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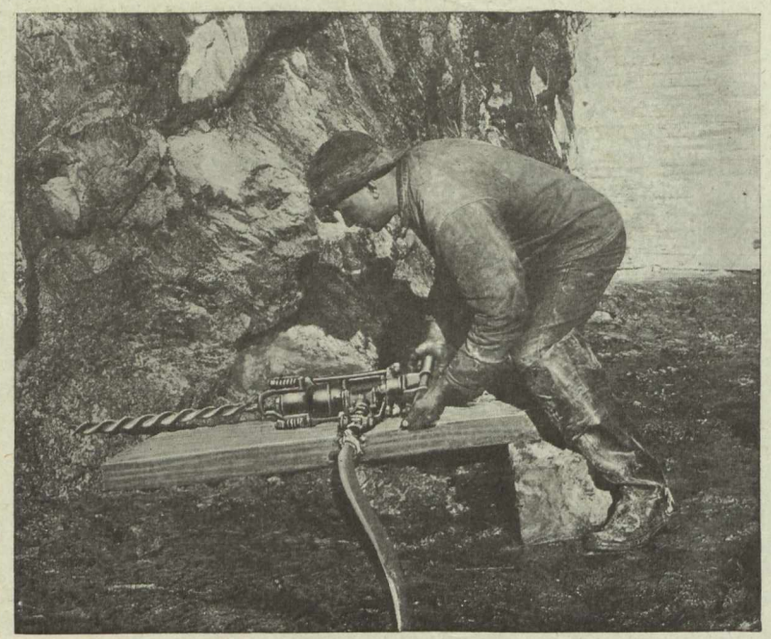

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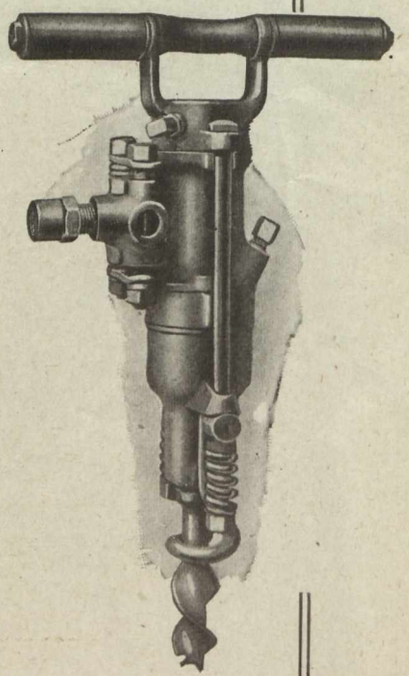

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:-: EDITORIAL :-:

Government Loan to Coal Mining Companies Suggested to Increase Production of Coal

The Government, through the Sub-committee of the Railway Commission, to which has been entrusted the movement of coal at this time, has placed an embargo on export shipments of coal from Nova Scotia, except to the United States and to Newfoundland. This action may have seemed to be unavoidable, but leaving this phase of the matter on one side, it is not constructively helpful inasmuch as it does not in any way tend to increase the production of coal. Actually, it will discourage production by debarring the coal operators from the most profitable market in the history of bituminous coal demand.

During the war period, and without losing sight of the valuable services rendered by the Dominion Fuel Controller or the embarrassments of the Government, we believe the authorities were always much more preoccupied with the idea of reducing the price of coal and controlling its distribution than they were impressed with the necessity for increasing the coal output. The word "control" was in itself a misleading word, and responsible for much misconception. What the coal industry of Canada has required in the past, and urgently requires at this time, is not control, but encouragement. Although coal is much more costly than ever before, it is nevertheless one of the cheapest of raw materials, considering the labor and risks involved in its production. A little shortage reveals that coal is cheap at any price, and, where the root of the problem of fuel supply is—as it is in Canada—a question of deficient production, cost is a secondary matter.

The general attitude of the Canadian public towards the coal producing industry—of which the policies of the large purchasers and any government which happens to be in power is a natural and necessary reflection—has been that when American coal is to be had in plentiful quantity and at low prices the domestic producers must put up with the inexorable functioning of the laws of supply and demand. When a national emergency arises the cry is raised that domestic resources should be reserved for domestic needs, and "control" of the industry is at once instituted. Briefly, this means that in slack and easy times the coal industry must take its chance of making money, and in good times it must not be allowed to make profits. A continued course of this treatment cannot but result in enfeeblement of any industry, and is responsible for the present entirely unsatisfactory condition of domestic coal production in Canada.

In Nova Scotia there exists a shortage of coal production that is between two and two-and-a-half million tons annually. The export embargo will affect possibly from 300,000 to 400,000 tons of coal, for which good prices are obtainable. If coal production had been sustained, Nova Scotia could have supplied both Canadian and foreign markets. If the Government prohibits profitable export of coal in order to fill domestic requirements—which it is always admitted is a proper proceeding—it thereby assumes responsibility for the financial condition of the industry which it takes control of, and if, in order to serve a national need, the coal industry is deprived of profitable business the proceeds of which would provide much needed capital for development, then it devolves upon the Government itself to find the capital.

The President of the Dominion Steel Corporation has announced that a sum of $4,500,000 or thereabouts is to be expended on the extension of the collieries controlled by this Corporation, but it must not be assumed that this sum, comparatively large enough it may be, in anything but a small degree represents the capital expenditure necessary to enable the Dominion collieries to produce an output commensurate with the extent of the coal areas, or the domestic demand for coal. An expenditure of $20,000,000 could be conservatively and profitably made upon these collieries, but a really adequate expenditure would be so large that it could not possibly be undertaken by any private corporation.

There are a number of considerations which, cumulately considered, indicate that financial assistance in the development of new collieries should be given by the Federal Government. These considerations include the following. During the war period the enlistment of miners was relatively greater than that of any other class, and enlistments from amongst these most essential munitions-workers were not restricted as they should have been. The praiseworthy desire of the miners to be recognized as war workers—which would have lessened the number of enlistments—was

never acknowledged, although badges were granted to munition workers of far less importance. The coal-freighting steamers of the coal companies were requisitioned for a length of time that has occasioned a discontinuance of coal shipments from Nova Scotia to Montreal of about five years. During the war period the price of coal was controlled in a manner that limited the profits of the companies, but at no time did the Government undertake to increase the coal output by financial assistance as was done in the case of other munitions. The Government did not during the war period, nor has since the Armistice, given tangible aid, or adopted any other attitude but a critical and watchful one, towards the coal industry. We submit that it would have been much better for Canada if the resources of the Government in the shape of financial assistance, of relaxation of immigration regulations, of assisted immigration, of freighting vessels and railway conveyance, and indeed every possible form of state encouragement and aid had been given to the coal industry. The millions of dollars lost in adverse exchanges would have been must better expended on the opening of new sources of coal supply. There is no corner of our national life where endeavor has not been restricted and expansion throttled by the insecurity of coal supply. The problem is not, however, an insoluble one. It may be that only a partial solution will be found possible, but, in that event, the sooner we know it the better.

There are two phases of the coal supply problem before this country today. One is a pressing immediate emergency, requiring emergent measures. The other is a problem that will always be with us, a condition that is part of our national heritage, a congenital weakness that if we do not take steps to end, will eventually end Canada, as a national entity. The actions of the Sub-Committee of the Railway Commission at this time are temporary expedients to avert a threatened crisis, but will not the Government earn the lasting gratitude of our people by forming a permanent body charged with unremitting study of the fuel problem so that we may find out whether or not there is a permanent solution to a permanent problem?

There are a thousand and one loose ends in connection with our fuel question that need tying up. No concentration of the thought and advice of competent men actually engaged in the production, transportation and sale of coal in Canada has ever been attempted, except for snap judgments in emergent situations, and this does not count. It can never be accurately stated that any problem is insoluble until a concerted, determined and prolonged effort has been made to solve it, and this is precisely what has **not** been undertaken in Canada.

Demands of United Mine Workers in Nova Scotia Discourage Increase of Coal Production

The United Mine Workers of Nova Scotia at their own urgent request were granted a Royal Commission charged with enquiry into all phases of the working conditions at the collieries, and in particular with reporting upon the request of the union for a general wage increase in addition to the adjustment of January last. This Commission is sitting, and newspaper reports indicate it is going into matters thoroughly. A session is to be held in Halifax on August 9th, when, it is announced by the U. M. W. leaders, the first demand for an increase of one dollar a day will be replaced by a fresh demand for an increase of two or maybe three dollars a day. It is stated unequivocally by the President of the union that whether the decision of the Commission is favorable or not, it will either be entirely repudiated, or regarded as merely a temporary arrangement. Each successive demand of the United Mine Workers in Nova Scotia has been based on increases in the cost of living, but the actual adjustment made has included many other things, having to do with conditions of employment, that are even more irksome than wage increases inasmuch as they are deterrents to production. The newest demand is like previous ones in this respect.

The President of the union has made some most extraordinarily misleading statements to the newspapers. For example, he is reported as stating that he has the statement of the President of the Dominion Steel Corporation that the Dominion Coal Company can produce coal in Nova Scotia cheaper than either the American or Canadian operator by two dollars a ton. Such a statement could not have been made because it is not true. If it were stated that the American operator can produce coal at from two to three dollars a ton less than the Nova Scotia mines it would be about correct.

It is further stated that the coal companies are reaping vast profits on the world coal shortage. As to this, the Dominion Steel Corporation did not quite earn six percent last year, and any chance it had of making a little more this year has been spoiled by the embargo on export coal.

The new demands of the miners are not forced by necessity to keep up with the increased cost of living. Each agreement with the operators contains machinery for such adjustment as may be required by a continued mounting of commodity prices. The attitude of the men is based on erroneous ideas of the

profits of the operators, and a desire to share in the returns. At the same time the union is doing its best to kill this profitable business by its general policy to restrict production, not as is erroneously proposed by reduction of the individual efficiency, but by opposition to any attempt at intensive production, such as night-work, double shifts, and concentration of workers underground, by the introduction of shorter hours of work, and by determined resistance to any lessening of the number of non-productive workers or the importation of miners from abroad. Increased output of coal, an increase adequate to the demand, would enable the coal companies in Nova Scotia to pay adequate wages, to accumulate adequate financial reserves, to make adequate financial expenditures on- new openings and to lay the foundations for steady employment for an increased force for many years ahead. But the present inadequate production, and the inadequate production of the last six years has placed the companies in the weakest position they have been in for many years. The business of a coal company is to produce coal. It is only functioning properly to the extent it produces coal. If the miners would manifest a genuine desire to increase production they would afford an opportunity to the operators to increase wages, but, unfortunately, while they protest with their mouths against alleged deterrents to production arising from lack of equipment, the greatest deterrent of all consists in their own attitude which imputes all possible blame to the operator, but assumes no tittle of responsibility on the part of the workers themselves.

CERTAIN POST-TIMISKAMING IGNEOUS ROCKS OF ONTARIO FOR WHICH THE NAME HAILEYBURIAN IS PROPOSED.

By Willet G. Miller and Cyril W. Knight.

In the pre-Cambrian of Ontario there is a widespread series of igneous rocks, of greater volume than formerly recognized, that intrudes the Timiskaming sediments but is older than the Algoman granite and gneiss. Descriptions of these rocks have been given in various papers and reports by the authors and their age relations have been discussed. For instance, in a paper published in 1915 the authors said[1]:

"It may be added that basic rocks of the age of sudburite are widespread and have frequently been mistaken for Keewatin[2]. They are represented by the peridotite and augite lamprophyre of the Porcupine region, one hundred miles north of Sudbury, and by the lamprophyres and other rocks of Cobalt, 90 miles to the northeast of Sudbury. For economic purposes, at least, some age name should probably be applied to these basic rocks."

[1]Journal of Geology, Vol. XXIII, p. 590.

[2]Sudburite is a lava, often with pillow structure but frequently schistose, that occurs in considerable volume in the Sudbury area. It has the same relation to norite as that of basalt to gabbro or rhyolite to granite. (Ont. Bur. Mines, Vol. 23, Part I, p. 215).

Diabase that appear to be of this age occur in considerable volume in the vicinity of Cobalt and elsewhere and at times are confused with the later Nipissing diabase. Gabbro-diabase and basic lavas of Hastings and other countries of southeastern Ontario are also of this age. The Correlation Table that accompanied our report in 1915 shows the occurrence of these rocks in several districts[3].

Since the publication of that report and other papers in which we have described and referred to these rocks we have found an age name for them more necessary, especially in connection with structural geology of the mines at Cobalt. In this area lamprophyres and the so-called "older diabases" are of common occurrence and reference has frequently to be made to them. While we are loath to introduce another age name, still as a matter of convenience we now propose to employ the name Haileyburian for these post-Timiskaming and pre-Algoman igneous rocks. The name is taken from that of the capital of the District of Timiskaming, the town of Haileybury. Dikes of certain of these rocks occur in the environs of the town.

Certain of the rocks that we class as Haileyburian are older than others but they are all post-Timiskaming and pre-Algoman.

The following table, with the addition of the name Haileyburian, gives the age classification employed by the geological staff of the Ontario Department of Mines, the names of the igneous systems or series being enclosed in parentheses, thus: (Laurentian intrusives), to distinguish them from the sedimentary systems[4].

Pre-Cambrian Epochs of Ontario and Their Metal Production.

Keweenawan.—Epoch, following basic intrusions, of (a) silver, cobalt, nickel, and arsenic at Cobalt and elsewhere, (b) nickel and copper at Sudbury, and copper elsewhere. Certain gold deposits, not now productive, appear to belong to this epoch.

Animikean.—Epoch of deposition of "iron formation" as a chemical precipitate. Includes the Cobalt and other series of sediments.

(Algoman).—Epoch, following granite intrusions, of gold at Porcupine and at many other localities, and of auriferous mispickel. Deposits of galena, zinc blende, fluorite, and other minerals appear also to have been derived from the granites, but some of them were not formed till post pre-Cambrian time.

(Haileyburian).—Preceding the intrusion of the Algoman granites, basic intrusives, of post-Timiskaming age, give rise to nickel and titaniferous and non-titaniferous magnetite deposits and chromite.

Timiskamian.—Epoch of minor deposition of "iron formation" as a chemical precipitate, with conglomerate and other sediments.

(Laurentian).—Granite intrusions probaly gave rise to ore deposits which have been removed by excessive erosion as is known to be the case with deposits of later origin.

Loganian (Grenville).—Epoch of deposition of extensive "iron formation" as a chemical precipitate, with limestone and other sediments.

Loganian (Keewatin).—Composed largely of basic volcanic rocks, many of which are now schistose.

[3]Ontario Bureau of Mines, 22nd. Report, Part II, Appendix.

[4]Journal of Geology, Vol. XXIII, p. 591.

Third International Mining Convention at Nelson. B.C. July 20th to 24th, 1920

(Reported by Robert Dunn, Victoria, B.C.)

With a large number of delegates in attendance, both from the different mining sections of the Province and from a number of the adjacent mining States, the third annual Mining Convention of Nelson, B.C., opened on the 20th of July and continued until the end of that week.

Those attending were welcomed on Wednesday morning (July 21st) by J. A. McDonald, the Mayor; Dr. W. O. Rose, member of the Provincial Legislature for the city; Hon. William Sloan, Minister of Mines for British Columbia; and R. F. Green, Member of the House of Commons for West Kootenay, the two latter speaking on behalf of the Province and the Dominion respectively.

The feature of the morning session, outside of the formal addresses, was a paper by A. G. Langley, resident engineer for the Kootenays, on general mining conditions in the Eastern Districts of British Columbia.

Mr. Langley reviewed the history of prospecting in British Columbia from the first discoveries of placer gold near Fort Steele by prospectors from the United States, and said that to one who had travelled the rugged mountain regions of the Kootenay district it was really amazing to see the places into which the pioneer prospector has penetrated, without the aid of trails and with his grub and blankets on his back. He advised search for fissures and crushed zones, and a careful look-out for float. He thought the average prospector went out into the hills to look for gold, silver-lead and copper ores and seldom gave the rarer metals a thought. He suggested it might be well for prospectors to familiarize themselves with the appearance of these minerals, and said that each resident engineer had a cabinet of specimens provided by the Government which could be inspected. He referred particularly to platinum, tungsten, pitchblende, tin and molybdenite. As pegmatite veins were often the source of rare minerals, he described the characteristics of these veins. He advised prospectors to get the best terms for properties, but not to hold them too long. Quick action was necessary, and he suggested that the prospector should ask cash for ore in sight, but that for further payments he should allow the purchaser sufficient time to develop and prove the property.

J. W. Mulholland, President of the B.C. Prospectors' Protective Association, gave a short talk on some of the problems affecting prospecting in the Canadian West. He emphasized the need of trails to facilitate the opening up of prospects; spoke of the need of exhibits of the rarer metals in order that those going to search for minerals might become conversant with those varieties not commonly found in B.C.; also referring to the organization of branches of the Prospectors' Association and the good work being done by the same.

In the afternoon, with S. E. Fowler in the chair, Nichol Thompson of Vancouver, gave an address on the possibilities of the Iron and Steel Industry in this Province. Iron, he said, was the basis of all industry and had been so looked upon from the very dawn of History, "for we find that when Croesus, in his ostentatious way was explaining to Solon the riches of his palace, including the gold in the treasury, the philosopher with a prophet's vision said to him: 'My friend, when a man comes along with better iron than thou, he will be master of all thy gold.'" Mr. Thompson pointed out that time had proven the truth of this for it not unfrequently happened that the surest way to a gold mine was through an iron mine.

The speaker traced the development of the iron and steel industry during the past sixty or seventy years, and then dealt more specifically with conditions in this province. He stated that the magnetites of the Pacific Coast were of a considerably higher grade than were found elsewhere in the world, as far as he knew. This was a point that did not seem to be generally appreciated. The statement that the magnetites could not be treated without haematite, was not correct. Such a theory had been exploded.

It seemed to him that the only question now was that of markets, and he did not think that there was any serious need for concern on that score. On this point he had been commissioned by capitalists considering investment in such an industry in the North-West, to make a thorough investigation of local market conditions. The results had been most satisfactory. There seemed to be no reason to doubt that it would be possible to absorb the output of a 250 ton furnace. He mentioned specifically the large consumption in British Columbia of tin plate for canning purposes.

Concluding, Mr. Thompson said, "Get the steel industry started and many other industries will follow. We have the ore and the coal to make coke, and failing coke we have the water power to generate electricity and the timber to make charcoal. All we require is capital and labour to co-operate in making this magnificent province the Greater Britain of the future."

Glenville A. Collins, who was Chairman of the International Mining Convention at Seattle, followed with an address on financing the prospector.

Mr. Collins said the prospector was a man of high ideals, and persistent faith, but he advised that he should learn more of the principles involved in raising money. "If prospectors knew how to deal with business men along business lines, there would be twice as many mines, and as many more mining fortunes owned by their discoverers. Business men lacked confidence in the prospector's knowledge of business principles, and asserted his belief that "any time a prospector approaches a live business man of capital, and demonstrates his knowledge of business principle as applied to mining, he may be sure of his backing."

The speaker said that the old stock company principle was on the wane. "To stock a mining prospect "today with the expectation of raising any consid-"erable sum by sale of shares is almost to guarantee "its failure." The speaker objected to corporate stock issues, and preferred unincorporated joint stock associations with non-personal liability, and proposed

a plan of co-operative prospectors' syndicates. The concluding part of Mr. Collin's novel and suggestive remarks are quoted in full, as follows:

Prospectors' Groups.

In these days of co-operation and collective bargaining, I am going to venture to suggest a plan of finance that so far as I know is new to mining.

Usually in any worthy district there are a number of prospectors working that are more or less accessible to one another. Say any number of such men meet together and organize themselves into a prospectors' joint syndicate. For the purpose of illustration, say there were five prospectors, and they all had several claims each; maybe some were better than others and possibly their idea of values of ore and property were inconsistent. These men come together and associate themselves (not their property yet) into a joint syndicate as trustees, whose object was to work to develop these properties and district. They jointly get together an accurate statement of the district represented, and its resources—this statement to be verified in so many ways as possible, one by the other, if need be, or by a reputable engineer if possible.

Such a joint syndicate could collectively bargain for grubstake, development capital, or sale of property, for any one of its individual trustees without tying up the claims. The syndicate could then apportion to each of its member trustees, on a specific claim or piece of work, such money as seems wise and needed in the judgment of the trustees, and with the proper legal and technical advice.

This kind of syndicate would represent a better speculation for capital than the ordinary individual property, because one would be assured of the honest collective judgment of several prospectors, their attorney and engineer, in making investment of syndicate funds, as against one individual, against one proposition, as in the present method of syndicate.

There are instances where such a plan can be worked out with success and in the financing of a whole group of prospectors, at one time, in ample proportions, and with many advantages as to legal protection, engineering assistance, dealing with smelter, and towards an honest and intelligent winning from nature of its coveted possessions.

These joint syndicate groups could in many instances become factors in a central association, such as your Prospectors' association here at Nelson. And where this is possible a Prospectors' association could work out a syndicate plan of group financing so as to supply funds to these individual prospector groups, thereby greatly strengthening this mode of finance and protection to the prospector at less cost all around.

Prospectors' Musts.

Now gentlemen, I have talked a lot, and said very little; but, to summarize before closing, let me repeat:

The prospector must learn more about business in order to interest capital.

He must be more careful about making his deals by securing proper advice.

He should hesitate before going in on a corporate plan of stocking a prospect.

He can wisely call together his neighbor prospectors and organize a co-operative joint syndicate.

He can work out a plan by such co-operation so as to finance not only himself but his neighbors, and at the same time provide for legal and technical advice and protection, and make better bargains with smelters and stores furnishing supplies.

He can advertise his district or encourage development, promote transportation and do many other such things.

Co-operation among prospectors in an organized manner cannot help but be beneficial to the mining industry, as well as the individual prospector.

On Thursday morning, the Chair was taken by L. K. Armstrong, Secretary of the Columbia Branch, A.I.M. & E., Spokane, who made a few introductory remarks relative to the various problems confronting industrial advance at the present time. He mentioned the development apparent throughout the Kootenays in connection with the lumber business, and emphasized the need of conservation in this connection. He thought it would be well if, in America, some system of re-forestration were adopted. The labour question was one very prominently before all classes, and he did not find it hard to understand the cause of this in view of the fact that the dollar now was purchasing only what two dollars purchased not many months ago. His opinion was that for the sake of the country, for the sake of industry and the general welfare, it would be advisable for employers and employees to get together wherever possible, discuss their differences in a sane and reasonable way and effect an amicable settlement. How they were to do this was a matter he would leave to them, it being his desire merely to give expression to his conviction that the spirit indicated was most necessary.

"Oxidized Lead Ores," was the subject of an address by S. S. Fowler, General Manager of the new Canadian Metal Co., Ltd., Riondel, B.C. When first coming to British Columbia, Mr. Fowler had given some attention to this matter and had concluded that there were no oxidized ores in this province, the action of glaciers having made their existence impossible. Subsequently however, his theory in this respect had been proved erroneous by the discovery of oxidized lead ore at the Bluebell Mine and the Paradise, the North Star and the Electric Point, the latter being situated just south of the line. The shipment of ore from these properties since had become rather an important contribution to the Trail Smelter of the Consolidated Mining & Smelting Co.

In the Bluebell mine he had found oxidized lead ores at a depth of four hundred feet below the level of Kootenay Lakes. His explanation of this, and he took credit for originating the theory, was that the weathering of the deposits preceded the existence of the lakes, there than perhaps having been an inconsiderable river, where now there is a very large body of water.

"Some years ago," Mr. Fowler said, "I found an area utterly barren of vegetation. Not a tree on it more than a foot high. It was about half the size of this hall, and I became curious as to what was underneath it. I opened it up and discovered a body of ore, lead-bearing and decided to ship some of it. It is strange looking ore, showing no signs of value, and when it was shipped the road-master on the railway said whoever sent it ought to be in an asylum, and that he knew where there were millions of tons of such rock. Well! the shipper is still out of the asylum." After giving some account of the development of the Bluebell mine, one of the best known operating properties in the province, Mr. Fowler told something of what he is now doing in experimentation to the end that a greater recovery of the values of this material may be secured.

T. W. Bingay, Comptroller, Consolidated Mining & Smelting Co., of Trail, contributed a paper on the advance in metallurgical practice, with special reference to the Trail Smelter plant for increased production. Much of the information given has already been made available to the public. He told the story of the Trail Smelter, of its efforts towards zinc production during the war; of the additions recently made to the copper refinery; and of the plans in view for the treatment of the ores of the Rossland plant.

Nichol Thompson occupied the chair for the afternoon session, the feature address of which was that by the Hon. William Sloan, Minister of Mines for British Columbia.

Speech of the Minister of Mines.

Mr. Sloan referred to his pleasure at attending the last Convention, expressed his renewed pleasure at being present at a third annual gathering and heartily welcomed the delegates to British Columbia on behalf of the Provincial Government.

He reviewed the mineral production of the province for 1919, which, although showing a reduction of twenty per cent from the figures of 1918, he considered was a good showing under the circumstances and required no explanation, instancing greater reductions in neighboring metal-producing states.

Mr. Sloan drew the special attention of the delegates to the decline in gold production, and he believed that everything possible should be done to stimulate gold output. He explained the changes in the Placer Mining Act designed to open up large areas now idle, and mentioned the removal of the fifty cents royalty formerly collected per ounce of placer gold recovered.

The policy of the Department of Mines in re-division of the mineral survey districts, and the expenditures on opening up trails was enlarged upon, the Minister mentioning that since the enactment of the legislation there had been expended on road and trail construction and on repairs to mines and promising mining properties the sum of $280,000, and that up to date $355,000 had been authorized on similar work. Mr. Sloan said that no application for road or trail construction to a mine or mineral property made to the Mines Department that had received the endorsation of the District Engineer, but was given favorable consideration, and he renewed his assurance to the delegates that this would be the constant policy of the Department under his direction.

The Minister of Mines denied that, as had been stated, all iron ore in British Columbia had been put under reserve. Only a small area carrying iron in the Clinton district had been so reserved under the powers granted him. The large area of iron-ore (limonite and hematite) in the Taseko or Whitewater district, estimated by the Government Engineer to contain possibly fifty million tons of ore had been so reserved, the Government believing that this body of ore, so suitable to be mixed with magnetite, should be held out of possible speculation so that nothing might interfere with the initiation of an iron and steel industry in the Province.

The Possibility of an Iron and Steel Industry in British Columbia.

On this important matter the Minister spoke at length as follows:

It seems to me that the time is propitious for action on the part of capital. There is no question that we have the magnetite ores necessary for the maintenance of a 300-ton a day plant and, if the exploration now in progress in the Taseko River district results as favourably as Mr. Brewer's report would indicate, we will have all the fluxes required. There now are two parties in this district—one having been sent into the field by the Provincial Government, Mr. F. J. Crosland, B.Sc., the well known mining engineer and geologist, being in charge—and the other under Mr. J. D. MacKenzie, of the Canadian Geological Survey. Mr. Crosland's work is to establish as far as possible the tonnage of ore available, and that of Mr. MacKenzie is to make a geological and topographical survey. There also are some high-grade red hematite deposits on the Bull and Sand Rivers, Kootenay District. This ore is known to be of excellent quality, and last year Mr. Langley, District Mining Engineer, was instructed to make an examination of the property. Owing to his many duties because of the extent of his territory he was unable to get the work done but, now that he has an assistant, the inspection will be made and we will await the report with interest.

Six years ago the development of the magnetite ores of British Columbia and their actual commercial utilization involved problems which seemed insuperable because of the advantages of the East over the West in respect of cost of materials, labour, etc. Pig-iron, I am competently advised, now can be produced as cheaply in British Columbia as in Pennsylvania and other industrial centres of America. Ores cost roughly $7.00 a ton at the lower Lake Superior ports, or approximately $7.50 a ton at the Eastern furnaces; the cost of British Columbia magnetites landed at some point within easy reach of fuel could not be more than $4.50 a ton—in fact such a figure would allow those delivering the ore a good profit. As to the cost of fuel—the former difference favoring the East has been eliminated, as coke which before cost the Eastern manufacturers from $2.00 to $2.75 a ton, is now costing them between $11.00 and $12.00 a ton, at which figure it should be possible to secure it in British Columbia.

Two tons of iron ore approximately are required to produce a ton of pig iron. In the East this ore is worth at the furnaces about $15.00, while in this province it could be had for about $9.00, which is a liberal estimate. One and a quarter ton of Eastern coke is necessary to produce one ton of pig iron, which means an expenditure on fuel at present prices of about $13.75, while before the war it cost something like $4.00. Under these circumstances it would appear that British Columbia now would not be at a disadvantage in respect to the production of pig iron.

The cost of production in this province of one ton of pig iron, by blast furnace and under existing conditions as sketched, has been placed at $33.00 as follows:—

Two tons of ore at $4.50	$ 9.00
One and a half tons of coke at $10	15.00
Three-quarters of a ton limestone at $4	3.00
Labor and Overhead Costs, etc.	6.00
	$33.00

For purposes of comparison it is interesting to note that the last Eastern quotations available follow: Bessemer, $42.50; basic, $43.00; foundry, $43.00 to $45.00. While there are no official figures at hand regarding the Western market price of pig iron there is no doubt that with freight and cost of handling added the material would be much more expensive on the Coast. This is proven by the fact that the Purchasing Agent of Yarrows, Ltd., Esquimalt, on inquiry, stated that they paid $75 a ton for their last shipment of pig. As to freight rates per ton of pig from Ontario it runs to $14.80 a ton; from Quebec $15.80; and from seaboard and U.S. points, $16.60 a ton.

As to the market possibilities, which of course is a matter of the utmost importance, it seems to me that there is no doubt that the product of say a 300-ton blast furnace could be absorbed in the Canadian and American West. If there is any doubt of the market now available taking care of this product it seems to me that the time is opportune to ask the Dominion Government to assist by the installation at one of the Pacific Coast terminals of the two National Railways of car shops and all the manufacturing plant that that implies. Hon. J. D. Reid, Minister of Railways and Canals, is in British Columbia this week, and it seems to me that he should be approached to this end. I know that it was the fixed policy of the Mackenzie and Mann interests, had they been able to discharge the vast financial obligations they shouldered, to provide such car shops. Should the Dominion Government do this it would mean that a large part of the product of a 300-ton a day iron blast furnace would be taken care of and, no doubt, the establishment of the industry assured. This would be an indirect, though effective way for the Federal Government to discharge the responsibility it unquestionably has to assist in the opening up of our iron ore resources. As you know, it was mainly through the bounties and bonuses granted by the Dominion that the Eastern Canadian iron and steel industry was put on its present flourishing basis. If we cannot get this treatment it seems reasonable to ask that their railway policy be shaped along such lines as will result in the encouragement of the same industry in the West, where the native resources are of just as high quality and just as extensive. This, too, would

appear to be the moment to strike from the fact that the launching of the British Empire Steel Corporation merger, with a capitalization of $500,000,000, has been announced within the past few weeks. Included in this combination are the iron and steel manufacturing interests of Eastern Canada, and the question occurs in considering the move, whether this tremendously powerful industrial and financial combination will retard or hasten our ambitions for an iron and steel industry in this province. Certainly it is not a time for sleep and British Columbia should not hesitate to strongly press her claims for recognition.

I draw attention to the fact that the Provincial Government has not overlooked or shirked its responsibility. This is evidenced not only by the fact that a bounty now is offered on the production of pig iron from British Columbia and which was last session extended for a period of five years, which, in the case of a 300-ton plant this bounty will entail an outlay of about $1,000,000, but as well by the activity of my Department in the obtaining of all possible information regarding the resources of the province. We have had many applications for assistance for the establishment of an iron and steel industry from private enterprise, but thus far all have required the endorsement of bonds to from 50 per cent to the full value of the plant. The Government's position is that, if it is necessary to go that far, it would be better that the industry should be vested in the people and operated for the people's benefit. The assembling of data is continuing to the end that, if it becomes necessary, the Government will be in a position to give serious consideration, basing the same on authentic information, to the advisability of the announcement of some such policy.

Further remarks of the Minister dealt with the Government's policy to aid returned soldiers, and mentioned that 25 parties of soldier-prospectors are now in the field on a Government grubstake.

Lectures to prospectors during the winter months, and exhibitions of mineral specimens were part of the Government's plan to help intelligent prospecting.

At the request of the B.C. Prospectors' Protective Association the Resident Mining Engineeers have been instructed to furnish brief preliminary reports of properties examined to the owners.

To stop "wild-catting"—which was the Government's aim—legislation has been passed providing that promoters of mining properties shall submit copies of prospectuses and advertising matter to the Resident Mining Engineers.

Mr. Sloan's evident thorough knowledge of the work of his department, and his references to the Government's policy in respect to the iron and steel industry, occasioned much enthusiasm, the Minister of Mines being accorded three hearty cheers on the motion of Mr. Carrington, of the Seattle Chamber of Mines. Mr. Sloan returned the compliment by calling for three cheers for the delegates from the United States.

C. B. Beale, His Majesty's Trade Commissioner, Winnipeg, delivered a very illuminating address, especially in regard to the splendid effort Great Britain is making to recover trade lost during the war, on the subject, "inter-Empire Trade Development." He dealt with the need of close co-operation with the Mother Country in the establishment of stronger inter-Empire trade ties.

W. Pellew Harvey, a former resident of B.C., when he was prominent in connection with the mining industry and for many years established professionally in London, England, addressed the Convention on the question of his mission to B.C. He said that it was generally admitted that the province possessed great mineral wealth, and he was here for the purpose of ascertaining as closely as possible, the position at the present moment; not for the sake of rashly investing, but for the collection of data and where these justified, making recommendations to his clients who might feel justified and willing to come to the support of those interested in mining in the Province. Mr. Harvey referred to the geographical conditions of Kootenay, particularly in the matter of transportation, and compared it with Siberia, where all is open country and transportation, therefore, an easy matter. After complimenting the Department of Mines on what it had done to make the obtaining of accurate information an easy matter, and also on what was being done for the encouragement and assistance of the prospector, Mr. Harvey spoke of the Trail Smelter and the tremendous work it was doing for the mining industry in this part of the Dominion. This plant handled 66 per cent of the total mineral production of the province. It might help, he suggested, if a subsidiary interest could be created, possibly supported by the Consolidated, whereby local camps and districts producing small quantities of ore, although probably large in the aggregate, could have a customs concentrator. Something also might be done in the way of establishing test centres to grade the ores for future treatment by smelters.

A number of resolutions were passed. One of these has reference to the activity of the One Big Union in the Slocan and other interior districts. It puts the delegates on record as emphatically condemning any species of radicalism which is a menace to the prosperity of the mining industry of B.C., and calls upon the Dominion Government to make immediate investigation of the baneful effect of these activities, and to take such action as will restore prosperity by guaranteeing to every law-abiding citizen, "the right to work where, when, and for whom he pleases, safe from the unlawful interference of any kind whatsoever directed by those who seek destruction of the free institutions under which we live, and to which we hereby pledge our continued and unyielding allegiance. And it is further Resolved," the Resolution continues, "That we condemn in unqualified terms any employer of labour who, in furtherance of selfish interests, panders to any organization of disloyalty whether flying the banners of One Big Union, or I.W.W. or the plain red flag of Anarchy."

Copies of this are to be forwarded to the Ottawa authorities.

Another resolution was submitted by the B.C. Prospectors' Protective Association petitioning the Minister of Mines, Ottawa, to throw open the Indian Reserves in B.C. to mining operations for all minerals. It was pointed out that the Provincial Government has amended the Mineral Act and the Placer Act permitting the mining of gold and silver on these Reserves. As, however, the precious metals almost invariably are found associated with the base metals, the privilege granted by the said amendment means very little, if anything.

No account of the Convention would be complete without a reference to the mineral exhibit and to the indefatigible and successful efforts of Fred A. Starkey, who was in general charge of the arrangements and the conduct of the programme, for the entertainment of the visitors.

As to the exhibit, it may be said to have been one of the most complete of the varied ores of the Kootenays it has been the privilege of the writer to inspect. Practically every shipping mine, whether large

or small, was represented, and it was an education in the mineral resources of Eastern British Columbia to make the circle of the tables containing the samples, all of which had been clearly labelled. A large specimen of the Mandy Mine, Le Pas, Manitoba, and a small cabinet of the rarer minerals, many of them not as yet discovered in British Columbia, which has been loaned by A. G. Langley, District Engineer, were among the many features accorded special attenton.

Fred A. Starkey and his energetic assistants are to be congratulated on the success of the Convention from whatever angle it may be viewed.

BOOK REVIEW

A STUDY IN CANADIAN IMMIGRATION. By W. G. Smith. The Ryerson Press, Publishers, Toronto. Linen Boards. 5 by 8 inches. 406 pages Price, $3.00

The preface of this book announces that it has many defects, but a perusal of the work reveals that its defects are not those of its author, but reside in the incomplete character of our vital statistics, and the difficulty of interpreting figures that are incomplete, and of too short a duration to enable critical elucidation and analysis. Not that the mass of statistical information in this work is meagre, for it contains sixty-one tables that must have cost the author tremendous labor to compile.

As an example may be mentioned the attempt to trace the per centage of infirm and defective persons in Canada among the various contributory sources of our population. Statistics of this kind are useless unless they contain data as to the ages of the persons considered, and the large percentage of infirm persons shown by the statistics to be of native Canadian origin is doubtless due to the number of elderly persons included, whereas the immigrant population, at any given time, naturally contains persons that are, in the phrase of the insurance actuary of "effective age," and are, by natural selection, neither very young, nor very old.

The author is an optimist on the ability of Canada as a "melting-pot" of nationalities, but he points out with clearness the dangers of indifference towards the strangers in our midst, and the undesirablilty of allowing foci of extra-national culture to multiply in our midst. He says, with fine fervor, and much truth, "What is needed is a new crusade of young Canadians "in whom the fires of patriotism burn, who will man "the outposts of Canadian nationality." He points out the hardships suffered by the immigrant, who he describes as "the lineal descendant of the forgotten pioneer, and like the pioneer achieves competence and prosperity." The problem of the immigrant is the problem of the Canadian people, who through their Government have advertised abroad and solicited the emigrant at home. The author points out how many millions of money have been spent in solicitation of emigrants, and how little in comparison has been spent to retain and incorporate the immigrant into our national fabric when arrived.

We have always considered that the work of the "Reading Camp Association," now known as the Frontier College, one much needed in Canada, and those who have read "A Handbook for New Canadians," by Mr. Alfred Fitzpatrick, will find in it the answer to many of the questions raised by Mr. Smith's book. As Mr. Fitzpatrick pointed out, and as Mr. Smith intimates also, the newly arrived immigrant in Canada is the prey of his environment and too often of his own countrymen, who because of their knowledge of the immigrant's language are too complaisantly allowed to control their compatriot's housing, supplies and general destiny in Canada. Tutelage in Canadian institutions, in the English laguage, and in citizenship is required to assimilate the immigrant, and Mr. Smith says truly: "A thousand new teachers in as many teacherages would mean the beginning of a new day."

"In time of war a half million of our best were enlisted in a gigantic struggle of destruction. In times of peace can there not be a brigade or two of equally ardent spirits who will engage in the work of construction?" The Frontier College would seem an organization ready to hand for a work that recent events have revealed as desperately necessary.

Mr. Smith advocates restriction of immigration in lean times, and stricter supervision of incomers in good times. He asks for inspection of emigrants at the point of departure, and suggests the throwing of greater selective responsibility upon the steamship and other agencies that earn dividends by bringing emigrants to Canada. He pleads for a large and adequately equipped institutions like Ellis Island at several points of main entrance into Canada, and asks that regulation of immigration shall be planned with a view to the tremendous scale on which it may be expected in years yet to come. Due credit is given to improvements in the Immigration Law, but it is suggested that larger measures are required in the proportion that immigration may be expected to be larger in coming years.

Mr. Smith has presented a lot of problems that he has not attempted to answer, but his book contains many statistics in understandable and convenient form which may lead enquirers to a better grasp, if not a solution, of the individual problem they themselves are faced with in connection with immigration.

We commend the work to officials of Canadian corporations who desire the foreign workman, to employment and welfare officers.

After perusal of the volume we would summarise the desirable conditions in connection with immigration to include the following. Careful selection of the country in which emigrants are to be solicited. Some countries—Finland for example—seem to yield undesirable elements in large proportion. Agreement with the government of the emigrant's country on the lines laid down by the Italian government and designed to protect against exploitation of the emigrant by his own compatriots both during his journey to Canada, and after his arrival there. Examination of intending emigrants at or previous to embarkation for Canada. Enlarged and centralized examination and detention facilities at the point of debarkation in Canada. Continued interest in the immigrant in his sojourn in Canada, and a deliberate and widespread campaign for his Canadianization, including discouragement of all forms of national segregation and the formation of communities in Canada detached from Canadian influences. Unless we Canadianize our immigrants then we risk the un-Canadianizing of Canada.

Coal Supply and Prices in Canada

By The EDITOR

In Nova Scotia the coal companies are selling coal for local domestic consumption at prices which are reasonably low, and netting only a small margin of profit over cost of production, namely at from $5.50 to $6.00 per ton for run of mine coal, with a differential of 35 cents for screened coal. There is no shortage of coal in the Maritime Provinces, and an increased quantity of coal is being produced from small mines having a local sale, particularly in the vicinity of New Glasgow and Amherst.

The cost of coal in Newfoundland is unprecedentedly high, running up to $35 per ton delivered in the consumer's cellar. Prospecting for coal is being actively carried on in Newfoundland under pressure of the demand and high prices, and, while coal mining in Newfoundland can never be a very large industry because of the small and contorted character of the deposits, it will eventually, like the coal deposit of New Brunswick, develop into a valuable local source of supply. Newfoundland, like the mainland is suffering from lessened efficiency of transportation, and during the war suffered a great decrease in the number of vessels available for coal freighting.

The Nova Scotia coal companies have been able to keep Halifax and St. John well supplied with coal, and at Halifax there has recently been a decided falling off in the demand for steamship bunkers.

The situation in Montreal is singular. Many of the local coal merchants have contracted with their customers for coal supply at comparatively low prices, figures in the vicinity of $3.75 at the mine being general. The coal companies are unable to deliver coal at the contracted prices, but there is no difficulty in obtaining "spot coal" at prices double and treble the figures at which deliveries were promised. This refers to bituminous coal.

Anthracite is selling retail at $16.50 per ton in Montreal, and an increase of fifty cents is expected immediately.

The condition of affairs in Montreal is understood to be general in the New England States,, where the same complaints as to non-fulfilment of contracts and the availability of "spot coal" at enhanced prices are heard.

In Toronto, retailers to domestic customers are quoting run mine bituminous at from $14.25 to $14.50 per ton delivered. Anthracite is quoted at from $8.00 to $11.50 per ton at the mines in American funds.

Many of the larger manufacturing concerns in Ontario and Quebec are uncertain regarding their operations duing the coming winter. Stocks are non-existent, and a considerable amount of unemployment is even now being caused by curtailment of operations caused by coal shortage. The position of manufacturers is illustrated by the published remarks of the Purchasing Agent of the Canadian Consolidated Rubber Company, who states that this Company's requirements of coal run to about 80,000 tons annually, and that this quantity will cost approximately $1,000,000 more than it did last year—if purchased. This official stated that he had bought Dominion Coal Company's coal throughout his Company's history, until the supply ceased.

Indication of the cost of U. S. coal in Manitoba is given by the prices at which the provincial government has let contracts for its winter supply. Ten thousand tons of Yougheogheny slack have been contracted for, 7,000 tons for the Government powerhouse at $15.25 per ton delivered and 3,000 tons for the Manitoba Agricultural College at $12.75 per ton delivered. For other provincial establishments at Brandon and Portage la Prairie, Souris run mine is being purchased.

In British Columbia, the collieries are not being pressed for coal so hardly as in the East. In Alberta, not withstanding the appeals of the Government and an extensive advertising campaign, the collieries are not working to capacity, and the members of the coal trade there are very justly indignant at a report which was given wide circulation in the East that the western collieries had a local market which was absorbing all the production. Nothing of course could be further from the truth. Alberta collieries never at any time, even in the strenuous period of 1917-1918, worked to full capacity.

High as coal prices are throughout Canada, they will certainly go very much higher as the result of the new wage agreement in District No. 18, the pending demand of the U. M. W. in Nova Scotia, and the general wage increase in the bituminous and hard coal districts of the United States, added to which there will be the freight rate adjustment required to enable the railways to pay the increase recently granted in the U. S., and the corresponding increase which will be given to railway men in Canada.

There is a phase of the coal question in Canada that is not fully understood, namely, that coal has not in recent years been used as freely as it would have been if supplies had been easier to obtain, and prices lower. There are a great many manufacturing enterprises mooted that have not been able to proceed because the promoters could not see their way to a stable coal supply. It is moreover not appreciated that the capacity for coal consumption, and the per capita use is a growing one. Many past calculations on coal supply have been falsified by neglect to take into account the growing factor of per capita consumption, and it may surprise many persons to know that the consumption capacity of Ontario alone is 12,000,000 tons of bituminous coal annually, or almost equivalent to the entire coal production of Canada. Calculations based on coal consumption rates of several years ago are entirely out of date, and will certainly lead to erroneous conclusions.

With regard to the efficacy of an export embargo in assisting the present crisis it is necessary to take both a backward and a forward view. The outstanding necessity in connection with our coal supply in Canada is to greatly increase the output capacity of the existing collieries, and to provide new collieries. The financial weakness of Canadian coal operators is due to the inconsiderate and almost contemptuous treatment they received at the hands of large coal consumers in Canada in years gone by. They were compelled, in order to hold their organizations together, to sell coal at prices which were actually below the ultimate cost of production, although possible they slightly exceeded the aggregate cost of labor and material at the time of purchase. Today, owing to con-

ditions in Europe very high prices can be obtained for export coal and the coal companies have a chance to make money. The profits thus obtained are vitally necessary to the provision of capital for the increase of production. The actual assistance in tonnage that will be obtained by an export embargo is utterly negligible in comparison with the actual shortage in production. The shortage of production outweighs the export tonnage ten to one, and if, as intimated by the Railway Commission, is should be considered that not only an export embargo, but price control, is to be imposed on Nova Scotian coal producers, it should not be forgotten that the crisis of this year will be the the crisis of 1921, and every year thereafter, so long as Canadian coal production does not appreciably increase.

There has recently been a turn in production in Nova Scotia, and what is more important than anything else, the Dominion Coal Company has announced the resumption of capital expenditure that has been deferred seven years.

This journal has on many occasions pointed out that what is required in Canada is not a coal "controller," but a coal "booster." More men engaged in coal-mining, more money invested in coal mining, more coal produced from Canadian mines, are things earnestly to be desired.

WORLD'S COAL OUTPUT.

The monthly **Bulletin** of statistics of the Supreme Economic Council for May states that in the case of coal the latest available figures for the United Kingdom, Belgium, France, and Germany indicate on the whole progress in the direction of the rate of production of pre-war days. The following table compares the aggregate average quarterly output of these four countries as a whole in 1913 with their quarterly output during 1919 and 1920:—

Period	Excluding German Lignite Metric tons	Comparison with 1913. Per cent.
Quarterly average, 1913 ..	132,000,000	100.0
1st Quarter, 1919	98,100,000	74.3
2nd Quarter, 1919	90,900,000	68.9
3rd Quarter, 1919	92,100,000	69.8
4th Quarter, 1919	105,000,000	79.5
1st Quarter, 1920	107,100,000	81.1

In the case of the United States the quarterly production of coal has increased from an average of 129 million tons in 1913 to 142 million tons in the first quarter of 1919. In consequence of the inability of the United Kingdom to export as freely as formerly, European countries have turned to the United States for supplies, and are now obtaining about 1,400,000 tons per quarter from that source.

TORONTO COAL PRICES.

Toronto, August 11.—Toronto coal dealers have been advised that on August 16th there will be an advance on the freight rates on all classes of coal on the United States side of the line. The new anthracite wage scale has not been announced but reports indicate that it will amount to one dollar a ton under the new scale. The freight advance for the Canadian market will probably be one dollar a ton on anthracite and from 50 cents to 75 cents a ton on soft coal. Prevailing quotations at Toronto; Mine run $14.25 to $14.50 f.o.b. Toronto; smokeless coal $14.50 to $15.00; hard coal $8.00 to $11.50 gross tons at mines, American funds.

STATISTICS OF ANNUAL PRODUCTION OF ANTHRACITE AND BITUMINOUS COAL IN THE UNITED STATES.

The following figures of the annual output of anthracite and bituminous coal in the United States, taken from "Saward's Journal" New York, form a useful reference.

It should be mentioned that the anthracite figures, showing as they do the total production, and being reported as they are in net tons by the Geological Survey, differ materially from the report of tonnage shipped as reported in gross tons by the Anthracite Bureau of Information. Roughly speaking, the Survey figures will be found to be about 25 per cent. more than the Bureau figures, the difference increasing in recent years because of more coal being used at the mines.

Coal Production—Net Tons.

	Coal Production Net Tons Anthracite	Bituminous
1890	46,468,641	111,302,322
1891	50,665,431	117,901,238
1892	52,472,504	126,856,567
1893	53,967,543	128,385,231
1894	51,921,121	118,820,405
1895	57,999,337	135,118,193
1896	54,346,081	137,640,276
1897	52,611,680	147,617,519
1898	53,382,644	166,593,623
1899	60,418,005	193,323,187
1900	57,367,915	212,316,112
1901	67,471,667	225,828,149
1902	41,373,595	260,216,844
1903	74,607,068	282,749,348
1904	73,156,709	278,659,689
1905	77,659,850	315,062,785
1906	71,282,411	342,874,867
1907	85,604,312	394,759,112
1908	83,268,754	332,573,944
1909	81,070,359	379,744,257
1910	84,485,236	417,111,142
1911	90,464,067	405,907,059
1912	84,361,598	450,104,982
1913	91,524,922	478,435,297
1914	90,821,507	422,703,970
1915	88,995,061	442,624,426
1916	87,578,493	502,519,682
1917	99,611,811	551,790,563
1918	98,826,084	579,385,820
1919	86,200,000	458,063,000
1920*	42,780,000	257,010,000

*Six months.

NOVA SCOTIA COAL INACCESSIBLE TO ONTARIO BY RAIL.

In reply to the enquiries sent out by the Windsor, Ont. Board of Commerce, three Nova Scotia coal companies have stated that their coal output is covered by current commitments. The replies received also suggest that the rail carriage from Nova Scotia to Ontario points would make the delivered costs prohibitive.

The Nova Scotia Steel Company, in its letter, stated: "Ontario has never given proper consideration to the "coal question, as it has heretofore been able to ob- "tain all the coal it required from the United States "at a low cost, and therefore, gave little heed to de- "veloping the Canadian coal industry."

NOTES FROM THE NOVA SCOTIA COLLIERIES.

Changes in the Mines Office Staff.

Mr. R. D. Anderson, an official of long service in the Mines Office at Halifax, has taken a position as technical adviser to the Inverness Railway and Coal Co., as newly organized. Before going to the Mines Office Mr. Anderson was connected in official positions with the Glace Bay collieries, and is well equipped for his new position.

Mr. Michael Mc. Intosh, for a number of years Inspector of Mines for the Waterford District, has resigned from the service of the Government, and has been appointed to special duties connected with the cost of colliery materials by the Dominion Coal Company. Mr. Mc. Intosh is returning to the Dominion Company, having previously been manager of one of the Waterford collieries.

Another official of the Mines Office, Mr. J. J. Mc.-Neill, recently returned to a position as colliery manager with the Dominion Company after having for several years been Inspector of Mines in the Glace Bay District.

COAL PRODUCTION.

The Nova Scotia Steel and Coal Company's collieries in July raised 51,472 tons, which compares with 43,713 tons in July 1919. For the seven months ending July the production for 1920 is 315,329 tons, being 82,000 tons in excess of the corresponding period of last year, equivalent to an increase of one third.

The Dominion Coal Company's production from the Glace Bay collieries during July was approximately 268,000 tons, or 13,000 tons below the output for June. For the seven months period the production during 1920 has been 1,883,000 tons, or slightly less than 100,-000 tons higher than for the corresponding seven months of 1919. June production of 268,000 tons compares with 224,000 tons in June 1919. The production for August is unlikely to exceed that of July.

British Columbia Letter

THE COLLIERIES

The Cassidy Collieries of the Granby Consolidated Mining & Selting Co. have been closed down for over a week. Just what the trouble is cannot be said although it is known that it has its source in demands of the men. Whther these demands are for increased wages or for recognition of an organization the employers do not care to have anything to do with is the question. It is denied, however, that more wages are asked for and it cannot be that better living conditions are being sought for the Cassidy Collieries are a model in this respect. The only possible difference, therefore, would appear to be in respect of the recognition of some organization among the men. Operation of the mine stopped when the men called a holiday to formulate their demands. The management, thereupon, met the miners by making the desire for a holiday appear unanimous and formally closing down the property. Their explanation is that the bunkers were full and that difficulty was being experienced in marketing the product. Among those familiar with the situation this is not taken too seriously, especially in view of the fact that all the other coal mines of Vancouver Island are working as near to capacity as the labor conditions permit and also having in mind that the orders for the product are far in excess of the output. There, however, still is a holiday at Cassidy. The deputy Minister of Labor is investigating the trouble and it is hoped that his intervention will result in a settlement.

The first British Columbia coal to be shipped to Europe left Vancouver Island on or about July 28th. It consisted of 4,500 tons of the product of the Canadian Collieries (D) Ltd, and is being carried by the motorship Pacific of the Johnson Line to Sweden. J. M. Savage, general manager of the Canadian Collieries, states that many inquiries are being received from Europe as to the possibility of securing coal from the Pacific Northwest. The present prices here are said to be comparatively low and, as the shortage on the continent is acute, purchasers are driven to all possible sources of supply. The development of this new trade between British Columbia and Europe will be watched with interest.

A mass meeting was held recently at Fernie when the question of ratifying the new wage agreement in U.M.W. District No. 18 was considered and the question of allegiance to the U.M.W. of A. and the One Big Union was debated. In view of the fact that the agreement was negotiated between the Operators and the U.M.W. of A. this organization appears to have had the best of the argument. The miners afterwards marched en masse to the office of the Crow's Nest Pass Coal Co. and conferred with the management. What occurred has not been announced, but the mines have up to the time of writing have been working without interruption.

The Wellington—Nanoose Collieries, operating the Nanoose Bay Mine, has been completely re-organized and the mine henceforth will be known as the Lantzville Mine. X. Louis Williams is the chairman of the Board of Directors; F. H. Lantz, the managing director; and J. A. Coleman, the secretary. Over $100,000 has been spent during the past year in improvements to the pithead equipment. New wharves have been built, a new "Link-Belt" screening plant installed, and a new washery capable of handling 500 tons a day erected. The slack from the washery is used for firing the boilers and electric power and light is generated from a 250 volt Robb dynamo, while an Ingersoll Rand Compressor of 150 lbs. capacity also has been installed. Edward Floyd, an English mining engineer with experience in the coalfields of Northumberland, has been appointed superintendent. The Lantzville Mine is situated on a beautiful townsite and it is proposed starting immediately on the construction of such houses as are necessary for the comfortable accommodation of officials and men.

Extensive coal deposits situated in the Copper River District, Northern British Columbia, are being inspected by engineers and representatives of Canadian financial interests with a view to their development. This field is located on Chettleburgh Creek, a tributary of the Zymoetz River, about thirty miles from the town of Smithers. There are seventy-five leases on which two good seams of coal have been exposed, respectively nine and six feet thick. The latter have been slightly developed by short prospect tunnels. A lot of exploratory work has been done and the

measures are exposed on Chettleburgh Creek for a distance of two miles. A diamond drill was taken to the property in 1913 but was never used.

British Columbia's production of coal for the month of June aggregated 239,566 tons, of which the Vancouver Island mines were responsible for 149,973 tons and those of the Mainland for 89,593 tons.

The detailed figures follow:

Vancouver Island Field

	Tons
Canadian Western Fuel Co., Nanaimo	56,474
Canadian Collieries (D) Ltd., Comox	41,426
Canadian Collieries (D) Ltd., S. Wellington	6,887
Canadian Collieries (D) Ltd., Extension	14,087
Pacific Coast Coal Co.	8,662
Nanoose-Wellington Collieries Ltd.	1,427
Granby Collieries, Cassidy	21,010
	149,973

Mainland Fields

Crow's Nest Pass Coal Co.	62,770
Corbin Coal Co.	15,048
Middlesboro Collieries	7,882
Fleming Coal Co.	2,730
Coalmont Coal Co.	1,163
	89,593

Some interest has been created in Southern Vancouver Island through the publicity given to the recent experience of a resident of Victoria in the person of James Rennie who, while exploring the Sooke River Country happened upon the remains of the once thriving mining town of Leachtown. Recalling stories of the placer excitement of the locality half a century or more ago Mr. Rennie decided to put in some otherwise idle moments in testing the sands. Searching he found what appeared to be virgin ground and a little panning brought surprising results. He returned with seventeen nuggets, none very large but some were very much worth while. It is understood that the ground is to be staked and that an effort will be made to perfect arrangements for placer mining operations on a considerable scale.

PERSONALS.

Mr. J. B. Tyrrell has returned to Toronto after visiting gold properties in Northern Manitoba.

Mr. H. H. Sutherland has returned to Toronto after several months absence in England where he has been enlisting capital for the development of gold properties in Northern Ontario.

Mr. J. S. DeLury who has completed an examination of the Rice Lake gold area for the Manitoba Government has returned to Winnipeg.

Mr. Jas. McEvoy has not yet returned from Alberta. His address there is c|o Cadomin Collieries, Cadomin, Alberta.

Mr. A. G. Burrows is in Toronto for a few days. He will return shortly to Gowganda where he is making examinations for the Ontario Bureau of Mines.

Mr. P. E. Hopkins of the Ontario Bureau of Mines staff is working in the vicinity of Schrieber, Ontario. He will later visit some Western Ontario gold areas.

Prof. M. B. Baker of Queens University is making geological examinations in Leeds Co., Ont., for the Bureau of Mines.

INTEREST IN GOLD MINING QUICKENS.

Increased activity in gold mining in the Porcupine district is indicated by recent announcements concerning properties that are not at present producing. Arrangements have been made for the resumption of work at the Porcupine Crown, Vipond and North Thompson which are in the vicinity of the Hollinger and developments at the Dome mine are awakening interest in the possibilities of the neighboring property, Dome Extension. A Toronto syndicate headed by H. B. Wills has undertaken to supply the treasury of the V. N. T. company with a sum that should put it in a position to operate the mine. The shareholders have accepted the offer made by the syndicate and it should not be long before the result of the financing is apparent at the property. It is announced that the syndicate will take of the treasury stock 200,000 shares at 15 cents, 200,000 at 30 cents and 200,000 at 50 cents.

The interest in Dome Extension is a result of the increased likelihood that the Dome company will exercise its option on the Extension property and develop it. The announcements concerning these mines is reflected in the stock markets. The trading in V.N.T. and Dome Extension is much more active than for some time.

The Kirkland Lake gold district is also attracting more attention now than for some time. Good progress has been made in exploring the surrounding area; but the more advanced properties have for many reasons been delayed in development and the outlying properties have not received the attention that they will when the older mines are operating at capacity. There are now rumors that a merger of some of the mining companies is likely to be effected and this is taken to mean that very considerable advantages will accrue to all the operators in the district. Vigorous development of the mines in this area will give new life to the prospectors working in the district.—R.E.H.

In Northern Ontario, the announcement made by Hon. Harry Mills, Minister of Mines in the Ontario Cabinet, that short courses for prospectors would be carried on in a half a dozen northern centres during the coming winter, has been greeted with interest among mining men. The courses are one of the units in the Provincial Government's plan for greater development of the mineral resources of Ontario. Schools will probably be opened in Haileybury, Sudbury, Timmins and one or two other centres. The course will last about six weeks and prospectors who attend will be taught the elementary principles of geology, to provide them with a sufficient knowledge of rock formations to enable them to judge the possibilities of a district with greater facility. General training will be given in sampling ores, testing values, etc, All courses will be free to prospectors. The Ontario Government will probably establish an assay office at Kirkland Lake, miners and prospectors will be able to obtain free assays of any ore they may discover.

The Denver Rock Drill Manufacturing Co., manufacturers of rock drills and accessories, of Denver, Colorado, will open an office at 421 Manhattan Building, Duluth, Minn. It is expected that the branch there will be ready for business on Aug 1st.

Northern Ontario Letter

THE SILVER MINES.

The Cobalt Field.

From available figures, the indications are that silver production from Northern Ontario is now a little under one million ounces monthly. At 95 cents an ounce which is the quotation at the time of writing, and plus 13 per cent premium on New York funds, the value of the output is at the rate of over $1.07 an ounce in Canada, or not far under million dollars monthly.

For the first half of the current year, due to silver having averaged a fraction over $1.18 an ounce, the indicated output had a value of over six million dollars, but with the lower average now prevailing, it is believed the total for 1920 may not exceed eleven million dollars.

Under the circumstances, and in view of the mines being about sixteen years old, the decline above noted is not heavy. The indicated output of $11,000,000 for this year compares with $12,747,621 for last year. Indeed in 1914 the value of the output amounted to only $12,765,461, while in 1915 it was valued at $12,135,816 and in 1916 at $12,643,175. From these figures, it is to be noted that the measure of prosperity being enjoyed in a general way is being well maintained.

Production from the newly opened Bailey Silver Mines has not materialized at as early a date as had been estimated. During the past week, A. J. Young, president of the company, visited the property, and was apparently pleased with the progress made, however. Among other things, financial arrangements have had to be made,, and it is now estimated that ore will be going to the company's mill within the next month or six weeks. In the meantime, the Bailey mill, which was formerly the Northern Custom Concentrator, is realizing quite large gross earnings, and net profits are said to range from $2,500 to $5,000 monthly from treating customs ore.

The La Rose Consolidated will employ a diamond drill for the purpose of exploring certain parts of its Cobalt property. It is planned to move the machine to the property at once, and although the more promising parts of the mine have been pretty well explored, the past history of these old Cobalt properties leaves much room for additional zones of enrichment to be encountered. Those who have followed the history of such mines as the La Rose are not yet convinced that all the ore bodies have been opened up, and any exploration work that may be carried on presents possibilities of new favorable developments.

Reports recently in circulation that the Mining Corporation might purchase a part of the Right-of-Way Mines, lying beneath the railway adjacent to the Mining Corporation, are said to have been unfounded.

A diamond drilling contract is being let on the Cobalt-Mohawk property, situated near Gillies Depot, in the vicinity of Mud Lake. Veins opened up in the early days of Cobalt, contain considerable smaltite, with low silver values. It is planned to tap these veins at depth. Petrolia business men are involved in the enterprise.

Drifting operations are under way at the 150 ft. level of the Oxford-Cobalt. The values at this point are comparatively low, although the vein itself has a width of about eight inches and contains some smaltite. It is learned that the plans are to continue the shaft to a depth of perhaps 300 or 350 feet, at which point further lateral operations will be undertaken. It is believed the chances of finding silver at this lower horizon will be much greater than at the present point for the reason that such work will be fairly close to the contact. The Company has studied the lesson learned at the Temiskaming mine where over 75 per cent of the silver so far mined came from within 100 feet of the contact of the overlying Keewatin with the underlying diabase.

Reports that the Beaver Consolidated has over a quarter of a million ounces of silver bullion stored at the mine, have received official denial, it being stated that the report has no basis in fact.

Ore and Bullion Shipments.

During the week ended August 6th, three Cobalt companies shipped an aggregate of six cars containing approximately 514,123 pounds of ore. The Nipissing, with four cars was the heaviest shipper.

A summary follows :—

Shipper	Cars	Pounds
Nipissing	4	346,718
McKinley-Darragh	1	84,950
La Rose	1	82,452
Totals	6	514,123

During the corresponding period the Mining Corporation and the Nipissing shipped bullion, the Mining Corporation sending out over a hundred thousand ounces on the closing day of July.

Following is a summary :—

	Bars	Ounces
Mining Corporation	99	100,573
Nipissing	15	20,533
Totals	114	121,106

The Elk Lake Field.

In the Cane and Auld township section of the Elk Lake district, renewed activity is taking place. This includes the Cane Silver Mines, the Triangle Silver Mines, and the Legault property. On the Triangle, a plan is being carried out to have 400,000 treasury shares underwritten, and to use the proceeds in further development as well as putting in a mill of small capacity to treat the medium grade mill rock being encountered. On the Cane Silver Mines, the company is said to have bought the original Elk Lake owners out, and to now be preparing to do considerable work. Work was commenced this week on a moderate scale, Jack Byrne, formerly associated with the Bourk's Gold Mines being in charge of the work. An endeavor is being made to interest one of the Cobalt Mining Companies in helping to finance the work. On the Legault property, lying about one mile south from the Cane property, an examination is now being made by J. Houston, and a deal is said to be pending.

In the immediate vicinity of Elk Lake, the Paragon-Hitchcock property is preparing for aggressive work. It is planned to perhaps secure a small plant for handling the ore right at the property. This company may be reached by mail to Elk Lake, Ont., while the address of the Triangle Silver Mines is Kenabeek, Ont.

The Gowganda District.

Uneasiness is made manifest in the Gowganda dis-

trict in connection with the slow progress being made in regard to the proposed light narrow-gauge railway from Elk Lake to the Gowganda field. With the Ontario Government having discontinued work last spring on the macadam road which had been commenced during the previous year, and with no definite assurance as yet of a light railway, the property owners are left to bear the full weight of totally inadequate transportation facilities.

The amount of work being done quietly in the Gowganda district is very considerable. With the Miller Lake-O'Brien serving to spur on to greater extent the hope of other property owners, and with success being met with on the Castle property of the Trethewey Company, and with the Reeve-Dobie on a fair way to make a success of producing silver, together with other favorable results in various parts of the field, it is regarded by mining men as a great pity that the Ontario Government has adopted a policy of indifference to the transportation difficulties of this partially proven and extremely promising silver field.

Another demonstration of confidence, and a real exhibition of that spirit which is conquering the great new problems which confront the pioneers of the mining industry of Northern Ontario is contained in official advice from the Dominico Mines Co. Inc., of Rochester, New York, regarding the Big 4 Mines of Gowganda.

Last spring this company launched a scheme to develop their 155 acres of mining lands in the Gowganda field. More than one year's wood supply having been cut, the company commenced the installation of a steam-driven mining plant. The spring proved to be one of the driest on record, and bush-fires in that district got out of control, completely destroying the plant, as well as burning up the fuel supply. In doing this, the fire appears to have made the property safe from a re-currence of such a fire, and has led the company to decide upon installing more modern equipment. Accordingly, an oil-driven mining plant is to be purchased at once.

The directors have just concluded a visit to the property and were highly pleased with the outlook. The main vein is stated to contain a large amount of the metal cobalt, this running as high as nearly 20 per cent. Silver values are said to amount to around 26 ounces to the ton.

A more or less peculiar occurrence is a large dyke of iron sulphides on the property in which the sulphur content is said to amount to from 40 to 44 per cent. It is believed this deposit may also be worked at a profit.

Among those visiting the Big 4 were the following: Dr. Carl H. Huber, who is president of the company, together with John C. McCurdy, James J. Withall. J. Wilson McCleary, all of Rochester; as well as W. W. Jones, of Albany, N. Y., who is State Mine Inspector, and H. L. Holmes, of Buffalo, N. Y

THE GOLD MINES.

A matter of very considerable concern to gold mine operators in Canada is the announcement to the "Canadian Mining Journal", that the two leading gold mines of Porcupine, namely, the Hollinger and the Dome, have each ordered a carload of low-grade cyanide from the American Cyanimid Company, from Niagara Falls, Ont. These companies will conduct a thorough test with a view to determining whether or not it would be possible for this cheaper material to replace the high-grade cyanide which the mines are now importing from Glasgow, Scotland.

It is estimated that the Dome could save about $15,000 annually by using the low-grade material, while the Hollinger might save at least double that amount, provided, of course, satisfactory recovery results from its use. The recent increase of two cents a pound for Cassel cyanide appears to have caused the Hollinger and Dome to decide to give the American Cyanimid product a trial.

The Hollinger Consolidated being one of the largest gold mines in the Western Hemisphere, and the Dome being the second largest in Canada, the attention of cyanide consumers in general are directed to the result of the experiments now to be undertaken.

Another matter of much interest, although local in its scope, is the decision of British interests to carry on extensive diamond drilling operations on property lying west of the proven Porcupine gold zone, in that part of Mountjoy township lying adjacent to Tisdale. The property to be explored is covered with a heavy overburden of sand, in fact is a veritable sand plain. The diamond drill is expected to show whether or not the geological conditions peculiar to the Hollinger-McIntyre part of the Porcupine field extend west south-west beneath the sand plains. A maximum of ten thousand feet of drilling may be done as the first part of the scheme. The drilling is to be done by Mr. Reid, a diamond drill operator of Timmins, while Ernest Loring of Haileybury will supervise the work.

Rumors are current that the Bewick-Moreing mining interests may re-enter the Porcupine gold mining area, and this time indulge in active mining operations. The plan of procedure has not yet been definitely stated. It will be recalled that this company of speculators enterred the Porcupine field in the early days and that had their lead been followed there might be no producing mines in that rich district. One of the chief pieces of work done was to build an elaborate office on the shore of Pearl Lake. The other was to purchase a block of Hollinger stock, which was held until the price went up a few dollars, and then to throw the whole lot on the market. Whether or not the Bewick-Moreing interests expected stock to break in price and then buy in the amount sold is not clear. At any rate, such an opportunity did not develop. Their next line of attack at this late date is expected to be of a somewhat different nature and be along the lines of real development work.

The Kirkland Lake District

Hamilton B. Wills, stock broker of Toronto, is asking the Orr Gold Mines to contribute 810,000 shares to him in return for nearly $200,000 which he claims to have spent through the now liquidated Kirkland-Porphyry Company during the currency of an option held by that concern, and the assets of which have now been purchased by Mr. Wills and Conrad Wettlaufer of Buffalo. It is not stated whether or not the request is based upon legal merit, or finds support in moral right. The Orr treasury contains only a little over 900,000 shares, and such an issue of 810,000 shares to the Wills' interests would leave the treasury in a depleted condition and would perhaps lead to a capital increase of perhaps another 500,000 shares with which to finance work and build a small mill.

The Hunton-Kirkland plant is completely installed and mining operations are commencing this week. It is planned to sink the shaft to a depth of 300 feet at which point lateral operations will be undertaken. This depth has been selected for the reason that at

this horizon all the operating mines have found some of their richest deposits. Due to the surface showings on the Hunton being exceptionally rich, although narrow, the work to be carried out during the next few months promises to be the center of more than ordinary interest.

There is said to be no truth in rumors about the Hunton-Kirkland joining the Orr Gold Mines in a scheme of consolidation.

Final details are being arranged in connection with transferring scrip in the Kirkland Lake Proprietary, 1919, for old shares in the Tough-Oakes mine. Once this is completed, the new company will proceed with taking over the control and operation of the Tough-Oakes mine.

Steady Work at Boston Creek.

Cross-cutting at the 500 ft. level of the Miller Independence Mines is proceeding unremittingly, and the face of the cross-cut is now nearing the point where the downward continuation of the main vein is expected to be encountered. The cross-cut is now in more than 300 feet and is going ahead at the rate of 100 feet a month.

Some rich ore has recently been bagged on the Peerless Gold Mines, about twenty sacks of this material being ready for shipment. The ore is said to contain high silver values as well as gold.

Good progress is being made on the work of building a wagon road as well as a bridge over the Blanche river so as to provide improved transportation facilities for the Skead township gold area.

At Fort Matachewan.

It is learned that there is very little likelihood of the Matachewan Gold Mines resuming operations for some little time, and that work may be deferred until such time as electric energy is assured following the harnessing of a water-power on the Montreal River. This power development scheme is not making very rapid progress.

On the Thesaurus property situated in the township of Baden some little distance north of Fort Matachewan ,sinking is being done with hand-steel and the shaft is down 28 feet. The property is sometimes known as the "Jim" Nelson claims. The pay-streak, though not very wide, is said to be quite rich.

WHY ORE IS WHERE IT IS

The old saying—that gold is where you find it—implied that theory and knowledge were of no value in the search for ore, and that its presence could be made known only by actually finding it The idea is still maintained by many, particularly by the practical mining man. However, it is being continually demonstrated by the economic geologist, or mining geologist, that not only is ore where you find it, but in considerable part its discovery depends on where and under what conditions search is made for it. As our previous conception of percentage of copper or of iron necessary to constitute ores of those metals has changed, due to added knowledge of treatment of ores, so our conception of **why ore is where it is** has changed with increased geologic knowledge supplied by field and laboratory work. The old adage must now be discarded, and give rise to intelligently directed research, based on geologic principles, whether for increasing ore reserves in regions already being exploited or for mineral in new regions. The research work of our of our universities and of Government, and endowed laboratories, and the field work of our geological surveys and independent geologists, has produced a host of valuable data which gives greater probability of reward for intelligently directed search for ore or oil based on an understanding of geology. The economic geologist who avails himself of all phases of this knowledge is enabled to decipher more readily why a particular ore is where it is.

Ore is where it is, not purely by chance, but by the result of definite processes which operated under certain conditions within the crust of the earth. The economic geologist is like a detective, in that he must search for his clue and diagnose these processes which gave rise to a certain deposit. For example: is a certain ore deposit located in a particular place because of a pre-existing fissure, or a certain favorable rock formation, or its proximity to an igneous intrusion, or to a combination of all of them? Economic geology is not an exact science like mathematics, yet there are certain fundamental principles which underlie the formation of most ore deposits. No two ore deposits are alike in all respects, but with a knowledge of the principles and processes of ore deposition, one is in a better position to ferret out the problems of the particular ore body.

Such a knowledge of principles and processes is required to answer scientifically the question of **why ore is where it is.**

The answer involves, among other things, a knowledge of the different processes which result originally in the concentration of minerals or mineral products which may be valuable; of the source of the materials and the agents of transportation; of the shapes and distribution of pre-existing cavities and their control over ore bodies; of the shapes and characteristics of ore bodies formed by making their own cavities; the effect of the host rock; the action and results of secondary processes, and the tale that may be unfolded by the minerals that make up the deposit. The final careful answer to be the question tells most that need be known of the deposit. The answer, in turn,, often enables similar places where conditions exist, and where similar processes operated to be determined, and search for more ore to be directed accordingly. For example, should it be found that an ore body originated by solutions given off from a nearby intrusive, that fissures of a certain system acted as channelways for the solutions, and that where the fissues intersected certain beds of limestone, replacement ore bodies resulted, then, if the same congenial bed of limestone be formed, and fissues of the same age be recognised and projected to cut the bed, the intersection of the two may a locus for ore. Exploration may then be directed to that place with the reasonable expectation of the search resulting in the finding of more ore. This is one phase of the work of the trained economic geologist.

While the above example applies to the search for for more ore in districts already partly developed, the answers to **why ore is where it is,** gained from a number of places, may also be applied to undeveloped districts. It is a generally accepted fact that most ore deposits susceptible to relatively easy discovery have already been found. Most regions have now been at least superficially prospected. The incentive for prospecting on the part of the old-time prospector is not as great as it used to be. Much credit is due to him

for bringing to light a large number of ore deposits, and his passing is much lamented. This, coupled with the fact that more attention is directed to the exploitation of large iow-grade deposite, and in the acquisition of new properties, investing capital now gives more weight than heretofore to the expected possibilities of prospcts, requires for the discovery and development of more mineralised regions that there should be enlisted all the knowledge and experience gained by economic geologists. The old propspector was a self-trained man, and more often not trained at all, but the economic geologist has his own training gained from answer as to why ore is where it is. In addition, he has the advantage of the experience of the prospectors, and of other countless trained men who have contributed their knowledge to the science.

With the decreasing chances of discoveries by prospectors, and the consequent waning incentive for them to prospect, has not the economic geologist an opportunity to increase the world's mineral reserves by supplementing, or even supplanting, the work of the old-time prospector? His field may be not only to examine and report upon the prospect found by the prospector, but specifically to direct the prospector in his search for new mineral areas, and to guide and advise him about his discoveries.

The old saying "Where ore is, there it is," may then fade into historic interest in the light of the application of the geologist's answers to why ore is where it is.—South African Mining & Engineering Journal.

INTERNATIONAL NICKEL.

People Intimate With Company's Affairs Say Business and Earnings Are Much Better.

Sentiment among people conversant with affairs of International Nickel Co. has taken a decided turn for the better. The company is said to have definitely rounded the corner and its business is considerably better than for some time. This condition may be expected to be reflected to some extent in report for three months ended with June.

While surplus stocks of nickel, held abroad, and difficulties of transportation in this country materially reduced demand in fiscal year ended March 31, officials are said to be much encouraged by better business since that time.

It may be presumed that plant operations are at a higher rate than the 60 p.c. of capacity averaged during three months ended March 31. That 60 p.c. of capacity represented 80 p.c. of former capacity, as the Port Colborne plant was included in percentage for March quarter.

Not a little of the improvement is the result of new markets the company is constantly developing for its Monel Metal, an alloy made up of the same component parts as found in nickel ore. One of the uses for Monel Metal is in construction of racing yachts. A large amount of Monel Metal was used in construction of the Resolute, as well as in Vanitie. Another wide use is in golf clubs, where non-rusting qualities are important.

Nickel company's financial position was greatly strengthened in the last fiscal year and at March 31 it had a working capital account of nearly $9,500,000, against $9,779,645 March 31, 1918. Working capital March 31 last was larger than in any of the previous three years.

Possibility of resuming common dividends is believed somewhat remote, although the company is in a strictly liquid position, with earnings showing real improvement. One thing which might delay dividends is that additional plant facilities will be required to take care of expansion in Monel Metal. Such facilities, undoubtedly, would be financed from earnings.—"Boston News Bureau.

GRANBY CONSOLIDATED.

Securing Greater Efficiency—May Build A Concentrator.

Although it has spent in the neighborhood of 10,000,000 during the past few years in expanding its operations the Granby Consolidated Mining Smelting & Power Co. may eventually spend $1,000,000 additional in the construction of a concentrator.

The company has among its ore reserves at least 10,000,000 tons of silicious ores not amenable to direct smelting treatment. A 2000-ton plant would probably cost between $1,000,000 and $1,500,000 and would at once add substantially to the company's productive capacity. To handle the output of such a mill the present smelter could be increased in size if necessary.

Since the change in mine management was recently effected, greater efficiency has been accomplished. Considerably less coke and lime have been used to get the same results. The metallurgical end of the company's operations at Anyox has been thoroughly over hauled under the direction of E. P. Mathewson.

Granby has been producing about 500 tons of coal daily from its own property. A portion of this has been made into coke for the company's own use while the balance has been shipped to Vancouver for sale in the open coal market. Production could be increased to 1000 tons daily should market conditions warrant.

Boston News Bureau.

REORGANIZING CANADA COPPER CO.

$500,000 Assessment Underwritten.

The Canada Copper Corporation will be reorganized; a $500,000 assessment which has been underwritten.

Upon payment of an assessment of 50 cents per share stockholders will receive a share for share exchange of stock in a new company with same capitalization.

Should the stockholders not care to pay assessment they may exchange their holdings on basis of ten for three new shares, leaving the seven shares for the underwriters.

Heretofore, the Canada Co. and its predecessor the British Columbia Copper Co., have operated under American charters but the new concern will take up a Canadian charter, thereby effecting some saving by eliminating dual taxation.

The Canada Copper Corporation has practically completed a 2000-ton mill and production, after many delays, should be started before the end of the year. It has taken about three years to build the plant which can treat 2500 tons of ore daily.

Costs have greatly exceeded early estimates in constructing the 2000-ton plant. Instead of $2,500,000, covered by an issue of bonds, construction and equipment to date has cost over $3,000,000. The company claims reserves of 10,000,000 tons of developed ore.—"Boston News Bureau."

Mr. Geo. R. Rogers, manager of the Wasapika mine has returned to Toronto after a visit to the property.

INCREASING DEMAND FOR HIGH-GRADE ASBESTOS.

Canada Controls American Market.

The demand for asbestos spinning fibre has in late years grown usually strong, and this demand, coupled with the fact that the United States is largely dependent on Canada for high-grade asbestos, has enabled the asbestos syndicate of Canada, which controls most of the world's supply, to fix prices for the raw material that are so high as to make the manufacture of textile fabrics of asbestos profitable. Thus American manufacturers who do not own Canadian mines are at a great disadvantage. For these reasons much attention has been given to the search for spinning fibre in South Africa and in the United States to meet the increasing demand. The results are encouraging. Three varieties of asbestos are found in the Transvaal, and at some places the mineral occurs in abundance. The imports to the United States from South Africa are increasing.

Arizona has the Most Promising Deposits.

Arizona is the most extensive producer in the United States, although its output of spinning fibre is not large as compared with that of Canada. The growing interest taken in Arizona fibre by asbestos manufacturers in the United States is encouraging. The total quantity of asbestos sold in the United States in 1919 was 1,002 tons, of which 420 tons came from Arizona, where there are two promising areas, one in the Grand Canyon and the other about 40 miles northwest of Globe. The route to the deposits in the Grand Canyon has recently been changed, and a small output was made in 1919. Part of the output was sold to customers in America, and the remainder was sent to Japan. Nearly all the asbestos mined in Arizona, however, comes from the region northwest of Globe, where the Arizona Asbestos Association, on Ash Creek, and the American Ores & Asbestos Co., in the Sierra Ancha at the head of Pocket Creek, are the principal operators. A number of smaller producers and shippers considerably increased the total output in 1919.

Government Surveys for Asbestos.

Thus far asbestos has been mined only in the western part of the Arizona asbestos field, on Ash and Cherry creeks, and in the Sierra Ancha. The formations that contain asbestos lie nearly flat and extend eastward into the Fort Apache and San Carlos Indian reservations, where asbestos mining is not yet permitted, although steps have been taken by the Government to make these deposits available to meet the needs of the country. A party sent out by the United States Geological Survey, Department of the Interior, is now examining these deposits to determine their availability as a national resource. Two valuable deposits of asbestos on Indian lands are already known, one on Cibecue Creek, in the Fort Apache Reservation, and the other in Bear Canyon, in the San Carlos Reservation.

Georgia and California May Help.

Georgia ranks next to Arizona in quantity of asbestos produced, but the fibre is of very low grade. The grade of the fibre from California is better, and the mineral is more abundant there, so that the general outlook for production in the United States appears to be good.

Total Output in 1919 and 1920.

The total output for the United States in 1919 was about as follows: Arizona, 420 short tons, chiefly spinning fibre; California, Georgia, North Carolina, Maryland, and Wyoming, 582 short tons, most of it of low grade. Wyoming reports the sale of a small quantity that had been mined in 1918. The production of 1920 will be larger than that in 1919, and the most notable feature of the production is the fact that most of the fibre produced in Arizona is of spinning grade. Nearly 237 short tons was shipped from mines in Arizona alone during January, February, and March, 1920. If mining is continued at this rate throughout the year the output of Arizona in 1920 will be about 1,000 tons.

Imports.

The asbestos imported into the United States in 1919 is tabulated below. More than 99 per cent. of it comes from Canada and is entered free of duty to compete with our domestic fibre, greatly to the advantage of the Canadian producer.

Asbestos Imported Into the United States in 1919.

Country	Unmanufactured: Quantity (short tons)	Unmanufactured: Value	Unmanufactured: Average value per short ton at port of origin	Manufactured
British Indies	1	$80	$80.00	.....
British South Africa	900	132,465	147.18	.....
Canada	133,662	6,935,804	51.89	$17,188
England	156	53,057	340.11	211,957
Germany	.....	.....	.....	10
France	450	202,412	454.70	24,939
Hongkong	1	30	30.00	.....
Italy	.....	.....	.....	2,989
Japan	.....	11	.....	.....
Philippine Islands	.....	35	.....	.....
Portuguese Africa	100	43,791	437.91	.....
Scotland	.....	.....	.....	298
	135,270	7,369,685	.....	257,381

—U. S. Geological Survey.

NEW MAP OF PRAIRIE PROVINCES.

A new edition of a map of Manitoba, Saskatchewan and Alberta giving the number of quarter-sections available for homestead entry in each township with the boundaries and offices of government land agencies has been issued by the Natural Resources Intelligence Branch of the Department of the Interior. This new edition clearly indicates all railways, forest reserves, parks and Indian reserves, also the land which has been reserved for soldier settlement purposes. The size of the map is 24 in. x 36 in., and the scale 35 miles to one inch.

The importance of the new edition at the present time is apparent to prospective settlers, officials of banks, railway companies and land agencies, in fact everyone interested in the development of land in the Western provinces. A copy of this publication which is known as the "Small Land Map of Manitoba, Saskatchewan and Alberta," may be obtained free of charge by applying to the Superintendent of the Natural Resources Intelligence Branch of the Department of the Interior, at Ottawa.

THE SEARCH FOR PETROLEUM.

By Mr. E. H. CUNNINGHAM CRAIG.

(*From the "Petroleum Times."*)

Western Canada.

The vast regions which may be included under the title of Western Canada have been prospected for petroleum fairly extensively, and in several districts speculative drilling has been active at one time or another. But up to the present there has been no very pronounced success achieved.

That oil does occur in the region is not a matter of doubt, but the conditions under which it occurs have, perhaps, not been fully appreciated, and conditions that will concentrate it in sufficient quantity to give rise to prolific oil fields can hardly be said to have been proved yet. Difficulties of transport over enormous distances and wild country have no doubt kept back development, but these are being steadily, if slowly, overcome, and the time cannot be far distant when it will be possible to transport plant to any desired location without any excessive danger or delay.

Geologists and prospectors have traversed the country from the international boundary to the Arctic Circle, and there is a mass of information available for the student of petroleum to study and form his judgment upon.

There are several distinctly and entirely different propositions presented by different districts, and each has its adherents.

There are those who believe in the possibility of the foothill country of the Rocky Mountains, part of which was exploited during the short-lived and somewhat crazy Calgary oil-boom of 1914. Much of the drilling done at the time was quite justifiable on scientific grounds, much was mere "wild-cat" work, but the result in the end was that only one or two localities were tested adequately and only in one has a workable field been developed. It is not a large field, the drilling is deep and expensive, but the oil is of high grade and the small productions that are being obtained from half a dozen wells are sufficient to be remunerative.

Again there are those who favor the prairie lands, where the great gas-fields are situated on very broad and gentle anticlinical structures. In the Viking field where the flexure is slightly less broad a little oil accompanied by very strong gas has been struck.

It seems very doubtful, however, whether there has been sufficient concentration of oil to give lasting productions, though the gas supply may be ample for many years.

Then there are the exploiters of the tar-sand area of the Athabasca River, where the basal beds of the Cretaceous formation consist of very thick asphaltic oilsands that extend in an almost horizontal position over thousands of square miles. If a method of tapping these deposits in shallow and cheaply drilled wells can be devised, and if such ground be worked like a low-grade ore proposition, it is possible that a commercial success might be achieved. But small production of rather heavy oil will be the rule, and only work on a very large scale with special precautions can give any hope of successful development.

Finally there are those who look to the Devonian Formation for petroleum, and believe that the impregnation of the basal Cretaceous beds with oil is the result of seepage upwards from Devonian strata.

This theory, though subscribed to by several geologists, is the nucleus of much controversial writing, but field evidence may be said without exaggeration to be very heavily against it. The holders of this theory advocate drilling in anticlines in the Devonian formation in localities from which the Cretaceous asphaltic oilsands have not long been denuded, and where filtered residues of oil now make fairly conspicuous surface shows. That a certain amount of oil can be obtained under these conditions is obvious, but it has yet to be proved whether a commercial yield can be maintained over a period of years.

These are the four main classes of petroleum propositions that western and north-western Canada afford, leaving out more speculative ventures in British Columbia. Oil can be, and has been, struck under all those different geological environments, but as stated above, no great success has been made, up to the present, in any one of them. But there are still very many localities that have not been tested, there are many that have partially but not adequately been tested, and there are modified or slightly varied examples of those four fundamentally different environments that have not been fully studied.

For instance, it is said that by drilling many miles from the tar-sand outcrops, these strata will be found still fully impregnated with oil, but preserved from inspissation, and great productions under high gas pressure are predicted.

There is admittedly some evidence for this, e.g., the famous gas well at Pelican River, but the difficulty is to find any structure that will suffice to concentrate petroleum towards any one locality and so maintain a supply of oil to the wells. By careful and elaborate levelling it is stated that such structures have been detected, but the evidence is meagre and the structures so discovered are too gentle to have had any appreciable effect upon the underground migration of a heavy petroleum.

In the foothill country there are many localities with excellent structures and all essential conditions for an oilfield, so far as can be ascertained from surface evidence, where no drilling test has been made. Most of such localities would require deep drilling, and there is always the fear that the adverse condition discovered in the Calgary district, i.e., the lack of a porous reservoir rock of sufficient thickness, may militate against profitable production. Deep drilling necessarily requires prolific production to make it pay, but as oil becomes dearer this objection tends to become less formidable. There are areas west of Edmonton that appear to be worth careful and scientific exploration with the drill.

Then, as already suggested, a bold and comprehensive policy of handling the shallow tar-sand proposition merits attention. No small scale work will suffice here, for no prolific production in any one well is possible.

Detailed and painstaking work in the prairie area may result in the discovery of small oilfields, but it is more probably as gas-fields that these areas must look for commercial prosperity.

The believers in oil of Devonian age in this western and north western territory are perhaps taking the longest odds, but such enterprises are not to be condemned off-hand because the bulk of the evidence points to the oil belonging really to the Cretaceous Series. Light shows of secondary filtered oil can be made to pay if there be sufficient concentration, which depends naturally upon large and well-defined geological structures.

Considering the whole subject it may be said that the verdict at present must be "not proven." There is no doubt whatever about there being a vast volume of oil in the country: the only question is—can it be found sufficiently concentrated under favourable conditions for development. The conditions are known over very large areas, it is not a case of drilling mere "wild-cat" wells in the hope of discovering something phenomenal. Any company undertaking exploitation work must start with most of the essential facts known and a fairly accurate estimate of the depth to be drilled. Modified success or partial or even complete failure has been up to the present the result of all development work done. But a clear case can be made out to justify further attempts in several well defined districts. All the cards can be put upon the table at once. It must be stated at what horizons oil is to be expected, what depth has to be drilled and what area of concentration each well can be expected to drain.

Also, and this is really the most important point of all, what production of oil per well will constitute a success.

The investor or speculator in oil-shares must consider every point carefully and weigh every condition in the light of previous experience before he risks his money. No vague generalities should suffice to induce him to subscribe capital to any scheme, however enticingly put forward.

This perhaps may be said: in the foothills the chances of large productions are greatest, but the expenses of development work and the risks of failure are high.

Among the gentle structures of the prairies or the tar-sand areas the striking of gas or oil respectively are excellent, so long as wells are located on simple scientific principles but the yields may be small. In the Devonian strata drilling is more purely a gamble, but not without hope of substantial results. There is a very confident feeling in the West that big results will be obtained some day, and though booms are always to be deprecated, they are often useful in drawing more than local attention to development work.

But there is no excuse now-a-days for anyone entering upon a venture in oilfield development in western and north-western Canada with his eyes shut. The main facts are known, the possibilities may be estimated; it is only necessary to balance the calculated expenditure against the class of result that can be expected, and if a margin on the right side be indicated to go ahead boldly. The high grade proposition, big production per well and a fortune made in a day, is naturally the most attractive to anyone with a speculative instinct, but the low grade proposition, consisting of a large number of wells cheaply drilled and pumped, may in the end prove the more remunerative. The oil is wanted, and wanted badly; in the opinion of the writer it may be got, but there cannot and will not be any successful development by prospectors or companies that shut their eyes to the material facts.

Mr. G. C. Bateman, manager of the La Rose mine, has returned to Cobalt.

THE COPPER INDUSTRY IN 1919.

Conditions and Prospects.

(From U. S. Geological Survey).

The principal features of the American copper industry during the year 1919 are shown in an advance statement on the production of copper in the United States by H. A. C. Jenison, of the United States Geological Survey, Department of the Interior.

The smelter output in 1919 was about 1,310,972,000 pounds, a decrease of 597,561,000 pounds from that of 1918. The production of refined primary and secondary copper from domestic and foreign ore and metal was 1,863,580,000 pounds, which was 612,497,000 pounds less than the production in 1918. Refined primary copper amounting to 326,043,000 pounds was produced from ore or other material imported from foreign countries, principally Chile, Peru, Mexico, and Canada.

The discrepancy between the smelter production and the refinery production is due to the fact that 562,000,000 pounds of blister copper and other material was in process of refining at smelters and refineries or in transit on January 1, 1919, and though it was smelted in 1918 it was not refined until 1919.

In 1919 the imports of copper in all forms amounted to 429,388,000 pounds, and the exports of copper in all forms amounted to 516,628,000 pounds, which was 231,062,000 pounds less than the exports in 1918 and 616,205,000 pounds less than those in 1917. The exports in 1919 were less than in any year since 1907.

On January 1, 1919, the stocks of refined copper were 180,000,000 pounds, and on January 1, 1920, they were 631,000,000 pounds, an increase during 1919 of about 451,000,00 pounds. The stocks on January 1, 1920, were several times greater than they have ever been before.

In addition to the stocks of refined copper in hand about 310,000,000 pounds of blister copper and material was in process of refining at smelters and refineries or in transit on January 1, 1920. This estimate does not include blister in foreign smelters destined for the United States for refining nor material in transit to the United States from such smelters.

The apparent domestic consumption in 1919 was about 876.564,000 pounds, which is 785.106,000 pounds less than that in 1918 and less than the domestic consumption in any year since 1914.

Causes of Decrease in Output.

Many causes contributed to decrease the smelter and refinery production, the domestic consumption, and the exports, and to increase the stocks, but the principal cause was a poor market. The industry was working at maximum capacity when the war demand for copper ceased, and it was then, of course, forced to continue production only at the rate required to supply the ordinary commercial and industrial demand. The war demand was stopped so suddenly as to disturb greatly the trade and industrial conditions, and the prospects for the immediate future appeared so uncertain that few industries were able to continue production without first decreasing it greatly and reorganizing, to some extent, their industrial mechanism.

Prices and Costs.

Under the peace-time conditions the demand for copper was small and the average price soon fell from 24.7 to about 15 cents a pound. This price was far below the actual cost of the production of a very large part of the previous year's output. All smelters and mines were forced to decrease production. Some were shut down entirely; others were operated at the minimum capacity that would keep the organization intact and the equipment in proper order. Much of the copper in stock could not be profitably held, and the placing of a large part of it on the market kept the price down, though it showed a tendency to rise when the readjustment set in.

The price during the year showed many fluctuations but averaged only 18.6 cents a pound, which was about 24 per cent less than the average price in any year since 1915, though the cost of labor and supplies had risen as much as 150 per cent during that time.

The labor troubles in other industries decreased the cost of supplies used by the copper industry, and materially increased the cost of production.

Decrease in Foreign Demand.

By the time the price of copper had risen high enough to permit the industry to meet these unfortunate conditions foreign exchange began to fall so rapidly that foreign buyers were unable or reluctant to purchase American copper, and finally the exchange between the United States and foreign countries dropped so low that they could no longer buy it. These conditions almost ruined the foreign market for American copper, and the demand and the price in the domestic market were less than they had been at any time for several years. On the whole, the year was an unsuccessful one, and in view of the conditions it is remarkable that the industry remained as stable as it did.

Prospects for 1920.

It is hard to forsee what improvement can be expected in 1920 but the quantity of copper sold in the early part of 1920 indicates that the year will be better than 1919. Any improvement, however, will be temporary and no stability or security can be found until existing troubles are settled and industry and trade become more stable. The prosperity of the copper industry is peculiarly dependent upon the establishment of stability in other industries, and before the industry can receive any great stimulus the condition of labor and of trade generally, not only in America but in Europe, must be greatly improved. When that time comes the industry will undoubtedly be as prosperous as ever.

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal August 12th 1920.

	Cents per lb.
Copper, electro	24¼
Copper castings	23¾
Tin	55½
Lead	10
Zinc	10½
Aluminum	35
Antimony	9

PERSONAL.

Mr. E. V. Neelands, Mining Engineer, of Toronto left for Venezuela on August 9th and expects to return to Toronto about October 15th.

FORESEES ELECTRO-CHEMICAL INDUSTRIES IN THE NORTH.

(By the Northern Ontario Correspondent of the Journal).

Among those who have given the matter considerable study, and from results accomplished under somewhat similar conditions in other countries, the belief is taking form that Northern Ontario may reasonably be counted upon to develop another important industry, which may rank favorably with the three chief industries of the present,—mining, farming and pulp-timber products.

It is in the water-powers, and the probable establishment of electro-chemical industries that careful observers claim to foresee new and important developments, and it is to the Des Quinze falls at the head of Lake Temiskaming, to Kettle Falls on the Abitibi River, as well as to the numerous great water-falls which occur on all the rivers tributary to James Bay that immediate attention may be turned.

It has been stated by the British Water-Power Commission that the world's annual consumption of nitrogen amounts to approximately 750,000 tons, having a value of at least $250,000,000. About four-fifths of the total has previously been produced from nitrate deposits, but with this source of supply nearing depletion, great importance attaches to nitrogen fixation from the air.

In Northern Ontario it has for some time been recognized that the rivers could be harnessed for this purpose, and that their economic value thus employed would be enormous. It has been pointed out that while no suggestion is made to copy the methods employed by the Germans before the recent war, it should nevertheless be kept in mind that Germany actually made great progress in the establishment of electro-chemical industries, including nitrogen fixation, and that these industries had their beginning from Government subsidies.

When last year's survey was made of a possible route for the extension of the Temiskaming and Northern Ontario Railway from Cochrane to tidewater at James Bay, considerable attention was given to the feasibility of utilizing Kettle Falls as a means of establishing an electro-chemical industry which might contribute to business for the proposed railway.

The diminution of the fertility of wheat and cotton-growing areas as well as general agricultural lands in many parts of the world creates a national necessity for establishing some system where artificial fertilizers may be obtained in large quantities, and it is believed that the favorable local aspect may attract the attention of the advisory bodies of the Imperial authorities, and that a solution of the nitrate problem may actually be found in the water-falls of Northern Ontario, an opinion based on existing official data.

COKE DISPOSAL.

The growth of the by-product coke industry independent of the iron and steel industry and the prospects for developing it primarily, as a source of gas without necessity for relying on the needs of blast furnaces, depend almost entirely on the question of coke disposal. The extension of the domestic coke market is of great importance in this connection, and much progress has recently been made in this direction. The situation bears close relation to the condition of anthracite coal supply which is yearly becoming poorer in quality and more inadequate in amount . Just as the availability of natural gas has accustomed millions of American people to the use of gas fuel for domestic purposes, so the wholesale use of anthracite coal as domestic fuel has paved the way to introduction and substitution of coke.—**Gas Age.**

Royal School of Mines Frecheville Research Fellowships

The Imperial College of Science and Technology, South Kensington, London, S.W. 7, with which the Royal School of Mines is incorporated, is offering two Research Fellowships of £300 a year each, tenable for one year and possibly renewable for a second year, to aid in carrying out any investigation or research connected with Mining, Mining Geology, Metallurgy, or Technology of Oil, which in the opinion of the Selection Committee is of sufficient use or promise.

Applicants, who may be Associates of the Royal School of Mines or others, and preferably men with some practical experience, if resident in Canada should apply in writing to the Secretary of the Canadian Mining Institute, Montreal, (from whom further particulars may be obtained), before 1st September, 1920, giving the nature of the proposed investigation, qualification for the work and references.

It is anticipated that the Committee will make the awards by the end of November, so that the Fellowships and work may begin on 1st January, 1921. Holders will be expected to devote their whole time to the work which may be conducted at the Imperial College or in special circumstances elsewhere at the discretion of the Committee.

The Canadian Miners' Buying Directory.

Acetylene Gas:
Canada Carbide Company, Ltd.
Canadian Fairbanks-Morse.
Prest-O-Lite Co. of Canada, Ltd.

A.C. Units:
MacGovern & Co.

Agitators:
The Dorr Co.

Air Hoists:
Canadian Ingersoll-Rand Co., Ltd.
Mussens, Limited.

Alloy and Carbon Tool Steel:
H. A. Drury Co., Ltd.
International High Speed Steel Co., Rockaway, N.J.

Alternators:
MacGovern & Co.

Spielman Agencies, Regd.

Aluminium:

Amalgamators:
Northern Canada Supply Co.
Mine and Smelter Supply Co.
Wabi Iron Works.

Antimony:
Canada Metal Co.

Antimonial Lead:
Pennsylvania Smelting Co.

Arrester, Locomotive Spark:
Hendrick Manufacturing Co.

Arsenic White Lead:
Coniagas Reduction Co.

Assayers' and Chemists' Supplies:
Dominion Engineering & Inspe tion Co
Lymans, Limited
Mine & Smelter Supply Co.
Pennsylvania Smelting Co.
Stanley, W. F. & Co., Ltd.

Ash Conveyors:
Canadian Link-Belt Company

Ashes Handling Machinery:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Co., Ltd.

Assayers and Chemists:
Milton L. Hersey Co., Ltd.
Campbell & Deyell
Ledoux & Co.
Thos. Heys & Son
C. L. Constant Co.

Asbestos:
Everitt & Co.

Balls:
Canadian Foundries and Forgings, Ltd.
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works.
The Hardinge Conical Mill Co.

Ball Mills:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd.
Mine and Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works.

Balances—Heusser:
Canadian Fairbanks-Morse Co., Ltd.
Mine and Smelter Supply Co.

Babbit Metals:
Canada Metal Co.
Canadian Fairbanks-Morse Co., Ltd.
Hoyt Metal Co.

Ball Mill Feeders:
Fraser & Chalmers of Canada, Ltd.
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd.

Ball Mill Linings:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd.

Belting—Leather, Rubber and Cotton:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Link-Belt Co., Ltd.
The Mine & Smelter Supply Co.
Northern Canada Supply Co.
Jones & Glasco.

Belting:
R. T. Gilman & Co
Gutta Percha & Rubber, Ltd.

Belting—Silent Chain:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Que.
Jones & Glassco (Regd.)

Belting (Transmission):
Goodyear Tire & Rubber Co.

Belting (Elevator):
Goodyear Tire & Rubber Co.

Belting (Conveyor):
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.

Blasting Batteries and Supplies:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Ltd.
Northern Canada Supply Co.
Canadian Explosives, Ltd.
Giant Powder Co. of Canada, Ltd.

Bluestone:
The Consolidated Mining & Smelting Co

Blowers:
Canadian Fairbanks-Morse Co., Ltd.
MacGovern & Co., Inc.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd.

Boilers:
Northern Canada Supply Co.
Canadian Ingersoll-Rand Co., Ltd.
Marsh Engineering Works
MacGovern & Co., Inc.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
The John Inglis Company
Wabi Iron Works.

Blue Vitriol (Coniagas Red):
Canadian Fairbanks-Morse Co., Ltd.

Bortz and Carbons:
Diamond Drill Carbon Co.

Boxes, Cable Junction:
Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.

Brazilian Rough Diamonds:
Diamond Drill Carbon Co.

Brazilian Mica:
Diamond Drill Carbon Co.

Buggies, Mine Car (Steel)
Hendrick Manufacturing Co.

Brazilian Ballas:
Diamond Drill Carbon Co.

Brazilian Rock Crystal:
Diamond Drill Carbon Co.

Brazilian Tourmalines:
Diamond Drill Carbon Co.

Brazilian Aquamarines:
Diamond Drill Carbon Co.

Bridges—Man Trolley and Rope Operated—Material Handling:
Canadian Mead-Morrison Co., Limited

Bronz., Manganese, Perforated and Plain:
Hendrick Manufacturing Co.

Buckets:
Canadian Ingersoll-Rand Co., Ltd.
Canadian Mead-Morrison Co., Limited
The Electric Steel & Metals Co.
R. T. Gilman & Co.
Hendrick Manufacturing Co.
Canadian Link-Belt Co., Ltd.
Marsh Engineering Works
Mussens, Ltd.
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd
The Wabi Iron Works

Buckets, Elevator:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co.

Cable—Aerial and Underground:
Canada Wire & Cable Co.
Northern Canada Supply Co.
Standard Underground Cable Co. of Canada, Ltd.

Cableways:
Canadian Mead-Morrison Co., Limited
Fraser & Chalmers of Canada, Ltd.
Mussens, Ltd.
The Wabi Iron Works
R. T. Gilman & Co.

Cages:
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Mine & Smelter Supply Co.
Mussens, Ltd.
The Wabi Iron Works

MINING OPPORTUNITIES IN MANITOBA

Mineral Areas

Approximately three-fifths of the total area of Manitoba is Pre-Cambrian. In the Pre-Cambrian of Ontario, the well-known camps of Sudbury, Cobalt and Porcupine have been developed. In Manitoba, there was but little prospecting before 1912, when the Rice Lake Camp was opened up, and the Hudson Bay Railway gave access to the mineral areas in Northern Manitoba. Attention is being directed particularly to the Pas Mineral Belt and the Rice Lake Area, but prospecting is being carried on in the Cross and Pipestone Lake Area, the Oxford Lake, Knee Lake, God's Lake and Island Lake Area, and the West Hawk Lake, Falcon Lake, Star Lake Area.

Development

Since 1915, development has been rapid in the Pas Mineral Belt. Twenty million tons of low-grade copper ore have been explored by diamond drilling at Flin Flon Lake and are now being actively developed under option. High grade copper is exported from Schist Lake to the smelter at Trail, B.C.; over seven million pounds of copper have already been realized. Other copper prospects are under development and the building of a smelter at the Flin Flon property will lead to the establishing of a large copper industry. Gold is now produced at Wekusko (Herb) Lake, and active underground development work is being carried on at Wekusko Lake, Copper Lake and in the Rice Lake District east of Lake Winnipeg

Transportation

Transportation is available to the Rice Lake Area by steamboat from Winnipeg to the Hole River, and thence by launch and Provincial wagon road. The Copper Belt is reached from The Pas by the Ross Navigation Co's. steamboats to Sturgeon Landing, thence by wagon road and canoe. Herb Lake is reached from Mile 82 on the Hudson Bay Railway (less than one day from The Pas.)

Mining Regulations

The mineral resources are under Federal control and the Federal mining regulations apply to Manitoba. No mining license is required. Work to the value of $100.00 a year must be performed for a period of five years on claims filed under the quartz mining regulations. The office of the Mining Recorder for the Rice Lake district is in Winnipeg, and for The Pas Mineral Belt at the Pas.

Opportunities

The districts are comparatively new, and on the eve of substantial development. There are good opportunities at the present time for prospectors, mining companies, and particularly for development companies.

For maps, reports and general information, apply to—

THE COMMISSIONER OF NORTHERN MANITOBA

THE PAS, MANITOBA.

Canadian Miners' Buying Directory.—(Continued

Cables—Wire:
Standard Underground Cable Co. of Canada, Ltd.
Canada Wire & Cable Co.
Fraser & Chalmers of Canada, Ltd.
Northern Electric Co., Ltd.
Osborn, Sam'l (Canada) Limited.
R. T. Gilman & Co.

Cable Railway Systems:
Canada Wire & Cable Co.
Canadian Mead-Morrison Co., Limited.

Cam Shafts:
Canada Foundries & Forgings, Ltd.
Hull Iron & Steel Foundries, Ltd.

Car Dumps:
Sullivan Machinery Co.
R. T Gilman & Co.
Canadian Fairbanks-Morse Co., Ltd
Canadian Mead-Morrison Co., Limited.

Carbide of Calcium:
Canada Carbide Company, Ltd.

Cars:
Canadian Foundries and Forgings, Ltd
Canadian Ingersoll-Rand Co., Ltd.
Canadian Fairbanks-Morse Co., Ltd.
Canadian Mead-Morrison Co., Limited.
John J. Gartshore
MacKinnon Steel Co., Ltd.
The Electric Steel & Metals Co.
Northern Canada Supply Co.
Osborn, Sam'l (Canada) Limited.
Marsh Engineering Works
Mine and Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd
Mussens, Limited
R. T. Gilman & Co.
The Wabi Iron Works

Car Wheels and Axles:
Canadian Car Foundry Co., Ltd.
Burnett & Crampton
Hull Iron & Steel Foundries, Ltd.
John J. Gartshore
Marsh Engineering Works, Ltd.
Osborn, Sam'l (Canada) Limited.
The Electric Steel & Metals Co
The Wabi Iron Works

Carriers (Gravity):
Jones & Glassco

Castings—Brass
The Canada Metal Co., Ltd.

Castings (Iron and Steel)
Burnett & Crampton
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
Osborn, Sam'l (Canada) Limited.
The Electric Steel & Metals Co.
The Wabi Iron Works

Cement and Concrete Waterproofing:
Spielman Agencies, Regd.

Cement Machinery:
Northern Canada Supply Co.
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
Osborn, Sam'l (Canada) Limited.
Fraser & Chalmers of Canada, Ltd
Canadian Fairbanks-Morse Co., Ltd
The Electric Steel & Metals Co
R. T Gilman & Co.
Burnett & Crampton

Chains:
Jones & Gltssco
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd
Canadian Link-Belt Co., Ltd.
Greening, B., Wire Co., Ltd.

Chain Drives:
Jones & Glassco (Regd.)

Chain Drives—Silent and Steel Roller:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Que.

Chemical Apparatus:
Mine and Smelter Supply Co

Chemists:
Canadian Laboratories
Campbell & Deyell
Thos. Heyes & Sons
Milton Hersey Co.
Ledoux & Co.
Constant, C. L. Company

Chrome Ore:
The Electric Steel & Metals Co.
Everett & Co.

Classifiers:
Mine and Smelter Supply Co
Mussens, Limited
Fraser & Chalmers of Canada, Ltd
The Wabi Iron Works
R. T. Gilman & Co.
The Dorr Company

Clutches:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Q

Coal:
Dominoion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutters:
Osborn, Sam'l (Canada) Limited.
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd

Coal Crushers:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Co., Ltd.

Coal Mining Explosives:
Canadian Explosives, Ltd.
Giant Powder Company of Canada, Ltd.

Coal Mining Machinery:
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd
Osborn, Sam'l (Canada) Limited
Canadian Ingersoll-Rand Co., Ltd.
Sullivan Machinery Co.
Marsh Engineering Works
Hadfields, Ltd.
Hendrick Mfg. Co.
Fraser & Chalmers of Canada, Limited
Mussens, Limited
R. T. Gilman & Co.

Coal and Coke Handling Machinery
Canadian Mead-Morrison Co., Limited.
Canadian Link-Belt Co., Ltd.

Coal Pockets:
Canadian Mead-Morrison Co., Limited.

Coal Pick Machines:
Sullivan Machinery Co.

Coal Screening Plants:
Canadian Link-Belt Co., Ltd.
Canadian Mead-Morrison Co., Limited.

Cobalt Oxide:
Coniagas Reduction Co.
Everitt & Co.

Compressors—Air:
Canadian Fairbanks-Morse Co., Ltd
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd.
Northern Canada Supply Co.
MacGovern & Co., Inc.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd
Mussens, Limited
The Mine & Smelter Supply Co

Concrete Mixers:
Canadian Fairbanks-Morse Co., Ltd
Northern Canada Supply Co.
Gould, Shapley & Muir Co., Ltd
MacGovern & Co., Inc
Mussens, Limited
R. T. Gilman & Co

Condensers:
Canadian Fairbanks-Morse Co., Ltd
Smart-Turner Machine Co.
Northern Canada Supply Co.
MacGovern & Co., Inc.

Concentrating Tables:
The Mine & Smelter Supply Co
Deister Concentrator Co.
The Wabi Iron Works

Converters:
Northern Canada Supply Co
MacGovern & Co., Inc.

Conveyors—McCaslin Gravity Bucket:
Canadian Mead-Morrison Co., Limited.

Contractors' Supplies:
Canadian Fairbanks-Morse Co., Ltd

Consulters and Engineers:
Hersey Milton Co., Ltd

Conveyors:
Canadian Link-Belt Co., Ltd.
The Mine & Smelter Supply Co
Jones & Glassco (Regd.)

Conveyor Belts:
Gutta Percha & Rubber, Ltd.

Conveyor Flights:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co., Ltd

Conveyor—Trough—Belt:
Canadian Fairbanks-Morse Co., Ltd
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co
Mussens, Limited
Jones & Glassco (Roller, Belt and Chain)
Hendrick Mfg. Co.
The Wabi Iron Works

Conical Mills:
Hardinge Conical Mill Co

Copper:
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co.

Couplings:
Hans Renold of Canada, Limited, Montreal, Q

Cranes:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Mead-Morrison Co., Limited.
Canadian Link-Belt Company
R. T. Gilman & Co.
Smart-Turner Machine Co.

Crane Ropes:
Allan Whyte & Co.
Canada Wire & Cable Co.
Greening, B., Wire Co., Ltd.

Crucibles:
Canadian Fairbanks-Morse Co., Ltd
The Mine & Smelter Supply Co.

Crusher Balls:
Canada Foundries & Forgings, Ltd
Hull Iron & Steel Foundries, Limited Hull Que
Osborn, Sam'l (Canada) Limited.

Swedish Steel & Importing Co., Ltd.

Crushers:
Canadian Fairbanks-Morse Co., Ltd
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
Hardinge Conical Mill Co.
Osborn, Sam'l (Canada) Limited.
The Electric Steel & Metals Co., Ltd
R. T. Gilman & Co.
Lymans, Ltd.
Mussens, Limited

Canadian Miners' Buying Directory.—(Continued)

The Mine & Smelter Supply Co.
Hadfields, Limited
Fraser & Chalmers of Canada Lt
The Wabi Iron Works

Cut Gears:
Hans Renold of Canada, Limited, Montreal, Que.

Cyanide:
American Cyanamid Company.

Cyanide Plant Equipment:
The Dorr Co.
The Mine & Smelter Supply Co.

D. C. Units:
MacGovern Co.

Derricks:
Smart-Turner Machine Co.
Canadian Mead-Morrison Co., Limited.
Marsh Engineering Works
R. T. Gilman & Co.
Canadian Fairbanks-Morse Co., Ltd.
Mussens, Limited

Diamond Drill Contractors:
Diamond Drill Contracting Co.
E. J. Longyear Company
Smith & Travers
Sullivan Machinery Co.

Diamond Tools:
Diamond Drill Carbon Co

Diamond Importers:
Diamond Drill Carbon Co.

Digesters:
Canadian Chicago Bridge and Iron Works

Dies:
Canada Foundries & Forgings, Ltd.
Hull Iron & Steel Foundries, Ltd.

Dredger Pins:
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
The Electric Steel & Metals Co.
Hadfields, Limited

Dredging Machinery:
Canadian Steel Foundries, Ltd.
Canadian Mead-Morrison Co., Limited.
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
R. T. Gilman & Co.

Dredging Ropes:
Allan, Whyte & Co.
Greening, B., Wire Co., Ltd
R. T. Gilman & Co.

Drills, Air and Hammer:
Canadian Ingersoll-Rand Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Sullivan Machinery Co.
Northern Canada Supply Co.
Osborn, Sam'l (Canada) Limited.
The Mine & Smelter Supply Co.
Mussens, Limited

Drills—Core:
Canadian Ingersoll-Rand Co., Ltd.
E. J. Longyear Company
Standard Diamond Drill Co.
Sullivan Machinery Co.

Drills—Diamond:
Sullivan Machinery Co.
Northern Canada Supply Co.
E. J. Longyear Company

Drill Steel—Mining:
H. A. Drury Co., Ltd.
Hadfields, Limited
International High Speed Steel Co., Rockaway
Osborn, Sam'l (Canada) Limited.
Mussens, Limited
Swedish Steel & Importing Co., Ltd.

Drill Steel Sharpeners:
Canadian Ingersoll-Rand Co., Ltd
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Northern Canada Supply Co.
Sullivan Machinery Co.
Osborn, Sam'l (Canada) Limited.
The Wabi Iron Works

Drills—Electric:
Canadian Fairbanks-Morse Co., Ltd.
Sullivan Machinery Co.
Northern Electric Co., Ltd.

Drills—High Speed and Carbon:
Canadian Fairbanks-Morse Co., Ltd.
Osborn, Sam'l (Canada) Limited.
H. A. Drury Co., Ltd.
Hadfields, Limited

Dynamite:
Canadian Explosives
Giant Powder Company of Canada, Ltd.
Northern Canada Supply Co.

Dynamos:
Canadian Fairbanks-Morse Co., Ltd
MacGovern & Company

Ejectors:
Canadian Fairbanks-Morse Co. Ltd
Canadian Ingersoll-Rand Co., Ltd
Northern Canada Supply Co

Elevators:
Canadian Mead-Morrison Co., Limited.
Canadian Link-Belt Co., Ltd.
Sullivan Machinery Co.
Northern Canada Supply Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.
Jones & Glassco (Regd.)
Mussens, Limited
The Wabi Iron Works

Engineering Instruments:
C. L. Berger & Sons

Engines—Automatic:
Canadian Fairbanks-Morse Co., Ltd
Canadian Mead-Morrison Co., Limited.
Fraser & Chalmers of Canada, Ltd.

Engines—Gas and Gasoline:
Canadian Fairbanks-Morse Co., Ltd.
Alex. Fleck
Fraser & Chalmers of Canada, Ltd
Osborn, Sam'l (Canada) Limited.
Sullivan Machinery Co.
Gould, Shapley & Muir Co., Ltd.
MacGovern & Co., Inc.
The Mine & Smelter Supply Co

Engines—Haulage:
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que
Canadian Mead-Morrison Co., Limited.
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.

Engines—Marine:
Canadian Fairbanks-Morse Co., Ltd.
MacGovern & Co., Inc.
Swedish Steel & Importing Co., Ltd.

Engines—Steam:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Mead-Morrison Co., Limited.
R. T. Gilman & Co.
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.

Engines—Stationery:
Swedish Steel & Importing Co., Ltd.

Engineers:
General Engineering Co., New York
The Dorr Co.

Ferro-Alloys (all Classes):
Everitt & Co.

Feed Water Heaters:
MacGovern & Co.

Fire Fighting Supplies:
Gutta Percha & Rubber, Ltd.

Flashlights—Electric:
Spielman Agencies, Regd.

Flood Lamps:
Northern Electric Co., Ltd.

Flourspar:
The Consolidated Mining & Smelting Co
Everitt & Co.

Forges:
Canadian Fairbanks-Morse Co., Ltd.
Northern Canada Supply Co.

Forging:
Canadian Mead-Morrison Co., Limited.
Canadian Foundries and Forgings, Ltd.
Hull Iron & Steel Foundries, Ltd.
Smart-Turner Machine Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.

Frogs:
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
John J. Gartshore

Frequency Changers:
MacGovern & Co., Inc.

Furnaces—Assay:
Canadian Fairbanks-Morse Co., Ltd.
Lymans, Limited
Mine & Smelter Supply Co.

Fuse:
Canadian Explosives
Giant Powder Company of Canada, Ltd.
Northern Canada Supply Co.

Gaskets:
Gutta Percha & Rubber, Ltd.

Gears:
Hans Renold of Canada, Limited, Montreal, Que
Jones & Glassco (Regd.)

Gears (Cast):
Hull Iron & Steel Foundries, Ltd.
Canadian Link-Belt Co., Ltd.

Gears, Machine Cut:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Steel Foundries, Ltd.
The Electric Steel & Metals Co.
The Hamilton Gear & Machine Co
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Granulators:
Hardinge Conical Mill Co.

Grinding Wheels:
Canadian Fairbanks-Morse Co., Ltd

Gold Refiners
Goldsmith Bros

Canadian Miners' Buying Directory.—(Continued)

Gold Trays.
Canada Chicago Bridge & Iron Works

Hose (Air Drill):
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.

Hose (Fire):
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.

Hose (Packings)
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.

Hose (Suction):
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.

Hose (Steam):
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.

Hose (Water):
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.

Hammer Rock Drills:
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Osborn, Sam'l (Canada) Limited.
Mussens, Limited
The Mine & Smelter Supply Co.

Hangers and Cable:
Standard Underground Cable Co. of Canada, Lt

High Speed Steel:
Canadian Fairbanks-Morse Co. Ltd.
H. A. Drury Co., Ltd.
Osborn, Sam'l (Canada) Limited.
Hadfields, Limited
International High Speed Steel Co., Rockaway.

High Speed Steel Twist Drills:
Canadian Fairbanks-Morse Co., Ltd.
H. A. Drury Co., Ltd.
Northern Canada Supply Co.
Osborn, Sam'l (Canada) Limited.

Hoists—Air, Electric and Steam:
Canadian Ingersoll-Rand Co., Ltd.
Canadian Fairbanks-Morse Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd
Jones & Glassco
Canadian Mead-Morrison Co., Limited.
Marsh Engineering Works
Northern Canada Supply Co.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works
R. T. Gilman & Co.
Mussens, Limited
Canadian Link-Belt Co., Ltd.

Hoisting Engines:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
The Electric Steel & Metals Co.
Mussens, Limited
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.
Canadian Mead-Morrison Co., Limited
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.
The Mine & Smelter Supply Co.

Hoisting Towers:
Canadian Mead-Morrison Co., Limited.

Hose:
Canadian Fairbanks-Morse Co., Ltd.
Gutta Percha & Rubber, Ltd
Northern Canada Supply Co

Hose (Steam, Air, Water):
Gutta Percha & Rubber, Ltd.

Hydraulic Machinery:
Canadian Fairbanks-Morse Co., Ltd.
Hadfields, Limited
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Industrial Chemists:
Hersey, M. & Co., Ltd

Ingot Copper:
Canada Metal Co., Ltd.
Hoyt Metal Co.

Insulating Compounds:
Standard Underground Cable Co. of Canada, Ltd

Inspection and Testing:
Dominion Engineering & Inspection Co

Inspectors:
Hersey, M. & Co., Ltd.

Jacks:
Canadian Fairbanks-Morse Co., Ltd
Can. Brakeshoe Co., Ltd.
Northern Canada Supply Co.
R. T. Gilman & Co.
Mussens, Limited

Jack Screws:
Canadian Foundries and Forgings, Ltd

Laboratory Machinery:
Mine & Smelter Supply Co.

Lamps—Acetylene:
Dewar Manufacturing Co., Inc.

Lamps—Carbide:
Dewar Manufacturing Co., Inc.

Lamps—Miners:
Canada Carbide Company, Limited
Canadian Fairbanks-Morse Co., Ltd
Dewar Manufacturing Co., Inc.
Northern Electric Co., Ltd.
Mussens, Limited

Lamps:
Dewar Manufacturing Co., Inc.

Lanterns—Electric:
Spielman Agencies, Regd.

Lead (Pig):
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co.

Levels:
C. L. Berger & Sons

Locomotives (Steam, Compressed Air and Storage Ste
Canadian Fairbanks-Morse Co., Ltd.
H. K. Porter Company
R. T. Gilman & Co
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited

Link Belt
Canadian Fairbanks-Morse Co. Ltd.
Northern Canada Supply Co.
Jones & Glassco

Machinists:
Burnett & Crampton

Machinery—Repair Shop:
Canadian Fairbanks-Morse Co., Ltd

Machine Shop Supplies:
Canadian Fairbanks-Morse Co., Ltd.

Magnesium Metal:
Everitt & Co.
Hull Iron & Steel Foundries, Ltd.

Manganese Steel:
Canadian Steel Foundries, Ltd.
The Electric Steel & Metals Co.
Hadfields, Limited
Osborn, Sam'l (Canada) Limited.
Hull Iron & Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Metal Marking Machinery:
Canadian Fairbanks-Morse Co., Ltd

Metal Merchants:
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
Coniagas Reduction Co.
Consolidated Mining & Smelting Co. of Canad
Canada Metal Co.
C. L. Constant Co.
Everitt & Co

Metallurgical Engineers:
General Engineering Co., New York
The Dorr Co.

Metallurgical Machinery:
General Engineering Co., New York
The Dorr Co.
The Mine & Smelter Supply Co.

Metal Work, Heavy Plates:
Canada Chicago Bridge & Iron Works

Mica:
Everitt & Co.
Diamond Drill Carbon Co

Mining Engineers:
Hersey, M. Co., Ltd.

Mining Drill Steel:
H. A. Drury Co., Ltd.
Osborn, Sam'l (Canada) Limited
International High Speed Steel Co., Rockaway, N

Mining Requisites:
Canadian Steel Foundries, Ltd.
Dominion Wire Rope Co., Ltd.
Hadfields, Limited
Osborn, Sam'l (Canada) Limited.
Hull Iron & Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd
The Electric Steel & Metals Co.
The Wabi Iron Works

Mining Ropes:
Dominion Wire Rope Co., Ltd

Mine Surveying Instruments:
C. L. Berger & Sons

Molybdenite:
Everitt & Co

Monel Metal (Wire, Rod, Sheet and Foundry Metal):
International Nickel Co

Motors:
Canadian Fairbanks-Morse Co., Ltd.
R. T. Gilman & Co
MacGovern & Co
The Mine & Smelter Supply Co.
The Wabi Iron Works

Canadian Miners' Buying Directory.—(Continued)

Motor Generator Sets—A.C. and D.C
MacGovern & Co.

Nails:
Canada Metal Co.

Nickel:
International Nickel Co
Coniagas Reduction Co.
The Mond Nickel Co., Ltd.

Nickel Anodes:
The Mond Nickel Co., Ltd.

Nickel Salts:
The Mond Nickel Co., Ltd

Nickel Sheets:
The International Nickel Co. of Canada
The Mond Nickel Co., Ltd.

Nickel Wire:
The Mond Nickel Co., Ltd
The International Nickel Co. of Canada

Oil Analysts:
Constant, C. L. Co.

Ore Handling Equipment:
Canadian Mead-Morrison Co., Limited.
Canadian Link-Belt Co., Ltd.

Ore Sacks:
Northern Canada Supply Co.

Ore Testing Works:
Ledoux & Co.
Can. Laboratories
Milton Hersey Co.
Campbell & Deyell
General Engineering Co., New York
Hoyt Metal Co.

Ores and Metals—Buyers and Sellers of:
C. L. Constant Co.
Geo. G. Blackwell
Consolidated Mining and Smelting Co. of Canada
Oxford Copper Co.
Canada Metal Co.
Hoyt Metal Co.
Everitt & Co.
Pennsylvania Smelting Co.

Packing:
Canadian Fairbanks-Morse Co., Ltd.
Gutta Percha & Rubber, Ltd.

Paints—Special:
Spielman Agencies, Regd.

Perforated Metals:
Northern Canada Supply Co.
Hendrick Mfg. Co.
Canada Wire and Iron Goods Company.
Greening, B., Wire Co.

Permissible Explosives:
Giant Powder Company of Canada, Ltd.

Pig Tin:
Canada Metal Co., Ltd
Hoyt Metal Co.

Pig Lead:
Canada Metal Co., Ltd.
Hoyt Metal Co.
Pennsylvania Manufacturing Co.

Pillow Blocks:
Canadian Link-Belt Company

Pipes:
Canadian Fairbanks-Morse Co., Ltd
Canada Metal Co., Ltd.
Consolidated M. & S. Co.
Northern Canada Supply Co.
R. T. Gilman & Co.

Pipe Fittings:
Canadian Fairbanks-Morse Co., Ltd

Pipe—Wood Stave:
Pacific Coast Pipe Co.
Mine & Smelter Supply Co

Piston Rock Drills:
Mussens, Limited
Mine & Smelter Supply Co

Plate Works:
John Inglis Co., Ltd.
Hendrick Mfg. Co.
The Wabi Iron Works
MacKinnon Steel Co., Ltd

Platinum Refiners:
Goldsmith Bros

Pneumatic Tools:
Canadian Ingersoll-Rand Co., Ltd
R. T. Gilman & Co

Powder:
Giant Powder Company of Canada, Ltd.

Prospecting Mills and Machinery:
The Electric Steel & Metals Co
E. J. Longyear Company
Standard Diamond Drill Co.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, L
The Wabi Iron Works

Pumps—Pneumatic:
Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
Sullivan Machinery Co.

Pumps—Steam:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Ingersoll-Rand Co., Ltd.
The Electric Steel & Metals Co.
The Mine & Smelter Supply Co.
Mussens, Limited
Northern Canada Supply Co.
Smart-Turner Machine Co.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Pumps—Turbine:
Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd.
Fraser & Chalmers of Canada, Ltd
The Wabi Iron Works

Pumps—Vacuum:
Canadian Fairbanks-Morse Co., Ltd
Smart-Turner Machine Co.
The Wabi Iron Works

Pumps—Valves:
Canadian Fairbanks-Morse Co., Ltd.

Pulleys, Shaftings and Hangings:
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd.
The Wabi Iron Works

Pulverizers—Laboratory:
Mine & Smelter Supply Co.
The Wabi Iron Works
Hardinge Conical Mill Co.

Pumps—Boiler Feed:
Smart-Turner Machine Co.
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
Mine & Smelter Supply Co.

Pumps—Centrifugal:
Canadian Fairbanks-Morse Co., Ltd.
The Electric Steel & Metals Co.
Smart-Turner Machine Co.
Canadian Mead-Morrison Co., Limited.
Canadian Ingersoll-Rand Co., Ltd.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Pumps—Diaphragm
The Dorr Company

Pumps—Electric
Canadian Fairbanks-Morse Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
Smart-Turner Machine Co.

Pumps—Sand and Slime:
Canadian Fairbanks-Morse Co., Ltd.
Fraser & Chalmers of Canada, Ltd
Mine & Smelter Supply Co.
The Electric Steel & Metals Co.
The Wabi Iron Works
Smart-Turner Machine Co.

Quarrying Machinery:
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.
Hadfields, Limited
Mussens, Limited
R. T. Gilman Co.

Rails:
Hadfields, Limited
John J. Gartshore
R. T. Gilman & Co.
Mussens, Limited

Railway Supplies:
Canadian Fairbanks-Morse Co., Ltd

Refiners:
Goldsmith Bros.

Riddles:
Hendrick Mfg. Co.

Roller Chain:
Hans Renold of Canada, Limited, Montreal, Que.
Canadian Link-Belt Co., Ltd.

Roofing:
Canadian Fairbanks-Morse Co. Ltd
Northern Canada Supply Co.

Rope—Manilla:
Osborn, Sam'l (Canada) Limited.
Mussens, Limited

Rope—Manilla and Jute:
Jones & Glassco
Northern Canada Supply Co.
Osborn, Sam'l (Canada) Limited.
Allan, Whyte & Co.

Canadian Miners' Buying Directory.—(Continued)

Rope—Wire:
Allan, Whyte & Co.
Canada Wire & Cable Co.
Dominion Wire Rope Co., Ltd.
Greening, B. Wire Co.
Northern Canada Supply Co.
Mussens, Limited

Rolls—Crushing
Canadian Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
Hull Iron & Steel Foundries, Ltd.
Osborn, Sam'l (Canada) Limited.
Hadfields, Limited
The Electric Steel & Metals Co.
Mussens, Limited
The Wabi Iron Works

Samplers:
Fraser & Chalmers of Canada, Ltd.
C. L. Constant Co.
Ledoux & Co.
Milton Hersey Co.
Thos. Heyes & Son
Mine & Smelter Supply Co.
Mussens, Limited

Scales—(all kinds):
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Screens:
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Hendrick Mfg. Co.
Mine & Smelter Supply Co.
Canada Wire and Iron Goods Company.
Canadian Link-Belt Co., Ltd.

Screens—Cross Patent Flanged Lip:
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Screens—Perforated Metal:
Hendrick Mfg. Co.

Screens—Shaking:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co.

Screens—Revolving:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co.

Scheelite:
Everitt & Co.

Separators:
Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
Mine & Smelter Supply Co.

Shaft Contractors:
Hendrick Mfg. Co.

Sheet Metal Work:
Hendrick Mfg. Co.

Sheets—Genuine Manganese Bronze:
Hendrick Mfg. Co.

Shoes and Dies:
Canadian Foundries and Forgings, Ltd.
H. A. Drury Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
Hull Iron & Steel Foundries, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works

Shovels—Steam:
Canadian Foundries and Forgings, Ltd
Canadian Mead-Morrison Co., Limited.
Osborn, Sam'l (Canada) Limited.
R. T. Gilman & Co.

Ship Bunkering Equipment:
Canadian Mead-Morrison Co., Limited.

Silent Chain:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Que.

Silent and Steel Roller:
Canadian Link-Belt Co., Ltd.
Jones & Glassco (Regd.)

Siline:
Coniagas Reduction Co.

Saline Refiners:
Goldsmith Bros.

Smelters:
Goldsmith Bros.

Sledges:
Canada Foundries & Forgings, Ltd.

Smoke Stacks:
Hendrick Mfg. Co.
MacKinnon Steel Co., Ltd.
Marsh Engineering Works
The Wabi Iron Works

Special Machinery:
John Inglis Co., Ltd.

Spelter:
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co.

Sprockets:
Hans Renold of Canada, Limited, Montreal, Que.
Canadian Link-Belt Co., Ltd.
Jones & Glassco (Regd.)

Spring Coil and Clips Electrico:
Canadian Steel Foundries, Ltd.

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Fraser & Chalmers of Canada, Ltd.

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Hull Iron & Steel Foundries, Ltd.

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Canadian Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
Osborn, Sam'l (Canada) Limited.
Hull Iron & Steel Foundries, Ltd.
The Electric Steel & Metals Co.
Hadfields, Limited
The Wabi Iron Works

Steel Drills:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Sullivan Machinery Co.
Northen Canada Supply Co.
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Osborn, Sam'l (Canada) Limited.
Canadian Ingersoll-Rand Co., Ltd.
Mussens, Limited
Swedish Steel & Importing Co., Ltd.

Steel Drums:
Smart-Turner Machine Co.

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Canadian Fairbanks-Morse Co., Ltd.
H. A. Drury Co., Ltd.
N. S. Steel & Coal Co.
Osborn, Sam'l (Canada) Limited.
Hadfields, Limited
Swedish Steel & Importing Co., Ltd.

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Hendrick Mfg. Co.

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Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
Osborn, Sam'l (Canada) Limited.
Mussens, Limited
R. T. Gilman & Co.
The Wabi Iron Works

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The Mond Nickel Co., Ltd.
Coniagas Reduction Co.

Sulphate of Nickel:
The Mond Nickel Co., Ltd.

Surveying Instruments:
C. L. Berger

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Canadian Steel Foundries, Ltd.
Mussens, Limited.

Switches and Turntables:
John J. Gartshore

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Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.

Tanks:
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The Mine & Smelter Supply Co.

Tanks (Wooden):
Canadian Fairbanks-Morse Co., Ltd.
Gould, Shapley & Muir Co., Ltd.
Pacific Coast Pipe Co., Ltd.
Mine & Smelter Supply Co.
The Wabi Iron Works

Tanks—Cyanide, Etc.:
Hendrick Mfg. Co.
Pacific Coast Pipe Co.
MacKinnon Steel Co.
Fraser & Chalmers of Canada, Ltd.
Mine & Smelter Supply Co.
The Wabi Iron Works

Tanks—Steel:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Ingersoll-Rand Co., Ltd.
Canadian Chicago Bridge & Iron Works
Marsh Engineering Works
Osborn, Sam'l (Canada) Limited.
MacKinnon Steel Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
Hendrick Mfg. Co.
The Wabi Iron Works

Tanks—Oil Storage:
Canadian Chicago Bridge & Iron Works
The Mine & Smelter Supply Co.

Tanks (water) and Steel Towers:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Chicago Bdidge & Iron Works
Gould, Shapley & Muir Co., Ltd.
MacKinnon Steel Co.
Mine & Smelter Supply Co.
The Wabi Iron Works

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Hadfields, Limited

Transits:
C. L. Berger & Sons

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R. T. Gilman & Co.
Northern Electric Co., Ltd.

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Jones & Glassco (Regd.)

Transmission Machinery:
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Hans Renold of Canada, Limited, Montreal, Que.
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Canadian Fairbanks-Morse Co., Ltd.

TTrucks:
Canadian Fairbanks-Morse Co., Ltd.

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Hadfields, Limited

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Tube Mill Balls:
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Fraser & Chalmers of Canada, Ltd.
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Burnett & Crampton
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Turbines—Steam:
Fraser & Chalmers of Canada, Ltd.
MacGovern & Co.

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Everitt & Co.

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Canadian Mead-Morrison Co., Limited.

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Imperial Brass Mfg. Co.

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Canadian Fairbanks-Morse Co., Ltd.
Imperial Brass Mfg. Co.

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Canadian Steel Foundries, Ltd.
Hadfields, Limited
The Electric Steel & Metals Co.
The Wabi Iron Works

Winches—Power Driven:
Canadian Mead-Morrison Co., Limited.

Winding Engines—Steam and Electric:
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Canadian Ingersoll-Rand Co., Ltd.
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
Mussens, Limited
R. T. Gilman & Co.
The Wabi Iron Works

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Canada Wire and Iron Goods Company.
Canada Wire & Cable Co.
Dominion Wire Rope Co., Ltd.

Wire Rope Fittings:
Canada Wire and Iron Goods Company.
Canada Wire & Cable Co.

Wire Cloth:
Northern Canada Supply Co.
Greening, B. Wire Co.
Canada Wire & Iron Goods Company

Wire (Bars and Insulated):
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Northern Electric Co., Ltd.

Wolfram Ore:
Everitt & Co.

Woodworking Machinery:
Canadian Fairbanks-Morse Co., Ltd

Zirconium:
Everitt & Co.

Zinc:
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Consolidated Mining & Smelting Co.

Zinc Spelter:
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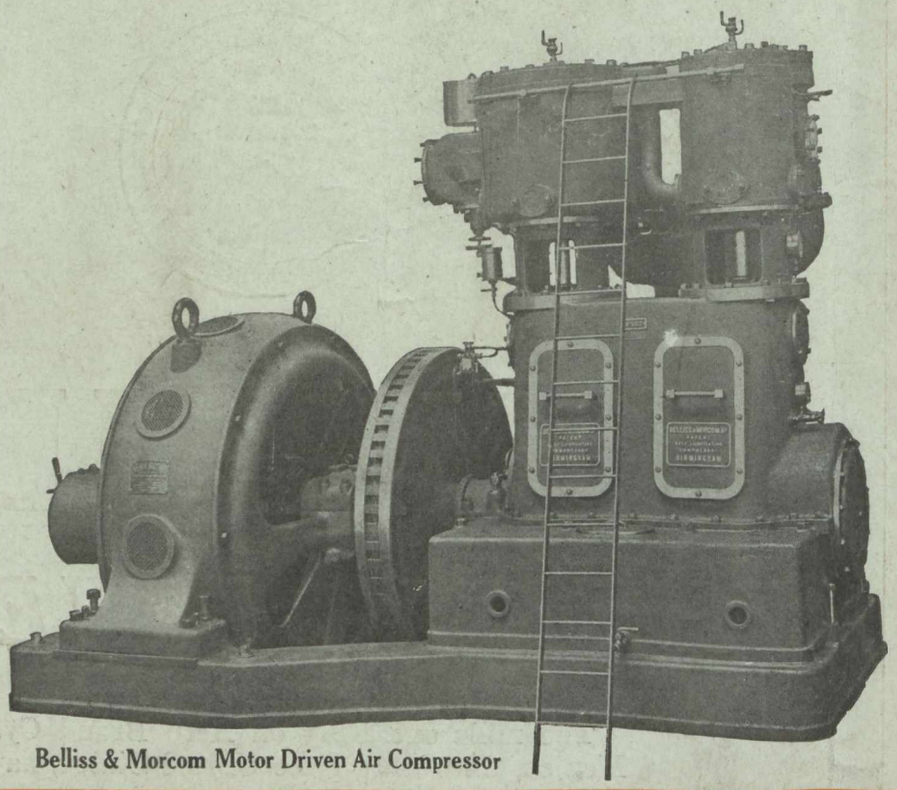

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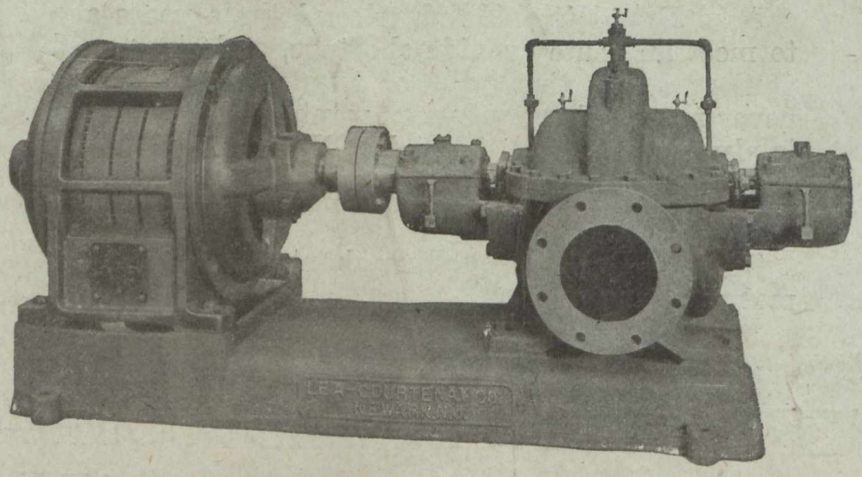

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