

CANADIAN MINING JOURNAL

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No. 45.

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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.

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

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

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

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

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

GEOLOGICAL SURVEY

Recent Publications

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

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

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

Memoir 107. Road materials in the vicinity of Regina, Saskatchewan, by L. Reinecke.

Memoir 108. The Mackenzie River basin, by Charles Cam-sell and Wyatt Malcolm.

Memoir 109. The Harricanaw-Turgeon basin, northern Quebec, by T. L. Tanton.

Memoir 110. Preliminary report on the economic geology of Hazelton district, British Columbia, by J. J. O'Neill.

Memoir 112. Geology of the district belt of southwestern Alberta, by J. S. Stewart.

Map 42A. Duncan sheet, Vancouver Island. Geology.

Map 44A. Sooke sheet, Vancouver Island. Geology.

Map 115A. Sheep river, Alberta. Topography.

Map 164A. St. John, New Brunswick. Topography.

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

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

Map 1585. Mackenzie River basin. Geology.

Map 1680. Portions of Grenville, Harrington, Chatham and Wentworth townships, Argenteuil county, Quebec. 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 1708. Bridge river, Lillooet district, B.C. Topography.

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.

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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Ontario's Mining Lands

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain Mines.

Practically all economic minerals (with the exception of coal and tin) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluorspar, graphite, gypsum, iron pyrites, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt and tale. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone sandstone, granite, trap, sand and gravel, meet every demand. Lime, Portland cement, brick and tile are manufactured within the Province.

Ontario in 1918 produced 45 per cent. of the total mineral output of Canada. Returns made to the Ontario Bureau of Mines show the output of the mines and metallurgical works of the Province for the year 1918 to be worth \$80,308,972 of which the metallic production was \$66,178,059.

Dividends and bonuses paid to the end of 1918 amounted to \$13,359,210 for gold mining companies, and \$74,810,521 for silver mining companies, or a total of \$88,169,733.

The prospector can go almost anywhere in the mineral regions in his canoe; the climate is invigorating and healthy, and there is plenty of wood and good water. Hydro-electric power is available in many parts of the Province, and many undeveloped water-powers remain to be harnessed. A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 240 day's assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in surveyed or unsurveyed territory.

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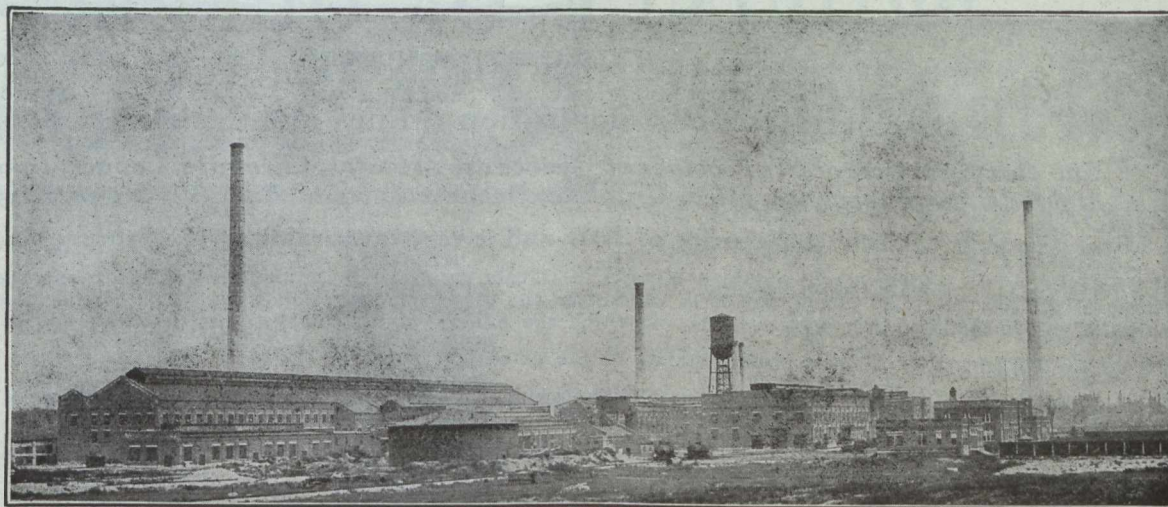
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Nova Scotia possesses extensive areas of mineral lands and offers a great field for those desirous of investment.

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

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

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

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

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

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

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

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

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

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PROVINCE OF QUEBEC MINES BRANCH

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

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

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

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

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

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

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

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

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

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

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

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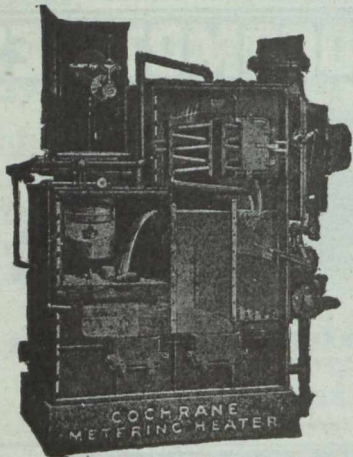
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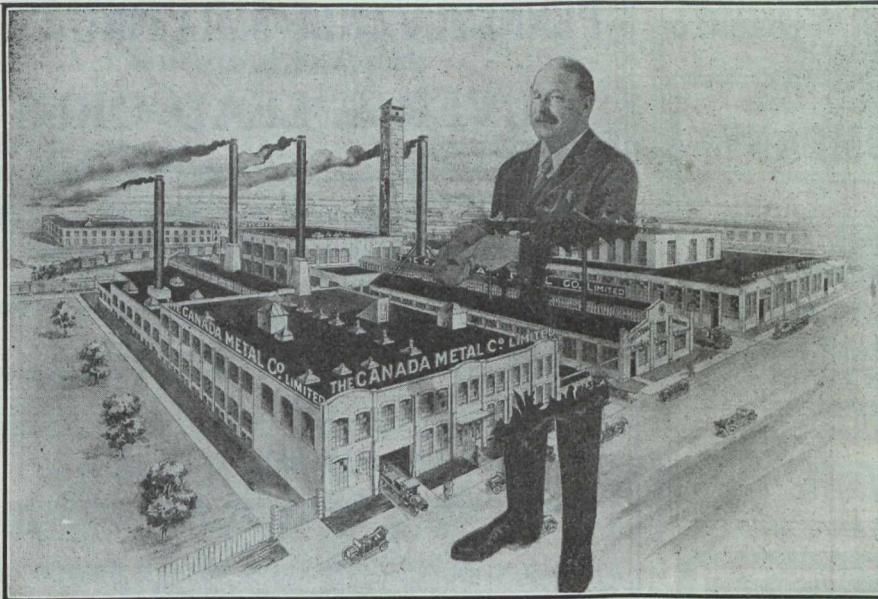
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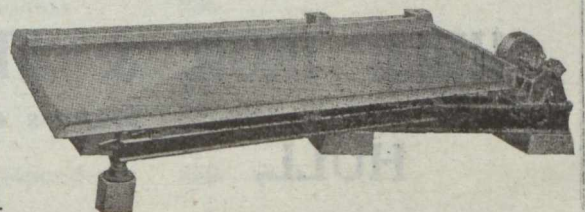
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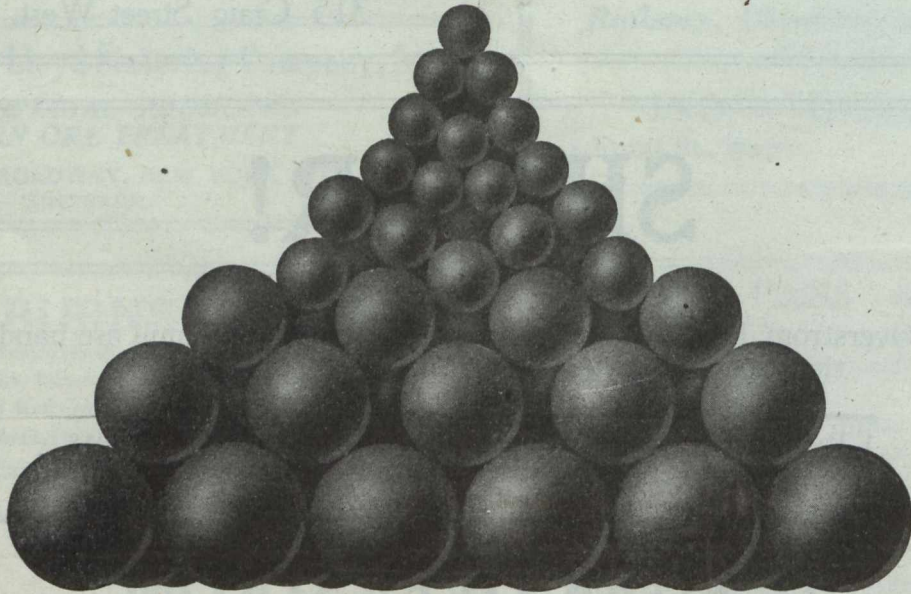


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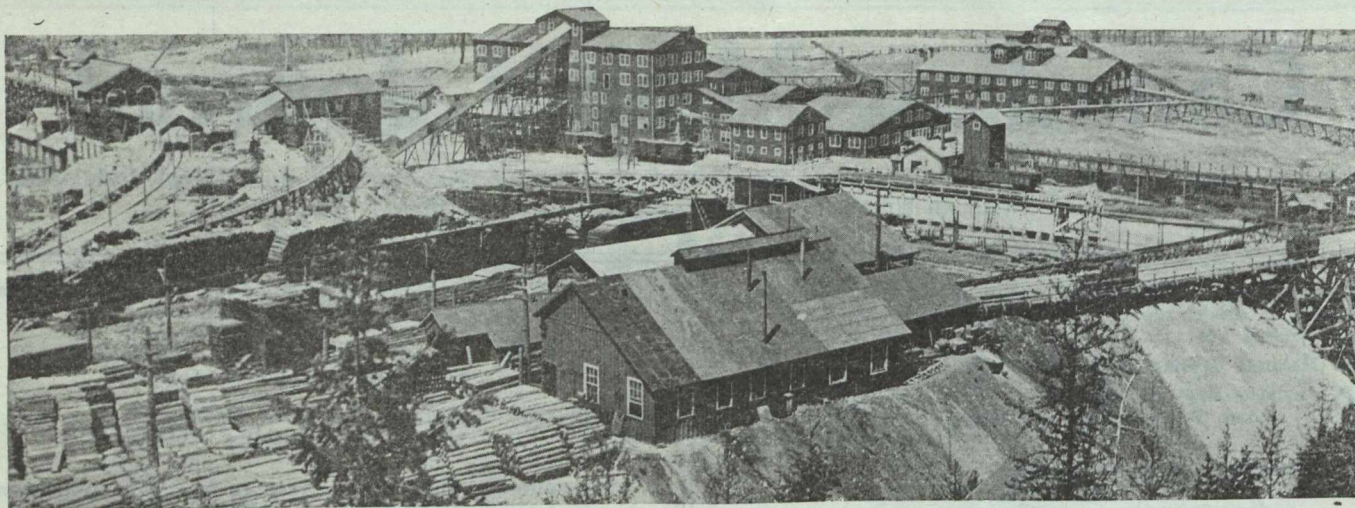
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EDITORIAL

Winnipeg and Toronto—A Parallel

Winnipeg men are drawing a parallel between the growth of Toronto, as it was assisted by the opening up of the mineral deposits of Northern Ontario, and the City of Winnipeg, as it may be affected by the development of the mineral deposits of Northern Manitoba.

The Manitoba Free Press writes: "Nothing in its history did so much in a short period for Toronto as the development of the mineral areas of Cobalt and Porcupine, and the same remarkable expansion may be witnessed in the next decade in this city."

The parallel seems to be correctly drawn. The authoritative descriptions which have from time to time appeared in the 'Journal' written by Dr. R. C. Wallace, the Commissioner of Northern Manitoba, and by Prof. Justin de Lury, leave no doubt of the great promise of the district north of Le Pas.

In this issue will be found a summary by Dr. Wallace of the work done in Northern Manitoba during the Summer just passed, together with a new map of the mineral belt tributary to Le Pas.

At the present time access to the district is very difficult, and will remain so until the extension of the railway from Le Pas takes place, but this extension, it is understood, is now assured.

In this connection, the significance of the mineral occurrences in the Upper Harricana River district of Northern Quebec, recently described in the 'Journal' by Mr. Adhemar Mailhot, should not be neglected. As the Northern Ontario mining camps were opened up by the extension of the Temiskaming & Ontario road, so has the Transcontinental Railway opened up a new country, giving the district around Amos about equal facilities for access from either the City of Quebec or from Toronto. Our Northern Ontario correspondent suggests the likelihood of an extension of the C.P.R. road northward from Kipawa, which would mean a paralleling of the T. & O. through a district the similarity of which to that traversed by the T. & O., combined with known mineral occurrences, is such as to suggest that Northern Quebec may become the counterpart of Northern Ontario in due time. In such an event it will become a question of railway strategy whether the cities of the Province of Quebec will benefit from the wealth which undoubtedly is contained in the Province, or whether Toronto will experience a further stimulus from mining developments that are already in rapid progress in the Province of Quebec.

Free Competition in Coal Mining Undesirable

Mr. H. A. Lovett, giving evidence before the Coal Commission appointed by the Alberta Government which has been sitting in Edmonton, said: "Free competition in the coal industry in Alberta has proved an expensive luxury, and by it much money has been wasted and lost. Twenty mines could produce the six million tons of coal supplied to the prairies by more than 300 mines working in Alberta."

Similar conclusions were reached by the various reports of the British Coal Commission, and in this regard all the reports concurred.

Actual trial demonstrated the evils of unrestricted competition and operation of coal mines in Nova Scotia, and led to the incorporation of the Dominion Coal Company in 1893, and a good many years ago after studying the history of the Nova Scotia coal trade from its earliest beginnings, the writer was compelled to the conclusion that the logic of events indicated the chief hope of settled prosperity in the

Nova Scotia coal trade to lie in the further development of strong corporations."

Whatever financial stability attaches to the coal companies of Nova Scotia is a testamentary benefit conferred by the General Mining Association, a monopoly that with all its faults, rendered it possible to conceive mining operations on a comprehensive basis, eliminated suicidal competition in selling prices; and enabled mine workings to be laid out with the maximum of economy, with due regard to the conservation of the vast coal reserves which sporadic individual operations have tended to endanger by uncoordinated effort.

The efficiency of monopoly in operation is not to be denied. Its dangers lie in the political direction, and not in the direction of the working out of monopolistic ideas in industry. The idea of the nationalization of coal is in the air. It is a plank of the platform of the labor party in England. It is one of the de-

mands of the labor party in the United States, and it is an accomplished fact in some countries.

The British Government has accepted the principle of public control of coal resources, but it has refused to accept the principle of public administration of actual production and management of the coal mines, believing that such is the province of private enterprise and initiative. At the same time, by providing for unified control of engineering problems within a selected district, it has placed its seal of approval on one of the most beneficial possibilities of monopoly, and has, to an extent that is yet to be realized, suggested the formation of great consolidations of colliery enterprises. It has in fact laid down the principle that where the conflict of private interests militates against the economical operation of coal-mining, these conflicting interests must be composed by pri-

vate agreement, or submit to adjustment by officers of the State, but, in any event, the public interest is not to be endangered thereby.

The distinction between public ownership of the coal seams, and public oversight of their extraction and the engineering problems associated therewith; and the commercial direction of coal mining enterprises, may seem to be a distinction finely drawn, but we believe it is properly drawn. The distinction lies in the proper functions of government. It is right for a government to conserve the natural resources of a country. This course is now generally admitted not merely as a right, but is enjoined as a duty. The propriety of government control of industry—except in national emergency—is the most debateable thing on earth, but it is not admitted in those civilized countries that have achieved political stability.

The Anniversary of the Armistice

A year ago silence came over the fighting fronts in France and Belgium, where for over four years the noise of the guns did not cease, and where the battle line swayed east and west, the final battles ending where the first tremendous battles of August and September, 1914, commenced.

The Germans were defeated by superior forces, on land and on sea—but chiefly on sea, but these forces were not more overwhelming than those that sought desperately, but vainly, to break the allied line in 1914 and again in 1918. Had the German armies been waging a defensive war, as they told the world they were; had there been any threat to the national independence of the German peoples, such as the threat of the German leaders against Belgium in 1914, the German hosts could have fought a bitter fight for many months, maybe years, to come, but the heart had gone out of the German soldiers. Theirs was a cause that only victory could justify, and defeat brought the disclosures which made plain the insincerity of the German leaders. No man fights well when he discovers that, instead of fighting as he supposed for hearth and home, he has been the dupe and accomplice of thieves and liars.

Early in the war, Hilaire Belloc likened the German machine to a glass rod. Steady pressure, he said, on a glass rod produces no visible effect, no bending, no apparent weakening, until, suddenly, the rod breaks, and breaks irremediably, suddenly and once for all. And so it proved. The inherent rottenness of the German cause, without minimizing the military effort and bravery of the allied armies, contributed to the suddenness and irremediable character of the German debacle.

Peace, unfortunately, did not come with the Armistice. The Russian people, also deceived by those who had been entrusted with the equipment and the command of the Russian armies, were overwhelmed by the bitterness of utter defeat, and between rage, despair, ignorance and the apathy of poverty and disease, fell a prey to the false prophets which the German leaders themselves conveyed into Russia and assisted in their destruction of all that remained of Russian national strength.

The Bolsheviks, like one of whom it was said: "they made a wilderness and called it peace," have made of Russia a Hell, and have called it Heaven. These men have puzzled the world by studied hypocrisy. They have committed the ordinary crimes specified in our criminal code, and have called their action political, thereby deceiving many good and earnest men. They have called murder "national safety," rape they have termed "eugenics," and to ordinary criminal actions, usually punished by the scaffold, they have applied the nomenclature of Christian ethics and philosophy.

The German failed because his system was founded on original error. For the same reason the Bolshevik conception will fail. The world is not yet convinced that the false leaders of Germany have seen the final consequences of their misdeeds, nor whether the dregs of defeat which that misguided country has yet to drink may not cause, even yet, popular excesses which may rival the unhappy events of the past two years in Russia. This is a possibility which is not the concern of Germany alone.

Progress in the Northern Manitoba Mineral Belt

(R. C. WALLACE)

The summer of 1919 has been one of prospecting, not of actual mining, in the Northern Manitoba mineral belt. There have been several reasons why capital has not been so extensively utilized in this field as merits of the properties would warrant. These reasons it is unnecessary to discuss here, with the exception of the all-important and fundamental one—the lack of railway facilities. For gold properties such facilities are almost necessary: for copper properties they are indispensable. The stage has now been reached in the district generally where, with the building of a railway to the Flin-Flon property, mining would become active throughout all the western half of the belt, and the eastern section would undoubtedly be affected by the movement. As a business undertaking, the building of this railway should be viewed with favor, more particularly if the railway be projected to run through the greater part of the western belt: as a national undertaking to assist the liquidation of Canada's debt it should not be longer delayed.

In reviewing the situation in the mineral belt, it will be advisable to deal with the districts seriatim. They may be taken in the following order (from west to east):

1. Flin-Flon and Schist lake district.
2. Athapapuskow lake district.
3. Copper and Brunne lakes district.
4. Herb and Little Herb lakes district.
5. Other districts.

While there is a variety of mineral deposit in each district, there is also on the whole a certain definite type of mineralization peculiar to each restricted area. A discussion of the fields by districts is therefore logical, not only from the geographical standpoint, but to a certain extent from the standpoint of mineral distribution as well.

1. The Flin-Flon and Schist Lakes District.

This, the most westerly area, situated almost on the boundary line between Manitoba and Saskatchewan, is the most widely known part of the belt, owing to the fact that the Flin-Flon property and the Mandy mine are situated within its limits. On the Flin-Flon, since the diamond drilling operations were completed last summer, negotiations have been pending, but no further work has been done. The conclusion of a deal with large eastern interests is expected, and, we trust, will not be longer delayed. A railway will then be built, and a mining camp established. It will then, also, be possible, apart from the 20,000,000 tons of ore which the Flin-Flon property will furnish as a minimum, to renew mining operations on the Mandy mine, in which the mixed copper-zinc sulphide ore left in the mine after the lens of high-grade chalcopryrite had been excavated will furnish additional tonnage to the smelter. In this district prospecting has been directed mainly to the discovery of further bodies of copper ore.

At the north end of the north-east arm of Schist lake sinking is now being done by Greenlees on the Levasseur claim, where, in a seven-foot zone of sheared greenstone, two stringers of mixed pyrite and chalcopryrite, respectively 3 and 5 inches wide, as they show at the surface, widen at the bottom of a pit six feet deep to a lens thirty inches in width, with con-

siderably heavier chalcopryrite than at the surface. From the inclination of the walls there is a reasonable chance that this may represent the north end of an ore body pitching southwards underneath the lake. The intention is to sink fifty feet vertically, and to drift southwards in order to follow the ore body along the strike if it is intercepted at this depth.

On Hook lake also, immediately west of a small bay on the west shore of the lake, the group of prospectors who staked the Flin-Flon have done some work on four stringers of fairly rich chalcopryrite, no one of which exceeds three inches in width, dipping 80 deg. west. At the bottom of a pit nine feet deep one of the stringers flatten out in the northeast corner of the pit, and a good deal of chalcocite occurs in this lens associated with the chalcopryrite. The sheared zone in which the stringers appear in the porphyry has been followed for some distance in a somewhat irregular course, and can be traced by the showings of the green and blue copper carbonates throughout.

On the west side of the northeast arm of Schist lake, and on the east side of the main arm of Phantom lake, iron sulphide bodies have been prospected, which may be taken as typical of the most extensively represented form of mineralization throughout the whole mineral belt. In these, as in all other cases, the lead is a carbonaceous schist impregnated with pyrite and to a minor extent pyrrhotite, with occasional showings of chalcopryrite.

On the Three Nations and Surprise claims, Schist lake, the trenches show a total width of seventy-five feet, with an additional twenty-five feet of rusted rock untrenched. Within this are bands of quartz much less heavily mineralized.

On Rosen's property on Phantom lake a fifty-foot cross trench has been made across a similar band of mineralization. In the immediate vicinity, and more particularly at the south end of the lake (Wonder claim), quartz veins show pyrite, a little chalcopryrite, and somewhat abundant molybdenite.

2. Athapapuskow Lake District.

On the Chica property the eighth hole is now being drilled. On the cross-trenches on this property, which is a sericite schist and porphyry at the granite contact, and flanked on the east side by a band of conglomerate, fairly abundant pyrite is seen in the schist with but little showings of copper sulphide. The dip is steeply westwards, and the drill-holes, which are now being put down across the strike from the west, are inclined at sixty-five degrees. This single claim is now being projected for the third summer in succession.

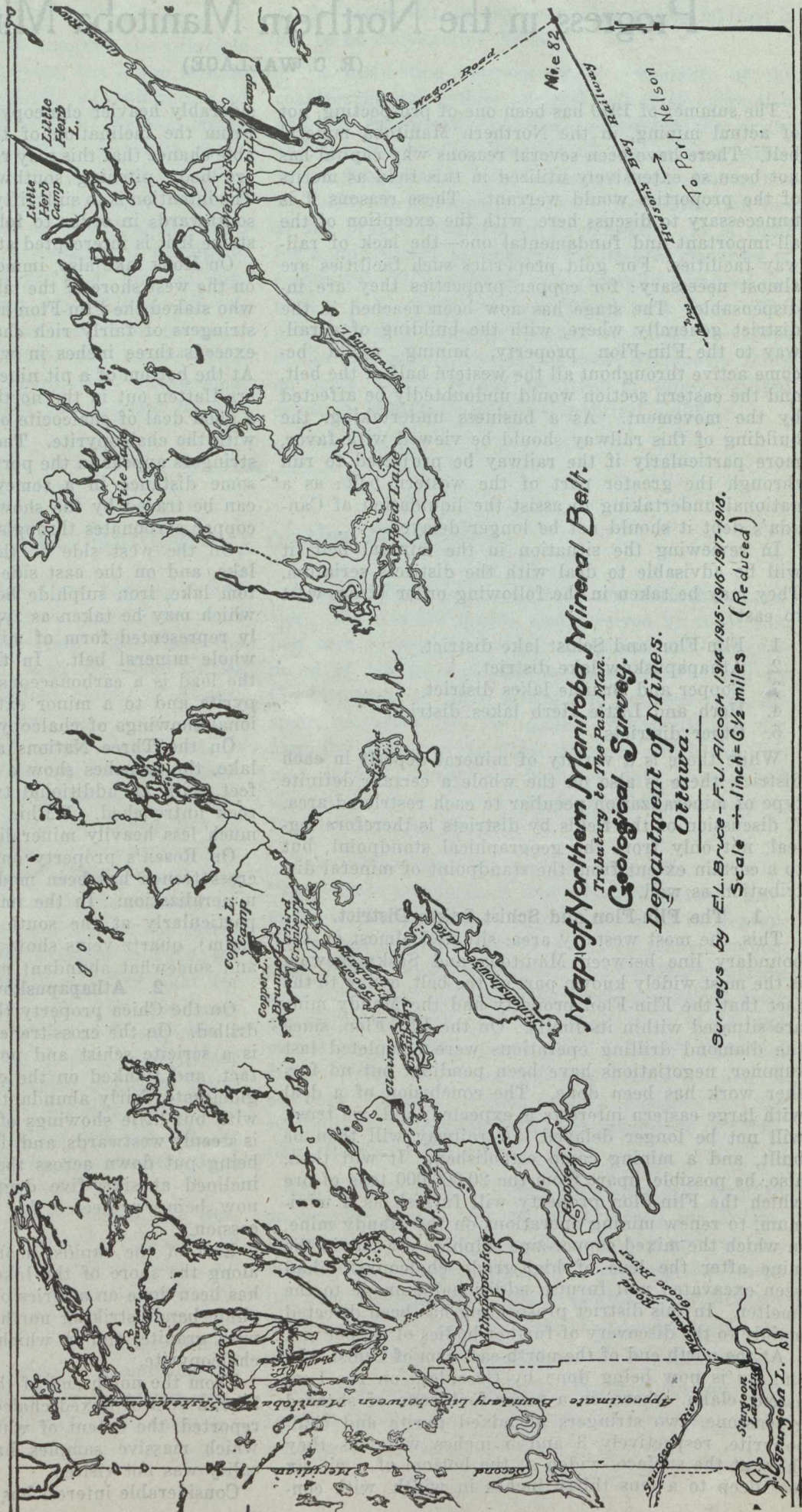
East of the rapids, near the Pine Root river, and along the shore of the lake, trenching and tunnelling has been done on a series of claims staked on iron sulphide bands striking northwards, intimately associated with granite, and in which are scattered showings of chalcopryrite.

From the north end of the north arm, on Thompson lake, a vein of mixed chalcopryrite and pyrite has been reported, the extent of which is not known, but from which massive samples have been taken. This locality was not visited.

Considerable interest has been displayed in the scat-

tered chalcopyrite and bornite showings, which are widely distributed over the north shore of the east arm of Athapapuskow lake, and initial prospecting and development work has been carried out on several properties. There is a very striking similarity in the mineralization on all the properties. The bands of greenstone schist inter-banded with more massive greenstone have been epidotised, and copper-bearing solutions have deposited chalcopyrite and bornite in stringers, bunches, and isolated crystals, as a rule not in the epidotised rock, but closely associated therewith. At least four independent zones of mineralization have already been prospected and somewhat extensively covered by staking. There is a reasonable hope that massive ore bodies might yet be discovered in this field. On the properties already prospected development work should only be undertaken if cross-channel sampling, carefully taken over widths of at least 50-100 feet, shows values in copper which would permit of economic development over such widths. Considerable trenching has been done on the Stewart, Cameron and Robertson groups. In the same district there are possibilities of gold. On the "Bob" claim, on the southward, continuation of the Ross group, very fine showings of gold, associated with telluride, were obtained on a vein 1½-2 feet wide, which has been uncovered for 45 feet.

A few miles north of this area, on the south-east shore of Twin lake, a good deal of tunnelling and cross-trenching work has been done on a fine-grained reddish phase of a granite intrusion into the greenstone from the east. The rock carries a little pyrite, and narrow veinlets of quartz in the



felsitic granite show bunches of zinc-blende with galena. The main tunnel and cross-trench are on a felsite twenty feet wide, approximating to the strike of the country rock. This is a not uncommon type of granite intrusive in this area.

3. The Copper and Brunne Lakes District.

This district has already been described in some detail by the writer in an article entitled "The Gold Discovery at Copper Lake, Northern Manitoba."* to which the reader is referred for fuller particulars. The main features are briefly as follows:—

The discovery during the present summer of a very rich shoot of gold in a quartz 18-24 inches wide has attracted attention to this district as a whole. The shoot is three inches wide on the east wall of the vein, and pitches steeply northwards (on the Red Rose claim). The neighboring mashed schist pans coarse gold over two and a-half feet at the bottom of a six-foot pit.

Parallel to this vein, and within a claim width to the west, a large quartz lode has been cross-trenched by J. P. Gordon over a width of 30-15 feet, the lode being exposed over 2,000 feet on the two most northerly claims; while on the fourth claim from the north end large bodies have also been found on preliminary prospecting.

On what is probably the continuation of the same lode northwards, across a beaverdam pond and muskeg, a vein with heavy galena mineralization has been stripped for eighteen feet. Further east a long line of claims has been staked on quartz carrying molybdenite, with sulphides of iron and copper.

Still further east, parallel bands of carbonaceous schist are heavily mineralized with pyrite, in one case (the Caribou claim) showing a width of 75 feet of practically solid pyrite with pyrrhotite. The district is heavily mineralized, and will doubtless attract mining interests which are prepared to carry on extensive exploration work on properties with unusually large surface dimensions.

4. The Wekusko (Herb) and Little Herb Lakes District.

In the Herb lake area the original gold discoveries of this mineral belt were made, and prospecting has been carried on continuously for five years. There are several properties on which considerable development work has been done, as the Syndicate, the Mc Cafferty group, the Dauphin-Elizabeth group and the Kiski-Wekusko property, and on which the initiation of greater work awaits the advance of capital into the Herb lake district. As these properties have been fully described in earlier articles, and as there is practically no change in the situation since last year, it is unnecessary to enter into details here. The main vein on the Elizabeth and Dauphin claims has been traced for almost 1,000 feet, and shows a good width throughout, while southwards, on the Bingo, where four parallel veinlets have been prospected within a width of 60 feet, very rich gold samples may be obtained from a vein 8 to 24 inches wide.

On the two properties on which the operations have been conducted on any extensive scale—the Rex and the Northern Manitoba—labor conditions necessitated a closing down before the end of 1918, and work has

not yet been resumed. Both properties are in good shape for the renewal of mining operations.

On the Rex, the Lane mill, the boiler and machinery, have been thoroughly overhauled in the expectation that the Mackeever Brothers will recommence work before freeze-up. It will be necessary to devote attention at first, and for some time, to underground development work before it will be possible to run the mill to capacity. On the Northern Manitoba the persistence and values of the vein at the 100-foot level should give encouragement to operate the property on conservative lines.

Special attention should be directed to the Apex group (P. Gasse et al) on the north end of Herb lake, both on account of the extent on the mineralized area and the rather unusual type of ore body. On the rounded point between the bay into which the Little Herb river issues, and the outlet of the Grassy river, a narrow fringe of greenstone forms the coast line, north of which a fresh but somewhat sheared hornblende granite is exposed. In what is apparently a fractured zone of arc-like shape in this granite, more than half a mile north of the contact, extensive silicification has taken place, extending over four claims, though in part (on the Victoria) unprospected owing to an intervening muskeg. On the two claims on the west limb of the arc (Apex and Dawson) a continuous zone of silicified rock, 1,000 feet in width, has been cross-trenched, and good values in gold have been assayed. On the Discovery a pit has been sunk on a faulted zone, and free gold shows on a narrow quartz vein. Over the whole are veinlets of quartz are thrown out from the main quartz body in the direction of the strike. This group of claims should be thoroughly investigated by companies prepared to carry on development work on a large scale.

Northeastwards and also in the granite, several small and discontinuous veins of quartz have been prospected during the last year, some of them immediately west of the Narrows south of Crowduck bay.

In the Little Herb lake district, while some prospecting has been done during the present year on several narrow veins on the west side of the north arm of the lake, the showings on the Cabin claim are of most interest. A pit has been sunk twelve feet deep on five veinlets of quartz which converge in the southeast corner of the bottom of the pit to a lens three feet wide, heavily mineralized on the hanging wall with pyrite, and throughout with chalcopyrite and bornite. The sulphides have also heavily mineralized the schist in which free gold may here and there be seen. On the surface the quartz has been followed along a line of shear for a limited distance by cross-trenches, and towards the south is associated with an iron carbonate, probably siderite. At the bottom of the pit the quartz is glassy, but towards the south is a milky variety very similar to the showing on the Syndicate property on Herb lake.

Other Districts.

Some prospecting has been done on Pipe lake, immediately south of the Burntwood river, on Wintering lake, File and Little File lakes, on Methy lake, on Reed lake, Island lake, Elbow lake and the Cranberry lakes on the Grass river system, Trout and Tartan lakes north of Athapapuskow lake area, and at various points along the Hudson Bay railway as far as Manitou crossing on the Nelson river.

* See Canadian Mining Journal p. 731 issue Oct. 1st. 1919.

In these widely separated areas there is a variety of mineral occurrences, on none of which has extensive work yet been done. They fall into one or other of the three types already more fully described in the other districts:

1. Quartz veins carrying gold.
2. Copper sulphides, either in stringers in quartz or disseminated through the greenstone.
3. Iron sulphide dykes, with low values in copper, nickel, gold and occasionally platinum.

At the present stage it is unnecessary to enter into details in connection with any of these areas. With the exception of the Elbow lake district and the narrows between the first and second Cranberry lakes, little has been done beyond staking and stripping. The mere enumeration of the districts involved will indicate that attention is no longer confined by the prospector to the districts in the immediate vicinity of the original discoveries in the mineral belt, but that a wide field is now under exploration, covering practically the whole of the greenstone area in the belt.

General Conclusions.

(1) The work of the past five years may be characterized as very successful prospecting. In order that successful mining may ensue, railway transportation is essential. Until such transportation is provided, mining operations will be difficult on the gold properties and impossible on the copper properties in the western section of the district.

While the extent of the Flin-Flon property in itself amply justifies building a railway, it is very desirable, from the point of view of the mineral belt as a whole, that that railway should cross the belt east of Lake Athapuskow and reach the property from the east, and in this way place a comparatively large section of the mineral belt in direct touch with transportation. When negotiations are finally concluded in the Flin-Flon property the building of the railway cannot be any longer delayed.

(2) While in the search for copper properties no discoveries have yet been comparable to the Flin-Flon and Mandy properties, prospecting has revealed a very widespread occurrence of copper sulphides through-

out the mineral belt, and more particularly on the western section. There is therefore ample encouragement for still further and more detailed prospecting for copper ore bodies in the mineral belt and, in certain instances, for the expenditure of capital in the underground prospecting of properties already obtained.

(3) As far as gold mining is concerned, interest now centres more specially on unusually large gold-bearing quartz lodes and silicified zones on the Copper and Herb lake districts. Much money will require to be spent on the underground prospecting of these and similar large properties. With the stimulus which gold mining is now experiencing throughout the continent, it cannot be doubted that the money will readily be spent by such mining corporations as are desirous of acquiring ore bodies of large dimensions with sufficiently high surface values to justify underground prospecting on a large scale.

(4) Throughout the belt the iron sulphide bands are remarkable both in respect of distribution and width. Such bands have been cross-channel assayed only to a very limited extent. Because of their extent, and also because of the fact that fairly wide quartz lodes are here and there closely associated with iron sulphides, careful attention should be paid to these occurrences, in order to determine whether sufficient quantities of copper, nickel, gold and platinum are present in any such occurrence to make operations profitable on a mineral body of large dimensions.

(5) It cannot be too strongly emphasized that the staking of claims must be followed by, and indeed preceded by, intensive prospecting, if good results are to follow to the district as a whole. In certain areas the actual work done is as yet entirely incommensurate with the amount of territory which, being already staked, is no longer available for prospecting by anyone but the owners of the claims. The regulations with regard to staking and assessment work are very favorable, and not the minimum but the maximum of work will always be done on the claims recorded by those who keep the welfare of the district closely to heart.

DEPT. OF MINES PUBLICATIONS RECEIVED

Museum Bulletin, No. 29, Geological Series No. 36, "The Discovery of a Portage Fauna in the Mackenzie River Valley, by E. M. Kindle, and a "New Species of Pelecypods from the Cretaceous of Northern Alberta," by F. H. McLearn. Illustrated by plates.

The first report correlates fauna found in the upper Devonian of the Mackenzie section with the Portage of New York.

Mr. McLearn's report deals with new fossil species collected from the Colorado group, which includes the Pelican shale, Pelican sandstone and Lower la Biche formation in the Athabaska Valley, and the St. John and Dunvegan formations and the lower shale and Bad Heart sandstone groups of the Smoky River formation in the Peace Valley. The group of Lower Cretaceous Age embraces the McMurray tar sands, Clearwater and Grand Rapid formations in the Athabaska Valley and the Loon River and Peace River formations in the Peace Valley.

These two reports give more exact knowledge regarding the stratigraphical relations of districts in which much interest is now being taken because of their mineral resources.

Colored geological map of a portion of the Rex Group of claims at Wekusko Lake, Manitoba. Publication No. 1763, to accompany Memoir by F. J. Alcock.

Map showing the geological structure of the oil regions of Lambton County and adjacent portions of Middlesex and Keat Counties, Ontario, to accompany Part E. of Summary Report by N. Y. Williams, 1918. Shows oil pools and structure contours on top of Delaware (Corniferous) Limestone, with cross-section of territory from the vicinity of Perch on Lake Huron to Thamesville.

The greatest military power in Europe is without an army; the navy that menaced us is at the bottom of the sea.

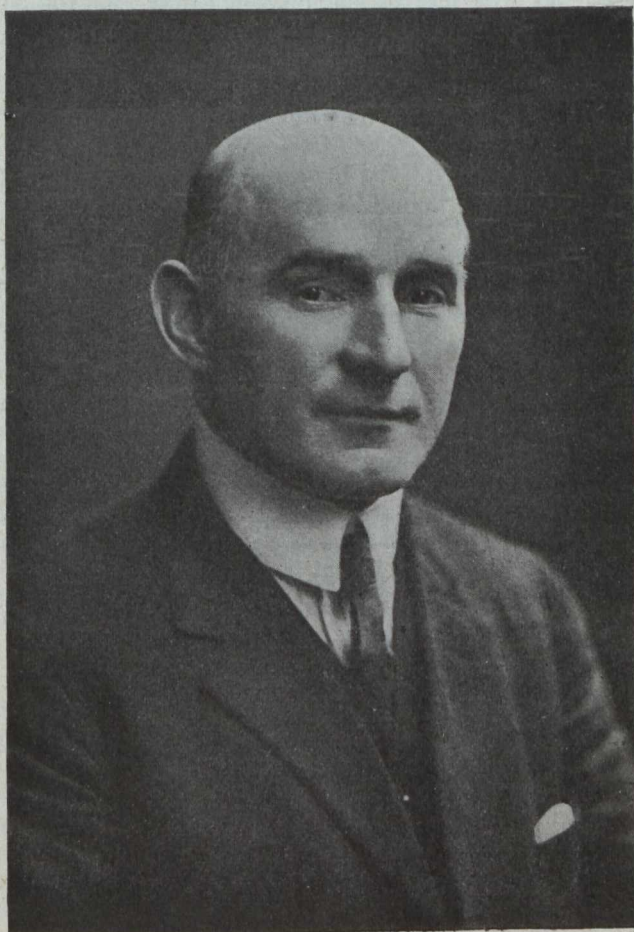
—Premier Lloyd George.

Did you buy your Victory Bonds?

CANADIAN COAL MEN.**George Wilkinson, Chief Inspector of Mines for British Columbia.**

Mr. Wilkinson comes from Cumberland, England, a county that boasts of Skiddaw and some of the oldest lead mines of the North Country. It is a country that pulls hard at the heartstrings of those who claim it as home, and in many respects the Cumberland man is not unlike the Cornishman, and enjoys a "la'al crack" about the tarns and moors and ancient mines that are its boast.

Born at Greysouthen in 1876 and commencing to work about a coal mine when thirteen years of age, Mr. Wilkinson received that most lasting of all educations, gained from actual experience in youth, and emigrated to British Columbia in 1896. He worked successively in collieries at Wellington, Vancouver Island, at Nanaimo for eight years, during which time he studied mining and passed for a first class certificate of competency as mine manager. After serving in the capacity of shotlighter and fireboss he became overman at the Protection Mine of the Western Fuel Company in 1904. After a year's service Mr. Wilkinson was appointed mine manager of the new Northfield Mine of the same company, filling the position for three years, when he resigned to accept the post of superintendent of mines for the Pacific Coast Coal Mines, a new company commencing mining operations on Vancouver Island. After the company had acquired holdings at widely separated points he was promoted to



GEORGE WILKINSON

Chief Inspector of Mines, British Columbia.

general superintendent in charge of all operations. After five years of hard work in this position Mr. Wilkinson was compelled to resign by ill-health. After resting for a time he engaged in consulting practice, and reported on many Pacific Coast properties. In 1914 he rejoined the Western Fuel Company's organization and was appointed manager of the Reserve Mine, then being opened near Nanaimo. After three years in this position Mr. Wilkinson was appointed Chief Inspector of Mines for British Columbia in 1917, and has also been chairman of the Board of Examiners for coal mining certificates of competency since the recent amendment to the C.M.R. Act of B.C. was passed. Mr. Wilkinson is also chairman of the Coal Miners Minimum Wage Board.

The duties of a chief mine inspector in British Columbia collieries are probably more varied than anywhere else, as the coal occurrences vary from highly inclined, thick and gaseous seams in mountain altitudes, with extraordinarily heavy overburden, to the more normally situated, but yet difficult seams of Vancouver Island, which, as is perhaps not generally known, include extensive undersea operations, and some conditions unique in Canada. In Mr. Wilkinson's home county is to be found the most extended undersea coal-mining operation in the world, so that in this respect he should be well able to advise on undersea mining practice.

DR. W. G. MILLER BACK FROM ENGLAND.

Imperial Mineral Resource Bureau of British Empire is now thoroughly organized and under way.

Dr. W. G. Miller, Provincial Geologist, is back at his desk in the Parliament Buildings at Toronto, having just returned from a 'six months' stay in Europe. Dr. Miller's mission was to England where most of his time was spent in completing the organization work of the Imperial Mineral Resource Bureau, which was established about two years ago for the purpose of sizing up the mineral resources of the British Empire and to place them before the world. In an interview with the Canadian Mining Journal, Dr. Miller stated that the organization was now thoroughly under way and that already much had been done through the co-operation of the various countries of the Empire in bringing before those interested the mineral potentialities of the colonies and the mother country. A work at once to be undertaken is the issuing from time to time of publications containing descriptions and statistics of the mineral resources of the various countries and these will be widely disseminated, while the mining laws will also be incorporated for the general information of the mining industry. Although started in the last year of the war, the organization could do little, owing to the unsettled conditions generally, but the Bureau is now thoroughly established and excellent results are looked for.

While in England Dr. Miller took advantage of the opportunity to tour the battlefields of France and Belgium. Although the peoples of both countries are still stunned by the awful tragedy of the war, he says that reconstruction work in a number of districts is energetically being carried on. Living in France, he says, particularly in regard to food prices, is cheaper than in England.

DEVELOPMENTS IN MINING PRACTICE.

AT THE HIDDEN CREEK MINE, B. C.

E. E. Campbell, Mine Manager at the Hidden Creek Mines of the Granby Consolidated Mining & Smelting Co. Ltd., has written an article explaining recent operations in these mines and new methods introduced to meet in a measure, the high costs resulting from the war.

He says:

The necessity of meeting the steadily increasing costs of labor and supplies, due to war conditions, presents many problems to the mine operator. At the Hidden Creek Mine of the Granby Company many changes were made in details of work, numerous economies were carried out in the use of mining materials, and improved equipment was installed in order to meet the continually increasing prices. The minor changes made during the latter part of 1915 and the first part of 1916 may be summarized as follows:

A Corps of Picked Men.

An accurate record was kept of all explosives used, and the consistent use of tamping in all first blasting was introduced. Specially picked men, receiving bosses' pay, were detailed to watch the powder consumption and to instruct inexperienced men in its proper use. Extensive experiments were made with the different kinds of rock drills, as well as with the different types of drill bits, which latter proved an important factor in increased drilling speed. A ban was placed on bulldozing as far as possible, and boulders were drilled that could be reached with safety. Centrally located pockets about fifteen feet square were driven from the 385 level or shipping tunnel, to embrace a large area of stoping ground above the 530 level, which eliminated the transfer of broken ore on this level. All pocket chutes were increased in width from three feet two inches to five feet eight inches, and a new haulage system was installed on the 385 level using cars of 130 cubic feet capacity with twelve-ton locomotives, instead of the former equipment of 75 cubic feet cars and six-ton locomotives.

Improvement Shown.

While a marked improvement resulted from these efforts, the real operating problem was not completely solved, which is the handling of the broken ore from the first blasting in the stopes and glory holes, through the mine to the crusher plant.

The mineralized schist making up No. 2 and No. 3 ore bodies drill fairly well and often breaks readily in very large masses. This is due to slips, seams and occasional small dykes cutting through the ore body. After these natural partings are broken the remaining large pieces are more resistant to blasting. To illustrate: A few months ago a piece of ground measuring 60x30x20 feet, containing several thousand tons, was blasted down in the glory hole. It rolled at least 150 feet without breaking, and it required several days' drilling to break it fine enough to let into the pockets.

When the first central pocket was driven from the 385 level to the upper workings it was equipped with a manway at the lower end, which entered the pocket at a point about twenty-five feet above the chute. Here a big opening was made to make room for drilling large pieces before they reached the chute. Another entrance was made at a point where the pocket passes the 530 level. It was soon found that many large pieces escaped from the glory holes and stopes into the pocket before they could be drilled. These frequently blocked

the pocket a hundred feet or more down. Dislodging these rocks entailed a great deal of danger to the men doing the work, as well as consuming an excessive amount of powder as it was impossible to use a drill in such a position, and bulldozing had to be resorted to. When the rock blocking the pocket was exposed from the top the usual procedure was to place the powder in a sack, light the fuse and lower the sack on to the rock with a rope. If this rock is covered up, as often happens, the only alternative is to use ladders to climb up from the nearest manway below, and place the bulldoze to the best advantage possible. There have been times when several cases of powder was used to clear a jam of boulders in one of these pockets.

Thus, at this stage the saving in tramping expected from these pockets proved more an expense than an economy. As soon as the work could be done, a manway was driven up beside the pocket from the 530 level to the top, with opening into the pocket at intervals of about thirty feet. Equipped thus, it was much easier to reach a blockade, but the amount of powder required to keep the pocket open was still excessive, and many pieces passing readily through the pocket were too large to go through the chute. These frequently had to be bulldozed at or near the chute, making big repair costs and wasting much powder.

Successful Experiments.

The next experiment was to pass the rock going into a pocket over a grizzly. At first the idea of having pieces of rock weighing fifty tons and more rolling on to a grizzly did not seem practicable.

The grizzly installation was made at the 530 level. A bulkhead was put in the pocket below the tunnel level. From a point below this bulkhead a raise was then driven, breaking into the bottom of the tunnel, and grizzly rails were fitted into this opening. A second was then driven from above the grizzly back into the pocket. This latter raise diverted the ore out of the pocket on to the grizzly, and the lower raise returned it into the pocket again below the bulkhead. The pocket above this grizzly was further increased in size to lessen the possibility of blocking.

The grizzly rails are eight feet long and they are placed three feet apart. Although much difficulty was experienced in procuring rails that would stand up to such violent service, and the cost of renewals seem extravagant, the reduction in explosives and chute repairs, together with the advantage of uninterrupted operations, far surpass any of the disadvantages.

The rails now used are made up of two 125-lb. track rails bolted strongly together, and each is reinforced with a 1x5-inch flat iron strip riveted on to the bottom. The temper is partially drawn from these rails before using, as they are very brittle and break readily. Under ordinary circumstances these rails last from one to two weeks. It is probable that a more suitable rail can be procured when the steel market becomes normal.

OUR PHOTOGRAPHS OF THE PRINCE OF WALES AT COBALT.

The 'Journal' omitted to mention in the last issue that the excellent photographs of the Prince of Wales taken on the occasion of his visit to the Cobalt mines, were taken by the MacLean Studios of Haileybury, Ont. We saw a number of additional views of the Prince during his Cobalt visit, taken by the MacLean Studios, to whom we have pleasure in referring such of our readers as may desire to obtain original prints for framing.

OIL PROSPECTS IN BRITISH COLUMBIA.**Developments in the Southern Coast Section of the Province and in Southeast Kootenay.**

(From our Victoria Correspondent.)

From Eastern Canada comes the report that an organization calling itself the Amalgamated Oil Company, Limited, after obtaining satisfactory reports from the Government and other geologists, has acquired considerable holdings in Southeast Kootenay to the end that the ground may be thoroughly prospected for oil. The company claims to have acquired a lease of 30,000 acres in the vicinity of Sage Creek, the said lease giving the Company the right of acquiring complete possession through Crown Grants at a cost of from \$10 to \$20 an acre.

The Company has leased to the Crow's Nest Oil Company of Spokane and their associates 4,886.5 acres on a royalty basis, with option to this Company to purchase at \$500 an acre. This Company is drilling and are now down 1800 feet on one well.

Negotiations are in progress with one of the strongest United States Companies towards leasing half of the balance of the Company's property on a royalty basis, also with an option to purchase at \$500 an acre. Both these leases include an obligation of the lessee to do certain development work. The Company at present does not propose to operate, but will await the results of the development work being done on the property by the lessees.

The following paragraph from the prospectus explains the attitude of the promoters:—

"The business of looking for oil is always a speculation. There is nothing new in this statement, and the public know it as well as the directors. The directors, however, believe that they have obtained the best advice available, and feel confident that their programme will result in what they consider one of the best prospects in Canada receiving a thorough testing.

"The indications of oil and gas at depth have been reported as most satisfactory, and analyses show that oil to be of extremely high grade and its value much higher than the average. Should oil be found in commercial quantities not only the shareholders but the whole country will benefit."

Note:—It has been ascertained in Victoria that the consolidation under control of one organization of leases to land in Southeast Kootenay held by individuals and by companies is in process. These leases in many instances were issued years ago and prospecting for oil in some cases was undertaken. Not a few are in arrears in payment of Government fees, action against the owners having been held up by the terms of the Relief Act which was brought into force for the duration of the war. With the war over no doubt steps will be taken, in due course, to secure delinquent payments. Should an application be made for the assignment of one or all of these leases to such a Company as is mentioned in the foregoing article, accompanied by moneys due, it is likely that it would be granted. There is no doubt that the Government would welcome the thorough prospecting of these lands for oil or for any other natural resource the discovery of which would be an asset to the country. There also is no doubt that the district in question is considered by some authorities as a possible oil producer.

Oil prospecting has been rousing considerable interest throughout the southern coast sections of the British Columbia mainland during the last few months. A number of companies are engaged in drilling and in one instance some success is reported. The Boundary Bay Oil Co., which is operating near Boundary Bay, has been drilling since last August and is down about 750 feet. At 686 feet a flow estimated at between 6 and 8 barrels a day was struck and it now is reported that oil is flowing at about 25 barrels a day. This latter is through a test hole of 2½ inch diameter, projected beyond the 16" hole and it is expected that oil will be tapped in commercial quantities when the 16" pipe is through to the present depth of the test hole. The Empire Oil Company is drilling in the vicinity of Langley, B. C. and is down about 1,100 ft. A slight showing of oil is said to have been encountered. The Pitt Meadow Oil Company has run a 6-in. test hole about 2,000 feet while the Spartan Oil Company, in the Burnaby District, close to Vancouver, is down about 2,000 feet with a test hole and is reported to be planning the commencement of a commercial sized hole.

THE PETROLEUM POLICY OF ENGLAND.

Petroleum, as is well recognized by students of the subject, is the most important basic factor on which pivots future military and commercial power. It has long been recognized that the wealth and power of a nation have varied in direct proportion to its coal and iron resources (granting that it retained control). That was the fundamental truth of the Age of Steam and the use of coal as the highest form of fuel. Now, however, we are in the first flush of the Age of Gasoline and fuel petroleum, and oil outranks coal in immediate strategic importance. The petroleum resources of the world are mainly under the control of two great powers, both Anglo-Saxon—England and America. The latter predominates at present, because of the vast oil resources which have been discovered within her own boundaries, and because of the organizing genius of her private business concerns. The control of England is growing by leaps and bounds, because of a fixed national policy and, to a considerable degree, of direct government ownership and control.

America has had no government policy regarding oil, since the government dissolved the Standard Oil Company. Since then the warfare against great and powerful business combinations has been neglected, but nothing new has been developed. England on the other hand, apparently taking a lesson both from the threat and example of Germany, has frankly adopted the opposite plan, of encouraging and even forming great oil monopolies, under government auspices. The power of this organized efficiency with the great strength of the British government behind it, as compared with the weakness involved in the negligent policy of America, needs no explanation; and the result is that we must acquiesce in the prediction of various conservative American petroleum experts that before long the preponderant control of the world's petroleum, and with it the military and commercial domination of the world, will pass to Great Britain; and that if the United States sits down to the table of equal political and commercial power anywhere in the world, even at home, it will be by favor of England's request only.

These facts have been known for a long time in private as well as government circles; there is no secret about them, and the magnitude of England's official program in this respect is so great that it could not be concealed, even if she so desired.

We shall soon present an article written by an author whom we know personally, and who states a few plain facts and inferences as plain. The author is in a position to know absolutely that of which he speaks.

This British petroleum policy, it will be shown, is frankly nationalistic and imperial, and bluntly discriminatory, against the United States in particular and all other powers in general. This is part of a similar nationalistic policy in regard to other minerals, the details of which we shall point out from time to time. Plainly, as we stated above, England desires to profit both by the threat and lesson of Germany. Plainly she is determined that no other nation, Anglo-Saxon or otherwise, shall again put her with the extreme danger to which carelessness regarding Germany's schemes and methods submitted her. Her solution for the future, as to plan, is to dominate the world, not only by her old device of a twice preponderant fleet, but by political and commercial control of the fundamental mineral resources of the world so far as possible. Her solution, as to method, is to adopt the efficient German system of state controlled monopolies; and to further safeguard herself by discriminating against non-British investors.

This program was evident during the war, when the nationalistic sentiment was perforce stiffened, as in other countries, by the necessity of strengthening to match the unhealthy German nationalism; and was between friends and partners. America must not submit to be put in such a position as to risk being told by England that such a talk is unnecessary, since she has arranged matters with entire satisfaction to herself. There has been and is much talk of American world domination, which is as indiscreet as England's present policy. Partners in the world's wars, peace, and business must not seek to eliminate or dominate one another, but to divide activities, responsibility, and profits equably.

Meantime, in view of America's sluggishness of insight and action, we can hardly blame England's vigorous and progressive nationalism (we believe it to be fundamentally against the Teuton and not primarily the American), so much as we do America's inactivity; and the firm yet fair method of joining issue with England in regard to her discrimination, in those countries which she controls, against American progress in the ownership and control of petroleum, would be to adopt corresponding retaliatory legislation, thus putting each on an equal footing as business rivals, but making it clear that we prefer that both should abandon selfish and domineering methods, and become true partners instead. In the shoulder to shoulder forward march of America and Britain, we firmly believe, lies the hope of the world; and not less important is the preservation of the dignity, independence, and power of America.—Editorial in Engineering and Mining Journal.

One big trouble with the labor movement is the fact that we have too many cabooses and not enough engines.—Railroad World.

INDIAN PETROLEUM.

A theory is being discussed in British India that oil-beds exist continuously along a belt stretching from Burmah in the east to Roumania in the west. Should the fact be eventually established a discovery of the very highest importance will have been made, for the belt, according to "Indian Engineering," will lie wholly on the Indian side of the Himalayas.

At present, however, only uncertain indications have been found, the latest of which have been discovered by Mr. Middlemiss, who is at present superintendent, Mineral Surveys of Kashmir. He has not so far actually found oil in Jammu Province, but has located geological conditions pointing to the existence of a natural reservoir of a type giving good promise of a store of oil, being in all respects similar to oil yielding structures in the neighboring Rawal Pindi plateau. In the latter region oil had long been known to be present, but efforts to obtain it in quantity were unsuccessful till the Khaur oilfield near Pindigheb was at last located.

AN APPRECIATION OF THE SCHOLARSHIP OFFER OF THE INTERNATIONAL NICKEL CO OF CANADA.

Mining and industrial companies have made great strides during the last decade in the way of caring for their employees, but it has remained for the International Nickel Company of Canada to introduce a new departure, in the form of three annual scholarships for a complete four years' course leading to a degree in science in the universities of Toronto, Queen's, or McGill. The scholarships, which cover all expenses while attending the chosen university, are awarded on the result of competitive examinations among the minor apprentices and sons of employees in the mining and smelting division, which has its headquarters at Copper Cliff, Ontario. The first of the annual examinations has already been held, so that the successful candidates may take advantage of the coming academic year. It will be observed that after the fourth year the company will be paying the expenses of 12 students continuously. So far as we know, this gift is unique, but it is the sort of thing we should have expected from the International Nickel Company, which has already blazed an honorable trail for notably generous dealings with its employees and to increase their well-being. The effect of this gift upon the ambitions of its workmen will be great, but we venture to suggest that the effect upon the mining profession may be even greater. Many of the finest miners and smeltersmen we have today were recruited from the ranks of what, for a better term, are often called 'practical' men. The 'school of hard knocks' develops character of a kind that is often denied those whose earlier years are surrounded by more luxury and less industry. Young men who have toiled hard for their living and who know the disadvantages of lack of training, upon winning a scholarship of this kind will take up their technical course with a full understanding of its benefits, an ability to correlate theory and practice, and an energy that will not let slip any opportunity for acquiring a thorough knowledge of their work. We should advise those that tread the softer path to 'watch their steps;' it is probable that in a few years these lusty young sons of the stope and the blast-furnace will be looming large in the mining profession.—Mining and Scientific Press.

Manitoba Correspondence

Brooklyn.

At the Brooklyn mine, Gold Lake, Manitoba, drifting is in progress at the 100-ft. level. Work was started on this property in March and good progress has been made in spite of transportation difficulties. The owners are for the most part residents of Buffalo. Mr. Bert Clarkson is president of the company and Mr. A. L. Anderson is superintendent.

McDonald Claims Sold.

One of the outstanding figures of the Rice Lake district was Angus McDonald, who was accidentally killed by a hunter in September. Mr. McDonald had secured control of several claims in the area before the war. He went to the front and came home safely after three years service there only to be shot in the woods in mistake for a moose.

Quite recently the McDonald properties have been purchased by a syndicate headed by Gordon McTavish. It is expected that development of some of the properties will soon be undertaken by the new owners.

Financing the Gold Pan Mine, Rice Lake.

Many of the readers of the "Journal" have heard of the Gold Pan mine in the Rice Lake district, east of Lake Winnipeg. From it has been taken some of the richest gold ore ever mined in Canada, and specimens rivalling those of the Croesus have found their way to many cities here and in the United States. The development work done indicated that a very important ore deposit had been found; but the property has been for some time idle and the finances of the company in bad shape. Considerable interest will be taken in the recent re-organization of the company and in the method of financing.

There is now being offered to the public 200,000 shares of 8 per cent preferred stock. This stock in addition to earning interest at a fixed rate carries as a bonus the earning power of three shares of common stock for every preference share issued. The first profits of the mine will be devoted to the repayment of both capital and interest. Then the holders of the preferred stock will share with the holders of the common stock any further profits. The company has 400,000 shares in the treasury which will be issued as preference shares.

The officers of the Gold Pan Company now are: Jas. H. Ashdown, president; F. O. Fowler, vice-president; Gordon McTavish, secretary-treasurer. The other directors are E. F. Hutchings, S. Hart Green and Sam Scott. J. B. Tyrell of Toronto is consulting engineer.

It is expected that development of the property will be carried on rigorously this winter. Mr. Tyrell visited the property recently in company with Secretary McTavish. Mr. Frank Phillips has been appointed mine superintendent.

An Early Freeze Up.

Cold weather descended unusually early on the Rice Lake district this year. Lake Winnipeg is frozen over and the water route from Riverton to Manigotegan and thence up the river to Clearwater Lake is no longer usable. As soon as possible the winter road from Fort Alexander will be made passable for teams. There is no summer waggon road to the district.

Bruce Consolidated.

The Bruce Consolidated Mining Co. owns 275 acres in the Gold Lake area, Manitoba. Development has been recommended by J. S. De Lury of Winnipeg. The

directors are Col. Wm. Grassie, Col. E. D. Alderson, Capt. W. B. Tobias, Dr. Halpenny and J. J. Papineau. Col. Grassie is president of the company.

THE POSSIBILITIES OF NORTHERN QUEBEC ALONG THE ONTARIO BORDER.

By J. McRAE.

In connection with the development of that part of the province of Quebec lying adjacent to Ontario, and extending from Mattawa on the south, north to the National Transcontinental Railway, a new era appears to be opening up.

Heretofore, this part of the province of Quebec has been left for the small pioneer, the settler, to develop. Some progress has been made in agriculture, but in this way only that fringe of territory lying adjacent to the Ottawa river and Lake Temiskaming has been opened up.

The construction of the great plant of the Kipawa Fibre Company, a subsidiary of the Riordon, at Lumsdens Mills near the south end of Lake Temiskaming, marked the beginning of more intensified development. The plant which is being completed this month, and which is served by the C.P.R. Railway, has been constructed at a cost of around \$4,000,000.

Now comes the unofficial report that the Canadian Pacific is considering the advisability of extending the Kipawa branch to the northward, for the time being to terminate near the north end of Lake Temiskaming. The distance, as the crow flies, is about 56 miles, but would perhaps necessitate the construction of 65 miles of line. The road would pass through a comparatively prosperous farming and lumbering district.

Incidentally, and no doubt having vital bearing on the final decision to be reached by the C.P.R. is the likelihood of another huge pulp and paper mill to be erected near the north end of Lake Temiskaming in close proximity to the Des Quinze water power. It is learned that a more or less complete survey has been made of this great water power, estimated to be sufficiently large to generate all the way from 100,000 to 250,000 h.p. and ranking among the largest in the Dominion, with the exception of Niagara. The M. J. O'Brien, Limited, a twenty million dollar corporation controlled by Senator M. J. O'Brien, of Renfrew, owns several hundred miles of territory located along the waters of and tributary to Lac Des Quinze. The same interest controls a large part of the Des Quinze power. It is believed, therefore, that the Canadian Pacific and the O'Brien interests are working together with a view toward realizing mutual benefit from the further development of this area. From Lac Des Quinze, extending away to the north and to the west is territory which as yet is practically untouched. It is an area hundreds of miles in extent, and presenting an almost unbroken mass of timber, broken at intervals by grey-rocky hills rising up through the green timberlands. The potentialities, in addition to its known tremendous value, are enormous. Geological conditions are such as to encourage the belief that deposits of precious metal will be found to occur throughout the area. The northern reach of the C.P.R. at Kipawa is on the threshold of this great new land. By extending to Lac Des Quinze it will have made the first stride in one of the greatest of the remaining opportunities at Empire-building, and would command, unchallenged in competition a territory, vast, and containing untold wealth.

Our Northern Ontario Letter

The Silver Outlook.

With the quotations for commercial bar silver continuing on an upward trend, and with an unfavorable rate of exchange between Canada and the United States, students of finance appear to be growing apprehensive lest it shall be found necessary in Canada in the near future to enact legislation similar to that now in force in Great Britain—making it a criminal offense to melt down silver coin, and placing an embargo on silver exports.

It is perhaps too soon to grow alarmed over the situation, for the reason that the point of bullion parity with the value of the coin has not yet been reached but, in a world suddenly possessed of insatiable desire for silver, a recession in quotations appears to be remote, while, on the other hand, continued demand may reasonably cause a further upward swing. Believing in preparedness, therefore, it seems quite reasonable that students of finance as well as metal authorities should give the matter the thought necessary to enable them to meet any emergency that may arise.

The high grade mines of Cobalt are deriving the maximum benefit from the present favorable situation. The mines are fully named; efficiency is increasing; costs are declining, and the margin of profit on every ounce of silver produced at the leading mines is greater than the total value of the product a few years ago.

According to figures just obtained from Arthur A. Cole, mining engineer for the Temiskaming and Northern Ontario Railway, which road serves all the productive precious metal mining camps of Northern Ontario, the total ore shipments from Cobalt during 1918, which figures will be contained in an annual report soon to be issued, amounted to 17,911 tons; this being in addition to the large amount of ore treated in local reduction plants. During the year 22 mines shipped ore, the heaviest shipper being the Buffalo with 3,842 tons to its credit, followed by the Nipissing with 2,619 tons and the Mining Corporation of Canada with 2,264 tons. Up to the end of 1918, the mines of Cobalt shipped an aggregate of 266,734 tons since the discovery of silver in 1903. The total silver production up to the end of 1918 amounted to 292,056,976 ozs. valued at \$169,241,387.

As near as can be ascertained, the silver output at present approximates \$1,250,000 every thirty days, the Nipissing being the chief producer, being responsible for upwards of one-fifth of the total.

At the time of writing a number of important mining deals are being negotiated. Chief among these are the Buffalo Mines, and the old Drummond property. The Mining Corporation is stated to be making a bid for the Buffalo, following the failure of the Temiskaming Mining Company to secure the Buffalo on satisfactory terms. Montreal interests through the former leaseholders of the Foster-Cobalt mine are negotiating in an endeavor to secure the old Drummond mine. In neither case have negotiations as yet reached successful consummation.

At the Beaver Consolidated, some of the richest ore ever found in the mine is being encountered. In addition to a substantial quantity of high-grade, a large amount of low-grade material occurs in close proximity to the vein.

The La Rose Consolidated is stated to be enjoying a prosperous year. Recent shipments of high grade ore have been made, one car unofficially estimated to contain a value of upwards of \$75,000. The outcome of the boundary dispute which arose last spring between the La Rose and the O'Brien, regarding which a legal decision was reserved, is still unsettled. A decision is looked for at an early date.

The Nipissing, Mining Corporation, O'Brien, Temiskaming, Crown Reserve, Kerr Lake, and, in fact, practically all the leading producers have scouts in the various mining districts in search of prospective mines. Backed by ample finances, and with excellent managerial organizations built upon more than a decade of successful experience in Cobalt, not a few of these companies are expected to prolong their life indefinitely through the careful selection of other possible paying mines.

Among the properties in Cobalt which have lain idle for a number of years, and which are being operated, might be mentioned the Farah, now known as the Nipissing Extension and the Oxford-Cobalt, a prospect situated south of the Kerr Lake and in the Gillies Limit. Others of the small prospective properties being worked include the Silver Cliff and Foster-Cobalt, while among those likely to be explored or developed at an early date are the Hylands property, to be known as the Victory Silver Mines, and the Silver Hills property, in the north-western part of Coleman township. With these might also be mentioned the old Drummond property, provided present negotiations terminate successfully. Also, presuming that the legal details can be arranged, the Bailey-Northern Customs, (a merger of the Northern Customs Concentrator, Ltd., and the Bailey-Cobalt) is expected to commence operations on the Bailey.

Regarding the affairs of the Bailey, the matter came up before Mr. Justice Middleton on Nov. 5th in Toronto, and at the request of the parties involved, the motion was enlarged until Nov. 19th.

The shareholders of the Tretheway-Cobalt, at the annual meeting held in Toronto on Nov. 7th ratified the proposal of the directors to acquire additional shares in the Castle property in Gowganda on a basis of one share of Tretheway for two shares of Castle stock. The deal to secure the Major property, which adjoins the Castle, and to acquire a lease of 112 acres lying under Miller Lake was also ratified.

It is quite evident that a continuation of the present high quotations for silver will be find practically all the prospective, but idle properties receiving renewed attention, and, in the aggregate, adding considerably to the extent of the silver mining industry of Cobalt.

The Nipissing mine is producing at the greatest rate in its history. The present record according to official advice is at the rate of over \$500 an hour or about \$12,105,75 every twenty-four hours. At such a rate for one year the output would amount to over four and a half million dollars.

According to the report of manager H. Park to the president and directors of the company, the mine during the month of October produced ore of an estimated value of \$375,247, and shipped bullion and residue from Nipissing and custom ores of an estimated net value of \$680,208.

Concerning development work, Mr. Park says:—
 "Underground work is now nearly back to normal. At 73 shaft, development and exploitation is proceeding at four levels. The fifth level will soon be dewatered, which will make 544 winze workings accessible. All operations at 75 shaft were satisfactory throughout the month. One of the cross-cuts at the third level encountered the extension of a known vein, No. 3006, some of the ore being of exceptionally high assay; the width averaging one inch.

"Exploration and drifting was carried on at the second level of 64 shaft. About 60 tons of low grade ore from old surface dumps are daily being sent to the low grade mill. Exploration is being carried on at two levels of 63 shaft. One of the cross-cuts will eventually connect with the lower workings at 96 tunnel. Drifting on vein 109 at a depth of 90 feet below 96 tunnel is about completed. Results of this drifting show the vein to be narrower and lower grade than at the tunnel level; the formation however is different. A cross-cut is also being run to vein 99, the intervening country being considered first class area.

"The low grade mill treated 7,674 tons. The high grade plant treated 230 tons. The refinery shipped 403,830 fine ounces of bullion. The following is an estimate of production for October:—

Washing Point	\$127,065
Low grade mill	248,182

Totals \$375,247

Ore Bullion Silver Shipments from Cobalt

During the week ended Nov. 7th, four Cobalt companies shipped an aggregate of seven cars containing 613,548 pounds of ore. The Buffalo with two cars containing 187,308 was the leader, as shown in the following summary:—

Shipper	Cars	Pounds.
Buffalo	2	187,308
Coniagas	2	132,170
Mining Corporation	2	130,060
O'Brien	1	64,010
Totals	7	613,548

During the corresponding period, the Nipissing and the Mining Corporation each shipped bullion, the total amounting to 93 bars containing 113,683 fine ounces, made up as follows:—

Nipissing	60	80,811
Mining Corp.	33	32,872
Totals	93	113,683

The Gold Mines.

A new vein encountered during the past week at a depth of 1500 feet in the Pearl Lake shaft of the McIntyre-Porcupine promises to be important. The ore came into one corner of the shaft, and at the time of writing the extent of the body and its average gold content is not known. The ore, however, appears to be of high grade and seems likely to develop into an important find. This is the deepest point to which mining operations have been carried in any of the gold mines of the province and is pointed to as corroborating the contention of mining men that the Porcupine deposits are deep-seated, and, in some instances might reasonably be found to continue to depths beyond which mining may be carried. It holds out untold promise to the gold mining industry of this country.

The Hollinger Consolidated, with a surplus already crowding close to \$3,750,000, with ore reserves according to estimates at the beginning of the year amounting to around \$41,000,000, with milling facilities for treating a maximum of 3,500 tons daily, ore averaging between \$8 and \$9 to the ton, developed to a depth of close to one-quarter of a mile and having at least two-score known ore bodies as yet undeveloped in addition to those being worked is gradually standing out as likely to make a strong bid for world leadership among gold producing mines.

The Dome Mines at its present rate is earning sufficient to cover dividend disbursements at the rate of 20 per cent annually, is the advice given your correspondent by an official of the company. A dividend of 50 cents a share is expected at the beginning of the new year.

On the Dome Extension, arrangements are being made at the 600-ft. level to stope out considerable ore to be treated in the Dome Mill. The result of treating a substantial and representative tonnage of this ore will have a vital bearing on the question of whether or not the Dome will exercise its option on the Dome Extension on or before March, next, on a basis of one share of Dome for thirty shares of Dome Extension.

Among the important properties about which very little has been said during the past year or so is the Schumacher and the Porcupine V. T. N., both properties equipped with large mills and having quite large ore reserves. It is believed that both of these properties will be whipped into shape for operation before very long.

At a meeting of the Gold Reef shareholders held in Toronto, Nov. 7th, the company was authorized to increase its capitalization from \$1,000,000 to \$3,000,000. This move was made advisable owing to the plans to finance an exploration and development program in addition to the present diamond drilling campaign. The fourth diamond drill hole is now being drilled.

On the Clifton-Porcupine, work is proceeding in an aggressive way, and officials declare that results are satisfactory.

The Porcupine-Kenora is to be developed by underground work, following the encouragement met with as a result of extensive diamond drill tests made.

On the Big Dyke property (formerly known as the McRae-Porcupine), situated in the township of Delora, plans are being arranged to sink a shaft to a depth of 300 feet. Up to the present about \$40,000 has been spent on exploration work on this property, on a large sulphide dyke in which occurs a large amount of sugar-quartz and iron sulphides. Low gold values occur throughout the dyke.

The Kirkland Lake camp is gradually becoming more active. According to reports emanating from Buffalo, it is believed the Wright-Hargreaves will absorb the Sylvanite company. The property of the latter company lies directly between the Wright-Hargreaves and the Tough-Oakes. Previous work consisted of the installation of a small electrically driven plant, and the driving of a shaft to a depth of 100 feet at which point two veins were opened up, one of which, though fairly narrow contained considerable ore.

The proposed scheme to construct light railways to the outlying camps is an interesting subject to the Kirkland Lake camp. Any concrete progress made is being watched with keen interest, as it is thought that

in addition to the present macadam road from Swastika to the mines, a light narrow gauge railway might prove to be an added convenience.

In the Fort Matachewan district the Matachewan Gold Mines has commenced diamond drilling, and in a general way is speeding up operations. A saw-mill has been erected and is turning out lumber for building purposes. Also, the government is assisting in the clearing of a right of way which is to constitute the winter road from Elk Lake.

The Robb-Clemmens group of claims have been optioned to the Smith-Norrington interests, and arrangements are now being made with diamond drill contractors to commence work just as soon as the drill can be transported to the property.

Miner Versus Farmer.

Mining interests and business men in general are evincing more than usual interest in the present political situation in Ontario. With the United Farmers of Ontario claiming a larger number of members in the Ontario legislature than any of the other parties, yet not being able to claim a substantial working majority, the naming of the ministry on November 14th the date on which E. C. Drury, leader of the U.F.O., has agreed to take over the reins of government, is being awaited with deep concern in the northern districts where it is feared the mining districts will not be given cabinet representation. Suggestions have been made to the effect that the interests of Northern Ontario and Southern Ontario are so different as to make it quite reasonable to consider dividing the province in two. For the greater part, these suggestions are put forward in a friendly spirit, as tempered with caution, and plainly marked with a desire to avoid undue embarrassment to the present provincial government.

A REVIEW OF THE PRODUCTIVE STATUS OF THE GOLD MINES OF NORTHERN ONTARIO.

By J. A. McRAE, Cobalt.

In an endeavor to give your readers a correct view of the status of the gold mining industry of Northern Ontario, your correspondent has secured official figures upon which to base this summary.

During 1918 the average gold content of the ore treated in the Porcupine district amounted to \$9.60 a ton; in Kirkland Lake \$11.89, the average in these two leading camps being \$10.74 a ton. The smaller and outlying districts now coming into more or less prominence appear likely to equal this average, although, perhaps containing less total tonnage than the camps mentioned.

It will be noted from the table below, that the gold mines of Northern Ontario are at present equipped with facilities for treating a maximum of approximately 6,810 tons of ore every twenty-four hours. The maximum output, therefore, estimating ore at \$10.74 a ton, would approximate \$73,139 daily, or about \$26,695,881 annually.

In dealing with these figures, it would perhaps be well to point out that all but six of the nineteen mines below referred to are beyond the prospective stage. Those in the latter class only include the Davidson, Newray, Associated Goldfields, Argonaut and Hill Gold Mines. It will be noted that the six mines in the prospective stage account for but a small part of the total milling equipment, and leaves 6,640 tons daily

capacity as representing the equipment of thirteen proven mines, which on ore averaging \$10.74 a ton would produce a maximum of over \$26,000,000. Also, in eliminating the above mentioned half dozen mines, does not necessarily infer that they will not each in time attain commercial success.

Another factor, without which this summary would be incomplete, is the proposed plans at a number of properties for the installation of additional equipment and in some instances the erection of new mills, all of which would serve to increase the total.

In presenting these facts, it might be stated that the following mines are in operations, the others being closed due to labor shortage: Hollinger Co., Dome, McIntyre, Porcupine-Crown, Dome Lake, Davidson, Kirkland Lake, Teck-Hughes, Lake Shore, Miller-Independence, Argonaut, Associated Goldfields.

Following is the maximum capacity of the present mills:

Porcupine District.	
Company.	Daily Capacity in Tons
Hollinger Con.	3,500
Dome Mines	1,500
McIntyre-Porcupine	550
Schumacher	200
Porcupine Crown	130
Porcupine V.N.T.	120
Dome Lake	80
Davidson	40
Newray	20
	6,140
Kirkland Lake District.	
Kirkland Lake	150
Tough-Oakes	120
Teck-Hughes	100
Lake Shore	70
Burnside	30
	470
Boston Creek.	
Miller Independence	40
	40
Larder Lake.	
Associated Goldfields	40
Argonaut	30
	70
Munro Tp. District.	
Croesus	50
Hill Gold Mines	40
	90
Grand Total	6,810

Concerning the ore reserves in the gold mines, it would perhaps be dangerous to deal with them all for the reason that at some of the smaller mines sufficient work has not been done to deal with them in safety. It is proper, however, to cite three leading mines, the official figures of which are entirely reliable, namely: the Hollinger with \$41,000,000; Dome with \$10,000,000 and McIntyre with \$5,000,000. These three mines alone contain an aggregate of \$56,000,000 in ore reserves. As the total of all the known gold mines of the district, unofficial estimates range from \$75,000,000 to \$100,000,000. From these figures, together with the foregoing facts, the known magnitude of the gold mining industry of Northern Ontario may be realized.

Special Correspondence

BRITISH COLUMBIA.

The Collieries.

The present prospects are that the bituminous mines of British Columbia will not be affected by the strike in the United States. All the collieries of Vancouver Island, as well as those of the Provincial Mainland, are working as usual and there are no reports of impending trouble. The same applies, up to date, to the mines of the Province of Alberta.

It was reported some days ago that the State of Washington would look to British Columbia to replenish its empty coal bins, the assertion being made that 10,000 additional tons would be shipped to the Sound every month in order to assist in overcoming any shortage that might develop.

This caused some uneasiness in this Province, it being felt that it might result in industrial and domestic embarrassment at home. J. M. Savage, manager of the Canadian Collieries (D) Ltd., has stated that his company would make no greater shipments to the United States than usual for the simple reason that it was not in a position to do so. He said that the local demands were so heavy that the Company was fully occupied taking care of them. Certainly the local market would have to be cared for before export was considered. Much the same statement was made by W. A. Webb, of the Canadian Western Fuel Co., which operates the Nanaimo Collieries, who added that the State of Washington could not look for more coal than now was being sent out because it was outside the capacity of the company to make such deliveries. Consequently those who were inclined to dispute a policy of permitting export of coal at the present moment apparently have been silenced.

The bunkering of steamships sailing from Puget Sound ports will not be affected. Most of these vessels call at Nanaimo for their fuel. The Nippon Yusen Kaisha and Osaka Shosen Kaisha vessels will be able to obtain coal from sound bunkers which are filled from Vancouver Island mines.

H. A. Lovett, president of the North American Collieries, Ltd., in his evidence before the Alberta Government Coal Commission, advocated putting the coal mining industry of the Province of Alberta under the supervision and control of a board appointed by the Provincial Government, with power to fix wages, regulate working conditions, pass upon all proposed developments, widen markets, and generally look after the interests of both the producing and the consuming public. Free competition in the coal industry in Alberta, Mr. Lovett said, had proved an expensive luxury, a large amount of money having been wasted and lost. The lack of some public control had been seriously felt, among other ways, by the number of mines in operation. Twenty mines could produce the 6,000,000 tons of coal supplied to the Prairie Province trade at present by more than 300 mines. In some way, Mr. Lovett declared, the State must step in. The present experiment in railway nationalization would show, in due course, whether the principle should be extended to the mines, but in the meantime the condition of the industry could be materially improved by a policy of public control and supervision.

THE METAL MINES.

Alice Arm.

A. J. T. Taylor, head of the Taylor Mining Company, Chris Spencer and Walter Leek, the latter two being heavily interested in the Company, have returned from a visit of inspection to the Company's property. They found that the season work on the Dolly Varden mine had been satisfactory and that there is every promise of shipments being maintained through the winter. It is expected that the October rate of output will be continued. At present a one thousand foot is being driven below the lowest existing working. This should tap ore bodies 250 ft. below the present tunnels.

The statement is made by officials that the Dolly Varden Mine shipped 112,000 ozs. of silver during September, and that the October total reached 150,000 ozs. The run of shipping ore is returning from 50 to 70 ozs., although some sacked toward the end of the season is expected to run 700 ozs.

The North Star Group, adjacent to the Dolly Varden, has arranged to ship some sacked ore this year. The Tiger Group and the Muskette, across the river, have developed some good showings and will continue with development work through the Winter, expecting to ship in the Spring.

The Dolly Varden officials state that the railroad between tidewater and their mine has experienced no operating trouble so far this year, and the weather alone will determine the length of its winter operations. Up to the time of their departure there had been no snow at the mine. They are of the opinion that the low reaching tunnel now being driven will open up large ore reserves, creating the necessity for extensions to the railroad and a new aerial tramway.

Salmon Arm, B. C.

R. K. Neill, of Spokane, Washington, has confirmed the recent report of the sale of a two-fifth interest in the Premier Mines to the Guggenheim Company and other New York capitalists. This is the largest mining deal made in British Columbia this year. While Mr. Neill declines to vouch for the accuracy of the statement that there are \$5,000,000 involved in the transfer he asserts that the value of the ore blocked out is estimated as being between eight and ten million dollars.

Development of the Premier Mine will be continued, a force of sixty men being kept at work throughout the winter. The Company's intention is to erect its own concentration mills, making use of both the location and cyanide processes of gold recovery.

Discussing future plans, Mr. Neill said: "Of course you understand the mine is still a baby mine and like a baby must creep before it can walk. We cannot do all these things in a day but will progress as rapidly and as consistently as possible. We have had many difficulties to overcome. We have had to build a road sixteen miles to Hyder to bring our ore out. This was first constructed as a trail. Later it was widened to permit the traffic of a sleigh. Last year we widened it still more until it was a two-sleigh roadway, and this year it will be a fine highway. We brought 3,000 tons of ore out over the snow last year and must continue to haul out that way this winter. Eventually when our mills and concentrating plants are constructed we shall bring out gold bricks."

George Clothier, Provincial Government District Mining Engineer, after returning from a trip to the

Salmon Arm and Bear River Districts, speaks very glowingly of mining possibilities. He says that recently there have been no less than six properties on the Bear River bonded, interests having been secured in most cases by American capital. He refers to some rich prospects on the Nass River slope, which however could not be inspected because of the snow. Some ore brought from these went as high as 900 ozs. silver to the ton. That preparations have been made for the continuance of work through the winter on the Mineral Hills, Bush, Forty-Nine and Big Missouri properties is confirmed by Mr. Clothier. Supplies were packed to these claims before the road became impassable. He also refers to the fact that with the coming of snow the Premier Mine people will commence bringing out ore.

The Spider Group which has produced some rich silver ore from a narrow vein, is reported to have been sold to interests represented by W. A. Meloche of New York. The consideration has not been made public but it is understood that development work will be undertaken with no unnecessary loss of time.

Miners at Stewart have been interested lately in ore samples from the Motherlode group which was located during the summer by A. W. Balzimer and Patrick McBride. This property is situated about two miles above Big Missouri and comprises six claims. A shipment of fifty pounds of the ore is being shipped to Vancouver. The principal value is silver but it contains also some gold and considerable lead.

Nelson, B. C.

The Morning Star group is showing promise of development, a sample of gold-copper ore having been brought to Nelson to illustrate the character of a new strike made on that property. There are two ledges on the Morning Star group, and it is the smaller of the two which has been receiving special attention. It has been traced for two hundred feet and has been developed by an open cut. The ledge has a width of eight feet and the width of the ore is three and a half feet. Paralleling the small ledge is a large one, twenty feet in width, which shows some copper but has not yet produced such ore as the small one. The two ledges dip toward each other.

A movement has started having in view organization of the different mining communities of West and East Kootenay, British Columbia, for the purpose of directing their united influence and energies to the satisfactory solution of those problems affecting the industries in these sections of the Province.

Representatives of the Associated Boards of Trade have returned from a tour of this extensive district in the course of which a number of the leading mining properties were inspected, information obtained as to conditions in various localities, and public meetings held at which important matters were discussed.

The party went through the Standard Mine Concentrator at Silverton, the flotation process, which is responsible for the recovery of an exceptionally high percentage of the zinc content of the mine's ores, being in operation.

At Slocan City much was learned of local mining activity and at New Denver a general meeting took place, Colin J. Campbell, president of the Slocan District board of Trades, presiding, and W. Thomlinson, acting as secretary.

An outline of the work of the Associated Boards of Trade was given by F. A. Starkey, Commissioner, after which he referred to several projects in mind

and on behalf of which he urged the support of all mining men interested in the districts' welfare. One of these was the arrangement, through the Government, for the opening up of idle properties deemed worthy of development by Government Engineers. Such properties could be worked under license by willing parties, if the owners refused to act. But Mr. Starkey's most important theme was the necessity for the establishment of an ore testing plant in the interior of British Columbia. He stated that the Dominion Government had appropriated \$100,000 for this enterprise but had shown a disposition to place it at the Coast.

Discussing the need for overcoming this inclination Mr. Starkey said that the ores of the Interior were characteristically complex and its mines were developed, entitling it to a plant at which the problems of the many good undeveloped properties could be solved, properties that now were of no value to the owners or the country because the owners, unlike the Consolidated Mining and Smelting Co., could not afford the expense of experimenting to ascertain the proper treatment. The ores of the Coast were relatively simple. The latter district had nothing like the development of the Interior and the authorities would not be justified in giving it consideration to the exclusion of the Interior.

That a policy of local syndicates for the development of prospects would be a paying proposition and a great benefit to the mining industry was the contention of the Chairman while C. F. Nelson, member of the Provincial Legislature, was emphatic in the declaration that the Kootenays were warranted in expecting the ore testing plant and that the Province was large enough for several.

The value of such an installation to the Kootenays was dealt with by Mr. Thomlinson who, as an illustration, pointed to the achievement of the Trail Smelter metallurgists who, as a result of experimentation, had made the Sullivan Mine, the ores of which originally gave much trouble, one of the greatest mines in the world. Clarence Cunningham now was treating zinc-silver ore. In the Boundary District flourite was being treated and shipped commercially. On the Arrow Lakes was an enormous ledge of complex minerals that might one day give a large payroll to the district. This depended on the solution of the problem of handling the ore. The Arlington Mine had been closed down because it could not use its second grade ore. Its old dumps were there to-day. There were old dumps and complex ores all through the Kootenay, and there were problems everywhere. Nor were the metals alone of value. There were other mineral deposits which, if their problems were solved, might become sources of great wealth to the country.

Taxation of minerals and the question of obtaining powder at cost for the prospectors and operators were other questions considered.

The following resolution was passed:

"That this meeting urges upon the Dominion Government the need of the erection of a plant in the interior of the Province for the purpose of aiding the miners of complex ores which occur to such a large extent in the Interior.

Therefore we, the representatives of the Associated Boards of Trade and of the mining industry generally, earnestly urge upon the Government the importance and real need of such a testing plant, which would greatly aid the smaller mine owners and the mining industry generally."

The Eureka Mine has finished its milling season. All the ore lately put through the Granite-Poorman Mill has been from No. 2 Level, on which a large body of good ore was tapped recently. Development on this as well as further work on the crosscut being driven to cut the vein on the No. 4 Level will be continued during the winter. In the meantime large samples of Eureka Ore have been sent to five testing laboratories for the purpose of obtaining advice as to the best method of treating it. With this information in hand the management will install the necessary plant to be operated in conjunction with the present stamp-mill which, as it stands, is adapted to the ore of the Granite-Poorman Mine.

Grand Forks, B.C.

Announcement of the cross-cutting of a dyke of high-class lead-bearing ore was made at the annual meeting of the Maple Leaf Mining Company held recently at Grand Forks. Samples, it was stated, ran from 31 to 36 per cent lead. The Company has tunneled 40 feet through the dyke by drifting on the contact, this tunnel now being 35 feet in the lead ore. The main tunnel has been driven for 178 feet and the drift started at about 100 feet from the portal, going through a red formation for a short distance before striking the dyke again. Directors were elected as follows: J. B. Miller, Walla Walla Wn., S. B. Sangers, Oroville Wn., Thomas Dunlop, Chesaw, and C. W. Brown, Molson, Wash., H. W. Collins, John Donaldson, and H. W. Young, Grand Forks. Mr. Young was elected president and managing director and Mr. Donald, secretary-treasurer.

Kamloops, B.C.

R. W. Thomson, Provincial Government Mining Engineer, has returned after making an inspection of the Snowstorm Group of Mineral Claims, Highland Valley, on which the government has been doing some diamond drilling. Surface stripping and other development now is in progress with a view to the resumption of the drilling in the spring. The properties are being surveyed in the meantime. Mr. Thomson also visited the property of the Aspen Grove Amalgamated Mines, Ltd., which now is under bond to James Errington and associates and on which considerable development is proposed.

Trail, B.C.

In order to keep its electrolytic zinc plant at Trail in operation during the inactivity of the Sullivan Mines at Kimberley, B. C., the latter being shut-down through a strike of the miners for an all round increase in wages of \$1 a day, the Consolidated Mining & Smelting Company has arranged to treat the accumulated zinc concentrates of various Sloean district properties. The Rambler-Cariboo has 500 tons of concentrates the shipment of which has commenced. The Standard, at Silverton, also has begun shipment of zinc concentrates of which it is said to have some 300 tons. The Echo, at Silverton, is expected to contribute about 350 tons. A large quantity of zinc concentrates has been accumulated by the Rosebery-Surprise Mining Company but it has not accepted the smelting company's terms up to the present. The settlement price is 2 cents per pound for the zinc, 75 per cent of the zinc content being paid for when the concentrates run 50 per cent zinc and 1½ per cent being deducted for every unit the material is under 50 per cent. The settlement for silver is the New York price on the day of sampling, 50 per cent of the silver content being paid for, this rising to 60 per cent if the silver content is 30 ounces or over a ton.

Prince George, B.C.

What is said to be an important discovery of copper ore is reported from the Hansard Lake District, east of Prince George. From samples it is judged that the ore is the richest thus far found in that section of the Province and the vein is reported to be several feet in width.

Victoria, B.C.

The Lucky Jim, Lucky John, and Marjorie groups of mineral claims, situated in the Salmon River section, and near Adams River, Vancouver Island, have been acquired by T. H. Kerruish, who proposes undertaking development work without delay. The Lucky Jim is the only one of the three on which any work has been done so far and Mr. Kerruish considers the showings made sufficiently encourage to warrant further investigation. The ore carries copper, gold and silver values. Mr. Kerruish is asking Government assistance in the construction of a trail to the properties in order that equipment may be shipped in and ore easily transported to tidewater at the mouth of Salmon River.

Vancouver, B.C.

The matter of the dumping in Canada of Mexican lead was before the mining committee of the Vancouver Board of Trade recently when one of the members asserted that the lead producers of Canada and particularly of British Columbia are under a severe handicap in the marketing of their output because of the unfair competition caused by the importation of surplus Mexican lead. It was stated that Canada, apparently, was the only outlet for this surplus, which was being sold at any price it would bring. The committee decided to investigate and, if the allegations are found correct, to asking the Department of Trade and Commerce, Ottawa, to enforce the anti-dumping laws.

An increase of \$1,017.75 is shown in the gold deposited at the Dominion Assay Office, Vancouver, B.C., for the month of October of this year in comparison with the total for the same month in 1918. The aggregate value of the deposits last month was \$804,231.70, most of the gold coming from the Yukon and the Kootenay districts.

George Adams has left Vancouver for northern British Columbia in order to make preparations for the commencement of hydraulic operations on thirteen one-half mile leases situated on Tibet Creek, 107 miles northwest of Telegraph Creek. The property is reported to be exceptionally favorable for the work in mind, the water used having 400 feet head pressure and the supply being unlimited. The Tibet Creek Valley affords 300 feet of dumping grounds. Mr. Adams proposes operating four distinct hydraulic plants, each using two No. 6 Giants.

Riondel, B. C.

A syndicate has been formed to proceed with the development of the Kirby Group of Mineral Claims at Riondel. This property was located last Spring by A. J. Curle, of Kaslo, B. C., and was taken up by W. T. Kirby, of Winnipeg Manitoba, who is arranging for the work referred to. First class showings were brought to light last July, the interesting point being the establishment that the ore is quite different from the characteristic ore of the Blue Bell, which is nearby, being high in silver. An open cut has been made on the vein, cross cutting it, and 17 feet have been driven without showing up the footwall. In the milling ore is a five-inch width of galena which runs over 100 ozs. in silver and a high percentage of lead.

Port Arthur Notes

By J. J. O'CONNOR.

The Kingston School of Mining, Queen's University, has been requested by the Port Arthur Fort William Development Association to authorize the establishment of mining classes in Port Arthur. The matter is now under consideration and a decision will shortly be reached. It is probable that if the Queen's authorities are not able to grant this request, the University of Toronto will undertake to do so.

A convention numbering 81 delegates, representing every point between Port Arthur and Winnipeg, including Rainy River, met at Dryden on the 6th instant, to formulate a plan for the construction of a highway from Port Arthur to Winnipeg. The convention was a success from every point of view, and it is expected that work will be commenced in the spring of 1920. This road will give access to an extensive area of mining territory, and be of immense advantage in the prospecting and developing of mineral, agricultural and timber lands.

Mr. M. F. Fairlie, M.E., of the Mining Corporation, Cobalt, paid a visit to the Schreiber gold area, last week, for the purpose of investigating the new gold find at Victoria Lake 6 miles north of Schreiber, with particular attention to the Longworth, and Casselman-Smith claims.

MANITOBA MINES ARE PROMISING.

Mr. J. B. Tyrell Inspects the Gold Pan and Gabrielle Mines in Eastern Manitoba.

Mr. J. B. Tyrell, chairman of the Toronto branch of the Canadian Mining Institute and representative of the Anglo-French Exploration Company, Limited, has just returned to Toronto after spending some weeks looking over the properties of the Gold Pan Mining Company in the Rice Lake district in Eastern Manitoba. While there Mr. Tyrell also visited the Gabrielle property, which is the first claim staked in the district. To the "Canadian Mining Journal" Mr. Tyrell made the following statement:

"Both properties look to be deserving of fuller exploration and development than they have yet received and the managers of the companies have asked me to direct such development as they seem to merit with the prospect of making mines of them. They have a shaft now which is about 250 feet deep. This is now being pumped out and on my next visit to the property, which will be as soon as the winter trails are ready for use, I hope to be able to make a full examination of this shaft. At the same time we are going ahead to do some development work and it will probably be necessary for us to instal a somewhat more efficient plant than is at present on the ground.

"The Gabrielle Mine will probably also be put into shape for development work this winter.

"I did not visit other portions of the district but prospectors were coming from many outlying claims with reports which are often backed up by specimens of ore from new discoveries of gold-bearing veins. Taken as a whole the district may be one that will yet give a good account of itself."

Both companies have their headquarters in Winnipeg and the directorates include many prominent business men of that city. The Gold Pan Company has been re-organized with Mr. J. H. Ashdown as president.

SODIUM SULPHATE DEPOSITS IN SASKATCHEWAN.

It is announced from Saskatoon that the sodium sulphate deposits at Lake White Shore will be commercially developed by the White Shore Chemical Company. The product, it is predicted, will revolutionize pulp making in Canada and the industry is expected to become one of the greatest of Western Canada.

METAL QUOTATIONS.

Fair prices for ingot metals in Montreal, 10th November, 1919.

	Per lb.
Electro copper	24 1/2c
Casting copper	24
Lead	8
Tin	58
Zinc	10
Antimony	10 1/4
Aluminum	32

INTERNATIONAL NICKEL.

New York.—For six months ended Sept. 30, 1919, International Nickel Co. reports surplus after charges, federal taxes and preferred dividends of \$510,602, equivalent to 30 cents a share (\$25 par) on common, against \$3,415,905, or \$2.04 a share in corresponding six months of 1918.

Consolidated general profit and loss statement compares as follows:

	1919	1918	Inc.	Dec.
Earnings ...	\$2,441,454	\$7,744,128	....	\$5,302,674
Other income	42,279	65,214	....	22,935
Tot. income.	2,483,733	7,809,342	....	5,325,609
Admin & gen exp.	256,104	381,843	....	125,739
U.S. & Forgn tax res.	450,475	2,749,126	....	2,298,651
Net income..	1,777,154	4,678,373	....	2,901,219
Depr & min exhaust...	999,174	995,090	\$4,084	.....
Profits	777,980	3,683,283	....	2,905,303
Pfd. divs...	267,378	267,378	....	.....
Balance	510,602	3,415,905	....	2,905,303
Com. divs. . . . . . .	.....	2,510,076	....	2,510,076
Surplus	510,602	905,829	....	395,227

—Boston News Bureau.

THUS SHALL MEN SAY—

Thus shall they say in years to come,
When men travel again foot-free.
"Here women died, here children sighed,
By death released."

So shall men speak in lanes of France
When the poplars have grown again:
"This church they razed, this altar blazed,
A devil's feast."

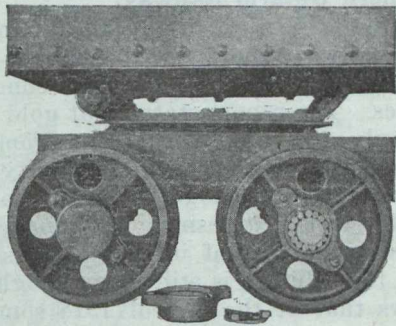
Thus shall sailors whisper at sea
Where the water lies cold and green:
"Here babes were sped, here rest the dead,
Weakest and least."

Thus shall men say 'mid rounded graves
Where the rusted guns keep guard:
"Lo, here lie they, who in their day,
Destroyed the Beast."
—F. W. Gray, in "Canadian Bookman."

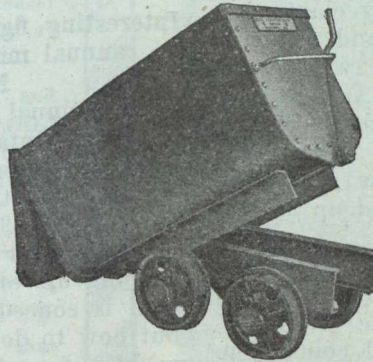
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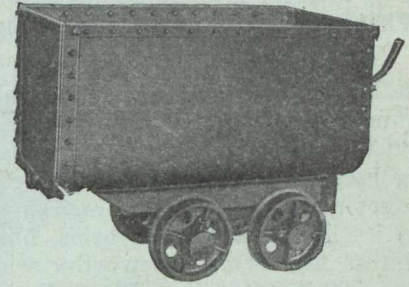
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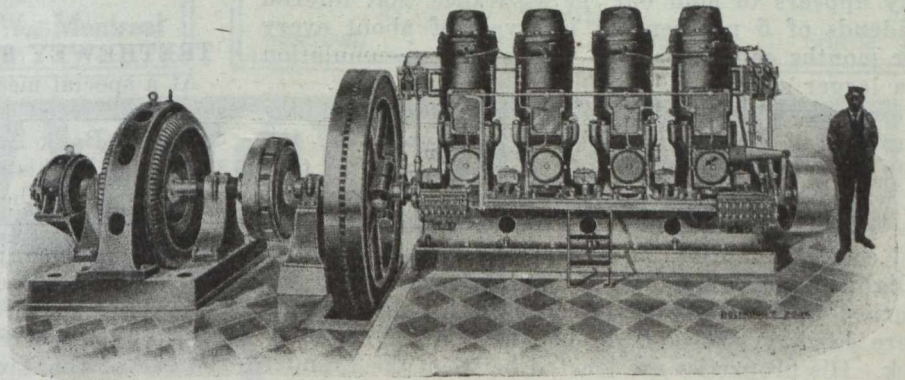
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TORONTO BRIEFS.**Items of interest gleaned amongst the mining offices—****What is going on in various northern properties.**

From Our Staff Correspondent.

The head offices of Associated Gold Fields, this city, announced this week a valuable strike of high-grade ore on the properties of the company at Larder Lake. Being concerned with the blocking out of enormous tonnages of average-grade ore, the company does not stress its high-grade discoveries, but they claim that the latest find is of noteworthy width and richness. On the 500-foot level of Block B, in the west cross-cut of the south drift, a very rich patch is said to have been encountered. The company states that five feet assay \$118 a ton, the next five feet \$80 a ton and the adjoining 15 feet, not yet assayed, show gratifying amount of free gold. The patch is opened up 25 feet in the cross-cut.

It is reported in mining circles here that negotiations between the Timiskaming and the Buffalo Mines, whereby the former should take over the latter, appear to have failed to reach the desired conclusion. There is another report in circulation and that is that the Mining Corporation, as well as the Northern Customs Concentrator Company, are making a bid for the Buffalo properties. There are also rumors that the Mining Corporation is after the Thompson-Krist in Porcupine.

A. S. Fuller, a Cobalt mining broker, is completing arrangements for the reorganization of the Porcupine-Premier, formerly known as the Standard Mine, a property that conducted a very active development program some years ago with encouraging results.

Hollinger Consolidated created considerable interest in Toronto mining circles this week by making a record shipment of bullion valued at about \$175 000. This was said to be the result of an eight days' run and it is understood that it is the company's intention to keep the future production around these figures.

J. P. Bickell, president of the McIntyre-Porcupine, is quoted as saying that the mine is expected to realize a net profit of a million dollars during the current fiscal year, one-third of which is already passed. This would compare with \$839,000 during the past fiscal year. R. J. Ennis, manager of the McIntyre, declares that ore will average about \$11 during the current fiscal year and that costs will average about \$5 a ton, leaving \$6 a ton net profit. The statement of the company appears to hold out the assurance that interim dividends of 5 per cent at intervals of about every four months can be paid as well as the accumulation of a larger surplus.

News from Porcupine is to the effect that the sampling of three veins being developed on the first level of the Clifton-Porcupine indicate that the work is being carried on in an excellent grade of ore. As a general rule it has been found that the gold content increases as drifting progresses north.

Digby Grimstone, a well-known prospector, has just returned to Porcupine from Painkiller Lake district, where he has been doing considerable development work. His properties are located between the Premier and the Hattie mines. On the Grimstone properties he reports a very promising vein about fifteen inches to three feet wide which has been traced from three to four hundred feet on the surface. There is apparently a great deal more development work going on in this section of Northern Ontario than is generally

known. It is learned that the Premier mine has now got its shaft down 250 feet, at which depth cross-cutting is being carried out to cut the ore body which is indicated along the surface. The company is contemplating the erection of an up-to-date plant, as results of development work to date have been very satisfactory.

GOLD PRODUCTION DECREASED ONLY TWO PER CENT.**Interesting figures on mining activities culled from annual mining report of the Timiskaming & Northern Ontario Railway.**

The annual mining report of the Timiskaming & Northern Ontario Railway, shortly to be issued, contains some interesting comment and statistics concerning mining activities. The report states that gold production for 1918 only decreased 2 per cent from the previous year and declares that "the necessity for keeping up, or even for increasing the production of gold is conceded by world statesmen and financiers, but how to do this in the face of increased costs is a problem for which the solution is still being sought."

The report shows that at the end of 1918 some 17 mines were equipped with mills for treating ore, with a capacity of 6,660 tons daily while only about 2,490 tons were then being treated. A summary of the position of Hollinger Consolidated Company is also given, in which it is shown that the consolidated companies up to the end of 1918 had produced \$25,933,910 from which net profits of \$13,379,074 were realized and dividends amounting to \$9,424,000 paid. During the year 1918 some 22 mines of Cobalt shipped an aggregate of 17,911 tons of ore as compared with 20 companies shipping 19,016 tons in 1917.

During 1918 the Buffalo was the leading shipper, sending out 3,842 tons, followed by the Nipissing with 2,620 tons and the Mining Corporation with 2,264 tons. In 1917 the Nipissing was the leader with 3,539 tons followed by the Mining Corporation with 2,230 and the McKinley-Darragh with 2,123 tons. According to the figures in the report the mines of Cobalt up to the end of 1918 had sent out an aggregate of over a quarter of a million tons of ore; this in addition to the large tonnage treated locally.

Of the total of 266,734 tons shipped, the Nipissing was the leader with 39,650 tons, followed by the La Rose with 38,403 tons and the McKinley with 26,345 tons.

TRETHEWEY SHAREHOLDERS RATIFY DEAL.

At a special meeting of the shareholders of the Trethewey Silver-Cobalt Mines, Limited, held in the Standard Bank Building, Toronto, on Nov. 7th, a new stage in the history of the mines began, when the agreement for the purchase of the Castle stock of 1,000,000 shares and of 112 acres of water leases and the option of the Major claims of 40 acres, was ratified. All these are close together in the Gowganda district and while prospecting has not yet proceeded far, it is believed that there is sufficient silver to greatly extend the life of the Trethewey. Already the company has spent \$150,000 in development work on the Castle property. The Trethewey had previously secured one-third of the Castle shares and now gets the remaining two-thirds in exchange for 500,000 shares of Treasury stock. Half a million shares was represented at the meeting by proxy.

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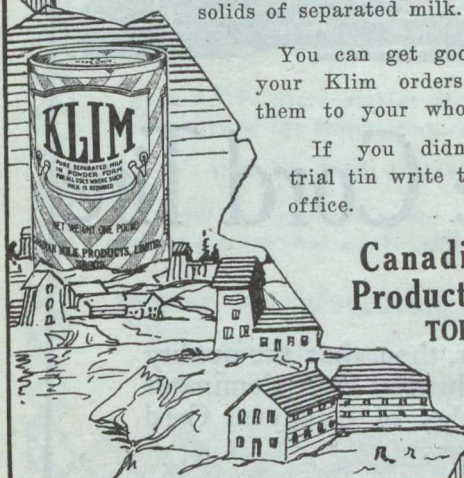
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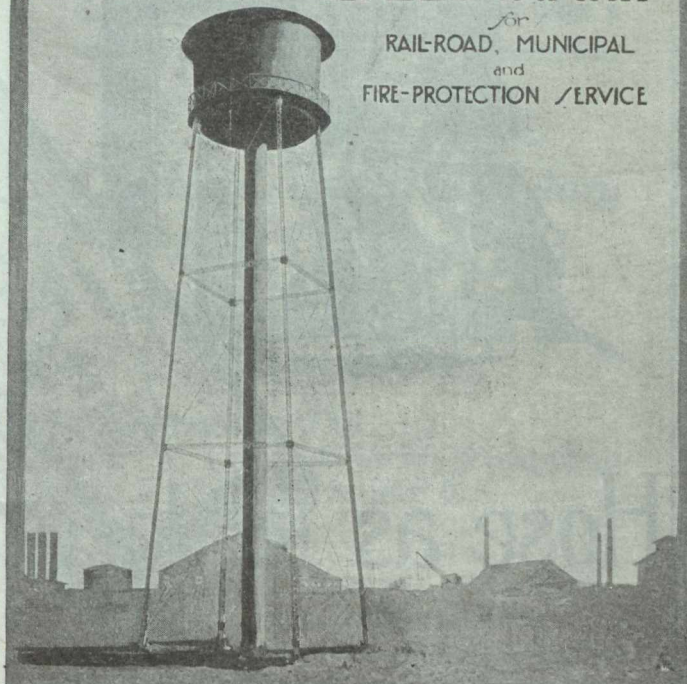
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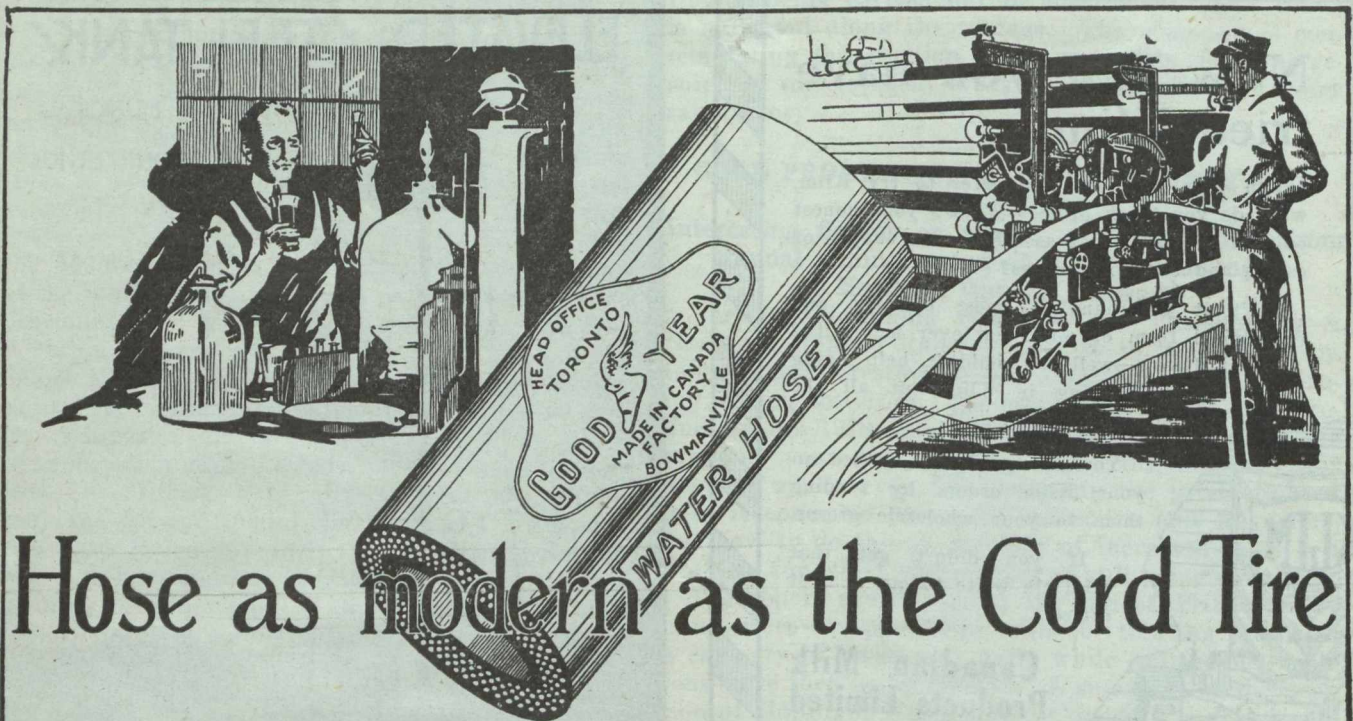
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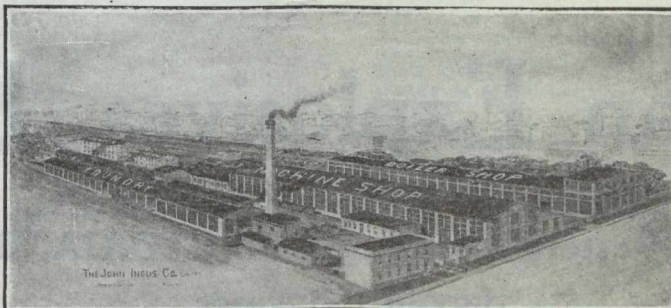
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MacGovern & Co., Inc.
- Contractors' Supplies:**
Canadian Fairbanks-Morse Co., Ltd.
- Consulters and Engineers:**
Hersey Milton Co., Ltd.
- Conveyor Flights:**
Hendrick Mfg. Co., Ltd.
- Conveyor—Trough—Belt:**
Canadian Fairbanks-Morse Co., Ltd.
Link-Belt Co.
Hendrick Mfg. Co.
Mussens, Limited
Jones & Glassco (Roller, Belt and Chain)
Hendrick Mfg. Co.
The Wabi Iron Works
- Conical Mills:**
Hardinge Conical Mill Co.
- Copper:**
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co.
- Cranes:**
Canadian Fairbanks-Morse Co., Ltd.
Link-Belt Co.
R. T. Gilman & Co.
Smart-Turner Machine Co.
M. Beatty & Sons, Ltd.
- Crane Ropes:**
Allan Whyte & Co.
Greening, B., Wire Co., Ltd.
- Crucibles:**
Canadian Fairbanks-Morse Co., Ltd.
Mine and Smelter Supply Co.
- Crusher Balls:**
Canada Foundries & Forgings, Ltd.
Hull Iron & Steel Foundries, Limited, Hull, Que
- Crushers:**
Canadian Fairbanks-Morse Co., Ltd.
Canadian Steel Foundries, Ltd.
Hardinge Conical Mill Co.
The Electric Steel & Metals Co., Ltd.
R. T. Gilman & Co.
Lymans, Ltd.
Mussens, Limited
Mine and Smelter Supply Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Canadian Miners' Buying Directory.—(Continued)

Cyanide Plant Equipment:

The Dorr Co.

D. C. Units:

MacGovern Co.

Derricks:

Smart-Turner Machine Co.
 M. Beatty & Sons, Ltd.
 Marsh Engineering Works
 R. T. Gilman & Co.
 Canadian Fairbanks-Morse Co., Ltd.
 Mussens, Limited

Diamond Drill Contractors:

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

Diamond Tools:

Diamond Drill Carbon Co.

Diamond Importers:

Diamond Drill Carbon Co.

Digesters:

Canadian Chicago Bridge and Iron Works

Dies:

Canada Foundries & Forgings, Ltd.

Dredger Pins:

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

Dredging Machinery:

Canadian Steel Foundries, Ltd.
 M. Beatty & Sons
 Hadfields, Limited
 R. T. Gilman & Co.

Dredging Ropes:

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

Drills, Air and Hammer:

Canadian Ingersoll-Rand Co., Ltd.
 Sullivan Machinery Co.
 Northern Canada Supply Co.
 Canadian Rock Drill Co.
 The Mine & Smelter Supply Co.
 Mussens, Limited

Drills—Core:

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

Drills—Diamond:

Sullivan Machinery Co.
 Northern Canada Supply Co.
 E. J. Longyear Company

Drill Steel—Mining:

Hadfields, Limited
 International High Speed Steel Co., Rockaway, N.J.
 Mussens, Limited

Drill Steel Sharpeners:

Canadian Ingersoll-Rand Co., Ltd.
 Northern Canada Supply Co.
 Sullivan Machinery Co.
 Canadian Rock Drill Co.
 The Wabi Iron Works

Drills—Electric:

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

Drills—High Speed and Carbon:

Canadian Fairbanks-Morse Co., Ltd.
 Hadfields, Limited

Dynamite:

Canadian Explosives
 Northern Canada Supply Co.

Dynamos:

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

Ejectors:

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

Elevators:

M. Beatty & Sons
 Sullivan Machinery Co.
 Northern Canada Supply Co.
 Hadfields, Limited
 Fraser & Chalmers of Canada, Ltd.
 Mussens, Limited
 The Wabi Iron Works

Engineering Instruments:

C. L. Berger & Sons

Engines—Automatic:

Canadian Fairbanks-Morse Co., Ltd.
 Fraser & Chalmers of Canada, Ltd.

Engines—Gas and Gasoline:

Canadian Fairbanks-Morse Co., Ltd.
 Alex. Fleck
 Fraser & Chalmers of Canada, Ltd.
 Sullivan Machinery Co.
 Gould, Shapley & Muir Co., Ltd.
 MacGovern & Co., Inc.
 The Mine & Smelter Supply Co.

Engines—Haulage:

Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
 Marsh Engineering Works
 Fraser & Chalmers of Canada, Ltd.

Engines—Marine:

Canadian Fairbanks-Morse Co., Ltd.
 MacGovern & Co., Inc.

Engines—Steam:

Canadian Fairbanks-Morse Co., Ltd.
 M. Beatty & Sons
 R. T. Gilman & Co.
 MacGovern & Co., Inc.
 Fraser & Chalmers of Canada, Ltd.

Engineers:

The Dorr Co.

Ferro-Alloys (all Classes):

Everitt & Co.

Feed Water Heaters:

MacGovern & Co.

Flood Lamps:

Northern Electric Co., Ltd.

Flourspar:

The Consolidated Mining & Smelting Co.
 Everitt & Co.

Forges:

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

Forging:

M. Beatty & Sons
 Canadian Foundries and Forgings, Ltd.
 Smart-Turner Machine Co.
 Hadfields, Limited
 Fraser & Chalmers of Canada, Ltd.

Frogs:

Canadian Steel Foundries, Ltd.
 John J. Gartshore

Frequency Changers:

MacGovern & Co., Inc.

Furnaces—Assay:

Canadian Fairbanks-Morse Co., Ltd.
 Lymans, Limited
 Mine & Smelter Supply Co.

Fuse:

Canadian Explosives
 Northern Canada Supply Co.

Gears (Cast):

The Link-Belt Co.

Gears, Machine Cut:

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

Granulators:

Hardinge Conical Mill Co.

Grinding Wheels:

Canadian Fairbanks-Morse Co., Ltd.

Gold Refiners

Goldsmith Bros.

Canadian Miners' Buying Directory.—(Continued)

Gold Trays:

Canada Chicago Bridge & Iron Works

Hose (Air Drill):

Goodyear Tire & Rubber Co.

Hose (Fire):

Goodyear Tire & Rubber Co.

Hose (Packings)

Goodyear Tire & Rubber Co.

Hose (Suction):

Goodyear Tire & Rubber Co.

Hose (Steam):

Goodyear Tire & Rubber Co.

Hose (Water):

Goodyear Tire & Rubber Co.

Hammer Rock Drills:Mussens, Limited
The Mine & Smelter Supply Co.**Hangers and Cable:**

Standard Underground Cable Co. of Canada, Ltd.

High Speed Steel:Canadian Fairbanks-Morse Co. Ltd.
Hadfields, Limited
International High Speed Steel Co., Rockaway, N.J.**High Speed Steel Twist Drills:**Canadian Fairbanks-Morse Co., Ltd.
Northern Canada Supply Co.**Hoists—Air, Electric and Steam:**Canadian Ingersoll-Rand Co., Ltd.
Canadian Fairbanks-Morse Co., Ltd.
Jones & Glassco
M. Beatty & Sons
Marsh Engineering Works
Northern Canada Supply Co.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works
R. T. Gilman & Co.
Mussens, Limited
Link-Belt Co.**Hoisting Engines:**Canadian Fairbanks-Morse Co., Ltd.
The Electric Steel & Metals Co.
Mussens, Limited
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.
M. Beatty & Sons
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.
The Mine & Smelter Supply Co.**Hose:**Canadian Fairbanks-Morse Co., Ltd.
Northern Canada Supply Co.**Hydraulic Machinery:**Canadian Fairbanks-Morse Co., Ltd.
Hadfields, Limited
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works**Industrial Chemists:**

Hersey, M. & Co., Ltd.

Ingot Copper:Canada Metal Co., Ltd.
Hoyt Metal Co.**Insulating Compounds:**

Standard Underground Cable Co. of Canada, Ltd.

Inspection and Testing:

Dominion Engineering & Inspection Co.

Inspectors:

Hersey, M. & Co., Ltd.

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

Canadian Foundries and Forgings, Ltd.

Laboratory Machinery:

Mine & Smelter Supply Co.

Lamps—Acetylene:

Dewar Manufacturing Co., Inc.

Lamps—Carbide:

Dewar Manufacturing Co., Inc.

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

Dewar Manufacturing Co., Inc.

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

C. L. Berger & Sons

Locomotives (Steam, Compressed Air and Storage Steam):Canadian Fairbanks-Morse Co., Ltd.
H. K. Porter Company
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited**Link Belt**Canadian Fairbanks-Morse Co. Ltd.
Northern Canada Supply Co.
Jones & Glassco**Machinists:**

Burnett & Crampton

Machinery—Repair Shop:

Canadian Fairbanks-Morse Co., Ltd.

Machine Shop Supplies:

Canadian Fairbanks-Morse Co., Ltd.

Magnesium Metal:

Everitt & Co.

Manganese Steel:Canadian Steel Foundries, Ltd.
The Electric Steel & Metals Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works**Metal Marking Machinery:**

Canadian Fairbanks-Morse Co., Ltd.

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

The Dorr Co.

Metallurgical Machinery:

The Dorr Co.

Metal Work, Heavy Plates:

Canada Chicago Bridge & Iron Works

Mica:Everitt & Co.
Diamond Drill Carbon Co.**Mining Engineers:**

Hersey, M. Co., Ltd.

Mining Drill Steel:

International High Speed Steel Co., Rockaway, N.J.

Mining Requisites:Canadian Steel Foundries, Ltd.
Dominion Wire Rope Co., Ltd.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works**Mining Ropes:**

Dominion Wire Rope Co., Ltd.

Mine Surveying Instruments:

C. L. Berger & Sons

Molybdenite:

Everitt & Co.

Monel Metal:

International Nickel Co.

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

Canadian Miners' Buying Directory.—(Continued)

Motor Generator Sets—A.C. and D.C.

MacGovern & Co.

Nails:

Canada Metal Co.

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

The Mond Nickel Co., Ltd.

Nickel Salts:

The Mond Nickel Co., Ltd.

Nickel Sheets:

The Mond Nickel Co., Ltd.

Nickel Wire:

The Mond Nickel Co., Ltd.

Oil Analysts:

Constant, C. L. Co.

Ore Sacks:

Northern Canada Supply Co.

Ore Testing Works:Ledoux & Co.
Can. Laboratories
Milton Hersey Co.
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
Oxford Copper Co.
Canada Metal Co.
Hoyt Metal Co.
Everitt & Co.
Pennsylvania Smelting Co.**Packing:**

Canadian Fairbanks-Morse Co., Ltd.

Perforated Metals:Northern Canada Supply Co.
Hendrick Mfg. Co.
Greening, B., Wire Co.**Pig Tin:**Canada Metal Co., Ltd.
Hoyt Metal Co.**Pig Lead:**Canada Metal Co., Ltd.
Hoyt Metal Co.
Pennsylvania Manufacturing Co.**Pipes:**Canadian Fairbanks-Morse Co., Ltd.
Canada Metal Co., Ltd.
Consolidated M. & S. Co.
Northern Canada Supply Co.
R. T. Gilman & Co.**Pipe Fittings:**

Canadian Fairbanks-Morse Co., Ltd.

Pipe—Wood Stave:Pacific Coast Pipe Co.
Mine & Smelter Supply Co.**Piston Rock Drills:**Mussens, Limited
Mine & Smelter Supply Co.**Plate Works:**John Inglis Co., Ltd.
Hendrick Mfg. Co.
The Wabi Iron Works
MacKinnon Steel Co., Ltd.**Platinum Refiners:**

Goldsmith Bros.

Pneumatic Tools:Canadian Ingersoll-Rand Co., Ltd.
Jones & Glassco
R. T. Gilman & Co.**Prospecting Mills and Machinery:**The Electric Steel & Metals Co.
E. J. Longyear Company
Standard Diamond Drill Co.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works**Pumps—Pneumatic:**Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
Sullivan Machinery Co.**Pumps—Steam:**Canadian Fairbanks-Morse Co., Ltd.
Canadian Ingersoll-Rand Co., Ltd.
The Electric Steel & Metals Co.
Mussens, Limited
Northern Canada Supply Co.
Smart-Turner Machine Co.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works**Pumps—Turbine:**Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works**Pumps—Vacuum:**Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
The Wabi Iron Works**Pumps—Valves:**

Canadian Fairbanks-Morse Co., Ltd.

Pulleys, Shaftings and Hangings:Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd.
The Wabi Iron Works**Pulverizers—Laboratory:**Mine & Smelter Supply Co.
The Wabi Iron Works
Hardinge Conical Mill Co.**Pumps—Boiler Feed:**Smart-Turner Machine Co.
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
Mine & Smelter Supply Co.**Pumps—Centrifugal:**Canadian Fairbanks-Morse Co., Ltd.
The Electric Steel & Metals Co.
Smart-Turner Machine Co.
M. Beatty & Sons
Canadian Ingersoll-Rand Co., Ltd.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works**Pumps—Diaphragm**

The Dorr Company

Pumps—ElectricCanadian Fairbanks-Morse Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
Smart-Turner Machine Co.**Pumps—Sand and Slime:**Canadian Fairbanks-Morse Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
Mine & Smelter Supply Co.
The Electric Steel & Metals Co.
The Wabi Iron Works
Smart-Turner Machine Co.**Quarrying Machinery:**Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.
Hadfields, Limited
Mussens, Limited
R. T. Gilman Co.**Rails:**Hadfields, Limited
John J. Gartshore
R. T. Gilman & Co.
Mussens, Limited**Railway Supplies:**

Canadian Fairbanks-Morse Co., Ltd.

Refiners:

Goldsmith Bros.

Riddles:

Hendrick Mfg. Co.

Roofing:Canadian Fairbanks-Morse Co., Ltd.
Northern Canada Supply Co.**Rope—Manilla:**

Mussens, Limited

Rope—Manilla and Jute:Jones & Glassco
Northern Canada Supply Co.
Allan, Whyte & Co.

Canadian Miners' Buying Directory.—(Continued)

Rope—Wire:

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

Rolls—Crushing

Canadian Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
Hadfields, Limited
The Electric Steel & Metals Co.
Mussens, Limited
The Wabi Iron Works

Samplers:

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

Scales—(all kinds):

Canadian Fairbanks-Morse Co., Ltd.

Screens:

Greening, B. Wire Co.
Hendrick Mfg. Co.
Mine & Smelter Supply Co.
Link-Belt Co.

Screens—Cross Patent Flanged Lip:

Hendrick Mfg. Co.

Screens—Perforated Metal:

Hendrick Mfg. Co.

Screens—Shaking:

Hendrick Mfg. Co.

Screens—Revolving:

Hendrick Mfg. Co.

Scheelite:

Everitt & Co.

Separators:

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

Shaft Contractors:

Hendrick Mfg. Co.

Sheet Metal Work:

Hendrick Mfg. Co.

Sheets—Genuine Manganese Bronze:

Hendrick Mfg. Co.

Shoes and Dies:

Canadian Foundries and Forgings, Ltd.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works

Shovels—Steam:

Canadian Foundries and Forgings, Ltd.
M. Beatty & Sons
R. T. Gilman & Co.

Siline:

Coniagas Reduction Co.

Saline Refiners:

Goldsmith Bros.

Smelters:

Goldsmith Bros.

Sledges:

Canada Foundries & Forgings, Ltd.

Smoke Stacks:

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

Special Machinery:

John Inglis Co., Ltd.

Spelter:

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

Sprockets:

Link-Belt Co.

Spring Coil and Clips Electrico:

Canadian Steel Foundries, Ltd.

Steel Barrels:

Smart-Turner Machine Co.
Fraser & Chalmers of Canada, Ltd.

Stamp Forgings:

Canada Foundries & Forgings, Ltd.

Steel Castings:

Canadian Brakeshoe Co., Ltd.
Canadian Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
Hadfields, Limited
The Wabi Iron Works

Steel Drills:

Canadian Fairbanks-Morse Co., Ltd.
Sullivan Machinery Co.
Northern Canada Supply Co.
The Electric Steel & Metals Co.
Canadian Ingersoll-Rand Co., Ltd.
Mussens, Limited

Steel Drums:

Smart-Turner Machine Co.

Steel—Tool:

Canadian Fairbanks-Morse Co., Ltd.
N. S. Steel & Coal Co.
Hadfields, Limited
Swedish Steel & Importing Co., Ltd.

Structural Steel Work (Light):

Hendrick Mfg. Co.

Stone Breakers:

Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
Mussens, Limited
R. T. Gilman & Co.
The Wabi Iron Works

Sulphate of Copper:

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

Sulphate of Nickel:

The Mond Nickel Co., Ltd.

Surveying Instruments:

C. L. Berger

Switches and Switch Stand:

Canadian Steel Foundries, Ltd.
Mussens, Limited.

Switches and Turntables:

John J. Gartshore

Tables—Concentrating:

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

Tanks:

R. T. Gilman & Co.

Tanks—Acid:

Canadian Chicago Bridge & Iron Works

Tanks (Wooden):

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

Tanks—Cyanide, Etc.:

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

Tanks—Steel:

Canadian Fairbanks-Morse Co., Ltd.
Canadian Ingersoll-Rand Co., Ltd.
Canadian Chicago Bridge & Iron Works
Marsh Engineering Works
MacKinnon Steel Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
Hendrick Mfg. Co.
The Wabi Iron Works

Tanks—Oil Storage:

Canadian Chicago Bridge & Iron Works

Tanks (water) and Steel Towers:

Canadian Fairbanks-Morse Co., Ltd.
Canadian Chicago Bridge & Iron Works
Gould, Shapley & Muir Co., Ltd.
MacKinnon Steel Co.
Mine & Smelter Supply Co.
The Wabi Iron Works

Tramway Points and Crossings:
Canadian Steel Foundries, Ltd.
Hadfields, Limited

Transits:
C. L. Berger & Sons

Transformers:
Canadian Fairbanks-Morse Co., Ltd.
R. T. Gilman & Co.
Northern Electric Co., Ltd.

Transmission Apparances:
Jones & Glassco

Troughs (Conveyor):
Hendrick Manufacturing Co.

Trucks—Electric:
Canadian Fairbanks-Morse Co., Ltd.

Trucks—Hand:
Canadian Fairbanks-Morse Co., Ltd.

Trucks:
Canadian Fairbanks-Morse Co., Ltd.

Tubs:
Hadfields, Limited

Tube Mills:
The Electric Steel & Metals Co.
Fraser & Chalmers of Canada, Ltd.
Hardinge Conical Mill Co.

Tube Mill Balls:
Canada Foundries & Forgings, Ltd.
Fraser & Chalmers of Canada, Ltd.

Tube Mill Liners:
Burnett & Crampton
Fraser & Chalmers of Canada, Ltd.

Turbines—Water Wheel:
MacGovern & Co.

Turbines—Steam:
Fraser & Chalmers of Canada, Ltd.
MacGovern & Co.

Twincones:
Canada Foundries & Forgings, Ltd.

Uranium:
Everitt & Co.

Welding—Rod and Flux:
Prest-O-Lite Co. of Canada, Ltd.
Imperial Brass Mfg. Co.

Welding and Cutting—Oxy-Acetylene:
Prest-O-Lite Co. of Canada, Ltd.
Canadian Fairbanks-Morse Co., Ltd.
Imperial Brass Mfg. Co.

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

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

Wire:
Canada Wire & Cable Co., Ltd.
Greening, B. Wire Co.

Wire Rope:
R. T. Gilman & Co.
Dominion Wire Rope Co., Ltd.

Wire Cloth:
Northern Canada Supply Co.
Greening, B. Wire Co.

Wire (Bars and Insulated):
Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.

Wolfram Ore:
Everitt & Co.

Woodworking Machinery:
Canadian Fairbanks-Morse Co., Ltd.

Zincblende:
Everitt & Co.

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

Zinc Spelter:
Canada Metal Co., Ltd.
Hoyt Metal Co., Ltd.

BUY



VICTORY

BONDS

1919

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Dresser, Jno. A.	11	J		University of Toronto
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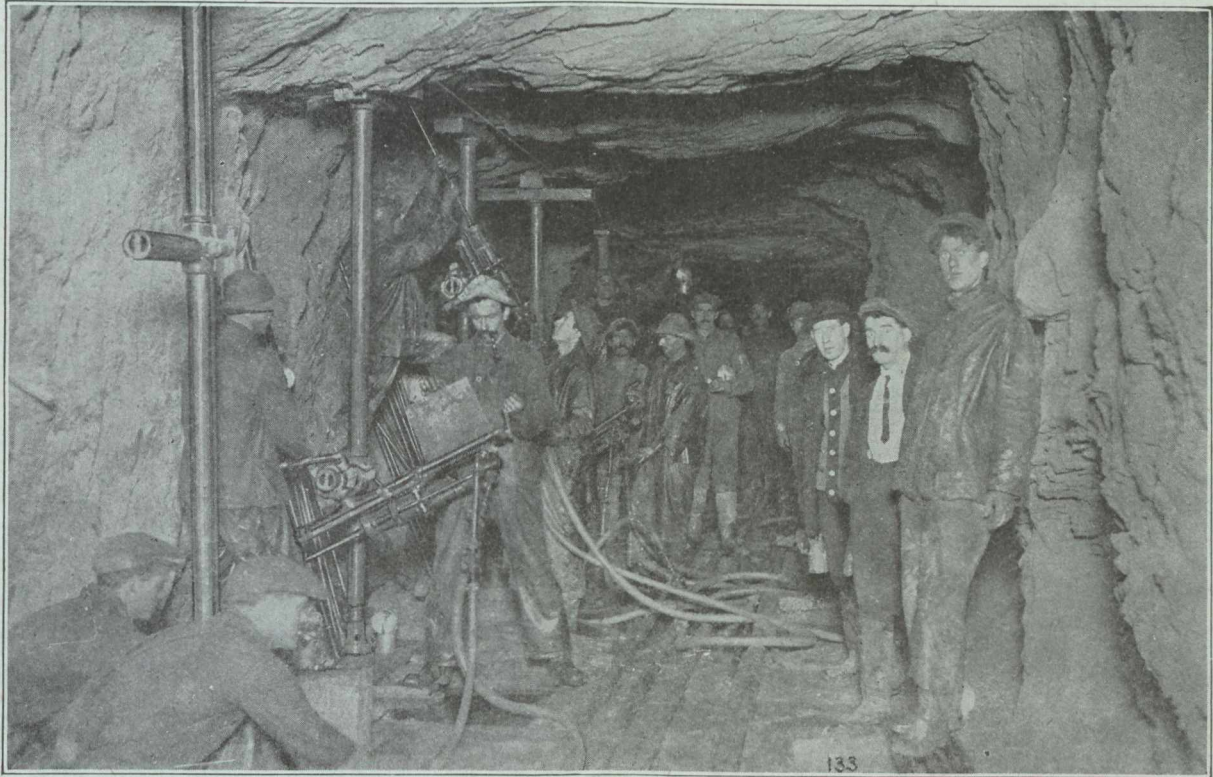
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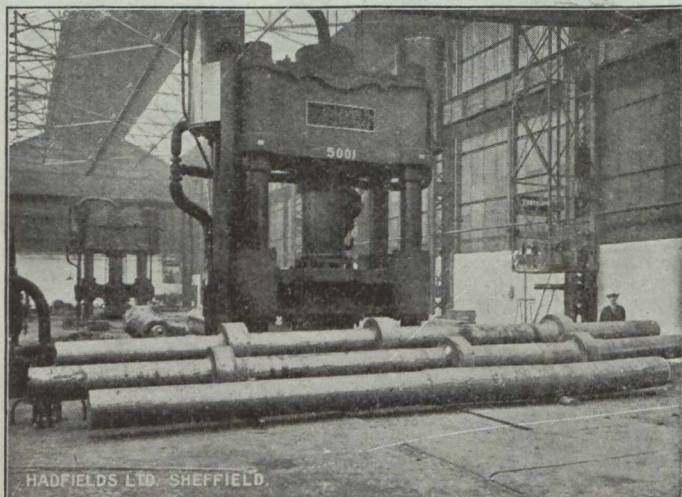
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