

# CANADIAN MINING JOURNAL

VOL. XL.

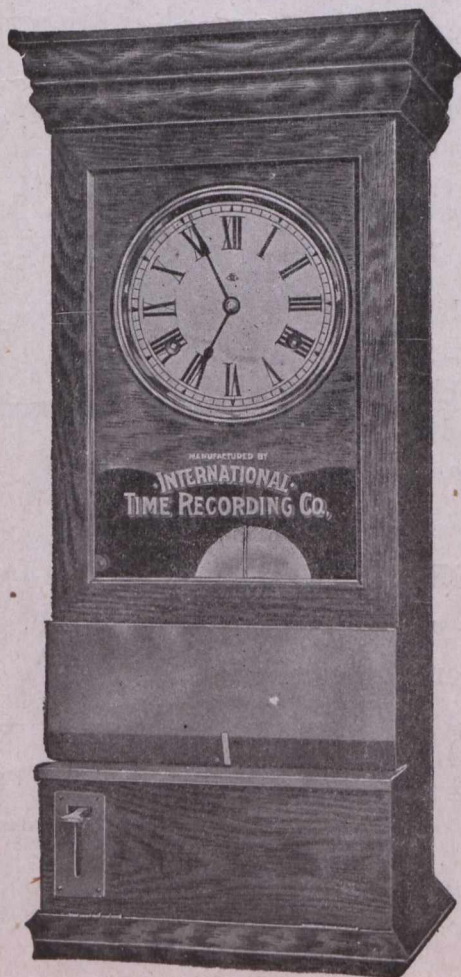
June 25, 1919.

No. 25

## Your Pay-Roll Cannot Stand "Leaks" Just Now Through Lost Labor Time

*You Can Detect Them*

***With an International  
Cost Recorder***



**International Cost Recorder,  
MADE IN CANADA.**

Pencil records made by human hands—whether of employee or foreman—can never form an absolutely sound basis of arriving at your production costs.

Without accurate "cost knowledge" you simply don't know where you are.

With an **INTERNATIONAL COST RECORDER** you get correct, unchangeable, **PRINTED** records of the time each job was started and the time it was finished.

***Your Pay-Roll is Your Largest  
"Raw Material" Purchase***

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Your aim is to keep down the non-productive hours of your workmen. How can you do this without the fundamental requisite: A **PRINTED RECORD** of the actual productive time used?

Pencil records "don't go"—in time records any more than would pencil-written cheques—and for the same reason.

*Let us help you solve the real time-keeping problem in your plant*

**International Business Machines Co., Limited**

(TIME RECORDER DIVISION)

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Vice-Pres. and Gen. Mgr.

Royce and Campbell Avenues  
TORONTO

Also at Winnipeg and Vancouver

(Also makers of Dayton Computing Scales and Hollerith  
Electric Tabulators)

# Sullivan Light Stopers

Looking for a light, fast, easily handled stoper ?

Here's the new Sullivan "DT-44" bantam weight drill, 66 pounds as the runner shoulders it to climb the stope—the lightest stoper in use.

## EASE IN POINTING HOLES?

This tool is only 47 inches over all with feed piston drawn in. You can run it in the narrowest stope you've got.

## "SIMPLE" IS RIGHT!

This drill looks simple and is simple—no valve, a single throttle for air cylinder and feed, automatic lubrication, self cleaning chuck, hand rotation, enclosed side rods—all parts accessible by loosening five nuts.

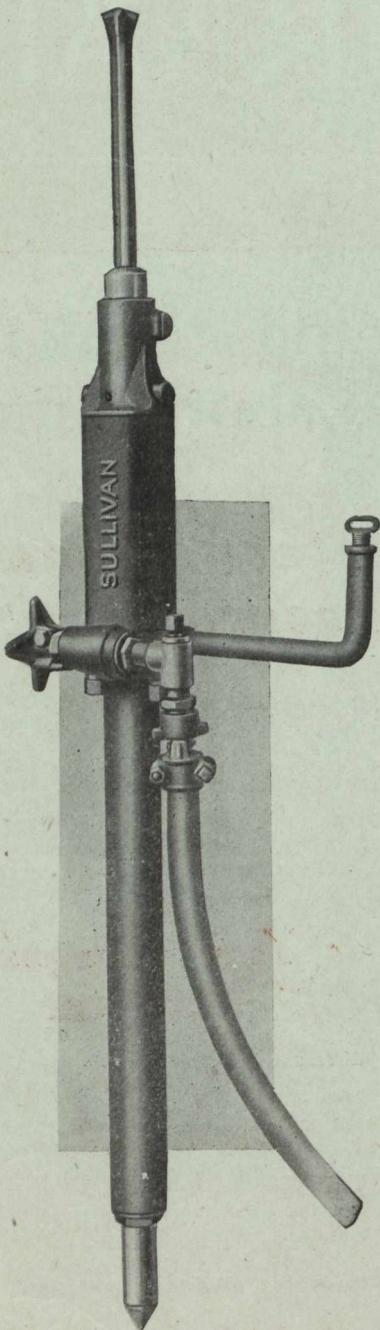
## STAY ON THE JOB?

The light stoper is built to Sullivan Hammer Drill Standards: alloy steel throughout, machined from drop-forged billets and bars; heat treated by special processes to resist wear and breakage.

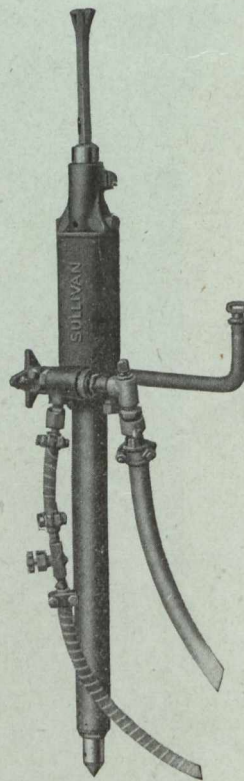
## CUTTING SPEED?

Ask our customers why they buy "DT-44's" (names on request). Types—"Dry" (solid steel), and "Water" (hollow steel), with direct or reverse feed cylinders.

Bulletin 670 M.



Sullivan "DT-44"  
Light Stoper



Sullivan Light Water  
Stoper "DT-44"

## SULLIVAN MACHINERY COMPANY

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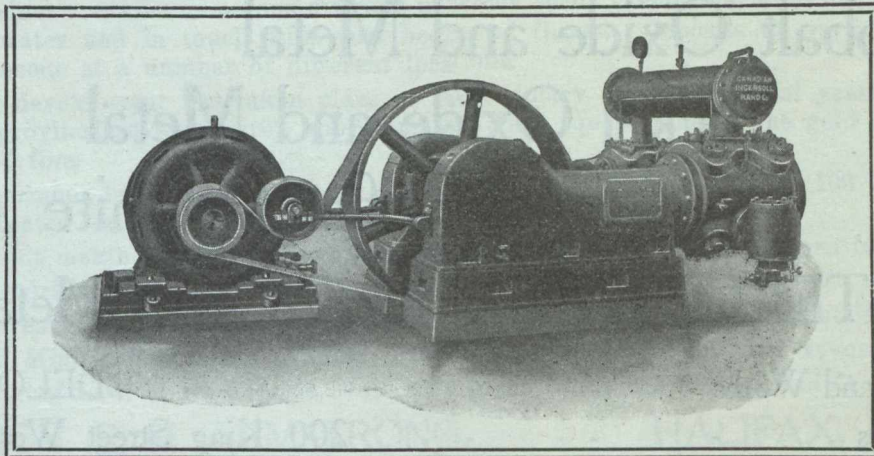
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# THE CIRCO PAGE



Illustrating Compressed Air Machinery, Tools and Appliances



## Air Compressors

One of our "PLB-2" Air Compressors, similar to the one illustrated, but with long-belt drive, has just completed fourteen months' steady service at the Tidewater Shipyards, Three Rivers, Que., with a total repair bill of FIVE CENTS.

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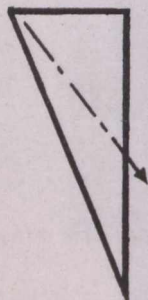
“STELLITE” High Speed Tool Metal

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 315 Craig Street West, Montreal

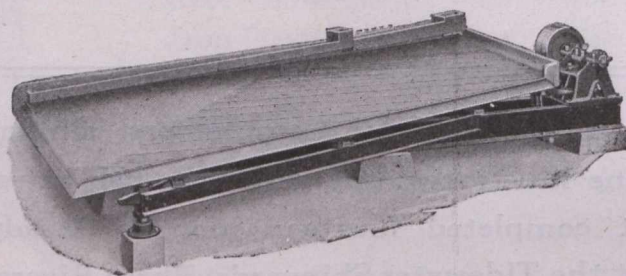
## Deister-Overstrom Diagonal Deck Concentrating Tables

Which has the greater area, one triangle or two ?

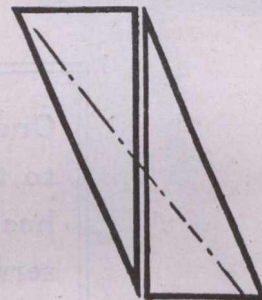
The arrows represent direction of pulp flow. Note the greater length of travel, and the greater percentage of table surface utilized on Deister-Overstrom Diagonal Deck Tables.



This route good as far as it goes



BUT



Is this not better ?

PRACTICALLY ALL OF THE TABLE SURFACE IS USED EFFECTIVELY

The deck area of a Deister-Overstrom table is so disposed as to take the greatest possible advantage of the oblique pulp flow. Shallower riffles can therefore

be used, thus permitting a freer inter-movement of the particles, a better stratification, and consequently a better separation of the mineral from the gangue.

### NET RESULTS

A higher extraction of values  
 A higher grade concentrate

Greater capacity  
 Minimum percentage of middlings

Write for Bulletin No. 3 illustrating our Deister-Overstrom Diagonal Deck Tables

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Manufacturers of Deister and Deister-Overstrom Tables

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# The Minerals of Nova Scotia

## THE MINERAL PROVINCE OF EASTERN CANADA

COAL, IRON, COPPER, GOLD, LEAD, SILVER, MANGANESE, GYPSUM, BARYTES, TUNGSTEN, ANTIMONY, GRAPHITE, ARSENIC, MINERAL PIGMENTS, DIATOMACEOUS EARTH.

Nova Scotia possesses extensive areas of mineral lands and offers a great field for those desirous of investment.

**Coal** Over six million tons of coal were produced in the province during 1916, making Nova Scotia by far the leader among the coal producing provinces of the Dominion.

**Iron** The province contains numerous districts in which occur various varieties of iron ore, practically at tide water and in touch with vast bodies of fluxes. Deposits of particularly high grade manganese ore occur at a number of different locations.

**Gold** Marked development has taken place in this industry the past several years. The gold fields of the province cover an area approximately 3,500 square miles. The gold is free milling and is from 870 to 970 fine.

**Gypsum** Enormous beds of gypsum of a very pure quality and frequently 100 feet thickness, are situated at the water's edge.

High grade cement making materials have been discovered in favorable situations for shipping.

Government core-drills can be had from the department for boring operations.

The available streams of Nova Scotia can supply at least 500,000 h.p. for industrial purposes.

Prospecting and Mining Rights are granted direct from the Crown on very favorable terms.

Copies of the Mining Law, Mines Reports, Maps and other Literature may be had free on application to

HON. E. H. ARMSTRONG, - HALIFAX, N.S.

*Commissioner of Public Works and Mines*



## PROVINCE OF QUEBEC MINES BRANCH

Department of Colonization, Mines and Fisheries

*The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc*

**The Mining Law gives absolute security of Title and is very favourable to the Prospector.**

**MINERS' CERTIFICATES.** First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

**SIX MONTHS AFTER STAKING.** At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

**MINING LICENSE.** The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is **Fifty Cents an acre per year**, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

**MINING CONCESSION.** Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

**PROVINCIAL LABORATORY.** Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

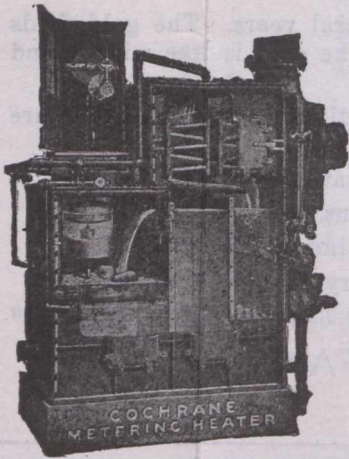
HONOURABLE HONORE MERCIER,  
MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.

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THE COCHRANE METERING HEATER TELLS HOW  
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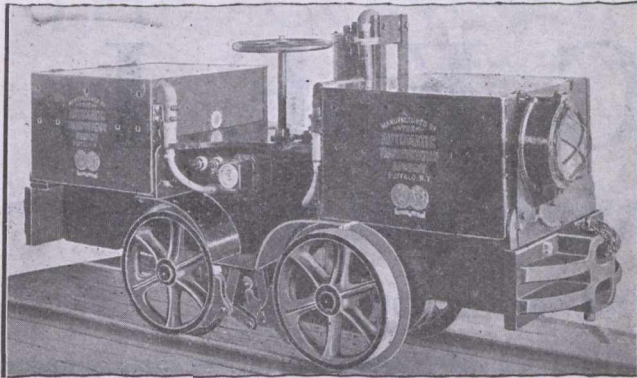
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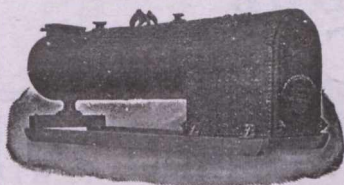
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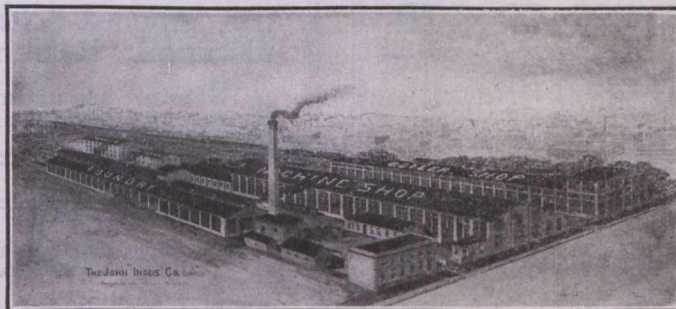
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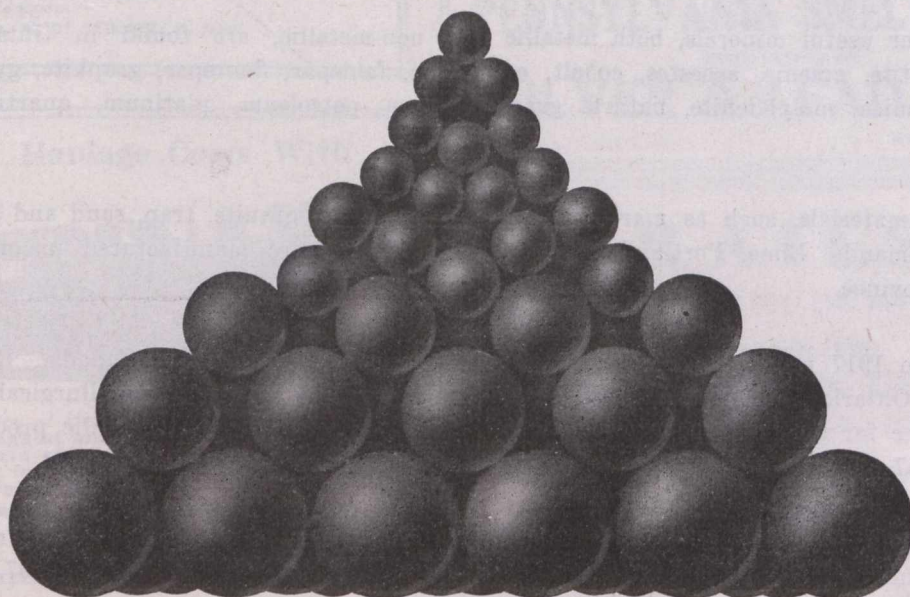
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## CONTENTS

### Editorial:

- Vocational Training . . . . . 449  
Report on Matachewan Gold Deposits . . . . . 449  
Forgotten Historical Events . . . . . 449  
Railways as the "Entrepreneur" of Industry 450  
Oil Concession Correspondence . . . . . 450-461

Nanaimo Meeting of the Western Branch of the Canadian Mining Institute . . . . . 451

The Prospector and the Mineral Industry, by J. C. Gwillim . . . . . 453

Haileybury Mining School . . . . . 455

Silver Output, Northern Ontario, Estimate of 1919 Production . . . . . 455

### Special Correspondence:

#### Northern Ontario:

- Labor and Wages. Kirkland Lake & Cobalt 456  
General Mining Notes . . . . . 457

#### British Columbia:

- The Need for a National Research Institute—Remarks by Mr. Nicol Thompson, Vancouver . . . . . 458  
Industrial Re-training in Ontario—Work of Soldiers Civil Re-establishment Dept. . . . . 459  
Map of Salmon River District, Northern British Columbia . . . . . 460  
Storage Battery Locomotive installed by Crown Reserve . . . . . 448-466

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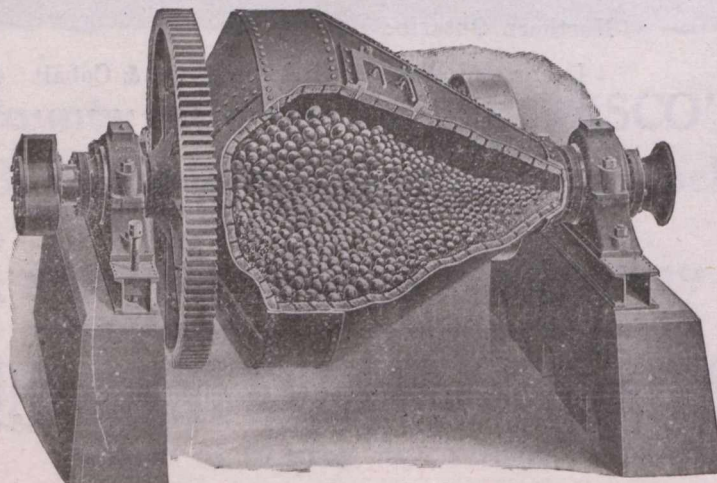
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# EDITORIAL

## VOCATIONAL TRAINING.

Prof. H. E. T. Haultain has resigned as Vocational Training Officer for Ontario. He has built up a splendid organization to carry on the vocational training of returned soldiers. From small beginnings there has been developed in a very short time a big institution which is effectively aiding men returned from overseas, teaching them, finding them suitable work and caring for them continuously. Prof. Haultain has been very largely responsible for the success of the work in Ontario. Many hundreds of men are given a fresh start in life by the Department of Soldiers Civil Re-establishment. Prof. Haultain has made every effort to see that the fresh start is a good one, and he is not satisfied with that. His provision of an after-care department indicates the thoroughness of the work. On another page will be found an outline of the organization of the Ontario branch. We recently visited the "plant" in Toronto, and found it a very hive of industry. The most "conservative" investigator would doubtless admit that "it's not bad—for a professor."

The several hundred members of his staff have shown their appreciation of Prof. Haultain's services by presenting him with a splendid automobile on the occasion of his return to professional work. They know better than anyone what he has accomplished, and his new car cannot be regarded as a mere machine, but rather as an expression of the admiration of a large number of men and women who have worked under his direction, and who appreciate what he has done for those returned soldiers who most need assistance on their return to civilian life.

## THE REPORT ON GOLD DEPOSITS.

In the June number of "Economic Geology" there is an interesting article by Dr. Cooke of the Geological Survey of Canada on the Matachewan gold deposits. The two best known properties, the Otisse and Davidson, are described in some detail. The subject of Dr. Cooke's paper is the origin of the deposits, and his paper indicates that we have at Matachewan conditions quite different from that at Porcupine or Kirkland Lake. There are some striking similarities in all three cases; but there are also as notable differences. It takes considerable study to permit of the writing of such a paper as that of Dr. Cooke's, and he deserves our thanks for recording his observations. It might have been of greater service, however, if the paper had been published in a Canadian rather than an American journal.

We are of the opinion that it is an advantage to Canada to have information concerning our ore deposits published in foreign journals, but it seems strange that such an account of observations, made at the public expense, should be published abroad before the Geological Survey has given out in Canada any report on the area.

We have on several occasions invited the Department of Mines to utilize our columns to give out preliminary reports on areas of economic interest, examined by the Department's geologists. We have offered to co-operate, because we believe it is of more use to have incomplete reports soon after examinations are made than more exhaustive reports a year or two later. In this case there has not only been a long delay, but the information is given out first abroad.

## FORGOTTEN HISTORICAL EVENTS.

Toronto "Saturday Night" under the above caption says, editorially:

"We are in danger here in Canada in following the blind lead of slap-dash American historians whose knowledge of events outside their own country is sometimes very limited. For instance, Canadian newspapers that should know better, carried a story the other day of the "Conquerors of the Atlantic" being a summary of the great feats that had been performed, and among them was the statement that the first vessel to cross the Atlantic under steam was the "Sirius," that feat having been performed in the year 1838. Now, it so happens that the first vessels to cross the Atlantic, steaming every inch of the way, was the Canadian-built "Royal William," and this feat took place in the year 1833, or five years before the "Sirius" crossed the Atlantic. Back in the year 1830, the American steamship "Savannah" crossed the Atlantic under a combination of steam and sail. In other words, she utilized her engines only a portion of the time. On the other hand, however, the old "Royal William," built in a Quebec shipyard, by a Canadian company, commanded by a Scotch-Canadian, manned by a Canadian crew, and burning Canadian coal, mined at Pictou, N.S., was the first vessel to cross the Atlantic or any other ocean, propelled all the way by steam power. If our schools do not teach such events as these they should, so that the children may at least put the old man right on Canadian historical events."

"Shipping" of New York—a weekly which we happen to know is largely energized by a Scot—says:

"The transatlantic passage by a flying machine, invented in America and operated by Americans is a fitting close to a century which began with the first transatlantic voyage by steam, also accomplished by an American-built vessel and operated by Americans."

Perhaps history will again repeat itself, and our grandchildren may be allowed to forget that the first non-stop Atlantic flight was achieved in a British-built plane by British flyers.

"Shipping" also remarks that while railway transportation "cannot be claimed as distinctly an American device, the construction of railways in the United States began only three years later than the Stockton & Darlington Railway in England, which is looked upon as the beginning of the steam railway system of the world."

We believe the Abercrombie Railroad, which ran from Stellarton mines of the General Mining Association to Pictou Landing, and on which the coal for the bunkers of the 'Royal William' was doubtless carried was the first steam railroad in America, and some years ago the original steam engine was taken away to be exhibited at some United States exposition—we believe at Chicago—and never came back to Pictou County. That old engine should have remained in Canada, and should have been given as honorable a place as is given the "Rocket" in Barrow-in-Furness Station.

How many Canadians realize that the coal mines of Nova Scotia were supplying coal to Boston and New York and the "British Provinces" long before it was found that anthracite would burn, and before Pittsburg was.

It is interesting to recall that Sydney, N.S., narrowly escaped being called Pittsburg, which was the name proposed for it by Governor Desbarres.

#### **RAILWAYS AS THE "ENTREPRENEUR" OF INDUSTRY.**

Our British Columbia correspondent refers to the attention given by the President of the Canadian Pacific Railway to mines and industrial enterprises in his tour of the Western Provinces, and in doing so draws attention to one of the great functions that privately-owned railways have performed in Canada and in the United States. The Canadian Pacific Railway, we believe, has for some years maintained a Department of Natural Resources, which answers to a department that was formed in connection with some United States railways under an official known by various titles, but usually as Industrial Commissioner.

It was the business of this particular branch of railway enterprise to encourage the growth of industry along a given line of railway; to give publicity to suitable sites for factories, to spy out the land and make its possibilities widely known. While the primal incentive behind these departments was of course to create traffic and business for the railways interested, nevertheless the country in the vicinity of these enterprising railways was benefitted.

This function of a railway, so important in a new and growing country, with large undeveloped tracts within its borders, is one that can be better carried

on by privately and corporately owned railways than by railways controlled and officered by Government officials, because, no matter how efficient the men appointed by a popular government, or how disinterested their motives, they cannot for long stave off the abuses of political patronage, of nepotism, of influence by populous and influential voting sections, and of the general tendency to ease in Zion that seems to descend upon all public utilities under electoral control.

The question of government control of railways versus corporate control is a live one in Canada and elsewhere today, and there are many sides to the question; but, as an *entrepreneur* of industry, we believe the government-owned railway will not prove successful, because it will not have behind it that paramount motive power of business, that primeval energiser of individual effort—personal and corporate profit. It is not fashionable in these days to express opinions in favour of monetary profits, but for what other incentive will the average man exert himself? Unrestrained individualism is responsible for many inhumanities, but in what other way has mankind found happiness but in honest work well done?—always (and here is where the average Canadian differs from the syndicalist, the communist, the Bolshevik, and all the other dreamers who wish to abolish toil, poverty and all grades of human effort, but whose finished work—if it were allowed to be accomplished—would be to degrade mankind to one drab and hopeless level of unremitting industrial slavery)—always, we repeat, for a consideration. That consideration may be larger or smaller, but if it is not forthcoming, the work will not be forthcoming either.

#### **OIL CONCESSION CORRESPONDENCE.**

In this issue of the JOURNAL will be found the text of a series of letters exchanged, first between the "Shell" Transport Company of London, and various members of the Canadian Government; and later, between the Federal Government and officers of the Provincial Government of Alberta.

In ensuing issues of the JOURNAL it is intended to publish the contents of letters exchanged between the Minister of the Interior at Ottawa, and the Toronto Branch of the Canadian Mining Institute, and further letters and telegrams exchanged between the Federal Government and the Alberta Government and oil companies already established and operating in Alberta and in Eastern Canada.

The correspondence is lengthy, but not tedious, and seeing that it concerns a request made to the Government of Canada for a reserve of 250,000 square miles of territory and a subsequent choice therefrom of 25,000 square miles, we believe it will interest most of our readers.

#### **STORAGE BATTERY LOCOMOTIVES FOR MINING PURPOSES.**

Present day labor conditions, accompanied by correspondingly high cost of unskilled labor, has made it imperative that mine managers consider the application of modern haulage machinery. In the past, mines with a limited output, and only moderate length of hauls could not give serious consideration to the heavy trolley type of locomotive, since their operations would not warrant such expenditure and it has therefore been necessary to resort to the primitive method of moving ore cars by hand. With the development of hydro-electric power throughout the Dominion, with its correspondingly low cost and flexibility, attention is

(Continued on Page 464.)

## Nanaimo Meeting Western Branch, C.M.I.

(From our British Columbia Correspondent.)

A number of addresses dealing with mining matters of special interest in the Pacific Northwest, notable among which was one by Major A. W. Davies on "Tunneling at the Front"; the formation of a Coal Mining Section, the membership of which includes Vancouver Island and the Nicola Valley Coal Fields; and the election of officers were noteworthy events in connection with the annual meeting of the Western Branch of the Canadian Mining Institute held at Nanaimo, B.C., on June 4th and 5th. Some fifty delegates were present, all of whom were of Vancouver Island, with not more than three or four exceptions, this being explained by the fact that transportation facilities with the Mainland were dislocated by a strike of steamboat men. The Metalliferous Branch of the Industry also was marked by its lack of representation, although four of the addresses presented were of special interest to men of that section.

In the absence of R. H. Stewart, E.M., who is in Texas on professional business, W. M. Brewer, Government Mining Engineer, Nanaimo, B.C., occupied the chair. After his introductory remarks the election of officers for the new year was taken up with the following results:

Chairman, E. E. Campbell, Superintendent of Mines, Anyox, Granby Consolidated Mining & Smelting Co.; Vice-Chairman, Prof. J. M. Turnbull, of the University of British Columbia; Councillors, Wm. Fleet Robertson, Provincial Mineralogist; W. M. Archibald, Mine Manager, Canadian Consolidated Mining & Smelting Co.; Major R. W. Brock, University of British Columbia; Thos. Graham, General Superintendent of the Canadian Collieries (D), Ltd.; Major A. W. Davies, Superintendent of the Taylor Mines Co., which has taken over the Dolly Varden Mines, Alic Arm, B.C.; James Buchanan, of Trail, B.C.; A. G. Larsen, Spokane, Wn.; Charles Camsell, of the Geological Survey Branch, Ottawa, with headquarters at Vancouver, B.C.; Henry Lee, of the Britannia Mining Co.; R. R. Bruce, Paradise Mine, Windermere, B.C.; C. M. Campbell, Granby Consolidated Mining & Smelting Co.; A. G. Langley, Resident Mining Engineer, Revelstoke, B.C.

### Coal Mining Section Formed.

The Coal Mining Section, to which reference has been made, then was proceeded with, and its organisation makes the third such body formed within the membership of the Canadian Mining Institute, the two others being in Nova Scotia and in Alberta and Eastern British Columbia, the latter being known as the Rocky Mountain Section. The idea is to give coal mine operators and miners an opportunity to devote independent and special attention to the problems relating to their industry. The officers selected for the Western Section follow: Chairman, George Wilkinson, Chief Inspector of Mines; Secretary and Editor, James Hargreaves, Instructor of Mine Work in connection with the Provincial Educational Dept.; Council: John Hunt, General Superintendent of the Canadian Western Fuel Company; Thos. Taylor, Pacific Coast Coal Mines, Ltd.; R. R. Wilson, Manager Granby Consolidated Coal Mining Company, Cassidy's; Francis Glover, Mine

Manager, Princeton Coal Mining Co.; Charles Graham, District Superintendent Comox Colliery, Canadian Collieries (D), Ltd.

Eight papers were read, four at the afternoon and the same number at the evening session. The former are of interest to the metalliferous mining man, while the others deal with matters of particular concern to the coal miner. The latter are "Notes on Coal Mine Air Sampling," by Dudley Michel, Instructor in First Aid and Mine Rescue Work, Department of Mines; "Technical Education and its Relation to Coal Mining," by James Hargreaves; "Regrading Slopes, No. 4 Mine, Cumberland, B.C.," by Charles Graham; and "Development and Operation of Mine Rescue Apparatus," by H. H. Sanderson, of Seattle, Wn.

An inspection of the coal mine plant of the Granby Consolidated Mining & Smelting by the delegates; a demonstration of the Gibbs and Paul Rescue Apparatus by teams representing the miners of Ladysmith and Nanaimo; and a smoking concert in the evening concluded the programme.

### Chairman R. H. Stewart's Address (by proxy).

As I shall be, unfortunately, unable to be present at your meeting at Nanaimo and there are a number of matters which have been under discussion during the past few months which should be brought to your attention, I am forwarding this letter to your secretary with the request that he place it before the meeting.

The Council of the Canadian Mining Institute and the general meeting in Montreal have passed certain resolutions and proposed amendments to the by-laws of the Institute, which are now being referred to the members to be voted on, and for which you have doubtless received printed ballot forms. I refer to them in more detail below:

### *Amendments relating to the election of Council and Vice-Presidents.*

This amendment is proposed in order that representation of the various provinces on the Council may be more evenly divided and that members elected to represent each province may be more truly representative of that province.

The present method of election is such that a councillor representing British Columbia is probably elected by the votes of members in Ontario or Quebec, most of whom may not even know him. The proposed method of election will make the councillors more truly representative of the Branches from which they come.

The Dominion is so large and the interests of the Provinces so varied that this arrangement seems very advisable.

*Change of Name of the Institute.*—The reasons for which this change is advocated are those which caused the change of name of the American Institute and the proposed change follows the lead of the American Institute. It is felt that the profession of metallurgy is so closely interwoven with that of mining, and members of both professions have so many interests in common that the Institute should embrace both, and as members of the metallurgical profession have in some instances felt that the C.M.I. was only a Mining Insti-

tute and that they were not mining engineers, they have not joined. The change of name is intended to make it clear that metallurgists are to be included.

*Amendments re Membership Requirements.*

It has been stated by certain members of the Engineering Institute of Canada that the C.M.I. was merely a trade organization and had no standing as a professional institute. While it is true that some of the members of the Institute are not engaged professionally in mining or metallurgy, the greater majority are so engaged and the amendments to the membership requirements have been designed to make this point more clear.

While the division between professional and ordinary members seems to be unnecessary and almost unfortunate, as there is no real distinction in so far as control of the actions of the Institute are concerned, both classes having the same rights and privileges; yet, in view of the remainder of the by-law, it would seem advisable that it be voted for in order that necessary changes be not delayed.

In view of the great extent of the Dominion and the differing interests of the various provinces, it is very advisable that the Provincial Branches be strengthened, and that they in turn be kept in closer touch with the parent Institute. Part of this is accomplished by the amendment to the by-law re. election of councillors. There remain other things to be done, and some of these have been under consideration by the Council.

Although the provinces are properly represented on the Council, distances are so great that it is impossible for Western Councillors to attend meeting at headquarters and matters can be passed only by Council meetings in Montreal, at which only eastern members are present. It would seem that outside of routine matters, all matters of general interest should be referred by letter or wire to all councillors for approval before being acted on and this if not already so, should be one of the by-laws of the Institute.

Besides the Council, there should be more definite connection between the Secretaries of the Institute and the Branch Secretaries and in a province like ours more definite connection between the Branch Secretary and the Branch Council and members. This, on account of distances between the Branch Councillors and members can only be accomplished by very considerable correspondence. It is necessary, therefore, that there should be a secretary who is paid by the Institute to give at least part of his time to this work. It is hardly fair to ask that a busy member give it voluntarily, and the thanks of the Branch are due to Mr. Wilkinson who has done so during the past year.

The council of the Institute have approved the principle that the Secretaries of at least the Western Branches should be paid, and it is hardly necessary to point out to you the necessity and advantage to your branch of such a move. It is advisable that you send by wire to Montreal recommendations as to the amount to be paid and the name of the secretary who will be selected by the new Council.

The council of the Institute have approved the principle of paying the expenses of one member of the Council from each of the distant provinces to at least one meeting yearly at headquarters.

The above changes should be of great advantage to the Western Branch, but there remains much to be done to stimulate interest in the Western Branch.

It has been proposed that owing to the difficulty on

account of the distances between the mining districts of the country, local branches be formed at important points, which will bring members in those districts together. Such branches are already in contemplation at Nelson and Nanaimo.

One of our active Kootenay members has suggested that in the Western Branch too little attention has been paid to the social side of our meetings. One of the main purposes served by the meetings is that of bringing members together and getting them acquainted. For this reason he believes that we should give more attention to this end of our meetings.

Some of the eastern branches hold informal monthly luncheons at which matters of interest may be discussed. Something of the kind might easily be organized in some of our B.C. centres.

A Committee of the American Institute has been formed for the purpose of further co-operation with the Canadian Institute and partly with this end in view it is proposed to hold a joint meeting of the Institutes at Nelson during the Convention there on June 19th—21st. It is to be hoped that many of the Western Branch members will be present.

It has been suggested that it would be possible to hold a general meeting of the Institute in the West once a year in addition to the Annual Meeting held in Montreal, which would enable western members to attend some of the general meetings of the Institute. This would appear to be feasible and of advantage to the Institute and its members. Would it be possible to hold such a meeting in Vancouver or Victoria, say about November 1st? This might be held jointly with Western Sections of the A.I.M.M.E. Your meeting might consider this question, and if thought advisable, make a recommendation regarding it to the Council of the Institute.

The Council of the Institute has made recommendations to the Dominion Government with regard to increasing the pay of technical men in Government service. It is well known that while the Government has very able technical men in its employ, notably in the Geological Survey and Department of Mines, the salaries paid are such that men are continually leaving them. No one can over-estimate the importance to the country of capable technical men in these departments or the necessity for their being properly paid. I believe your meeting will be prepared to endorse the recommendations of the Council.

A tentative scheme for the employment of returned soldiers in prospecting has been recommended to the Dominion Government. Details have not been worked out and probably had better be worked out by returned men themselves, amongst whom are many of our best prospectors, mineral and mining engineers. If such a scheme can be successfully organized and carried out, it might be of immense value to the province and to the Dominion at large.

In conclusion, you have my best wishes for a successful and interesting meeting and for a successful year for the Branch.

#### Vancouver International Mining Convention at Nelson.

The Vancouver Board of Trade will be represented by Messrs. Nichol Thompson, A. Erskine Smigh and Wm. Godfrey. The Vancouver Chamber of Mines by Messrs. A. M. Whiteside, Dr. Edwin T. Hodge, R. S. Lennie, Robt. C. Sweatt.

# The Prospector and the Mineral Industry

By J. C. GWILLIM.

During the last year or so there has been some concern for the encouragement of prospecting in Canada. There has been a fear that unless prospecting is stimulated the mineral industry will decline. No new camps of great merit have been found in British Columbia for the last ten years. Some large producers, here and there, have become great mines, e.g., the Sullivan lead-silver-zinc mine of East Kootenay; the Britannia Copper Mine of Howe Sound; the Anyox Hidden Creek mines of Alice Arm; and the Surf Inlet gold mine of the same coast.

Within the last thirty years, 1888 to 1918, there have been several great impulses to prospecting, with the making of highly productive mining camps. In the order of their discovery, these are: The Sudbury copper-nickel deposits; The West Kootenay silver-lead, and gold-copper deposits; the Yukon placers, and the Cobalt and Porcupine silver and gold deposits. At the present time the districts of most promise are the pre-Cambrian areas of Northern Quebec, Northern Ontario, Northern Manitoba and Saskatchewan; all more or less wooded, rocky tracts of country intersected by water routes; and the flanks of the great coast granite batholith northwestwards from Vancouver.

There are still a good many prospectors, or adventurers of other kinds, who may chance upon a new mining camp. Prospectors breed fast after a chance discovery, such as the Murray mine outcrop of Sudbury; the Silver King of West Kootenay; the La Rose or McKinley-Darragh of Cobalt; and the Britannia of the British Columbia Coast. Not one of these camp makers was first found by a prospector of the vocational type. When, by chance, or by design, another camp maker is found, as it surely will be, there will be no lack of quickly appearing prospectors to search the adjacent and other districts. Some one may object to this variety of prospector, but a little enquiry will show that their winnings have been considerable, for prospector "aces" are uncommon; the life-long prospector may find less in any given time than one of these.

The mineral production of Canada, according to statistics, has increased from \$12,518,894 in 1888 to \$210,204,970 in 1918. Thirty years ago the metallic minerals produced were less than one-third of the total. Ten years ago metallic and non-metallic production was nearly equal, and in 1915 the metallics overtook the non-metallics, and structural materials. This was probably due to war demands; otherwise a great agricultural and industrial country is likely to produce a greater value of non-metallic minerals. During this period of thirty years the per capita production increased from \$2.67 to about \$25.00.

Prior to 1888, prospecting as a vocation was little followed in Canada, if we except the placer miners of British Columbia and a few casuals of Nova Scotia, Quebec and Ontario, who were searching for gold, copper, asbestos, rock phosphate, and nickel ores, in the back lots of these provinces. There was, however, a movement of prospectors along the north shore of the Great Lakes towards the silver area of Thunder Bay, and the gold occurrences of the Lake of the Woods.

Yet Canada, in its earliest history, was looked upon as a mineral country by those adventurers who examined the coasts of Newfoundland, Labrador, the islands of Hudson's Bay, and the north shores of the Great Lakes. I do not know the early history of gold discoveries in Nova Scotia or of copper and rock phosphate in Quebec; but the asbestos of Thetford, and the copper-nickel of Sudbury, were not discoveries made by vocational prospectors, and it is probable that the prospector of those days was a lumberman, a fisherman, trapper, hunter or backwoods settler, who did not wander far from his base in a direct search for minerals.

The more modern type of prospector appeared in Canada about 1885 to 1890, at a time when gold was coming from the Nova Scotia Anticlines, and the British Columbia placers of Cariboo, Omenica and Cassiar, in nearly equal quantities; silver from Port Arthur in Ontario, and from an unknown source in Quebec. Also in nearly equal quantities—195,580 ounces from Ontario and 149,388 ounces from Quebec. Copper then came almost entirely from Quebec, for Sudbury was only beginning its great production of copper-nickel. Lead, as now, came from British Columbia, but not from the Kootenay mines, for they were yet undiscovered. Pyrites had made a good start—63,479 tons in 1888. Rock phosphate was going strong in Quebec and Eastern Ontario. Manganese, in Nova Scotia and New Brunswick, was at its peak production, 1,801 tons. Zinc, cobalt and nickel, in 1888, were not produced in commercial quantities.

At this time Thetford asbestos and Sudbury nickel-copper fields were, so to speak, on the bottle—not known to be rare young giants—Rossland, Slocan, Boundary Creek, Klondike, Cobalt and Porcupine, were as Nature made them. These were not back lots, they were parts of the virgin wilderness; they were discovered more than less by luck and chance, but they were prospected by men who made a business of prospecting.

In 1889 the western mountains and coast contained many adventurous men, such as had followed the construction of the Great Northern and Canadian Pacific railways. There were also many who had followed mining or prospecting in the Western States—Montana, Colorado and Idaho.

When the Hall brothers, of Colville, on the Columbia, found the "Silver King" outcrop on Toad Mountain, near Nelson, while searching for lost horses, they started a prospecting movement which overran Southern British Columbia for the next ten years.

A year later, in 1890, Bourgeois and Morin staked on Rossland Red Mountain, and the following year Eli Carpenter came back to Ainsworth with high grade silver-lead ore from the Slocan. These, with discoveries of Boundary Creek, were all the beginnings of famous camps, which attracted "Mining Men" from many other fields, but chiefly from the Western Mining States; men who followed a mining boom as others follow a real estate boom. The country was alive with prospectors, promoters, mining experts and parasites, of a Western mining boom; mostly Western Americans at first. Sometimes a prospector staked and developed a "grass roots" property,

taking pay ore from the outcrop down; but the usual sequence of events was to option or bond the discovery to some mining man, who found the people who were ready to prove the property during a term of development. If things looked well, payments were made from time to time. Thus the prospector and the purchaser shared in the results of work done. This left the prospector free to follow his own line, or spend his payments, as he pleased, but kept him in the district watching developments.

The Western American method of bonding claims at a moderate figure, with payments as development warranted, has less risk than the cash payment for prospects. Often very large sums, made in Northern Ontario during the early days of Cobalt, Gowganda and Porcupine. Some of these won out in those districts, but they were great risks and a menace to good mining. Only good fortune was invoked when a large cash payment was made on pure prospects.

The prospector of the golden age in Southern British Columbia, was seldom a paid man. He went alone, or shared with partners, or was grub-staked for half share by someone who was ready to find him while in the hills and pay for his assays and other expenses on his return. The mountains were all crown lands; or if not he had the right of way, for British Columbia, mindful of its early gold hunting days, gives the prospector a pretty clear field. He can stake his ground in any direction and almost any place; but cannot overlap a prior location. Three stakes in a more or less straight line orient and define his boundaries.

The prospector of this period, 1889 to 1899, rarely made much but a living; some made fair "stakes," which were usually soon spent in the vicinity, not carried away and salted down. The great majority sold or bonded for small sums, worked in the mines when they were hard up, or got a grub-stake to carry on. The complexion of mining at this time was American. There were men from Butte, Spokane, Seattle, and the Coeur d'Alene of Idaho, with a scattering of Canadians from Alberta, where times were dull, and from the many drifters of British Columbia, who had wandered westwards and could go no further for the sea—an unstable element ready to follow new developments.

By 1898, much of Southern British Columbia had been run over by prospectors. No new camps were being found. The day of quick transfers was over. Production increased. Many went into the mines or clung to their pet claims; the rest were very ready for the great rush to Klondike in 1898 and 1899.

There was a ditty at this time in the minds of those who stayed behind to this effect:

"Kootenay was Kootenay when Klondike was a pup.  
And Kootenay will be Kootenay still when Klondike's  
busted up."

The 30,000 men who went to Klondike in 1898 were a very mixed lot. Nothing much might be expected of most of them in the way of new discoveries; but there were many good prospectors also, some of whom traversed the country en route by way of the Edmonton, Ashcroft and Telegraph or Taku-Teslin trails. From all the host which traversed that north country and slowly filtered out again, much might have been expected, but the results were singularly small: a few small placer areas, and some lode mines at Windy Arm, Atlin, Wheaton River, White Horse, and White River. None of these, except the White

Horse copper deposits, show much activity at the present time.

After a subsidence of British Columbia and Yukon booms, which had helped to bring the annual production up to \$60,000,000, prospecting fell away. It was a period of prosperity and few men were adrift. Then, by another of those "Adventitious" discoveries in 1903, prospecting broke out afresh in a most unexpected place and Cobalt came to fame. All the rock cuts of British Columbia railways, as far as I know, never disclosed a valuable ore-body, or new camp, like the Murray mine outcrop west of Sudbury, or the La Rose of Cobalt. The Monarch Mine at Field and the Lanark, each of Revelstoke, may have been found during construction of the C. P. Ry.; but in other cases the railway followed the prospector, did not precede him.

Cobalt developed a different type of prospector. It is a country of low relief, woods, rocks, bogs, and water ways. To the Western man it had little romance; he was used to long views, and visible outcrops or float from them. The narrow streaks of ore; the covered surface; and the trenching for a discovery in the fly-plagued woods of Northern Ontario did not much attract him. Still, the reward in Cobalt camp, to the prospector, was unusual. One has to search for the men who made a stake and kept it in most camps; but Cobalt made a competency for many of its original prospectors, and their associates.

The Cobalt discoveries caused another long period of prospecting. There spread out into Northern Ontario and Quebec a host of adventurers, who found the lakes, rivers, woods and rocks as attractive and as hopeful as their Western brethren find the mountain. The canoe and tump-line became to them what the pack-horse and diamond-hitch is to the Western variety, and with these they have penetrated to many far away places. The names and stakes of some of them may be found along the edge of Labrador, 400 miles north of Quebec, and some are still searching pre-Cambrian areas, from Quebec to Churchill river, across the Northern portions of four provinces.

Porcupine gold camp is the latest of the great discoveries. Gold mining in Ontario had previously been disappointing. It needed courage to pay large cash sums for gold prospects; but it was done, and followed up by sufficient development, which has often proved the making of a mine. Otherwise Porcupine might have shared the fate of the earlier gold mining camps of Ontario. Since the discovery of Porcupine, there have been many new calls to the prospector, none of which, excepting, perhaps the "Pas" of Northern Saskatchewan, is a history maker. There have been some good ore-bodies found or developed in places far apart, without creating a prospecting boom.

The Portland Canal rush filled that country with prospectors, but did not make good at that time. Now it looks as if there might be a return to that and adjacent districts, caused by good results on Salmon river, Alice Arm, and the proved mineralization of rocks, associated with the coast range granite.

Considering, then, the record of new camps within the last thirty years, and the large areas yet potential, for such, it seems that other camps will appear, and the prospector will not die out, for there are always masterless men, who prefer to follow luck, chance, and the wilderness to the restraint of other occupations.

## Haileybury Mining School

Mr. Cody, Minister of Education, at Formal Opening.

At the formal opening of the Haileybury Mining School, held recently, Hon. H. J. Cody, Minister of Education for Ontario, made the definite offer to do all in his power to secure the necessary financial aid to make the School one of the most up-to-date and efficient institutions of its kind in Canada. With regard to the various courses in connection with mining, the Minister stated that in so far as the returned soldiers are concerned, if the School Board and all concerned with the welfare of the School will unite and successfully impress upon the Federal Government the importance of the work and thus induce the Dominion Government to pay the cost of personal maintenance, amounting to \$70 or \$80 per man, he made the definite offer that the balance of the expense, which would include the upkeep of the school and equipment, and the payment of salaries to the teaching staff, would be taken care of by the Department of Education of Ontario.

The chairman, George T. Smith, paid fitting tribute to the invaluable work of the advisory board, consisting of leading mining men of the Cobalt camp, namely, F. D. Reid, M. F. Fairlie and J. Deny, the first named being chairman. He also took occasion to refer to the unremitting efforts of the principal, W. A. Wilson, without whose efforts the school could not have achieved its present measure of success.

The first speaker was Capt. Thos. McGladery, who, as M.P.P. for this district, welcomed the Minister of Education to Tesimkaming. Capt. McGladery was followed by N. J. MacAulay, Mayor of Haileybury, who drew attention to the fact that the present was not only the first visit of Hon. H. J. Cody to this part of Northern Ontario, but it was the first formal visit of any Minister of Education.

### Hon. H. J. Cody's Address.

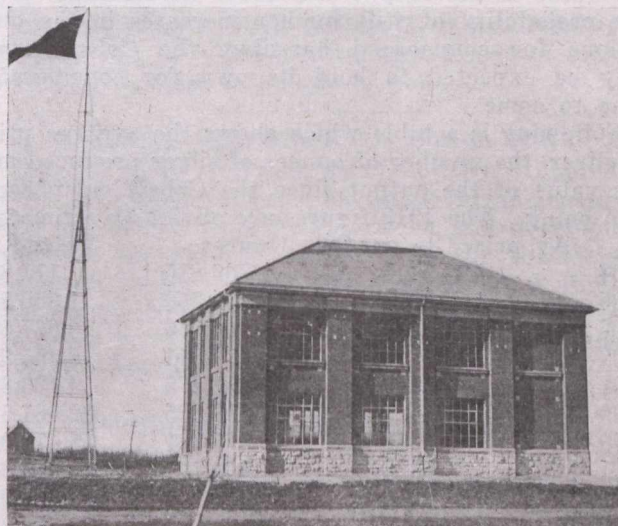
In opening his address, the Minister declared the Haileybury Mining School "well and truly opened," and stated that in so far as the school had been in operation some little time before this, his official visit, he was of opinion that the present was more in the nature of a benediction rather than an initiation.

The speaker referred to the fact that from this country had gone forward a body of men to fight a common enemy, and "whose suffering and service had purchased afresh this great heritage." He told of his previous impression of Northern Ontario being a wedge of rock extending away into the sub-Arctic, valuable alone for its great mineral wealth. The present visit, he said, had been a revelation, and that as he looked out over the vast sweep of territory, over the beauty of two million acres of agricultural lands, at the beauty and the fertility on surface and visioned the untold wealth below, the sight and the thought spelled out the magnitude of the North.

Optimism, said the Minister, appeared to be characteristic of every man in Northern Ontario. The discovery of the great silver mines of Cobalt a few years ago had marked the re-birth of Ontario, and, followed by the discovery of great gold mines further north and the gradual development of the wide sweep of agricultural lands had marked the north as the Greater Ontario. He referred briefly to a visit to the prairie provinces of the Canadian West when

in their early stages of development, and in illustrating the spirit of optimism which held sway there at that time, he mentioned a visitor from the East having said that "Every knoll was a mountain, every rill a river, and every man a liar."

Hon. Dr. Cody touched briefly upon the present wave of industrial unrest, the necessity for patience and co-operation, and stated that it would be tragic for the wheels of Canadian commerce to be clogged at this time, by what in some instances looked like some malign influence at work. He told of the work of the Canadians in Europe, of how at the eleventh hour of the eleventh day of the eleventh month of 1918 the Canadian Corp had struck the final blow in the war in the capture of historic Mons, and that it would be a great pity to lessen the advantages of victory by lack of harmony.



*Ore-testing Laboratory, Haileybury Mining School.*

### Haileybury's Fine Educational Record.

The Minister emphasized the supreme importance of education in a nation, of how the Haileybury Mining School was providing means whereby men could learn to specialize in a manner that would directly fit them for their life work, and that in this respect the North had led the way. The Haileybury High School started nine years ago, with a handful of pupils in a rented building. Six years ago the present school was started. And now, has come the addition of a mining department.

Comparing a secondary school of this nature with the Technical Colleges in other parts of the country, Hon. Dr. Cody declared: "I venture to think the kind of training here would fit the men for the particular work in much shorter time than in any other way."

J. A. McRAE.

### SILVER OUTPUT—NORTHERN ONTARIO.

#### Estimate of 1919 Production.

The output of silver from the mines of Northern Ontario for the first half of 1919 has approximated 7,000,000 ounces. This would appear to indicate a total output of about 14,000,000 ounces for the whole year. So far during the year the price of silver has averaged about \$1.03 per ounce. Since the removal of the fixed maximum price, however, a steady increase in quotations has taken place, and by the end of the year it would not be a surprise to metal authorities were the average for the year to amount to

about \$1.10 per ounce. Thus, with these figures as a basis of calculation, it would appear reasonable to expect the value of the 1919 production to amount to about \$15,400,000. Compared with 1918 it would indicate a decline of about \$2,000,000, but compared with 1916 would show an increase of over \$2,000,000, and compared with 1911 would show an increase of upwards of \$3,500,000.

During the fifteen years beginning with 1904 and ending with 1918, the silver output amounted to \$169,241,387, or an annual average of \$11,282,759. During the fifteen year period under review a total of 292,056,976 ounces of silver was produced, or an average of about 19,470,564 ounces annually. Thus, although in point of ounces produced, the indicated 1919 output is considerably below the average, yet the increased price in quotations for the white metal makes the value of the output well above the average. With the probability of still further increases in the quotations for commercial bar-silver the Cobalt camp may be expected to hold its own for considerable time to come.

Following is a table which shows the average price of silver, the number of ounces of silver produced and the value of the output since the Cobalt camp came into being. The 1919 figures are obviously estimates:

	Av. price Cts. per Oz.	Ounces.	Value \$.
1904 .. .. .	57.2	206,875	111,887
1905 .. .. .	60.4	2,451,356	1,360,508
1906 .. .. .	66.8	5,401,766	3,667,551
1907 .. .. .	67.5	10,023,311	6,155,391
1908 .. .. .	52.9	19,437,875	9,133,378
1909 .. .. .	51.5	25,897,825	12,461,576
1910 .. .. .	53.5	30,645,181	15,478,047
1911 .. .. .	53.3	31,507,791	15,953,847
1912 .. .. .	60.8	30,243,859	17,408,935
1913 .. .. .	57.8	29,681,975	16,553,981
1914 .. .. .	54.8	25,162,841	12,765,461
1915 .. .. .	49.69	24,746,534	12,135,816
1916 .. .. .	65.661	19,915,090	12,643,175
1917 .. .. .	81.417	19,401,893	16,131,013
1918 .. .. .	96.772	17,332,804	17,290,826
1919 (1st half)	103	7,000,000	7,210,000
Totals .. .. .		299,056,976	176,451,387

J. A. McRAE.

## LABOR AND WAGES — KIRKLAND LAKE AND COBALT.

(From Our Northern Ontario Correspondent.)

After having learned that the members of the Miners' Union at Kirkland Lake called a strike without the sanction of the district executive, and after learning that one of the district officers had gone to Kirkland Lake for the purpose of endeavoring to bring about some sort of a settlement and induce the men to return to work, the journal correspondent took occasion to look into the situation carefully.

It is learned that the Union has addressed an appeal to the mine managers of Kirkland Lake, asking for another meeting on Thursday night, June 19. To this the mine managers have agreed. It is a peculiar fact, however, that even should the mine workers offer to return to work at the wages and on the conditions which formerly obtained, the mining companies are not prepared to take them back. The mine workers, they declare, were given every possible consideration, and were being paid wages that threatened the very existence of the gold mines of the camp, yet despite

every effort to convince the men of this fact they proved untrustworthy to the companies for which they worked and demand that all men should cease work in those mines. Already a good deal of loss has resulted, and the mines having been forced to go to the expense of closing down, appear to have decided to remain closed for the summer and are confident that in the meantime the cost of producing gold will decline sufficiently to pay for the enforced idleness.

### Mines Closing Down.

The Lake Shore, the leading producing gold mine in the Kirkland Lake camp during the past year, and paying interim dividends of about 2 1/8 p.c. quarterly has not only closed down tight, but taken the pumps out and is letting the mine flood with water. Already the 400-ft. or lower level of the mine is said to be filled, the water having risen to within 375 feet of surface. The Tough-Oakes, the Wright-Hargreaves, Teck-Hughes, Kirkland Lake, Elliot-Kirkland, etc., have also all closed down with the intention of not opening until men may be employed at a rate that will leave a reasonable margin of profit to make it worth while to conduct mining operations.

In spite of this situation the union has asked for another conference and the mine managers have shown their usual courtesy in agreeing to meet the men in open discussion. However, as stated above, the mine managers consider the drastic action of the men as a breach of trust, and are not expected to again offer the same workers even the opportunity of re-employment, as it would again place the already heavily burdened gold mines at the mercy of the body which even now constitute the strikers.

### Kirkland Lake Strikers Agitating Cobalt.

In the Cobalt camp quite a number of the most radical of the Kirkland Lake strikers have put in their appearance and appear to be endeavoring to enlist the sympathy and to incite the mine workers of Cobalt to strike in support of the action taken at Kirkland Lake. Meantime, as stated in Monday's "Globe," the Union here has agreed to not take any drastic action until Senator Robertson returns to Ottawa from Winnipeg.

### Cobalt Managers Prepared to Close Mines.

The managers of the Cobalt mines have already made arrangements to close down should the demands of the union be pressed to the point of calling a strike. It is contended that wages are higher and conditions are equal to any other metal mining camp in the world. It is pointed out that in the Western United States wages have recently been reduced about \$1 per shift. Also it is learned on good authority that in the Sudbury district a large number of miners are now actually out of work and seeking employment for only two or three days a week where or whenever possible. Were the Cobalt mines to close it is not improbable that curtailment would last until such time as new forces became obtainable, and that it might be found necessary to discontinue the payment of a bonus on the high price of silver at least until such time as the mines could recoup the loss incurred during the period of enforced idleness.

Under such conditions, therefore, and taking into consideration the fact that the suspension of precious-metal mining for a time would not cause more than local hardship, being in this respect different to coal mining, it would appear, after a careful review of the situation, that the Union will have everything to lose should they decide to strike.



## Special Correspondence

### NORTHERN ONTARIO.

#### Trethewey-Cobalt, Castle Property.

Shareholders of the Traethewey Cobalt Mining Company are enthusiastic over results being encountered on the Castle property in the Gowganda district. The shaft has reached a depth of 380 feet at the time of writing, and will be carried to the 400-ft. level where lateral work will be done for the purpose of opening up the vein system found at the 300-ft. level. The Castle property lies adjacent to the Miller Lake-O'Brien mine, and the geological conditions are very similar. This indicates excellent prospects for the Castle.

More courage is required to conduct mining operations in the Gowganda field than was the case in the early days of Cobalt, Porcupine and Kirkland Lake for the reason that even at the leading mine several year's work was done before encountering silver deposits of material of commercial value. The knowledge gathered as a result of the development of the Miller Lake-O'Brien mine, which is producing upwards of one million dollars a year, has made the exploration and the development of other neighboring properties less problematical, in that the geological structure has been proven to be less favorable for the deposition of silver in commercial quantities.

The terms under which the option is held gives the Trethewey stock in the Castle company in payment for money spent in developing the latter. This holds gold only up to a point where the Trethewey shall acquire fifty-one per cent. of the Castle stock. As to whether or not the remaining forty-nine per cent. is to be left in private hands or is held under option at some stated cash price has not been learned at the time of writing.

#### Beaver Lake—South Lorrain.

Properties situated in the South Lorrain silver area continue to attract attention. It is learned that British interests are now negotiating for the Beaver Lake property, situated adjacent to the old Keeley mine.

The Beaver Lake is owned by Messrs. J. M. Wood, Mr. Loney, Robert Jowsey, and Chas. Keeley, all of Toronto. Several years ago the property was explored in an aggressive way, a good deal of encouragement being met with. A considerable amount of low grade ore was opened up, and a number of veins uncovered in which a large amount of cobalt and encouraging silver values were found to occur.

#### New Uses for Cobalt Mineral.

It is understood that big interests are in the field, quietly endeavoring to secure mining properties in this district on which Cobalt minerals occurs in commercial quantities. It has been learned that "Stellite" (a high grade steel in the manufacture of which cobalt plays an important part is to be used extensively in the manufacture of automobiles in Great Britain. Not only has "Stellite" proved highly efficient in the manufacture of tool steel and in automobile construction, but it has been found to last indefinitely without tarnishing, and for this reason will probably be extensively used for purposes of decoration, replacing brass and nickel.

Much speculation is rife among certain of the mining men of the Cobalt district where cobalt mineral is found to occur in greater quantities than in any other part of the world. A few years ago its use appeared to be confined almost entirely to the china manufacturing industry in which it was used for coloring purposes. Should the use of the mineral really become extensive, added value will perhaps accrue to not a few of the silver mines of Cobalt, where, during the course of mining silver, a considerable amount of cobalt is mined. Also, a large number of outlying properties are known to have substantial deposits of cobalt.

#### Gold Occurrence Near Swastika.

A party of Dominion government geologists are engaged in field work in the townships of Eby and Otto, in the vicinity of Swastika, on the west side of the T. & N. O. Ry.

Recent prospect work in this area has resulted in the discovery of what has the appearance of being a possible important discovery of gold.

#### Catherine Gold Mines Co., Boston Creek.

The Catherine Gold Mines Company, Limited, a newly organized concern, has made arrangements to carry on comprehensive exploration and development campaign on property situated in the township of Catherine in the Boston Creek district. A force of men has already been engaged, the work of constructing camp buildings have been completed and surface trenching started.

#### Goldfields Consolidated—Larder Lake.

Diamond drilling is to be done on the Kerr-Addison property of the Goldfields Consolidated Company, in the Larder Lake area. According to official information the surface showings on the property are such as would offer every inducement to carry out an extensive exploration program with very satisfactory prospects of proving a large body of commercial ore.

A good deal of criticism is heard among mining men relative to the apparent failure of the Goldfields to venture an estimate as to how much commercial ore has been proven on their property, showing the number of tons and the average grade. In view of the fact that about three quarters of a million dollars has been spent on the property, it is thought a detailed report made out along the generally recognized lines would throw much light on the outlook. It has been pointed out that the Goldfields appears to be desirous of selling shares for the purpose of financing development work and that if average values are such as would indicate a big commercial proposition, then the quicker such a fact is advertised the sooner would the requisite finances be made available.

#### Clifton-Porcupine.

According to reports from the North the Clifton-Porcupine, owners of the Preston claim which adjoins the Dome Mines, is making good headway and meeting with excellent results.

In the early days of the camp a considerable quantity of commercial ore was produced from the property, but financial backing appeared to be more or less limited and finally resulted in curtailment of work. The Clifton-Porcupine Company is understood to be well financed and is prepared to develop the property along important lines.

### Leroy Lake Syndicate—Gowganda.

Surface work is well under way on the former Gowganda property of the Leroy Lake Syndicate, now under the control of eastern interests, with whom are associated Messrs. L. C. Campbell, and W. Fairburn, leaseholders of the Foster mine at Cobalt.

James Robertson, a former M.P. in the Province of New Brunswick, is understood to also be interested in the financing of the operation, having paid a visit to the property this week.

### Dickson Creek—British Capital Available.

Arrangements are being made to resume underground operations at the Dickson Creek Mine, situated on the shore of Lake Temiskaming about half way between Haileybury and New Liskard. It is understood the head office in England has been permitted to release the finances required to operate the property along more or less extensive lines. During the course of the war, particularly in the closing stages, the British authorities took steps to discourage the sending of capital out of the country, with the result that mining properties in this country financed by British money were obliged to curtail operations. The release of finances for the Dickson Creek would appear to indicate that the restrictions have either been modified or relaxed.

### Silver at Sixteen to One?

The utmost optimism prevails among the silver producers on the strength of the belief that a genuine movement is on foot in the United States to organize a league for the purpose of regulating the price of silver, and with a view to perhaps holding quotations at around \$1.29 an ounce. The high grade deposits of silver in Cobalt make possible the realization of large profits at the present price of silver, and the manipulation of its market value to an equivalent of sixteen ounces of silver to one of gold will swell to a very considerable extent the margin of net profit. Whether or not this proposed league will actually come into being and prove as effective as calculated remains to be seen. Very recently it was intimated that an important announcement might be forthcoming early in July.

### Personals—Northern Ontario.

David Fasken, president of the Nipissing Mine Company, has returned to Toronto after having paid a visit to the mine.

Mr. Haines, president of the Penn-Canadian mine is a business visitor in Cobalt this week.

Morgan R. Cartwright, manager of the Adanae mine is in Buffalo, attending the funeral of his father who died in that city this week.

### BRITISH COLUMBIA.

#### THE NEED FOR A NATIONAL RESEARCH INSTITUTE.

Mr. Nichol Thompson, Chairman of the Mining Bureau of Vancouver, in supporting a resolution of the Board of Trade of Hamilton, Ontario, favoring the formation of a National Research Institute for Canada made some interesting references to the possibilities of the complete utilisation of the constituents of coal. Mr. Thompson's remarks were as follows:

I may say that I am heartily in accord with the spirit of the resolution; the enormous debt which we have incurred through the unfortunate war in which our Canadian boys have played such a conspicuous

part, can only be redeemed by everyone in the first place practising the greatest thrift and conservation possible, for we have, as the latter states, in the past been one of the most wasteful of nations, and in the second place, there should be greater development of our natural industrial resources, and in order to secure this development and be able to meet other nations on anything like an equal footing, it will be absolutely necessary for us to devise ways and means through the work of men specially qualified to do research work in all the branches of industrial, commercial, agricultural and above all, human resources.

Canada, in establishing a National Research Institute, is only following the example set by other nations, who have taken to heart the lessons taught by the results of the late war. Great Britain, France, the United States and even Japan have set aside large appropriations of money for the promotion of chemical and scientific research.

Speaking on science and industry, Dr. Arthur Shuster, lecturing at the Regent Street Polytechnic in London a short time ago on pure science in relation to national life, said that the duty to work, the right to live, and the leisure to think were the three prime necessities of our existence. The prosecution of pure science was the search of knowledge for its own sake and the greater the industrial need, the greater must be the need for scientific research, for science was the organizer of common-sense. We look to science for a new outlook, which would have a primary influence on national life through its effect on the human mind.

Speaking at the annual meeting of the Silk Association of Great Britain and Ireland, at the Cannon Street Hotel a short time ago, Sir Henry Birchenough said that as a member of one of the committees created to deal with the trade problems of the war, he had been more than ever impressed with the necessity of better organization of the trade interests of the nation. Individual enterprise had its advantages no doubt in the past, but it had become too much of a fetish among us and when the rest of the nations were utilizing cartels and combines and other organized efforts to regulate and advance the interests of their industries, it was time that we readjusted our methods to meet the changed situation, and instead of trusting to the old system of individual competition, we should co-ordinate individual effort by combination and organization.

The question of tariffs and government assistance were not new but they had ceased to be academic and were now issues of practical urgency.

Nothing had done more to bring this fact home to us than the discovery, which appeared to have amazed both the Government and the commercial community, that certain key industries, which many of our trades depended upon were practically in the control of the enemy.

Two lessons we had learned from the war. The first was that we must make ourselves absolutely independent of all foreign sources of supply of things upon which our national security depended, and the second was that we must be equally independent of the foreigner for the supply of things upon which the security of our industries depended.

At a dinner given to Premier Wm. Hughes of Australia in London, presided over by the Marquis of Londonderry, the object of which was to enable the Prime Minister of Australia to meet representatives of capital and labor in England, Mr. Hughes

said there had been general assent to the necessity for organization, but much confusion in the minds of many persons here and elsewhere as to what precisely is meant by "Organization." "The organization of which I speak," said Mr. Hughes, "is not a formula, nor a doctrine, nor an electioneering cry, but just the adoption of plain business-like methods to the circumstances of Britain, the Empire, and of every industry in it. It is national in scope, non-party in aspect, is not for the benefit of one class, but for all classes, for labor, for capital, for the nation, for the Empire. It is not a weapon from the armory of the faddist, to be used for tilting against windmills, but a flexible, convenient and effective instrument by which the welfare of the nation and that of every individual in it can be materially improved. What it does propose, is to utilize and develop the resources of the Empire, ensuring an adequate supply of raw materials for our industries, and to equip those industries, with the most up-to-date methods, so that regular and profitable employment for all available capital and labor will be assured, and wealth production per unit of labor and capital so greatly increased that we shall be able at once to carry the huge burdens imposed by this war, find employment for all our people, at good wages and decent conditions of labor, and enable Britain and the Empire to hold their own on their merits in the home and foreign market."

These are the sentiments of some of the foremost men of the Empire, and are germane to the subject of the Resolution which the Hamilton Board of Trade wishes this Board to support.

If time would permit I could give you many instances of prodigal waste in connection with many of our industries, but take one of our principal natural resources, that of coal. We import millions of gallons of crude oil every year at the expense of our coal industry, whereas if we were to adopt proper scientific methods, we could not only supply to a very great extent our own oil requirements, but also a valuable fertilizer, which we also import, and in addition would provide a smokeless fuel at a cost much below the present price of coal. Perhaps it is not generally known that our coals contain approximately 40 gallons of oil to the ton. They are higher in nitrogen than any other coal I know of and consequently high in the product of sulphate ammonia, one of the principal fertilizers.

Speaking of the shortage of petrol during the war, Mr. F. D. Marshall, president of the Institute of Gas Engineers, London, gave a concrete instance of the average results of two extreme types of coal which had been subjected to low temperature carbonization on a commercial scale. One, a poor coal classed as colliery refuse, worth about fifty cents per ton, the second a high grade Scotch canel coal rich in oils worth five dollars per ton.

Based on carbonizing these coals at the rate of only 200 tons per day or 72,000 tons per year, they obtained on the average of the two, the following products:

	Gallons.
Motor spirit (petrol) . . . . .	260,000
Light oils . . . . .	588,000
Middle oils . . . . .	1,126,000
	Tons.
Bitumen . . . . .	8,000
Sulphate ammonia . . . . .	526

and in addition to this 44,000 tons of smokeless fuel or coke, practically gratis, as the yield of spirit oils

and ammonia pays for the cost of the raw coal plus the cost of carbonizing, etc. The value of the spirits, oils and sulphate alone at the prevailing prices would be over £40,000 or approximately \$200,000, but besides this the coke, if further gasified, will yield in addition to the quantity of 526 tons obtained by the preliminary carbonization of the coal, a further quantity 1,047 tons of sulphate of ammonia, making a total yield from the original coal of 1,573 tons of sulphate, and on this second process each ton of coke will yield on the average 121,000 feet of power gas, and every 70 cubic feet of this gas when consumed in a good gas engine, will develop what is termed one brake horse-power, so that from 44,000 tons of coke, which we obtain gratis, we get 75,000,000 brake horse-power on the aggregate for one year, which would equal approximately 7,000 brake horse-power per day free of cost. So you see if we were to deal with our coal rationally we could take from it the valuable volatile matter it contains in the form of spirits, oils and tar acids, and turn the resultant pure carbon or coke into power, which is the only sane way of dealing with this national standard asset, instead of allowing it to escape in huge volumes of black smoke poisoning the atmosphere, destroying vegetation and seriously affecting the health of the people.

The same is practically true of our smelters. We import sulphur from Japan for the manufacture of sulphuric acid for our powder works and also for use in our pulp mills, and thousands of tons of sulphur is belched into the atmosphere every year from our own copper smelters. Sulphur is the base of approximately all the alkalies such as washing soda bleaching powder, etc., which we ought not only to make for our own requirements, but have an ample surplus for export to the Orient, a market supplied from Europe and the United States.

These are some of the evils which this National Research Institute will assist to remedy and I hope this Board will strongly support its establishment by the Government of Canada.

**INDUSTRIAL RE-TRAINING IN ONTARIO.**

"Pensions are all very well but they will never stop the brooding and the bitterness of those who gave up their best energy forever, in the prime of their youth—you can't cure that with money; occupation and sense of usefulness will alone do it. To assure everyone of the chance of that, is the very least we can do for the men who have done so much for us."

John Galsworthy.

The fulfilling of this duty in Ontario is in the hands of the Department of Soldiers' Civil Re-Establishment through the Vocational Branch.

The work of this Branch begins in the Hospitals where the patients in the earlier stages of convalescence, are taught basket-weaving, wood carving, etc., and in the more advanced stages, in the Curative Workshops where carpentry, shoe-repairing and fifteen or more other subjects are taught. In addition to providing mental occupation these classes also tend to direct the man's mind towards earning his own living, when he is discharged from the hospital.

The Bedside and Ward Occupation are taught by Ward Aides trained for the Dominion by the University of Toronto in conjunction with the Branch and number over 250 to date.

On discharge from Hospital or Discharge Depot, if the Vocational Officer in the Hospital or Depot thinks

the man is eligible for retraining under Government Pay and Allowances, he is advised to report to the District Vocational Officer, Keen's Bldg., Toronto, or at any of the District Sub-Offices at Hamilton, Brantford, Kingston, Ottawa, Guelph St. Catharines or London, or at one of the Sub-Offices at Windsor or Stratford. Any disability incurred by service which renders it impossible for him to continue his pre-war occupation, constitutes eligibility for re-training.

At the above offices the man is interviewed by men who have been chosen on account of their understanding of human nature and of the soldier, and for their wide experience in business and industrial fields. From the Preliminary Interviewers, particulars as to the last Medical Board, the man's dependents, his education and industrial experience, are noted and placed with the file recording his progress in Vocational Classes in Hospital, etc.

He next appears before a board composed of two Vocational Officers and a Vocational Medical Adviser who endeavor to select a means of livelihood in which the applicant can compete with the normal worker.

In deciding a suitable course, the Board must give consideration to the following factors:—

What particular trend did the man's own wishes take in Hospital?

What is the best course considering the man's disability, prospects in suggested trade, and pre-war occupation?

What work can he be placed in and derive maximum value from his former civil experience?

Is there anything akin to his old job, when 100% efficiency can result from retraining?

Will it aggravate his disability?

For doubtful cases or those rejected by the Interviewers a hearing is given by the Advisory Board or Court of Appeal.

Courses of re-training have been arranged for in the University of Toronto, Vocational Classes and in Private Institutions, and the subjects to date total over 55.

In addition there are over 1,100 present being trained directly in Industries in Ontario. The "Industrial Survey" sub-branch locate firms willing to assist in the work, and after the man is placed, visit him weekly or oftener, making reports on the man's progress and conduct at work as well as on the opportunities offered by the Plants themselves. During this course of re-training on Government Pay and Allowances, the man is given any Medical treatment necessary, free of charge.

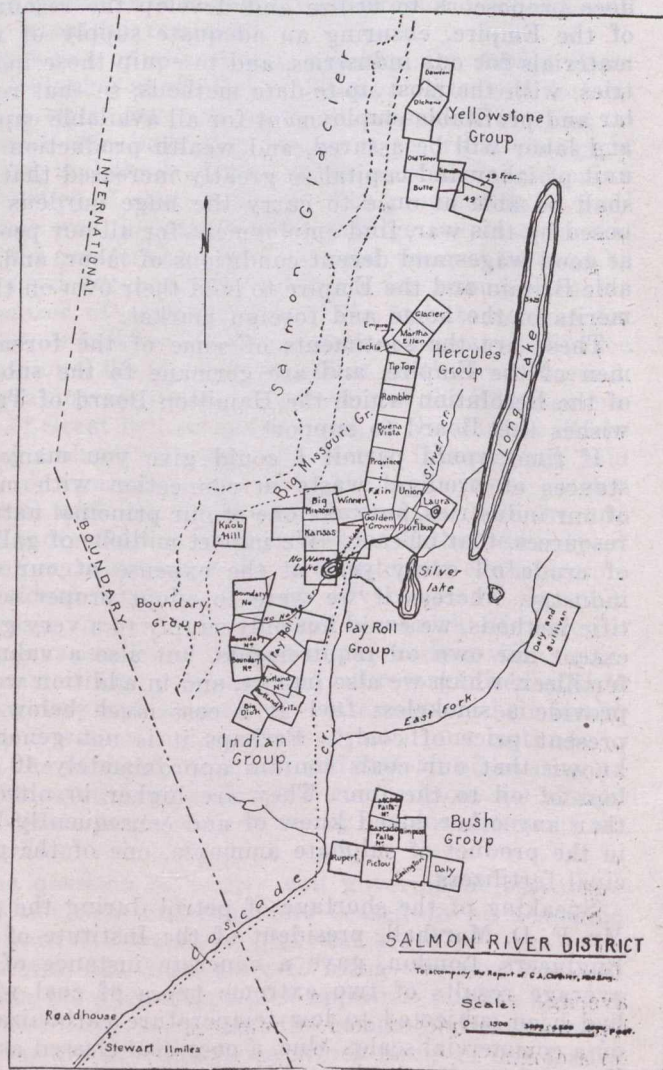
Three weeks before the completion of a course each man's case is referred to the "Information and Service" sub-branch of the Department for the purpose of finding him employment.

The "After-Care" sub-branch visits the home and occasionally the place of employment of the man after graduation from his course of re-training, and makes him feel he still has the Department's support and interest. When the graduate has four month's continuous employment it is deemed that he has "settled down" and visits cease, but not their interest and support, however.

In addition to the above sub-branches there are also the Administrative, Research, Medical, Reference and Literature, Supplies and Equipment, Records, Social Service, Adjustment and Claims, Accountants and Statistics.

SALMON RIVER, B.C.

We reproduce here a map of the Salmon River District, which will serve to illustrate that part of the Portland Canal Section, Northern British Columbia, which is at present attracting so much attention and where much development is expected this season. The sketch, which was prepared by George Clothier, Resident Mining Engineer, does not show several groups, notably that of the Bush Mines, Ltd. What was known as the Bush Property when Mr. Clothier examined the district is now the Premier Mine, shown on the map as the Bush Group. Another of the important properties not shown is the Mineral Hill Group which adjoins the Big Missouri Group on the east.



McKinley-Darragh.

Within the next few days the McKinley-Darragh will commence the exploration of the south-eastern part of its property, adjacent to the Nipissing. A cross-cut was driven into this section of the property some years ago, but the volume of work in other parts of the mine has required full attention in recent years, with the result that the proposed raising and exploration was not completed in the south-east corner.

A part of the area now about to be explored contains conglomerate formation and presents fair prospects of ore development.

## The Oil Concession Correspondence

### The Original Proposal.

July 30, 1917.

To Hon. W. J. Roche,  
Minister of the Interior,

### Territory Applied For.

Sir,—On behalf of "The 'Shell' Transport Company, Limited, of London, England, hereinafter referred to as "The Company," I beg to make application through Lieutenant-Colonel Adam T. Shillington, of Ottawa, for exclusive oil and natural gas rights for the period of the duration of the war and including five years after the declaration of Peace, over that part of the Province of Alberta lying north of the fifty-fifth degree of North latitude, and that part of the north-west territory of Canada bounded as follows:—On the south by the Northern boundary of the said Province of Alberta; on the East by a prolongation of the eastern boundary of said Province till it strikes the sixty-fifth degree of north latitude; on the North along said sixty-fifth degree of latitude west to the Eastern boundary of the Province of British Columbia, thence South along said last mentioned Eastern boundary till it strikes a prolongation of the Northern boundary of the Province of Alberta and thence Eastwardly to the point of beginning, subject to the following conditions to be observed by the petitioner company and by the Government of Canada.

### Concessions Already Granted.

1.—The exclusive rights so mentioned shall not in any way interfere with any rights already granted to any persons, firms or corporations within the boundaries above set out, but shall only apply to territory not yet conceded except in case of leases which may from time to time fall in or be cancelled.

### Operation .

2.—The Company shall, if this concession is granted, begin and in a substantial way at the first open season after the date of such grant, and shall during the duration of the war, honestly and reasonably proceed with the exploration for oil and natural gas, and after the declaration of Peace the company shall measurably increase their efforts along these lines, and shall carry on the work in a measure proportionate to the magnitude of the territory comprised in the concession.

### Rights of Way, Sites, Etc.

3.—The Company would require the free grant of rights of way over ungranted lands for all necessary pipe lines, telegraph and telephone lines, railways and highways and of land for the sites of reservoirs, storehouses and refineries or other factories to be established by them in connection with the exploitation of said oil fields, if any are found in said territory.

### Customs Duties.

4.—The Company should be allowed to import, free of customs duties, any necessary machinery not manufactured in Canada, for the carrying on of the exploration and production of said oil and gas for the refinery of said oil.

### Restrictions.

5.—The Provisions of the Government Regulations "for the disposal of petroleum and natural gas rights," so far as they may reasonably apply to and not be inconsistent with, or repugnant to, the terms of spirit of the agreement to be founded on this application shall apply:—

6.—It is a prime condition that for the duration of this agreement, after the proclamation of Peace, the territory for oil and gas shall bear reasonable proportion to the scope of country assigned, or conceded, though for the previous period these efforts cannot be so large owing to the fact that many exports are not now available on account of the war.

### Bonus.

7.—It is desirable that the present bonus on production of crude oil be continued to the Company so long as Canada imports more oil than it exports, and that the Royalty foreshadowed to be imposed after January 1st, 1930, shall not exceed, so far at least as the Company is concerned three (3) cents per barrel.

### Tax Exemption.

8.—That during the time the Company's operations shall be within unorganized territory and for a period of fifteen years after such territory shall have been organized there shall be upon the company's property, or works, within said territory, no assessment levied by way of tax or impost.

### Rents and Charges.

9.—No rental charges shall be made against the company for any land used by the Company for the purposes herein set out until the same shall be conveyed to the Company by lease nor shall they be chargeable for the wood or water used by them for the said purpose of exploration and production which may be taken from lands now in possession of the Government.

### Hudson Bay Land Grants.

10.—Full regard should be paid to the Company's interests in the selection of such lands as the Government may be under obligation to withhold from the lease for the purposes of their agreements with the Hudson Bay Company.

Your Petitioner would set forth the following as some of the reasons why so large a concession in point of territory should be asked for by the Company.

### Transport Facilities.

1.—The absolute absence of transport facilities in the territory covered and for hundreds of miles outside the territory necessitating the expenditure of an enormous amount of money in providing said transport facilities.

2.—Petroleum being a liquid and transport facilities when established being almost exclusively for carrying solids all the necessary equipment, even outside the territory has to be especially created, and owing to peculiar construction can only be used for carrying oil and are not of service for other products,

so that a large supply of oil must be produced in order to keep said special transport facilities profitably employed.

#### Difficulties of Operation.

3.—Owing to the severity of the winter season in Northern Alberta, and the adjacent territory it is practically impossible to carry on operations particularly as the transport in pipe lines, except at an initial expense which would be prohibitory, which necessitates immediate outlay for reservoirs and storage places for the product during that portion of the year when it is impossible owing to climatic conditions to transport the oil.

4.—These reasons which apply only to the territory covered by this application and not to Southern Alberta, where both transport facilities and climatic conditions are favorable to exploration and production by people of small means form insurmountable objections to the attempt to prospect and exploit on the part of anyone except a corporation of unusual financial strength or the Government itself.

#### Financial Strength of Applicants.

The market value of the stock of "The Shell Transport Company, Ltd.," exceeds one hundred and twenty million dollars, while the various capital stocks of its many subsidiary companies will in the aggregate amount to at least an equal amount, amply proving that the applicant company is financially quite equal to the burden. The business of the company, and its allied companies, is the production of oil, a business which they carry on in every known oil producing region in the whole world, and their experience in Russia, Dutch East Indies, Borneo, Mexico, California and Roumania, amply justifies the statement that no other British oil producing company has either equal wealth or experience in technical knowledge for the task.

The tremendous importance of oil as a fuel and as a power producer cannot be exaggerated, and when a company of known ability and standing is willing to risk its own money in such large measure in a country so difficult of access, even for exploration purposes, and so much more difficult for purposes of production. I would respectfully suggest that no possible criticism would come from any person on account of granting oil and gas rights over a territory that cannot possibly be even examined for a sufficient supply of oil except at so great an initial outlay as to prevent anyone except a Government or a great corporation from undertaking the task. The opening up of the country as proposed, if oil is found in paying quantities, provides that the present concessionaires will have without expenditure on their part transport facilities to enable them to market a product which, but for such facilities would be of no more use to them than so much water. The present scarcity of fuel oil and the many useful by-products of oil teach us the importance of the possession of oil within the Imperial boundaries, and your petitioner humbly requests that the prayer of this application may be granted and agreements and undertakings based upon the same may be entered into between the Honourable, the Minister of the Interior, representing the Government of Canada, on the one part, and your petitioner, representing "The Shell Transport Company, Ltd.," on the other part, for the carrying out of the purposes set out in said application.

Your petitioner further ventures to point out that the large sums to be spent by this company by exploration, and the much larger sums to be spent in production of oil, if paying quantities shall be found as a result of such exploration, will be of inestimable value to Canada in opening up a vast region which is now an uncultivated waste.

Dated at Ottawa, July 31st, 1917.

(Sgd.) R. N. BENJAMIN,

(Sgd.) pp. ADAM T. SHILLINGTON,

his Attorney.

#### Mr. Meighen's Acknowledgment.

12th November, 1917.

Dear Colonel Shillington,—

Since taking over the Department of the Interior I have had brought to my attention the application you presented to my predecessor, the Hon. Dr. Roche, on behalf of The Shell Transport Company, Limited, of London, England, for certain rights and concessions in connection with petroleum in the Northern part of the Province of Alberta. I have carefully perused the application and am impressed with the importance of the scheme outlined therein. The matter will, however, have to stand in abeyance until after the General Elections, when I hope to give the application my most careful consideration, and as soon as a decision is arrived at I will communicate with you further.

Yours very truly,  
A. MEIGHEN.

#### The Controller's Letter.

Department of the Interior,  
Ottawa, 25th January, 1918.

Sir,—I beg to refer you to your letter dated the 30th of July last, addressed to the Minister, applying as attorney for R. N. Benjamin, on behalf of The Shell Transport Company, Limited, of London, England, for a reservation of the exclusive right to the petroleum and natural gas, the property of the Crown, in that portion of the Province of Alberta lying north of the 55th° of north latitude, and that part of the North-West Territories lying south of the 65th° of north latitude and west of the projection of the eastern boundary of the Province of Alberta. The application also included free rights of way and sites for reservoirs, refineries, etc.; freedom from custom duties; the present bonus on the production of crude oil; absence of impost tax for fifteen years after the organization of the territory; and free timber and water required in connection with operations.

In reply I beg to inform you that the application made by you, as attorney for Mr. Benjamin, has been under careful consideration, and it has been decided that the Department is not in a position to consider the reservation of the rights described in the application above referred to.

H. H. ROWATT,  
Controller.

Lt.-Col. A. T. Shillington, M.D.,  
281 Gilmour Street,

#### The Second Proposal.

122 Wellington Street,

Honourable Arthur Meighen,

Ottawa, May 3rd, 1918.

Dear Sir,—

On behalf of the Shell Transportation & Trading Co., Ltd., of London, England, I am enclosing you an application for prospecting rights over certain portions of Alberta and the N. W. T.

I do not know that it is necessary for me to say

anything in regard to the Shell Transportation & Trading Co., Ltd., as the Company is so well known in Great Britain. The activities of the Shell Co. extend to Russia, Roumania, Egypt, Borneo, Sarawak, Mexico, the United States, South America and elsewhere.

The Company was formed in 1897, being an amalgamation of tank, steamer and oil interests. I would be very pleased indeed to give you the fullest possible information in regard to the Company.

The following particulars will give you an idea of the volume of the Company's business. Dutch East Indies production during 1916, over 11,000 bbls.; Russia production during 1916, 10,000 bbls.; Roumania production 1916, eleven months, 2,500,000 bbls.; United States, exclusive of the State of California, production 1916, 4,684,000 bbls.; California production 1916, 4,809,403 bbls. Production in Mexico during 1916 was very large, but was intentionally curtailed by reason of export difficulties.

I would respectfully call your attention to the following reasons in favor of granting the Company the right to prospect over the area described in their application:—

1.—The absolute absence of transport facilities in the territory covered and for hundreds of miles outside the territory, necessitating the expenditure of an enormous amount of money in producing transport facilities.

2.—Petroleum being a liquid, and transport facilities when established being almost exclusively for carrying solids, all the necessary equipment even outside the territory has to be especially created, and owing to the peculiar construction can only be used for carrying oil, and are not of service for other products, so that a large supply of oil must be produced in order to keep special transport facilities profitably employed.

3.—Owing to the severity of the winter season in Northern Alberta and the adjacent territory, it is practically impossible to carry on operations, particularly transport in pipe lines, except at an initial expense which would be prohibitory, and necessitates immediate outlay for reservoirs and storage places for the product during that portion of the year when it is impossible owing to climatic conditions to transport the oil.

4.—These reasons, which apply only to the territory covered by this application, and not to Southern Alberta, where both transport facilities and climatic conditions are favorable to exploration and production by people of small means, form insurmountable objections to attempts to prospect and exploit on the part of anyone except a corporation of unusual financial strength or the Government itself.

5.—It is unnecessary for me to point out that the large sums to be spent by the Shell Company in explorations and the much larger sums to be spent in production of oil if paying quantities are found as result of such explorations, will be of inestimable value to Canada in opening up the vast regions which are now an uncultivated waste.

Kindly give this application your early consideration and oblige,

Yours very truly,  
R. A. PRINGLE.

### The Reply.

May 9th, 1918.

R. A. Pringle, Esq.,  
Dear Mr. Pringle,—

I have your letter of May 3rd, enclosing applications for prospecting rights on behalf of the Shell Transportation and Trading Co., Ltd.

The concessions asked for in this application are such that the same could not be considered.

(Sgd.) ARTHUR MEIGHEN.

### Request for Withdrawal of Second Proposal.

May 21, 1918.

Hon. Arthur Meighen,

Dear Mr. Meighen,—

Yours of the 9th instant in regard to application made on behalf of the Shell Transportation and Trading Co., Ltd., duly received.

In view of your decision that the concessions asked for are such that they could not be considered, acting under instructions from my client, I would ask to have the application withdrawn.

(Sgd.) R. A. PRINGLE.

### The Application Returned.

22nd May, 1918.

Dear Mr. Pringle,—

I have to acknowledge the receipt of yours of the 21st, and not that you desire to withdraw the application made on behalf of the Shell Transportation and Trading Co., Ltd. I am returning the application herewith.

(Encl.)

ARTHUR MEIGHEN.

### Sir Reginald MacLeod Asks for Interview With Sir Robert Borden.

8th July, 1918.

The Hon. Arthur Meighen, M.P.

Dear Sir,—

I have the honour to enclose copy of a letter I am forwarding to the Rt. Hon. Sir Robert Borden, and I shall be gratified if I may be favoured with an interview at an early date.

(Sgd.) REGINALD MacLEOD.

8th July, 1918.

The Rt. Hon. Sir Robert Borden, K.C.M.G.

London, W.C.

Dear Sir Robert Borden,—

You were good enough in April and May of last year to receive and consider certain communications from me on behalf of the "Shell" interests regarding exploration of territories in Western Canada.

You authorized the Hon. Robert Rogers, then in England, to discuss the matter with me, and as a result of several interviews with him and in compliance with his suggestion I forwarded on the 4th May, 1917, a general statement indicating the lines on which the "Shell" Group would be prepared to undertake the work of exploration and development, together with some reference to the position and experience of the Company.

It was then felt that negotiations could hardly proceed further in this country as Mr. Rogers could not conveniently enter into detail regarding a subject of such importance which lay under the control of another department of State. Moreover, his return to Canada rendered it necessary for further discussions to take place at Ottawa.

The Company then authorized Colonel A. T. Shillington to carry on these negotiations in Canada, and they learn from him that he has been in frequent communication with the Ministry of the Interior.

No decision has, however, been reached nor, it appears, can be reached until it has been decided as a matter of State policy whether the Government is desirous of entering into an agreement with the "Shell" Group, which would secure:

- (1) for the Government skilled examination of territory, and skilled extraction of oil should such be discovered, all risks and charges being defrayed by the Company, and
- (2) for the Company exclusive rights to selected portions of a sufficiently large area for a sufficient time to render their work effective and—if oil be found—successful.

The "Shell" Group in a point of resources, experience, and attained success over the world stands pre-eminent.

As a matter of special interest I would beg to point out that since my last communication the operations of the Company in Egypt have been greatly extended, and the Anglo-Egyptian Oil Company has now attained an assured position as owning one of the most important oil fields in the Empire.

Appended hereto are extracts from the Report of the Financial Adviser to the Government of Egypt, and there is also enclosed a copy of the Company's report just issued.

Sir Marcus Samuel, Chairman of the "Shell" Co., and his colleagues, would be gratified if the responsibility of seeking for, and, if found, of testing on a large scale, and in a scientific and comprehensive way the oil capacities of the area suggested in Western Canada were entrusted to them, and they would approach the problem with the firm intention of making research thorough and success—if success there be—large and enduring.

They feel, however, that the negotiations cannot be indefinitely prolonged.

The presence in this country of yourself, together with the Minister of the Interior, and the Prime Minister of the Province of Alberta—within the boundaries of which this territory mainly lies, and which is pre-eminently concerned in the success of the project under review—appears to offer a favourable opportunity of arriving at a decision on the main point—whether the Dominion and Provincial Governments view with favour the general proposition that a large area should be examined on scientific lines under the responsible management of the "Shell" group.

If this proposition be viewed with favour, perhaps Mr. Meighen would honour me and one of my colleagues on this Board with an interview leaving the arrangement of details for adjustment either here or in Canada.

I am taking the liberty of forwarding a copy of this letter to the Hon. Arthur Meighen and to the Hon. Charles Stewart.

(Sgd.) REGINALD MacLEOD.

Hon. Mr. Meighen's Reply.

9th July, 1919.

Dear Sir,—

I have your letter of the 8th instant, enclosing copy of communication of the same date addressed to our Prime Minister; also extracts from Note by the Acting Financial Adviser on the Budget of 1918. All of these I have read with care.

Several months ago a proposal was made on behalf of what is known as the "Shell" Group by Doctor Shillington, of Ottawa, Canada, to the Department of the Interior, over which I preside, looking to the securing of certain concessions for the purpose of oil ex-

ploitation in the Province of Alberta and the North. These proposals were of such a character that they could not for a moment be entertained. Later on, and shortly before I left Canada, the proposals were put in somewhat different form, but were still impossible of consideration. The Mines Branch of the Interior Department has regulations framed under the authority of Statute under which all operations in lands owned by the Dominion must be carried on. There are many companies operating under these regulations.

The Department would not be disposed to make special concessions in favour of any special concern or group, and could only consider any proposal along that line under the most special circumstances, and embodying the most adequate guarantees and return.

Unless the "Shell" people have definite proposals to make of a character very substantially different from those already presented, I do not think there would be any advantage in a discussion of the subject. If they have such proposals I would be glad to discuss the matter with you, and would suggest Saturday next, at 12 noon, at my rooms at the Savoy.

A. MEIGHEN.

London, W.C., July 10th, 1918.

My dear Meighen,—

Sir Reginald MacLeod suggests in his letter to me of the 8th instant (copy of which has been forwarded to you) that an interview between you and the Premier of Alberta will be desirable from his standpoint. Will you be good enough to give his request your best consideration.

Yours faithfully,  
(Sgd.) R. L. BORDEN.

Hon. Arthur Meighen,  
Savoy Hotel.

#### Memorandum Supplementing Interview.

London.

24th July, 1918.

The Hon. Arthur Meighen, M.P.,  
Minister of the Interior of Canada,  
Ottawa.

Dear Mr. Meighen,—

I trust by the time this letter reaches Ottawa you will have arrived safe at home.

I had hoped to have been in a position to send you the memorandum which you suggested as desirable to set forth at fuller length the observations by Mr. Benjamin on the occasion of our recent interview.

It has been impossible to complete this memorandum in view of the great stress of other business, and I write these few lines to tell you that the matter is being carefully dealt with with all reasonable speed and that we greatly hope to be able to forward it to you in the course of next week.

Yours very truly,  
(Sgd.) REGINALD MacLEOD.

8th August, 1918.

The Hon. Arthur Meighen, M.P.

My dear Mr. Meighen,—

Mr. Benjamin and I have been seriously considering the kind suggestion you made at our recent interview that we should draw up a memorandum covering our recent conversation and the suggestions arising out of it for the entrustment to the "Shell" Group by the Dominion Government of the search for and, if found, the exploitation of oil in the Province of Alberta and neighbourhood.

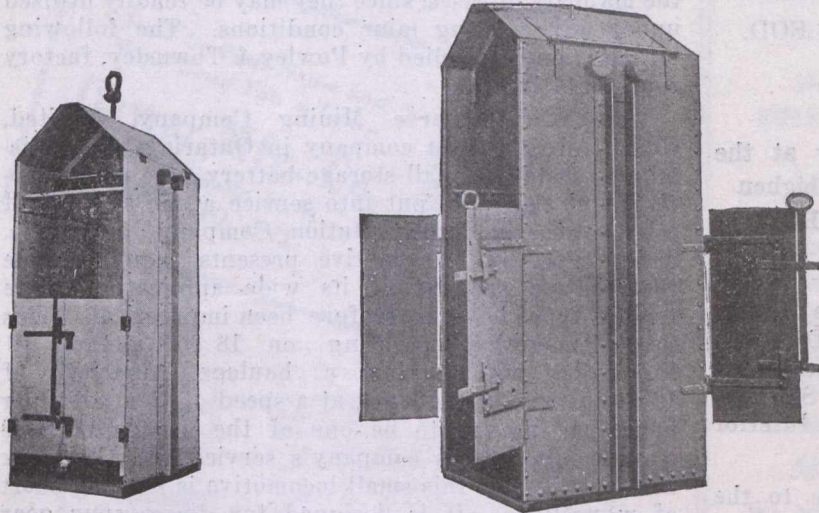
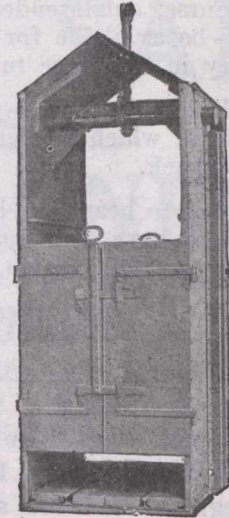


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# BRITISH COLUMBIA

## The Mineral Province of Western Canada

Has produced Minerals valued as follows: Placer Gold, \$75,116,103; Lode Gold, \$93,717,974; Silver, \$43,623,761; Lead, \$39,366,144; Copper, \$130,597,620; Other Metals (Zinc, Iron, etc.), \$10,933,466; Coal and Coke, \$174,313,658; Building Stone, Brick, Cement, etc., \$27,902,381; making its Mineral Production to the end of 1917 show an

**Aggregate Value of \$595,571,107**

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive, \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,509,968; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for the year 1916, \$42,290,462; for the year 1917, \$37,010,392.

**Production During last ten years, \$296,044,925**

Lode-mining has only been in progress for about twenty years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than those of any other Province in the Dominion, or any Colony in the British Empire.

Mineral locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full information, together with Mining Reports and Maps, may be obtained gratis by addressing

**THE HON. THE MINISTER OF MINES**  
**VICTORIA, British Columbia**

The suggestions are made in memorandum form, and are, of course, not intended for competition, but will obviously be available for such use as you may deem necessary in reference to your colleagues.

We are willing to fix, say, 5 years after the war, as the period within which 90 per cent of the territory shall be given back.

I shall be glad to hear that this outline meets with approval, and to have your suggestions for bringing the matter towards completion.

(Sgd.) REGINALD MacLEOD.

**Memorandum with Regard to an Interview at the Savoy Hotel Granted by the Hon. Arthur Meighen To Sir Reginald MacLeod, and Mr. H. N. Benjamin, on the 13th July, 1918.**

Sir Reginald MacLeod briefly opened the discussion referring to the letter he had received from the Hon. Arthur Meighen in which the latter had stated that the proposals put forward by Col. A. T. Shillington were unacceptable to the Ministry of the Interior in Canada, by reason of:

(a) the insufficient return and guarantee to the Dominion Government, and

(b) the large area asked for, while Mr. Meighen further stated that certain companies are working at considerable outlay under the existing mining laws without having obtained special conditions.

In the discussion that ensued Mr. Benjamin explained in general terms the reasons why geological exploration in an unproved country must take place over an extended area if a serious and economical exploitation is eventually to result.

Starting from the assumption that a serious deposit may probably be found in the Province of Alberta or in its neighbourhood, Mr. Benjamin proceeded to show how it was in the interest of the Dominion Government, on behalf of Canada and the Empire, that such deposit should be worked in a sound and economical manner and so as to obtain the best ultimate results in volume of production together with a due return to the Dominion Government and people.

Mr. Benjamin suggested a rough outline of a scheme by which the Dominion Government should entrust the search for a deposit and, if found, its eventual exploitation to the "Shell" Group on the basis that they should find the whole of the necessary funds by issue of preferred stock at a moderate rate of interest, the net profits of the venture being divided between the Dominion Government and the Group.

Mr. Meighen asked that the arguments on which the desire for an extended area were based and the proposal for association of partnership between the Government and the Group should be repeated in a communication addressed to him at Ottawa in such extended form as to give a comprehensive idea of the scheme.

(Continued in Next Issue.)

**Storage Battery Locomotive.**

(Continued from Page 448.)

promptly directed to this source of energy utilized through the medium of the highly perfected, non-destructible Edison Storage Battery, since with batteries of this type as the source of energy, small, compact and efficient locomotives are now being used to solve haulage problems. The locomotives equipped with Edison storage batteries undoubtedly present the most practical and cheapest medium of haulage for the majority of cases, since they may be readily utilized under any existing mine conditions. The following information is supplied by Powley & Townsley, factory representatives.

The Crown Reserve Mining Company, Limited, Cobalt, are the first company in Ontario's silver district to install a small storage battery type of locomotive, and this year put into service a one and a half ton Automatic Transportation Company locomotive. This type of locomotive presents many unique features on account of its wide application where trolley types have heretofore been impractical. This small locomotive, operating on 18 in. gauge 12 lb. rails, and having a haulage capacity of 12 to 15 tons on the level, at a speed of five miles per hour, has proved to be one of the most profitable investments in this company's service and the work accomplished by this small locomotive is nothing short of marvellous. It is designed for direct spur gear drive on all four wheels, from a 48 volt motor, taking its current from a 40 cell type A-6 Edison Battery, having a 10.8 KWH capacity, which is sufficient to operate the locomotive continuously for a ten-hour shift. The locomotive is provided with detachable battery boxes and when mines operate two or three shifts per day, an extra set of batteries is provided, and at the end of the shift the discharged battery is removed as a unit and the re-charged one substituted, thus providing continuous operation.

The wheel base of this locomotive is 28 in. It readily negotiates curves of 7 ft. radius. Its overall length can be restricted to a minimum of 7 ft. with a width of 28 in., thereby being especially adapted for use in drifts, and new developments, where narrow passages are encountered. The economy of this small locomotive can be reckoned, since the current consumed for battery charge is but 15 KWH, and in the majority of cases current does not exceed 2c per KWH, representing 30c per day for current.

One small unit of this type replaces on an average of six men, lessening congestion, since it travels at a much higher speed and reduces the number of ore cars required owing to the rapid transportation provided.

The batteries are automatically charged at idle periods. When in continuous service an extra battery is employed. This is all done automatically, current being supplied from a small Hertner constant current motor generator set. When direct current is available, batteries are likewise automatically charged through a special type of automatic rheostat and are disconnected from the line when fully charged, through the medium of a chargometer, which is mounted on locomotive.

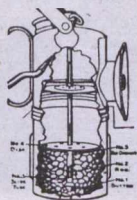
The installation was made by Powley & Townsley, Excelsior Life Building, Toronto.

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When the valve is opened the water starts to flow at No. 1, the carbide starts to expand, raising No. 4; this carries with it No. 3. The result is the same as when other lamps are raked by hand, with this advantage, the raking is taken care of automatically at just the right moment, the carbide is never vigorously agitated: there is no excess generation and no gas is wasted.

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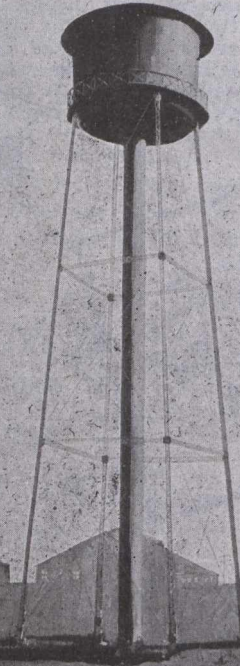
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## To Manufacturers

Valuable economic minerals, of which the people of this country as a rule have little knowledge, are distributed in various sections served by the Canadian National Railways. The field of utility for these minerals is constantly expanding and entering more and more into the realm of manufacture.

Information on this subject can be obtained by writing:—

**The Industrial and Resources  
 Department Canadian National  
 Railways**

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### COMPRESSED AIR COAL-CUTTERS IN CANADIAN MINES.

"Coal-cutters of the radial post type are coming into general use. These machines consist essentially of a percussive cutter of rock-drill type mounted on a column, fitted with a worm-gearing which enables the machines to cut either vertically or horizontally as desired. The radial machines do not impose so great a strain on the men operating them as do the "puncher" machines, moreover, they can be worked by comparatively unskilled men, whereas the successful operation of a puncher machine is a very specialized class of work."

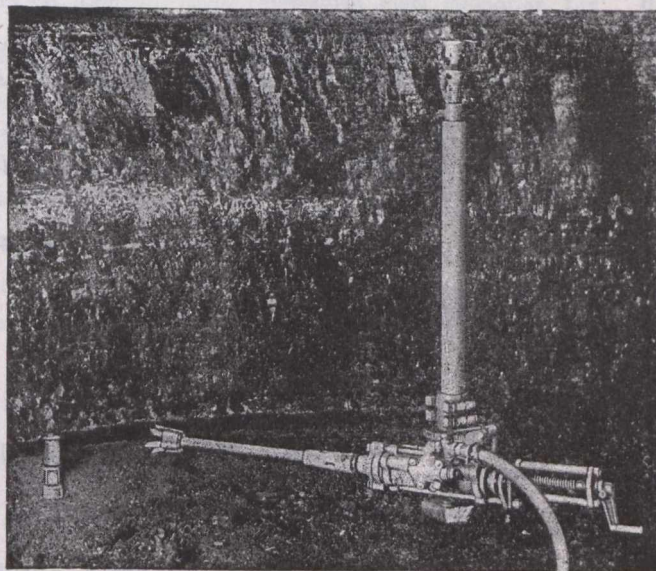
This quotation from Bulletin No. 14 of the Mines Branch, Ottawa, written by the associate editor of "Canadian Mining Journal," Mr. F. W. Gray, gives a brief idea of the radial coal-cutter as used in Canadian coal fields. The radial coal-cutter, of which the "47," manufactured by the Canadian Ingersoll-Rand Company is an example, is practically a "piston-drill" on a special class of work, and for this reason the design of the radial coal-cutter differs in several particulars from that of the ordinary piston rock-drill, chiefly in connection with the valve. The chief work of the "47" Coal-cutter is for making cuts across the face of seams either horizontally or vertically. Where the machine is used for undercutting the column mounting is set up centrally in the "room," with the screw end next to the roof about  $3\frac{1}{2}$  or 4 ft. from the coal face. This allows plenty of room to manipulate the screw and to work the machine as close as possible to the bottom of the seam. By the worm crank the machine is swung back and forth, cutting a groove 2 inches deep on each swing. At the extremities of the undercut the groove is worked back to be square. The illustration shows this process very plainly, the screw at the top is shown, also the worm gear for swinging the radial coal-cutter.

One of the chief difficulties in coal-cutting is the occurrence of impurities such as sulphur in the coal. The radial coal-cutter will remove sulphur balls; these sometimes occur in bands 8 to 10 inches thick; the machine undercuts the lower 5 or 6 inches of this, and the remainder falls of its own weight or is easily barred down. The coal-cutter can also be used as an ordinary rock-drill for trimming or "brushing" entry rock walls.

A short description of the design of the "47" Coal-cutter may be of interest. The two principal features desired in the valve design of a radial coal-cutter are: A cushioned blow should the pick miss the coal, and an effective variable stroke. To secure these features the "47" uses a special form of valve with main and auxiliary valves. The auxiliary valve reverses when the piston has completed half its stroke, the main valve does not reverse till later. The main valve will reverse whether the piston completes its stroke or not, thus providing the variable stroke feature desired. If the pick misses the coal in the open end of the working the main valve will reverse in time to give the necessary cushioning effect. Still another feature of this valve mechanism is that the shorter the stroke the harder is the blow; this is useful in beginning a cut where the stroke is naturally short. The rotation is of the "release" type; with this type of rotation the ratchet is retained by compression, and if the steel sticks the ratchet slips instead of breaking.

One difference between the radial coal-cutter is in the design of the drill bit. Instead of having a solid

bit forged at the end of the drill steel as in the rock drill, the radial coal-cutter uses a special bit, in which are either three or five chisels; and these chisels can be removed independently for sharpening. The width of the cut is about five inches.



"47" Rand Radial Coal-Cutter.

The radial coal-cutter shows well on flat seams, but is particularly adapted for seams of 15 to 50 degrees pitch. Owing to the extreme variations in mine conditions it is impossible to give figures that will apply to very many mines. In Eastern Canada a great deal of the work is done by contract; that is, the miner is paid by the ton and pays his own help; this makes it difficult to secure accurate data on working. In one mine in Eastern Canada one "47" Radial Coal-cutter cut 12 rooms 20 ft. wide with 6 ft. depth of undercut in an eight hour shift. This is exceptional, but 100 tons per eight hour shift in normal working conditions, and 60 tons with adverse conditions can be expected with confidence.

The radial coal-cutter has the particular advantage of being readily portable; it is also not very expensive in first cost, and the repair cost of 300 coal-cutters in one of the Nova Scotia coalfields—came to \$1.34 per machine per month, the results being taken for one year.

### Optimism in Regard to Gold Outputs.

Having survived the period of war depression when labor could not be secured at any price, and when the cost of material was exorbitant and the delivery of supplies very unsatisfactory, the gold mines of Northern Ontario are now showing evidence of strength far greater than expected. The labor unrest which resulted in a strike at Kirkland Lake has been met with the utmost calm, and this newest of the productive gold camps appears to be content to perhaps wait until Fall before launching out into its full stride. In the Porcupine camp the utmost quiet appears to prevail in labor circles and it is thought that better judgment will hold sway. The coming Fall bids fair to witness every operating gold mine in Northern Ontario producing gold at full blast and bringing prosperity alike to the country, to the mine workers and to the country as a whole.

# CANADA

## DEPARTMENT OF MINES

HON. MARTIN BURRELL, *Minister*

R. G. McCONNELL, *Deputy Minister*

### MINES BRANCH

#### Recent Publications

Iron Ore Occurrences in Canada, Vol. II. Compiled by E. Lindeman, M.E., and L. L. Bolton, M.A., B.Sc. Introductory by A. H. A. Robinson, B.A.Sc.

The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.

Building and Ornamental Stones of Canada (British Columbia). Vol. V., by W. A. Parks, Ph.D.

Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.

Annual Mineral Production Reports, by J. McLeish, B.A.

The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.

Occurrences and Testing of Foundry Moulding Sands. Bulletin No. 21, by L. H. Cole, B.Sc.

Analyses of Canadian Fuels. Parts I to V, by E. Stansfield, M.Sc., and J. H. H. Nicolls, M.Sc.

Clay Resources of Southern Saskatchewan, by N. B. Davis, M.A., B.Sc.

Summary Report of the Mines Branch, 1917.

The Mineral Springs of Canada. Part II., by R. T. Elworthy, B.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

Fuel Testing Laboratory.—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

Ore-Dressing Laboratory.—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

Chemical Laboratory.—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

Ceramic Laboratory.—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

Structural Materials Laboratory.—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

### GEOLOGICAL SURVEY

#### Recent Publications

Summary Report. The annual Summary Report of the Geological Survey is now printed in parts. Applicants should therefore, state what particular geologist's report is required, or what subjects they are interested in.

Memoir 95. Onaping Map-Area, by W. H. Collins.

Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.

Memoir 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.

Memoir 105. Amisk-Athapapuskow Lake district, by E. L. Bruce.

Memoir 106. Road materials in a portion of Vaudreuil county, Quebec, and along the St. Lawrence river from Quebec boundary to Cardinal, Ontario, by R. H. Picher.

Map 63A. Moncton Sheet, Westmoreland and Albert Counties, New Brunswick. Topography.

Map 132A. Southwestern portion of Rainy River district, Ontario. Soils.

Map 135A. Lower Churchill river, Manitoba. Geology.

Map 145A. Timiskaming county, Quebec. Geology.

Map 154A. Southwestern Yukon.

Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.

Map 165A. Windermere, Kooteney district, B.C. Topography.

Map 174A. Blairmore, Alberta. Topography.

Map 179A. Onaping; Sudbury and Timiskaming districts, Ont. Geology.

Map 183A. Harricanaw-Turgeon basin; Abitibi, Timiskaming and Pontiac, Que. Geology.

Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway,—in two sheets: Sheet 1 Gogama to Missonga, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.

Map 1690. Whiteburn Gold District, N.S. Geology.

Map 1702. Klotassin, Yukon Territory. Geology.

Map 1710. Bothwell-Thamesville oil region, Kent county, Ontario.

May 1712. Foothills of Southern Alberta, St. Mary river to Highwood river. Geology.

May 1714. The Niagara peninsula, Ontario. Geology.

May 1715. The Ontario peninsula. Geology.

Applicants for publications not listed above should mention the precise area concerning which information is desired.

Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to The Director, Geological Survey, Ottawa.

# The Canadian Miners' Buying Directory.

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Canada Carbide Company, Ltd.
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Fraser & Chalmers of Canada, Ltd.
- Cages:**  
Canadian Ingersoll Rand Co., Sherbrooke, Que.  
Northern Canada Supply Co.  
Fraser & Chalmers of Canada, Ltd.
- Cables—Wire:**  
Standard Underground Cable Co. of Canada, Ltd.  
Canada Wire & Cable Co., Ltd.  
Northern Electric Co., Ltd.,
- Car Dumps:**  
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- Coal:**  
Dominion Coal Co.  
Nova Scotia Steel & Coal Co
- Coal Cutters:**  
Sullivan Machinery Co.  
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- Coal Mining Explosives:**  
Canadian Explosives, Ltd.
- Coal Mining Machinery:**  
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.  
Sullivan Machinery Co.  
Marsh Engineering Works.  
Hadfields, Ltd.  
Fraser & Chalmers of Canada, Ltd.
- Coal Pick Machines:**  
Sullivan Machinery Co.
- Compressors—Air:**  
Smart-Turner Machine Co.  
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Northern Canada Supply Co.  
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R. T. Gilman & Co.
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Diamond Drill Contracting Co.  
E. J. Longyear Company.  
Smith & Travers.  
Sullivan Machinery Co.
- Dredger Pins:**  
Canadian Steel Foundries, Ltd.  
Hadfields Ltd.
- Dredging Machinery:**  
Canadian Steel Foundries, Ltd.  
M. Beatty & Sons.  
Hadfields Ltd.
- Dredging Ropes:**  
Allan, Whyte & Co.  
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Northern Canada Supply Co.  
Canadian Rock Drill Co.
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Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.  
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:**  
Hadfields Ltd.
- Drill Steel Sharpeners:**  
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Canadian Rock Drill Co.
- Drills—Electric:**  
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Canadian Explosives.  
Northern Canada Supply Co.
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Northern Canada Supply Co.  
Hadfields Ltd.  
Fraser & Chalmers of Canada, Ltd.
- Engineering Instruments:**  
C. L. Berger & Sons.
- Engines—Automatic:**  
Smart-Turner Machine Co.  
Fraser & Chalmers of Canada, Ltd.
- Engines—Gas and Gasoline:**  
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## Canadian Miners' Buying Directory.—(Continued from page 29.)

- Gears:**  
Canadian Steel Foundries, Ltd.  
Smart-Turner Machine Co.  
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Fraser & Chalmers of Canada, Ltd.
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- Zinc Spelter:**  
Canada Metal Co., Ltd.  
Hoyt Metal Co.

THE CANADIAN MINING JOURNAL  
ALPHABETICAL INDEX TO ADVERTISERS

<b>A</b>		<b>F</b>		<b>McEvoy, Jas. . . . . 11</b>	
Allan Whyte & Co. . . . .		Fleck, Alex . . . . .		Mine & Smelter Supply Co. . . . .	
American Zinc Lead & Smelting Co.		Ferrier, W. F. . . . .		Mond Nickel Co. . . . .	
<b>B</b>		Fasken, Robertson, Chadwick & Sedgewick . . . . .		Mussens, Ltd. . . . .	
Balbach Smelting & Refining Co. 10		Fraser & Chalmers of Canada, Ltd.		<b>N</b>	
Blackwell, G. C., Sons & Company 12		<b>G</b>		Northern Canada Supply Co. Ltd. . . . .	
Beatty, M. & Sons . . . . .		Gartshore John J. . . . . 12		Northern Electric Co., Ltd. . . . .	
Berger C. L. & Sons . . . . . 12		General Engineering Co. . . . . 12		Nova Scotia Steel & Coal Co. . . . . 6	
Brigstocke, R. W. . . . . 10		Gilman, R. T. Co. . . . . 25		Nova Scotia Government . . . . . 5	
British Columbia, Prov. of . . . . . 23		Goldsmith Bros., Smelting & Refin- ing Co., Ltd. . . . . 10		<b>O</b>	
Burns & Roberts . . . . . 10		Greening, B. Wire Co. . . . .		Ontario, Province of . . . . . 13	
Burnett & Crampton . . . . .		Goodyear Tire & Rubber Co. of Can- ada, Ltd. . . . .		<b>P</b>	
<b>C</b>		<b>H</b>		Pacific Coast Pipe Co., Ltd. . . . .	
Campbell & Deyell, Ltd. . . . . 11		Hadfields, Ltd. . . . . 34		Peacock Bros., Ltd. . . . . 34	
Canadian Allis-Chalmers, Ltd. . . . . 6		Hall, G. C. & Co. . . . .		Pennsylvania Smelting Co. . . . . 12	
Can. Chicago Bridge & Iron Works . . 26		Hamilton Gear & Machine Co. . . . . 10		Powley & Townsley . . . . . 7	
Canadian Explosives, Ltd. . . . . 30		Hardinge Conical Mill Co. . . . . 16		Prest-O-Lite Co. of Canada, Ltd. . . . .	
Canadian-Fairbanks-Morse Co., Ltd.		Hassan A. A. . . . . 11		<b>Q</b>	
Canadian H. K. Porter, Ltd. . . . . 12		Hendrick Mfg. Co. . . . . 12		Quebec, Province of . . . . . 5	
Canadian Milk Products . . . . .		Hersey, Milton Co., Ltd. . . . . 11		<b>R</b>	
Canadian National Railways . . . . . 26		Heys Thomas & Son . . . . . 11		Ridout & Maybee . . . . . 12	
Candian Ingersoll-Rand Co., Ltd. . . . 3		Hull Iron & Steel Foundries, Ltd. . . 14		Rogers John C. . . . . 11	
Canadian Laboratories, Ltd. . . . . 11		Hoyt Metal Co. . . . . 34		Rogers, Geo. R. . . . . 11	
Canada Foundries & Forgings, Ltd. . . . . 10		<b>I</b>		Reddaway, F. & Co. . . . . 25	
Canada Wire and Cable Co. . . . .		Imperial Bank of Canada . . . . . 25		<b>S</b>	
Canadian Rock Drill Co. . . . . 33		International Business Machines . . . 1		Salisbury Electric Co., Ltd. . . . .	
Canadian Steel Foundries . . . . .		International Nickel Co. . . . . 8		Smart-Turner Machine Co. . . . .	
Canada Carbide Company . . . . .		Inglis, J. & Co. . . . . 9		Smith & Travers Company . . . . . 11	
Canada Metal Co. . . . .		<b>J</b>		Standard Underground Cable Co., of Canada, Ltd. . . . . 25	
Canadian Brakeshoe Coy. . . . . 7		Johnston, Matthey & Co. . . . . 11		Stewart, Robert H. . . . . 11	
Capper Pass & Son, Ltd. . . . . 12		Jones & Glassco . . . . .		Sudbury Diamond Drilling Co., Ltd. 11	
Consolidated Mining and Smelting Co. . . . .		<b>L</b>		Sullivan Machinery Co. . . . . 2	
Coniagas Reduction Co., Ltd. . . . . 9		Laurie & Lamb . . . . .		Swedish Steel & Importing Co. . . . .	
Constant, C. L. & Co. . . . . 10		Ledoux & Co. . . . . 11		<b>T</b>	
<b>D</b>		Lindsey, G. C. S. . . . .		Toronto Testing Laboratory, Ltd. . . 11	
Deister Concentrator Co. . . . . 4		Longyear, E. J. Company . . . . . 6		Toronto Iron Works . . . . . 7	
Denver Rock Drill Mfg. Co. . . . . 33		Lymans, Ltd. . . . . 26		Tyrrell, J. B. . . . . 11	
Department of Mines, Canada . . . . 28		<b>M</b>		<b>U</b>	
Dewar Mfg. Co. . . . . 25		McDonald, M. P. . . . . 11		University of Toronto . . . . . 10	
Diamond Drill Carbon Co. . . . . 32		MacGovern & Co., Inc. . . . .		<b>W</b>	
Diamond Drill Contracting Co. . . . . 12		MacKinnon Steel Co., Ltd. . . . .		Wabi Iron Works . . . . .	
Dominion Coal Co., Ltd. . . . . 7		Marsh Engineering Works, Ltd. . . . 23		Whitman, Alfred R. . . . . 11	
Dorr Co. . . . . 11		<b>N</b>		<b>V</b>	
Dresser, Jno. A. . . . . 11		<b>O</b>		<b>W</b>	
Dunlop Tire & Rubber Co., Ltd. . . . .		<b>P</b>		<b>X</b>	
Dwight & Lloyd Sintering Co., Inc. Ltd. . . . . 12		<b>Q</b>		<b>Y</b>	
<b>E</b>		<b>R</b>		<b>Z</b>	
Electric Steel & Metals Co., Ltd. . . . .		<b>S</b>			
Engineering & Machine Works of Canada . . . . . 7		<b>T</b>			
Everett & Co. . . . .		<b>U</b>			

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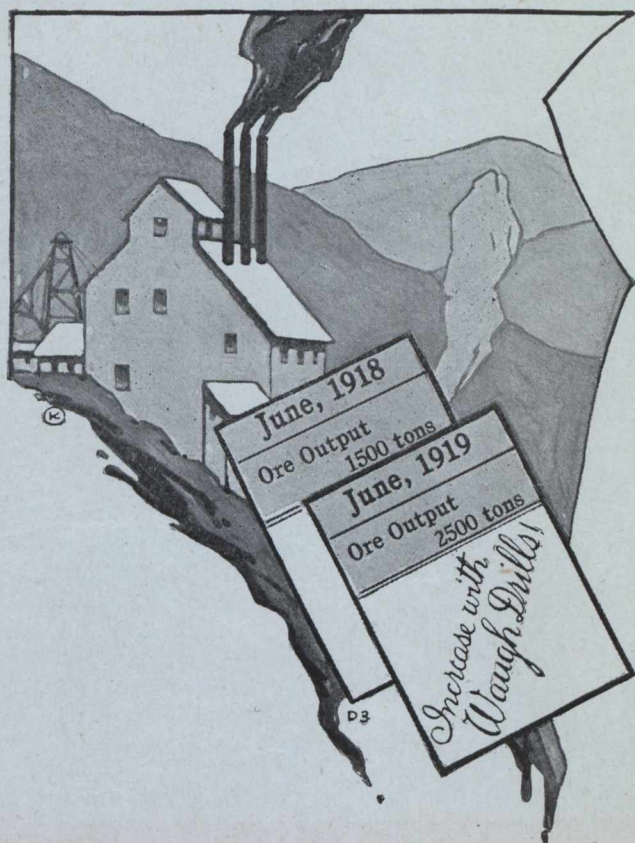
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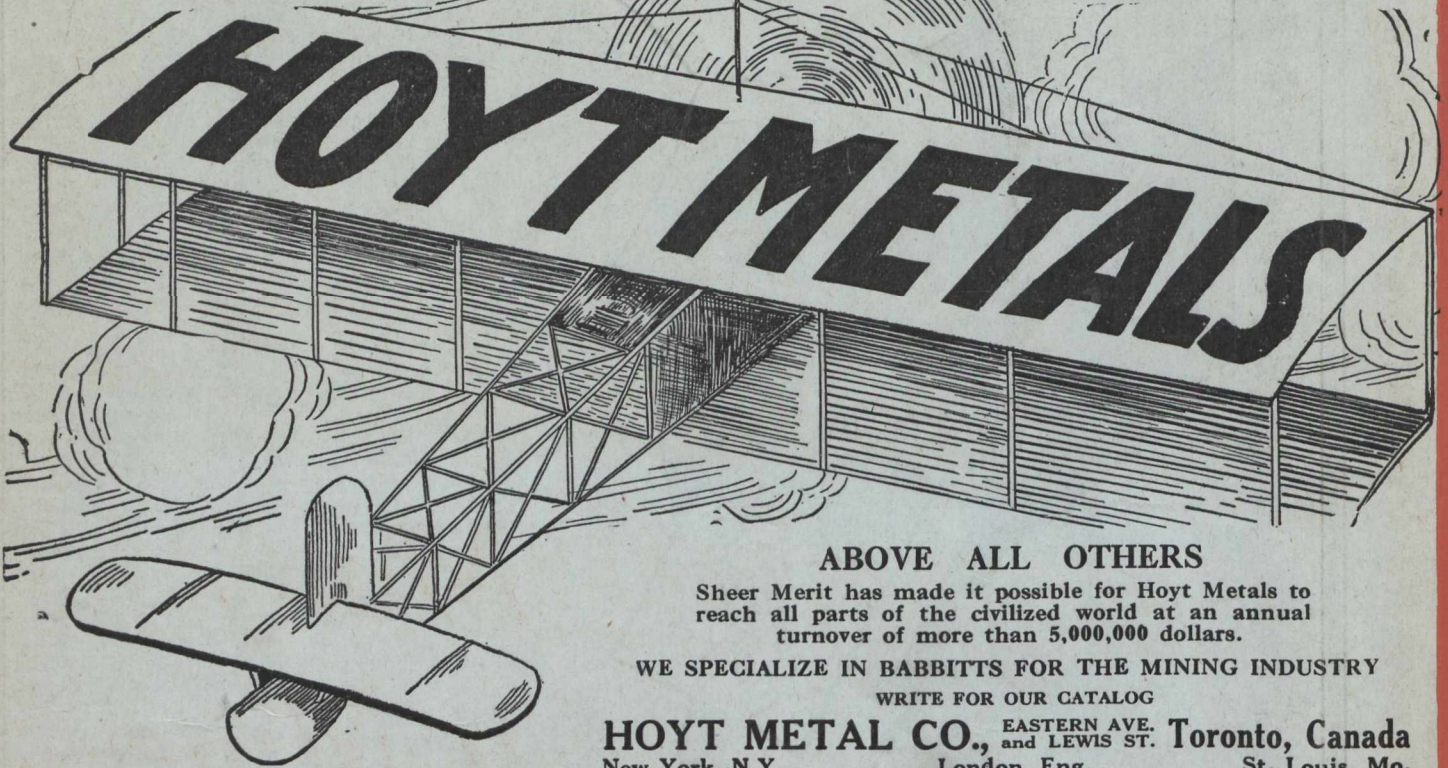
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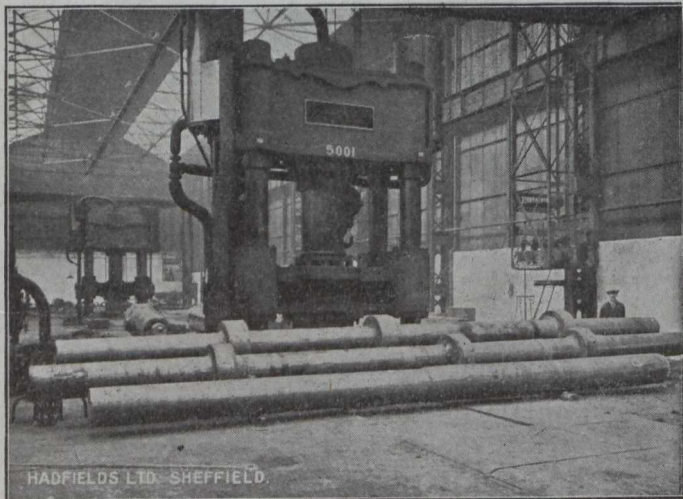
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