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No. 27



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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.

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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, Argen-teuil 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.

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

Map 1714. The Niagara peninsula, Ontario. Geology.

Map 1715. The Ontario peninsula. Geology.

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

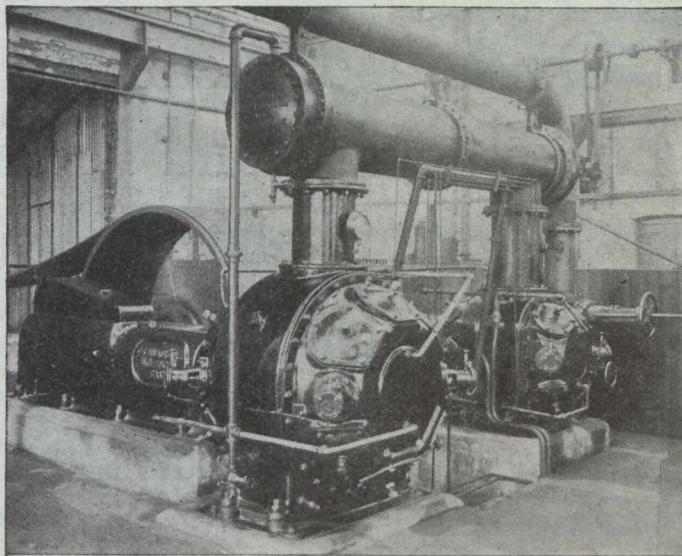
Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

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.

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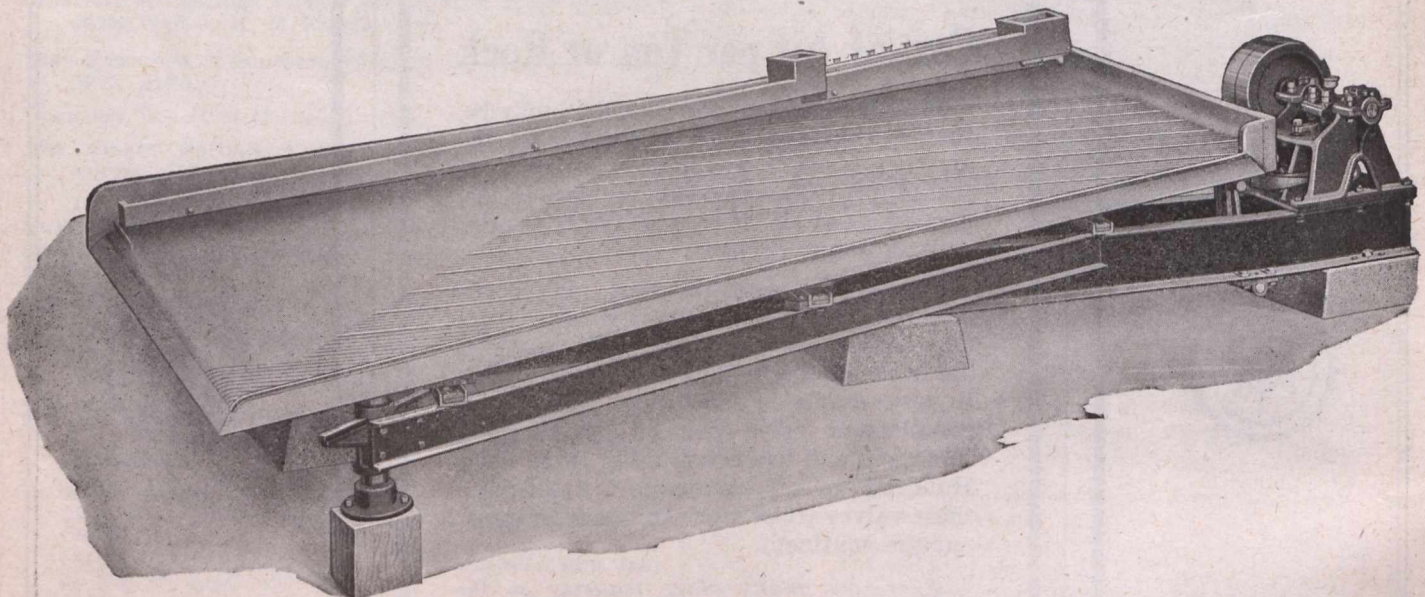
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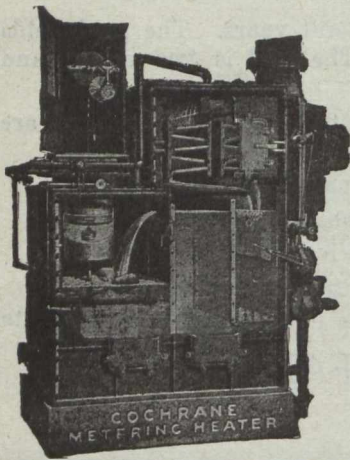
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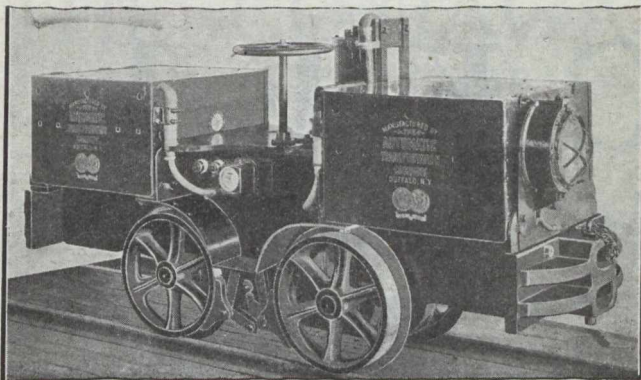
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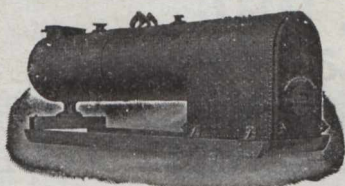
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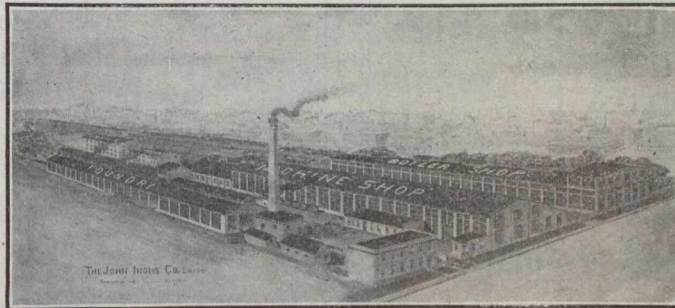
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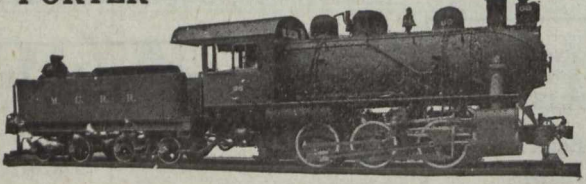
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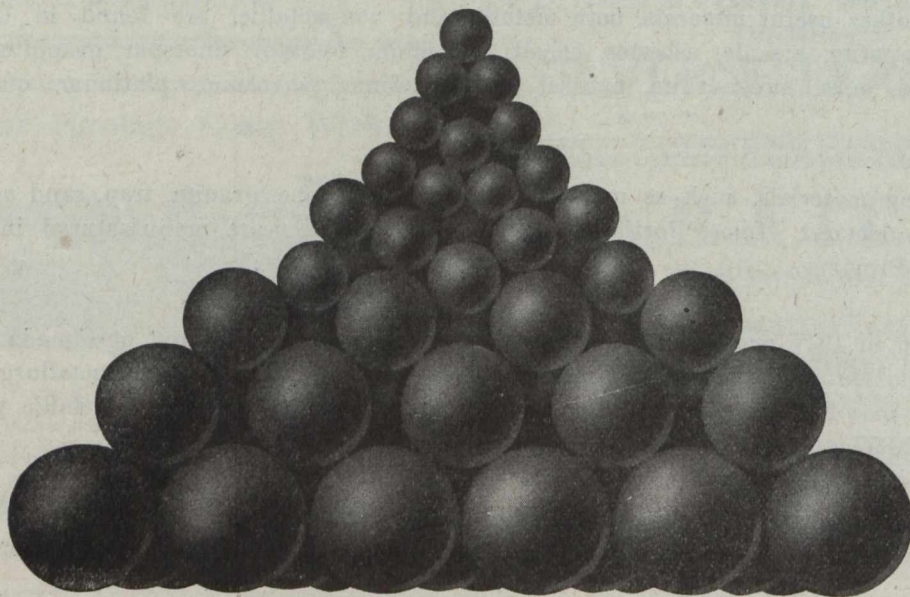
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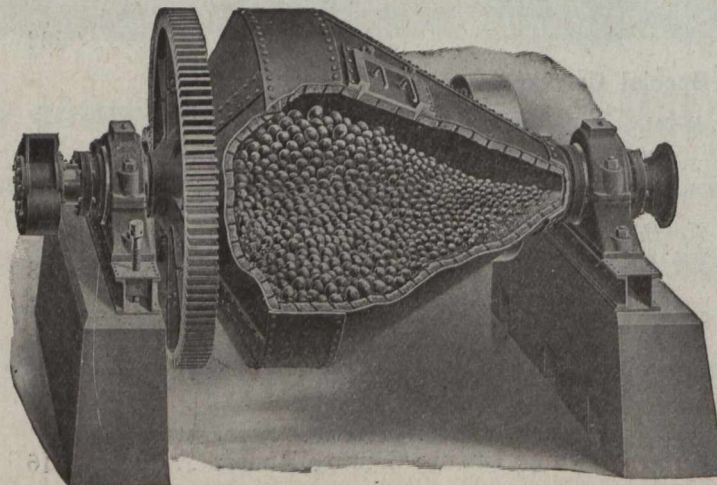
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EDITORIAL

TRANSPORTATION FOR THE NEW GOLD AREA.

Relative to the problem of carrying supplies to the West Shining Tree district, which includes the Wasapika gold area described in this number of the Journal, the Toronto World says editorially:

"The World has urged upon the government the necessity of putting more energy into the work of furnishing transportation facilities to the mining interests of the Shining Tree district.

"So long as the government lags on the performance of a manifest obligation it limits and restricts the advantages and benefits which the new gold district is destined to confer upon the entire community. Central among these advantages and benefits at the present moment would be a broad progressive effect upon our industry in minerals and metals, the potentiality of which the financial world is beginning to realize.

"Government is often asked these days to undertake expenditure in different directions where return is both uncertain and substantial. The revenue that comes from the mining industry reaches the public account before the investor gets his dividend, and sometimes before the speculator pockets his profit. Government alienates property in minerals not only because it is absolutely certain of revenue from private ownership, but because the state by obvious indirect sources of gain increasingly supplements taxation of the country's producing mines.

"So long as the certainty of production lies ahead in respect to minerals and metals the first incentive to the attainment of that stage should be felt by the government. But, as the "World" has shown, the West Shining Tree camp has reached that important point of progress along the road to productive success where it must wait for the government to come along with transportation facilities. The government has fallen behind even with temporary facilities.

"Credit must be given where it is due. A good deal of accurate, painstaking and timely work was done in regard to the mineral survey of the district. All this led up, as it was intended, to the opportunity where the government could make a safe investment in the supply of a public service to private investors who had found the government's information about the mineral resources reliable, and helpful.

"It would be economy now to hasten not only the temporary transportation facilities, but to make an immediate beginning of the permanent communication by rail. Every month that this work may be delayed will mean pecuniary loss to the government itself and to the general commercial community.

"Judging by the active conditions of the new camp it would appear to be the most questionable economy to rest satisfied for a day with the completion of the wagon road that has so long been demanded."

What is immediately needed for the Wasapika area is an improved wagon road. The Ontario Government is endeavoring to make the present road useful to those who are taking in machinery to develop the gold deposits. No endeavor is yet being made to build a road suitable for motor trucks.

Fortunately the road from Westree to Wasapika crosses fairly level country, and does not encounter many serious obstacles. A bridge has already been constructed across the river at the Halfway. Timber for corduroy stands beside the roadway nearly everywhere. Gravel beds are numerous. The men and teams now at work will be able to greatly improve the road this summer. We would like, however, to see three or four times as many men and horses at work. Next year the area may have sufficiently advanced to warrant the Government converting the wagon road into a first class motor road.

So far as railway construction is concerned it seems to us advisable to consider whether a light railway such as was used in France would not answer the purpose. Returned soldiers who have made the trip to Wasapika have naturally given expression to the view that a light railway would be just the thing, and that it could be constructed economically. A good motor road would answer the purpose, but if the road is not made suitable for motor traffic a railway of some kind will be necessary. Why not a light railway?

MINING PROFITS AND WAGES.

In a statement given out at Cobalt by an official of the Miners' Union we find the following paragraph:

"We want to be a constructive organization. We are miners and do not want to ruin the mining business from which we get our livelihood. We feel, however, that we are entitled to a wage commensurate with the work in which we are engaged. Our future lies in the mining industry as much as there is no doubt that many misunderstandings like those existing in Cobalt today would be wiped out."

This looks to us like an invitation to the managers that should be immediately accepted. As intimated

previously in these columns, our opinion is that the past history of the unions should not be allowed to stand in the way of a proper understanding now. It is well to know something of that history; but it is folly to allow it to obscure the present situation. The miners should have full opportunity for expressing their views.

They should also be made to realize that they cannot expect to take all the profits of the industry; that it is essential to the life of the industry that some operators should be very successful; that no new properties would be developed unless someone attracted by the chance of winning a prize risks his money in exploration. If he is successful there are many new jobs for miners, and if he fails the miner is not asked to pay the cost. Neither the miner nor the mining companies can be depended on to furnish capital for the development of new areas. Some do their share and some do not. Much of the money for the development of new areas must come from other sources, from those who are willing to venture in the hope of making big profits. Many a man who will take chances himself will not ask shareholders of companies in which he is interested to take the same chances. Some who have been exceptionally lucky once are content for the future to leave the making of mines to others, recognizing that lightning rarely strikes twice in the same place. No new discovery is developed without risk to those who supply the money, and development depends largely on the faith of the venturesome in the richness of our natural resources and in their knowledge that the profits are in some instances very large.

Under the circumstances, we cannot agree with the same union official when he implies that those investing money expect to shift the burden on their workmen if a good prospect fails to make a paying mine. That is exactly contrary to the facts. There is no certainty of profit for those who furnish the money; but the workman profits whether the venture pays or not. It is true that in some cases where the price of metal has been exceptionally high the workman has received higher than normal wages, but it is also true that the workmen receive a very large proportion of the expenditures of mine operators in the case of losing ventures as well as in the successful. If there is anything certain about mining in Ontario it is that workmen will receive their wages and that they will not be asked to make good the losses of the operators. The Union official is not justified in stating that "those investing money with the hope of big returns cannot expect to shift the burden on their workmen if a good prospect fails to make a paying mine." He implies that the operators of unsuccessful ventures endeavor to shift the burden on the workmen. We do not believe this to be true.

MINERS' CERTIFICATE BOARDS—CHANGES IN BRITISH COLUMBIA.

As will be noted from our British Columbia communication, the Legislature of that Province, on the initiative of the Minister of Mines, has amended the C. M. R. Act insofar as it relates to the method of granting certificates of competency to miners and officials by abolishing the local examining board at each colliery and substituting a travelling board. A similar reform was made in the Nova Scotia C. M. R. Act a few years ago, and in place of the persons who were formerly appointed for the purpose of granting miners' certificates at each colliery, Local Boards were appointed by the Commissioner of Mines. British Columbia has adopted a plan which is suitable for a Province of wide distances and varied mining activities. In both British Columbia and in Nova Scotia, we believe, the reform was needed to cure certain abuses in the granting of miners' certificates, which are well understood locally, but not usually discussed.

We are slightly puzzled at the statement made by our correspondent, which indicates that the employment of aliens in British Columbia mines is not desired, and is, in effect prohibited, by the new regulation. Alien is a term of wide application, and even the more specific appellation of "enemy alien" is difficult to apply now that Europe is being re-cast, and the former citizen of Austria-Hungary has blossomed out as one of a dozen resurrected ethnological persistences. Unless emigration to Canada has ceased—which no one believes—we expect the Dominion in the future to be enriched by the labour and national genius of many European nations, as it has been in the past. While we earnestly believe that the greatest discrimination should be exercised over incoming emigrants to Canada, and feel that public opinion agrees that our national gates have been too wide open in the past; and while also the danger to British institutions from the careless admission of undesirable European emigrants has been of late only too clearly demonstrated in Winnipeg and elsewhere, we also feel that any attempt to earmark for British citizens exclusively any particular branch of endeavour in Canada will not only impose tremendous economic limitations, such as may cause public opinion to swing too quickly the other way, but will be out of harmony with Canadian policy, which in the past has welcomed good men, from any country, as potential Canadians. If the League of Nations becomes an international reality, what will constitute an "alien"?

EDITORIAL NOTE.

The concluding portion of the Oil Concession Correspondence, the last instalment of which appeared in the "Journal" of the 2nd July, is held over until the issue of the 16th July.

THE FALLACY OF THE ASSUMED ADVANTAGE OF RESTRICTING OUTPUT.

"The proposition that the prosperity of the country depends upon production in the country obtains no credence whatsoever, being generally treated by working men as a sheer irrelevance."

This most dangerous and widespread fallacy is discussed, amongst other current fallacies, by Sir Lynden Macassey in the Edinboro' Review, who says further:

"The delusions referred to cannot justly be described as 'heresy contumaciously adhered to.' They are in most cases honest misconceptions, and no solution of the labour problem is possible until all this error and mistaken belief has been swept away."

One fallacy dissected by Sir Lynden Macassey is that government intervention can override economic law, and this particular misconception is not confined to Great Britain.

A newspaper report from Sydney, Nova Scotia, states that the United Mine Workers' Executive has decided to inaugurate a five-days' working week, commencing 2nd August.

In the same announcement it is stated that plans are being made for a joint meeting of the steelworkers of the Dominion Iron & Steel Company, of the Nova Scotia Steel Company, and of the mine-workers of both companies to discuss the advisability "of asking the Government to keep these plants running."

From previous references to the five-day week proposal we gather that it is being urged because of the "assumed advantage of restricting output," and is not based on the necessity for shorter hours of work, and one must assume that the miners' leaders are sincere in their mistaken belief that enforced restriction in production will assist in the restoration of business prosperity.

The coal production of Nova Scotia during 1919 will not, we believe, reach five million tons. Year by year it has dropped from the maximum of 1913 until it is now 2½ million tons per year below the 1913 rate of production. It is necessary to go back twenty years to find as low a coal output in Nova Scotia as will be recorded in 1919. The loss in provincial royalty revenues alone is \$300,000 per year, and that deficit must be made up out of taxation of the people of Nova Scotia. Canada's adverse trade balance is piling up, her credit on New York must be paid for by a higher premium than previously recorded. The Montreal market is temporarily at least lost to Nova Scotian coal producers.

It really does not matter much, this summer, whether the United Mine Workers decide to work five days per week, or any other number of days, because the choice of work will not lie with them. It will depend on the market for their labour. No juggling

with hours of labour, with wages, or with profits, will permanently enable the people of any nation to enjoy or consume a greater value than that of their production.

Meantime, we commend to the earnest thought of the mine-workers of Nova Scotia one outstanding economic fact, namely, that in spite of all the capital invested in developing collieries, shipping fleets, discharging plants and markets, the coal production of Nova Scotia is back where it was twenty years ago.

THE NELSON INTERNATIONAL MINING CONVENTION.

In this issue of the "Journal" will be found a full account, by our British Columbia correspondent, of the Second International Mining Convention held in Nelson during the 19th to 20th June. An interesting feature of the Convention—and one which assured its success—is the number of organizations which combined to arrange for the meeting. These included the Nelson-Slocan and British Columbia Mining Men's Club, the Northwest Mining Association of Spokane, the Kootenay Mine Owners' Association, the Spokane Chamber of Commerce, the Vancouver Chamber of Mines, the City of Nelson and the associated Boards of Trade of Eastern British Columbia and Nelson.

The technical programme was in charge of the Columbia Section of the American Institute of Mining & Metallurgical Engineers, and the Western Branch and Kootenay-Boundary Branch of the Canadian Mining Institute.

A mere statement of these facts, without comment, is sufficient indication of the organized comradeship that characterises the mining men of the Pacific North-West, not the least pleasing part of which is the international good-will that makes such a gathering possible, and rendered it so thoroughly successful.

5 DAYS WORK A WEEK.

Sydney Miners Will Inaugurate New Schedule Aug. 2.

Sydney, N.S., July 7.—That the proposed five day working week will be inaugurated, beginning August 2nd, was the decision arrived at by the United Mine Workers' executive, in session at Glace Bay. Another decision of considerable public interest was the voting of the sum of \$500 to assist the arrested Winnipeg labor leaders with the cost of their defence.

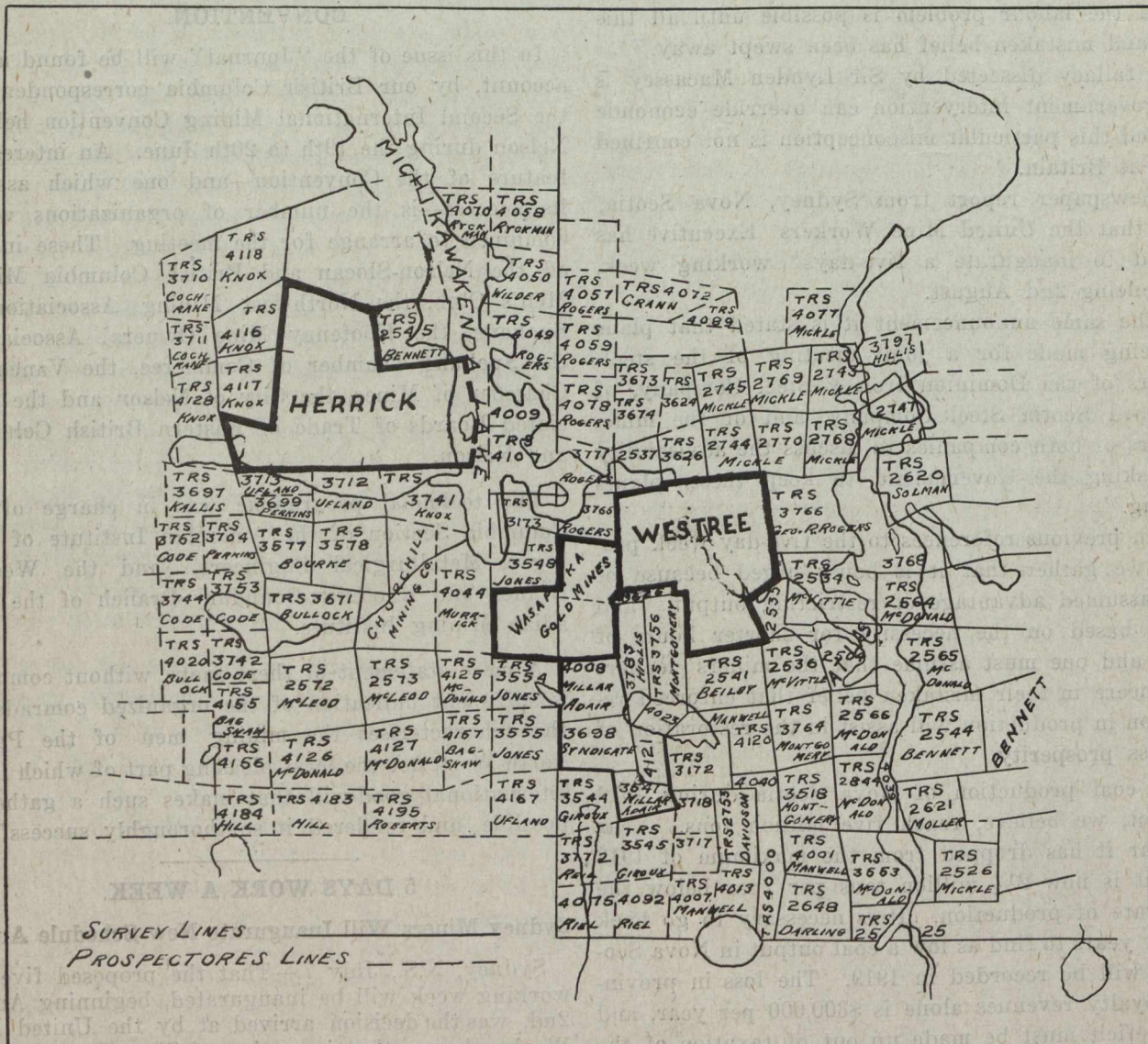
Plans are being made for a joint meeting of the steel workers of the Dominion Iron and Steel Company, and of the N. S. Steel and Coal Company, and the miners of the companies to discuss the advisability of asking the Government to keep these plants running. Things have come to the point where immediate action is necessary, and work is becoming slacker every day. At Sydney Mines the miners are working only two days of the week.

The Wasapika Gold Area

By REGINALD E. HORE.

In July, 1918, in company with Mr. George R. Rogers, president and manager of Wasapika Gold Mines, Limited, I visited the Wasapika and neighboring properties in Churchill and MacMurchy townships, Sudbury mining division, Ontario. Some account of the area was published in this Journal last August. I have recently revisited the area, and have again been very favorably impressed with its possibilities. Under the direction of Mr. Rogers, development work is being carried on at several pro-

and hundreds of claims staked, but very little development work was being done. He carefully examined a large number of properties and purchased a few of them. On one of the most promising he did considerable surface work. After carefully sampling, he decided to develop the Ribble vein on what is now known as the Wasapika property. Like other pioneers who would develop mines in a new district he encountered many obstacles, notably transportation difficulties, but he stayed with it, and is now making a



Sketch Map of Wasapika District.

erties in a way that is commendable, and is very likely to result in the making of gold mines in this little known, but much discredited area.

In this article, I will give some account of my observations. The numerous photographs will help readers to visualize the area. Those who are particularly interested in the development of new fields will be able to appreciate what Mr. Rogers and his associates have accomplished. When he entered the area a few years ago many discoveries had been made,

mine at the Wasapika. He is also in charge of the development work on other neighboring properties, and is handling them in an able manner. No man can be certain as to the outcome of mining ventures; but the Wasapika area has promising ore deposits, and will in all probability become a profitable producing area if the properties are all handled in as capable a manner as those in which Mr. Rogers is interested. The making of a producing mine in the hinterland is something that arouses our admiration, and I need



A View from West Shining Tree Hotel.



Westree, on the Canadian National Ry. The starting point on the road to Wasapika.



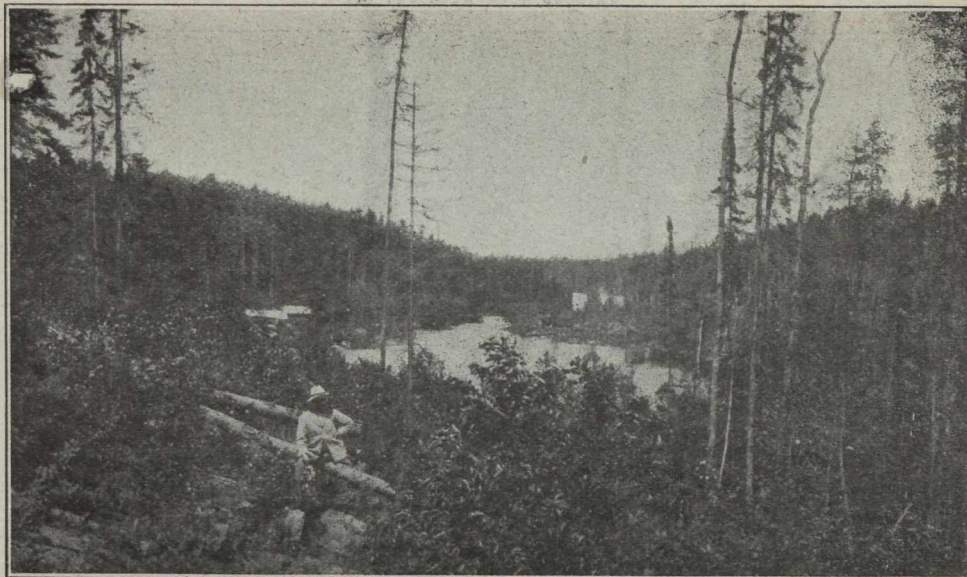
West Shining Tree Hotel.



On the road to Wasapika.



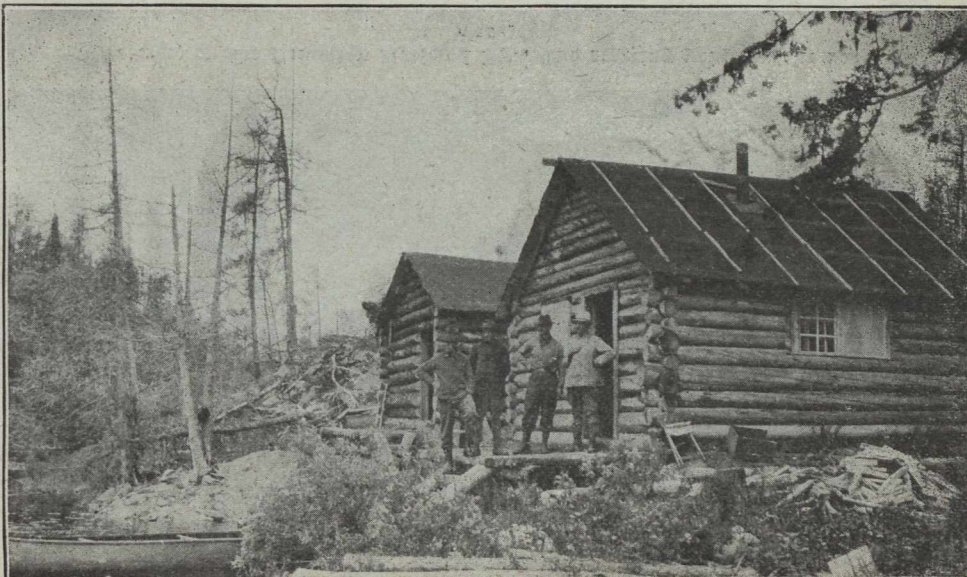
Westree Shaft No. 2.



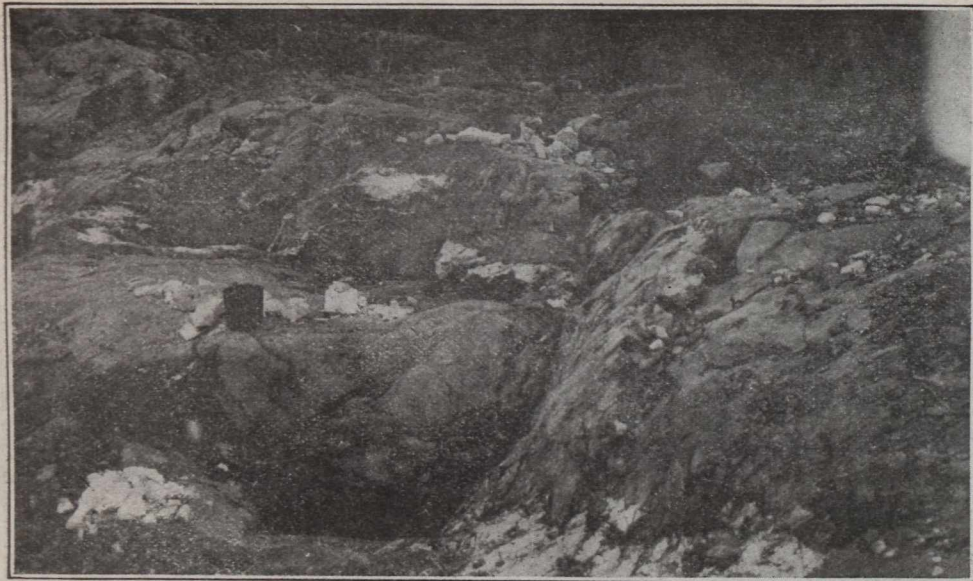
Looking up Upper Wasapika Lake. Westree Camp buildings at left.



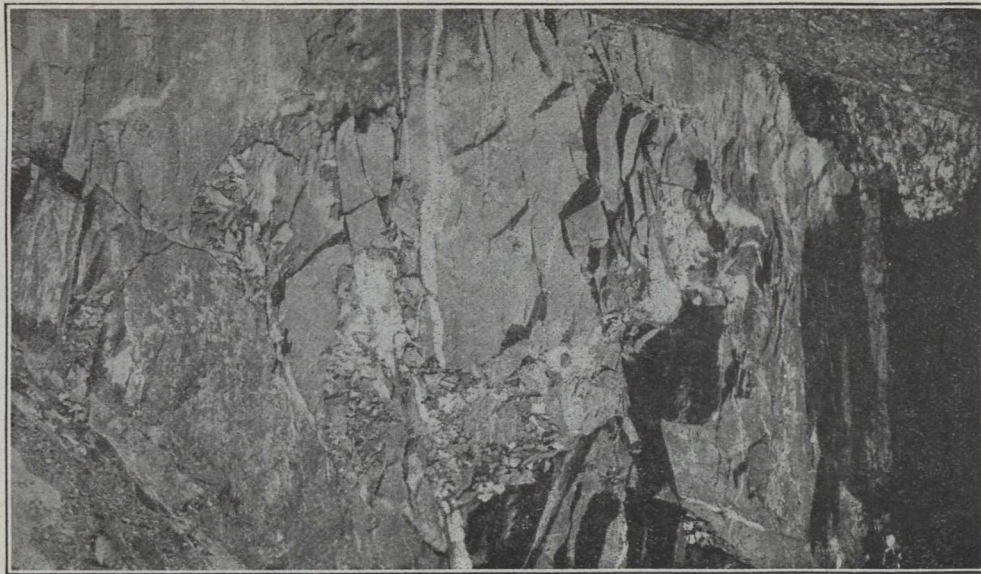
Looking up Upper Wasapika Lake from edge of dump at Shaft No. 1.



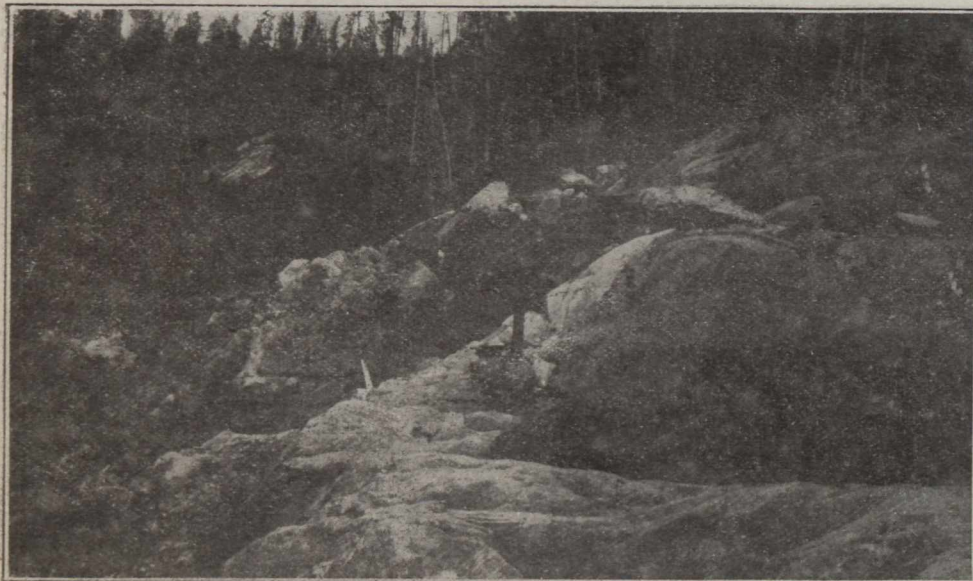
The Westree Office.



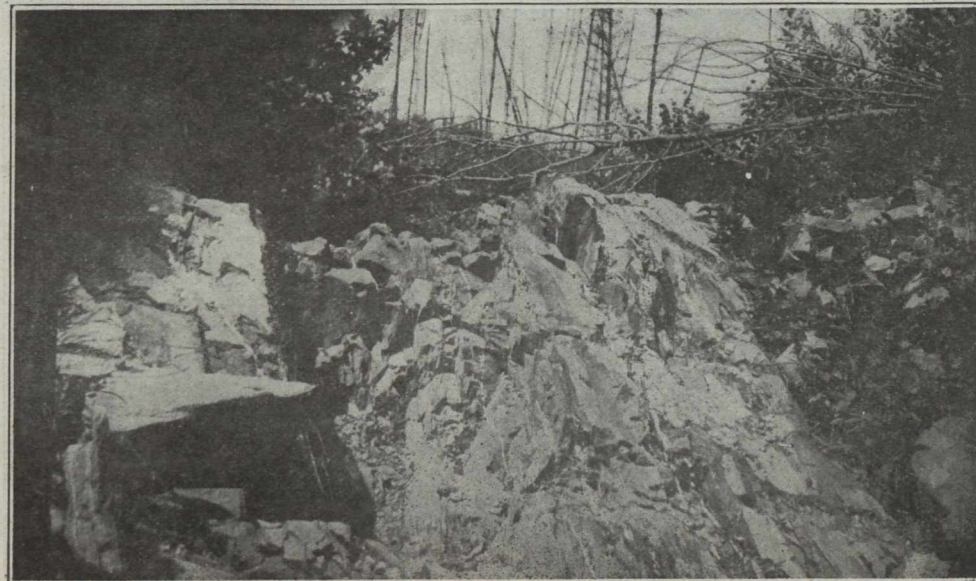
Looking along a fault in the Bennet Vein.
Vein shows at centre and continuation at lower edge of photo.



View of the Westree ore Deposit at Shaft No. 2.



An Outcrop of the Ribble Vein, Wasapika Mine.



An outcrop on the Westree Property.



The Outlet of Upper Wasapika Lake.



Halfway House on the Road to Wasapika.



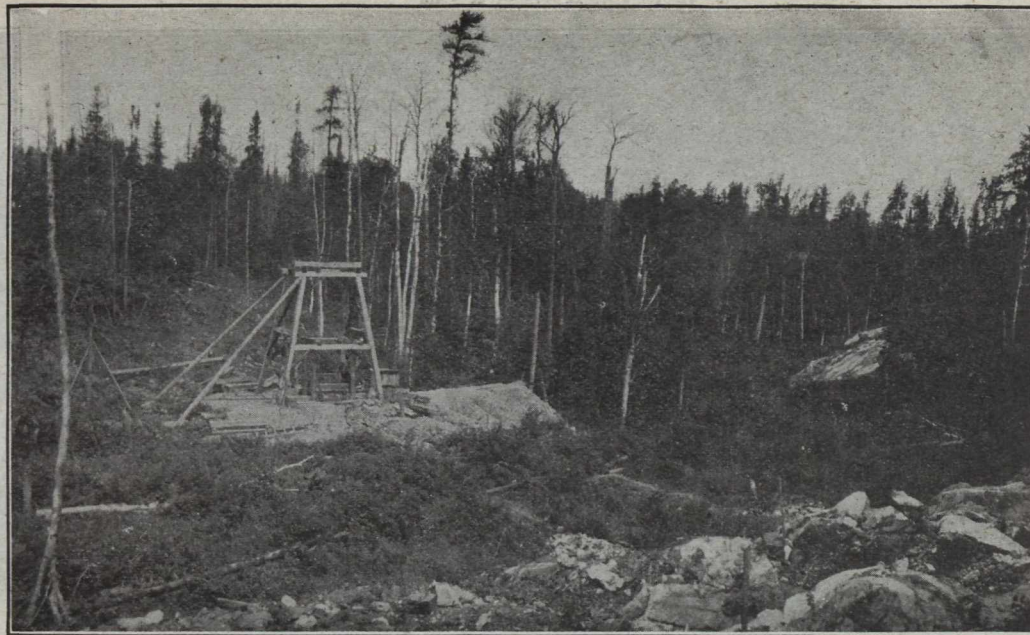
An Outcrop on the Wasapika Property.



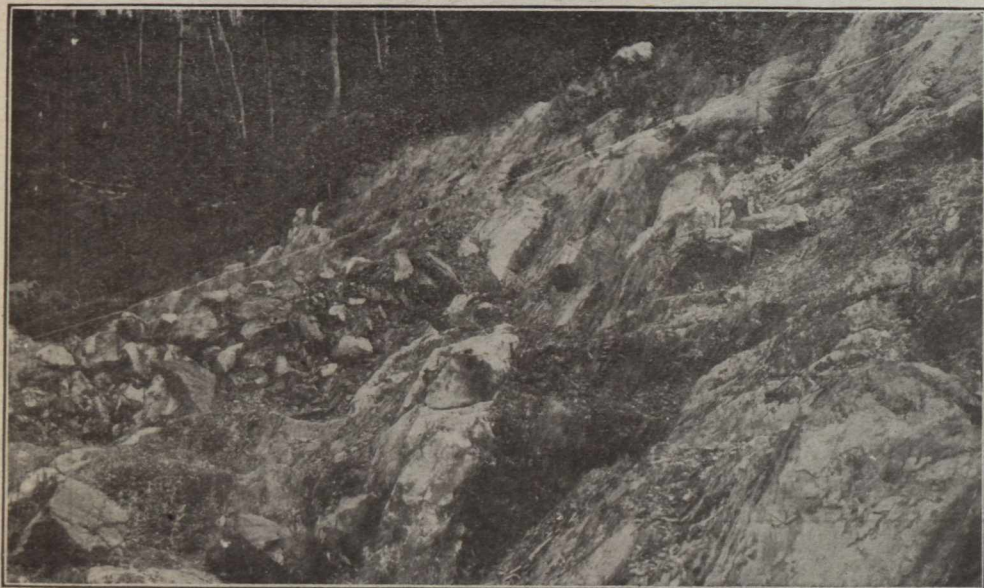
A stretch of Corduroy west of Halfway on the road to Wasapika.



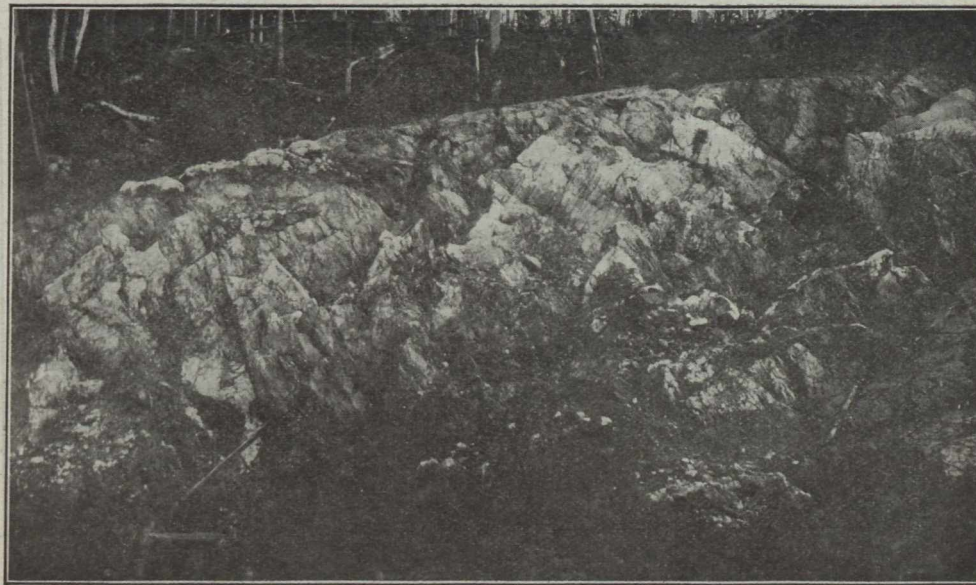
Cutting Samples from a Vein in the Churchill Property.



The Wasapika shaft on the left. Ribble vein outcrops at right and in District.



An outcrop on the Wasapika Property.



An out crop on the Wasapika Property. The quartz vein lies on the face of the outcrop.



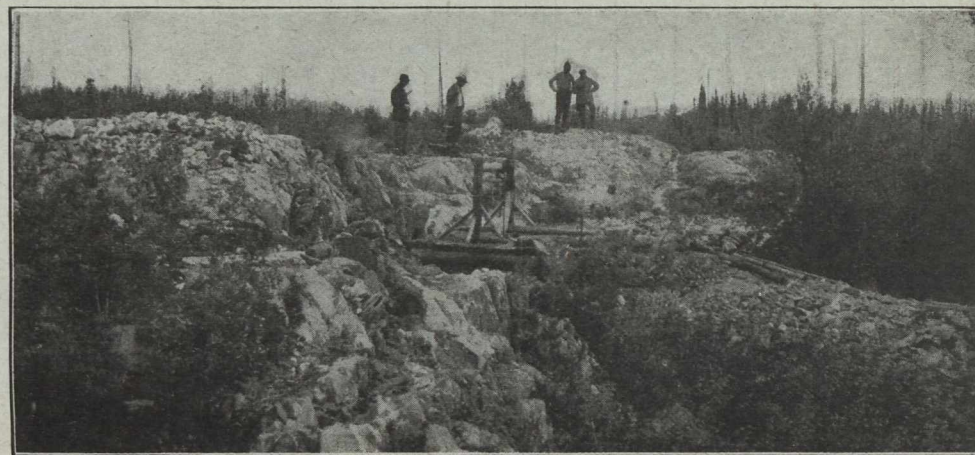
On the Bennett Property.



The Wasapika Power House and Head Frame.



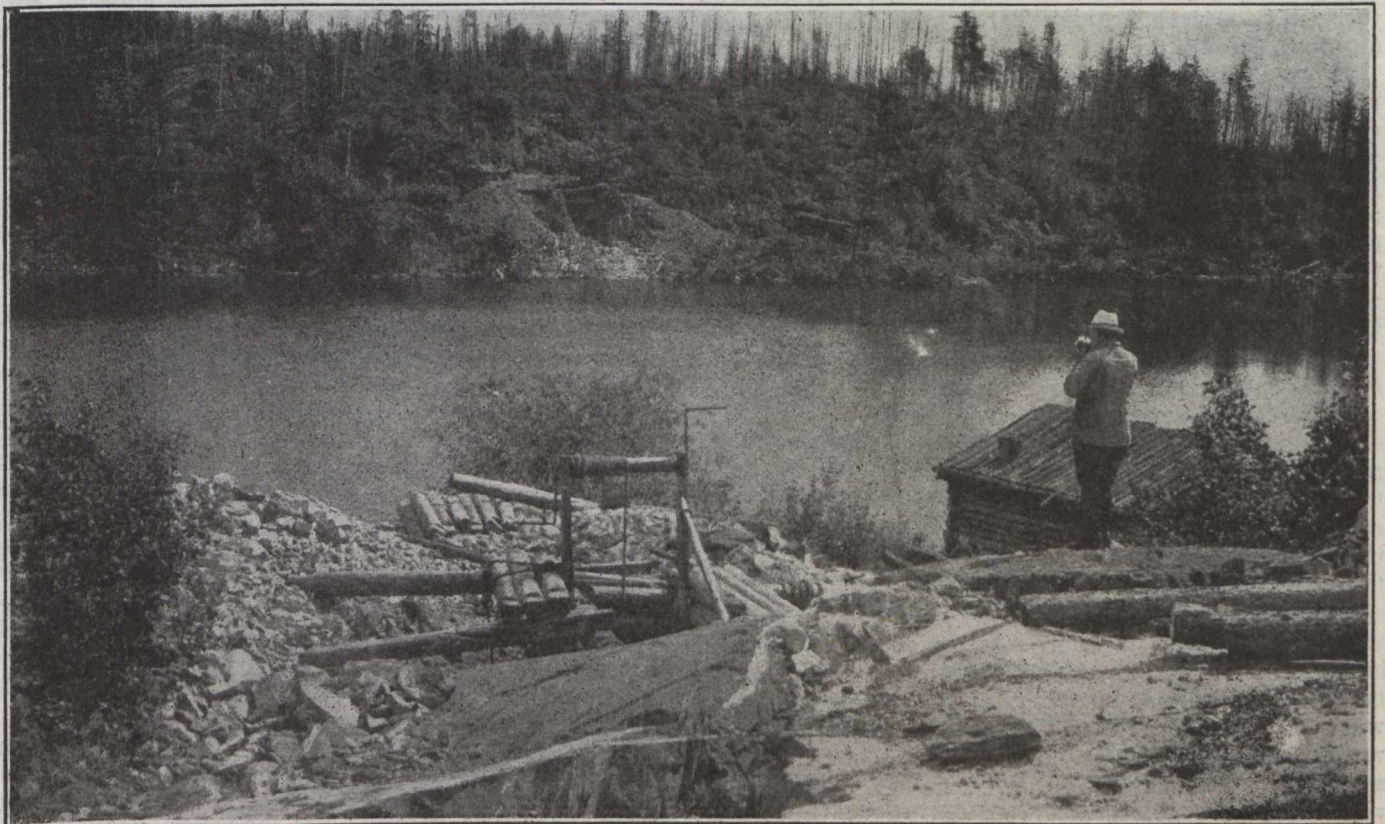
Manager Rogers Seated on Ore that Runs about \$200 per ton.



The Bennett Vein and Shaft.



A Portage Scene on the Way to Wasapika.



Looking across Upper Wasapika Lake. This view shows location of workings on the Westree Property.

not apologize to readers of this journal for prefacing my remarks about the area by recognition of the fact that it takes men as well as ore deposits to make mines. To the prospectors who located the claims and to those who are developing the deposits the people of Ontario owe more than they realize.

The Wasapika Area.

The area which I visited, and which I am here calling the Wasapika gold area, is a part of West Shining Tree area. The Wasapika property is south of Michikawakenda (nice little pickerel) lake. The Churchill is west of the south end of the lake. The Westre, formerly known as the Caswell, adjoins the Wasapika on the east end and extends north across Upper Wasapika lake, which is fed by the waters from Michikawakenda lake. The water runs east of Upper Wasapika lake to Wasapika Lake—an expansion of the west branch of Montreal river. The Atlas property is at the south end of Wasapika lake, and from its rocky promontory one may look across Wasapika lake and down the Montreal river. A short distance up the river, and on the east bank, is the Bennett property. The Adair property is south of the Wasapika and the Foisey is further south. The location of all the properties mentioned is shown on the accompanying sketch map.

Means of Access.

To get within 25 miles of the Wasapika area is an easy matter. The Canadian National Railway runs north-easterly across the country at that distance. The most used stopping place is at Westree, formerly known as Kashbaw. It is at present only a flag station; but will doubtless be soon a regular stop. Quite recently the need of improving service has been recognized by the placing of an agent at Westree station. Trains leaving Toronto at 9.15 p.m. reach Westree about 10 o'clock the following morning. Returning you leave Westree about 3 a.m., arriving in Toronto about 4.30 p.m. the same day. These trains run three days a week, leaving Toronto Monday, Wednesday and Friday.

From Westree to Wasapika there is a good water route, on which motors of the Evinrude type are advantageously used. From Ruel there is another good water route. A day's journey by water brings you from the railway to Wasapika mine. The portages are short and well cut out. It is a comparatively easy canoe route, and, by use of motors, it affords access to the gold area without any great hardship. It is a roundabout route, however, and double the length of the road which runs in a fairly direct line from Westree to Wasapika mine. At present the river is blocked with logs near Westree, but this condition of affairs need not be tolerated for long.

In less comfort, but with a saving of time, one may reach Wasapika by road. At present wagons are used on this road for half the distance, but for the remainder the road is usable only in winter. The Government now has a party of workmen improving the road near Westree, and it is understood that an effort will be made to make the road usable for its whole length this summer. Attention is at present being directed to improving the first half. This is much to be desired, but there should also be now at work the second half of the road another party of workmen. Otherwise it will be impossible to take in any heavy freight during the summer. I am advised that this part of the road will receive attention very soon.

The present method of getting in supplies is to use the road for half the distance, and use the water routes for the other half. At the halfway, a stopping place where meals and prospectors' supplies can be obtained has been established by Mr. Borland, of Toronto. Freight is carried on wagons to the half-way by freighters, whose charge is about \$1.00 per cwt. From the halfway to the mines the various companies bring their supplies by motor boats and canoes.

On the water route to Wasapika, the lake which has given the name West Shining Tree to the district, is crossed. Here is another stopping place, the West Shining Tree hotel, run by Mr. Cosineau. Mr. Cosineau's place is also convenient for those who use the road from Halfway to Wasapika. Few use the road in summer time, however, except as a trail. West Shining Tree lake is a large one, with numerous islands; quite picturesque, with numerous rock outcrops exposed here and there along the wooded shores.

In the vicinity of West Shining Tree lake there have been several gold discoveries made. I did not visit the properties, however, and know them only by hearsay. It is understood that some work will be done on at least one of the properties this year.

Leaving West Shining Tree Lake, we followed a little stream for a few miles, then walking over a well-cut portage, crossing a small lake, walking over a second portage, and then taking the boat down another small stream, we reach Okawakenda (Big Pickerel) lake, and thence Michikawakenda Lake and the Wasapika mine.

The character of the country traversed is well indicated by the accompanying photographs, and I need not describe it at length here.

The Wasapika Gold Mine.

At the Wasapika mine there has been installed since my last visit a plant well suited for development work. The shaft is being sunk in the hanging wall, a short distance west of the outcrop of the Ribble vein. The rock coming from the shaft is fine grained, grey colored and somewhat schistose. It is well mineralized with pyrite. It contains much fine grained carbonate mineral, probably a calcium-magnesium-iron carbonate, and sericite. White quartz is encountered here and there in the shaft. I must more carefully study the rocks and ores before venturing to describe them fully; but from my observations I have no hesitation in saying that the formation is favorable for gold deposits, and there may well be a large body of ore in the hanging wall of the Ribble vein. Further geological examination and sampling must be done as development proceeds. I regard the results so far obtained as very encouraging. The shaft is an advantageous position for the continuance of development work. A capable superintendent, Martin Hasset, is in charge of operations. If nature has been kind and has sprinkled enough gold in the hanging wall the Wasapika will be one of Ontario's big gold mines. It would be foolish to say that the gold is there in sufficient quantity. The development work is being done with the object of finding out whether that is the case, as well as to test at depth the Ribble vein itself.

Just here it might be well to distinguish between veins and ore deposits. The quartz veins in the Wasapika area are very narrow—a foot or two is a good width. The ore deposits are, however, not all vein quartz; but largely silicated rock. The ore deposits,

vein quartz and rock included, are themselves commonly not more than a few feet in width for any length, but they are a minable width.

At the Wasapika, where most of the development work is being done, it seems not improbable that the ore deposit will prove to be very much wider than the Ribble vein. Should the ore deposit prove to be only a few feet wide, it may yet prove very profitable, for surface sampling indicates a good grade of ore in the vein quartz, and the silicated schist enclosing the quartz. There is a reasonable chance that there may be enough gold in the silicated hanging wall to make a very wide orebody. It is unlikely that the grade will prove to be as high as the well defined ore deposit immediately along the vein; but it looks sufficiently promising to warrant careful testing. Fortunately the shaft has been so located that such testing can be done economically while exploration of the Ribble vein proceeds.

The accompanying photographs show the Wasapika power plant, head frame and blacksmith shop. Just south of the power house there is under construction a small saw mill building.

It will be noted from the photographs that the Ribble vein outcrops on the side of a hill, and that there is low ground immediately to the west of the quartz vein, which strikes north. The shaft is west of the vein, and a narrow wet depression lies between it and the vein. To the north from the shaft, as shown in one of the photographs, is another outcrop, on the western face of which the vein is again well exposed. Similar outcrops occur on the claims further north and south, and one cannot escape the conclusion that the Ribble vein marks out a major line of fracturing. It is not unlikely that good ore occurs in several places along this fractured zone. It remains for exploration to determine where the orebodies are. Obviously diamond drilling must be resorted to if the low lying places are not to remain unexamined. It would be strange if only the best parts have been left exposed. Developments at the Wasapika will help to furnish a key for exploration of the properties north and south. The diamond drill can be used to great advantage in such exploration. A series of short holes properly located would give very useful information. Correlation of the drill cores with the openings at the Wasapika shaft should give helpful guides.

Millar-Adair and Foisey.

South of the Wasapika there are outcrops of gold bearing quartz on the Millar-Adair and Foisey properties. No development work has yet been done on these claims. They are promising prospects that demand exploration. The main showing in each case is a white quartz vein at the eastern edge of low wet grounds. They are fit subjects for the diamond drill. Holes started to the west of the line of these outcrops and driven towards the line might disclose important orebodies. There is no certainty that they will do so; but there is a reasonable chance.

The Northern Extension of the Ribble Vein.

North of the Wasapika property there are outcrops of the Ribble vein on claims owned by George R. Rogers. These properties are yet to be explored. A little stripping has been done, and Mr. Rogers states that his surface sampling has shown good values in several places. The claims merit attention, and they will doubtless receive it later on.

The Westree.

The Westree property lies on either side of a narrow lake which drains into Wasapika lake, and which for convenience I am calling Upper Wasapika Lake. The accompanying photographs show the location of the shafts and of the camp buildings with reference to the lake. Some of the photographs will help the reader to visualize the character of the country. Others show, at close range, the nature of the ore deposits. The properties were formerly known as the Caswell.

From the abandoned workings on the north shore of the lake a considerable quantity of rich ore was taken out by former owners. As far as can be seen there has been little development work done other than that necessary to remove a rich pocket of ore. One of the photographs shows the size of the dump, a fair measure of the amount of excavation work done. Extending northerly from the shaft there is a fissured zone. One of the photographs shows the fissured zone at the shaft, and another photograph shows similar fissuring at an outcrop a short distance north of the brow of the hill. Other photographs show the ore deposit at a second shaft on the south side of the lake. There is no big quartz vein in this fissured zone. The ore deposit includes more rock than quartz. In places the narrow quartz veins are very rich, and there is little doubt that some small high grade shoots will be exposed during development. The future of the property depends of course on the average value of the deposit over a minable width, and the result of development work under the lake. The individual veins are short as well as narrow, but there are several narrow ones in the fissured zone. The fissured zone is itself not strongly marked a short distance south of the shaft. The natural course in testing the property is to sink on the ore deposit at the south shaft and drive under the lake toward the northern workings. The prospect shaft is now being enlarged preparatory to sinking. Some of the quartz broken during this operation is liberally sprinkled with gold.

At this early stage in development it would be rash to make predictions, but there is a good chance that the Westree will prove up favorably if its owners are prepared to risk some money on systematic exploration. The property, like most mines in the early stage, would never be developed by anyone who was unwilling to take a chance. Under the direction of Mr. Rogers and his superintendent, Mr. Hassett, the development work will be, we feel sure, well done.

While attention so far has been chiefly directed to the immediate vicinity of the two shafts, there are numerous other outcrops on the Westree that deserve attention. There are quartz veins and fissured zones that warrant surface work being done on them. One prominent vein exposed at the east end of the lake will probably be encountered in the drive across the lake.

The Herrick.

The Herrick property consists of several claims on the west side of Michikawkenda lake. Since my last visit a shaft has been sunk to a depth of 50 feet on the Kingsley vein. This is one of what were formerly known as the Knox claims. The deposit was briefly described by the writer in the Journal in August,

1918. At the shaft the vein has a well defined vertical wall. The shaft has been timbered and the surface outcrop has been covered with rock in levelling around the collar. The dump shows the rock excavated in sinking the shaft to be a greywacke, a fine grained grey-colored sedimentary.

The vein matter is chiefly quartz with some calcite and small particles of pyrite. On the fracture faces there is a soft dull green mineral that looks like serpentine. There is a thin layer of pale brownish grey calcite on some of the fracture surfaces—evidently a secondary filling. The vein matter is said to show good values for a minable width in the shaft. Samples show high grade ore in the shaft for a width of 5 feet. Mr. Rogers, who is consulting engineer for the Herrick, has sampled the vein as exposed in the shaft. I am advised by Mr. F. C. Sutherland that the samples show high grade ore to the bottom of the shaft.

The Herrick ore deposit is a well defined vein. The surface sampling showed good ore, and the development work has exposed such ore to a depth of 50 feet. Further development work by shaft sinking and drifting may very reasonably be expected to prove up an excellent orebody. I understand that this work will be undertaken as soon as the necessary machinery can be taken in. Exploration by diamond drilling will be begun shortly. I look for interesting developments at the Herrick this summer, and will be surprised if development work does not prove similar ore at depth. Changes in rock formation accompanied by changes in character of the fissuring are to be expected as development proceeds.

The chances of making a small profitable mine at the Herrick seem very good. There is also a good chance that it may become a big mine.

Other Properties.

There are a number of promising properties in the area in addition to those I have mentioned above. I made brief visits to some of them—the Churchill, Queen of Sheba and the Bennett.

At Churchill some work has been done on a vein exposed along the southern edge of an andesite outcrop. The vein strikes west. The accompanying photograph shows two men at work cutting samples. I know so little about this property that I do not care to venture an opinion about it.

At the Queen of Sheba, north of the Churchill, there was no work being done. A few minutes spent at the outcrops showed a deposit of different character from those already described. The ore is red with iron rust, and when broken shows an abundance of fine grained pyrite. The rock is a felsite with the glassy appearance and clean fracture of the more siliceous volcanic rocks. In places it has been squeezed laterally into sericitic schists.

The Bennett vein, on the Bennett claims east of the Montreal river, is shown in the accompanying photographs. It is undoubtedly rich, and should be carefully tested. I have not seen the assay plan, but the presence of much gold is easily detected in parts of the vein. Some of the structural features, and the

topography of the outcrop are indicated by the photographs. It will be noted that the location is very favorable for mining the upper part of the ore deposit, and that the deposit could easily be tested at depth by short diamond drill holes. At the time of my visit H. M. Roberts and Wm. Smith were examining the property for the E. J. Longyear Company. The Bennett is the only property east of the Montreal River that I visited on this trip. The ore and wall rocks are of similar character to those at the Wasapika. The quartz vein shown in the photographs is enclosed in grey andesites. Near the shaft it is distinctly faulted. At another place it is crossed by a narrow basaltic dyke. In either direction along the strike are masses of diabase.

Among other promising properties in the area are the Atlas and Saville-McVittie. I have not visited these recently. A number of men are at work on the Atlas.

Present Surface is a Mere Incident, Not a Governing Factor in Life History of the Ore.

The gold in the ore deposits here described is certainly not present as a result of concentration at the present surface. I do not believe that the present rock surface existed when the ore was deposited in the form in which it is now found. The present surface has no genetic connection with the ore deposits, and there is no good reason to fear the bogey of "surface enrichment." The ore exposed near the surface is of a type that is formed at depth and similar ore may confidently be expected to occur for any minable distance downwards. I do not mean to suggest that values will be uniform. I don't know whether they will be lower or higher, but I do believe that the conditions are favorable for the occurrence of deep ore deposits in which ore of similar mineral composition to that near the surface will be found at any depth to which mining operations can be carried. The individual deposits will doubtless vary in depth as they do in length, but the present surface is a mere incident in the lives of these ore deposits—not a governing factor.

A Promising Area.

After a second visit to Wasapika I still regard the area as one of great promise. There are difficulties to be encountered in developing the deposits, for they are 25 miles from the railway and the roads are not yet in shape for use in summer. There is as yet no large amount of underground work done, and there is a chance that when done it will prove disappointing. Some of the properties need to be tested by diamond drilling before one may even guess at their value. There are many things to be done, and the result of doing them is uncertain; but the work that has been done has given results that should prove encouraging to those who are willing to risk something in a bold attempt to make mines in the wilderness. To such adventurers I would strongly recommend this area. The deposits are promising enough for the venturesome, but not yet sufficiently developed for those who think they cannot afford to or will not knowingly take a chance.



OTHER WASAPIKA VIEWS.

Second International Mining Convention, Nelson, B. C.

Reported by our British Columbia Correspondent.

The annual International Mining Convention of the Pacific Northwest was held on the 19th, 20th and 21st of June at Nelson, B.C., and was attended by representatives of the industry from all sections of the British Columbia Interior and from the State of Washington.

Hon. Wm. Sloan, Minister of Mines, was present and informed the delegates that it was the policy of the Provincial Government to offer every encouragement to Capital, it being appreciated that this was essential if the country's mineral riches are to be developed. Taxes might be considered high, but they were not as much so as in the neighboring States and the Government was looking forward to the time, which he trusted was not far distant, when assessment would be based only on net incomes.

One of the Convention's features was the announcement that the Committee appointed to investigate the charges against the Consolidated Mining & Smelting Company of placing its rates of treatment at such a figure as to impose a great hardship upon shippers of ore, had found the company "not guilty." This was followed by a suggestion from the company's officials that they and the independent shippers should get together to consider and settle their differences as well as to solve their joint problems.

There were a number of valuable papers, dealing with all phases of mining activity, and F. A. Starkey, the Convention Manager, and his Associates were congratulated on the able manner in which the event was organized and carried through.

First Day's Proceedings.

Organization of C.M.I. Branch for B.C. Interior.

The first day was employed in the organization of a branch of the Canadian Mining Institute for the British Columbia Interior. Mr. S. S. Fowler, Manager of the Blue Bells Mines, near Riondel, B.C., was selected to act as Chairman and explained that the purpose of the proposed branch was to give the mining men of the Eastern Districts of the Province a medium for the consideration of problems which were constantly arising relative to the industry and for the impression of their views, with the support and influence of the Canadian Mining Institute, upon those in authority in Government or otherwise. He was sure the importance of this would be recognized and that those associated with the development of the industry would co-operate in order that the move might be made a success. These views generally speaking were endorsed, and some suggestions made as to how the usefulness of such a Branch could be emphasized, by Dr. E. T. Hodge, Professor of Mining at the University of British Columbia, Ernest Levy, James Anderson and R. R. Bruce. It was pointed out that heretofore matters relating to mining in the Kootenays had been dealt with by organizations not directly affected and only indirectly interested. For these reasons it was decided, without opposition, to launch the new organization and the necessary formal steps were taken, officers being elected as follows: S. S. Fowler, chairman; W. G. Wilson, secretary; executive committee, James Anderson, Kaslo; Randolph R. Bruce, Windermere; A. G. Langley, Revelstoke; F. S. Peters, Rossland and S. G. Blaylock, Trail, B.C.

Other events of the day were of a purely preliminary character. The Mineral Exhibit, which was housed in a canvas structure on the main street of the city, was judged. This was a representative display of the mineral wealth of the Kootenay and Boundary Districts of the Province. Most of the well-known properties were represented and the variety, as well as the quality of the specimens shown, were the subjects of favorable comment by visitors. After the session to which reference has already been made a reception was tendered a body of delegates from various parts of the Province, including the Coast, who came by steamer up the Arrow Lakes. Nelson is situated on the West Arm of the Kootenay Lake, a chain of inland waterways from which rise very beautifully timbered hills and mountains. The citizens are enthusiastic yachtsmen, canoeists, and motor boat devotees. There is available, therefore, quite a large mosquito fleet and this was mustered to extend welcome to the incoming mining men. It cruised down the water, greeted the regular steamer with all whistles and horns procurable, and turning escorted her into harbor. It was a striking scene, as the rays of the sinking sun were reflected on the placid waters and the varied colors of the mountain and hill sides were thrown into relief, while the little craft churned their way into the quaint little City of Nelson, the mining centre of the interior of one of Canada's greatest mineral producing provinces.

Proceedings of Second Day.

On Friday, June 20th, the Convention got into full swing. The delegates about two hundred strong assembled at the gaily bedecked City Hill to listen to addresses of welcome from Mayor J. A. McDonald, who figuratively handed them the keys of the City. Hon. John Keen, Speaker of the British Columbia Legislature, was another of those called upon. Himself a pioneer among pioneers, one of the sturdy band who had a hand in the opening up of the Slocan District, a man direct in speech, uncompromising in his statement of fact, and possessed of a sense of humor which makes his public utterances features of all important gatherings of western mining men. Mr. Keen bade the delegates welcome in warm terms. He said that the City of Nelson admittedly was a delightful place and no doubt they would have a good time. But there was another city, which wished to be remembered—Kaslo, the Mother City of the Kootenays. For some reason she could not have the Convention and so was glad that it went to Nelson, her largest suburb. (Laughter.) The delegates could thank God that there were not living in the years 1891 to 1894. Then they did not have the learned geologist and the equally learned metallurgist to tell them when they were wrong. True these accomplished men did not tell them when they were wrong till after the event even today, but nevertheless their advice was available and unquestionably it was invaluable. (Laughter.) There were some of them present and he could assure them that what he said was not intended in any but a complimentary sense. To the visitors from Spokane and other points on the American side he wished to extend a special welcome. Their co-operation was always appreciated. They had done good work in

the past and would continue in the path of industry and virtue. It had been Spokane mining men who had done a large part in the development of the Slocan in the early days. British Columbians had never forgotten that and the latter's sense of obligation had been so great that they had turned around and constructed Spokane, one of the great industrial centres of the State of Washington. "Let us continue hand in hand," advised Mr. Keen, "remembering that the important things are to find and recover the ore and then obtain for it the best possible price."

Remarks of the Secretary A.I.M. & M.E.

L. K. Armstrong, Secretary A.I.M. & M.E., expressed appreciation on behalf of himself and associates, the majority of the City of Spokane, on the hearty manner in which they had been received. He declared that Mr. Keen's observations regarding Spokane were founded on fact and the fact was appreciated, generally, by the citizens of that city. He had heard it stated, and be-

Joint Meeting A.I.M. & M.E. and C.M. Inst.

In the afternoon there was a joint meeting of the A.I.M. & M.E. and the C.M.I., Mr. Fowler occupying the chair. Three interesting papers were read as follows: "Mining Methods at the Granby Mines, Phoenix," by C. M. Campbell, E.M.; "Nodulizing Copper Concentrate," by Oscar Lachmund, E.M., Spokane, Wn.; and "Tunnelling Reminiscences," by Major Angus W. Davis. Summaries of the two former are subjoined while the reference suffices for the latter inasmuch as it was read before the recent annual meeting of the Western Branch of the C.M.I.

Mr. Campbell's Paper on Granby Phoenix Mines.

Mr. Campbell's paper was illustrated by lantern slides. He stated that the first of the camp's claims, the Knob Hill and Old Ironsides, were staked by Henry White and Matt Hotter in 1891. There followed a period of comparative inactivity, marked by intermittent development until in 1901 a consolidation of min-



International Mining Convention, Nelson, B.C., June 19-21st, 1919.
Delegates outside Convention Hall.

lieved it to be true, that that City would be but a village; were it not for the mines of the Kootenays and the Boundary of British Columbia. It was said that its extent and its business was about 80 per cent due, either directly or indirectly to the mining industry. The interests of the producers of the Province and of Spokane, therefore, were closely allied and he was sure that they would in the future work together in an ever larger degree than they had in the past. In closing he delivered a message of goodwill and regret at his inability to be present from Phillip M. Moore, former president of the American Institute of Mining Engineers, who had attended the last Convention in Nelson and recalled his experiences on that occasion with extreme pleasure.

L. O. Howard, of the College of Mines, Washington State College, spoke briefly, referring to his pleasure at being present and stating that he came, not to lecture, but to learn.

ing and smelting interests resulted in the formation of the Granby Consolidated Mining & Smelting Company. The first ore was shipped in July, 1900. Between then and June 14, 1919, about 14,000,000 tons were shipped. From 1910 to 1916 daily shipments averaged 3,000 tons; while in 1912 and 1913 the daily average output was 4,000 tons a day. Mr. Campbell went into the geological conditions of the district and enumerated some of the bigger problems which the company's staff had to overcome. He stated that the mining costs, were exceptionally low and that it was possible to win and to successfully treat very low-grade ore at a profit. Efforts were made constantly to reduce the costs with such satisfactory results that as conditions changed, and the methods in use failed to yield a profit on the class of ore being handled, there were new methods ready to further decrease operating expenditure to such an extent that mining could be maintained and divi-

dends paid. As an instance he mentioned that timbering costs were cut in two years from 34 to 4 cents and later to 2½ cents per ton. And this was done, it was stated, with increased safety to the men. Views were shown of the town of Phoenix, shipping terminals, of underground workings showing stoping methods, the filling of stopes with waste, and electric shovel operations.

Nodulizing Copper Concentrate.

The preparation of copper concentrate for the market, stated Mr. Lachmund is a problem that confronts the British Columbia producer today, assuming that it is the intention ultimately to smelt all domestic copper ores within the Province.

The only market for such material was some outside reverberatory smelting plant as there were no such plant within the province. This meant high railroad freight charges owing to the high moisture content of the concentrate, or an appreciable loss of fines in transit if the product is dried before shipping, to say nothing of the additional cost of drying. He said that as there were several glass-furnace smelting-plants in British Columbia the logical method was to put the concentrate in proper physical condition for blast furnace practice. Three methods were suggested, namely, briquetting, sintering and nodulizing. The first he did not think very satisfactory as briquettes did not lend themselves to transportation. Sintering the sulphides in roasting pans or pots, he declared, made an undesirable product for British Columbia blast-furnace practice as far as retaining the sulphur is concerned, it bringing the percentage down as low as five.

Taking up nodulizing, that is getting the fines into round particles or nodules by passing the material through a revolving cylindrical furnace or kiln under application of heat, he said that it had been successfully carried out at several large plants.

He instanced the United States Metals Refining Company at Chrome, New Jersey, which had used the method on a large accumulation of flue dust, and later on flotation concentrate. The copper concentrate of the Braden Copper Company in Chili as well as the flotation product was being handled through the rotary kiln.

After quoting a number of authorities, Mr. Lachmund, said that it appeared that nodulizing the fine ores, flue dust and sulphide concentrate is the solution of the problem of preparing this material for the market where reverberatory furnaces are not available. In fact under average conditions smelting the nodules in the blast furnace can be done more cheaply.

He told of the series of experiments which he was called upon, recently, to supervise in British Columbia. For the preliminary work, a sheet iron tube 12 inches in diameter by about ten feet in length was used, and this was not lined with firebrick or other refractory material as only small lots of concentrate were tried at a time and each test was of short duration. The results indicated that a certain amount of the desirable products could be made in this way, but the apparatus was too small and crude, and fuel control too uncertain, to keep it up for any length of time, and no tests were made as to sulphur elimination, as the main object was to ascertain whether nodules could be made. Having determined this, the process was tried on a larger scale, the plant of an idle cement works being used. This consisted of a cylindrical revolving furnace 125 feet long by 7 feet in diameter inside the fire brick lining

and a coal crushing plant, the fuel used being powdered coal.

In telling of this experiment, Mr. Lachmund said that he had never heard of powdered coal being used for nodulizing copper-sulphite concentrate and consequently he and his associates were not very sure of themselves. It appeared to them that fuel oil was out of the question, the concentrate available being limited and the plant not being arranged for burning fuel oil. However, the former Superintendent of the works was familiar with coal dust firing and the experiments were initiated. It was discovered in the first place that the temperature required to be lower for making nodules from concentrate than it did in the dry process cement practice of calcining clinker. The burner was too large and the fuel feed difficult to control, the result was that there was produced everything from fine roasted dust to lumps of partially smelted material as large as a man's fist. However some good nodules were made which seemed to him to show that powdered coal could be used successfully as fuel providing that proper equipment is used. He said that coal dust firing was being used at reverberatory works and also under boilers of various types and that a similar arrangement no doubt could be worked out for a nodulizing kiln.

Dealing with costs he said it was impossible to obtain favourable working conditions always and the total expense could not be charged against the operation. An effort was made to obtain representative cost figures when the kiln was doing good work, but they were more or less estimates. Between 12 and 14 tons of concentrate were treated with one ton of coal. He figured the coal at \$5.00 per ton pulverized and in the bin, and thought the cost of concentrate nodulized should not exceed 50 cents. To these figures, however, would have to be added overhead and other expense items amounting to about 50 cents perhaps, and making a total of \$1.00 per ton. He said that the capacity of a kiln 125 feet long such as had been used in these experiments should be about 100 tons of concentrate a day.

In closing, Mr. Lachmund commented on the rapidly gaining popularity of powdered coal as fuel and asserted that this should result in making certain so-called semi-lignite coal of Western British Columbia of commercial value. He also surmised that any future discoveries of large copper deposits in this province probably would be of so low a grade as to require water concentration. It would therefore be necessary to ship the concentrate to a smelter and he did not think that anything could be more desirable than the installation of such a plant as would permit the driving of the moisture from the product and as much sulphur as was undesirable. Not only would this give the smelterman a very attractive material for his plant, but would save the operator substantial freight charges.

Consolidated Smelter Charges—Committee's Finding.

Mr. Fowler explained that, as Chairman of the Committee appointed to investigate the justice or injustice of the charges levied by the management of the Consolidated Mining & Smelting Company on custom ore treated at the Trail B.C., Smeltery, he had been asked to give a summary of the Report of the committees which had been forwarded to the Minister of Mines at Ottawa. He recalled the circumstances attending the appointment of the Committee which included James Anderson, of Kaslo, B.C., and Ivan DeLashmutt and himself. Something over a year ago the Consolidated Mining & Smelting Company announced that conditions made it essen-

tial that a new schedule should be applied to ores received for treatment. Following this "Schedule B." was issued imposing higher rates on lead ores. Considerable dissatisfaction was manifested by operators and mining men generally and the company became the subject of such criticism that the matter was taken up by various public bodies, among them being the Board of Trade for Eastern British Columbia. Representations to the Dominion Government at Ottawa finally led to the endorsement of the proposal that an investigation be instituted and the Committee as indicated had been authorized to proceed with the work.

The inquiry had been pushed forward with all possible expedition and the Committee had been given every possible assistance by the officials of the Company. Mr. Fowler emphasized this point. It was a matter of satisfaction to him that the company's books had been thrown open to the members of the Committee without reserve and nothing withheld.

The conclusion reached was that the company was justified in the increases enforced at that time. It had been justified, in the Committee's opinion, because it was shown that the smelter had not been making a profit. What profits were made were coming, not from the smelter, but from the mines, the property of the company and operated in connection with the smelter. There had been a time, it was true, when the smelting as such had been profitable. That was when there was available, close in and around the plant, ore of exceptionally high quality, among which could be instanced that of the Saint Eugene Mine. This, however, had become exhausted and conditions had gradually and completely changed. With the exhaustion of this mine it had been necessary to develop some permanent source of supply of ore for the smelter, a source which could be depended upon. The smelter management considered that it now had accomplished this in the Sullivan Mine.

Then there were to be considered the increased costs both of material and of labor. But, aside from the question of costs, as the market quotation on silver began to go up the quantity of zinky silver-lead ores received for treatment increased. The ratio of lead to zinc for satisfactory smelter handling should be about 9 to 1 in the slag but this, it appeared, was far from being the situation in which the company found itself. Their action, under the terms of "Schedule B.," made its effect felt in 1918 and on September 30th of that year it was found that the ratio of zinc to lead in the ores received had been reduced by approximately 50 per cent. It followed that the conditions in the furnaces and generally were much improved. Metallurgical experimentation with these ores had been in progress in the interim and, as a result, he was able to state that the company now was engaged in the preparation of "Schedule C." which, he understood, would mean a reduction of about \$3 a ton on the average custom ore treated. This meant approximately \$120,000 a year. He would not say that the company was giving it to the operators, or to those to whom it would go. The company could afford to take this action, or else it would not undertake it. But it was an evidence of its good faith. He thought the new schedule would be effective as from the 1st of July and believed that the change would be appreciated by the mining fraternity of Eastern British Columbia.

Remarks by Smelter Officials.

Mr. Bingay, of the Consolidated Mining & Smelting Company, said that he thought it was generally understood in 1918 that when the smelter solved its zinc

trouble those ores which had been affected by the increase would have the load relieved. There seemed, he said, little appreciation of the fact that at the time these increases were announced there were decreases in charges on certain class of ore used for the reducing of large zinc contents. With improved metallurgical methods, and the use of these diluting ores, it was possible to state that another schedule was in preparation which would be issued very shortly and go into effect without delay. He was not prepared to go into details. These were to be discussed and decided upon at a meeting between himself, other officials of the company, and the members of the investigating committee. There was no doubt, however, that there would be reductions. It was the intention to inform each shipper to Trail by letter of how the proposed changes would affect his particular class of ore, so that all would know just where they stood and there would be no reason for misunderstanding.

General Manager Suggests Co-operation in Marketing Zinc.

Mr. J. J. Warren, the Company's General Manager, made a plea for closer co-operation between the company and the shippers of the Province. He said that Mr. Blaylock informed him that the company would be producing shortly 75 tons of zinc a day. The Canadian market was 40 tons a day. What was going to happen to the other 35 tons and what was to become of the product of the independent shipper? There was only one solution, namely, the search for foreign market and the acceptance of lower prices. The point could not be evaded. It was the company's policy to share fairly and evenly the Canadian market with the independent man, and it wanted the latter to show a willingness to share with it the loss resulting from the lower prices obtained outside the Dominion. It was the same with regard to lead and copper. This was a reason why he thought it in the interests of both to come together for a discussion of matters generally relating to the industry. There not only was the question of market but other common problems such as duties, embargoes, labor, etc. All of these, and many others, affected both the company and the independent shippers. It was in their interests to get together and to co-operate. Now that the company had been given more or less a certificate of good character he thought this might be arranged. He did not favor Government ownership and did not think it would be a good thing for the industry to have a Government official, who probably knew nothing about it, at the elbow of the management giving instructions as to how the smelting should be done. The company was not going to be satisfied until the Trail plant was made the best of its kind on the American continent in point of efficiency and of service. It was faced with all manner of difficulties. The attaining of such a goal would require the patience of a Job and the persistence of the Devil. But the company had them both. (Laughter.) "Now," he concluded, "I have presented the olive leaf, or rather the olive tree, you may accept or reject it."

Nicol Thompson, of Vancouver, B.C., and R. R. Bruce of Windermere, commended the Committee on its work. They also endorsed the suggestion that the Committee should be made permanent. That such was proposed had been indicated by Sidney Norman, of Spokane, in the course of a few remarks in which he expressed his gratification at the conclusions reached by the investigators and hoped that the Government would continue in office a Commission, the duties of which

would be to keep in touch with the smelter management and act as an intermediary between it and the shippers. He, and the majority of those who expressed themselves, thought the idea a good one, Mr. Bruce asserting that only in such a way could it be hoped that the good relations between the two would be preserved and without such good relationship the mining industry would be much handicapped.

Third Day.

Mr. Camsell on Geology of B.C. Gold Deposits.

When the Convention reassembled on the morning of Saturday, June 21st, Mr. Nicol Thompson, Cahirman of the Bureau of Mines, Board of Trade, Vancouver, presided and called upon Mr. Charles Camsell, of the Dominion Geological Survey, for an address on geological features of the gold deposits of British Columbia.

Mr. Camsell first commented on the falling off of production and the reasons therefore as commonly understood and pointed out that this was found so alarming that a commission was formed in England to discuss the problem of aid to the industry and in America proposals were made either to increase the value of an ounce of gold or to grant a bonus to producers. He spoke of the opinion of some students of political economy that it made very little differ-



From the hills above Nelson, B.C., with the Kootenay Lake in background.

ence how much gold was produced as long as there was sufficient production of other things. This matter had been discussed at meetings of the Canadian Mining Institute and the speaker thought that among mining men the opinion was unshaken that it was very necessary to produce more gold.

Mr. Camsell quoted statistics of world gold production during the last few years and said that the influence of war and the high cost of mining had had the same effect in British Columbia as in other countries. This was best illustrated by the actual figures, which are:

Gold Production of British Columbia.

1915	\$5,937,934
1916	5,167,834
1917	2,863,190
1918	3,558,895

He explained that the increase in 1918 over 1917 was due to one new mine which had not before produced, the Belmont Surf Inlet Mine. This unsatisfactory condition was, in the opinion of many familiar with the extent and possibilities of the province, only temporary. Continuing, Mr. Camsell said, "It is not exactly safe to argue because each mile of the Cordilleran chain to the south of the Dominion has produced so much in mineral wealth, that an equal amount

per mile will be found in the Canadian portion. But the difference is as yet so great and so much of our country remains to be prospected that we can well afford to feel that our production in gold as well as in other metals must increase until the difference per mile is greatly reduced. This and other conditions, therefore, lead one to believe that as soon as industrial unrest is settled, we will have reached the downward limit of gold production in this province and any change will be for the better."

The same was not considered to be the prospect in the United States, according to some of the best authorities, but it was being urged there as a patriotic duty to produce gold in spite of difficulties and discouragements in order to maintain their gold reserve and the credits based thereon. "The same duty," Mr. Camsell said, "devolves on Canadians and I would earnestly urge prospectors to devote more time and effort to the discovery and development of gold deposits."

Age of B.C. Gold Occurrences.

Having made a few observations relative to the geological occurrence of primary gold deposits on the North American Continent, the speaker stated that practically all of the gold deposits of the province belonged to the second or younger period of mineralization and that the whole production of gold is made from these deposits. They were all believed to be closely related to the great intrusions of plutonic rocks that took place in the Jurassic period, and were formed at the time of intrusion or shortly afterwards. Some of them appeared as contact metamorphic deposits formed on the border of the igneous bodies, but most of them occurred as veins both in the igneous and in the intruded rocks in a zone surrounding the igneous bodies.

"No workable gold deposits have been as yet developed," he said, "in British Columbia whose origin may be attributed to the early Tertiary period such as are found in Colorado, Montana, Utah and Idaho, or to the later Tertiary as the Bonanza deposits of Nevada and portions of the adjoining States and in Mexico.

"From 65 to 75 per cent. of the gold produced in the Province of British Columbia is obtained from the smelting of copper ores, but in describing or discussing gold deposits in this paper we only propose to consider those deposits in which gold is the principal metal obtained. Placers too need not be considered since they are secondary and derived from erosion from the primary deposits."

Mr. Camsell then dealt fully with each of the gold-bearing districts of the province, and in concluding, advised that in searching for gold a district should be selected where it is known to occur in lode form, or where the streams carry placer gold.

Mr. Sloan, the Hon Minister of Mines, addressed the Convention.

Hon. Wm. Sloan, Minister of Mines, who was well received expressed his pleasure at being present at such a representative gathering of the mining men of the Northwest. There was no doubt that the City of Nelson was one of the most charming communities of the Provincial Interior. He had enjoyed his visit and wished to acknowledge the hospitality of which he had been the recipient at the hands of the citizens and those associated with the Convention. In this connection he mentioned particularly Mr. Fred Starkey, the manager, and his associates. He congratulated

the former upon the able manner in which the arrangements had been carried out. As Minister of Mines he also extended greetings to the delegates who had come from the south of the line. As has been noted at a recent similar Convention it was pleasing to observe the interest manifested by the mining men of the neighboring states in the development of the minerals of British Columbia. Their co-operation was welcomed and appreciated. They had fought shoulder to shoulder in France in the settlement of the great problem of the ages, namely, the maintenance of democracy, of free government by the people, and now were prepared to face shoulder to shoulder, the problem, almost of equal importance, of restoring settled conditions and developing the illimitable resources of America.

There is, as you are all aware, a condition of unrest in Canada, as well as in other countries, at present. I want to say that this is not an uncommon manifestation after the disturbance of such a war as that through which we have just passed. Rather it is what might have been expected, inasmuch as it has been the experience in Great Britain, although perhaps not quite to such an extent, after previous and comparatively recent wars. In my opinion it will not be very long before the life of the country becomes normal. Certainly it must regain its equilibrium if we are to take up the work of our daily lives and continue along the lines of industrial development and general progress. Looking back it is gratifying to remember that the British Empire always has emerged from conflicts greater and stronger than ever before. Moreover, the various outlying parts of our Empire, through the trials of the past four years, are not more closely welded and more determined to stand together than at any time in their history.

Provincial Government Aims to Stabilize Industry.

The aim of the Provincial Government, to pursue the subject of conditions and their settlement, is to establish the best of relationship between Capital and Labor. Only by so doing can it be hoped that the best results be obtained in the development of our natural resources and this refers in especial to the great milling industry. The mining business is more or less a precarious one and it is appreciated that capital must have all reasonable assurance that it will receive consideration when placed in legitimate enterprise. When in New York recently I had many inquiries as to the situation in this province and the prospects for profitable investment and am therefore certain that, as soon as the industrial unrest to which I have referred and of which we all are so painfully aware subsides, we shall be able to take up the work confident that ample capital will be available. It is a matter of outside comment that the mining laws of British Columbia are fair and just, and of such a character as to encourage the capitalist to find in the development of its minerals as safe a field for investment as is to be found anywhere. In the matter of taxation I may say that the policy of the government is to base its assessment to a constantly greater degree on net incomes alone. At present, unfortunately, there are not enough considerable net incomes to make this possible and to pay the bills. That, however, is what we have in mind and those of us who are complaining of high taxation should remember that it is still higher in the adjacent United States.

Government Ore-Testing Plant.

While in Ottawa I took up with the Hon. M. Bur-

rell, Minister of Mines, the matter of the establishment in British Columbia of an Ore Testing Plant.

It is not necessary for me to say much to the mining men of the Nelson District of the necessity for such an installation. There has been an agitation for one here for many years. Mr. Burrell informed me that it was the Government's intention to begin work on such a plant, the required finances having been provided by the Dominion Parliament. It was undecided at the time whether it would be placed at Nelson or the Coast, it would be proper that it should be made an adjunct of the University of British Columbia. Personally I should have preferred that the province have a School of Mines, but we have embarked on a more ambitious enterprise, namely, the establishment of a University that will be a credit to this great western country. But I know of the difficulties experienced by mining operators in this section because of the lack of such facilities for the determination of what class of mill should be provided for the treatment of their various kinds of ore and there is no doubt that an ore-testing plant is a necessity in this district.

It is interesting, in touching on the complexity of some of our ores and the consequent difficulty experienced in effecting full recovery of their values, to recall a statement made in Nelson a few weeks ago in the presence of the President of the Canadian Pacific Railway, Mr. Beatty, by Mr. J. J. Warren, the General Manager of the Canadian Consolidated Mining & Smelting Company. He stated that Mr. Blaylock, of the company's metallurgical staff, and his assistants had discovered a process by which silver, lead, and zinc can be recovered from the Sullivan Mine Ore. He also is reported to have said that the problem of the treatment of the low grade gold-copper ores of the Rossland Mines had been solved and that within a short time the Rossland Mines of the Company would be turning out between 2,000 and 5,000 tons of ore daily.

I sincerely trust that I have correctly interpreted the purport of these statements. The first should mean much to the operators of properties, of which there are not a few with ore similar generally to that of the Sullivan Mine. The second should result in the bringing to the historic mining camp of Rossland that prosperity which she had enjoyed for so many years and which we all are interested in seeing continued.

In referring to this improved process I may say that while in Brooklyn recently I was interested in witnessing in operation a new flotation process, known as the alkaline process. The experiments appeared to show that oil could be satisfactorily supplanted by alkali, by the method for which patents have been secured. Those controlling this process have informed me that they are coming to British Columbia to demonstrate it in the treatment of some of our complex ores, and it will be interesting to watch the results of this work.

Iron and Steel Industry in B.C.

With respect to the Iron and Steel Industry to which as Minister of Mines I have devoted much attention I may say that we have on the Coast and elsewhere large deposits of magnetite ores. These are of exceptional purity. We have been handicapped by the lack of hematite and for that reason I was struck with a specimen of red hematite in the Nelson Exhibit. I have given instructions to the District Engineer to examine the property from which this sample was taken and to report fully. As to what has been done,

must if you are familiar with the Bounty Act passed by the Provincial Government grant a bonus of \$3 a ton on pig iron produced in the province from local ores. This so far has not given the results hoped for. Our action was followed up by an investigation of the possibility of the development of our iron ores by electric smelting, and Dr. Alfred Stansfield, an authority, was commissioned to come to the province and report. This he has done, and his report indicates that our magnetites can be so treated, but that the cost of power stands in the way of making the enterprise a commercial success. Recently an electric-smelter expert came to the Government and stated that he had an improved method by which it would be possible to treat our ores more economically. As the Government is much interested in this possibility a small grant was made in order that this method might be demonstrated and the results of the experiments will be known at an early date.

Government Aid in Construction of Roads and Trails.

When taking the office of Minister of Mines one of my first actions was to introduce the Mineral Survey & Development Act, dividing the Province into six mineral survey districts, each of which districts was placed in charge of a competent engineer. The duties of these engineers were to aid the prospector and the operators in every way, and I believe the policy has proved satisfactory. Among their responsibilities is the examination of such properties or prospects as require trails, or roads, to facilitate development. If the reports of our engineers indicate that the properties have merit and should be encouraged the Government authorizes an appropriation to aid in the furnishing of means of transportation. In this work we have spent \$207,535 in a little over two years, built 98 miles of mining roads, overhauled 437 miles of mining roads, built 75 miles of trails, and overhauled 420 miles of trails. The only complain I have received, as a matter of fact, is that the engineers have been unable to cover their districts thoroughly enough and this refers particularly to the district in which are the East and West Kootenays. So marked is this that I have come to the conclusion that your district engineer, Mr. A. G. Langley, must either have expert assistance or that the district will have to be divided into two. (Applause.)

The outlook everywhere in a mining sense is bright. As I have said, Capital is looking to British Columbia for investment. This is strikingly shown by the number of properties which have changed hands in the Kootenays, as well as the dealing which has been going on at Coast points. The industry generally appears to be in a very healthy condition. It remains for those directly interested to pursue their work energetically and along legitimate lines. The country possesses the natural wealth. It is the duty of the people to develop it in such a way as to contribute to the commerce and industry of the Northwest. If this policy is followed the confidence of those looking for profitable mediums of investment will be maintained and there will be no difficulty in obtaining capital.

Increase in Value of Mineral Output of Province.

Last year, when the mining industry did not flourish as it had done generally, British Columbia's mineral output in value was \$41,083,093, an increase over 1917 of \$4,072,701, or 11 per cent. This is particularly gratifying when it is remembered that decreases were reported from the States of Utah, Nevada, Idaho, Colorado and California. It was not the time, however, to look back upon the past. Mining men should look

forward. Not only is metal mining in the happy position of an assured future, but the gold producing districts of the Province having been mentioned, I want to say that it is significant that there have been of late many applications at the Department of Mines for placer dredging leases. There is no doubt that there is to be revival of this form of mining on the placer grounds of the Cariboo and other northern sections of the Province.

Mining Flotations Must Be Legitimate.

But it is essential that we as mining men should beware of the "wild catter." Under the Mineral & Survey Act I have authority to check such propositions as may seem, on investigation, to be of such a character. I may say that there is no objection to a company with a prospect issuing a prospectus which paints in fairly rosy colors the future of that prospect. But it is our determination that money obtained by the sale of stock shall be spent in the development of the property in question. It must be recognized that capital is needed at the beginning of the opening of every prospect and that those most promising not infrequently turn out differently on development. The biggest propositions must have a start, but those who put their money into them at the beginning must have fair treatment. Briefly it should be the duty of us all, in the interests of the public, to see that the mineral and not the public is mined.

Revival of Local Treatment as Regards Flotation by Dean Francis A. Thomson, of the College of Mines, Moscow, Idaho.

Dean Thomson stated that it was not his intention to hold very closely to the limits of the title inasmuch as it was his desire merely to touch, generally, on the development of the smelter and the rapid improvements being introduced constantly through advances in metallurgical methods.

It was not many years ago when throughout all the mining States and in British Columbia there were numerous little smelters. They had been dotted all over the landscape and their remains still were to be seen, a somewhat dismal reminder of the past. It had been discovered through experience that it did not pay for a single mine, small in its output, to attempt to maintain a smelter. This experience resulted in a combination of properties for the maintenance of the smelters to handle their joint production. The change was found to work admirably. The method then was carried further and we have the present conditions of very large smelting plants handling the product of considerable mining districts.

Revival of Small Individual Treating Plants at Mine Site.

It was Dean Thomson's opinion that another step in the process of evolution was about due, and in this connection he referred to the very rapid development, and to the wonderful achievements of hydro-metallurgical methods. He spoke of some of the things that already have been done along this line with particular reference to silver, lead and zinc and expressed the opinion that all this was but the beginning, and that some remarkable advances were probable in the not distant future. The time was coming when we would lose the period of consolidation in regard to smelting, and go back, in a measure, to the small installation at the mine. His theory was that the ore would receive treatment at the mine metallurgically, after which it would be shipped to the smelter for refinement. He did not want it to be taken that he held the opinion that the day of the smel-

ter was drawing to a close. That was far from his view of what the future holds in store. But he did want to make it clear that successful metallurgical experimentation was bringing about important changes in the method of treating ore particularly the peculiarly complex ores such as are found in the Kootenay and Boundary Districts of British Columbia.

Dr. Hodge Speaks on the Iron & Steel Industry of B.C.

Chairman Thompson called on Dr. E. T. Hodge, Professor of Geology, University of British Columbia, who took for his subject the iron and steel industry in British Columbia. He said that as it was admitted, apparently, that nothing could be of more benefit to the Pacific Northwest than the development of its magnetite deposits. It was strange that some action had not yet been taken. The natural resources were available. There had been considerable discussion as to the quality of the ore as well as in regard to its quantity. As to the latter point there was no doubt that there was sufficient available to supply a fairly good sized plant for fifty years. In regard to the matter of quality the ores of British Columbia were magnetite for the most part. Of these deposits there were many. It was possible that some of the magnetites of the Northwest would be difficult to handle because of their copper contents, but this was no longer a serious problem, inasmuch as it has been proved that copper was not a detriment to steel. There was no doubt however, that for the most part the British Columbia iron ores were exceptionally pure, and the only question of a serious nature that he could see was whether it was more desirable to adopt the electric smelter or abide by the old blast-furnace practice. For his part he was of the opinion that the blast-furnace was of the most service in an industrial way and that electric smelting as a main factor in a large iron and steel industry was not yet established.

It having been established that the ores available of the required purity, it was well to glance at other features in the consideration of such an enterprise. Plenty of good metallurgical coke could be secured. It was said that the coal of Vancouver Island was not desirable, but he doubted this. Vancouver Island coal has been subjected to some experiments and he did not think that it could be definitely said that it was not good coking coal. Certainly, however, the coal of the Nicola Coalmont-Princeton Valley was a fine metallurgical coal. In fact, there could be none better. Coal dust, too, had been used to advantage in the blast furnace, so that there did not seem to be any cause for doubt in respect of fuel.

There was lots of flux. Many belts of first class limestone existed in British Columbia. There was fluorite, a large deposit of which has just been opened by the Canadian Consolidated, and there were refractories. Everyone had heard of the magnesite of the State of Washington, which unfortunately now appeared to be inactive owing to the European situation. There also were good deposits of a similar nature in British Columbia. He knew of one in the Cariboo District a short distance from tidewater. Chrome, too, was found in this Province, there being deposits at Cascade and on Scotty Creek. Manganese had been found close to Kaslo and on Vancouver Island. It, therefore, would appear that those minerals necessary for purification purposes were present in the Northwest in ample quantities. It was apparent from what he had outlined that there could be produced without difficulty such alloys as Ferro-Chromite, Ferro-Magnesite, Ferro-Silicon, and Ferro-Tungsten. In regard to the latter,

Dr. Hodge said that he had knowledge of deposits of scheelite in the Cariboo District.

In short, the speaker declared that it was his opinion that the time for talk had passed and that for action had come. A plant should be established, he said, of from 200 to 300 tons per day capacity. Perhaps there might be some difficulty as to labour but Pittsburgh had started without trained men and had succeeded. There were a great many mechanics employed in the shipyards and it was possible that some of these might be available. In regard to the market he did not think that there would be any difficulty in finding or developing enough to take care of the production of such a plant as he had in mind. For instance there is an exceedingly large tonnage of sheet iron used for canning purposes in the Pacific Northwest. Moreover, too little attention was given to the possibilities of the Oriental trade, from what he had been able to gather, the accounts commonly heard of the extent of the Chinese iron deposits were exaggerated. It seemed to him that the Pacific Coast had an opportunity of developing a large trade intercourse with the Orient.

Desirability of Bonusing Steel Manufacture Urged.

If the possibilities were as stated how was it that no company had as yet embarked in the industry? The explanation, Dr. Hodge thought, lay in the very large amount of capital which would have to be invested and the fact that it would take a rather lengthy period before the industry was established on a paying basis. An iron and steel industry, he declared, should be treated by the Government in the same way as a railway. Railways were bonused or subsidized by the Government because they had the effect of opening new country, bringing about development, and materially aiding the advancement of an unexplored country. Why not apply the same principle to a steel industry? It was in much the same position. Much capital was required to start it and some years would have to be spent in putting it on its feet but, when it was established, the result in the employment of men, in the initiation of subsidiary industries, and in the general welfare of the country was inestimable. He believed, for these reasons, that the British Columbia or the Dominion Governments, or both, should subsidize the industry in this Province, just as they had done various railways. What had been done in the way of bonuses, etc., did not go far enough. If there was further delay others would seize the opportunity which, there was no doubt, was available at the present moment. (Applause.)

Some discussion followed. Mr. Armstrong, of Spokane, thought that there was an important future for electro smelting in British Columbia and Washington, because of the variety of the rarer alloys which they had been found to possess. Mr. Thompson, of Vancouver, emphasized the purity of the magnetites of British Columbia which were low in sulphur and without copper for the most part. As to magnesite, he said that Dr. Hodge had neglected to refer to the very large deposit of it at Atlin, B.C. He was sure that there were 1,000,000 tons of first-class hydro-magnesite lying on the surface a short distance from the town of Atlin. Rock Magnesite also occurred in that section. Mr. Thomson spoke of the bounties which had been offered by the British Columbia Government on pig-iron produced locally and to the efforts which had been made to induce the Dominion Government to do something to assist those who might contemplate launching an iron and steel industry.

"Platinum and Other Minerals Found in the Ultra-Basic Rocks," by William Tomlinson, E.M.
New Denver.

Mr. Tomlinson on the staff of the Munition Resources Commission in Canada during the war, directed his talk to the prospectors entirely. He spoke of the peculiarities of chromite, molybdenite, tungsten, platinum and others of the rarer metals. There were deposits, or indications of all those named, as well as of others, in British Columbia. The trouble, he stated, was that the average prospector did not recognize them when he saw them. It was more than likely that he would walk right over chromite, for instance, and systematic education of the prospectors was required. Mr. Tomlinson recounted his experiences in the Franklin Camp and the finding there of platinum in place. Mr. Tomlinson concluded with a very strong plea for government assistance on behalf of the prospector. This duty had been neglected in the Northwest to such an extent that there were few men, comparatively speaking, going into the hills. In California alone had he found the educated prospector. The men he had seen there were hard to deceive when it came to the appraisal of mineral. There was no reason why such a condition should not be developed in B.C. and he recommended that mining schools should be opened in the different mineral districts during the winter months. This would enable men to employ their idle time in acquiring knowledge and fitting them for the summer's work. He also expressed the hope that all the District Mining Engineers would place exhibits of the rarer minerals at their headquarters for the benefit of prospectors and others.

"Straight Talk" From a Veteran.

J. J. Mulholland, a pioneer prospector, gave what was entitled a "straight talk." He briefly outlined his experiences in the wilds of the Northwest and referred to the future of the great unexplored northwest section of the province in a mining sense as being full of promise. He thought it likely that there would be found another Klondyke somewhere along the great rivers of the Peace River and adjacent districts. It was his intention, in fact, he already had completed plans, to conduct an expedition into the Mackenzie River Country. Of course, the great difficulty, even if a strike were made, was that of transportation.

During the last few years there had been comparatively little prospecting and the reason was hard to find. It was true that the prospectors were given little encouragement. In the old days it was not hard to obtain a grub-stake, but now if a miner asked a merchant for one it was likely that the latter would express doubts of his sanity. The construction of trunk trails into the unexpected areas he thought was a desirable move, because there was no doubt that it was extremely hard to travel through the heavily wooded and mountainous frontiers of this province. The teaching of mineralogy and geology in the public schools would help and he thought that each Mineral Survey District should be provided with a map showing its topographical peculiarities and the mineralized zones.

Illustrating the results of prospectors working in the darkness of ignorance he said that 30 odd pounds of high grade tin ore had been found in a prospector's shack in Northern British Columbia. This prospector had had the ore assayed for gold and silver and, having got an unsatisfactory return, paid no more attention to it. Subsequently this man had died in the

Yukon. Efforts had been made to find the deposit from which these samples came without success up to the present.

Prospectors, should be able to get reports on their prospects from the Government Mining Engineers; they should have assaying done free of charge; and should have the benefit of winter schools. He also advocated that the price of powder to miners be reduced and that the duty should be taken off mill machinery, inasmuch as the greater part of this was imported from the United States.

Summary Review of Mining and the Distribution of Minerals in the Kootenays.

Mr. A. G. Langley, District Engineer for Mineral Survey District No. 5 pointed out that his District was responsible for the entire Lead-Zinc production of Canada and was second only to the Cobalt in silver output. The principal methods mined, taken in the order of the value of production, were: lead, zinc, silver, gold and copper.

Referring to the importance of Rossland as a gold camp Mr. Langley said that the Consolidated Mining & Smelting Company had recently curtailed the production of their properties pending the installation of a concentrator to treat the low grade sulphides. When this was completed a considerable increase in output was contemplated.

Discussing the Yankee Girl at Ymir Camp it is pointed out that this property has been a substantial producer of gold in the past, that in 1918 about 8,000 tons of ore were shipped to the Greenwood Smelter, from which very favorable rates were obtained "due to the fact that the ore was suitable for mixing with those of the Boundary District." Shipments, he stated, had been suspended in December of 1918, "but there is reported to be a considerable tonnage of milling ore available, and judging from reports it is a property well worthy of further investigation with a view to installing a concentrator to treat the low grade sulphides. The principal values are in gold and silver."

In the Central Mineral Belt of the Trout lake Mining Division, extending from Camborne to Poplar Creek, numerous prospects have been located.

Near Camborne the Eva and Oyster Criterion, which are both equipped with ten stamp mills, have had a considerable amount of development work done on them, and there is said to be a large tonnage of low grade ore available. Numerous other properties in this vicinity have been prospected. Among others the Burniere Group at the head of Scott Creek is said to have a good showing."

Discussing the copper production Mr. Langley dealt with the Rossland Camp; the Mountain Chief Mine at Ranata on Arrow Lake, recently come into prominence; the California Mine near Nelson, which had leased the Athabasca Mill and was likely soon to be on a producing basis; and to the Trojan Mine, on Boulder Creek, Windermere District, the management of which were contemplating the erection of a small concentrator. He spoke also of the Eureka Mine, where a considerable body of low grade ore has been encountered in the southern end of the main workings, and stated that the management had leased the Granite Poorman Mill, and installed a Zeigler Flotation Machine. The values of the Eureka, which is situated close to Nelson, are in copper, silver, and gold.

Dealing with Lead-Silver-Zinc, and Lead-Silver-Zinc Gold-Zinc Ores, Mr. Langley said, in regard to the former, that the Kootenays produced more of this

class than any other section. The Slocan Division was first in silver production by a wide margin which the Fort Steel Division was in the van in respect of lead and zinc output.

Reference was made to the Noble Five Mine near Sandon, where the big raise connecting the lower workings with the upper is completed and a 100 Ton Concentrator is being constructed by the General Engineering Company of Salt Lake City. The flow sheet, it was explained, embodies a system of jigs, Whilfley tables, and Callow Flotation Cells. The Surprise Mining Company, the Queen Bess Mine, the Silversmith Mines, and the Rambler-Cariboo Mine were mentioned by Mr. Langley as being either producers or prospective producers in the Sandon District. In connection with the latter properties the 150 Ton Concentrator, being constructed at Alamo, B.C., for Clarence Cunningham, was described. In a recent interview it is stated that Mr. Cunningham expressed his readiness to treat custom ores and it was thought that this would be a help to the small operators of the district.

In conclusion Mr. Langley said:

"In concentrating the silver-lead-zinc ores from the Slocan and other parts of the District, a fairly high percentage of the silver values is contained in the zinc concentrates, and a solution of the problem of separating the silver from the zinc would be of immense value to the mines of the district.

"Besides the ores already dealt with there are known deposits of molybdenite, chromite, hematite, bismuth, magnetite, and manganese, but none of these is being mined at present."

The Mineralization of Northern Manitoba, by R. C. Wallace, The Pas, Manitoba.

This paper, which was read by proxy, stated that the areas of which something had been learned of late extended northward about 200 miles and was of varying width, averaging about 20 miles. It was some 186 miles distant from The Pas and could be divided into two zones, the Western and the Eastern. The former had been found to be rich in high grade copper and in the latter had been discovered gold. Of the copper properties developed the chief were the Mandy and the Flin Flon, which were copper sulphide ore bodies. They had been discovered in the Fall of 1915 near the boundary of the Provinces of Saskatchewan and Manitoba. The Mandy had been taken over by the Tonapah Mining Company and a subsidiary operating company formed known as the Mandy Mining Company. Ore had been taken from a very high grade lens of Chalcopyrite and hauled 40 miles by wagon, 130 miles by barge to The Pas, and freighted 1,200 miles by railway to Trail Smeltery. Altogether 25,000 tons had been produced, of which half had reached the Smeltery, which averaged in its copper content between seventeen and eighteen per cent., with some values in gold and silver. Despite the high transportation expenses a profit had been shown on the ore shipped. On the Flin Flon, during the year 1916-17- and 18, development had proceeded by means of the diamond drill, as a result of which an ore body had been blocked out to a depth of 900 feet. The work done had demonstrated that it was one of the large low-grade copper-sulphide bodies of the Dominion, there being sixteen million tons blocked out to the depth stated averaging eight dollars per ton at present prices. The ore also contained gold and silver values. A smelter would have to be built and a water power developed

which was 35 miles distant from the deposit. There was a railway for a distance of 85 miles from The Pas and the Canadian National Ry. will guarantee the provision of transportation facilities providing funds were available to install the 2,000 ton smelter necessary and to undertake to operate it to capacity. In this connection the writer stated that there was a fuel problem because of the high price of coke, but powdered coal might be utilized. He thought that electric smelting might be tried.

Referring to the gold discoveries of the eastern section of the area under discussion the first indications were found on Herb and Wekusko Lakes. Since then prospectors had been active. The Rex Property had been recorded by the Makeever Bros. on which a 40 Ton Lane Mill had been installed in 1918. Between May, 1918, and early in the following December, when the Mill closed because of labor troubles, approximately \$27,000 had been obtained in values from the plates. Work thus far had been confined to the first level and the vein was between 4 and 4½ feet in width.

Closing Resolutions.

The Convention closed with the discussion and passage of a number of resolutions.

Returned Soldiers' Prospecting Parties.

The first was that proposed by the Canadian Mining Institute, embodying a scheme whereby returned soldiers, with the necessary qualifications, may be given an opportunity to prospect for minerals in Canada. The idea is that capable returned men, wanting this kind of work, shall be divided into small parties, each of which shall be in charge of an engineer. These parties, it is explained, would be re-grouped and the latter group placed under the supervision of a divisional engineer. The whole, in turn, would be under a Chief Engineer. Each group would be placed in specified parts of the mineralized zones of Canada, and each man would be paid a small salary, and, of course, maintained. The Dominion Government is to be asked to provide \$200,000 to permit 200 returned men to be sent into the field in the manner outlined. It is understood that discoveries by these prospectors would be developed when thought of merit by experts, and their value, when realized, divided in proportions to be decided upon between the discoverers and the Government, the latter having this means of recouping itself in a measure. The proposal was endorsed.

Government Asked to Purchase and Distribute Powder.

A resolution was passed asking the Provincial Government to arrange for the purchase of powder in large quantities for use in each mineral district, and for its distribution through a Government Agency in small quantities and at minimum charges to prospectors and operators.

Resolutions were also passed asking the Provincial Government to appoint more District Mining Engineers where needed, and petitioning the Dominion Government to intervene for the settlement of the coal miners' strike in the Crows Nest Pass District, inasmuch as the shortage of coke was adversely affecting the metaliferous industry of the Province.

The British Columbia and the Dominion Governments were also urged to provide subsidies to encourage the establishment of a blast furnace of 300-ton daily capacity at some point in the Province on the Pacific Coast.

Special Correspondence

BRITISH COLUMBIA.

Changes in Examination Boards for Miners' Certificates.

In accordance with amendments to the Coal Mines Regulation Act enacted at the last session of the Provincial Legislature, the system of examining officials and men employed in and around the coal mines of the Province as to their competency to hold positions of responsibility will be radically changed from the 1st of July next. For some time Mr. Sloan has been engaged in perfecting the organization which is to supplant that of the past, and today he stated that all arrangements were complete and that everything was in shape to launch the new and less cumbersome method of holding examinations and issuing certificates of competency.

Henry Riard, of Coal Creek, B.C., and James Dixon, of Nanaimo, B.C., are the examiners appointed. Both are well and favorably known among all associated with the coal mining industry in the Province. Mr. Riard has been a resident of Canada for over 20 years, and since 1911 has been the miner's representative on the retiring Board of Examiners. For nearly 20 years he has worked in the coal mines of the Crow's Nest Pass Field, and at the time of the outbreak of the war was employed as Overman at No. 3 Mine, Coal Creek Colliery. No sooner did hostilities break out than he was on his way to Europe, reaching the front in the early stages of the great war, and was in the defensive battles at Verdun. Finally he was taken prisoner and held for 27 months in South Westphalia, where he served as interpreter, bookkeeper, timekeeper and in other capacities in a pyrites and barytes mines. He returned to British Columbia about a month ago and is the holder of a First-Class Certificate of Competency in this Province. James Dixon is mine manager at the Reserve Mine operated by the Western Fuel Company, Nanaimo. For several years Mr. Dixon held important official positions in Great Britain. He has been appraiser for the Board of Examiners of B.C., examining the papers of candidates for Certificates of Competency, and both by training and experience is highly qualified for the duties of his new office. He was a teacher in connection with the Technical Mining Classes conducted at Nanaimo and is the holder of a First-Class Certificate of Competency for British Columbia and Great Britain.

Mr. Sloan feels that he is fortunate in being able to obtain two men, so well qualified in every way, to handle the work of examining officials and men wishing to qualify for employment in the coal mines of the Province. He wishes also to make clear a point, in connection with the new system, over which there appears to be some misunderstanding. These two appointments are all that are required for the operation of the change provided for by the amendments to the Coal Mines Regulation Act of last session. Messrs. Riard and Dixon will act in a dual capacity. Firstly they are members, with the Chief Inspector of Mines as chairman, of the Board of Examiners charged with the examination of candidates for Certificates of Competency as coal mine officials. Secondly, they are members, with the Inspectors of Mines of the various districts as chairmen—the personnel of the chairman depending on

the particular district in which the examination happens to be in progress—of the Board for the examination of candidates for certificates of competency as coal miners. Thus, Mr. Sloan explains, there is really only one Board, supplemented in the manner indicated by permanent officials of the Inspection Staff of the Department of Mines. This Central Board supersedes the top-heavy machinery which has existed consisting of a Mine officials' Board of six members and nine Miners' Board of three members each, and it permits the reduction of the personnel of the Examining Administration from 33 to 3, enabling the Government to dispense with the services of 27 officials, and at the same time gain increased efficiency.

The formation of this Central Board will remove the difficulties encountered in the satisfactory maintenance of nine Board of Examiners for the examination of coal miners and one Board for the examination of Coal Mine Officials. At present the latter Board consists of three coal mine managers, and three representatives of the men from different parts of the Province, together with the Chief Inspector of Mines. Its headquarters are in Nanaimo, B.C. Two of the men's representatives are of the Crow's Nest Pass Coal Field and, in the course of the past five years only on one occasion has one of these representatives been able to attend a Board meeting. While provision was made to pay the travelling expenses of those coming from a distance, this reimbursement by no means covered the loss of time which trips from various parts of the Province to the Coast entailed. The result was that the Board often found it difficult to obtain a quorum. Its duties, too, have been merely of a supervisory character in connection with examinations. It called a meeting, set a date for examinations, appointed outside parties who had to be paid very highly for their services, to prepare examination papers and examine the answers of candidates. The Board then forwarded the results to the Minister of Mines. Mr. Sloan, when considering reorganization, felt that much of this procedure was useless, besides having the effect of leaving functions of vital importance in the hands of a few, it being impossible in many instances, as has been shown, for the men's representatives to be in attendance at regularly called meetings. Under the new arrangement the two examiners just appointed, with the Chief Inspector of Mines as their chairman, will conduct examinations of candidates for Certificates of Competency as officials in coal mines, wherever it may be most convenient to all concerned.

As stated there now are nine Boards of Examiners for the conduct of examination of candidates wishing Certificates of Competency as coal miners. If the old system were to be continued it would be necessary to augment this number by at least five more and, as the extent of coal mining in the province widened, it would be essential to continue adding to the Boards ad infinitum. This point is illustrated by the present situation. Under the unamended Coal Mines Regulation Act most of the collieries had their own Boards for the examination of men, the membership of which consisted of a secretary appointed by Lieut.-Governor-in-Council, a representative of the mine management, and another of the men. This arrangement, no doubt, was satisfactory so long as there were only a few operating mines in the province. Conditions, however, are changed. There now are a considerable number of small collieries and, if each of these were given a Board, to which they were

entitled under the Act as it stood originally, there might be almost as many members of examining Boards as there are miners coming up for examination monthly.

These problems will be completely met by the new Central Board. Instead of the men going to the Board, the Board will go to them. It will visit each coal mining district at regular intervals, the two permanent examiners just appointed being joined in each district by the Inspector of Mines of that District and conducting examinations for the benefit of miners wishing to secure the Certificates of Competency necessary to permit them to go to work as coal miners. Besides the obvious benefit that this will be to the candidate, both in respect of expense and loss of time, it will have the effect of setting a standard of knowledge among all underground workers in coal throughout the province, making it impossible, as sometimes now happens, for a man to fail before one Board and immediately after successfully passing another Board in an adjacent district. It will obviate the present difficulty of too much Board representation at one point and too little at another. Another important point—and this will be the death-blow to the practice sometimes countenanced in the past of permitting aliens to obtain employment in the coal mines of the province—is that no man will be admitted to a mine to work as a coal miner for a temporary period pending his examination. This has been allowed heretofore. Hereafter, however, if a man applies for work as a miner, and an immediate examination is impracticable, he must go before the Inspector of Mines for the district who, having satisfied himself of the man's qualifications, will issue him a temporary certificate. In such cases those affected must go before the regularly constituted Board at the first opportunity.

In this connection Mr. Sloan maintains that it is a manifest absurdity to allow an uncertificated man to assume the responsibilities of a miner for thirty days without his knowledge being tested, it being possible for an incompetent person in that period to endanger, not only his own life, but that of hundreds of others. He points out, too, as indicated, that the necessity of a candidate going before an Inspector of Mines to secure a temporary certificate will provide the means of much more adequate control than at present over those given underground employment, and he feels it will restrict the employment of aliens underground as miners in British Columbia.

Mr. Donald McLean, manager of the Coalmont (B.C.) Collieries, has been appointed Inspector of Mines for the Merritt District, according to an announcement made to-day (June 28) by Hon. Wm. Sloan, Minister of Mines.

This vacancy was created through the transfer of Inspector Andrew Strachan from Merritt to Fernie on the retirement of former Inspector T. H. Williams from the Crow's Nest Pass District.

The new Inspector of Mines, Mr. McLean, returned from service overseas about 18 months ago. He enlisted in the early part of the war and was through a considerable of the first military operations on the western front. Finally he was wounded and invalided home.

Mr. McLean has high qualifications for the discharge of the duties of the post to which he has been appointed. He is the holder of a First Class Certificate of Competency for British Columbia and Alberta and, since his return from Europe, has been manager of the Coalmont Colliery. He also has had a varied and

lengthy experience in other coal mines of the province, for many years being employed as overman at the Extension Colliery, and later teaching at the Mining School at Ladysmith.

NORTHERN ONTARIO.

"Post-Mortem" on Nipissing Not Necessary—Our Correspondent Reveals Inaccuracy of Deductions in Toronto "Saturday Night" Article.

In an article written by Carpel L. Berger, in the *Financial World*, New York, and reproduced in the *"Saturday Night"*, Toronto, on June 21st, appear a number of startling deductions and prophesies with regard to the Nipissing Mines, of Cobalt. The article is one of the most pessimistic written in recent years in connection with the silver mines of Cobalt, and would be alarming to shareholders of some of the mining companies operating in the district, but for the undeniable fact that the article from beginning to end is founded chiefly on inaccuracies, and is but another demonstration of how impossible it is, and how pitiful is the attempt of any man to deal with a subject about which he has but very little information. The article does not even show ability to properly analyse a mining report.

For instance, it is stated that "Only 33 ounces per ton was the average recovery in the first 4 months of 1919 from combined high-grade washing ores and low-grade cyanide milling ores." How the writer arrived at these figures is difficult to understand, as the official average has ranged from 40 to 45 ounces. It is quite possible the 33 ounce average was reached by dividing the number of ounces produced by the Nipissing by the amount of ore treated in the mill. Mr. Berger apparently divided the Nipissing bullion production by not only Nipissing ore, but also including the customs-ore from other mines which was treated in the Nipissing mill. So much for the incorrect statement in connection with the average grade of the ore.

The writer continues: "In the early months of 1919, the yield of high grade washing ores dropped to only 700 ounces per ton, and when it dropped to 450 ounces per ton in April, the high grade mill was closed down, signifying the exhaustion of large bodies of high-grade ore. Henceforth the high-grade, such as may remain or be found, will probably be mixed with and handled as part of the feed of the low-grade mill." This statement is incorrect in every particular. First, it is a fact that the high grade ore treated so far this year has averaged from 1,400 to 1,600 ounces per ton, and for the first six months of 1919 has exceeded the average of 1918. Second, the high-grade ore *is not* being mixed with and handled as a part of the feed for the low-grade mill. The fact is that owing to the war having caused the quotations for mercury to increase from a minimum \$33 per flask of 75 pounds, to a maximum of \$130 per flask, it was decided to discontinue the amalgamation process, but arrangements were made to treat the high-grade by cyanidation, after giving the ore a preliminary treatment with bleaching powder in the tube mill. Accordingly, the necessary apparatus for the process was installed under the same roof as the equipment for treating low-grade ore. This is why the New York critic becomes erroneously obsessed with the idea that the Nipissing had exhausted its high grade ore! Furthermore, the change was not made in April, as Mr. Berger states. The change was made in August, 1918,

and is so stated in the last annual report of the Nipissing Mining Company.

It is one of the ironies of fate that when Mr. Berger was writing his article, pointing out that during the first four months of 1919 the Nipissing produced \$952,197, or an average of about \$238,049 monthly, the company was setting a new high record by producing \$347,751 in May, one of the highest month's output in the history of any silver producing mine in the British Empire. Also, for the first half of the current year the output has amounted to upwards of \$1,600,000, or at the rate of upwards of \$3,200,000 annually, as compared with Mr. Berger's guess of about two and a half million ounces, which at the present high quotation for silver would be approximately half a million dollars less than that actually indicated. Indeed with the exception of 1918, the production from the Nipissing during 1919 will probably have a greater value than any previous year in the company's history. This fact is clearly shown in the following summary of production since the mine was first opened, and also showing the dividends paid from year to year, with 1918 and 1919 in point of dividends paid, equal to the company's best years, with the exception of 1910:

Year	Dividends Paid.	Value Produced.
1904.....	\$ 23,887.52
1905.....	471,666.61
1906.....	\$480,000	1,421,655.54
1907.....	840,000	1,234,492.35
1908.....	720,000	1,364,478.03
1909.....	1,350,000	2,180,407.02
1910.....	2,100,000	2,742,842.58
1911.....	1,800,000	2,381,712.54
1912.....	1,800,000	2,827,317.62
1913.....	1,800,000	2,920,714.26
1914.....	1,350,000	2,207,427.72
1915.....	1,200,000	2,383,877.91
1916.....	1,500,000	2,687,530.85
1917.....	1,800,000	3,239,151.62
1918.....	1,800,000	4,166,064.27
1919.....	1,800,000	3,250,000.00
Totals.....	\$20,940,000	\$35,503,226.44

A study of the above figures reveals the interesting fact that approximately 59 per cent of the entire production has been paid in dividends.

It might be interesting to state that during the first five months of 1919 the Nipissing produced \$1,299,948, on which a "net" profit of \$800,000 was realized. This reveals the very significant fact that current profits amount to approximately 61 per cent of the total output, as compared with an average of 59 per cent since the mine was first opened up. These figures are not prophecy, or expectations, but are facts. Figures, fortunately, do not lie, no matter to what severe tests they may be put. To the 59 per cent, of course, must be added the present treasury surplus; yet, after adding this, it is still evident that the Nipissing is maintaining its earning power on a par with its best days.

Pessimists sometimes point toward the Nipissing's ore reserves of 6,000,000 ounces as of the beginning of the current year. They did the same many years ago. As far back as 1915 the general manager, R. B. Watson, apparently had this in mind when he opened the concluding paragraph of his annual statement with the remark, "The Nipissing Mine has never shown ore reserves commensurate with its annual output, but the history of the company during the past twelve years has

shown that the development of new ores has kept pace with the current production."

To the foregoing, the year 1919 promises to be no exception, in that already a large amount of new high-grade ore has been developed this year. As to what the future will bring, it would be folly to hazard a guess. However, that the Nipissing, with quotations for silver at or above \$1 per ounce, will enjoy prosperity for a good many years seems certain. The Nipissing, like every other mine discovered, must some day end its profitable career. Every dollar taken out leaves that much less in any mine. This fact is obvious to all. Nevertheless only unrelieved pessimism can explain the spectacle of a careless critic holding a postmortem over a world-famous mine just at the moment when that particular mine is enjoying the acme of prosperity.

Increased Price of Silver Brings Bonus to Cobalt Miners.

During the month of June, the quotations for commercial bar silver, as submitted by Handy and Harman, of New York, showed an average of a fraction of a cent above the \$1.10 mark, and it is understood the majority of the mines of Cobalt have decided to pay their employees an additional bonus of 25 cents per day. This increases the bonus to \$1.50 daily above the regular wage.

The bonus, or profit-sharing plan, was adopted in 1917, and is based upon the quotations for silver, a bonus of 25 cents a day to be paid when silver averages 60 cents or over for the month, and an additional 25 cents a day for each ten points above 60 cents. Although there has apparently been no promise made to the men that this system would continue beyond that of \$1.25 per day paid on \$1 silver, yet the high cost of living has been taken into account by the mining companies, with the result as above stated that a bonus of \$1.50 a day will be paid by the majority of the mines on silver at \$1.10 cents an ounce or over.

The additional bonus during June will add about \$600 every 24 hours to the men engaged in mining at Cobalt. There are upwards of 2,300 men engaged, and allowing a 26-day working month, the monthly pay-roll will be increased approximately \$15,600, or at the rate of about \$187,200 annually, provided it should continue that long.

Kirkland Lake District.

Following the successful development of the Ontario-Kirkland Mine, formerly the Hurd property, arrangements have been made to instal a mill at an early date. The plant will have a capacity for treating 100 tons daily, and will be installed with the least possible delay, the contract having already been let, according to official advice just to hand.

During the present lull in operations, caused by the labor strike, the macadam road from Swastika to Kirkland Lake is being built, under the direction of the Ontario Government. With this road completed this year, the transportation of heavy machinery will be made less difficult.

At the 300-ft. level of the Ontario-Kirkland, two veins have been opened up in one of which \$28 ore is showing in the west drift across a width of about five feet. This was at first thought to be vein No. 1, but in working out the fault problem was found to be No. 2 vein. Accordingly, a cross-cut is being driven north to tap the No. 1 vein. About 30 feet remains between the present face of the cross-cut and the point where No. 1 vein is expected to be encountered.

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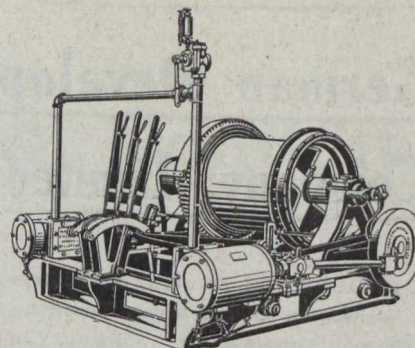
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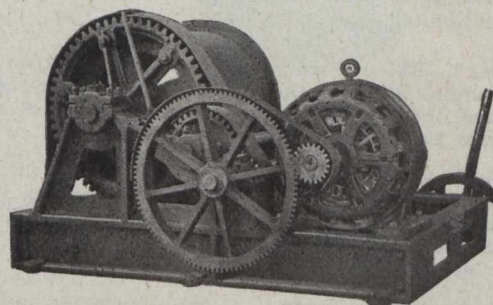
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STEAM POWER



ELECTRIC POWER

Plans are under way to carry out an aggressive exploration programme on the property of the Greene-Kirkland Company, at Kirkland Lake, toward which end a small mining plant is to be installed.

The property consists of a group of claims formerly owned by the Lucky Cross Mining Company. Part of the Lucky Cross property was sold last winter to the Marigold Mining Company, the remainder going to the Greene-Kirkland. The latter company is practically a closed corporation, and is being financed largely by interests in Chicago.

Boston Creek Not Involved in Strike.

At Boston Creek a peculiar situation has arisen in connection with the labor strike. It is now understood that although the men at the Miller-Independence went out on strike at the same time that the Kirkland Lake strike was called, they had not been told to do so by the officials of the organization to which some of them belong.

About a week or ten days ago a labor delegation of three from Kirkland Lake called at the Miller-Independence, and stated that no strike had been called. As a consequence, therefore, there would appear to be nothing in the way to prevent the resumption of work under the old conditions at any time the Miller-Independence so desires.

As this was the only property in the camp where the men quit work, the Boston Creek camp may now be said to not be involved in any way in the labor strike.

Another shoot of high grade ore is stated to have been opened up at a depth of about 575 feet on the Temiskaming Mine. Until further work is done it will not be possible to estimate whether or not the find is important.

WILL DEVELOP HERB LAKE PROPERTIES.

The Pas, Man.—Having been relieved of the financial burden of carrying on its Mexican properties, Messrs. Makeever Brothers, of New York, owners of the Rex at Herb lake, feel they are now in a position to open up the property. They are planning, it is stated, to go ahead upon a large scale sometime in August.—The Pas Herald.

Of this property Dr. R. C. Wallace, Mining Commissioner of Northern Manitoba reported in March as follows: One property—the Rex—has reached the producing stage. The Makeever Brothers have erected a 40-ton Lane mill, with amalgamation plates and two Deister Overstrom tables, a 55-h.p. engine, two 60 h.p. boilers and 390 cu. ft. air compressor. The mill was in operation from May 1st to December 1st, 1918, when adverse labor conditions, accentuated by the influenza epidemic, necessitated its closing for the winter. Approximately \$27,000 of gold were obtained from the plates during the time of operation, representing the first regular output of gold from any mine in Manitoba. The amount of underground work is relatively small, and is confined to stoping from the drift on the 100-ft. level, and it was possible to employ a single shaft only to operate the mill. The vein is exposed for 1,700 feet, and has an average width in the shaft and drift of probably 4½ feet. The values throughout this width range from \$110 to \$6, with an average of over \$20. Sulphides are unimportant except on the walls. The concentrates from the table are stored for extraction when a cyanide plant shall have been added to the mill equipment. It is planned, upon the resumption of operations in the fall, to pursue much more extensive underground developments, in order that the mill may be operated on a continuous basis.

IN THE MATTER OF

The German Development Company, Limited

SEALED TENDERS will be received addressed to G. T. Clarkson, 15 Wellington Street West, Toronto, and marked "Tenders re German Development Company, Limited," up to Twelve o'clock noon of **Wednesday, July 16th, 1919**, for the purchase of the following assets of the German Development Company, Limited, namely:

Parcel No. 1.—68,000 shares, of a par value of \$1.00 each, of the Capital Stock of the Miller Lake and Everett Mines, Limited, the owner of certain mining claims in the Miller Lake District in Northern Ontario.

Parcel No. 2.—Mining Claim being the S.E. $\frac{1}{4}$ of the N. $\frac{1}{2}$ of Lot 9 in the 5th Concession in the Township of James, Timagami Forest Reserve, containing 39- $\frac{3}{8}$ acres, more or less, covered by Mining Lease No. 3818, from the Province of Ontario.

Parcel No. 3.—Mining Claims T. C. 453, 454, 455, 456, and 457, and M.E. 723, 522 and 523, and G.G. in the Township of Halton, District of Nipissing, containing 157 2-5 acres, more or less, covered by Mining Lease No. 3875, from the Province of Ontario.

Parcel No. 4.—Mining Claim being the N.E. $\frac{1}{4}$ of the N. $\frac{1}{2}$ of Lot 12, in the 4th Concession in the Township of James, District of Nipissing, containing 4 $\frac{3}{4}$ acres, more or less, covered by Mining Lease No. 3878, from the Province of Ontario.

Tenders for Parcel No. 1 must be at a rate per share for the shares offered, and the tenderers must agree to purchase any lesser number of shares than 68,000, but not less than 25,000, if the undersigned shall so require.

As to Parcels Nos. 2, 3 and 4, the purchasers shall search the title at their own expense, and purchasers shall have ten days in which to make any objection or requisition as to title. In case any purchaser shall within such time make any objection or requisition which the undersigned shall be unable or unwilling to remove or answer the undersigned shall be at liberty to rescind the sale, in which case the purchaser shall be entitled only to a return of the deposit money without interest, costs or compensation.

Terms of Sale:—25 per cent cash and the balance within thirty days.

Each purchaser at the time of sale must sign an agreement for the completion of the purchase.

Tenders will be opened at the office of the undersigned, 15 Wellington Street, West, Toronto, at Twelve o'clock noon of Thursday, July 17th, 1919, when all tenderers are requested to be present.

Tenders must be accompanied by a marked cheque payable to the undersigned for 10% of the amount of the tender, which will be returned if the tender be not accepted. The highest or any tender not necessarily accepted.

For further particulars and conditions of sale application may be made to the undersigned.

Dated at Toronto this 9th day of June, 1919.

G. T. CLARKSON,
Controller and Manager of
The German Development
Company Limited

COAL-LANDS IN SMOKY RIVER DISTRICT, ALBERTA.

Report of Special Committee of Senate discloses Irregularities in Leasing of Mining Rights, Which Are Cancelled.

The Special Committee appointed by the Senate to investigate charges of irregularity in the granting of leases in the Smoky River District has reported. The coal mining locations comprised 18,000 acres of land and were originally held by a German-American syndicate, including one Dr. Reinhold Hoppe, of Oakland, Calif. That syndicate had expended \$200,000 in work on the property and had paid \$115,000 in rentals at a dollar an acre a year, when the leases were cancelled by the Interior Department because of default in payment of rentals. The leases were cancelled on August 3rd, 1918, and by August 21st all the locations had been re-staked by eight prospectors, who secured leases and in January, 1919, assigned their rights to Messrs. Shillington and Barnard.

The investigation by the special committee was ordered as a result of suggestions made in the Senate by Senators Bostock and Bradbury. The committee in its finding expresses the opinion that S. J. Robbins, formerly assistant secretary to the Minister of the Interior, disclosed information in the possession of the Interior Department with respect to the cancellation of the Hoppe leases. The committee finds that Mr. Robbins and George Craig, a clerk in the department, who is related to Dr. Shillington, went to Edmonton immediately after the Hoppe leases were cancelled. From this the committee infers that Messrs. Robbins and Craig aided those who re-staked the locations and subsequently assigned their rights. The committee recommends that the Interior Department hereafter deal with coal locations as it does with timber limits, investigate them, fix up-set prices for leases, disclose the information to the public and call for tenders for the locations. The committee also suggests that legislation be enacted to make disclosure of confidential information by a department official a criminal offence.

Since the granting of the mining rights on the Smoky River locations was brought to the attention of the Senate and the Government, the leases of Messrs. Shillington and Barnard have been cancelled.

PREDICTS GREATEST COAL SHORTAGE.

Chicago, June 29.—Government coal production figures point to "the greatest coal shortage in history" next winter unless production is stimulated immediately 25 per cent. or more throughout the nation, according to a statement made public to-day by F. S. Peabody, Chairman of the National Coal Association's special committee dealing with the prospective shortage.

"The information gathered by the committee is that at the present rate of production one industrial plant out of every eight in the United States will have to shut down next winter for lack of coal," said the statement, which attributed the falling off in production to the extremely low demand.

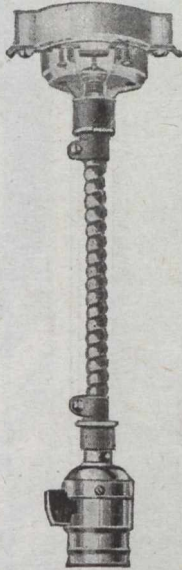
The bituminous coal shortage of 65,000,000 tons for the first 24 weeks of 1919 must be wiped out and production increased 30 per cent. the remainder of the year to meet the nation's requirements of 530,000,000 tons, according to the statement.



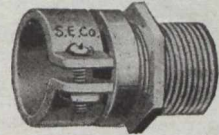
Flexible Armoured Cable & Conduit



Nos 6135 and 6140 to 6144 S.amped Steel Panel Box Connectors.



Application of Steel-Armored Flexible Cord with Rosette and Socket Adapter



s.6136 to 6139 and 6144 to 6149 Malleable Iron Panel Box Connectors



Flexible Steel Conduit Single Strip Type



Flexible Steel Conduit Double Strip Type



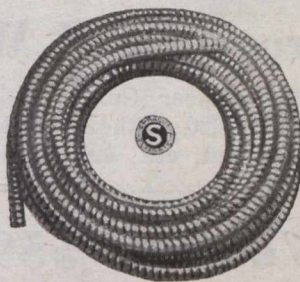
Steel-Armored Flexible Cord



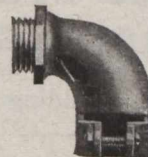
Flexible Steel-Armored Conductors



45° Connector Nos. 6190 and 6191



A Coil of Double Strip Type of Greenfield Flexible Steel Conduit



90° Connector Nos. 6192 and 6193

Write our nearest sales branch for full particulars on Flexible Steel-Armoured Hose, Cable and Conduit.

Canadian General Electric Co., Limited

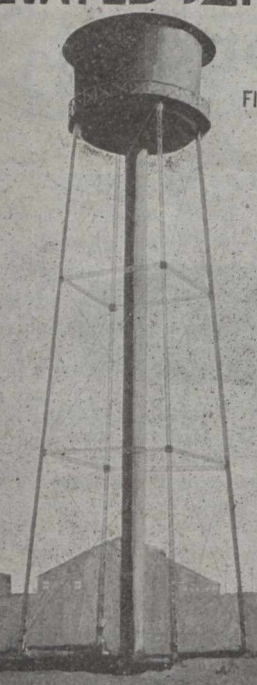
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Aggregate Value of \$595,571,107

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

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This tight-top tin brings right to your camp or boarding house absolutely fresh pasteurized separated milk in its lightest and most easily transportable form—a dry powder that will not sour in hot weather or freeze in cold. Always fresh and ready for use wherever milk is needed. Klim is packed in 10-lb. tins, 6 tins a case. Order from your supply house.



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The water supply varies with each pressure variation; at the same time the end of the water tube is automatically cleared of the slacked carbide —the flame size is constant, the same at the finish as at the start of the charge—all without the need of hand regulation.

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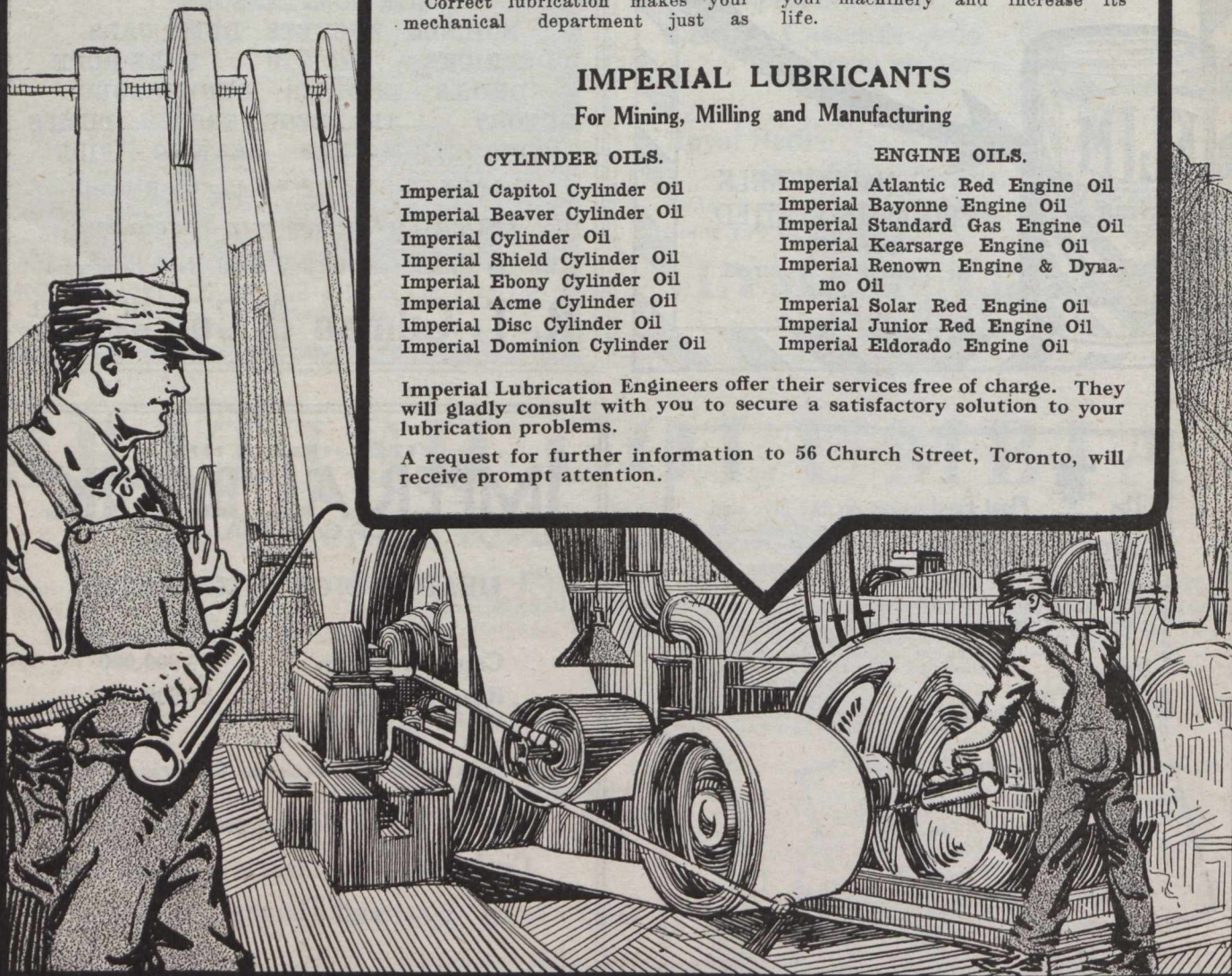
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Imperial Beaver Cylinder Oil
Imperial Cylinder Oil
Imperial Shield Cylinder Oil
Imperial Ebony Cylinder Oil
Imperial Acme Cylinder Oil
Imperial Disc Cylinder Oil
Imperial Dominion Cylinder Oil

ENGINE OILS.

Imperial Atlantic Red Engine Oil
Imperial Bayonne Engine Oil
Imperial Standard Gas Engine Oil
Imperial Kearsarge Engine Oil
Imperial Renown Engine & Dynamo Oil
Imperial Solar Red Engine Oil
Imperial Junior Red Engine Oil
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The Canadian Miners' Buying Directory.

- Acetylene Gas:**
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- Air Hoists:**
Canadian Ingersoll-Rand Co. Ltd.
Montreal, Que.
- Amalgamators:**
Northern Canada Supply Co.
Mine and Smelter Supply Co.
- Antimony:**
Canada Metal Co., Ltd.
- Assayers and Chemists:**
Milton L. Hersey Co., Ltd.
Campbell & Deyell, Cobalt.
Ledoux & Co., 99 John St., New York.
Thos. Heys & Son.
C. L. Constant Co.
- Assayers' and Chemists' Supplies:**
C. L. Berger & Sons, 37 William St., Boston, Mass.
Lymans, Ltd., Montreal, Que.
Stanley W. F. & Co., Ltd.
Mine & Smelter Supply Co.
- Brakeshoes:**
Can. Brakeshoe Co., Ltd.
- Babbit Metals:**
Canada Metal Co., Ltd.
Hcyt Metal Co.
- Balances—Hessner:**
Mine & Smelter Supply Co.
- Balls:**
Canadian Foundries and Forgings, Ltd.
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries Ltd.
- Ball Mills:**
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Belting—Leather, Rubber and Cotton:**
Northern Canada Supply Co.
Jones & Glasco.
- Blasting Batteries and Supplies:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Northern Canada Supply Co.
Canadian Explosives, Ltd.
- Blowers:**
MacGovern & Co., Inc.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Boilers:**
Northern Canada Supply Co.
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Marsh Engineering Works.
MacGovern & Co., Inc.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
The John Inglis Company.
- Boxes, Cable Junction:**
Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.,
- Buckets:**
Canadian Ingersoll Rand Co., Sherbrooke, Que.
Hendrick Mfg. Co.
M. Beatty & Sons, Ltd.
Marsh Engineering Works.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Cable—Aerial and Underground:**
Northern Canada Supply Co.
Standard Underground Cable Co. of Canada, Ltd.
- Cableways:**
M. Beatty & Sons, Ltd.
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:**
Sullivan Machinery Co.
R. T. Gilman & Co.
- Carbide:**
Canada Carbide Company, Ltd.
- Cars:**
Canadian Foundries & Forgings, Ltd.
Canadian Ingersoll Rand Co., Sherbrooke, Que.
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
Marsh Engineering Works.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Car Wheels and Axles:**
Canadian Car Foundry Co., Ltd.
Marsh Engineering Works, Ltd.
- Castings (Iron & Steel):**
Canadian Steel Foundries, Ltd.
- Cement Machinery:**
Northern Canada Supply Co.
Hadfields Ltd.
Fraser & Chalmers of Canada, Ltd.
- Chains:**
Jones & Glasco.
Northern Canada Supply Co.
- Chemical Apparatus:**
Mine & Smelter Supply Co.
- Chemists:**
Canadian Laboratories.
Campbell & Deyell.
Thos. Heys & Sons.
Milton Hersey Co.
Ledoux & Co.
- Classifiers:**
niMe & Smelter Supply Co.
- Coal:**
Dominion Coal Co.
Nova Scotia Steel & Coal Co.
- Coal Cutters:**
Sullivan Machinery Co.
Can. Ingersoll-Rand Co., Ltd., Montreal, Que.
- 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.
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Northern Canada Supply Co.
MacGovern & Co., Inc.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
- Concrete Mixers:**
Northern Canada Supply Co.
Gould, Shapley & Muir Co., Ltd.
MacGovern & Co., Inc.
- Condensers:**
Smart-Turner Machine Co.
Northern Canada Supply Co.
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.
- Concentrating Tables:**
Mine & Smelter Co.
- Converters:**
Northern Canada Supply Co.
MacGovern & Co., Inc.
- Conveyor—Trough—Belt:**
Hendrick Mfg. Co.
- Cranes:**
Smart-Turner Machine Co.
M. Beatty & Sons, Ltd.
- Crane Ropes:**
Allan, Whyte & Co.
- Crucibles:**
Mine & Smelter Supply Co.
- Crushers:**
Canadian Steel Foundries, Ltd.
Lymans, Ltd.
Mussens, Limited.
Mine & Smelter Supply Co.
Hadfields Ltd.
Fraser & Chalmers of Canada, Ltd.
- Derricks:**
Smart-Turner Machine Co.
M. Beatty & Sons, Ltd.
Marsh Engineering Works.
R. T. Gilman & Co.
- Diamond Drill Contractors:**
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.
R. T. Gilman & Co.
- Drills, Air and Hammer:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Sullivan Machinery Co.
Northern Canada Supply Co.
Canadian Rock Drill Co.
- Drills—Core:**
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:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Northern Canada Supply Co.
Sullivan Machinery Co.
Canadian Rock Drill Co.
- Drills—Electric:**
Northern Electric Co., Ltd.,
- Drills—High Speed and Carbon:**
Hadfields Ltd.
- Dynamite:**
Canadian Explosives.
Northern Canada Supply Co.
- Ejectors:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Northern Canada Supply Co.
- Elevators:**
M. Beatty & Sons.
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:**
Alex. Fleck.
Smart-Turner Machine Co.
Gould, Shapley & Muir Co., Ltd.
MacGovern & Co., Inc.
- Engines—Haulage:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Marsh Engineering Works.
Fraser & Chalmers of Canada, Ltd.
- Engines—Marine:**
Smart-Turner Machine Co.
MacGovern & Co., Inc.
- Engines—Steam:**
Smart-Turner Machine Co.
M. Beatty & Sons.
R. T. Gilman & Co.
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.
- Flood Lamps:**
Northern Electric Co., Ltd.,
- Forges:**
Northern Canada Supply Co., Ltd.
- Forging:**
M. Beatty & Sons.
Canadian Foundries and Forgings, Ltd.
Smart-Turner Machine Co.
Hadfields Ltd.
Fraser & Chalmers of Canada, Ltd.
- Frogs:**
Canadian Steel Foundries, Ltd.
- Furnaces—Assay:**
Lymans, Ltd.
Mine & Smelter Supply Co.
- Fuse:**
Canadian Explosives.
Northern Canada Supply Co.
- Gears, Machine Out:**
Canadian Steel Foundries, Ltd.
The Hamilton Gear & Machine Co.
Fraser & Chalmers of Canada, Ltd.

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Canadian Miners' Buying Directory.—(Continued from page 29.)

- Gears:**
Canadian Steel Foundries, Ltd.
Smart-Turner Machine Co.
Northern Canada Supply Co.
The Hamilton Gear & Machine Co.
Fraser & Chalmers of Canada, Ltd.
- Hammer Rock Drills:**
Mussens, Limited.
- Hangers&Cable:**
Standard Underground Cable Co. of Canada, Ltd.
- High Speed Steel:**
Hadfields Ltd.
- High Speed Steel Twist Drills:**
Northern Canada Supply Co.
- Hoists—Air, Electric and Steam:**
Can. Ingersoll-Rand Co., Ltd., Montreal, Que.
Jones & Glassco.
M. Beatty & Sons.
Marsh Engineering Works.
Northern Canada Supply Co.
Mine and Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Hoisting Engines:**
Mussens, Limited.
Can. Ingersoll-Rand Co., Ltd.
M. Beatty & Sons.
Marsh Engineering Works.
Fraser & Chalmers Engineering Works.
Fraser & Chalmers of Canada, Ltd.
- Hose:**
Northern Canada Supply Co.
- Hydraulic Machinery:**
Hadfields Ltd.
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.
- ..Ingot Copper:**
Canada Metal Co., Ltd.
Hoyt Metal Co.
- Insulating Compounds:**
Standard Underground Cable Co. of Canada, Ltd.
- Jacks:**
Can. Brakeshoe Co., Ltd.
Northern Canada Supply Co.
- Laboratory Machinery:**
Mine & Smelter Supply Co.
- Lamps, Miners:**
Canada Carbide Company, Ltd.
Dewar Mfg. Co., Inc.
Northern Electric Co., Ltd.,
- Locomotives (Steam, Compressed Air and Storage Steam):**
H. K. Porter Company.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
- Link Belt:**
Northern Canada Supply Co.
Jones & Glassco.
- Manganese Steel:**
Canadian Steel Foundries, Ltd.
Hadfields Ltd.
Fraser & Chalmers of Canada, Ltd.
- Metal Merchants:**
Henry Bath & Son.
Geo. G. Blackwell, Sons, & Co.
Consolidated Mining and Smelting Co. of Canada.
Canada Metal Co.
C. L. Constant Co.
Everitt & Co.
- Mining Requisites:**
Canadian Steel Foundries, Ltd.
Hadfields Ltd.
Fraser & Chalmers of Canada, Ltd.
- Monel Metal:**
International Nickel Co.
- Motors:**
R. T. Gilman & Co.
- Nickel:**
International Nickel Co.
- Ore Sacks:**
Northern Canada Supply Co.
- Ore Testing Works:**
Ledoux & Co.
Can. Laboratories.
Milton Hersey Co., Ltd.
Campbell & Deyell.
Hoyt Metal Co.
- Ores and Metals—Buyers and Sellers of:**
C. L. Constant Co.
Geo. G. Blackwell.
Consolidated Mining and Smelting Co. of Canada.
Orford Copper Co.
Canada Metal Co.
Hoyt Metal Co.
Everitt & Co.
- Perforated Metals:**
Northern Canada Supply Co.
Hendrick Mfg. Co.
- Pig Tin:**
Canada Metal Co., Ltd.
Hoyt Metal Co.
- Pig Lead:**
Canada Metal Co., Ltd.
Hoyt Me.al Co.
- Pipes:**
Canada Metal Co., Ltd.
Consolidated M. & S. Co.
Northern Canada Supply Co.
Smart-Turner Machine Co.
- Pipe—Wood Stave:**
Pacific Coast Pipe Co., Ltd.
Mine and Smelter Supply Co.
- Piston Rock Drills:**
Mussens, Limited.
- Plate Work:**
John Inglis Co., Ltd.
- Pneumatic Tools:**
Can. Ingersoll-Rand Co., Ltd.
Jones & Glassco.
- Prospecting Mills and Machinery:**
E. J. Longyear Company.
Standard Diamond Drill Co.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Pulleys, Shafting and Hangings:**
Northern Canada Supply Co.
- Pulverizers—Laboratory:**
Mine & Smelter Supply Co.
- Pumps—Boiler Feed:**
Smart-Turner Machine Co.
Northern Canada Supply Co.
Canadian Ingersoll-Rand Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
- Pumps—Centrifugal:**
Mussens, Limited.
Smart-Turner Machine Co.
M. Beatty & Sons.
Canadian Ingersoll-Rand Co., Ltd.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Pumps—Electric:**
- Pumps—Sand and Slime:**
Mine & Smelter Supply Co.
- Pumps—Pneumatic:**
Smart-Turner Machine Co.
Sullivan Machinery Co.
- Pumps—Steam:**
Canadian Ingersoll-Rand Co., Ltd.
Mussens, Limited.
Northern Canada Supply Co.
Smart-Turner Machine Co.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
- Pumps—Turbine:**
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd.
Fraser & Chalmers Engineering Works.
Fraser & Chalmers of Canada, Ltd.
- Pumps—Vacuum:**
Smart-Turner Machine Co.
- Quarrying Machinery:**
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.
Hadfields Ltd.
- Rails:**
Hadfields, Ltd.
R. T. Gilman & Co.
- Roofing:**
Northern Canada Supply Co.
- Rope—Manilla and Jute:**
Jones & Glassco.
Northern Canada Supply Co.
Allan, Whyte & Co.
- Rope—Wire:**
Allan, Whyte & Co.
Northern Canada Supply Co.
- Rolls—Crushing:**
Canadian Steel Foundries, Ltd.
Hadfields Ltd.
- Samplers:**
Fraser & Chalmers of Canada, Ltd.
C. L. Constant Co.
Ledoux & Co.
Milton Hersey Co.
Thos. Heyes & Son.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Screens:**
Northern Canada Supply Co.
Hendrick Mfg. Co.
Hadfields Ltd.
- Screens—Cross Patent Flanged Lip:**
Hendrick Mfg. Co.
- Separators:**
Smart-Turner Machine Co.
- Sheet Lead:**
Canada Metal Co., Ltd.
- Sheets—Genuine Manganese Bronze:**
Hendrick Mfg. Co.
- Shoes and Dies:**
Canadian Foundries and Forgings, Ltd.
- Shovels—Steam:**
Canadian Steel Foundries, Ltd.
M. Beatty & Sons.
R. T. Gilman & Co.
- Smoke Stacks:**
Hendrick Mfg. Co.
MacKinnon Steel Co., Ltd.
Marsh Engineering Works.
- Special Machinery:**
John Inglis Co., Ltd.
- Spring Coil & Clips Electrico:**
Canadian Steel Foundries, Ltd.
- Steel Barrels:**
Smart-Turner Machine Co.
Fraser & Chalmers of Canada, Ltd.
- Steel Castings:**
Canadian Brakeshoe Co., Ltd.
Canadian Steel Foundries, Ltd.
Hadfields Ltd.
- Steel Drills:**
Northern Canada Supply Co.
Can. Ingersoll-Rand Co., Ltd.
- Steel Drums:**
Smart-Turner Machine Co.
- Steel—Tool:**
N. S. Steel & Coal Co.
Hadfields Ltd.
- Stone Breakers:**
Hadfields Ltd.
Fraser & Chalmers of Canada, Ltd.
- Surveying Instruments:**
C. L. Berger.
- Switches & Switch Stand:**
Canadian Steel Foundries, Ltd.
- Tables—Concentrating:**
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Tanks (Wooden):**
Gould, Shapley & Muir Co., Ltd.
Pacific Coast Pipe Co., Ltd.
- Tanks—Steel:**
Canadian Ingersoll Rand Co., Sherbrooke, Que.
Marsh Engineering Works.
MacKinnon Steel Co.
Fraser & Chalmers of Canada, Ltd.
- Tanks—Cyanide, Etc.:**
Hendrick Mfg. Co.
Pacific Coast Pipe Co., Ltd.
MacKinnon Steel Co.
Fraser & Chalmers of Canada, Ltd.
- Tanks (water) and Steel Towers:**
Gould, Shapley & Muir Co., Ltd.
MacKinnon Steel Co.
- Tramway Points and Crossings:**
Canadian Steel Foundries, Ltd.
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- Transits:**
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Northern Electric Co., Ltd.,
- Tubs:**
Hadfields Ltd.
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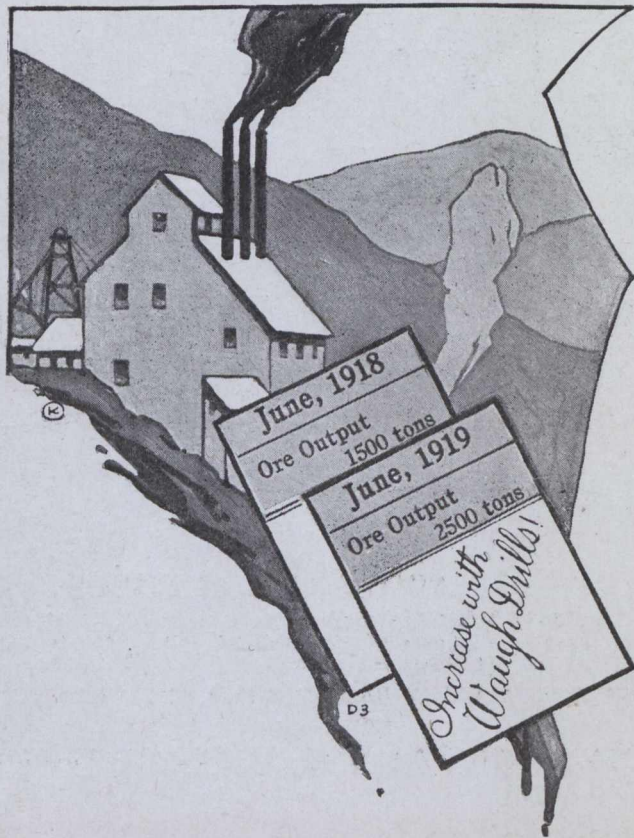
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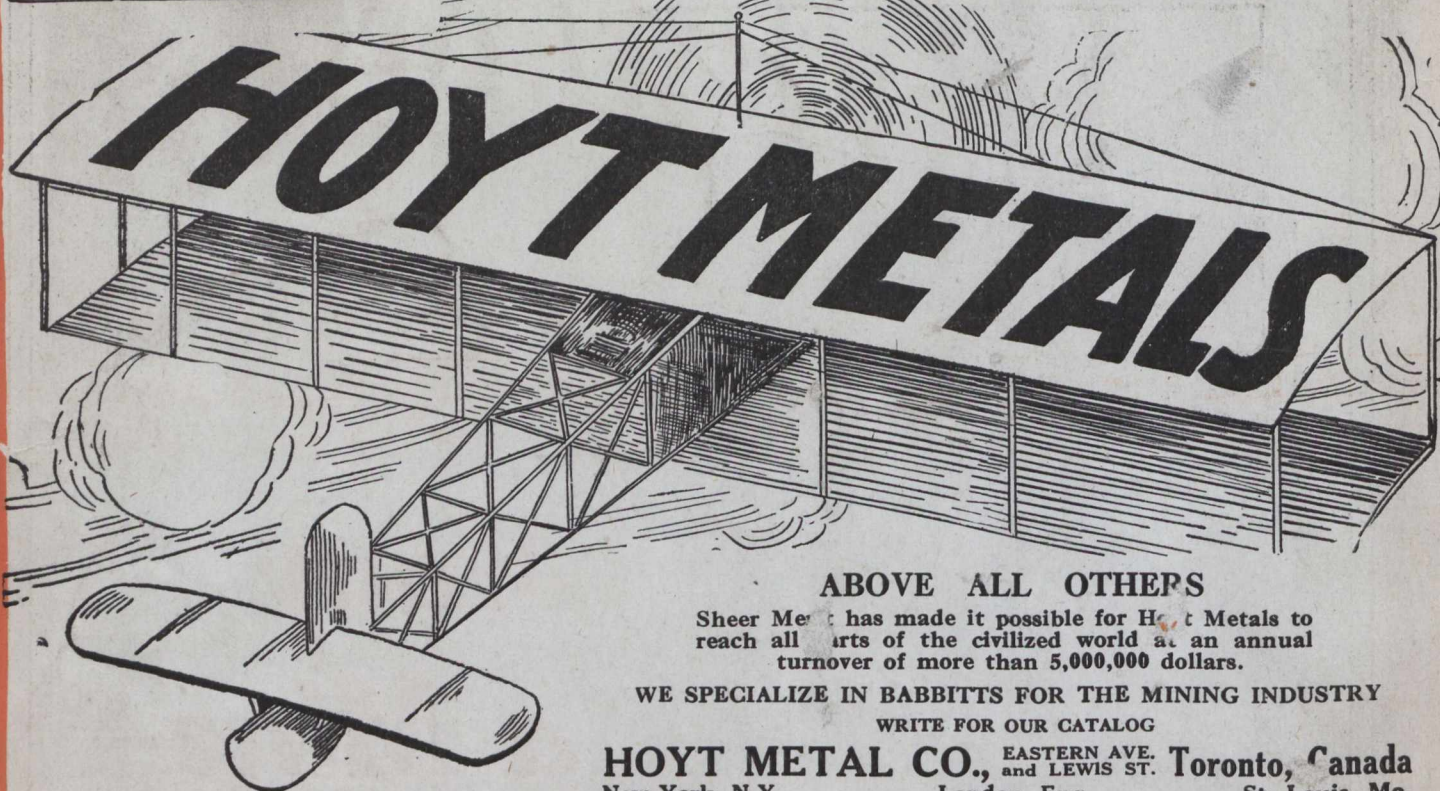
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