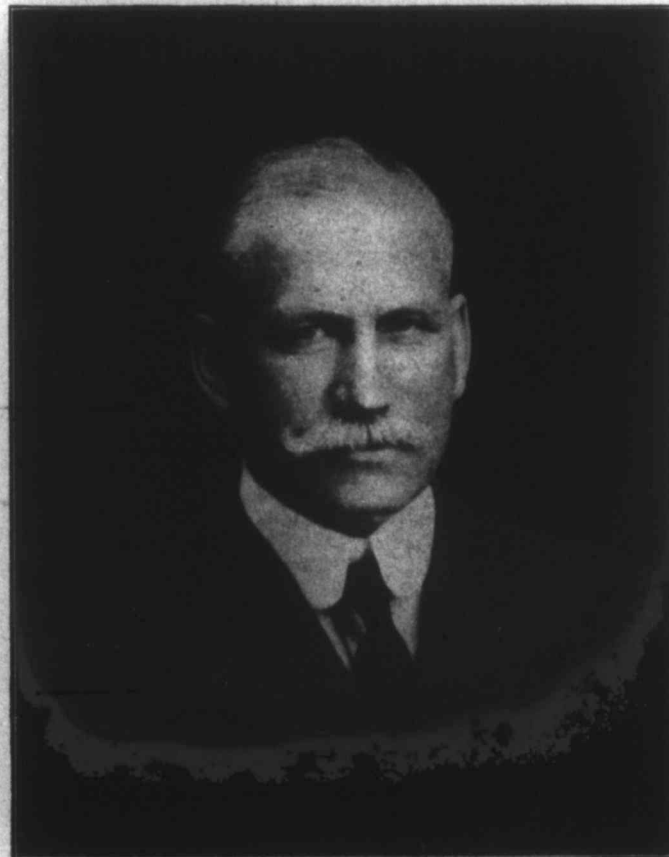
Mr. James McEvoy of Toronto had consented to open a discussion on this question, and gave a summary what had been accomplished. In part, Mr. McEvoy said:

During the early years of the Institute efforts were made in some of the provinces to pass legislation regulating the practice of engineering of all kinds, but representations made on behalf of the Institute had caused such legislation either to be withdrawn or to have omitted from its scope the direction of mining operations.

The Quebec Act of 1898 specified the character of engineers' work, and provided that no person except a member of the Canadian Society of Civil Engineers could act as engineer within the definition of the Act, and the Act was amended this year to make the provisions apply to any person not a member of a corporation of engineers.

This Act creates practically a close corporation, but the mining engineer is not specifically designated, and the terms of the definition are loose. As far as can be learned the Act is not enforced.

A little over a year ago the Engineering Institute of Canada called a Committee together in Montreal representing each of the provinces to prepare a bill which might be used as basis of legislation in each province and thereby secure some degree of uniformity. The Committee reported and a model act was published in the E. I. C. Journal.



MR. T. W. GIBSON.
Deputy Minister of Mines, Ontario.

In Ontario the bill has received earnest and full consideration by the E. I. C. members in Ontario. So far as the C. M. I. is concerned the bill has been discussed by individual members and some of the branches have objected to certain of its provisions. As yet, however, the C. M. I., as a whole, has not decided on any policy in the matter nor has it, so far as the ordinary member knows even considered it at all.

The Joint Committee of Technical Organizations in Ontario has also submitted a model bill, which is a distinctly popular bill, inasmuch, as it suggests the governance of the different branches of engineers under a board of engineers of each class, the whole being under a government department. In this respect the bill is different to the plan of the E. I. C. model, which is more properly of the close corporation type.

A Committee consisting of two representatives from each of the professional organizations in Ontario, namely, the E. I. C., C. M. I., and the organizations of the architects mechanical and chemical engineers, is to convene in Toronto next week to consider the question of engineering legislation.

A study of professional organizations has been made by Sydney & Beatrice Webb, and printed in the Engineering News Record, which shows variations in them ranging from a typical trades union organization to the type that considers only the ethical side of the professions.

This Report makes some definite recommendations, namely:

a. It is undesirable that the government of a profession should be exclusively and autocratically by a lay authority.

With all this we shall agree.

b. It is undesirable to give to professional organizations undivided control over the conditions of entry to the profession, powers of expulsion, etc. What is required is a composite authority.

This Report does not offer any complete solution of the problem, but says finally:

"The only inference we can draw is that the constitution of any professional council, whether statutory or voluntary must necessarily be complicated, ought always to be elastic, and will need to be perpetually revised."

Some general facts to bear in mind are:

Engineers include employing engineers and employed engineers, whose views are unlikely to coincide.

In all professional organizations there are groups of older men, ranking high in the profession, and younger men, who may be called the rank and file. Differences of opinion arise here.

There is a tendency in professional organizations to develop groups having special interests and at a certain stage to split up into separate organizations, possibly leading to disintegration of the parent body.

Is legislation for the engineer to be for self interest, or for service? Should our attitude be: "What is there in this for me?" or, "Will this be of public service?"

Having endeavoured to outline some phases of the question without having personal bias, Mr. McEvoy submitted his own views, as follows:

a. It is yet an open question whether or not we need any legislation for mining engineers. We must bear in mind that if we do not legislate for ourselves someone will legislate for us, unless we are perpetually armed against outside legislation.

b. That legislation which may be suitable for other branches of engineering may not, in fact is not, at all alike to satisfy the needs of the mining profession or the mining industry. Special provisions for the government of mining engineers is essential, whether this be afforded by special clauses in one all-embracing Act, or by means of a separate ancillary Act.

Third: There is grave danger to the mining industry if legislation of too exclusive a character is enacted. It ought to be freely admitted that the owner of a property can engage any one he likes to tell him what he thinks of it, and how it should be worked. If the foreign capitalist cannot freely send his own man in whose judgment he has confidence to advise him about investment, then without doubt the development of our resources will suffer.

Fourth: That not only for the good to the public, but also for the welfare of the members of the profession itself, it is not desirable to have the profession a close corporation. This may appear to be a debatable point, but while I am open to conviction it is the opinion I now hold after a good deal of thought on the subject.

Fifth: That the Administration or Government of the profession should be carried out with the assistance and advice of members of good standing.

Sixth: It is very doubtful whether in any legislative Act a satisfactory definition exists of what work is legally termed mining, engineering.

In conclusion, Mr. McEvoy said the Engineering Institute of Canada had a definite policy regarding legislation. The unwritten policy of the C.M.I., he gathered, was against legislation. He thought the opinion of the individual members should be expressed, and suggested the appointment of a committee of the Institute, representing all provinces, charged with the duty of following the question to a finality, so that the attitude of the Institute towards legislation could be defined.

The President stated that a Committee had been during the year appointed by the Council to scrutinise all legislation affecting the status of the engineer, and vested with authority to notify any persons moving to effect close corporation legislation that the Institute could not be a party to such legislation, and authority was also given to a member in each province to attend the Legislature to oppose any legislation in which the interests of the Canadian Mining Institute had not been considered.

Professor Haultain said that if he had understood Mr. McEvoy to state that the E. I. C. had appointed a Committee with authority to seek legislation defining the legal status of engineers, Mr. McEvoy was wrongly informed. Apparently Mr. McEvoy's point was that the E. I. C. had a definite policy towards legislation, but the C. M. I. had not yet defined its point of view.

Lunch time had been reached, and unfortunately no discussion of Mr. McEvoy's pro and con recapitulation of the subject followed. The matter was not again reached during the continuance of the meeting, but it is to be hoped that the publication of Mr. McEvoy's paper in the Bulletin will lead to steps being taken to define the feeling of the members either for or against legislative enactments defining the status of the engineer.



MR. JAMES MC.EVOY.
Toronto.

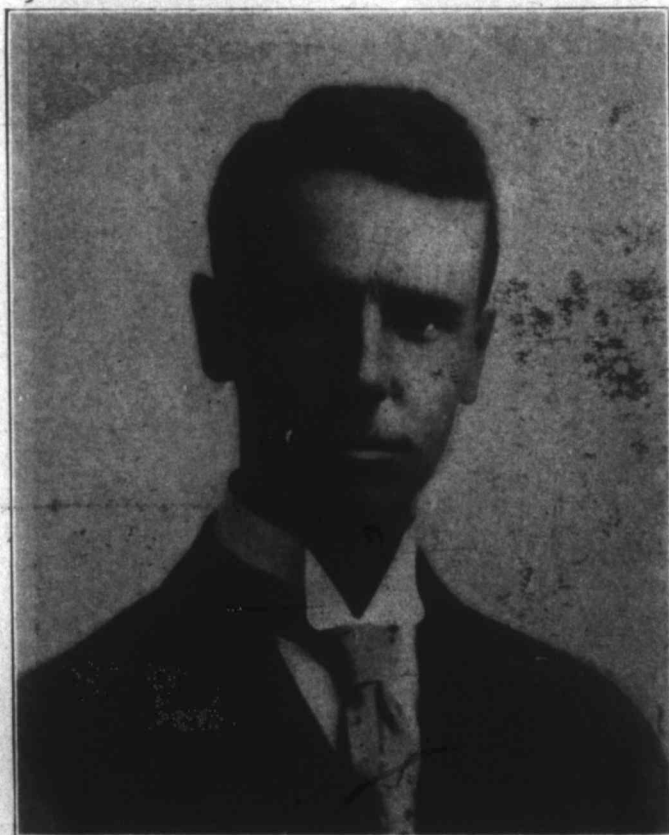
AFTERNOON SESSION, MONDAY 8th.

Mr. C. E. C. Smith in the Chair.

Reports of Committees.

Committee on Education. Dr. W. L. Goodwin reported progress by the Committee on Education appointed two years ago by the Institute. He was present at the Winnipeg Conference on Education (see C. M. J. issue Aug. 6th 1919, page 581), and the fact that the recommendations which the Committee had previously formulated were identical with the recommendations decided upon by this great conference was a compliment to the idealism of Mr. Corless who first brought this matter to the attention of the Institute, and an indication that we were in the van of progress. Dr. Goodwin asked that his remarks be taken as a report of progress, and moved that the Committee be continued for another year, which was agreed to.

A number of papers of interest to the Iron and Steel Section had been arranged for, but unfortunately none of them were given at the meeting. Mr. G. C. Mackenzie's paper on "Ferro-Alloys in Canada," was looked forward to, but at the last moment Mr. Mackenzie was unable to get to Toronto. Two papers on the Plate Mill of the Dominion Iron and Steel Company at Sidney were in course of preparation, but were not finished in time for presentation. It is expected these papers will be read at the Annual Meeting of the Mining Society of Nova Scotia at Glace Bay in May next, and will appear duly in the Transactions of the Institute. Mr. F. E. Lucas's paper is also expected at the Glace Bay Meeting, and deals with "Economies in Steel Plants".



MR. CYRIL KNIGHT, Toronto.
To whose work as Local Secretary much of the success of the Meeting was due.

Molybdenite in the Ottawa Valley.

Dr. M. E. Wilson described with the aid of lantern slides the occurrences of molybdenite in the Ottawa Valley. From an economic point the work so far done, and the extent of the deposits as revealed by actual mining, show that there would be steady work for a number of mills for many years should the market price of the mineral allow profitable operation of the known deposits.

The Iron Ranges of the Michipicoten District, Ont.

Mr. W. H. Collins, of the Geological Survey, spoke on the iron ranges, and gold occurrences of the Michipicoten District and the vicinity of Goudreau. An abstract of Mr. Collin's report on the work done by the Survey in this region was contained in the "Journal" of 25th February (see page 156).

The most interesting portion of Mr. Collin's remarks was his description of the attempt made to establish a definite stratigraphic succession within the Keewatin complex of the rocks immediately associated with the iron ranges. The general succession of basic volcanics, banded silica, pyrite, siderite and acid tuffs, in the order given was found to apply to the Michipicoten District. If the top and bottom of the known ranges could be determined, then this succession could be used to guide with some accuracy the course of future exploration.

The faults encountered had a tendency which in nine cases out of ten was to the left, and displacements of 6,000 feet of horizontal throw were frequent.

With regard to the Houldsworth pyrite deposit, about 900,000 tons of high grade pyrite were under development, and Mr. Collins suggested the possibility of further deposits of this kind being discovered.

Dr. Goodwin mentioned that in 1912 he was summering in the Magpie District, and had at that time noticed the difference of texture on the rocks on the upper and lower contact of the iron formation, and was able to confirm from his recollection some of the features brought out by Mr. Collins.

In answer to Mr. Bradley Stoughton, who asked whether the ore could be used without concentration Mr. Collins said that Mr. Cowie of the Algoma Steel Corporation was present, and could give exact information. The siderite runs about 35 per cent iron, and by roasting it can be raised to 51 per cent iron. The ore is almost self-fluxing.

Mr. Cowie said that after driving off the sulphur, the roasted ore contained from 50 to 52 per cent iron, and the manganese content was increased up to as high as 3 per cent. At the Helen Mine, there was an immense deposit and the next generation would still be mining siderite. There was 150 million tons, and all that was required was a bounty to enable it to be opened up.

Work of Mining Organizations in the United States.

Major Percy Barbour, Assistant Secretary of the A. I. M. & M. E. said that during 1919 the American Institute had done a great deal of work of a non-technical character, but no really outstanding mining undertaking had been in progress during that year. The feature of the year had been the activity of the Institute in important public matters, and the Charter of the Institute had been amended to permit of this being done.

The year began with strikes. The mining executive's work had been increased, but the results had been disappointing because of the lessened production and general inefficiency, and he had not been given credit for his greater responsibility and increased worries.

He described how at the Miami Copper Company the industrial troubles had been straightened out by bringing in the workmen and mine foremen into consultation.

The return of the soldiers had presented a great problem, and the four national technical societies had co-operated with great success in solving the problem. Twenty thousand engineers has been put into touch with positions in 1919.

The interest of the mining industry had been watched in connection with such matters as the Mineral Relief Act and mines taxation. In connection with taxation the Institute had assisted the U. S. Government by request.

With regard to the licensing of engineers, Mr. Barbour said the mining engineers did not care whether civil engineers license themselves up the front and down the back, but they ask to be let alone. There were 48 states in the Union, and if a consulting mining engineer had to take out a license in each state, and conform with as many different notions of what constituted the status of the engineer, they might as

well go out of the business. Examples of freak legislation were Oregon and Colorado, but the representations of the A. M. I. E. had been successful in opposition. The whole business originated in a difference of opinion between the structural engineers and the architects.

In connection with relief to gold miners, much had been said and written, but nothing accomplished. Most people who had tackled the problem forget that the law of supply and demand is about as immutable as the law of gravitation.

Mr. Corless's paper on "Industrial Democracy and Education" had attracted a great deal of attention, and there had been a widespread demand for copies of the paper. It was a classic. For the first time, the mining engineer has branched out and assumed an important place in literature. Mr. W. R. Ingall's paper in "Industrial Co-operation" has also been widely read.

In connection with the bituminous coal problem, the Institute had recently held an open forum, and good results were anticipated from the concentration of some of the best informed men in the country upon this important question.

In conclusion, Mr. Barbour said the selection of Herbert Hoover as President of the Institute had aroused great hopes for the future.



MR. C. V. CORLESS.



MR. J. L. AGNEW.
Vice-President International Nickel Co.

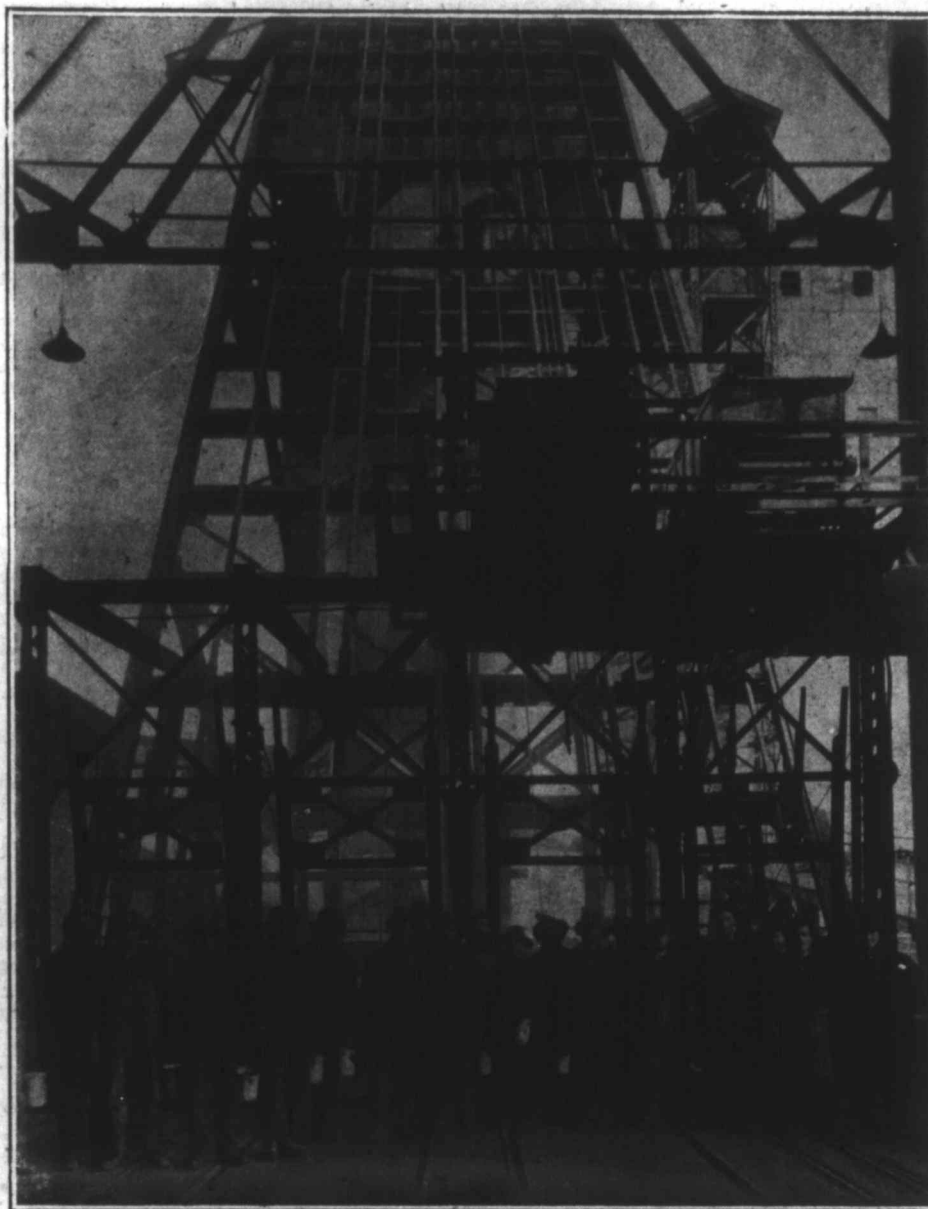
EVENING SESSION, Monday 8th**The Creighton Mine of the International Nickel Company at Sudbury.**

In the evening, Mr. J. C. Nichols, General Superintendent of the Mining and Smelting Division of the International Nickel Company, described with the aid of the lantern the operations at the Creighton Mine, and at the Smelter at Copper Cliff. Unfortunately, owing to the use of the lantern it was not possible to make extended notes, but Mr. Nichols had an intensely interested audience. A notable feature was the description of the underground loading plant and crusher. The exposition of the mining system was very lucid, and an excellent idea was given by Mr. Nichols of the extent and shape of the ore body. All but about two percent of the ore was obtained in the different stages of extraction. The hoist and underground loading arrangement, which ensured a steady and equable load for the skips, handled 2800 tons in eight hours. The arrangements for the comfort of the men underground included water-bubblers for drinking purposes, and appeared to be as complete as those on the surface. The "Journal" of February 13th contained a full description of the International Nickel Company's operations by Mr. W. L. Wotherpoon (see page 118), in which issue there is also contained a diagrammatic section of the Creighton Mine, and some views of the Port Colborne Refinery. Additional views are contained in this issue.

Mr. Nichols mentioned that at the smelter, pulverised coal had been used for nine years, without any trouble, notwithstanding that coal containing 13 per cent ash had been used.

The Alfred Peat Bog.

Mr. A. A. Cole, whose abilities as a photographer are well known, showed lantern slides and moving pictures of the Alfred Peat Bog, and synopsised the work accomplished by the Peat Committee, which included Messrs. R. A. Ross of Montreal and B. F. Haanel of Ottawa, on behalf of the Federal Government, and Messrs. R. C. Harris of Toronto, and Mr. Cole, representing the Ontario Government, assisted by Mr. E. V. Moore of Montreal who acted as Engineer to the Committee. The process adopted consists of excavation, maceration and spreading. Maceration appears to contain the solution of the problem, and the



Waiting at the Collar of the Creighton Shaft.

final product, after drying and curing in the sun, contains 25 per cent moisture.

The Anrep Plant, which includes an excavator, mounted on caterpillars, a macerator and spreader, was first experimented with, and later a modification of this equipment, with which the name of Mr. Moore is coupled, was evolved. This plant is identical with the Anrep Plant, except in the spreading process. The mechanical processes have been further perfected in the Moore Plant which requires only seven men to operate it, against 13 to 15 in the original Anrep design.

The work done has been on the Alfred Bog between Ottawa and Montreal. The season has a length of from 100 to 120 days. Peat is being sold f.o.b. cars Alfred Station at \$3.50 per ton, which allows for the reasonable commercial profit, after deduction of 10 per cent

depreciation and an 10 per cent amortization allowance.

Mr. Cole states: "A ready market is obtainable in Ottawa and Montreal for the product of many such machines as those built for the Peat Committee. It is not supposed that peat fuel will entirely replace coal, even where most plentiful but for certain special uses it has advantages over coal and if used for these purposes will materially help the fuel situation.

Peat can be used to advantage for open grates and in cooking ranges but is not recommended for furnace use except in the fall and spring when light fires are needed or in conjunction with coal when a coal fire has to be hurried.

The programme laid out for the coming season is to work both plants to capacity marketing the product and showing thereby what can be done on a commercial basis. It is also proposed to test out a small three man machine which is now being built and which we hope will make available a great many small bogs of comparatively shallow depth throughout Ontario and Quebec that would be too small to endeavour to work with the larger machines.

It will be gathered that Mr. Cole's communication is of a most important character, indeed, one of the most important and far-reaching of recent meetings.



MR. A. A. COLE.
A Past President.

Mr. R. C. Wallace, who was to have presented some aspects of the mining situation in the middle West, was unable to be present, a fact that was much regretted, as the members would have liked to hear something about the new discoveries in Northern Manitoba.

After Mr. Cole had spoken the members called it a day, and some did not.

Mention should not be omitted of the Ladies' Tea and Reception in the Hotel in the afternoon. There was then observable that social distinction and bearing, and that *joie de vivre* that sits so gracefully upon certain of our members. The attendance at this function greatly exceeded the attendance at any other event during the meeting.

TUESDAY MORNING, 9th MARCH.

Chairman, Mr. O. E. S. Whiteside.

Formation of Proposed Coal Section.

This question was laid over for further consideration by the incoming Council.

In the absence of Mr. J. T. Stirling, a paper on "Coal Mining Industry in the Province of Alberta" was summarised by Mr. McEvoy.

The main points in Mr. Stirling's paper were as follows:

The coal deposits of Alberta are conservatively estimated to contain 1,059,976 million tons. The existing mines have a producing capacity which is twice the present coal requirements of the district they serve.

The growth of the coal production of the West is shown by the following figures of production:

	Tons.
Total North West Territories, 1901.....	346,649
Alberta, only, 1918	6,148,620
Alberta, only, 1919	5,022,412

In 1919, there was imported from the United States into Canada, into territory which should undoubtedly be supplied with Canadian-mined coal, a tonnage of 2½ million tons.

The possible present market for coal in Alberta and Saskatchewan is from 7,500,000 to 8,000,000 tons per year.

In December 1919, Alberta alone produced 780,832 tons, so that an output of 9,000,000 tons of coal per year is possible in Alberta with the present supply of labour and the existing mine development.

The prejudice against the use of Canadian coal is disappearing, and in a few years the western mines will supply the territory as far east as Fort William.

To hold the Canadian market proper attention must be paid to preparation. Dirty coal must be avoided. Low grades coals have been sent for long distances incurring heavy freight charges, which is not advisable, and arrangements should be made to give the customer authentic information as to quality and moisture content so that the distances to which coal is forwarded may answer to some extent to its quality.

The following figures show the difference between costs of production under conditions of maximum output in months of good demand, and insufficient demand in Spring and Summer.

	Tons mined	Cost	Being per ton
Year 1919	2,395,290	\$6,126,120	\$2.55
December, 1919	451,016	1,031,112	2.28
April 1919	85,478	308,025	3.60

The intermittent operation of collieries increases costs, and the mines must operate more steadily, or, in other words, the market must be enlarged, or the production must be reduced to fit the market.

The average annual production per mine during 1918 in Alberta, compared with British Columbia and Nova Scotia is given below:

	Tons.
British Columbia	92,106
Nova Scotia	89,516
Alberta	19,936

In Alberta under existing conditions, five times as many plants, offices, and staffs of officials are required for the same production as in the other coal-mining provinces.

Since 1905 there have been opened in Alberta 600 mines, of which only 276 are in operation, meaning that 324 mines, or 64 per cent of the mines, have been abandoned.

During this same period 100,448,038 tons of coal in the ground were affected by mining operations, of which, 47,227,498 tons is estimated to have been extracted, leaving 53,356,540 tons developed, probably not more than half is recoverable. This indicates a loss of coal through improper mining of 26,629,000 tons in less than 15 years.

Since 1903 there has been expended in mining \$39,110,775 of which \$9,813,500 tons, or twenty-six per cent, has been invested in mines completely abandoned.

Of 324 mines abandoned since 1905, only three were so abandoned because the available coal had been extracted.

We may look forward to the time when Canadian mines will supply all the fuel required in Alberta, Saskatchewan and Manitoba.

Canada's Coal Supply.

Following Mr. Sterling's paper, Mr. F. W. Gray read a paper on "Canada's Coal Supply", which will be found elsewhere in this issue.

Lignite in Saskatchewan.

Mr. A. Mc Lean, assisted by lantern slides, described the occurrence and mining of lignites in the district around Estevan, Bienfait and Roche Percee. (See the Geological Survey Report on the Wood Mountain, Willow Bunch areas). Mr. Mc. Lean showed some very nice slides descriptive of the difficulty of determining the horizons in this district. Only comparatively few of the seams have as yet been worked.

Mr. Mc. Lean specially described the mine of the Western Dominion Colerieries at Taylorton. This is a shaft mine, with modern equipment, including self-dumping cages, trolley haulages underground, and electric coal-cutters, making a six foot cut. No gas is found in this mine, or generally in the district. Reference was made by a speaker to the unsuitability of box-car loaders of the loading-arm type for the friable lignite, and mentioned that loaders of the cradle type had been found more suitable. The lignite production in 1919 was about 250,000 tons, and in view of the large amount of lignite available for mining, compared with the coal requirements of Saskatchewan, which are approximately 1,500,000 tons annually, it will be seen that a large market is available for the lignites, particularly if a successful briquetting industry is established.

Principles and Practice of Fuel Briquetting.

Mr. Edgar Stansfield, of the Mines Branch at Ottawa, opportunely followed Mr. Mc. Lean's paper by one of the most lucid and comprehensive accounts of the present attainments of the fuel briquetting industry ever given to the Institute.

Mr. Stansfield said that with other gentlemen appointed for the purpose he had visited numerous briquetting plants both in the United States and Europe, and had had many interesting experiences seeing that the work of visiting was commenced on November 11th 1918.

Generally speaking, Mr. Stansfield thought that the failures experienced in briquetting trials in this country had been due to attempting to transplant European methods without regard to the essential differences and the economic factors. There is no royal road to briquetting, and the perfect briquette has not yet been attained. Many difficulties still remain to be overcome, and Mr. Stansfield said the problem involved an infinite number of variables.

Some of the main facts brought out by Mr. Stansfield are as follows:

There are two general types of briquetting plants, namely, those using a hard binder, and those using a liquid or molten binder.

European briquets are of all sizes, up to briquets that are a comfortable load for one man. American briquets have a maximum weight of probably 13 to 14 ozs., and are generally much smaller. The industry now growing up on this side the water is an American industry.

Desirable characteristics of a briquet should include suitable size without friable corners, should be strong and clean to handle, weather-proof and not affected by rain or frost, not unduly soft in the heat of the sun, and should be good fuel.

As an instance of the small things that influenced briquet making, Mr. Stansfield mentioned a case which occurred in the trials at Ottawa, where one binder had been tried with many failures, but on one occasion a perfectly suitable binder had been made. The raw materials and proportions of this binder were known, but it had not been found possible to repeat the successful result.

With regard to the raw materials used in briquetting, anthracite was the best known example. A large quantity of fines was made in preparing anthracite for market.

It was not usually found necessary to briquet bituminous coal.

Lignite required carbonizing before briquetting, and samples of lignite briquets were displayed by the speaker.

There had been many attempts to briquet coke breeze, and it was usually mixed with bituminous coal. Coke breeze was an abrasive and wore down the briquetting machines rapidly. Charcoal had also been briquetted.

The nature of the material to be briquetted made a great difference to the process. For example, the briquetting of anthracite meant the consolidation of a number of particles of a hard and solid material, but coke was porous, not strong in structure, and drunk up the binder greedily.

Binders.

The number of binders is legion, but the number actually employed is small. Asphalt from oil refineries, and coal tar as among the best materials. Sulphide pitch is a nice binder, but is not cheap, as it contains much water which must be removed, and is of course not a waterproof binder. It must be baked to make it waterproof.

The admixture of a dry binder with the crushed coal is good practice, but when coal comes hot from the carbonizer it is difficult to mix a dry binder that softens with heat.

The speaker said he had concluded from his observations that briquetting was an infant industry, and is not yet standardized as to practice.

The carbo-coal briquet is a good one, but the process of manufacture is quite complicated. Bituminous coal is mainly used, and the object is to get a large yield of tar oils. The coal is carbonized at a low temperature. The coke resulting is mixed with the pitch obtained at a later stage in the process. The briquets are then baked in an oven at a temperature corresponding to the nature of the use to which the briquets are to be put. This makes a very pretty dense briquet, which is a smokeless fuel. The people who make this briquet have a large experimental plant at Irvington, N. J., and one at Clinchfield. Referring to Mr. Gray's paper, a plant of this description at Montreal, treating Nova Scotia coal would give us a fine home-made substitute for anthracite.

Types of Plants Now Working.

Plants at or near coal mines, owned by the coal operators. Plants between the mine and the shipping point. The coal comes from the mine and is screened. Screenings are briquetted. Plants at or near mines, operated by interests independent of the mines, and buying for briquetting purposes the coal from a number of mines. In one case of this kind, washery refuse is sent down by flumes to a briquetting plant. It is hoped that such a central plant of this kind will include the plant of the Lignite Briquetting Company at Edmonton. Another type of plant is found at points of transshipment, where coal is screened. A plant of this kind is a possibility in Canada, should the system of storing anthracite suggested in Mr. Gray's paper be adopted. The fines screened out of transhipped coal, which has already been screened at the mine contains a much smaller percentage of ash than the mine screenings. Screenings from screened lump coal will average about 20 per cent less ash than the mine screenings.

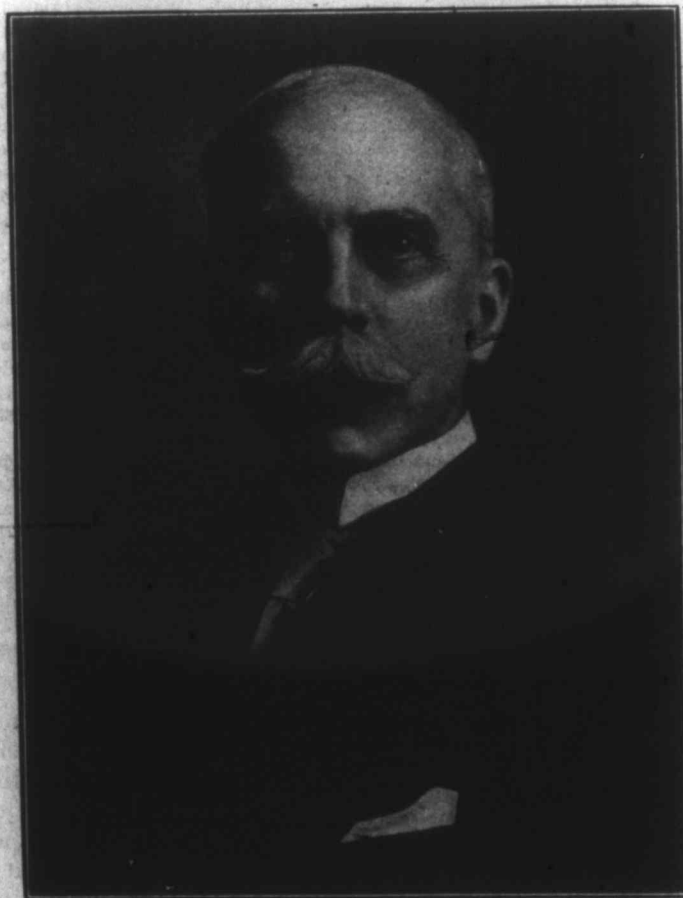
Mr. Payne, of the American Mining Congress, advised the thorough going utilisation of low grade fuels. He mentioned the discussion at the A. M. I. E. meeting in Chicago last September, when the suitability of coals containing more sulphur than it has been customary to specify for gas coals was pointed out. Their utilisation is only a question of additional purifying capacity at the gas-plants.

The morning session was ended, as the time had expired, and the further reading and discussion of the papers on fuel was left until the afternoon.

Complimentary Luncheon by the City of Toronto.

At the noon hour the Institute members were the guests of the Mayor and the City Corporation of Toronto. The Mayor asked the consideration of the mining industry in affording all possible employment for returned soldiers, and gave particulars of the fine record of enlistments held by Toronto. Speeches were made by Dean Adams of McGill University, by Mr. Bradley Stoughton, Secretary of the American Institute, and by the President. Mr. Stoughton amusingly contrasted the summerlike aspect of Toronto with the sub-Arctic condition of New York and Boston. He congratulated Toronto on its Mayor and feelingly deplored the lack of a similarly good man in other cities. He mentioned the over-shadowing calamity occasioned by the 18th Amendment to the U. S. Constitution, and said that in New York they used to have both optimists and pessimists, but now only optimists were left. "The pessimists are dead."

The President thanked the Mayor for the especial manner in which the Institute had been marked out for distinction in Toronto, which he said had been so unusual as almost to embarrass the individual members, who felt, however, that the compliment paid was to the responsible status reached by the Institute as the spokesman and representative of the mining and metallurgical industries of Canada.



DEAN F. A. ADAMS,
McGill University.

AFTERNOON SESSION, 9th MARCH, 1920.

Mr. M. A. Mc. Innis, of the Lackawana & Mc.Crory Coal Company, Montreal, and formerly a Superintendent of the Dominion Coal Company in Cape Breton, gave a paper on:

Coal Transportation.

An abstract of this paper is as follows:

At our present rate of importation of anthracite and bituminous coal from the United States totalling 22,000,000 tons annually, or 60,000 tons daily, we shall have from time to time to deal with abnormal conditions, and for these, and for the ordinary increase in population and consequent increased coal consumption, we should be prepared.

In 1919 Canada consumed 35,000,000 tons of coal, or about 4½ tons per capita. When our population reaches 10,000,000, which may be expected by about 1925, consumption will have increased by 9,000,000 tons, to a total of 44,000,000 tons, which, unless our home production can be increased in the meantime, means that by 1925 we shall have to import 27,000,000 tons, or 74,000 tons daily. Of our total imports 42 per cent is water-borne, 46 per cent rail-borne, and 12 per cent comes by car-ferries.

For handling our water traffic we have at present available the following plants:

Plants	Storage Capacity	Discharging Rate	
		Per Hour	Per Hour
On St. Lawrence River.....	44	1,750,000	7,800
On Lake Ontario.....	9	29,000	240
Lake Erie	3	5,500	300
Huron and Georgian Bay.....	52	815,000	4,800
Superior	11	2,800,000	3,600
Sault Ste. Marie.....	4	715,000	1,400
		6,114,500	18,140

The 12 per cent of the imports handled by ferries to two points on Lake Ontario and four on Lake Erie amounts to about 2,600,000 tons yearly.

British Columbia, Saskatchewan and Alberta do not need to import fuel, and the matter of transportation in these three provinces need not concern us.

In Manitoba, although about 1,500 miles distant from the mines, the water haul of 800 miles with a low freight rate keeps the price of coal in Winnipeg within \$1.50 per ton of the price in Quebec and Ontario.

Our greatest difficulty in importing coal by rail occurs at what is known as the Niagara Gateway. Canadian roads at this point are unable to accept freight at the speed and in the quantity offered by the American roads. Ontario points must take more coal by water, and adequate unloading and storage facilities must be developed to allow this to be done.

Importation of coal into Eastern Ontario and Quebec has but reasonable difficulties. Ample transportation facilities exist for the importation of both American and Nova Scotia coal into this territory.

The Maritime Provinces have no difficulty in providing themselves with coal.

The coal trade of Nova Scotia advanced in the early nineties in exact proportion as the transportation facilities of the St. Lawrence improved. With steamers of 30 ft. draft and 10,000 tons capacity coal could be landed in Montreal for 50 cents a ton freight. As the transportation and handling facilities were improved the coal importations from Nova Scotia to St. Lawrence ports improved. The market was there in every case, and the coal was in Nova Scotia. Transportation was the weak link in the chain.

Storage of coal in the Summer months has in the case of anthracite been assisted by the differential price between Summer purchases and Winter purchases, and the application of this principle to bituminous coal is urged.

Store coal early in different parts of the country, and it will diminish to a large extent the danger of coal famine, will avoid high prices caused by shortage, and, without laying an extra mile of track, it will increase the effectiveness of our existing transportation systems by giving them the bulk of coal to be carried when it can best be handled. The maximum service from coal cars will also be thus obtained, as they can be unloaded more quickly in Summer, and the tying up of railway yards and junctions by congestion of unloaded cars would be avoided.

No discussion followed the reading of Mr. McInnis's paper, which perhaps is explainable by the fact that most of the members interested in coal matters had been called to a meeting of the Sub-Committee on Mining and Metallurgy by the Hon. Advisory Council. There has rarely been presented to the Institute such a symposium of papers on the coal problem as those which were concluded by the reading of Mr. McInnis's paper. These papers covered adequately the production of coal in the eastern and western mines of Canada, the use of the Saskatchewan lignites, the briquetting of coal and lignites, the national aspect of the subject and the transportation questions. Those who arranged this symposium anticipated a real discussion, such as was held in New York recently, and actually there was not a peep out of anyone. This circumstance cannot be regarded as less than disappointing.

Oil Papers.

Following the coal papers a number of papers were presented dealing with oil in Canada.

Dr. M. Y. Williams spoke regarding the future prospects for oil and gas production in Ontario, and showed a number of lantern slides of Ontario oil wells. After describing the well-known fields in South-Western Ontario, Dr. Williams made reference to his preliminary investigations in the search for oil in the slope of the James Bay District, and showed photographs of the country. He stated that privately conducted



MR. D. B. DOWLING.
A Past President of the Institute.

search for oil was being undertaken in this area. (A Report by Dr. Williams on the South-Western Oil Fields of Ontario will be found in the Summary Report of the Geological Survey for 1918, Part E.)

Mr. Estlin's paper on Natural Gas in Ontario was not presented.

Oil Possibilities in Western Canada.

Dr. Dowling spoke on the above subject, illustrating his remarks by a series of coloured and relief lantern slides of much excellence. The "Canadian Mining Journal" hopes to have an opportunity of publishing Dr. Dowling's paper, as it is one which not only contains excellent information, but presents it in a lucid and understandable form. Dr. Dowling stated that oil was a result of low forms of marine life. It is found in rocks of older age in which the remains of life are not so discernible or traceable, but it is found in greater quantity in those later rocks in which we find more evident and numerous traces of life, particularly in rocks of Tertiary Age, which, Dr. Dowling suggested would appear to indicate that life had been increasing in abundance upon the earth. By a process of elimination Dr. Dowling showed on coloured slides those portions of North America where oil might be found, distinguishing between the older and newer strata with which the presence of oil is associated.

Dr. Dowling mentioned how in the West many oil wells had been spoiled by salt water by being bored through a strata which contained a moderate supply of oil, in the unrealized hope that deeper boring might produce a greater flow of oil. He suggested that some one well should be chosen to treat the presence of the deeper seated oil horizon, and that it was a pity to spoil a lot of wells now assured of a moderate supply.

Mr. A. P. Rowe, in discussing Dr. Williams's paper, said that so far as the evidence shown by the drill went it had showed the presence of oil in synclines.

Mr. Louis Simpson of Ottawa thought the Institute should press for the exemption of oil-drilling machinery from customs duties.

Mr. Gibson, who was in the Chair, said it was a pity Mr. Eugene Coste was not present as he was interested in the possibility which had been suggested of oil coming from pre-Cambrian sources. The reference was to an occurrence of oil in Southern Alberta, near the Rockies, where pre-Cambrian rocks have apparently been pushed over newer formations. Oil has been obtained from cracks in the pre-Cambrian rocks under these conditions.

This ended the proceedings on Tuesday afternoon.

THE SMOKER.

The smoker is best described as a "peach". The battery-commander was Lieut.-Col. Penhale, and when he called "Fire" his guns roared. A gentleman with a pleasingly rotund voice had reached the culminating point of "The Bandelero" when there was a regular movie smash of dishes and plates, and two colliding waiters were apparently thirsting for each other's blood. The audience was quite thoroly fooled and not until the ring shoes and gloves were noticed did the spectators realise that the "Penhale has been up to one of his tricks". The mill was a good one, and singular-

ly enough no one remembered the singer until next morning. Eddie Holland was the raconteur of the evening, and gave a performance that was at once *amusant et risqué*. One of the most pleasing numbers was the rendition of the "Marsellaise" by Mr. Denis, who covered himself with glory. In other phrase, "he done fine". The singing-sheet was good, and the enthusiasm of the singing-leader was so infectious that even Presbyterians were noticed yodelling.

Mention must not be omitted of the pianoforte solos by the Chairman's charming daughter.

WEDNESDAY MORNING, MARCH 10th. 1920.

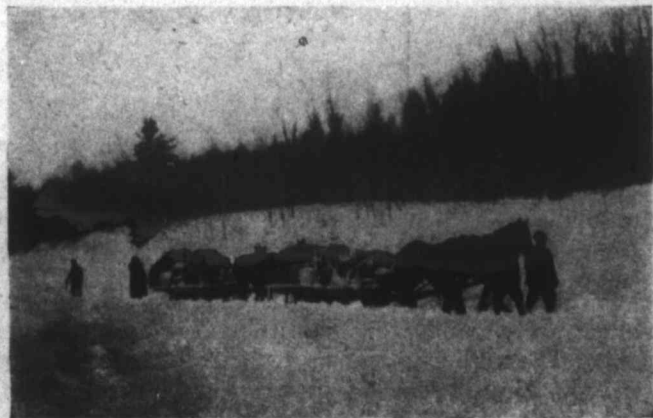
The opening session of the last day of the meeting commenced with the reading of a short paper by Mr. G. R. Mickle, of the Provincial Mines Office, entitled "Expectations", which had been announced as the mystery paper of the meeting.

Mr. Mickle spoke of the two periods of mining development, namely, that of reaping and that of sowing, or the period of putting money into development, and the period of taking profit-yielding minerals out. He showed the curve of probability in each period, and instances in illustration the mines of Cobalt, now in the productive stage, and the mines of Porcupine, still in the development, or the "expectation" stage.

Following Mr. Mickle, Mr. J. A. Campbell, M.P. spoke at some length regarding the Government's attitude towards mining development.

Mr. Campbell's remarks chiefly had reference to conditions in Northern Manitoba. He gave an interesting account of the promising mines in Northern Manitoba, and explained the dire need of that district for railway communication. He referred to the extraordinary richness of the Mandy copper deposit, and its ability to stand the transportation and re-shipments charges to Trail B. C. for treatment. Mr. Campbell also spoke of the Flin-Flon mine, and indicated the probability of its sale to interests that would energetically develop the deposit, and would erect a smelter that would serve other mines in the district and generally help development.

The speaker dealt at length with the necessity to abolish the dual control of natural resources that now obtains in the Western Provinces. There should either be definitely vested in the provinces or in the federal government. The present uncertainty was hindering development.



Present Method of Teaming Mine Supplies in Northern Manitoba.

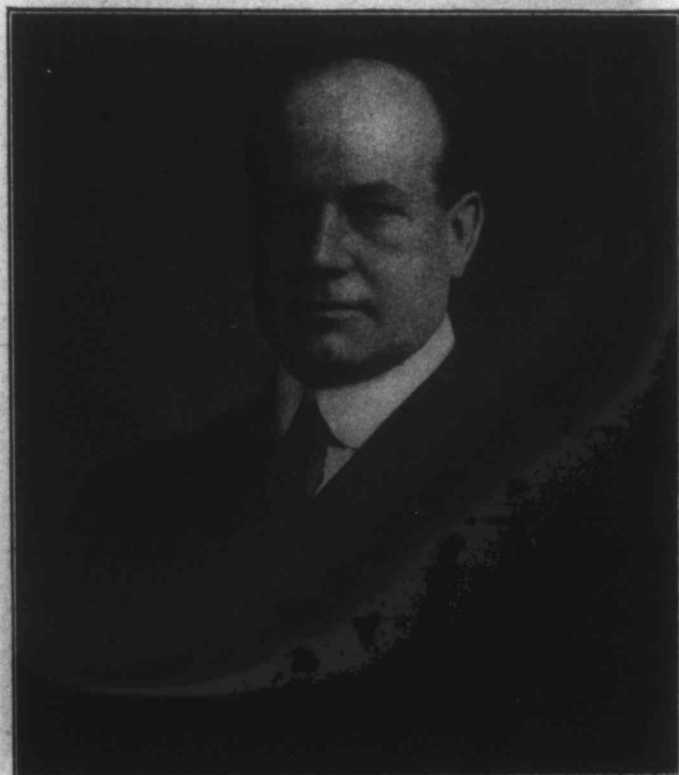
Dr. J. B. Porter of McGill University reported progress made by the Committee on Engineering Standardization, with especial reference to standardization in the mining industry. He asked for assistance in the Committee's work, and asked that members would communicate with him if they had any suggestions to bring about more complete standardization.

Mr. W. S. Landis read a paper on Canadian Cyanide, its Manufacture and Utilization.

Mr. Landis said that in the Autumn of 1916 the cyanide situation became so acute that a large mining corporation with headquarters in the United States interested the American Cyanamid Company in undertaking serious development work at the Cyanamid Plant at Niagara Falls, Canada, with the object of developing a process of producing cyanide from cyanamid. No operating plants or processes were found to exist that could be given consideration, and they were forced to commence at the fundamentals of the process. Plans were completed for the experimental installation at Niagara Falls, Canada, and the first units were put into operation about 1st January 1917.

Extensive tests of the Aero Brand cyanide were made in Mexico, and recoveries were found to be equal to those obtained from 98 per cent sodium cyanide. The brand had been in extended use in the silver districts of Ontario, with very successful results.

Mr. Landis said that today Canada possesses a cyanide manufacturing industry which within three years has so grown and expanded that it is supplying the bulk of the cyanide consumed in the mining and fumigating industries of the United States, and will shortly lead in the Canadian and Mexican fields. The proximity of the Ontario fields to the point of manufacture gives a favorable delivery service, and the Company confidently look forward to their brand of cyanide replacing the previously used and more expensive high-grade material.



MR. G. C. BATEMAN.
Who announced the coming development of the Flin-Flon Mine.

WEDNESDAY AFTERNOON, MARCH, 9th.

Quebec Asbestos Deposits.

Dr. Harvie, of the Geological Survey, described the geological characteristics of the Quebec asbestos occurrences. Mr. Theo. Denis and Capt. J. C. Ross discussed the probable depth of these deposits, and urged the speedy publication of Dr. Harvie's Report.

Nickel Coinage.

Mr. MacDonald of the International Nickel Company led the discussion on nickel coinage by a very convincing presentation of the physical and financial advantages that go with nickel coinage. Mr. MacDonald said the the press articles advocating nickel coinage in Canada had done so largely from the standpoint of national pride in our national metal, but while he did not minimise the usefulness of sentiment, he desired to set forth the very substantial advantages that nickel was intrinsically possessed of. The use of nickel in coinage dates back to 235 B.C. in Persia.

Following are some of the main points made by Mr. Macdonald:

Seventy-four countries have adopted some form of nickel coinage, and eleven countries have adopted pure nickel, namely, in the following order of date:

Switzerland, 1881; Austria, 1892; Italy, 1901; France, 1903; Serbia, 1906; Mexico, 1910.

Properties possessed by pure nickel are responsible for its constantly increasing use in coinage, among which may be named:

- a. Stability of value of the metal.
- b. Desirable appearance.
- c. Resistance to wear, corrosion and oxidation.
- d. Malleable and susceptible to the die.
- e. Difficult to counterfeit.

Mr. MacDonald compared the qualities of nickel with cupro-nickel and other alloys, with bronze and aluminum, and with silver for coins of low intrinsic value. Aluminum is too light. Cobalt is too hard. Nickel-copper, after use, assumes a greenish cast which is displeasing. Appearance of bronze coins becomes unattractive in use, and if used as tokens for coins of higher value can be easily counterfeited because of ease with which metal can be worked. The wear is also considerable, amounting to about one per cent per annum.

The speaker quoted a table of figures showing resistance to abrasion established through experiments by the Swiss Government, giving nickel by far and away the lead in all suitable coinage metals.

Mr. MacDonald strongly urged the adoption of a five cent coin in place of the small and inconvenient coin of silver now used, and suggested the replacing also of the ten cent silver coin by one of pure nickel. The nickel 5c coin would be same size as the present silver 10c coin, and the 10c coin would be the size of the present U. S. nickel.

The seignorage of the Government would in this event be in excess of \$500,000 per annum. If the present silver 5c coin was returned and nickel coinage substituted, the Government could recover silver which cost 70c an oz. and sell it at the present market rate. Should half the existing silver coinage represented by 5c and 10c pieces be so treated, a gain of one and one-third million dollars would result.

Mr. Corless, in response to an invitation by the Chairman to speak, said the matter had been entirely covered by Mr. MacDonald.

Dr. Coleman said he had advocated nickel coinage for many years, and would strongly support any move that the Institute could make to have nickel substituted for silver in our two smaller coins.

Mr. Gibson said it was expedient and advisable for the Canadian Mining Institute to make some active move to assist the Government in its consideration of this question. Sentiment was not a negligible thing in national life, and he thought that the minting of nickel coin would strike a responsive note of pride through-

out the country. The 5c. coin is entirely too small, and utterly inconvenient to handle, as those who had seen a lady fumbling in her purse with gloved hands for a 5c. piece on a cold day could realise. The coin should be of pure nickel. Nickel alloy becomes greasy and malodorous. To test this question, Mr. Gibson said he had for many years carried a few pure nickel and nickel alloy coins in his pocket. The nickel coins were as bright and attractive as when newly minted. The nickel alloy coins were dull and unsightly. He urged the passing of a resolution asking for pure nickel 5c and 10c coins.

Dr. Miller (who was in the Chair) read from the Hansard some remarks of the Finance Minister who held office when the Canadian Mint was established in 1901, and at that time the adoption of a nickel coinage was urged. The Minister of Finance said: "To a certain extent this desire for nickel coinage has been the outcome of legitimate national pride. No doubt this feeling has influenced the establishment of the Mint". Dr. Miller said: "The case is proved. What shall we do about it?"

Mr. Gibson moved, and Mr. A. J. Young seconded the following motion:

"The Canadian Mining Institute desires to go on record, and would strongly recommend to the Dominion Government the advisability of introducing nickel coinage at the earliest possible date."

There was no dissent from the motion.

Mr. Macgregor said that a certain amount of educational work would be necessary, and that it was desirable that some member of the House would raise the question at this Session. He moved that "We request the Council to procure the assistance of some member of parliament to bring about a discussion on the question of nickel coinage at the present Session, and that the full powers be given to the Council to assist in any way possible. Dr. Porter seconded and the motion was carried. A further motion was made and adopted that a copy of Mr. MacDonald's paper would be forwarded to the Minister of Finance.

It may be mentioned that a very full exposition of the advisability of nickel coinage will be found in the description of the Mond Nickel Company's operations which was issued in 1918. This description contains reproductions of all the nickel coins in use throughout the world at that time.

The Lost Placers of Ontario.

Dr. Coleman said he has advocated nickel coinage old papers he found a little vial, and remembered where it had come from, and that brought to his mind the question of placers.

Placer mining usually preceded quartz-mining, with the exception of the Klondyke. Two other exceptions were South Africa and Ontario, which had never had a placer stage. Why these two exceptions? The reason in the deep-seated and fine grained deposits of South Africa was obvious. Why had we not placers in Ontario, where the gold is found free?

A good many years ago a placer was discovered in Ontario. It was at Vermillion Lake. Dr. Coleman said he had got a hundred colours in the pan, and had found a nugget worth four cents. Where did the gold come from. He thought it came from the North because the glaciers came from there. Porcupine is now a very imposing region. We have had over \$100,000,000 of gold recovered or in sight. How much more was there originally? I think at least double that amount. We are half way down in the Archean at Porcupine. Thousands of feet of rock have been destroyed. How much above the present surface did these quartz veins extend? Maybe a

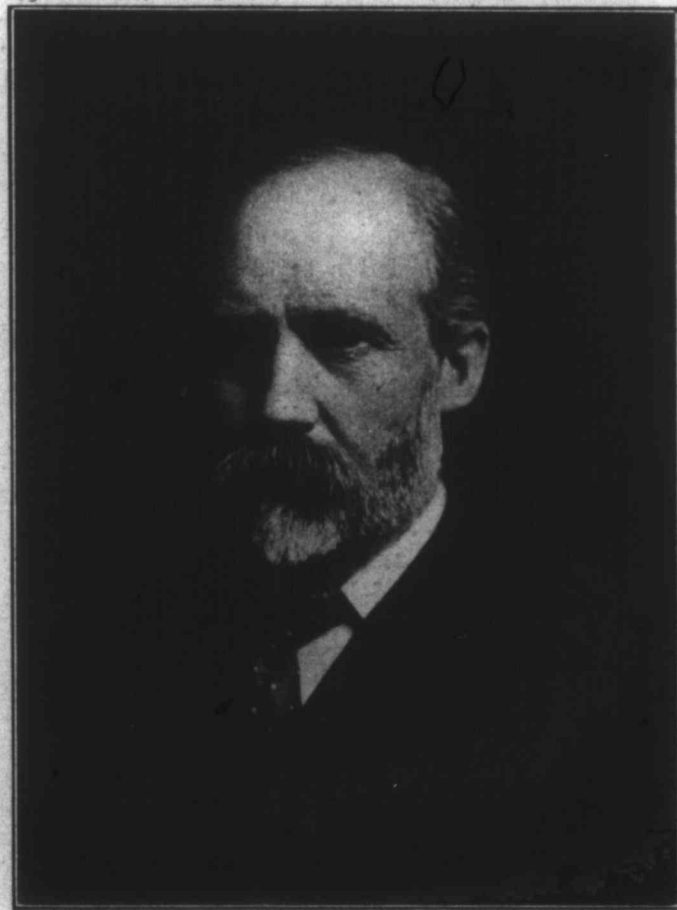
thousand feet. Were these upper veins as rich as those we know? Have we lost millions of gold by their destruction? Where did it go?

The highest point at which I got gold at Vermillion Lake was where the coarsest gold occurred, and it is 400 ft. above the present gold-bearing rocks of North Ontario. When did the weathering begin that set free the quartz deposits? Where did the rivers of that day flow? The placer deposits ought to be on the way to James Bay. About half of the Porcupine region is covered with drift, and as you go North the drift covers everything. There is a possibility of placers in the clay belt. There ought to be placers in the Paleozoic rocks of the Hudson Bay slopes. Is there any gold in the Cobalt conglomerates?

Mr. J. W. Evans said that in the old days when he prospected Vermillion they found that all the gold was in the first six inches of sand below the grass roots, and we wondered why. It was all in the red sand below the grass roots. No one went to bedrock.

Dr. Coleman did not think anyone ever went to bedrock.

Mr. Gibson asked why no suggestion was made of silver placers? Dr. Coleman said "Look for it under the clay."



DR. A. P. COLEMAN.

Dr. Miller said he once made an estimate of the erosion of Cobalt rocks, and said more had been eroded than since recovered.

In calling upon Major Mc. Millan to speak on this subject, Dr. Miller struck one of the key-notes of the meeting by referring to the number of members present who had been absent for the past four years. The presence of members returned safely from the war, and again busily occupied in mining work, gave to the Toronto meeting almost a sense of elation, and Dr. Miller's remark was audibly appreciated.

Major McMillan presented the changes in the mining camps as he was impressed by them after three and a half years absence on overseas service, and compared the conditions of 1914-15 with those of 1920.

Developments in Cobalt traceable to increase price of silver. Has been an endeavour to increase mill capacity as mill-heads have decreased in value. This has been secured by much coarser grinding by stamps and the addition of tube-mills for re-grinding. Another factor has been increased recovery due to flotation. A minor factor has been the enhanced value of cobalt residues, making it profitable to mine cobalt ores, and to introduce tables to recover the residues.

Previous to the war, mechanical concentration at Cobalt gave a 75 per cent recovery from 20 oz. silver ores. Tube-mill re-grinding and cyaniding recovered from 10 to 15 per cent additional. In 1915, cyaniding bid fair to replace straight concentration, but flotation process made great progress in the meantime, and today is in use at Cobalt in mills with a daily capacity of some 1,600 tons. Re-treatment plants have since become general.

Progress in concentration is exemplified by a comparison of practice at the Coniagas mill in 1914 with that in 1920, as outlined by Mr. Reid.

1914. Straight concentration. 60 stamp mill treated 180 tons a day of 20 oz. ore plus high grade. Stamps crushed to 14 mesh; sand and slime tailings went direct to waste from concentrating tables carrying 4 to 5 ozs. silver.

1920. Concentration and flotation. 60 stamps treat 300 tons a day of 10 oz. ore. No high grade. Crush in stamps to 3 mesh and as coarse as 2 mesh. Table this product and re-grind the coarser than 100 mesh material in tube mills preparatory to treatment by flotation. One oz. tailing to waste.

Increasing value of Cobalt ores in the past ten years is shown by the following table of the value in ozs. per ton of the McKinley-Darragh heads.

1910.....	47.0	1915.....	17.2
1911.....	39.7	1916.....	14.8
1912.....	32.7	1917.....	13.4
1913.....	31.0	1918.....	12.9
1914.....	17.2	1919.....	11.8

Change produced in Cobalt camp is remarkable. From a camp with stopes of narrowest possible dimensions on high-grade veins, it has become one with workings comparable in size with those of any precious metal mines. Several mines contain stopes 20 to 40 feet in width. In the Coniagas, where formerly the widest stope was 15 feet, there are now two with a width exceeding 60 feet.

Extensive exploration has taken place in all the mines and drilling practice is much improved by introduction of drills of the Leyner type.

A number of properties considered to be worked out have been acquired by companies owning the largest mills, and a singular feature of the sales instanced by Major McMillan was that "in every case where the properties have been sampled this has been done by the vendors in order to determine whether they should accept the price offered." Major McMillan's statement caused some amusement.

The increased cost of wages was referred to and instances given, and it was mentioned that as a result of this mechanical haulages had been introduced, and electric storage batteries of various makes are in use on tracks of ordinary mine gauge hauling 8 to 10 cars.

Major McMillan suggested that the progress of mining and metallurgical practice in this camp during the past ten years was worthy of compilation for permanent record.

Full particulars were given of changes in underground practice at the Hollinger Mine, and reference was made to the introduction of the Armstrong shovel underground. The best performance to date has been 100 tons with 4 men in attendance. Large pieces of rock in the muck cause trouble, and sometimes the machine lifts the light track and at other times refuses to lift the piece of rock. It is believed that this machine can however be modified to suit the conditions.

At the McIntyre Porcupine the main shaft has a depth of 1550 feet, and the ores have consistently improved in depth so far as development has been reached.

The production record of the Dome was referred to as being previously unattained in gold-mining in Canada, being 7 tons daily for each employee underground, and the milling of 3 tons daily per employee. The methods used to secure the Dome's results include, adequate shaft and haulage ways, box-hole chutes 6 ft. in width at the angle of running muck, say 33 degrees; the use of 4 ton cars, holding 85 c. ft. on all developed levels; haulage by electric storage-battery locomotives; ore passes to the eighth level where the primary crusher is situated, hoisting from ore-pockets by means of 4-ton skips working in balance, and haulage from surface

bins to secondary crusher in 25-ton cars. Those who saw Mr. Nichol's description of the Creighton workings will recognize some similarity between the methods at that mine and at the Dome.

References were also made to the progress at Kirkland Lake, where in six mines some 300 men are employed, to Boston Creek, and to Gowganda silver mines. Major McMillan expressed some definite opinions as to mismanagement and waste of investors' funds which had come under his observation through the direction of affairs by unqualified persons.

At this point resolutions were passed thanking the Local Committee for its work; and also expressing the thanks of the Institute to the Ontario Government, to the Minister of Mines, and to the Mayor and City of Toronto. The ladies were also thanked for the arrangements made for the comfort and entertainment of the visiting ladies.

Prof. Haultain asked the loan of the lantern for a minute while he presented some "finished business", and displayed a cheque for \$25.00 signed by a well-known member of the Institute, which he observed did not bear the statutory affixation of a two-cent stamp.

The President announced the names of the officers for the ensuing year.

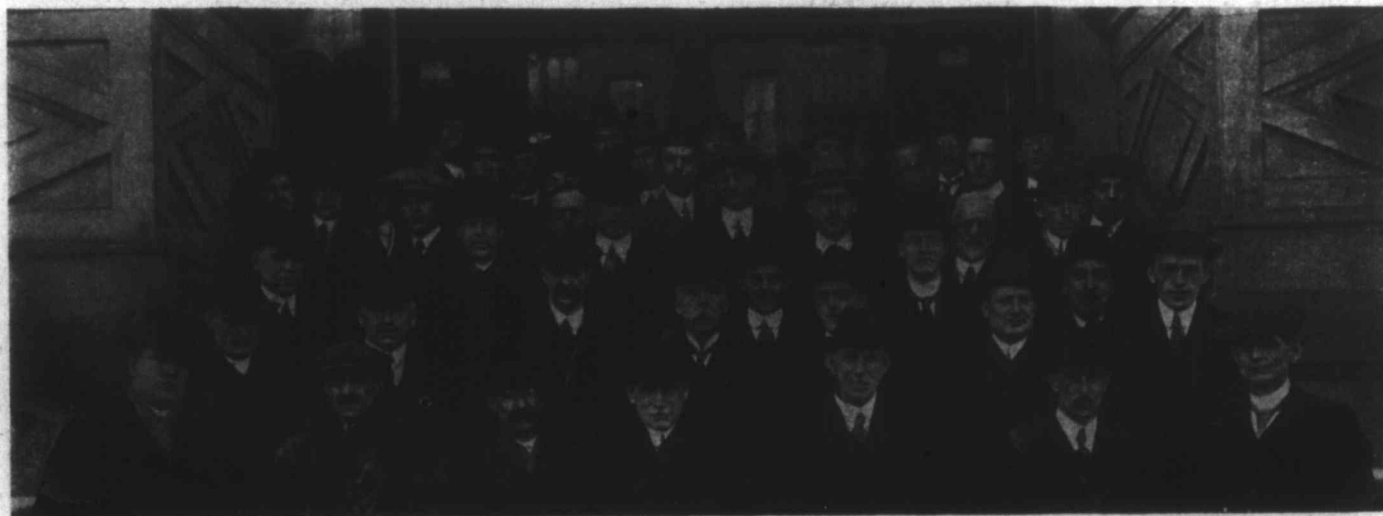
The Silver Islet Mine.

Mr. T. L. Tanton, in a brief but an absorbingly interesting address, described the history of the Silver

Islet Mine in Lake Superior, and showed photographs and a diagrammatic geological section of the locality. He pointed out that attention had been confined to the vein which yielded such phenomenal results on the Islet itself, and stated that another vein was recently discovered crossing, under water, the end of Burnt Island. He referred to the remarks of Sir. Wm. Logan many years ago, who had suggested search for mineral in the fractured zone. Mr. Tanton said that the prospecting which had been done on the land had not been directed by geological deduction, and suggested that attention should be directed to those points in the fractured zone on the mainland where the quartz veins intersected the dykes. He believed that mineralization was much more likely at these points than in the sediments which are included between the parallel dykes.

The concluding paper of the meeting was one by Mr. J. W. Evans who dealt at length with the minerals and producing mines of Eastern Ontario. Mr. Evans urged the payment of a bonus to enable the iron ores of the Marmora district, which are magnetites, to be developed by the electric furnace. He referred to the vanadium and other rare metal content of some of these ores.

The paper on "Mining Methods at Nipissing" by H. Park, Jr., was read by title.



This photograph was taken at a previous Institute Meeting in Montreal. Among those included in this group who took part in the Toronto Meeting will be noticed Messrs. McLeish, Gibson, Cole, McDougall, Adams, Goodwin, Tonge, Dresser, etc. As Mr. Bradley Stoughton said at the Dinner, the Toronto gathering missed Mr. Dresser and Mr. Stevenson Brown, Mr. Hardman, and others of the "Old Guard."

THE ANNUAL DINNER.

The Annual Dinner was attended by the Lieutenant Governor of Ontario, by the Minister of Mines, and by representatives of sister societies and the Toronto Board of Trade. The most marked feature of the meeting was the amount of advice the Institute received. It was pointed, free and copious. The variety and vociferousness of the college yells kept the uninitiated hesitating as to whether the function was a poultry show or a boiler-shop. "Foghorn" MacDonald's rendition of "Drill ye tarriers" had a delicious Hibernian savor, and was up to the standard of the Vancouver meeting, led by Major Brock. The Minister of Mines was in happy vein, and was duly received

into the bosom of the Institute. Mr. E. P. Mathewson discoursed on tittlebats and tittlemice, and grew eloquent on the distinction between tweedledum and tweedledee. His manner was of Pickwickian excellence, but it is to be doubted whether that genial gentleman could have excelled the gallinaceous arias that ever and anon escaped the throat of the gentleman who gave his name to "Matheson, Ont."

The retiring President announced the resignation of Mr. H. Mortimer Lamb, and took the opportunity to express his personal appreciation of the Secretary, and asked permission to voice what he believed to be a general opinion "that the present esteem in which the

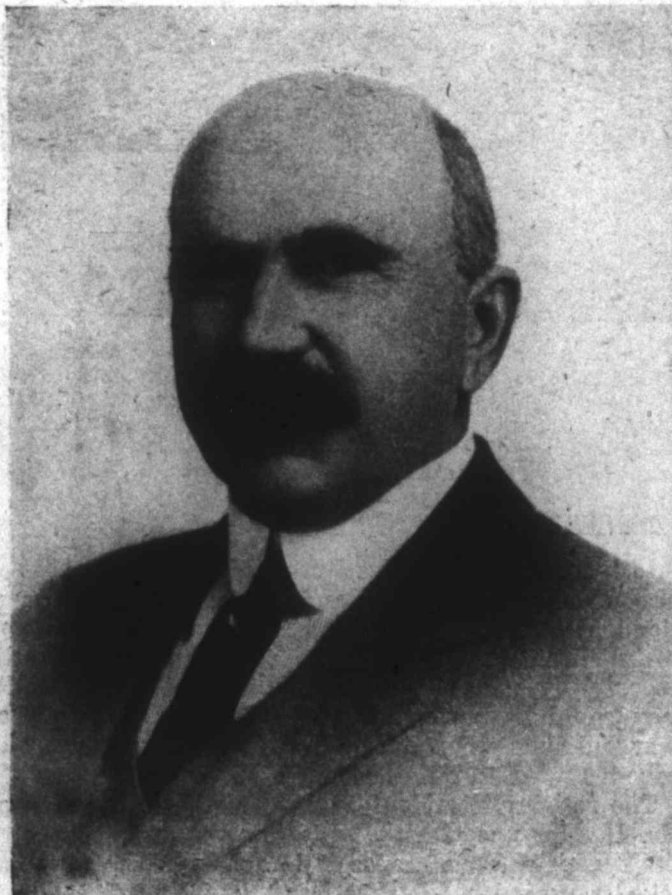
"Institute is held, and the harmonious nature of its membership, is to a very large extent the result of Mr. Lamb's services."

Referring to Mr. Whiteside's incumbency, the retiring President bespoke the hearty support of the members. Mr. McDougall said that the new President represented that part of Canada which contains the largest coal reserve we have, which "is equivalent to saying that it will some day be the most important industrial and political factor in our national economy. The increased interest taken by the West in Institute affairs, is I believe, the best indication of our vitality and ability to read the signs of the times."

Mr. Bradley Stoughton, whose remarks are always anticipated by a pleased preliminary expression on the faces of the members, expressed his sorrow at Mr. Lamb's resignation and referred feelingly to their personal friendship.

Mr. Whiteside, the new President, spoke most appreciatively of Mr. Lamb, and asked the members to rise and drink his health, which was done with a will.

Mr. Marriott, representing the Toronto Board of Trade, said he knew there was money in mines, because he had put some in them, and referred to some nicely engraved stock certificates he was possessed of, some of which paid dividends, and some of which did not. The members responded with a ditty from the pen of a knight-errant, which intimated delicately, "the mines that make us happy, are the mines we sold to you."



MR. E. P. MATHEWSON.

THE EXCURSION TO PORT COLBORNE.

Thursday, March 11th.

Notwithstanding that some members of the Institute felt like singing "We don't want to get up this morning," ninety of them were at the station at 8-10 a.m., to take advantage of the invitation extended by the International Nickel Co., to visit the Port Colborne Refinery.

The International Nickel Co. proved a generous host, providing the visitors with breakfast, lunch and dinner, for which purpose a regular Pullman diner was attached to the train.

The outward trip from Toronto occupied some three hours, and the return trip a little longer. The fun was unlimited, and there was leisure to observe that as yarners certain members of the C.M.I. have Boccaccio backed off the map, and are in fact the pink penultimate.

Arrived at the Refinery, the visitors were shown every part of the establishment, from the cupola house to the manufacture of nickel-shot. The arrangements for handling material are well-thought out. In the cupola-house the arrangement of the three large double-acting cranes is particularly interesting to observe, particularly in the changing of pots. The Cottrell House proved most interesting, notably the pyrotechnic effect of the rectifiers which are interposed between the d.c. motor-generator and the step-up terminals.

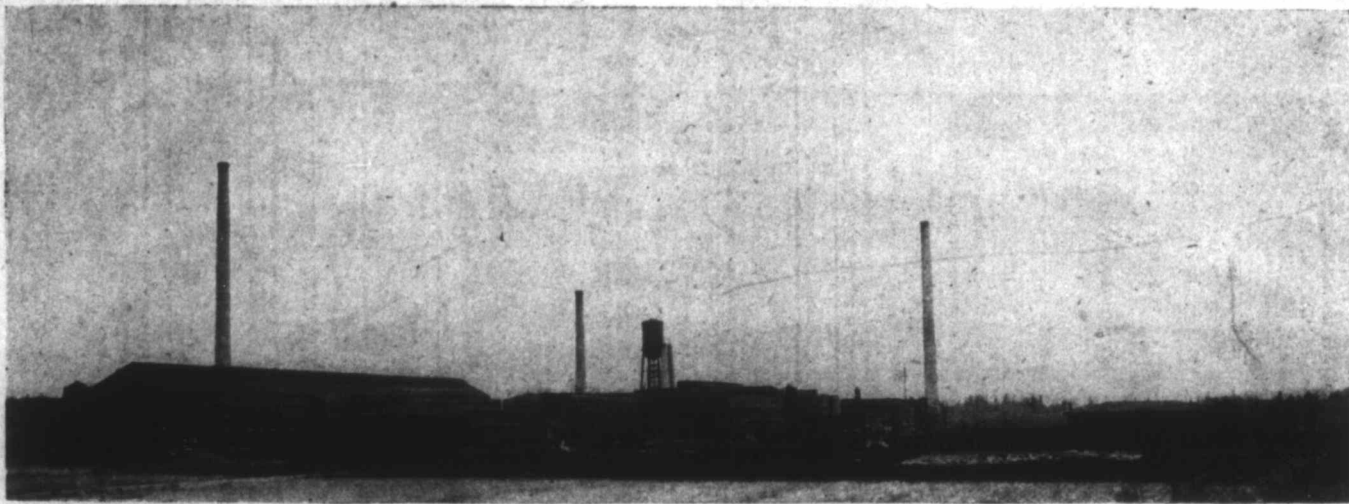
A full description of this refinery was written by Mr. Wotherspoon, of the International Nickel Company, and is reproduced in the 1919 Report of the Ontario Bureau of Mines, q.v.

On leaving the Refinery, Major Leonard expressed the thanks of the members to Mr. Miles and his assistants for their hospitality and the thorough manner in which the works had been shown and explained to the visitors. Mr. Miles in replying said the reason the Company had not previously given out its secrets was, as the visitors had been able to observe, because it did not have any.

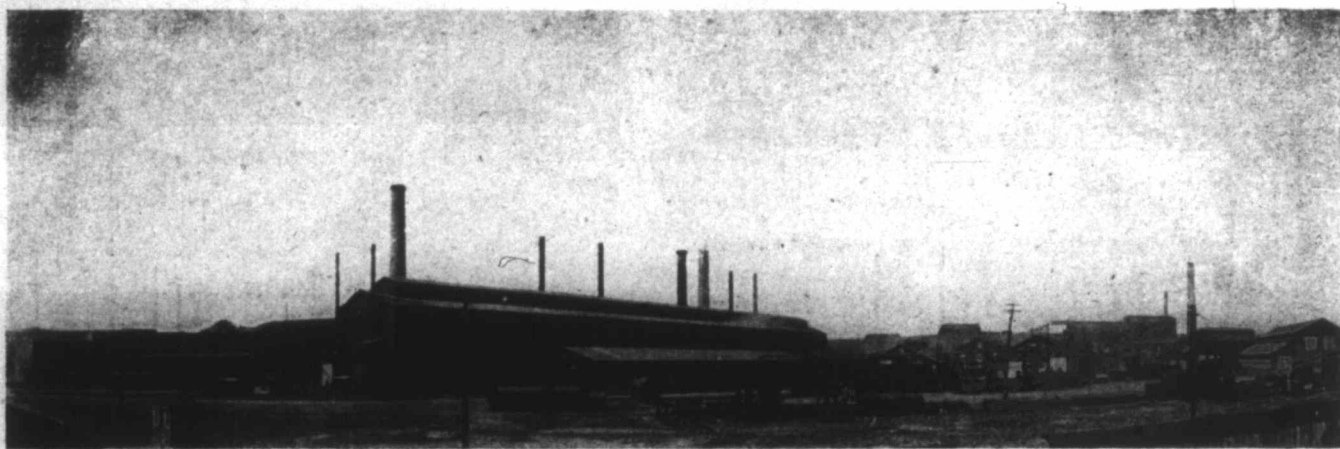
Before leaving Port Colborne, the members also visited the works of the Canadian Furnace Company, and witnessed the tapping of a run of pig-iron. A description of this plant will be found in the February issue of "Iron and Steel of Canada". This blast furnace, which was blown in September 1913, has since steadily continued its annual output of 120,000 tons of foundry and malleable iron. The Port Colborne blast-furnace has one of the best and most consistent records of any in North America. The arrangements for unloading ore and coal, and for stocking are well laid out, and full advantage has been taken of the advantageous water-front location of the plant.

Mention was omitted in the account of Monday night's session of the moving pictures of the Cobalt silver-mining industry, taken at the instance of the Ontario Government. These pictures were excellent, but discerning observers may have noticed a timberman feverishly driving in a new cap over a timber of some antiquity, judging by the fungoid growth which covered it. One also admired the determination with which the movie man persisted in photographing the lighting of a series of fuses, until it occurred to one that possibly fuses they were, "and nothing more." It was noticed that Mr. H. Y. Russel showed no alarm.

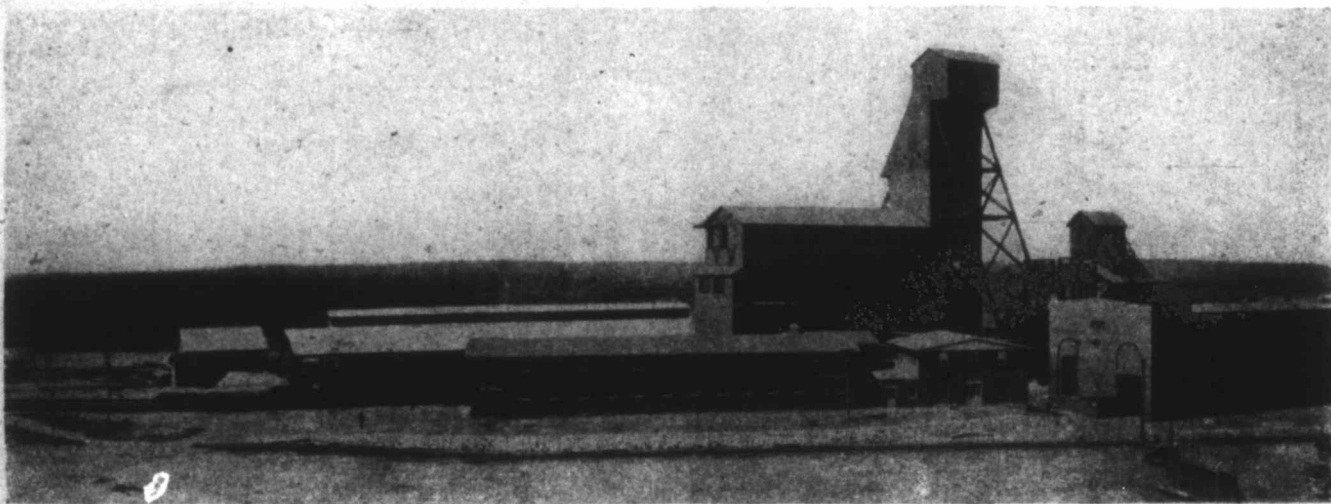
Views of the Mine, Smelter and Refinery of The International Nickel Company, Limited.



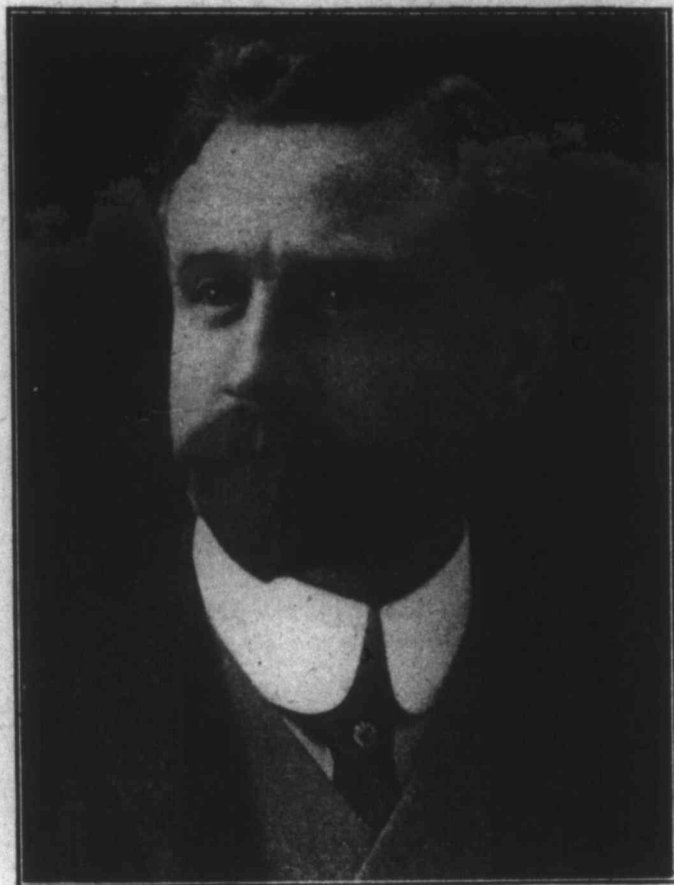
THE PORT COLBORNE NICKEL REFINERY.



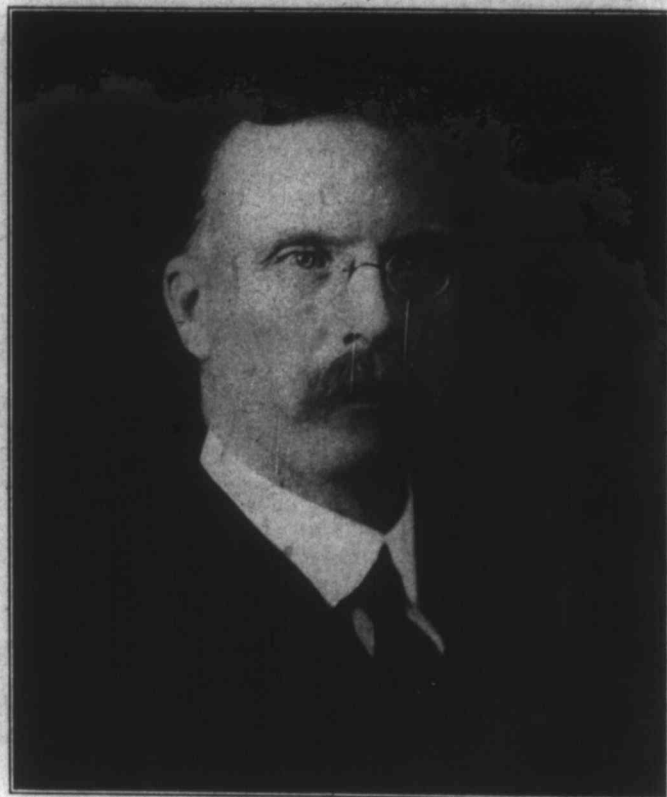
THE SMELTER — COPPER CLIFF.



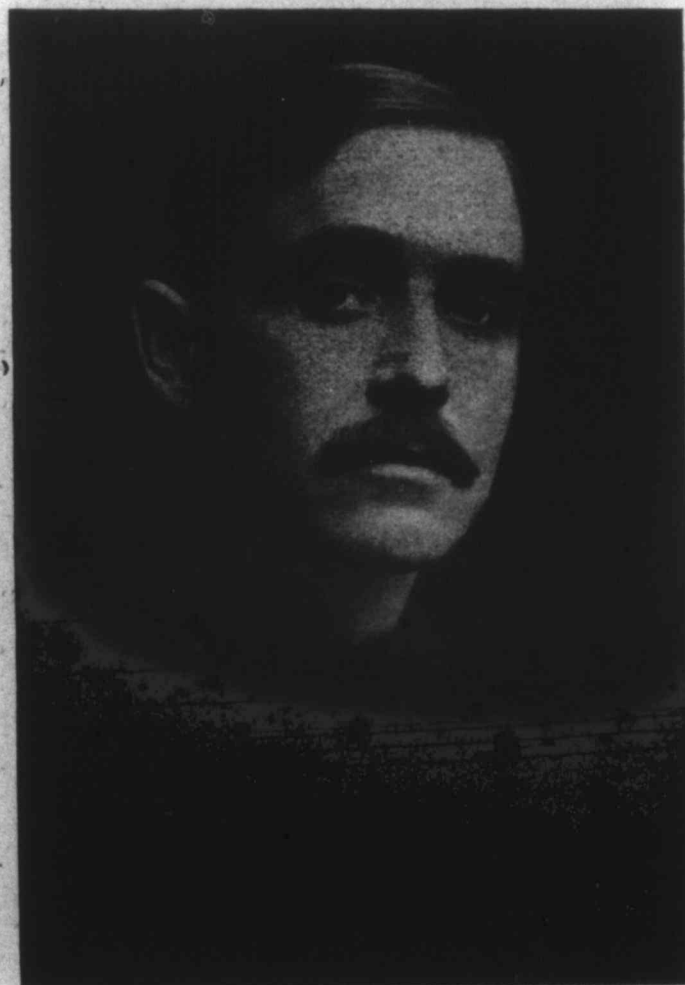
THE CREIGHTON MINE.



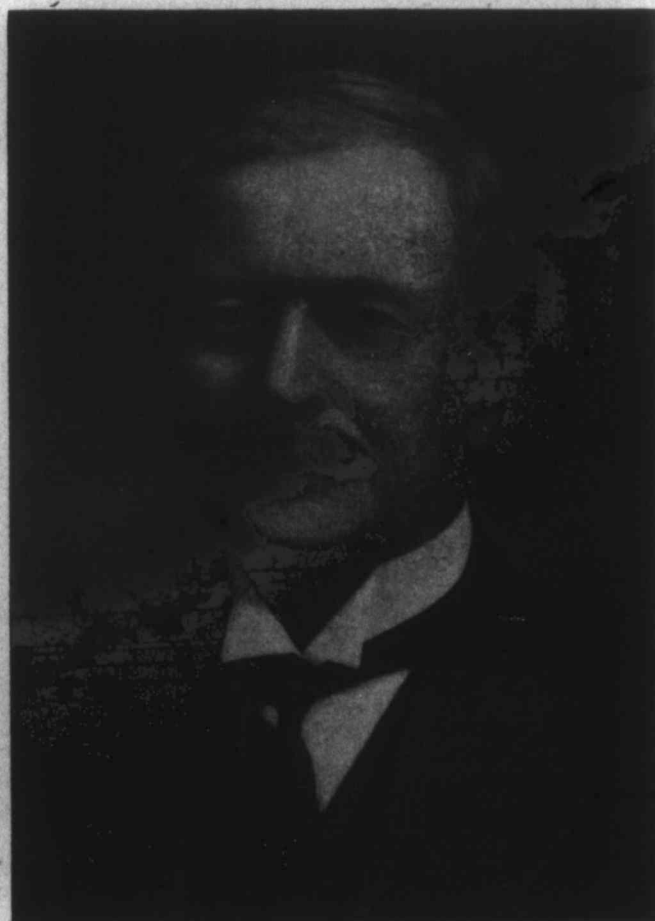
MR. G. G. S. LINDSAY.
A Past-President of the Institute.



MR. J. B. TYRRELL.



MR. R. B. WATSON, Cobalt.



MR. M. J. BUTLER, C.M.G.

Registration for Annual Meeting of Canadian Mining Institute

Toronto, March, 8th, 9th and 10th.

- C. A. Newton, Toronto.
 F. W. Gray, Ste. Anne de Bellevue, Quebec.
 O. N. Scott, Toronto.
 D. H. McDougall, New Glasgow, N. S.
 Jas. McEvoy, Toronto.
 C. E. C. Smith, Toronto.
 T. L. Walker, Toronto.
 W. G. Miller, Toronto.
 Geo. C. Riley, Montreal
 Jas. R. MacGregor, Toronto.
 P. E. Hopkins, Toronto.
 W. K. McNeill, Toronto.
 Eug. Poitevin, Ottawa.
 S. J. Schofield, Ottawa.
 Arthur Bulsson, Ottawa.
 Robert Harvie, Ottawa.
 Charles Camsell, Vancouver, B. C.
 M. E. Wilson, Ottawa.
 E. L. Bruce, Ottawa.
 Edgar Stansfield, Ottawa.
 E. R. Collins, Copper Cliff, Ont.
 W. Peek, Ottawa.
 H. E. T. Haultain, Toronto.
 A. O. Dufresne, Quebec, Que.
 John C. Rogers, Copper Cliff, Ont.
 J. L. Agnew, Copper Cliff, Ont.
 M. F. Fairlie, Cobalt.
 W. P. Alderson, Perth.
 Theo. C. Denis, Quebec.
 J. W. Rawlins, Copper Cliff.
 Alfred J. Tonge, Sydney, N. S.
 W. H. Collins, Ottawa.
 C. A. Richardson, Toronto.
 T. L. Tanton, Ottawa.
 R. E. Hore, Toronto.
 Geo. S. Cowie, Sault Ste. Marie.
 F. D. Reid, Cobalt.
 E. Roland Gilley, New Westminster, B. C.
 John McLeish, Ottawa.
 Louis Simpson, Ottawa.
 M. Y. Williams, Ottawa.
 J. G. McMillan, New Liskeard.
 C. A. Morris, Montreal.
 Adrian E. O'Brien, Toronto.
 A. Pryse MacKenzie, Toronto.
 H. H. Claudet, Ottawa.
 F. W. Simpson, Thornhill.
 O. H. Hugill, Sault Ste. Marie.
 A. L. Irwin, Toronto.
 E. P. Rowe, Toronto.
 Norman M. Campbell, Montreal.
 F. A. Bapty, Deloro, Ont.
 James White, Ottawa.
 H. E. Purdy, Toronto.
 J. C. Fawcett, Toronto.
 G. B. Doner, Toronto.
 C. S. Parsons, Toronto.
 F. M. Smith, Queen's Kingston.
 W. J. Embury, Queen's Kingston.
 J. S. DeLury, Winnipeg.
 Geo. A. Guess, Oakville.
 O. E. S. Whiteside, Coleman, Alta.
 W. P. Mackie, Toronto.
 H. A. Oaks, Toronto.
 J. G. McNiven, Toronto.
 A. G. Horping, Toronto.
 J. C. Perry, Toronto.
 L. J. Robinson, Toronto.
 G. M. Thorpe, Toronto.
 G. W. H. Coe, Toronto.
 R. J. Henry, Toronto.
 A. M. Anderson, Toronto.
 H. J. LaRonde, Toronto.
 E. L. Brown, Toronto.
 S. J. Duggan, Toronto.
- E. W. Rolph, Toronto.
 W. J. E. Wyllie, Toronto.
 J. H. Black, Toronto.
 R. J. Paul, Toronto.
 D. G. H. Wright, Kingston.
 F. J. Ellis, Kingston.
 F. V. Lord, Kingston.
 J. F. Young, Toronto.
 J. F. Comer, Kingston.
 C. V. Corless, Coniston.
 Wm. G. Milligan, Toronto.
 C. M. Beck, Penetang.
 A. R. Clarke, Toronto.
 G. C. Bateman, Cobalt.
 W. E. Simpson, Boston Creek.
 A. P. Coleman, Toronto.
 J. C. Ross, Montreal.
 D. B. Dowling, Ottawa.
 Jno. J. Penhale, Sherbrooke, Que.
 Eric C. Macdonald, Montreal.
 A. L. Parsons, Toronto.
 Arthur A. Cole, Cobalt.
 Henry M. Payne, New York.
 L. H. Goodwin, New York.
 D. A. Dunlap, Toronto.
 Bradley Stoughton, New York.
 Percy E. Barbour, New York.
 A. Longwell, Toronto.
 Geo. W. Rayner, Toronto.
 C. E. Macdonald, Toronto.
 Geo. A. Morrison, Creighton Mine.
 W. L. Goodwin, Kingston.
 C. L. Drury, Toronto.
 R. Dawson Hall, New York.
 A. J. Young, Toronto.
 Geo. R. Rogers, Toronto.
 G. R. Mickle, Toronto.
 D. C. Maddox, Kingston.
 A. B. MacCallum, Ottawa.
 R. F. Segsworth, Toronto.
 W. E. Segsworth, Toronto.
 A. D. Miles, Toronto.
 F. M. Connell, Toronto
 I. M. Marshall, Kingston.
 G. E. Silvester, Toronto.
 Charles, A. Poynton, Kingston.
 F. W. Guernsey, Thompson, Nev.
 H. G. Young, Montreal.
 A. G. Burrows, Toronto.
 Edward H. Robje, New York, N. Y.
 J. W. Evans, Belleville.
 J. J. Harpell, Ste. Anne de Bellevue, Quebec.
 C. J. B. Armstrong, Cobalt.
 B. V. Kelly, Timmins.
 A. R. Webster, Toronto.
 Phillips Thompson, Oakville.
 A. W. G. Wilson, Ottawa.
 Thos. W. Gibson, Toronto.
 James W. Moffat, Toronto.
 J. Murray Clark, Toronto.
 W. S. Wilcocks, Flesherton, Ont.
 C. W. Gishem, Toronto.
 Fred C. Dryer, Toronto.
 E. P. Mathewson, New York City.
 R. W. Leonard, St. Catherines.
 Jack C. E. Skinner, Toronto.
 W. R. Rogers, Toronto.
 A. W. Mellish, Toronto.
 A. L. Anderson, Winnipeg, Man.
 J. F. King, Toronto.
 H. V. Ellsworth, Ottawa.
 S. J. Cook, Ottawa.
 J. F. Black, Sudbury.
 L. B. Reynolds, Waterford.
 Lorne M. Campbell, Toronto.
 J. C. Nicholls, Copper Cliff.
 James T. Kemp, Port Colborne.
- J. More, Port Colborne.
 R. W. Brigstocke, Kingston.
 M. J. Butler, Oakville.
 T. F. Sutherland, Toronto.
 J. H. Stovel, Bessemer, Alta.
 C. D. Chisholm, Toronto.
 Jack Monroe, Toronto.
 Frank M. Perry, Sault Ste. Marie.
 J. B. Tyrrell, Toronto.
 B. Neilly, Cobalt.
 Geo. H. Gillespie, Madoc.
 A. MacLean, Toronto.
 J. Bartlett, Sudbury.
 H. B. Davis, Toronto.
 J. Mackintosh Bell, Almonte.
 W. A. Parks, Toronto.
 R. A. Elliott, Deloro.
 N. L. Brown, Kingston.
 G. J. MacKay, Kingston.
 D. E. Creigie, Toronto.
 S. B. Wright, Deloro.
 F. W. Field Toronto
 E. W. Wright, Toronto.
 H. C. Smith, Toronto.
 M. B. Barker, Kingston.
 J. S. Stauffer, Kingston.
 E. H. Birkett, Cobalt.
 E. E. Campbell, Anyox, B. C.
 W. S. Lecky, Ottawa.
 A. K. McGill, Kingston.
 Frank D. Adams, Montreal, Que.
 M. A. McInnis, Montreal, Que.
 Geo. E. Sancton, Montreal, Que.
 S. R. Brooks, Black Lake, Que.
 F. P. K. Gallagher, Montreal.
 H. M. Porteous, Kirkland Lake, Ont.
 H. A. Stevenson, M.P.P., London, Ont.
 J. B. Porter, Montreal, Que.
 H. Y. Russel, Montreal, Que.
 D. E. Keeley, Schumacher.
 E. C. Keeley, Kirkland Lake.
 E. Hibbert, Nickelton.
 P. Kirkegaard, Cordova Mines.
 Fraser S. Keith, Montreal.
 C. L. Cantley, New Glasgow, N. S.
 J. G. O'Connor, Hamilton, Ont.
 R. J. Young, Kingston.
 B. C. Lambie, Orillia.
 J. L. Coulson, Toronto.
 G. C. Montoire, Kingston.
 H. T. Leslie, Toronto.
 Thos. Southworth, Toronto.
 E. V. Neelands, Toronto.
 H. G. Slater, Toronto.
 Wm. Nicholson, Banff.
 A. S. Fuller, Porcupine, Ont.
 C. H. Manaton, Toronto.
 Wm. McLeish, Toronto.
 Ellis Thomson, Toronto.
 Peter MacLaren, Toronto.
 S. J. Evered, South Porcupine.
 H. C. McCloskey, Cobalt.
 H. Park, Cobalt.
 A. W. Gray, M.P.P., Westport.
 H. E. Kee, Cobalt.
 A. Ferland, Haileybury.
 K. B. Heisey, Markham, Ont.
 J. A. Campbell, M.P., The Pas, Man.
 J. F. Robertson, Coniston.
 W. S. Landis, New York City.
 F. S. Pearce, Mamora, Ont.
 R. H. Hutchison, Sudbury.
 W. F. Ferrier, Toronto.
 John A. MacDonald, Cobalt.
 Douglas A. Mutch, St. Catherines, Ont.
 Tom R. Jones, New Wilmington, Pa.
 F. D. S. Robertson, Toronto.
 M. B. R. Gordon, Toronto.

Canada's Coal Supply

By F. W. Gray.

The political division of North America, as it finally evolved from the conflict of races and the divergent search for an identical ideal by two branches of the English-speaking peoples, bore no considered relation to the balancing of the mineral resources of Canada and the United States; and, in so far as coal supply is concerned, the boundary line was fixed before the national importance of coal in peace and in war was realized, and in ignorance of the coal resources of what used to be known as the Far West, and is now known as the Canadian provinces of Alberta and British Columbia.

If no national issue has arisen, and North America has developed its resources as one nation, then in the East the coalfields of Nova Scotia would have supplied the Atlantic seaboard with bituminous coal; British Columbia and Alberta would have supplied the Pacific seaboard and the North Western States, and the central territories would be supplied entirely from the great central coalfield of Pennsylvania and the adjoining coal-yielding states.

This is the natural scheme of distribution. Under such circumstances, however, it is certain that the territory which is now included within our own borders would not have reached so advanced a development as is the case, as the independent impulse of our own nationality would have been absent in the North, and industry would have concentrated itself further south and nearer the great central coalfield. Also, it may be surmised, the coal production of Nova Scotia would have been upon a much larger scale than it is, while Sydney, Nova Scotia would have been of greater importance and Montreal of lesser importance than is the case today.

But the national issue did arise. Canada is a nation, so acclaimed and recognized in the councils of the world powers, and although the boundary line between ourselves and our good friends in the United States has certain disadvantages to ourselves, we must even make the best of accomplished facts.

Canada's Coal Problem is Largely one of National Defence.

Our unevenly distributed and deficient coal resources, and to a large extent also their backward state of development, are a consequence of this country's determination to be a nation within the British Empire. We have desired national independence, and have achieved it, and as our coal problem is an outcome and a concomitant of this desire and achievement, it becomes a principal duty of Canadians to work for the solution of our most pressing internal problem—the country's coal supply.

It is necessary to state these dominating considerations in order to emphasize that our coal problem is not altogether economic or geographical, but is primarily associated with Canada's national independence

*A paper prepared for presentation at the Toronto Meeting of the Canadian Mining Institute, March 8-10th 1920.

and defence. It is with this idea taking precedence of purely commercial considerations that this presentation of the question is submitted.

Canada has no Anthracite.

North America is favoured above the nations of Europe in having a supply of anthracite, a most desirable fuel, more especially for congested centres of population, because of its smokeless character and greater heat value.

Unfortunately, Canada has no anthracite, so far as is known, with the exception of some anthracitic metamorphosed coals of relatively small tonnage in the West. Therefore, if we use anthracite it must be imported.

Bituminous Coal is Already Sole Fuel Used in Large Tracts of Canada.

Large parts of Canada use bituminous coal and have never found it necessary to import anthracite. In many parts of Canada the burning of anthracite is not understood, and all grates and furnaces are adapted for the burning of bituminous coal. This being the case, and seeing that Europe gets along with bituminous coal, it can hardly be argued that anthracite is indispensable in those districts of Canada that can be supplied with bituminous coal from Canadian mines; and it follows that anthracite, under such circumstances, no matter how desirable, is a luxury.

Anthracite a Rapidly Diminishing Commodity.

There is also the further consideration that men can always do without that which they cannot get, and anthracite will shortly be a luxury for the rich only, as it will steadily increase in cost as it decreases in quantity. Old anthracite mines are today being worked over for what was left by a more opulent generation, and anthracite seams of under two feet in thickness are being mined, facts which tell more eloquently than figures the impending scarcity of anthracite.

Can Zones of Distribution of Canadian Bituminous Coal Cover Canada?

Assuming therefore that bituminous coal can entirely replace anthracite in Canada, we have only to consider over what extent the bituminous coals we have can be distributed, or, how we can extend the zones of distribution of Nova Scotia and Western coal so that they may approach, and if possible, meet.

So far as Canada west of Fort William is concerned it surely can be equally well supplied with bituminous coal from the western mines in Canada as with bituminous coal brought from Pennsylvania. Transportation distances do not enter into the question in the same grave manner as they effect Nova Scotia coal.

West of the longitude of Lake Superior, there is as much bituminous coal in the province of Alberta alone as in the remainder of the western half of North America.

Canada has not yet apprehended all the implications of the vast concentration of coal, and probably oil also, that exists in Alberta, and there is no compelling reason why the zone of distribution and use of Alberta bituminous coal should not be as extended as that of Penn-

sylvania and West Virginia. West of Fort William, Canada is more than capable of providing itself with all possible requirements of fuel.

Problems of Coal Mining In Nova Scotia.

There remains to consider the possible radius of distribution of the coal of Nova Scotia, but first something should be said as to the extent of the maritime coal deposits and the costs of mining them.

The coalfields of Nova Scotia, while they are not relatively large, forming as they do only one percent of Canada's coal resources, have never been worked to full advantage because of divided interest and scattered operation.

The consolidation of operation that followed the formation of the Dominion Coal Co. was the salvation of the Sydney field, but, unfortunately, consolidation did not go far enough to ensure the maximum cheapness of production that it only can make possible. Sporadic, uncoordinated, haphazard, and in some instances, unwise operation of the coal deposits of Nova Scotia, have conspired to prevent a healthy growth in the annual production of this province. One who, say in 1907, had looked forward to the annual coal production in Nova Scotia of ten million tons by 1920, could not have been regarded as unduly optimistic. Indeed, the objective of the Dominion Coal Company alone was at that time seven million tons annually, as those who refer to the late Mr. James Ross's remarks on the matter may confirm for themselves. The disappointingly small production of Nova Scotia during the past six years is chiefly a result of the war, and in that respect is a passing incident, but underlying, and altogether apart from the temporary effects of war, coal production in Nova Scotia has shown a recessive rather than an advancing tendency. What is the reason for this lack of vigor in the maritime coal industry?

Without attempting to excuse the faults of operation that have hindered coal production in Nova Scotia, it may be answered that the non-progressive character of the industry is due to a general lack of encouragement on the part of the railways and large purchasing interests in Canada; and the failure of governments in successive administrations to understand the paramount influence of coal supply on financial, military and naval security.

Canadian Railways Have Demanded Unremunerative Selling Prices.

For many years it was the policy of the Canadian railways to screw down the Nova Scotia coal operators to a minimum selling price. American competition being skilfully used to effect this. As an instance, it may be mentioned that Cape Breton coal was sold to the large railways in Canada delivered at Montreal at \$2.40 per ton, a figure that was—when the costs were correctly calculated—below the cost of production. The American coal against which the Cape Breton coal competed on a rigorous basis of monetary cost, was itself sold at prices below the cost of mining to the American operator, a fact that the statistics of the United States Fuel Administration have since abundantly demonstrated.

A combination of inaccurate (or perhaps one should say) partial cost-sheets, divided interests and low selling prices for coal prevented the coal companies in Nova Scotia from accumulating adequate financial reserves, with the result that they found it difficult to survive the ordinary hazards of coal-mining, and per-

iods of trade depression. But a principal pre-disposing cause of these unfortunate conditions has been the unreasoning hostility of certain sections of the public towards the coal operators and the short-sighted attitude of the railways, including the Canadian Government Railways, in enforcing prices that did not permit coal operators to expend the large amounts of capital that maintenance of output capacity and reasonable increase of production insistently demand in coal-mining.

This feature of Nova Scotian coal-mining is not new, but of long standing. The writer, in a Bulletin prepared for the Mines Department in 1916, stated the matter as follows:

"Within the past twenty years the price of coal has varied very little, it being one of the few commodities that have not materially increased in price. It is doubtful whether the market for Nova Scotian coal has ever yielded the operators a greater price than \$2.50 per ton at the pit-mouth, and the average price realized, after allowing for waste and slack coal, is very much less than this figure. A comparison with normal European pit-mouth selling prices will show how moderate this figure is, if due consideration is accorded to the higher cost of labour and materials in Canada. The margin of profit has been too small to permit of the accumulation of proper reserves to provide against the troubles from mining coal, or to allow of adequate depreciation reserves for the amortization of capital liabilities and the depletion of coal areas. Therefore, periods of financial depression, or mining accidents, have too often forced the abandonment of mining operations, and have involved investors in losses.

Output of Coal in Nova Scotia capable of Great Expansion

Coal must always cost relatively more to mine in Nova Scotia than it does in the uniquely favored deposits of the United States, but a considerable part of the abnormally high mining costs in Nova Scotia at the present time is a result of too small a production of coal in relation to the capital invested in mine properties and transportation equipment. Nothing can so effectively lower the unit costs of production in Nova Scotia as an increase in the output of coal. The coal companies there possess equipment sufficient to handle from two to three million tons annually of additional coal so far as transportation and marketing facilities are concerned. Given a sufficient expenditure and the necessary lapse of time to open new collieries and extend the existing collieries, there is no reason why Nova Scotia cannot produce twice its present output of coal. Such a programme is however only possible through the thorough-going consolidation of the operating coal companies, unification and concentration of direction, and very large capital expenditures on new mines and transportation equipment. Before investors can be induced to undertake the heavy commitments indicated there must be a change in the attitude of the public and the railways towards the coal-trade. Mr. C. A. Magrath, the Fuel Controller, in his Final Report, suggested that the railway companies should give contracts for their coal supply for a term of years, at cost, plus a fair percentage of profit, provided the coal companies made the necessary expenditure to equip and maintain properties with all appliances to enable production to be carried on at a minimum of cost. There is much to be said for this suggestion. It should be obvious that if in times of plenty our Canadian railways choose to starve our domestic coal mines by buying coal in the United States, or by demanding that the domestic producers meet United States competition even though that involve a profitless transaction or an actual loss to the

Canadian producer, our coal trade must live a precarious life, and will always be unready to meet the national emergency which may at any moment arise through political, social or diplomatic occurrences, or by reason of physical hindrances.

Canada cannot be run as a successful economic whole if we ignore the obligations of nationality and insist on buying goods in the cheapest market merely because they are cheap. That way lies loss of independence and national disintegration.

Coal Resources of Nova Scotia Imperfectly Known.

The apathy of public opinion if not actual hostility towards the struggling coal trade of Nova Scotia is not less effective because it is based on ignorance and is against the best interests of Canada, for not only has it discouraged the expansion of the known coalfields, but it has deterred the search for the hidden coalfields, the existence of which is much more than a presumption. It would be entirely incorrect if we were to assume that the known coal deposits of Nova Scotia comprise the whole of the coal resources of that province, and here again there is reason to complain of the lack of interest on the part of our governments, for no part of Canada has been so neglected during the past thirty years in the matter of geological exploration and mapping as Nova Scotia.

As a case in point, one would mention the Springhill Coalfield, which has an unknown but extremely probably southward extension. The port of Parrsboro which now serves the Springhill coalfield, as known, is distant by water only some 90 miles from St. John, N. B., which place by the direct line of the Canadian Pacific Railway is about 380 miles from Montreal. There is nothing insuperable in sending coal from this field to Montreal even by rail. Much longer hauls are made from the mines to great cities in the United States.

There is however no necessity to send coal by rail. It has in the past gone from Nova Scotia to Montreal by water at the rate of two million tons in the season of navigation, and could be sent in very much greater quantity by providing additional transportation equipment.

The feasibility of sending coal by water from Nova Scotia to Montreal has already been demonstrated. What can be done to cover the gap between Montreal and Fort William that is now entirely dependent upon United States coal? The cheapness of transportation from the United States central coalfield to the Great Lakes and the adjoining territories arises from a combination of water transport and a preferred inland freight rate from the mines to the Great Lakes ports. The carriage of coal to Canada gives an outward load for the cars carrying iron ore from the Lake Superior ranges to Pittsburgh, which otherwise would make the outward journey in an empty condition. From such points as Ashtabula and Cleveland, the transportation of coal to Canadian ports is cheaply affected by the water routes.

Deepening of St. Lawrence Waterway Would Extend Zone of Distribution of Nova Scotia Coal.

Apparently the only way by which the radius of distribution of Nova Scotia coal can be greatly extended east to say the eastern extremity of Lake Ontario is by deepening the St. Lawrence channel so as to give access to ocean-going vessels to the Great Lakes. In such event, Nova Scotia coal could compete

on fairly even terms so far as transportation is concerned with United States coal, as the all-water route from Nova Scotian ports to the point of unloading in a Great Lakes port would offset the preferred rail rate from the United States mines to the point of transshipment on the Great Lakes. This project is under investigation. So far, all the protests that have been made against the project are such as, if conversely applied constitute arguments for its carrying out, so far as Canada is interested.

It may be submitted that if the project is pronounced feasible it offers to Canada the opportunity to become thoroly self-supplying and self-contained in bituminous coal supply. By affording to Nova Scotia a cheap water-route for coal shipments, the coal miners there would be able to so enlarge outputs as to effectively reduce costs of production, and soft coal from Nova Scotia could be shipped far enough west to span the country and meet Canadian soft coal shipped from the western mines.

The deepening of the St. Lawrence waterway is however not an immediate possibility, while the necessity to make Canada more independent in bituminous coal supply is indeed a most immediate urgency. What is feasible is the enlargement of distribution of Nova Scotian coal today? We can at least get back to the pre-war shipments to St. Lawrence ports of some two million tons annually. Further the same factors of increase in the cost of coal production have been at work in the United States also. There is also some encouragement in knowing that the Canadian people have to some extent awakened to the serious handicap we suffer from such entire dependence on the United States for coal, the danger of dislocation of our business, the threat of discomfort and physical danger that are always impending whenever interruptions to our coal supply occur.

These new conditions suggest that an extension of the pre-war radius of distribution for Nova Scotia coal may be possible at the present time if energetic effort is made by the operators to recover and extend the St. Lawrence markets.

The present moment offers an opportunity to the coal interests of Nova Scotia, and the transportation interests of Eastern Canada to work together to secure the future permanency of the coal trade of Nova Scotia, which, whether they appreciate it or not, is something on which the railways, the public and the Government of Canada are equally interested with the coal operators and the mining population.

The equipment of the Nova Scotia collieries is modern, and, apart from the duplication inseparable from divided interests, no grave criticism can be made of the technical or business management of the operating properties, but some changes will be necessary before the most efficient production is possible. In particular, the present system of single shifts will have to be replaced by multiple shifts. The present practice of working the collieries for only eight hours in each 24 hours, often for only five days a week, does not permit of full returns from the capital invested, or the extent of underground territory developed.

To sum up these opinions—which it may again be emphasized are all dependent upon the assumption that Canada can only be politically dependent in so far as she controls and supplies her own bituminous coal—it would appear that to effect the necessary increase in the coal output of Nova Scotia, two things

are chiefly required, namely, a unified control of the operations of mining, transportation and sales, and the recognition by purchasing interests, for their own future welfare and protection, of the necessity to buy Canadian-mined coal, and to pay a just price for it.

The writer will not attempt to discuss what relief we can obtain from utilisation of our peat-bogs and hydro-electric reserves, for these have been ably dealt with by specialists, and even their completest utilisation can only be in the nature of a palliation of the fuel problem, and can never constitute a remedy.

Coal Problem one of Deficient Transportation.

With regard to the bituminous coal supply we may conclude that the problem is not one of a source of supply in Canada as it is one of deficient and difficult transportation. Canada has sufficient bituminous coal for its own needs, but the country has never undertaken to become thoroly self-supporting from a conviction that this was not only desirable, but actually essential to national independence. It cannot therefore be said that our capacity to be self-supporting in bituminous coal supply has even been tested.

Storage of Anthracite Urged During Summer Months.

With regard to anthracite, the situation is different. It has been contended that the use of anthracite where Canadian bituminous coal was available is a luxury, and this contention is still maintained. There is however a portion of Canada, which, until our transportation systems are perfected, must have anthracite, although, as also already intimated, the anthracite supply must year by year decrease in quantity and increase in price by reason of exhaustion of the United States reserves. It is suggested that the whole matter of anthracite supply is in need of oversight by some department of the Government, similar to the recent organization of the Fuel Control Department. It is unnecessary to enter into details of why it is desirable that anthracite should be purchased, transported and stored in Canada in the Spring and Summer seasons. The ideal condition would be to have the cellars of the ultimate consumer filled before the close of Summer with sufficient coal to last until the next Spring, but this is an ideal difficult of attainment. The possibility of storing anthracite in Canada during the Summer to an extent sufficient to eliminate entirely any movement of anthracite from the United States to Canada, after say October first in each year, is a proper matter for Government enquiry, and if found feasible, for government management. Such an arrangement would save much money, much anxiety in Canada, and would be welcomed by the United States railways and mine operators. The necessity to import anthracite being one of our national handicaps, it is for that reason alone a matter in which the government should take the initiative. Anthracite, unlike bituminous coal, suffers no deterioration in storage, and it not subject to spontaneous combustion or heating when piled.

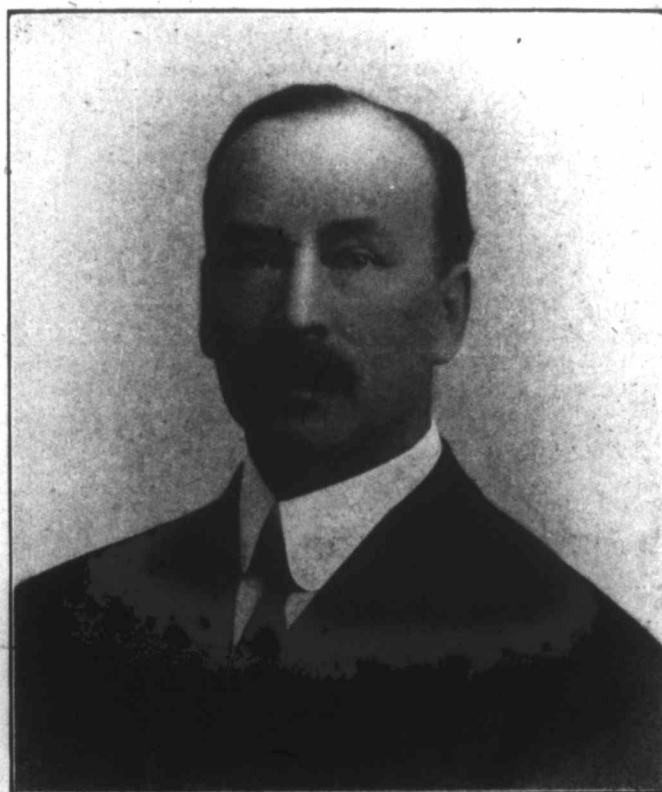
Canada's Future Rests Upon Coal and Iron.

In conclusion, one may be permitted to quote a remark of George Stephenson's, made long before coal had become so indispensable as it is to us today. "The strength of Great Britain lies now in her iron and coal beds; the Lord Chancellor now sits upon a bag of wool, but wool has long ceased to be emblematical of the staple commodity of England. He ought to sit upon a bag of COALS" In Canada, we have long

thought in terms of wheat and lumber, but these are in process of ceasing to be our staple commodities. Iron and coal are the two things upon which our future chiefly rests, and we cannot long have our frontiers march with the opulent and enterprising nation of the United States unless we develop our coal resources in a more thorough going fashion than has hitherto been attempted. Far from expanding our coal output we are not even holding our own, and every year's record of Canadian coal output is more disappointing than the one preceding. How is it that the worse examples of dishonored bond issues in Canada are connected with coal-mining enterprises, and that in at least two well-known instances, the capital invested by Canadian and British interests has been lost, and re-organization has been effected by United States capital? While a good many reasons could no doubt be advanced in explanation, the lack of any well-defined policy to foster coal production in Canada, because of its national importance, will explain the ill fate of many well-intentioned and promising coal mining flotations on this side the line.

It may be necessary to explain that this presentation of the Canadian side of the coal problem is not made in any spirit of hostility towards the United States. On the contrary, the generous and whole-hearted manner in which the U. S. Fuel Administration co-operated with the Fuel Controller of Canada in the desperate conditions of fuel shortage in 1917-1918 is gratefully remembered here. In this instance the United States shared its inadequate supplies of fuel with Canada in a manner worthy of all praise.

The people of the United States, however, are the last people in the world to excuse a lack of enterprise in another people, and if they should criticise the backwardness of our fuel policy, it would be criticism well-deserved.



MR. T. L. WALKER.
University of Toronto.

"INVESTOR" OR "SPECULATOR"?

Protection of the "Investor in mines or "prospects" is somewhat of an abstract science.

Mr. Tyrrell and Mr. Hore—both eminent in their profession—have stated their views as to the advisability of safeguarding the "Investor" while encouraging the "Prospector".

They are not so divergent in their conclusions as the esteemed Editor of The Canadian Mining Journal assumes—for the advocate standardization without circumstancing the sphere of influence of the pioneer to whom must be accredited most of the "Great Adventures" in Miningdom.

Perhaps Mr. Tyrrell, accustomed as he is to pass judgement upon immutable geological conditions, is too much of a strict constructionist.

Then, again, Mr. Hore, with the ardour of the scientist who revels in rocks, naturally is predisposed to favor the "pick and pan" fraternity.

How to bridge the "two stools" upon which these gentlemen are seated, is one of the problems they bestow upon the so-called "Farmers' Government".

Unfortunately, the Idealist on the platform is not prolific in practical performances—unless popular sentiment is aroused and support is forthcoming. I once heard John P. St. John, who "prospected" Prohibition, remark that, "prohibition legislation is feasible only insofar as the people make it effective". So it is with "Blue Sky" laws. Statutory provisions governing mining promotions and the sale of shares in mining ventures, cannot accomplish what either Mr. Tyrrell or Mr. Hore urges,—unless the people make it clear to the Governments that a stricter censorship of syndicates and companies seeking public monies is imperatively necessary.

Also, unfortunately, the rank and file of the public know little or nothing about mining industrialism—and will not learn—because the altogether too unanimous impression is that having-to-do with "a mine"—even if it is not "a hole in the ground"—is proof all-sufficient of obliquity.

Impliedly, the Ottawa Government acclaim the inconsequential character of their Geological and Mining Departments, by keeping the staffs on a "starvation wage"—doubtless to minimize their mischief-making—and "give the Investor a run for his money". Consequently, the Provinces maintain bureaus for their revenue possibilities; taxation, fees, licenses, designedly make it difficult for any "guilty man to escape".

Ontario geological and mining officials have pre-eminent status for their integrity and scientific services—but that status is personal to those officials—and the people most concerned played a feeble role in creating it. Instead of being the creatures of environment, the official spokesmen domiciled at Parliament Buildings, Toronto, have been constructive—while there have been times when anything aiming at corrective regulation of "mushroom" mining promotions was declared to be subversive of the rights of the "speculator", including those who had to make affidavit as to "bona-fide" discoveries—usually an elongation of the truth, to begin with.

A year ago Mr. Lucas was almost "hung, drawn and quartered" for thinking of "ideal" mining legislation.

The mediums of share distribution were lachrymose at the thought of the hardy "prospector" being prevented from marketing his wares. Trades or organizations resolved that "the purchasing power of the prospectors" was to be "cribbed and confined"—and the capitalist was execrated for an attempt to "crab the mining game".

Mr. Tyrrell is familiar with all of this. Mr. Hore has followed closely events in the Ontario North Country. There is a middle ground upon which the "prospector", the "promoter", and the "investor" can operate—and, after all, it is technical advisers primarily—and a more rigid accountability—that will remedy a great deal of what is urgently sought. The "Investor", per se, never discovered a new mining field. The "Speculative Investor" provided capital to prove mining fields. But, for example, it was Hamilton Smith who induced Rothschild to advance Rhodes enough to make De Beers Consolidated a going concern—and Smith was a trained mining man. Rhodes was not an "Investor". He was a "digger". So was J. B. Robinson, who "beat" Rhodes to an important portion of the western Witwatersrand. Beit, apart from Kimberley experience, was not expert in mining matters. Nor was Julius Wernher—nor Hermann Eckstein. Promoters and "Investors", counselled by scientists subscribed capital, or procured it, Mr. Tyrrell will recall that Cobalt lacked "Investors". It made millionaires overnight—and for years "bloom" and "calcite" with a bit of "smaltite" or "native" was justification for starting printing presses running off reams of script—without the judgment of recognized mining scientists. Hence the disastrous failure of the entire Montreal River area—with two or three exceptional claims, thus far.

On the other hand, Cobalt and Porcupine were visited with condemnation by scientists of international repute. Other scientists, more familiar with such occurrences, recognized the attractive geological and mineralogical conditions. Cobalt capitalizations were of the "wildcat" species; yet the less than a dozen real silver mines there have broken all records for values in a given tonnage. It was rash assumptions that every "silver showing" in the diabase would be "another Kerr Lake", that wrought havoc. The inexperienced "placed their bets" on the checker-boarded Montreal River country; the Township of Bucke, in South Lorraine, and elsewhere—not to speak in polite society of the Gillies Limits—and the Government helped themselves to the contents of the till. The Government "needed the money". What the Government did not take, the "prospector", "promoter", or the now-you-see-it-and-now-you-don't "mining" brokers took.

Canada simply learned the "mining game" from the United States, Australia, and South Africa. It is unlearning some of it—and there is healthier sentiment. What is needed more than anything else, is a campaign of education in which the new Ontario Mine Operators' Association, the Mining Institute, and the newspapers, can materially assist the Government. Mining engineers are not infallible. Those who are qualified to sit in judgment upon propositions are as high-minded as those who frown upon "Mining" as a profession. When the Get-Rich-Quick elements are restrained by having newspapers decline to let them have space and publicity; when "dope" literature is

censored—and incorporation papers cannot be obtained without explicit sworn statements as to values and work done—such statements to be subjected to inspection—then the “prospector” will have to take his chances with the “speculative investor”.

Meanwhile, it might be as well for bankers, business-men—and Governments to concede to reputable mining scientists the same rating as the other professions. For every “prospector” who has something worth having, there is an army of others without anything of much merit. It is the recognized engineers or geologists who should decide. After that “the dopester” should be made amenable to police regulations.

Alexander Gray, Montreal.

Northern Ontario Letter

THE SILVER MINES.

New favorable developments at such properties as the Nipissing, Kerr Lake, Beaver Consolidated, La Rose and Chambers-Ferland are adding to the aggregate of ore reserves in the mines of Cobalt. The supply of labor is adequate, and the men show general contentment. Wages, based on the high price of silver is accepted as an equitable scheme, while the recognition of workmen's committees, at each of the mines affords ample opportunity to keep working and other conditions satisfactorily adjusted: In this way harmony is manifest on every hand.

It is officially announced that as a result of the exploration and development program commenced a few months ago, the Chambers-Ferland has already placed at least \$150,000 in new ore in sight. The average grade is about 15 ounces of silver to the ton. At the present point of operation, average values of 28 ounces to the ton occur over a width of about five feet. Regular shipments are being made to the Dominion Reduction Co. for treatment.

On the Beaver mine large quantities of silver mine produced an average of \$10,603 every twenty-four hours, while development work in a general way was favorable. In his regular monthly report to the president and directors, Hugh Park, manager, states in part:—“During the month of February the company mined ore of an estimated value of \$307,485 and shipped bullion from Nipissing and custom ores of an estimated net value of \$409,253. Development and stoping operations at all shafts continued to be favorable during the month. Exploration work resulted in the discovery of medium grade mill rock have been developed, and the life of the mine has been lengthened considerably. Substantial quantities of high grade also occur, but it is to the mill rock that reliance on a large and sustained silver output is based. Mining and milling costs combined amount to between \$7 and \$8 to the ton of ore treated, which is exceedingly low for Cobalt ores.

During the month of February, the Nipis-

a new vein of promise. The most important development of the month was the cutting of vein 230, by a cross cut being driven to connect 63 shaft and 96 tunnel. Two veins were found, within six feet of each other, one being one inch in width and the other vein two inches. The intervening country rock contains appreciable amounts of argentite, native and ruby silver. The veins are not particularly high grade, but are strong physically and show fair amounts of leaf silver and cobalt. The development is important as the cross-cut is just above the Keewatin contact, which, at this point is 225 feet from surface. A crosscut 90 feet higher up and 110 feet distant also encountered milling values in a disturbed zone, which may ultimately prove to be part of vein 230. Good milling values occur over a width of six feet.”

Contrary to current reports, the Mining Corporation of Canada has not encountered new bodies of high grade ore on its recently purchased Buffalo mine. In view of the opposition to the recent deal, made by a minority interest of the Buffalo, the reports gained headway, but are now denied. The truth of the situation, it is learned, is that on veins which both the Buffalo and the Mining Corporation had mined up to the party wall, a small amount of ore was left in the intervening regulation seven feet of wall. Beyond this, no high grade has been encountered. As to general operations on the Buffalo, the indications appear to be that a substantial tonnage of medium grade mill rock will be



MR. B. NEILLY.

Vice-President of the Institute. Secretary of the Ontario Mine Operators' Association.

mined. Of, course, the fact that the Mining Corporation paid close to half a million dollars for the property makes it only reasonable to suppose that a large tonnage of ore will be taken out on which to realize the profit commensurate to the gamble taken.

In the Mining Corporation, an electric pump with an automatic starter has been installed, and with which all the mines of the company are de-watered. A huge stope in the lower workings, some 800 or 900 feet in length, nine feet wide and about 60 feet in depth has been converted into a giant sump to which all the water from the various properties has a natural flow. The scheme has eliminated the necessity of duplicating pumping equipment, and has reduced the number of pumpmen.

The Coniagas Company is still negotiating for a working option on the Gamble-Thompson claims in the Gowganda district. Indications that the deal will go through are quite promising.

During the month of February the Hargraves Consolidated, a merger of the old Hargraves and the Reliance properties, shipped 210 tons of ore to the Dominion Reduction plant for treatment. The ore contains an average of about 15 ounces of silver to the ton. As yet a force of only ten men is engaged on the Hargraves Consolidated, and the work is confined to the Reliance part of the property.

Arrangements have been made to carry on sinking operations on the Oxford-Cobalt property, situated in Gillies Limit, about one mile south from the Kerr Lake mine. A contract for 200 feet of sinking has been let, the work to commence just as soon as the air transmission line is completed.

The possibilities of working some of the outlying properties in the Cobalt district for the cobalt (the metal, cobalt) which they may contain is occupying the attention of a number of mining men. With cobalt valued at \$2 a pound and coming in for increased use, it is thought that some of the old properties might be turned into revenue producers. This belief is greatly strengthened by the following facts:—

From the silver producing mines of Cobalt, in 1918, approximately \$3,793,652 worth of cobalt was produced as a by-product. This includes 438,229 pounds of metallic cobalt valued at \$1,074,556, and 1,147,535 pounds of cobalt oxide valued at \$1,813,947, together with other cobalt compounds amounting to 185,416 pounds, valued at \$905.14, or a total valuation of \$3,793,652. In view of the increasing use of stellite which is a new steel manufactured from an alloy in which cobalt plays an important part, and which is used in the manufacture of high-speed tool-steel as well as cutlery, etc., it is believed that quotations for cobalt metal will continue to rule high.

The suggestion has been made that now is an opportune time for a re-study of the geological conditions in the various precious metal mining districts of Northern Ontario and that it would be well for the Ontario Bureau of Mines to supervise the work. This would tend to assure access to all underground workings and make it possible to prepare a geological map, on a basis of correlation. It is thought that even in Cobalt a re-study of conditions would be valuable, while in such districts as South Lorrain it might reasonably lead to renewed activity with fair prospects of success.

Ore Statement.

During the week ended March 12th, four Cobalt com-

panies shipped an aggregate of five cars containing approximately 367,964 pounds of ore. The McKinley-Darragh with two cars was the heaviest shipper. A summary follows:—

Shipper.	Cars.	Pounds.
McKinley-Darragh	2	143,840
La Rose	1	87,859
Temiskaming	1	72,008
O'Brien	1	64,257
Totals	5	367,964

THE GOLD MINES.

The voluntary increase of 50 cents a day to the mine workers in the Kirkland Lake district is an outstanding feature in connection with the gold mining industry of Northern Ontario. The step is pointed to as one which indicates the sincerity of the mine operators of Kirkland Lake in their endeavor to share with their employes the advantages of the gradually improving economic condition. As to what may occur along these lines in the other gold mining camps of this country, time alone will determine, but, in other camps, as was the case at Kirkland Lake, it is felt that a spirit of co-operation will continue.

Official figures which show that after resuming milling operations last spring the Dome Mines, up to December 31st treated 187,580 tons of ore and recovered \$1,290,301.19 are received with a high degree of optimism by shareholders. While the mill operated in June, yet the achievement really only represents the last half of the year as some little time was lost in getting work well under way. This being true, it is interesting to note that an average of over thirty thousand tons of ore was treated monthly. It also shows that an average of \$6.87 a ton was recovered from the ore milled. Prior to the war the Dome handled its ore at a total cost of between \$2.50 and \$2.60 a ton. At last Summer's meeting the general manager stated that costs had advanced about 30 per cent. This being so, it is evident that a cost of about \$3.50 would cover that of the present, in which case the net profit during the last half of 1919 amounted to more than an average of \$100,000 a month, or at the rate of upwards of 30 per cent annually. It is believed that when the company's year ends, on March 31st, a surplus of around \$900,000 will be shown. This would compare with \$56,801.26 a year ago. The rapid recovery thus realized is one of the outstanding achievements in the Porcupine district.

Shareholders of the Dome Extension Company, at a special meeting held on March 10th, ratified a by-law authorizing a six month's extension on the working option held by the Dome Mines.

Operating its mill at full capacity, and with mill heads running higher than the average, the McIntyre-Porcupine is setting new high records in point of value produced. In January it is stated in usually well-informed circles that upwards of a quarter of a million dollars was produced. Also, the current rate of output would tend to indicate net profits of around 25 per cent annually on the company's 3,600,000 issued shares. Development work at depth continues very favorable.

The endeavor to place the Dome Lake property on a self-supporting basis is being carried on with fair prospects of success, although ore reserves are low and the cost of operation is running neck-and-neck with the gold content of the ore.

The increase in wages at Kirkland Lake, previously

referred to, amounts to an average of about 50 cents a day, and will give muckers \$4.25 and machine runners \$4.75 for each eight-hour day worked. This increased rate is expected to attract additional men to the camp, and may reasonably meet the added demand for workmen as a result of the resumption of work at the Wright-Hargreaves and at the Tough-Oakes.

The Chaput-Hughes property has inquired as to the possibilities of purchasing the small mill on the Burnside Company, in that the latter in merging with the Tough-Oakes will have no use for its mill. In regard to this, however, only a limited amount of work has been done on the Chaput-Hughes and the ore necessary to operate a mill has not yet been found. The property is well located.

About April 15th, it is officially announced, the Wright-Hargreaves will commence work in connection with installing its new large mill, the machinery for which is already on the ground.

Financial arrangements necessary to assure an extended program of exploration and development work on the Hunton-Kirkland property are being made, and the prospects of success are very bright, is the advice submitted to the correspondent of the Journal by a mining man who is heavily interested in shares in the company.

Arrangements are being made to deepen the shaft on the Elliot-Kirkland, which properties lies directly west of and adjoins the Kirkland Lake Gold Mines. Formerly, work was carried to a depth of 500 feet on the Elliot, and, although the main fractured zone was encountered, yet only a very limited amount of gold ore was found. Now, going on the theory that as the ore body extends to the West the horizon of mineralization dips downward, the Elliot-Kirkland Company will carry their shaft to a depth of perhaps 700 feet, at which point exploration work will be carried on.

A deal for the Stitt property in the township of Grenfell is pending, according to advice received from Kenogami station. The Stitt group of claims will perhaps be remembered on account of the interest which they attracted a few years ago following the discovery of rich gold ore in narrow veins. The geology is very similar and is believed to be the westward extension of that belt which passes through the Kirkland Lake district.

Official information from the Argonaut Gold Mines at Beaverhouse Lake, some twelve miles east from Kirkland Lake is very reassuring. It is stated that the shaft has been completed from the 70-ft. to the 200-ft. level at which point drifting has been carried on for a distance of over 100 feet and with ore averaging about \$9 to the ton over several feet in width. In the meantime the mill is being kept in operation, and by a process of straight amalgamation sufficient production is being maintained to almost offset the current cost of carrying on the desired development work. Tests are being made with cyanide so as to ascertain the process best suited to adopt in the proposed new mill. A force of about fifty men are engaged.

A contract has been let to continue the shaft on the Boston-Kennedy property to a depth of 150 feet where it is proposed to carry on lateral work. The shaft is now down 100 feet. \$10,000 has been subscribed with which to continue on the extra 50 feet and finance the desired amount of drifting.

"Jim" Nelson, owning claims in the township of Baden in the Fort Matchewan district, has organized a new company known as the Thesaurus Gold Mines,

for the purpose of financing the operation of his promising group of claims. Mr. Nelson is a practical mining man who has spent many years prospecting, and who has carried on a large amount of real prospect work on his claims.

In connection with the Fort Matchewan Gold Mines (the Otisse property), it is learned that the ore occurs in lenses more or less widely separated, but that they show a width of from 8 to 30 feet at their widest points. It is stated that in that part of the lenses measuring 8 feet or more in width the indicated average gold content is about \$11 to the ton and that the proposition would appear to be a commercial undertaking of at least moderate proportions.

BRITISH COLUMBIA LETTER.

Stewart, B. C.

The fourth shipment of ore from the Premier Mine, Salmon River District, has been made to the Tacoma (Wn.) smelter. The shipments average 300 tons and the ore is reported to assay about \$275 to the ton. Development are proceeding on the Big Missouri. The tunnel on the Bush Mine is reported to be in high grade ore. The same is true of the Forty Mine. A crosscut tunnel is being driven on the Unicorn. Up the Bear River the crew at work on the Lakeview Mine is in ore. The Indian Mines, Limited, plan to resume development on their four claims situated on the west side of Cascade Creek, opposite the Bush property. Development consists of three opencuts on the crop-pings and two tunnels. The opencuts expose a well defined vein, when can be followed on the surface for about 2,000 feet. The vein is quartz and appears to follow a wide dioritic dyke which intrudes the greenstone schists. The minerals found include galena, sphalerite, and pyrites. With the report that the old Portland Canal Tunnel Company may be revived interest is being manifested in properties of Glacier Creek back of Stewart. The tunnel was an ambitious scheme started in 1912 to run a 2,000 foot tunnel to tap at depth all ore bodies of Glacier Creek, including those of the Portland Canal Mining Co., The Stewart Mining and Development Co., the Glacier Creek Mining Co., Portland Wonder Mining Co., "O.K." and the Pacific Exploration Co. An early opening of the Salmon River District is expected according to advices from the North, the weather having been mild recently, much of the snow in and immediately around Stewart having disappeared.

Alice Arm, B. C.

More high grade ore is reported to have been struck on the Esperanza, Alice Arm District. The Centre Star has been bonded to O. B. Bush, the original purchaser of the Premier, Salmon River. The property adjoins the Last Chance, now bonded to H. B. Price, of New York, and is close to the Moose, owned by Dave Cameron, who staked the Wolf. It is stated that the consideration was \$75,000, there being a small cash payment and an undertaking to commence work before the 1st of July.

New Hazelton, B. C.

On Hudson's Bay Mountain there are a number of promising properties under development. The Mamie, under bond to Seattle capitalists, is attracting attention. J. D. Galloway, District Engineer, reporting in 1917 said of this property that the ore-minerals disseminated through the gangue in bunches and stringers are zinc-blende and arsenopyrite, together with a little chalcopyrite. The main value in the ore is zinc, but the arsenopyrite carried low gold values.

Some silver occurs with the zinc but as a rule the silver content is low. The Victory and Empire Groups, staked by the Simpson Brothers, are under bond to the Skeena Milling and Mining Co., which has started the installation of a concentrator. There also is the Coronado Group, also leased by the last named Company, and which is showing up well, being considered one of the most promising properties on the mountain.

Nelson, B. C.

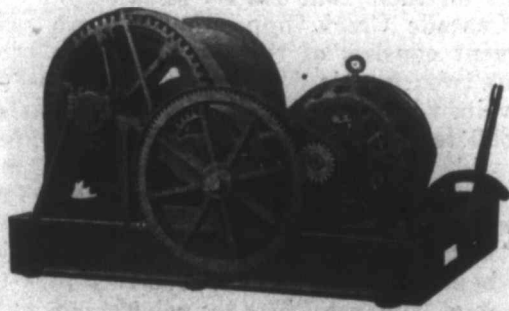
D. F. Strobeck, one of the pioneer operators of the Ainsworth Camp, and who sold the Florence Mine to its present owners, has returned to take up the development of other properties. He holds a group of mineral claims on Princess Creek and also is interested in the Eden-Crescent Group on Coffee Creek. The Mountain Chief Mine at Renata, B. C., on which the shaft has been extended about 40 feet, still is in ore.

In the upper shaft the ore was largely chalcopyrite and with the attaining of depth a considerable percentage of bornite has been shown. Air drills are being used, the Mountain Chief Compressor being one of the few of the district not incommoded by water shortage. Shipping is expected to be resumed shortly. The mill of the Rambler-Cariboo Mines Company has been closed down. The Compressor Plant ceased to be a factor in operation some weeks ago owing to lack of pressure but the mill was continued. However, a late freeze diminished still further the flow of water in the streams and the Company had to discontinue. About the only large mill in the district operated by its own power and still working is that of Clarence Cunningham at Alamo. Here, with the flow of the north fork of Carpenter Creek available, no difficulty is being experienced.

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