

# CANADIAN MINING JOURNAL

VOL. XLI.

GARDEN CITY PRESS, Ste. Anne de Bellevue, JANUARY 7, 1920.

No. 1.



The  
wrong way  
to use a Time  
Recorder—  
False economy  
—a “bunch”.

**H**OW would you like to stand in this “push” and wait your turn at the Time Recorder? It would peeve you some, wouldn't it? You'd quit work a few minutes earlier to make up, wouldn't you? Put yourself in your employees' place. Also ask yourself who pays for the lost working time. And get this—it doesn't pay to overwork your Time Recorders. If you need two or more get 'em. Let us send you our latest literature.

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(TIME RECORDER DIVISION)

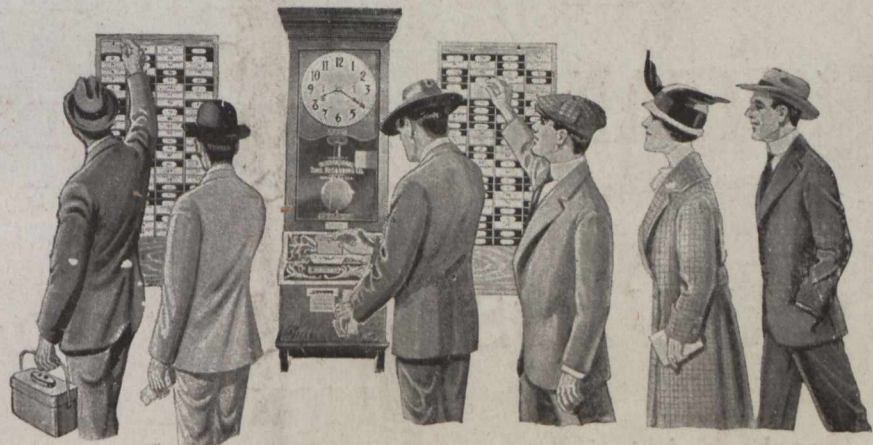
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212 McGill Street,  
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*Also makers of Dayton Scales and Hollerith Electric Tabulators.*

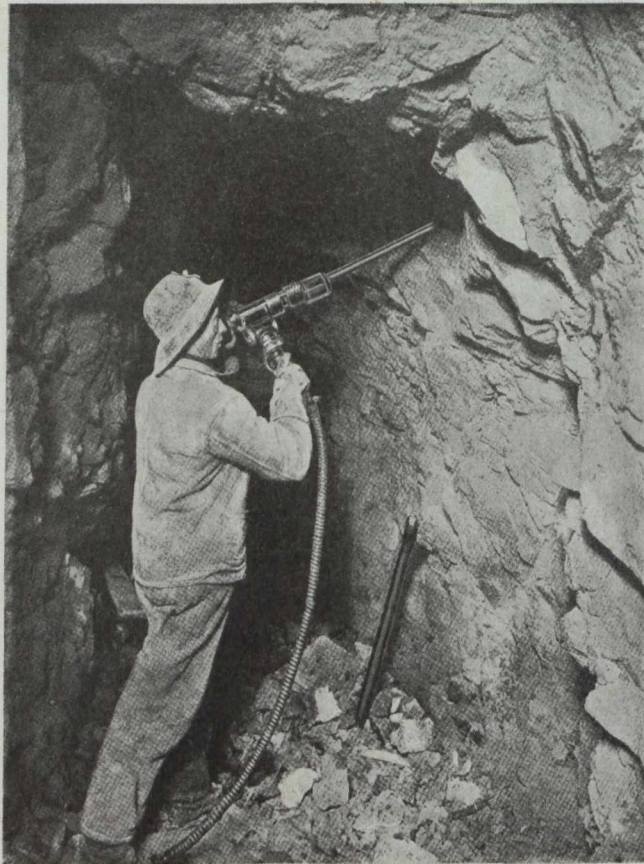
Here Is  
The Right Way  
No Crowd  
A “Stream”.



# **“HARDY SIMPLEX”**

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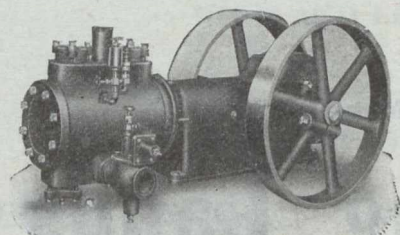
*Toronto*

*Winnipeg*

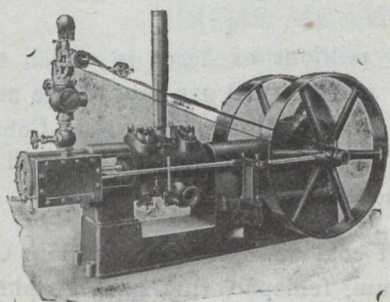
*Vancouver*

# Buying Air Power at the Lowest Cost

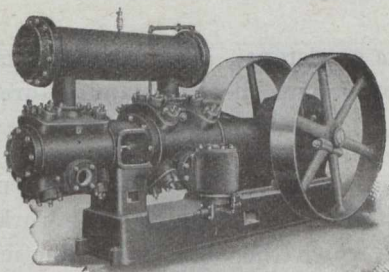
## Does Not Mean Buying the Cheapest Air Compressor



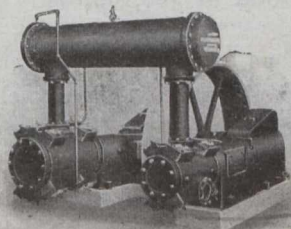
EL-1. Straight-line, Power Driven, Single Stage Compressor.



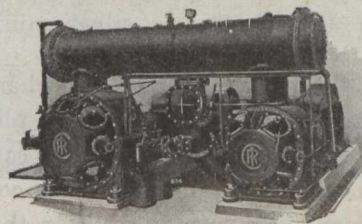
FL-1. Straight-line, Steam Driven, Single Stage Compressor.



EL-2. Straight-line Power Driven, Two Stage Compressor.



PLB-2. Cross Compound, Power Driven, Two Stage Compressor.



PRE-2. Cross Compound, Direct Connected, Electrically Driven, Two Stage Compressor.

When figured on the basis of cost per cubic foot per year, the air power you buy will cost you less if your compressor is chosen for quality rather than price.

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Cobalt



PROVINCE OF ONTARIO



HON. H. MILLS, Minister of Mines.

# 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 tale, 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.

For list of publications, illustrated reports, geological maps and mining laws, apply to

**Thos. W. Gibson,**

Deputy Minister of Mines,

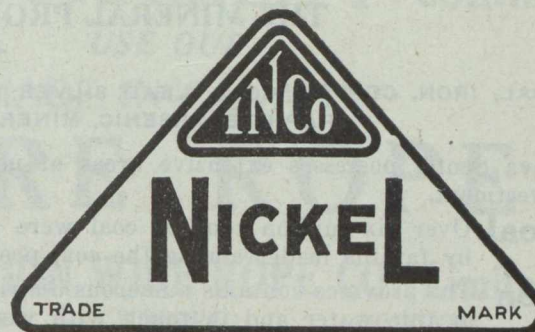
Toronto, Canada

**Metallic Nickel.** 98.40—99.00%

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**Ingots**  
25 LB. AND 50 LB. SIZES

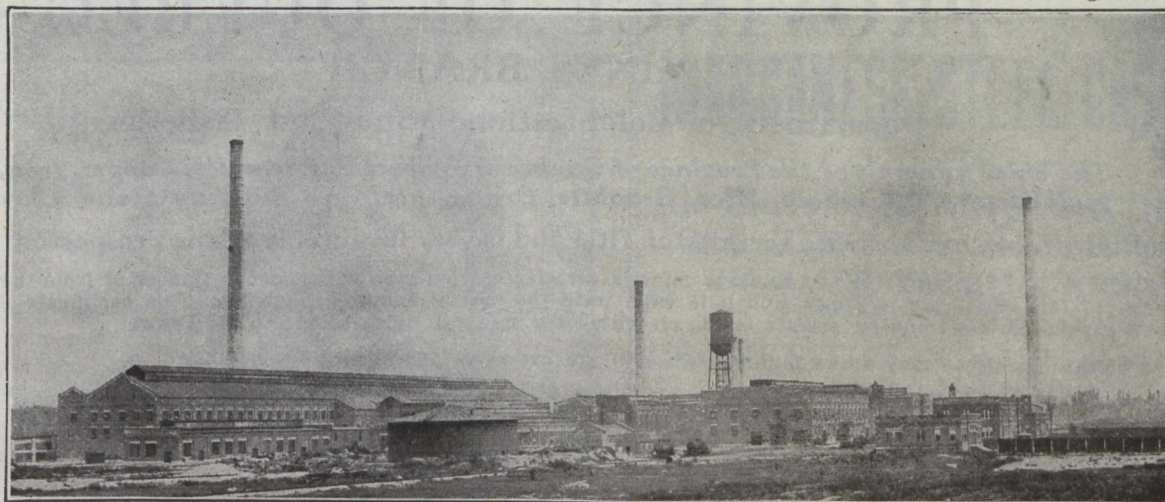
**Nickel Oxide** 77.2%



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# The Minerals of Nova Scotia

## THE MINERAL PROVINCE OF EASTERN CANADA

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

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

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

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

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

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

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

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

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

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

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

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

*Commissioner of Public Works and Mines*



## PROVINCE OF QUEBEC MINES BRANCH

Department of Colonization, Mines and Fisheries

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

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

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

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

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

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

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

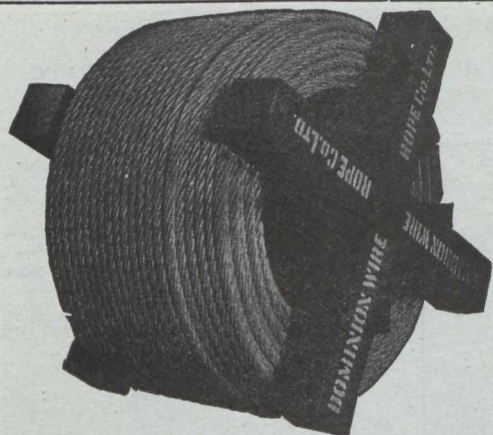
**MINING CONCESSION.** Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS

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

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

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

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MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.



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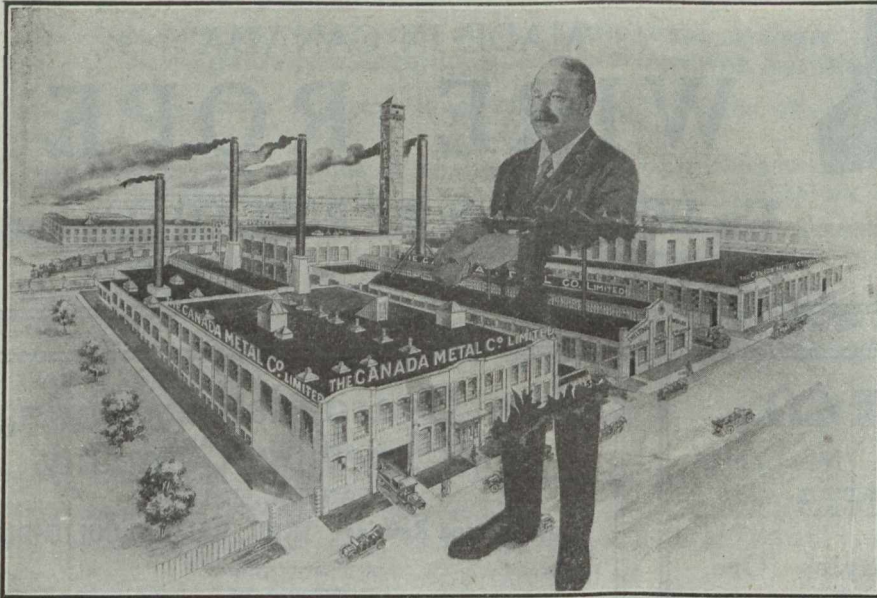
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# BRITISH COLUMBIA

## The Mineral Province of Western Canada

Has produced Minerals valued as follows: Placer Gold, \$75,436,103; Lode Gold, \$97,121,786; Silver, \$46,839,631; Lead, \$42,294,251; Copper, \$145,741,069; Other Metals (Zinc, Iron, etc.), \$13,278,058; Coal and Coke, \$187,147,652; Building Stone, Brick, Cement, etc., \$28,843,272; Miscellaneous Minerals, \$651,759; making its mineral production to the end of 1918 show an

**Aggregate Value of \$637,353,581**

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive, \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,509,968; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for the year 1916, \$42,290,462; for the year 1917, \$37,010,392; for the year 1918, \$41,782,474.

## Production During last ten years, \$313,976,022

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

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

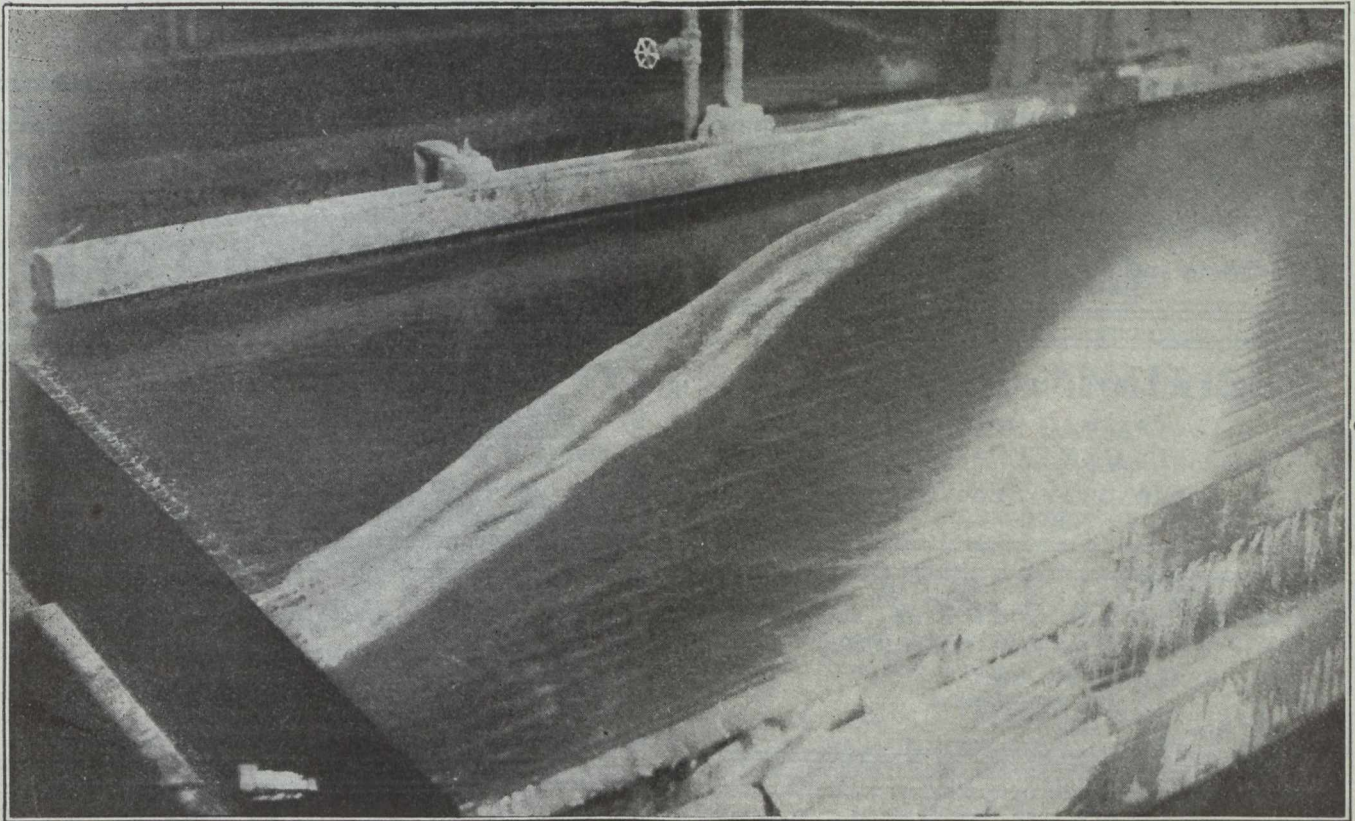
Mineral locations are granted to discoverers for nominal fees.

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

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

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

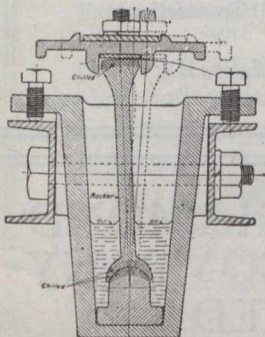




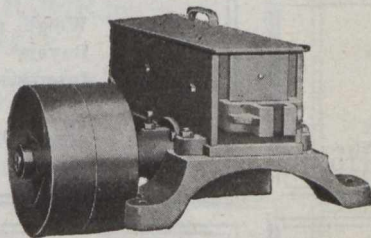
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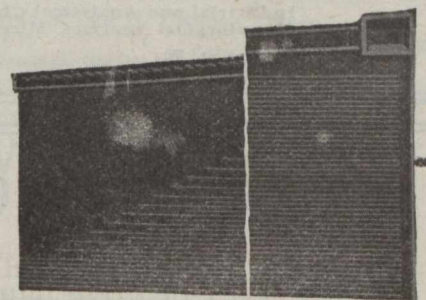


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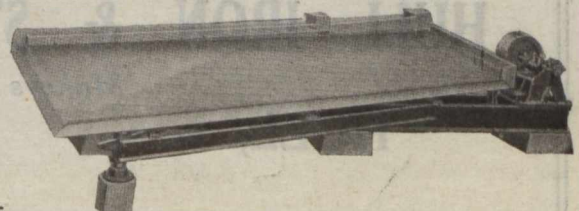
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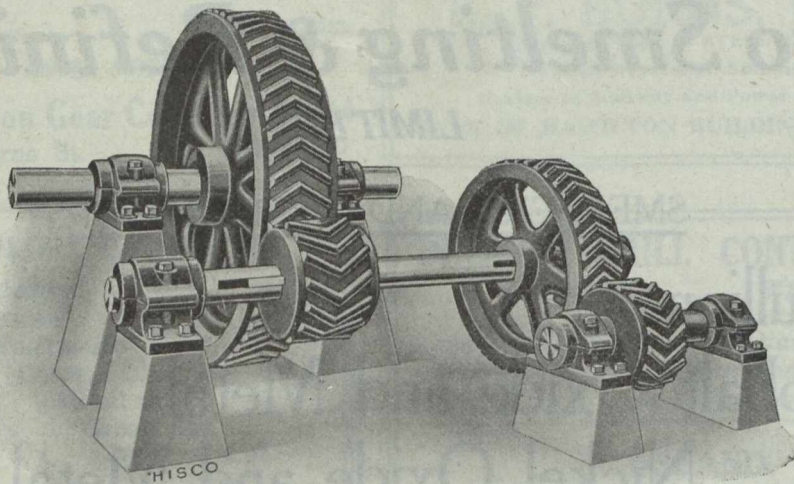
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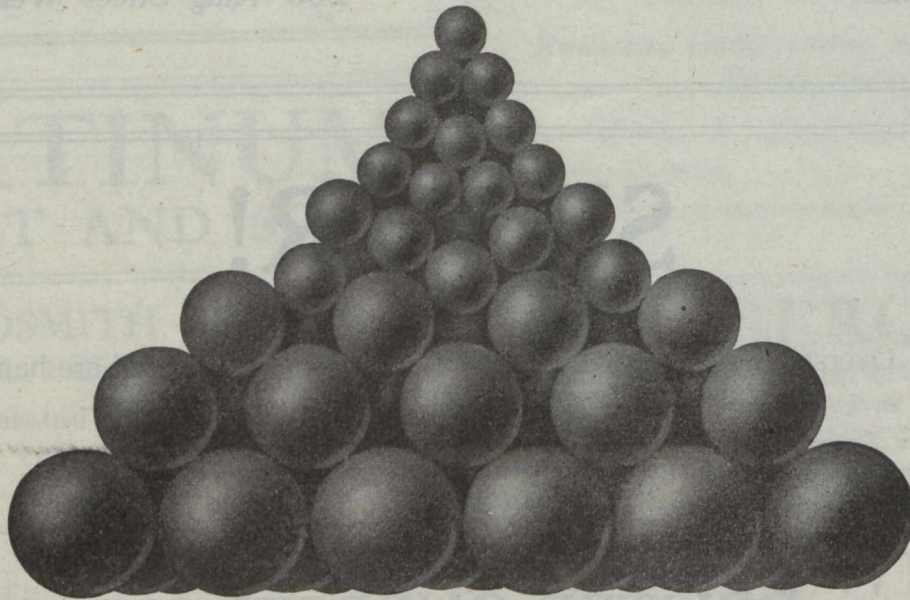
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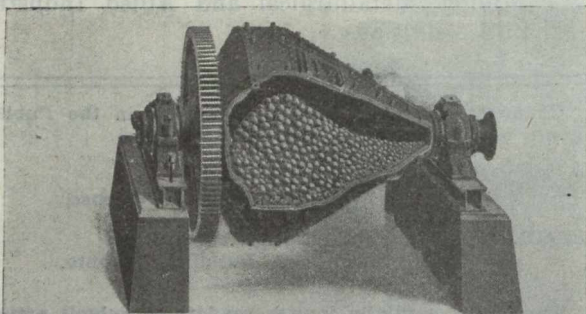
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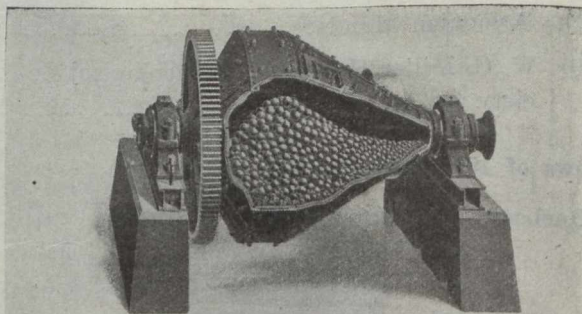
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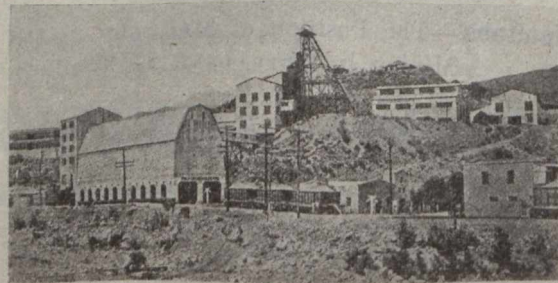
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# EDITORIAL

## The Mineral Industry in 1919

The most important tendency of the year 1919 in regard to the mineral industry of Canada is the interest taken by American capitalists in our mineral deposits. Our trade relations with the United States have attained large dimensions, having increased from \$559,000,000 in 1913 to \$1,227,896,000 for the year ending March last. This increased intimacy, combined with the immensely wealthy status of the United States today and the discount on the Canadian dollar that makes purchases in Canada so advantageous to the United States buyer, is causing a projection of United States capital and business organizations into Canada that is without parallel in the history of the two countries. United States interests, moreover, have not been debarred from extra-territorial investments, as United Kingdom interests have been until very recently. For good or for evil it is certain that a large proportion of the war profits of the United States are being invested in Canada, and the mineral industry is receiving a good share of this investment.

Compared with 1918—a truly wonderful year—the production in Canada of the so-called “war minerals” such as copper, nickel, chrome, and in a lesser degree of zinc, lead, asbestos, will show a decline in 1919—but by no means such a decline as might have been reasonably expected under the circumstances. At the close of the year it has become evident that the arts of peace will cause a legitimate and salutary demand for metals such as nickel, copper, zinc and lead, and minerals like asbestos, with which Canada is generously—and in some instances preponderatingly supplied.

Gold mining has been hampered by labor shortage, and the difficulties of mining gold when the only remnant of the gold standard of monetary values is the fixed price of the metal itself. Some relief to the gild miners seems overdue. No tampering with the selling price of gold itself is possible without disaster, but relief from taxation and possibly some assistance in the form of a bonus may commend itself to government. The recommendations of the committee recently appointed by the Canadian Mining Institute to study this puzzling subject will be awaited with much interest.

Silver is today of much greater value than “the stones in Jerusalem” and is indeed of greater selling value than it has ever been since it was first appraised

by Solomon the King. Silver at \$1.33 per oz. means great prosperity for our silver mines, and it has the effect in practice of making lean ores rich—temporarily so, at all events. There is also the comforting probability—comforting to Cobalt, that is—that the prevailing high selling price of silver is not an ephemeral thing, but bids fair to continue until the world’s credits once more inspire confidence. The high favor in which silver is held seems to be a reflex of the virtual disappearance of gold coin as a medium of ordinary commerce, and will presumably continue until the days return when gold coin circulates as it used to before the Germans let loose the wrath of men and the foolishness of kings.

The most disappointing thing about the year’s mineral record in the coal production, which, notwithstanding all the lessons of the war, despite a premium of 10 per cent on New York funds, and the recent warnings of the Fuel Controller, actually showed a decline of 2½ million tons from the miserably inadequate figures of 1918. All cause for congratulation on the progress of Canada’s mineral industry is offset by our failure to produce a reasonable modicum of our consumption of coal, and by a continuance of the expensive, demoralizing and totally unnecessary luxury of importing United States coal at an annually increasing rate.

It is reported the Canadian Manufacturers’ Association has appointed a committee to enquire into the possibility of decreasing our coal importations by increasing Canadian production. This influential body could not have undertaken a more necessary duty, nor one likely to prove more beneficial to Canada if the subject is enquired into by competent persons. We would add that the supplying of Canada’s coal needs for her own coal mines or from the coalfields of the United States is not altogether a matter of relative delivered cost of coal; it is not—as has been asserted—a purely economic matter. The matter has some economic bearings—in its effect on Canada’s exchange credit and internal employment for example—but its importance lies chiefly in the fact that a country which unnecessarily depends upon a neighbor for an indispensable necessity of life and national growth may find itself in the humiliating position of a beggar, if indeed Canada is not already in that position.

In 1917 the Dominion Coal Company alone had a programme of seven millions tons per year. Twelve years later the whole province of Nova Scotia can produce but a little more than five million tons.

Alberta has more coal than any single state in the American union, and far more coal than the rest of Canada put together. Yet it is accounted a matter for congratulation when that province produces six million tons in one year, and even that really insignificant production has not been maintained.

It cannot be demonstrated that either Nova Scotia or Alberta have ever supplied coal to that portion of Canada which comes within their proper sphere of distribution. There has never been in Canada any concrete exemplification of the desire of any government to expand the use of Canadian coal in Canada because it was a Canadian product.

Protective tariff have their uses, but we need something more than an expedient which merely serves to lessen some of the economic advantages possessed by the United States in the matter of coal importation into Canada.

We need an active interest in the national aspects

of coal supply by our government—provincial and federal—some appreciation of the fact that if we do not develop our coal resources sufficiently at least to put us in a position of respectable national independence and defence there may some day be no necessity for these same governments, who will have been superseded by their economic—and therefore logically and ultimately—their political masters.

Until our domestic coal supply to some extent approximates to our industrial importance, our national fabric of finance and industry is an inverted pyramid, resting upon a development of our coal resources that is perilously inadequate—and so entirely inexcusable, because so entirely unnecessary.

The further utilisation of Canada's water-powers, the use of peat as a fuel, the use of the Souris lignites in gas-producers and other possible aids to the solution of one fuel problem are all matters of proper and even hopeful enquiry, but they can at their best be only partial aids, and the solution to the fuel problem will be found in the adequate development and the extension of the zones of distribution of the bituminous coals of Nova Scotia, Alberta and British Columbia.

## The Armenian Mandate

Our esteemed contemporary, the "Engineering and Mining Journal" has had two editorials dealing with the proposal that the United States should take upon itself the mandatory supervision of Armenia. A convincingly large number of perfectly good reasons are given why the United States should not mix itself in that delightful hodgepodge of racial complexity and religious differences which centre around a region where tradition says that Noah undertook his preliminary post-diluvian prospecting. Our contemporary properly assesses the great difficulty of holding "the turbulent mountainous country of the Armenian republic and the wild republics between it and Russia." It is intimated that Britain has reaped such rewards from this war that she ought herself to assume the duty that the United States is counselled to avoid. The "Engineering and Mining Journal" says: "The situation is clearly nothing less than the result of a diplomatic move made by France and England—England, who as a result of this war has extended her flag over German Africa, Persia, Palestine and Mesopotamia, and much besides."

Why "England"? Living alongside us, a New York journal should know that there is a place called Canada which did its share in the war — and did it right early. And there are other nations, the Scots, the Irish, the Welsh, who are not properly included in the territorial term of England; and there is Australia, New Zealand, South Africa, India, and many many other places who sent their men to the ends of the

earth to fight for England. Yes, but not more for England than for their own birthplaces. Does the belief still survive in New York that "England" is a grasping imperialistic entity, gifted with diabolical diplomatic ingenuity, who entered the war for what she could get out of it? It does not yet appear to have been understood in some circles that when Canadians fought in Palestine, Australians in Gallipoli and Mesopotamia, South Africans in German Africa, and New Zealanders on the Suez Canal, that a world miracle had taken place, and that "England" territorially considered, became but one nation among many.

The plea that the United States should avoid European entanglement because such entanglement may mean heavy responsibility, is unworthy of a nation that boasts itself today richer in money, greater in population and less impoverished and decimated by the recent war than any country that took part in it.

If the plea is entered that such responsibility should not be undertaken because the rewards are incommensurate, it conflicts with the oft repeated statement that the United States did not enter the war with any desire for territorial aggrandisement, but to make the world safe for democracy.

If the mandatory expedient is now found unsuitable, it might be enquired who suggested it?

As to the sacrifices made by the British peoples, we do not recollect that they are in the habit of advertising their losses, but they have been enumerated in moving words by citizens of the United States who

lived and worked, and in some cases, died, alongside our men.

We do not think the "Engineering and Mining Journal" is quite fair in its appraisal of British aims, nor in its appraisal of the feeling of the majority of the citizens of the United States, who after all were a unit with Canada in the fight that ended in 1918, and can be trusted to assume that proportionate share of the burdens of world reconstruction—in some large European countries not even commenced—which will fall upon the shoulders of a populous, wealthy and idealistic people that counts itself not the least of the Christian democracies of the modern world.

#### DR. W. G. MILLER HONORED BY GEOLOGICAL SOCIETY.

Dr. W. G. Miller's many friends will be glad to hear of his election as Second Vice-President of the Geological Society of America at the Society's Annual Meeting held in Boston recently. Dr. Miller's reputation is one that is steadily growing, and his newest honor, combined with his selection as Canada's representative on the Imperial Mineral Resources Bureau, emphasise that the good opinion of Dr. Miller held by the mining profession in Canada, has now become an international one.

The Editor wishes the readers of the Canadian Mining Journal a happy and prosperous New Year.

If any of our friends and advertisers issue pocket-diaries, such as we remember in pre-war times, the Editor will be glad to receive one.

#### PERSONALS

Mr. E. P. Mathewson, who was in Toronto for some time as general manager of the British America Nickel Corporation, is now practising in New York as consulting metallurgist. His address is 42 Broadway. Mr. Mathewson is one of the leaders in his profession. He contributed largely to the success of the Anaconda Copper Co., by his work in Montana when he was in charge of the metallurgical works of the big company.

Mr. J. B. Tyrrell of Toronto is in London, England. He expects to return about the end of January.

Mr. F. C. Sutherland of Toronto has returned from London, England.

Mr. C. H. Hitchcock of Sudbury is spending the holiday season at Los Angeles.

Major Pelletier of the Overseas Development Company is at the Gabrielle Mine, Rice Lake District, Manitoba, making arrangements for the resumption of operations.

Mr. R. E. Hore has returned to Toronto after examining gold properties in the Rice Lake district.

#### Port Arthur Notes

Instructions have been received by the Mining Recorders throughout the northern districts of Ontario, from the Hon. Harry Mills, Minister of Mines, to extend for another year the relief against loss of forfeiture of rights, in the case of men interested in mining claims, who enlisted at home, or overseas. This relief has been continued from year to year since 1917, and now extends, in the case of men who have not yet obtained their discharge, until January, 1921.

The fact that we have no private assayers here is found to work great inconvenience, expense and hardship on prosecutors. The nearest assay office is at Winnipeg. It takes a week to get results from there. From Toronto, or Cobalt, it takes ten days. Express charges are high, and often prohibitory to the prospector. This tends to make samples too small to be representative or fair. Port Arthur is the centre of a vast and varied mineral field, extending for several miles, east, west and north.

A branch of the Provincial Assay Office here would not only be a boon in itself, but would immediately create a large volume of business. Prospectors that would not send samples to far distant points, at considerable expense, would gladly take them to such an office, hundreds of assays would be made, where none are made now, and the country would get the benefits of results. The equipment and housing would cost very little. It is more than probable that from the first the office would be self supporting. The list of economic minerals is long: iron, gold, silver, sulphur, molybdenum, zinc and copper, marls and clays.

The reported perfecting of a process for the manufacture of molybdenum high-speed steel, by Prof. John Oliver Arnold of Sheffield University, Eng., has caused considerable interest here, where several well known and valuable deposits of molybdenite are owned. These deposits are at Loon, and in Conmee township, near Port Arthur, at Jackfish, and at Long Lake, on the Canadian National Railway.

#### New Incorporations

Among the new mining companies recently incorporated are the following: Premier Gold Mining and Exploration Co., New Liskeard, Ont., with an authorized capital of \$2,000,000, the incorporators being J. W. Elliott, A. A. Sproul, F. W. Ferguson; Federal Mining Co., Limited, Port Arthur, with an authorized capital of \$40,000, the incorporators being F. S. Wiley, C. F. Gibbs and E. M. Turville; the Wachman Mining and Milling Co., Ltd., Dryden, Ont., with an authorized capital of \$500,000, the incorporators being H. P. Cooke, R. H. Moore; the Iowa Canadian Mining Co., Limited, of Dryden, Ont., with an authorized capital of \$40,000, the incorporators being H. P. Cooke, H. V. Cooke and R. H. Moore; the International Pyrite Company, Toronto, with an authorized capital of \$1,000,000, the incorporators being C. A. Smith, A. H. Pace and J. G. Adair.

#### Princeton, B. C.

It is announced that the mining camp at Copper Mountain and the Mill Camp at Allenby of the Canada Copper Corporation will be closed down temporarily. Work at the mine and the mill is reported to have reached the point where little more can be accomplished before the completion of the railway from Allenby to the mine site.

# The Mining Industry in the Province of Quebec in 1919

By THEO. C. DENIS.

Superintendent of Mines of the Province of Quebec.

Although it is too early to give definite figures of output regarding the mineral production of the Province of Quebec during the year which is coming to a close, everything points to an appreciable decrease as compared with 1918. From all appearances the diminution will bring the total value of the production to the vicinity of 16 million dollars instead of the 18 $\frac{3}{4}$  millions of the previous year.

Practically all the items which appeared in the list of production for 1918 will show decreases, with the exception of some of the structural materials. Several of these decreases will be very appreciable, particularly in the case of the so-called "war materials", such as pyrites, molybdenite, chromite, magnesite, quartz and silica, which all found applications in the manufacture of war materials. However on the whole it is believed that the Quebec Mineral Industry has felt the effects of after-war conditions less than most other parts of North America. The industrial and social unrest, which is now so marked throughout the world has been much less noticeable in our province, than perhaps anywhere else in Canada. There have been no general strikes, no undue exigencies on the part of labour. Troubles such as those which paralyzed, for various periods, the economic and industrial life in many parts of the world have not disturbed the comparative equanimity of the Quebec population. It is not easy to determine why the Province is freer of troubles during the critical period of readjustment to pre-war conditions, but one of the reasons is certainly the fact that the people of Quebec appear to have confidence in the judgment and the advice of the "directing" classes, and they seem to remain indifferent to the insinuations, and often plausible, urgings of theorists who have panaceas to bring about the advent of utopian conditions and of the millenium.

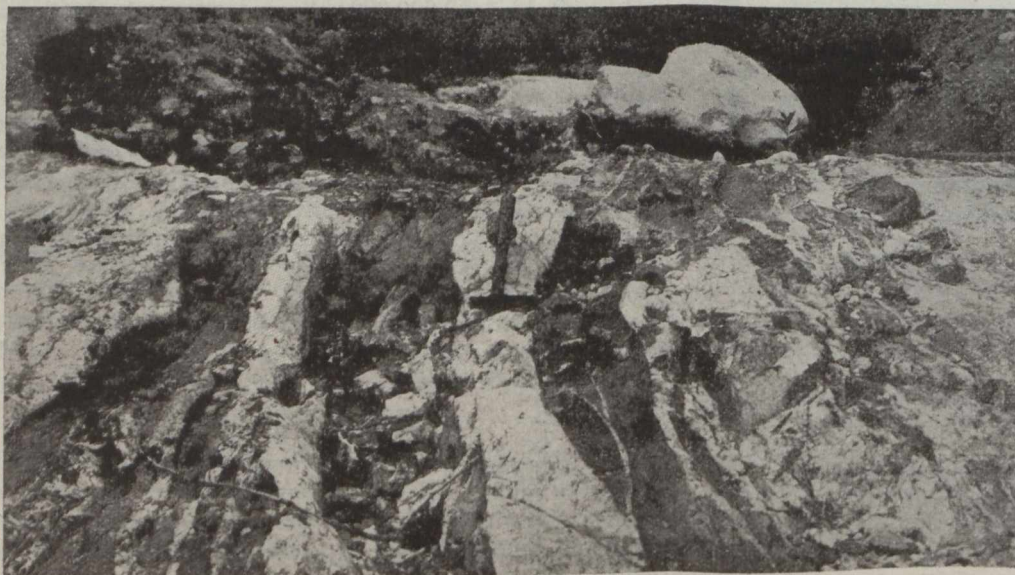
## Asbestos.

Reviewing the principal ones of our mineral products, it is gratifying to note that Asbestos has not suffered from the cessation of hostilities, and that the figure of production for 1919, will not be greatly inferior to those for 1918, which was a most prosperous year, as the value of the asbestos shipped was nine million dollars. The value of the production for the first six months of 1919 was \$4,471,359. Asbestos alone, for the last few years, has represented nearly half of our total yearly production, and all points to a continued prosperity, for the uses of this mineral are taking greater extension, and the mines are in excellent condition. With depth the contents of asbestos in the rock seem to increase rather than diminish; in 1918, the yield of asbestos per ton of rock mined was 117.3 lb., whereas in 1917 it had been 108.7 lb. Large reserves of serpentine have been blocked out, and on the whole the future of asbestos mining in the Province is very reassuring.

In the report of Mining Operations for 1918 mention was made of a discovery of asbestos in Gaboury township, east of Ville-Marie, in the district of Temiscamingue. A short examination of the occurrence was made by an officer of the Quebec Mines Branch, and it was found that there is the possibility of the existence of quite an important development of serpentine rock which in several places is asbestos bearing. The contact was followed for more than half a mile and it is probable that the serpentine extends over a length of a mile and a half or more, whereas the width could not be determined, the serpentine underlying a wide depression, of half a mile between the banks. Of course this can only be regarded as a potentiality, as it is some eight or nine miles from a highway and some 25 miles from Ville-Marie on Lake Temiscamingue.

## Copper-Sulphur Ores.

The production of copper-sulphur ores, which item takes second place in our list of "Products of the Mines", did not fare as well. With the signing of the armistice the strenuousness of manufacture of explosives greatly relaxed, and Spanish pyrites reappeared on the United States market. The Eastern Township mines which produce ores used in the manufacture of sulphuric acid, the cinder of which is subsequently treated for the extraction of copper, keenly felt the reaction. The Eustis mine stopped hoisting in April, and was closed during the



A Typical Vein Formation Near Lac de Montigny, Showing Interbanded Quartz With Schist and Granite. Total Width Mineralized Zone is Over 80 Feet.

greater part of the year. However the concentrating mill was kept running, at less than half capacity, on the old dumps. At the other mines, the Weedon, the Huntingdon, activities were greatly diminished.

#### Magnesite.

The Quebec magnesite industry, which obtained such a good start during the war, the production having advanced from a value of \$2240 in 1914 to \$1,016,764 in 1918, has had a much smaller year in 1919, as compared with the previous one. The operating companies took advantage of the quietness of the market to get ready to produce the dead-burned magnesite at lower costs. The Scottish Canadian Magnesite Company is completing a sintering plant at their Calumet quarry, and have stopped clinkering their product at the cement works at Hull. The latter makeshift entailed a haul of 70 miles for the crude magnesite, of two tons of the raw stone to produce one ton of dead-burned. In the future the dead-burned magnesite will be shipped from the quarry. The sintering plant, comprising crushers, ball mills, rotary kilns and accessories is built for a daily production of 70 tons a day of dead-burned. The North American Magnesite Company is also installing a 40 ton plant, at Calumet, which will be ready in three or four months. In the meantime they are continuing to produce dead-burned magnesite at the Montreal works of the Canada Cement Company.

The Quebec Magnesite has given eminent satisfaction to all the users, of which the list is very long. They comprise, among numerous others, the Carnegie Steel Co., Bethlehem Steel Company; Jones and Laughlin; Algoma Steel Company; Steel Company of Canada. It is regrettable that the U. S. House of Representatives has lately passed a bill imposing duties on magnesite entering into the United States, as follows:—crude magnesite  $\frac{1}{2}$ c. per lb; calcined and dead-burned  $\frac{3}{4}$ c. per lb; brick  $\frac{3}{4}$ c. per lb; and 10% *ad valorem*. Although this tariff is not yet effective, owing to the U. S. Senate having postponed indefinitely the consideration of the bill, the measure hangs like a Damoclean sword over the Quebec magnesite industry.

#### Molybdenite.

The molybdenite production, in 1919, was only a small fraction of the previous year's. This substance which appears to have been strictly a "war-mineral" has keenly felt the effects of the cessation of hostilities. The molybdenum market is taking a long time to readjust itself to peace conditions. However, in the last two or three months, there has been a revival of interest shown in this metal, the rumor being that it had found new applications in the automobile industry.

#### Chromite.

The chromite industry has suffered much less than was anticipated. Three companies have operated during the greater part of the year, and have produced ore, improved their mining plants and methods and developed considerable ore reserves.

#### Upper Harricana Gold Area.

Prospecting and development work was carried on actively on the gold deposits of the Upper Harricana region in the Abitibi district. A small production of gold is reported. The field is very promising, and should, in time, become an important factor. Unfortunately

gold mining under the present conditions, is not attractive to investors. Unlike all metals and other commodities, the price of gold remains fixed at \$20.67 an ounce, while the cost of its production has increased to such an extent, owing to the raise in the cost of labour and supplies, that the margin of profit has considerably narrowed.

#### Zinc.

The Zinc Company, Ltd., opened their mine in Montauban, Portneuf county, throughout the year. They also reopened their oxide plant which had been closed down for a year and a half.

Further development work was done by the Federal Zinc and Lead Company, on their property in the region of the head-waters of the Cascapedia river. This field, which shows all the signs of becoming an important producer of lead and zinc, has been handicapped by the lack of transportation facilities. It is situated some fifty miles from the railway, and the only connection is a lumber road, which at certain seasons is quite impassable. This being remedied by the construction of a road, on which the company has a large gang of men working at present, which will be used for hauling ore by tractor. The Federal Zinc and Lead Company will erect a concentrator and a small lead furnace plant in the spring, and it is expected that shipments of ore and of pig-lead will begin within a year.

#### Building Materials.

There has been a slight revival of activity in the production of building materials, but the figures for 1919, while showing an improvement as compared with the previous year, will still be below normal. This is due to the fact that the high price of labour and of supplies has greatly restrained building operations. However the need of new constructions, especially dwelling, is becoming acute, and although the cost of building may be forty per cent higher than before the war, it may be forecast that a period of great building activity is setting in and will continue for some time.

\*See description of this area in issue 15th Oct. 1919 p. 765, by Prof. A. Mailhot.

#### SMELTING OF MAGNETITES.

Those who were present at a discussion on smelting British Columbia magnetites which took place at the concluding session of the C. M. I. meeting in Vancouver recently, may be interested in the following brief, but sufficient letter:

The Editor of Mining and Scientific Press

Sir—In your issue of December 6 is a communication from F. H. Mason in which he says that "the bulk of the accessible ore on the Pacific Coast is magnetite, which cannot be reduced by ordinary blast-furnace practice without an addition of more reducible iron ore".

This is so diametrically opposed to the fact of furnace practice that it cannot be permitted to pass without denial.

DWIGHT E. WOODBRIDGE.

Duluth, December 8.

# A Historical Review of the Silver and Gold Production of Northern Ontario

By J. A. McREA, Cobalt.

## A Comparison of Gold and Silver Fields.

For the reason that silver was first produced in Cobalt in 1904, and that up to that time the province of Ontario had not been an important producer, it is perhaps well to deal only with Ontario's precious metal history beginning with 1904.

Thus, in dealing with the fifteen years just ended, these facts stand out conspicuously:—In 1904 the province of Ontario was not an important producer of precious metal. The output of gold and silver up to that time was a little or no consideration among the industries of the Province. The discovery of silver in Cobalt rapidly elevated the silver mining industry to one of first class importance and by 1911 the Cobalt camp reached the maximum output of 31,507,791 ounces during the year. Up to that time the gold output was decidedly small and in 1911 amounted to only \$42,625.

It is a remarkable fact that in 1912, which year marked the downward trend in the production of silver in the province, the gold mining industry came into prominence by exceeding the million dollar mark for the first time in Ontario's history. Since that time, the decline in silver and gold mines amounts to approximately \$25,000,000 a year.

During the part fifteen years the silver mines of Northern Ontario have produced approximately 303,724,172 fine ounces of silver valued at \$181,570,561. The gold mines have produced 2,872,680 fine ounces valued at \$59,389,508. The combined production of gold and silver from this district, during the fifteen years just ended amounts to 306,596,852 fine ounces valued at \$240,960,069.

In analyzing the present status of the precious metal mining industry in brief, I will turn first to the Cobalt and Gowganda districts and deal with the silver mines.

### The Silver Mines.

During the year 1919 a total of 34 mines contributed to the silver output. Of these 30 were Cobalt companies, three Gowganda and one South Lorrain. The heaviest producer was the Nipissing with a record of close to 3,000,000 fine ounces. The total output of silver from the silver mines may be estimated at approximately 11,000,000 ounces for the year just ended, and having a value of about \$12,210,000 owing to the product being marketed at an average of over \$1.11 an ounce. For the purpose of comparison a table of figures is presented herewith. In reference to these figures it should be pointed out that the last summer's labor strike caused a total suspension of operations for 47 days at all the mines added to which was several weeks of lost time in putting the mines in shape to resume. This resulted in reducing the year's production by perhaps 2,000,000 ounces or about \$2,400,000.

## THE SILVER OUTPUT OF COBALT.

Year	Average Price of Silver	Ounces	Value
1904	57.2	206,875	111,887
1905	60.4	2,451,356	1,360,503
1906	66.8	5,401,766	3,667,551
1907	67.5	10,023,311	6,155,391
1908	52.9	19,437,875	9,133,378
1909	51.5	25,897,825	12,461,576
1910	53.5	30,645,181	15,478,047
1911	53.3	31,507,791	15,953,847
1912	60.8	30,243,859	17,408,935
1913	57.8	29,681,975	16,553,981
1914	54.8	25,162,841	12,765,461
1915	49.69	24,746,534	12,135,816
1916	65.66	19,915,090	12,643,175
1917	81.41	19,401,893	16,131,013
1918	96.78	18,000,000	17,400,000
1919	111.29	11,000,000	12,210,000
Grand Totals		303,724,172	\$181,570,561

In the order of their importance, the present producing silver mines are the following, it being kept in mind that some of the mines are producing almost an equal amount of silver and that they are difficult to classify with exactness:—

Nipissing Mining Corporation, Kerr Lake, O'Brien, Coniagas, McKinley-Darragh, Miller Lake O'Brien, Temiskaming, Beaver, Crown Reserve, La Rose, Trethewey, Hudson Bay, etc. Other properties from which a limited amount of silver was produced during the year includes the Peterson Lake, Silver Cliff, Foster-Cobalt, Adanae, Chambers-Ferland, Right of Way, Edwards and Wright, Pittsburgh-Lorrain, Keeley, Reeves-Dobie, etc. A number of other properties were opened up during the year, including the Nipissing Extension (formerly the Farah property) and the Lumsden.

Everything considered, there is more activity at present in the silver area of Cobalt as well as Gowganda and Elk Lake than for a good many years. That production during 1920 will be well maintained appears to be quite certain; particularly so provided the current high quotations for silver continue.

### Outstanding Developments.

Developments of importance during the year include the followings:—During the first half of 1919 the Nipissing encountered an exceedingly rich shoot of ore in the "Little Silver" vein. At the Beaver Consolidated, considerable high grade ore was encountered, as well as a large amount of mill rock, and the management has decided to begin at surface and work the mine all over again. On the Crown Reserve a high grade discovery was made early in December which promises to yield about \$140,000 in addition to current production from mill rock. The Temiskaming also encountered a number of high grade ore shoots. These developments among others helped to strengthen the physical condition of the camp as a whole.

**Important Transactions.**

During the year the Mining Corporation of Canada purchased a controlling interest in the Buffalo Mines. The Northern Customs Concentrator Company purchased that part of the Chamber-Ferland Mine lying east of the railway. The Northern Customs also secured a lease on the Silver Cliff and operated the property successfully. The Mining Corporation during the last quarter of the year purchased a lease on the Foster-Cobalt property. The Lumsden mine was purchased by C. L. Campbell of Montreal and arrangements are being made to develop it. The old Farah property was taken over by the Nipissing Extension and is being worked. In the Gowganda field the Castle property of the Trethewey Company produced encouraging quantities of high grade ore.

**THE GOLD MINES**

**On the Eve of the Gold-Mining Era in Northern Ontario**

Everywhere in Ontario where gold mining has reached important proportions there is manifest a degree of optimism greater than ever before in the North.

As a result of the magnitude of the developments recorded, enthusiasm, well justified and permanent has been created. The year 1919 has marked the period of readjustment. In that time the gold mining industry has regained its pre-war status, even exceeding it. The output for 1919 is estimated at \$10,500,000, which is the highest record in Ontario's history.

And now, as 1920 comes in, and it is found that the gold mines in the aggregate have ore reserves amounting to around \$100,000,000 actually in sight and with untold millions in potentialities; the careful observer is compelled to confess to a genuine thrill at the immensity of the gold mining industry.

From the forest fastness in which ten years ago it was not known that commercial gold ore bodies occurred, there is at present being produced a steady stream of yellow metal, now estimated at at least a million dollars every thirty days and steadily increasing in volume. According to the trend of developments the year 1920 is expected to result in something like \$14,000,000 being produced, and this record to be still further increased before the maximum is reached.

The producing gold mines of Northern Ontario include the following:—Hollinger, Dome, McIntyre, Lake Shore, Kirkland Lake, Teck-Hughes, Dome Lake, Davidson and Argonaut. The dividend payers include the following: Hollinger, Dome, McIntyre, and Lake Shore.

In addition to the above producing mines, the following is a fairly complete list of the other gold mining operations:—Wright-Hargreaves, Ontario-Kirkland, Canadian-Kirkland, Clifton-Porcupine, Associated Goldfields, Miller Independence, Kennedy-Boston, Peerless, Boston-McCrea, Bourke's Mines, Murray-Mogridge, Gold Reef, Keora, Big Dyke, Northwoods, Gold Centre, Skead Gold Mines, Catherine Gold Mines, Matachewan Gold Mines, Nelson property, Robb-Clemens, etc. This summary is not inclusive of the West Shining Tree district where considerable activity is taking place.

The dividend record of the gold as well as the silver producing mines follows, and offer some idea of the

magnitude of the net profits being realized. It will be noted that with total production of \$240,960,069 in gold and silver produced during the past 15 years, upwards of \$100,000,000 has been paid in dividends. Of the total production the silver mines accounted for \$181,570,561 while the gold mine produced \$59,389,508. By the middle of the current year the total output of gold and silver from the Northern Ontario mines will have exceeded a quarter of a billion dollars. The dividend record follows:—

**THE SILVER MINES.**

Company	During 1919	Total
Nipissing Mining Co.....	\$1,800,000	\$20,340,000
Coniagas.....	300,000	9,540,000
Kerr Lake.....	840,000	8,850,000
La Rose.....		7,221,433
Crown Reserve.....		6,190,847
McKinley - Darragh.....	269,723	5,639,258
Mining Corporation.....	622,618	4,876,316
Buffalo Mines.....	350,000	2,637,000
Temiskaming.....		2,075,000
Hudson Bay Mines.....		1,940,250
Seneca Superior.....		1,582,211
Trethewey - Cobalt.....		1,151,998
Cobalt Townsite.....		1,042,259
Beaver Consolidated.....		650,000
Wettlaufer Silver Mines..		637,465
Cobalt Lake.....		465,000
Peterson Lake.....		462,036
Right of Way Mining Co....		325,644
Silver Queen.....		315,000
Cariboo - Cobalt.....		275,000
Right of Way Mines.....		265,038
Penn - Canadian.....		256,443
Casey - Cobalt.....		203,249
Cobalt Central.....		192,845
City of Cobalt.....		139,324
Aladdin - Cobalt.....		50,000
Closed Corp. (estimated)....	700,000	3,700,000
<b>Grand Totals.....</b>		

**THE GOLD MINES.**

Company	In 1919	Total
Hollinger Consolidated.....	\$1,720,000	\$15,476,000
McIntyre - Porcupine.....	541,542	1,624,627
Dome Mines.....	100,000	1,600,000
Porcupine Crown.....		780,000
Tough - Oakes.....		391,123
Lake Shore.....	100,000	200,000
Rea Mines.....		12,000
		\$20,083,752

**GRAND TOTALS.**

	1919	Total
Silver Mines.....	\$4,882,341	\$81,003,616
Gold Mines.....	2,461,542	20,083,752
	\$7,343,883	\$101,087,368

In addition to the foregoing, the following dividends were declared in December, payable during the opening month of 1920, and which figures bring the grand total up to \$102, 135,013 in dividends from silver and gold mines:—

Dividends declared in Dec. 1919, payable in January 1920:—

Nipissing.....	10 %	\$600,000
Temiskaming.....	4	100,000
Dome Mines.....	2½	100,000
McKinley - Darragh.....	3	67,430

# The Position of Manitoba in the Mining Industry

By R. C. WALLACE, Commissioner for Northern Manitoba.

Until the year 1912 agriculture was the only industry in the Province of Manitoba which attracted attention within the Province or without. The Province had been settled by a population which was attracted in the first instance by the magnificent soils of the Red River Valley and which later scattered into Southern Manitoba and into Northwestern Manitoba where equally rich soils were discovered and cultivated. Because of this resource and because of its strategic position as a distributing centre, the City of Winnipeg had rapidly grown up to serve as a nucleus and stabilising factor to the agricultural industry of the Province and the West. The addition, in 1912, of a very large territory extending to the Sixtieth Parallel of latitude and to the Hudson Bay, attracted the attention of the people in Manitoba to the possibilities of resources other than agriculture. As Manitoba is now constituted it is unlikely that more than two-fifths of the total area will be productive from the point of view of agriculture. The possibilities of the remaining three-fifths are mainly in mineral wealth, more particularly in gold, copper, silver, lead, zinc and iron.

## The Rice Lake District.

Immediately before the extension of the boundaries of the Province, in the latter part of 1911, there was discovered within the older part of the Province and east of Lake Winnipeg, in the district which is now known specifically as the Rice Lake district, quartz veins carrying high values in gold. As this area is not more than a hundred miles distant from Winnipeg, interest became keen, prospecting was active, and many other veins were discovered in the same area. Development work was continued until the outbreak of war but this work was seriously hampered by the transportation difficulties, which are, in Northern Canadian Territory, always serious, but in this particular case more formidable than usual. Notwithstanding this a great deal of work was carried on, machinery was shipped in over the ice in winter, and in all some eight or ten properties were developed to the hundred-foot level. With the outbreak of war work practically ceased. It is true that prospecting went on more or less intermittently during the four years of war and the area extended from Rice Lake to Gold Lake, Long Lake, Long Lake and northwards into the Hay Lake country. In this latter area discoveries were made of a somewhat different type which gave promise of proving up more extensive ore-bodies than can normally be expected where quartz veins are the typical carriers of the gold ores. Since the conclusion of war, however, interest in this area has immediately come back and there are to-day mining companies representing fairly large holdings which are making arrangements for continuation of mining on properties already partially developed or for the underground prospecting of new properties. With this there will be a united effort to obtain some means of transportation which may be available both summer and winter. At the present time practically all the heavy supplies and machinery are sent in over the winter road to

camp. In Summer it is necessary to transport in part over Lake Winnipeg and in part by the Bad Throat River or the Hole River, on either or which several portages have to be encountered. A serious endeavour will be made to obtain from the Government authorities a summer road so that it may be possible without delay to reach the district in either summer or winter and to transport into the district the freight and supplies which under the best of management, cannot be entirely looked after during the winter season. Much interest is being taken in the development work which is now being planned throughout the whole area.

## Northern Manitoba.

In 1914 another area, (in this case within what is strictly known as Northern Manitoba, that is, the new territory added to the Province in 1912) was opened up. The building of the Hudson Bay Railway north-easterly towards the Bay, attracted prospectors into a belt of greenstone lying directly north of The Pass and some sixty miles distant from that centre. On the eastern end of this belt there was discovered at Herb Lake, quartz veins carrying high values in gold. Again in 1915 a discovery was made in the western extremity of the belt within Manitoba and in fact practically on the boundary line of a large low-grade deposit of copper of mixed sulphides of copper, iron and zinc. The significance of this discovery was soon realized and a large amount of money has been spent during the subsequent years in diamond drilling the Flin Flon property with the result that twenty million tons of ore, averaging approximately ten dollars under present prices of silver and copper, has been blocked out. Immediately after the discovery of this property and within a distance of three and a half to four miles, another property was discovered containing a lens of very high-grade copper ore. This was taken over by the Tonopah Mining Company of Nevada, and the Mandy Mine, as it was named, was operated under a subsidiary company and has already produced copper to the value of \$2,500,000. This copper was transported forty miles by team, a hundred and thirty miles by barge and twelve hundred miles by railway to the Trail Smelter at British Columbia. Notwithstanding the heavy expense connected with this method of transportation, the ore, which averages over 18 per cent in copper, returned handsome profits to the operators. On the larger property, the Flin Flon, negotiations are proceeding with an American corporation and it is expected will be concluded in 1920. Owing to the heavy capital expenditure, including the erection of a two-thousand ton smelter on the property, negotiations, as may be expected, proceed somewhat slowly and only after full details have been obtained on the property and on all matters connected with its operation. When the deal is completed a railway will be built from The Pass to the property, seventy-five miles long, and stimulus will be given to the development of all the properties in the district. In the Herb Lake area after the initial discoveries of gold on one property, the Rex, after machinery had been installed ore was milled and bullion to the extent of \$27,500



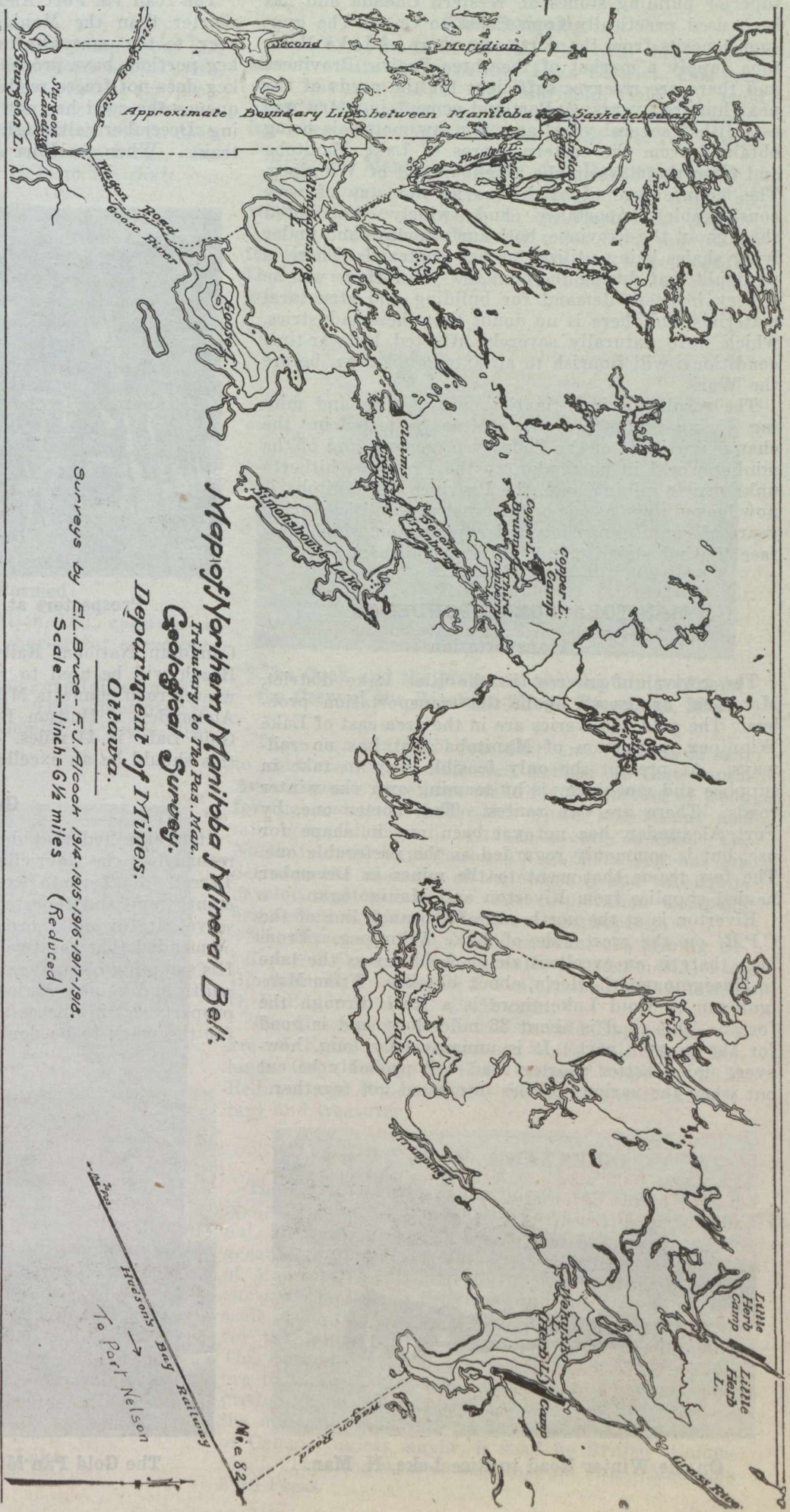
was extracted before it was necessary to close down owing to untoward labour conditions and the influenza epidemic. Here also, and in the Copper Lake district in the centre of the area, several properties will be developed during the winter. A rather sensational discovery of gold in the Copper Lake area attracted the attention of practically the whole mining world to this mineral belt during last summer.

**Other Mining Activities of Manitoba.**

There are other areas throughout the Province where prospecting has been done and there are places where mining machinery has been erected. In the Star Lake district immediately east of Winnipeg where a certain amount of development for gold was carried out prior to the War, molybdenite and scheelite were discovered during the time of the war and development would have reached the stage of production had not the conclusion of the War seriously affected the prices of molybdenite and tungsten. Immediately north of Lac du Bonnet and some forty miles south of the Rice Lake district there are indications of ore bodies sufficiently rich in copper and in nickel to be operated at a profit. When the Hudson Bay Railway is extended to the Bay a very large territory will be thrown open on the west coast of Hudson Bay as far north as Chesterfield Inlet, to the prospector and mining companies.

**Structural Material.**

For several years before the discovery of the precious metals in Manitoba, the staple structural materials had been mined and had found a ready market. The Manitoba building stone, which is quarried thirty miles east of Winnipeg, is recognized to be one of the



superior building stones of Western Canada and has been used practically from Coast to Coast. The gypsum deposits from the north-east shore of Lake Manitoba supply a market of the three Prairie Provinces and there are reserves sufficient for the needs of the next hundred years. A Portland cement industry was established several years ago, the raw materials being obtained from the eastern shores of Lake Manitoba and from the clays in the neighborhood of Winnipeg. The manufacture of brick was an industry of very considerable importance and widely distributed throughout the Province, both surface clays and underlying shales being utilized as raw materials. There is no doubt that during the next few years there will be a very insistent demand for building and structural materials and there is no doubt that these industries, which were naturally severely affected by war-time conditions, will flourish to an extent unknown before the War.

The results of investigation, prospecting and mining during the last seven years are reflected in the changed attitude of the Country in general and of the mining world in particular, to the Province, hitherto unknown to mining men, the Province of Manitoba is now looked upon as one of the great possibilities during years of rapid expansion and exploitation which now face the industrialist and the financial man.

## MANITOBA CORRESPONDENCE

### Transportation

The revival of interest in the Rice Lake district, Manitoba, brings up again the transportation problem. The gold discoveries are in the area east of Lake Winnipeg, a portion of Manitoba that has no railways. At present the only feasible way to take in supplies and machinery is by teaming over the winter roads. There are two routes. The shorter one, by Fort Alexander, has not yet been put in shape for use, but is commonly regarded as the preferable one. The few teams that went to the mines in December hauled supplies from Riverton and Manigotogan.

Riverton is at the north end of a branch line of the C.P.R. on the west side of Lake Winnipeg. From here there is an excellent sleigh road across the lake to Manigotogan via Hecla, about 40 miles. From Manigotogan to Gold Lake there is a road through the forest. This road is about 36 miles long and is good for the greater part. It is unnecessarily long, however, and a better shorter road will probably be cut out when the various parties interested get together.



On the Winter Road to Rice Lake, N. Man.

The road via Fort Alexander to Gold Lake is much shorter than the Manigotogan route. Owing, however, to the unusually heavy early snowfall the muskeg portions have proved a great obstacle, as the muskeg does not freeze readily under the snow. In consequence the road has not been passable for teams during December, although in excellent shape for dog trains. When the Fort Alexander route is in use the

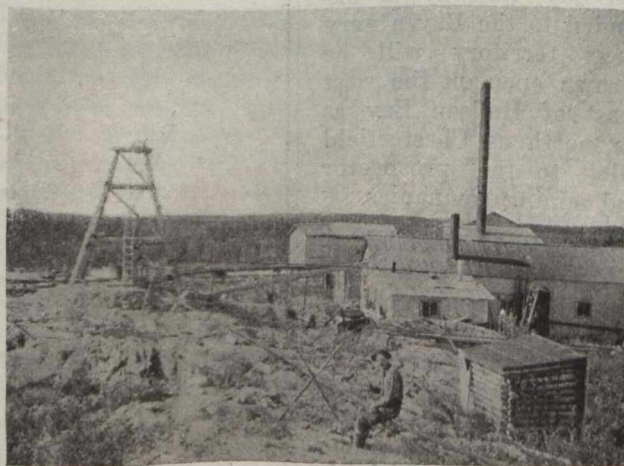


Prospectors at Rice Lake, N. Man.

Canadian National Railway branch line to Victoria Beach will be used to reach the district. A 14-mile winter road connects Mile 69 on the C.N.R. with Fort Alexander, a Hudson Bay port. From the Fort to Gold Lake is 44 miles. Once the muskeg is frozen this should be an excellent winter road.

### Gabrielle

It is expected that development work will soon be resumed at the Gabrielle Mine, Rice Lake. Mr. J. B. Tyrrell of Toronto examined this property a few months ago and reported that the veins examined deserve careful and thorough exploration. He has recommended that the two shafts be deepened to 100 ft. His sampling of surface exposures showed ore of good width and value. Major Pelletier is at present at the property getting necessary information in preparation for the work to be done.



The Gold Pan Mine, Rice Lake, N. Man.

**Gold Pan**

The Gold Pan workings have been pumped out and one machine is in operation. Mr. Gordon McTavish, secretary of the operating company, visited the property recently. The Gold Pan has some very rich ore in the vicinity of the shaft. This shaft is 265 ft. deep, and the vein looks well in the lower workings. Development to date has all been close to the shaft.

**Pan Extension**

The Pan Extension Gold Mines Co., Ltd., has raised funds which will enable the company to proceed at once with development work on the properties near the Gold Pan Mines. Machinery for shaft sinking has been purchased and arrangements are being made to take in supplies and commence work. Mr. J. A. Borthwick has been appointed superintendent and he will leave Winnipeg shortly for the property, where work on the construction of the necessary camp buildings will be begun as soon as possible.

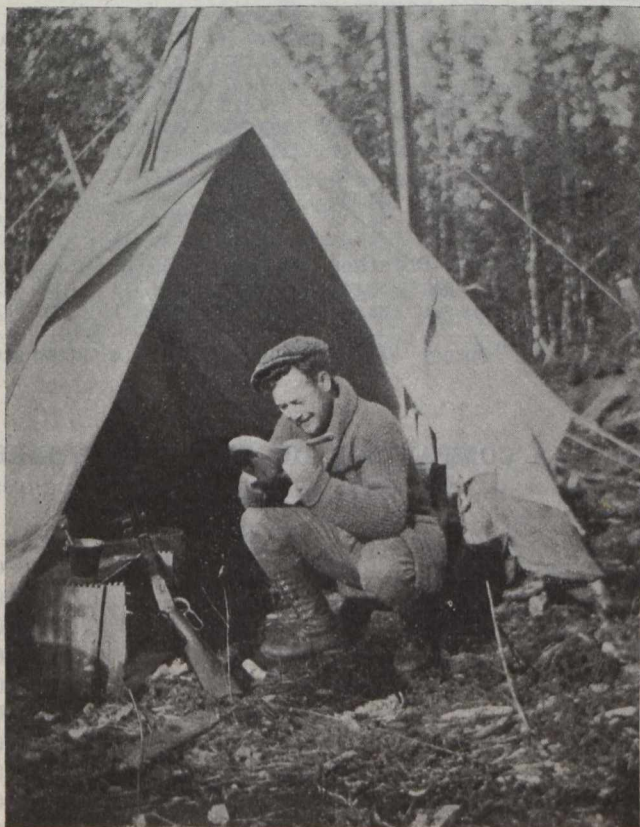
**Turtle Lake**

During the past summer a number of discoveries were made in the vicinity of Turtle Lake, a few miles west of Gold Lake. Arrangements have been made for the development of some of these claims.

**New Companies Formed**

The Mammoth Mining Corporation, Ltd., capitalized at \$5,000,000, has applied for a charter for operating in Manitoba mining areas.

The Bonanza Mining Corporation, capitalized at \$2,500,000, has applied for a charter. The applicants are interested in properties in the vicinity of Little Rice Lake.



Panning Gold at Rice Lake.  
"The pure quill."

**The Marigold**

The Marigold Gold Mining Co. will begin work shortly on its claims in Rice Lake District. This company has five claims: The Marigold, Gold Fly, Gold Star No. 1, Antique and Ione. Most of the prospecting work so far done has been on the first two claims.

**Northern Manitoba Mining and Development Co.**

This company's property consists of five claims adjoining the Rex property in the Herb Lake district, Northern Manitoba. It is 21 miles from mile 82 on the Hudson Bay Railroad. There is a wagon road of 11 miles to the lake. Boats are used for the remaining 10 miles.



"The Cook and the Mate and the Captain bold, and the Crew of the Brooklyn Mine" Rice Lake, Man.

There is a shaft 125 feet deep and the vein is said to continue strong and well defined at that depth. Arrangements have been made for the cutting of wood for fuel and mine timber this winter and mining and milling machinery will be taken in early in 1920. The North Canada Exploration Co. of Winnipeg has undertaken the financing of the company and will equip, develop and manage it. The Exploration Company has agreed to spend \$60,000 on the property.

The directors of the Northern Manitoba Mining Development Co. are: Robert Kerr, president; Major A. Bingham, H. S. Johnson, J. P. Gordon, W. H. Bunting, G. R. Bancroft and C. B. Morgan.

The directors of the North Canada Exploration Co. are: J. F. Caldwell, president; W. F. Hull, Ward Hollands, Capt. George B. Hall, Richard Bingham, T. E. Redman and Robert Kerr. C. W. Chappell is secretary and treasurer.

**RIP VAN W. AWAKENING**

The east is awake! The evidence say you? Here it is; fresh from the page of the Canadian Mining Journal, a sane and reputable organ not given to exaggeration or brain storm: "The growing importance of Manitoba is reflected in the rise of the combined curve of the Prairie Provinces and the Yukon, but the scale is too large to show how Manitoba is making up for the falling off in the Yukon gold production." This estimable journal then goes on to say: "We venture to forecast that some day the value of the coal production of Alberta alone will exceed the value of the mineral production of any other single province of Canada, unless maybe, it shall be British Columbia." Thus the west cometh into its own.—Manitoba Free Press.

**COAL OUTPUT DURING 1919.**

By JOHN McLEISH.

Chief of the Dept. of Mineral Statistics, Ottawa, in the Toronto "Globe".

Canada's coal production during 1919 has probably been about 13,000,000 tons. This is rather disappointing when compared with the 1918 figures, for it shows a reduced output of about 13 per cent. Strikes chiefly, also lack of tonnage for the transportation of coal, thus cutting down the market, together with minor causes, have been responsible for the falling off. Another noteworthy feature of the year's showing is that Alberta, which in 1918 wrested from Nova Scotia the laurels for production, slumped badly during 1919. Indeed at the end of October it had only produced seven-tenths as much as the Province by the sea, and the indications were that this ratio of loss would be pretty well maintained until the end of the year.

This reduction in output is disappointing for the further reason that during the war, and in spite of the fact that thousands of experienced miners were overseas, the production of coal advanced steadily, as the following figures show:

**MONTHLY PRODUCTION OF COAL IN CANADA BY PROVINCES, 1919.**  
(Short Tons.)

Month.	N.S.	N.B.	Sask.	B.C.	Alta	Total Canada.
January.....	503,152	21,674	27,877	240,199	491,247	1,284,149
February.....	407,122	15,999	23,900	182,454	419,335	1,048,810
March.....	421,696	13,800	25,975	209,524	497,673	1,168,668
April.....	457,237	12,359	15,829	183,635	318,554	987,614
May.....	453,338	11,796	18,409	181,003	264,260	928,806
June.....	434,029	12,641	19,024	124,098	40,596	630,388
July.....	462,471	13,179	17,839	151,024	55,045	699,558
August.....	478,561	14,936	22,016	164,501	146,585	826,599
September.....	498,703	12,834	30,042	226,096	499,014	1,209,709
*October.....	537,947	14,471	30,000	245,000	579,500	1,406,918

\* The Alberta and British Columbia returns are based on carefully-prepared estimates.

**MONTHLY PRODUCTION OF COAL IN CANADA BY PROVINCES, 1918.**  
(Short Tons.)

Month.	N.S. (b)	N.B. (b)	Sask. (c)	B.C. (c)	Alta	Total Canada.
January.....	506,961	24,004	37,890	242,767	610,439	1,422,061
February.....	435,926	22,155	41,182	216,657	468,738	1,184,658
March.....	441,771	25,388	18,119	227,472	427,251	1,140,001
April.....	463,065	22,953	16,331	223,359	386,831	1,112,539
May.....	473,504	23,624	21,947	227,361	418,811	1,165,247
June.....	380,857	23,783	23,480	229,288	503,312	1,260,720
July.....	489,395	18,886	29,266	227,467	550,782	1,315,796
August.....	516,218	28,611	24,433	231,200	558,374	1,361,736
September.....	494,113	24,277	25,899	147,689	537,593	1,229,571
October.....	586,904	18,064	31,706	211,548	555,502	1,403,724
November.....	478,584	17,806	38,616	176,616	444,372	1,155,892
December.....	451,264	18,661	38,080	207,165	510,811	1,225,981
Totals.....	5,818,562	268,212	346,847	2,568,589	5,972,816	*14,977,926

\* Includes 2,900 tons produced in the Yukon district.

(b) Bituminous. (c) Lignite.

**MINERAL PRODUCTION IN CANADA DURING 1919 WITH A COMPARISON OF PREVIOUS YEARS**

Compiled from the records of the Division of Mineral Resources and Statistics, Ottawa. 1919 figures approximate.

	1913	1917.	1918	1919.
Coal short tons .....	15,012,178	14,046,759	14,997,926	12,500,000
Gold value in dollars .....	\$ 16,598,923	\$ 15,272,992	\$ 14,463,689	\$ 16,275,000
Silver—ounces .....	31,845,803	22,221,274	21,383,979	13,500,000
Copper—pounds .....	76,976,925	109,227,332	118,769,434	81,500,000
Nickel—pounds .....	49,676,772	84,330,280	92,507,293	43,000,000
Lead—pounds .....	37,662,703	32,576,281	51,398,002	50,000,000
Zinc—pounds .....	7,069,800	64,655,713	38,083,175	38,000,000
Pig Iron—short tons .....			1,195,551	920,000
Steel Ingots and Castings .....	1,128,976	1,170,480	1,873,708	1,020,000
Electric Furnace Steel (included in above)		13,691	119,130	(?)15,000
Total Value of Mineral Production in Canada—not a total of foregoing figures....	\$145,634,812	\$189,646,821	\$211,301,897	\$167,000,000

	Tons.
1919 .....	13,637,529
1915 .....	13,267,023
1916 .....	14,483,395
1917 .....	14,046,597
1918 .....	14,979,926

Of course it was the increased production in Alberta that made this possible, the output in that Province having gone from 3,683,015 tons in 1914 to 5,927,816 tons in 1918.

**A Serious Loss.**

The effect of a loss of at least 2,000,000 tons on the year's coal production was a serious matter, and the resulting situation was accentuated by the strike among the bituminous coal miners in the United States. Last year, even with a production of practically 15,000,000 tons, Canada had to import over 21,000,000 tons during the financial year that ended on March 31st, 1919.

The appended tables tell the story of the year's production, and they contrast it with the production for 1918:

# Mining in British Columbia During 1919

By Our Victoria Correspondent

## A Year of Preparation for the Future

One of the Provincial Government Mining Engineers, in commenting on the progress of the mining industry in British Columbia during 1918, observed that, from the viewpoint of production, it was a period of "marking time," but, if looked at with an eye to the future, "it had been one of the most eventful and encouraging twelvemonths in the history of the Canadian Northwest."

This about sums up the situation. From figures available from the various producing properties for part of the year there can be no doubt that in respect of most of the chief economic metals there has been a distinct shrinkage as regards output. It is possible that the estimates made of the production from the last date on which authentic statistics were to be obtained to the end of the year will be proven at fault. Consequently it is not improbable that final information will not indicate so considerable a decline in the production of gold, silver, copper and lead.

It is unnecessary to more than draw attention in passing to the world's market conditions as compared with those of the previous year as unquestionably having been responsible, in a large degree, for the 1919 results. These, however, were augmented by local occurrences having the effect of retarding production. As to copper, it need only be said that the Phoenix Mines and the Grand Forks Smelter were closed entirely by the Granby Consolidated Mining & Smelting Co. some months ago. To this may be added that the same Company, the largest copper producer of the Province, owing to labor troubles and for other reasons, is estimated to have turned out nearly 10,000,000 lbs. less of the metal at its Anyox plant. When the war ended the Consolidated Mining & Smelting Company had a surplus of lead so that it is not surprising that a material drop in the quantity of the output is indicated. There is some satisfaction, under the circumstances, in being able to show that the East and West Kootenays, evidently, have topped the 1918 mark substantially in regard to the zinc output. It is to be noted, however, that the Sullivan Mines, the greatest single zinc producer of the Province, still is limping along as the result of a strike of its miners and it is possible that this will to some extent upset calculations.

With reference to the precious metals, while the outlook is bright as to silver, the opening of the Salmon River Section of the Portland Canal District, where is situated the Premier Mine, being sure to be felt next year, the returns thus far received do not reflect the general revival of interest in all properties carrying this metal. The chief cause of this is found in the situation in the Sloean Mining Division, where the Standard, which has been shipping only zinc concentrates, to instance one of several properties, has ceased production. The withdrawal of this large producer, and of others of the area, from the actively producing class has not been neutralized in its effect by the contributions of the new northern section, as yet comparatively small, or by those of scattered but numerous small shippers, which are starting in a small way throughout all the mining districts, the incentive, of course, being the high price of silver. Of gold it

is sufficient to say that the handicap confronting those engaged in its production elsewhere applies with equal force in British Columbia, although, notwithstanding high costs, more placer ground is being taken up in the Cariboo and in little prospected parts of the Far North, and there is lode mine development under way of a promising nature in several districts.

Generally 1919 does not appear to have been a record breaker by any means as to production. It has, however, been exceptional in the interest displayed in mining; in the development that has been initiated with splendid results; in the discovery of a new mineralized zone having rare possibilities; and in the encouragement the year's achievements have given all interested in the industry. The fact that the production seems to have dropped is forgotten in contemplation of the sure foundation that is being laid for the future.

## Estimate of Total 1919 Production of B. C. Minerals (Exclusive of Coal)

An estimate of the Mineral Production of the Province of British Columbia for 1919, with that of 1918 for comparative purposes, is subjoined:

	1918	1919	Comparison
Gold oz. ....	180,674	150,050	30,624 (dec.)
Silver oz. ...	3,498,172	3,261,267	236,905 (dec.)
Copper lb. ...	61,485,754	46,546,815	14,936,939 (dec.)
Lead lb. ....	43,899,661	17,804,470	26,095,191 (dec.)
Zinc lb. ....	41,772,916	43,649,700	1,876,784 (inc.)

## Estimate of Mineral Production by Districts

Estimated production for 1919 and comparison with that of 1918 by districts as defined by the Mineral Survey & Development Act:

No. 1: Comprising the Mining Divisions of Bella Coola, Queen Charlotte, Skeena, Portland Canal, Naas River, Atlin, Stikine and Liard. George A. Clothier, Government Mining Engineer.

	1918	1919	Comparisons
Gold (placer)			
Atlin and Liard			
Mng. Divisions			
.....\$	219,000	\$ 189,000	\$ 30,000 (dec.)
Gold (lode) oz.	47,993	59,729	11,736 (inc.)
Silver oz. ....	415,280	905,685	490,405 (inc.)
Copper lb. ...	30,198,782	20,670,685	9,528,097 (dec.)

No. 2: Comprising the Mining Divisions of Omineca, Quesnel, Cariboo and Peace River. J. D. Gallo way, Government Mining Engineer.

	1918	1919	Comparison
Gold oz. ....	5,385	5,700	315 (inc.)
Silver oz. ....	84,125	90,000	5,875 (inc.)
Lead lb. ....	123,568	100,000	23,568 (dec.)
Copper lb. ....	643,843	12,000	631,843 (dec.)
Zinc lb. ....	313,112	300,000	13,112 (dec.)

No. 3: Comprising Mining Divisions of Clinton, Lillooet, Kamloops, Ashcroft, Nicola, Vernon and Yale. R. W. Thomson, Government Mining Engineer.

	1918	1919	Comparison
Gold oz. ....	3,288	3,200	88 (dec.)
Silver oz. ....	negligible	6,600	6,600 (inc.)
Copper lb. ....	531,000	520,000	11,000 (dec.)
Magnesium			
Sulphate tons	150	- 650	500 (inc.)

No. 4: Comprising Mining Divisions of Grand Forks, Osoyoos, Greenwood and Similkameen. P. B. Freeland, Government Mining Engineer.

	1918	1919	Comparison
Gold oz. ....	53,654	33,000	20,654 (dec.)
Silver oz. ....	227,244	203,000	24,244 (dec.)
Copper lb. ....	9,940,125	3,990,000	5,950,125 (dec.)
Lead lb. ....	47,738	34,500	13,238 (dec.)
Fluorite tons ...	170	650	480 (inc.)
Limestone tons .	2,000	16,300	14,300 (inc.)

No. 5: Comprising the Mining Divisions of Golden, Windermere, Fort Steele, Revelstoke, Lardeau, Ainsworth, Slocan, Slocan City, Trout Lake, Nelson, Arrow Lake and Trail Creek, generally referred to as the East and West Kootenays. A. G. Langley, Government Mining Engineer.

	1918	1919	Comparison
Gold oz. ....	51,020	35,771	15,249 (dec.)
Silver oz. ....	2,650,918	1,945,982	704,936 (dec.)
Lead lb. ....	43,728,355	17,669,970	26,058,385 (dec.)
Copper lb. ....	1,685,299	1,354,130	331,169 (dec.)
Zinc ....	41,459,804	43,349,700	889,896 (inc.)

No. 6: Comprising the Mining Districts of Alberni, Clayoquot, Quatsino, Nanaimo, Victoria, Vancouver and New Westminster.

	1918	1919	Comparison
Gold oz. ....	5,565	3,200	2,355 (dec.)
Silver oz. ....	116,425	110,000	6,425 (dec.)
Copper lb. ...	18,475,013	20,000,000	1,524,987 (inc.)

All of the above for 1919 is production of the Britannia Mines, Ltd., Howe Sound.

Approximately 600 tons of Manganese Ore has been shipped from the "Hill 60" property, near Cowichan Lake, Vancouver Island.

**Coal Production During 1919—Slight Decline—Due to Labor Troubles**

The coal production for the Province of British Columbia for 1919 is expected to show a decline of approximately 94,640 tons, the total for this year being estimated as being approximately 2,412,548 tons, as compared with 2,578,724 tons in 1918. In glancing at the figures which, it should be remembered, are made up of a combination of what is known of the output of the various collieries up to the end of the month of October and an estimate of that of November and December, it will be found that the collieries of Vancouver Island are the only ones which show an increase, with the exception of the Telkwa Colliery, northern British Columbia, the production of which is inconsiderable. This result is the more satisfactory in view of the fact that the larger companies lost considerable time during the Summer for various reasons and that one of the mines of the Canadian Western Fuel Company was closed down for a period. While the increase was not great, about 32,459 tons, it indicates that the trend is upward, forecasting which is commonly believed is imminent, namely, a more intensive development of the coal fields of the Island in the future. The decrease in the production of the Crow's Nest Coal Field, amounting to about 171,722 tons, was expected, as the mines of the Crow's Nest Pass Coal Company were unproductive for a period early in the year as a result of a strike.

Following are the detailed figures:

**Coal Production 1919**

Coal Creek .....	229,615			
Estimated .....	80,000	309,615		
Michel .....	128,547			
Estimated .....	44,000	173,547		
Corbin .....	54,980			
Estimated .....	24,000	78,980		
Total Crows Nest Pass District .....		561,142		
Telkwa .....	1,340			
Estimated .....	400	1,740		
<b>Nicola-Princeton District</b>				
Middlesboro Collieries Co. ....	62,780			
Estimated .....	20,000	82,780		
Fleming Coal Company .....	32,380			
Estimated .....	6,000	38,380		
Merritt Collieries .....		1,037		
Coalmont Collieries .....	9,266			
Estimate .....	800	10,066		
Princeton Coal & Land Co. ....	15,133			
Estimate .....	4,400	19,533		
Total for District .....		150,996		
<b>Vancouver Island</b>				
Canadian Western Fuel Co. ....	526,171			
Estimate .....	110,000	636,171		
Canadian Collieries, Comox .....	456,588			
Estimate .....	90,000	546,588		
Canadian Collieries, Extension .....	189,218			
Estimate .....	36,000	255,218		
Canadian Collieries, South Wellington. ....	69,005			
Estimate .....	14,500	83,505		
Pacific Coast Coal Mines, Ltd. ....	55,149			
Estimate .....	10,000	65,149		
B. C. Coal Mining Co., Jingle Pot ..	29,739			
Estimate .....	7,000	36,739		
Nanoose Collieries Co. ....	17,303			
Estimate .....	8,000	25,303		
Granby Cons. M. S. & P. Co. ....	56,235			
Estimate .....	24,000	80,235		
Total Vancouver Island .....		1,698,670		
Total for Nicola-Princeton District .....		150,996		
Total for Crows Nest Pass District .....		561,142		
Total for Northern (Telkwa) District .....		1,740		
Total for Vancouver Island District .....		1,698,670		
Total for Province .....		2,412,548		
<b>Comparison</b>				
	1918	1919	Decrease Increase	
Vancouver Island	1,666,211	1,698,670		32,459
Nicola-Princeton	179,179	150,996	28,183	
Crowsnest Pass	732,864	561,142	171,722	
Telkwa .....	470	1,740		1,270
	2,578,724	2,412,548	199,905	33,729

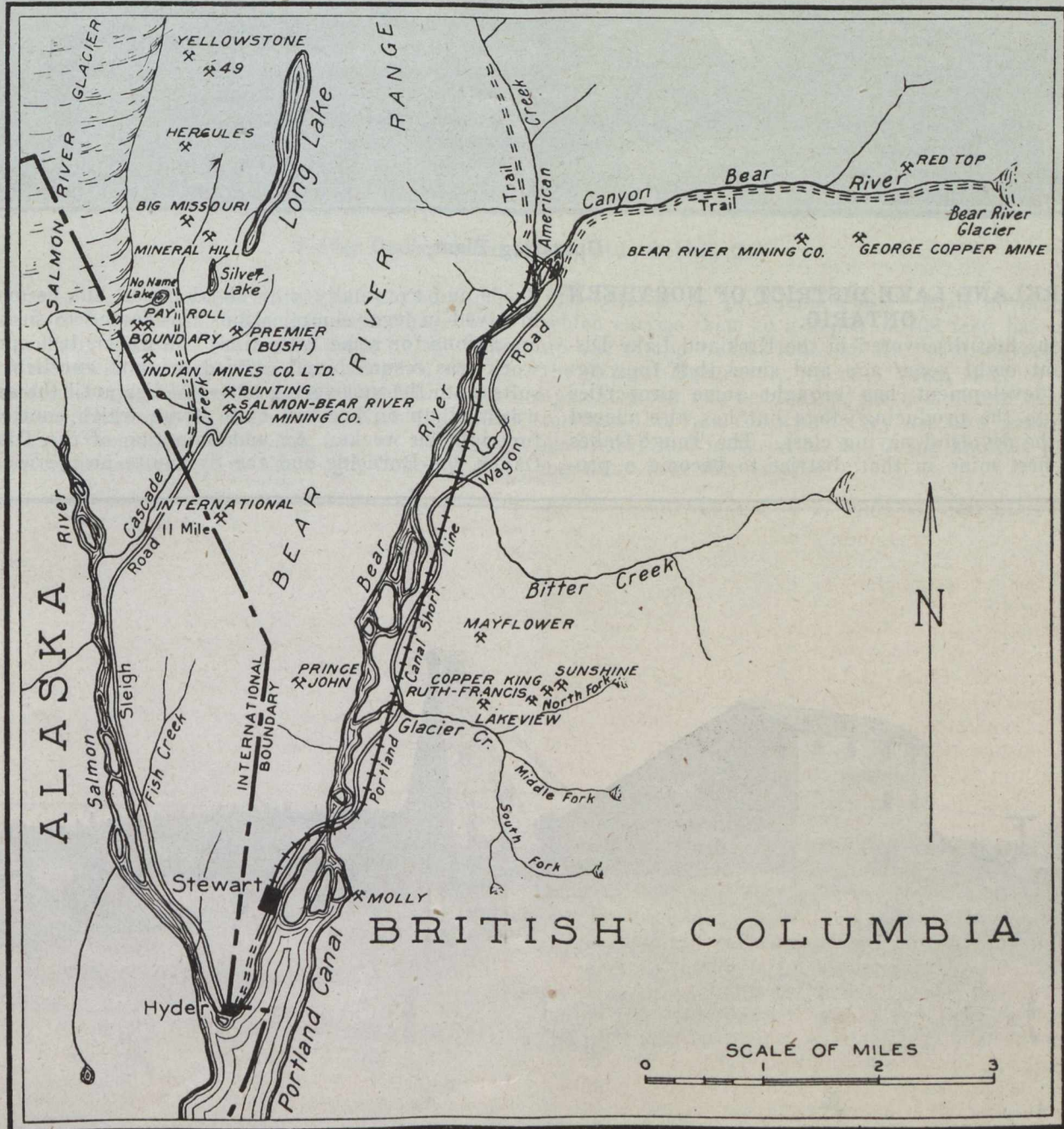
	Coal made into coke	Coke made
Coal Creek .....	20,915 tons	13,271 tons
Michel .....	74,718 tons	46,831 tons
Cumberland .....	33,710 tons	20,225 tons
Granby, Estimated ..	24,000 tons	14,000 tons
	<hr/> 152,343 tons	<hr/> 94,327 tons
1918		
Coal made into coke ...	276,479	188,967
Decrease—	94,640 tons	

**Northwestern District Has Some Remarkably Promising Mines**

Summing up the outstanding features of the mining situation in his District, at the close of 1919, G. A. Clothier, Government Engineer for the Northwestern Mineral Survey District, refers to the far-reaching effects that may be expected from the fact that the

American Smelting & Refining Company has become interested in the Premier Gold Mining Co., Salmon River. He speaks, too, of the wonderful showing made by the Taylor Engineering Company on the Dolly Varden Mine, Alice Arm, and of the *immense potentialities* of the Kitsault Valley. Other impressive facts to which attention is drawn are the 25 per cent increase in the production of gold in the district and the remarkable jump in silver output amounting in quantity to 120 per cent and in value to even more comparatively.

It is the opinion of Mr. Clothier that 1919 has been a crucial year for the mining industry in this Province, and especially for the northwestern section. Prospected areas have been thoroughly examined and investigated by the most competent mining engineers in the profession, many of them representing the  
(Continued on Page 18.)



**A New Map of the Stewart District of British Columbia.**  
—by courtesy of Mining & Scientific Press.



Operating Plant.

Beaver Consolidated Mines, Ltd., Cobalt, Ont.

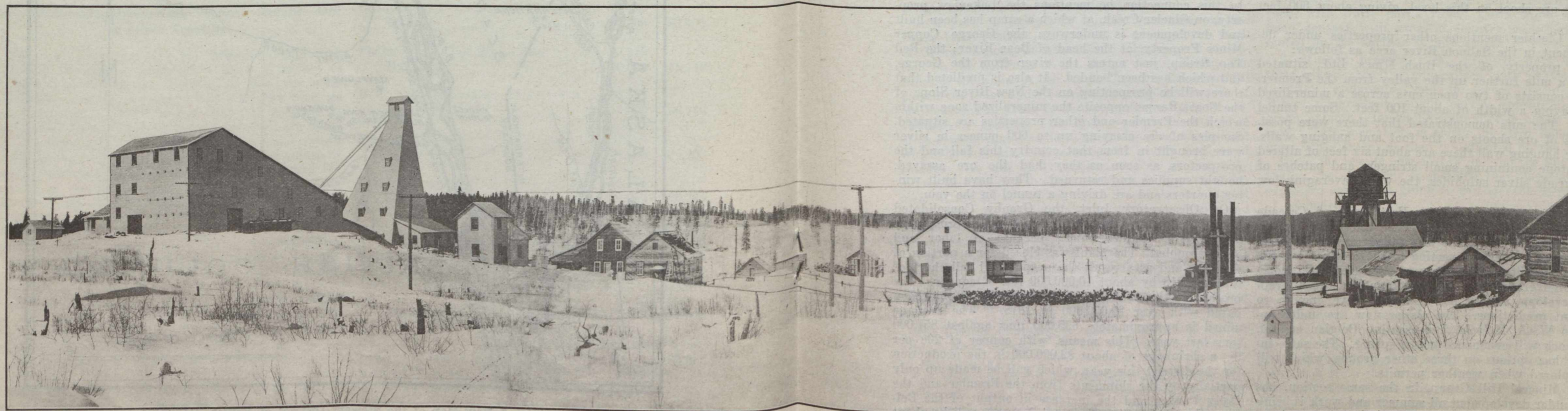
**THE KIRKLAND LAKE DISTRICT OF NORTHERN ONTARIO.**

Gold was first discovered in the Kirkland Lake District about eight years ago and since that time aggressive development has brought some properties not only to the producing stage but has also placed them in the dividend paying class. The Tough-Oakes was the first mine in that district to become a pro-

ducer and eventually a dividend payer, but becoming involved in legal complications was forced to suspend operations for some little time. However, last spring work was resumed and carried on with excellent results as to the uncovering of ore bodies until the camp was tied up on account of a strike which continued for eighteen weeks. An amalgamation of the Tough-Oakes, the Burnside and the Sylvanite properties has

been contemplated but as yet a deal has not been perfected. In the meantime other properties have been doing excellent work and the record made by the Lake Shore Mine spells success. The Teck-Hughes, one of the oldest operating mines in the Kirkland Lake district, is also producing regularly. The Kirkland Lake Gold Mining Company, which has one of the finest and most up-to-date plants in the North Country, has

just entered the producing class. Their development, which carries them to a depth of 700 feet, has proven up one of the richest lodes of ore yet discovered. At the Wright-Hargraves, where a great deal of development work has been done, the completion of a 200-ton mill this fall, for which they are now getting the machinery and material in, will bring another producing mine into this camp.



Operating Plant.

Kirkland Lake Gold Mining Co., Kirkland Lake, Ont.



(Continued from Page 15.)

strongest mining and financial companies on the continent. That their verdict has been favorable is shown in the number of properties taken under option and the amount of capital expended in preliminary development work.

Discussing the Portland Canal District, with particular reference to the Salmon River Zone, Mr. Clothier expresses the opinion that it will take at least another season to conclusively prove which of the properties now under development will make the mines. There, however, will be no fact of capital to facilitate the demonstration. The chief cause of the keen interest displayed is attributed to the phenomenal development of the Premier Mine, the results of which confirm the general opinion of Mining Engineers who have examined it, viz., that it will become one of the great gold-silver producers of the continent. The fact that the American Smelting & Refining Company has purchased a 40 per cent interest in it for \$2,000,000, after exhaustive examinations by their engineers, demonstrates the position it has taken in the mining world. This transaction, it is ventured, should assure the complete investigation and development of the entire section. Mr. Clothier proceeds to outline present conditions at the Premier Mine, stating that there is a first class sleigh road to the property from the beach; that further equipment is being added this winter to carry on development on a large scale; that a snow tractor will be tried out for haulage; and that an adequate equipment of teams and sleighs are on the ground ready to move ore as soon as snow conditions permit. All ore is to be extracted from the upper tunnel. Development will be continued in No. 2 Tunnel and a compressor plant installed at the mouth of the Plate Tunnel for its further advancement. This tunnel has been driven 600 feet towards the showing in the upper tunnel and, it is expected, will be continued in the hope of picking up the ore shoot on this level, giving about 600 feet depth.

Mr. Clothier mentions other properties under development in the Salmon River area as follows:

The property of the Bush Mines, Ltd., situated about a mile further up the valley from the Premier. Work consists of two open cuts across a mineralized belt having a width of about 100 feet. Some tunnel work. The cuts demonstrated that there were possibilities of ore shoots on the foot and hanging walls. On the hanging wall there are about six feet of altered greenstone containing small stringers and patches of high grade silver sulphides, the whole averaging low grade.

The Spider Group, on the East Fork of Cascade Creek, bonded first to Messrs. Trite and Wood, owners in the Premier Mine, but who failed to exercise their option, the property reverting to the original owners, Messrs. Hamilton and Larsen, of Stewart, B. C. Some very high grade silver ore was found in a small vein but development has not been extensive enough to warrant predictions. The claims now are under option to W. A. Meloche, representing Belgian capital, and work will commence in the spring. The same investor has options on three other groups, which will be explored when weather permits.

The Mineral Hill Group, in the same section, has been under development all summer and work is being continued this winter. There are several fine showings of high grade ore on the surface and several hun-

dred feet of underground work have been driven under these showings. While the results have not been favorable as far as the uncovering of high grade ore is concerned, the probability of proving a sufficient tonnage of milling grade ore to warrant the installation of a concentrator are good. The property is under bond to Messrs. Welch, Fetter, Carlton and associates of Seattle, Wash.

The E. Pluribus and Laura, of the Big Missouri Group, adjoining Mineral Hill. This property was optioned by Sir D. D. Mann. Nine or ten holes were drilled by diamond drill this summer. A tunnel was driven 30 feet and is being continued. The results of the drilling are not known but it is assumed that they were satisfactory as it is proposed resuming drilling on other portions of the property next year. The Big Missouri has been examined by many engineers and the general opinion is that, with proper metallurgical process for the ore, it would make one of the biggest producers of the country.

The Unicorn Group, lying north of Mineral Hill, has been opened up by considerable surface work. The open cuts show good looking ore.

The 49 Group, in the same district, is under bond to S. Silverman and associates. A good camp has been established, the necessary lumber and material being packed by horse from the beach. A tunnel is being driven diagonally across the big ore showing, cropping on the 49 Claim, which should develop a large tonnage of milling grade ore as well as some shoots of high grade. A new vein on the Occidental Claim is being explored with a tunnel which now is in about 50 feet, showing from a foot to three feet of shipping ore. There is a considerable surface showing north of the latter which has not yet been touched but which should develop a big tonnage of at least milling ore.

It is prophesied by Mr. Clothier that there will be much work done up the Bear River Valley next year. In this connection he mentions the Lakeview property, on Glacier Creek, at which a camp has been built and development is underway; the George Copper Mines Property, at the head of Bear River; the Red Top Group, just across the river from the George, and which has been bonded. It also is predicted that there will be prospecting on the Nass River Slope of the Coast Range, opposite the mineralized zone within which the Premier and other properties are situated. Samples of ore assaying up to 600 ounces in silver were brought in from that country this fall and the prospectors, as soon as they had the ore assayed, bought supplies and returned. They have built winter quarters and are driving a tunnel on the vein.

On Observatory Inlet, the Granby Consolidated Mining & Smelting Co., Ltd., has not had as prosperous a year as heretofore, chiefly because of labor and other troubles. The plant was closed for a portion of the year and as a result the output will fall short of that of 1918 by about 10,000,000 lbs. of copper. The production this year will be about 20,000,000 lbs., compared with over 29,000,000 in 1918. The tonnage mined is approximately 655,000 tons against 857,000 tons last year. This means, with copper at 20c per lb., a shrinkage of about \$2,000,000 in the production for the district this year, which will be made up only partially by the shipments from the Premier and the Dolly Varden and the increase in output of the Belmont Surf Inlet Co. The total decrease will be about \$1,250,000.

### Alice Arm Section

Turning to the Alice Arm Section, it is observed by Mr. Clothier that the development of the Dolly Varden, the returns from the shipments it has made this summer; the ore proven by diamond drilling on the Wolf property, also belonging to the Taylor Mining Company; the opening up of such promising properties as the North Star, Tiger, Toric, Muckateer, Moose, Last Chance, Vanguard, Homestake and others prove conclusively the potentialities of this section.

Credit is given Major A. W. Davies, who has charge of operations for the Taylor Engineering Co., for his aggressiveness in putting the property in shape for shipping. Work was commenced in July and several thousand tons of ore had been shipped by the end of September. To accomplish this the railroad has to be completed for three or four miles, a tramway built from the mine to the railroad, power plant installed, ore bunkers built at the upper and lower terminals of the tram, a big bunk and cook house erected at the mine, and the mine itself put in shape for stoping.

Other properties mentioned are the Last Chance, on Trout Creek, and the Tiger Group, across the Kitsault River from the Dolly Varden, which are being diamond drilled. The Muskateer Group, adjoining the Tiger, which showed some very high grade in an open cut, and on which a contract has been let for 200 feet of tunnel work. The Climax, Moose and North Star Groups, the latter having been under development all summer and from which were shipped 30 tons of ore to the Granby Company's Smelter.

Referring to the Illiance River Section, Alice Arm, the activity of the United Metals Co., the owners of the Silver Bell Group and the Monarch Group, are noted. All are spoken of encouragingly. It is said that on the Silver Star Claims, lying across the creek from the United Metals, a tunnel was started on the vein last season. The vein was crosscut at the mouth of the tunnel, disclosing an exceptionally fine body of ore about 12 feet wide at that point.

In regard to the placer mining operations in the Dease Lake District, an account is given of the work of George Adams, of Atlin, B.C., who secured an option on the holdings of the Thiber Creek Mining Co. Finding the plant in bad shape through dis-use he repaired the flume and cleaned up a considerable area of old bed rock in order to move his sluices up to an advantageous position. He then washed an old piece of bed rock that had been partially cleaned up and which he was given to understand would yield good returns. He was badly disappointed in getting only 40 ozs. but decided to open a new pit on his own judgment of the lay of the bed rock. From this he cleaned up \$14,000. He now is planning extensive repairs and improvements and will take up the enterprise next season on a large scale.

The Atlin District has had a very dull year, owing to the lack of labor and the increased cost of production gold. The total placer yield for 1919 will be approximately \$175,000, compared with \$218,000 last year.

The Granby Company is continuing drilling on the Ecstall River Property and the work will be proceeded with next year.

The Belmont Surf Inlet Company have had a very successful year, judging from their output, which will exceed last year's by about \$120,000. This increase is made up of 3,750 ozs. of gold, about 1,000 ozs. silver and 220,000 lbs. copper.

### Middle Interior and Kamloops

An increase in the production of silver and a decline in that of copper, gold and coal is predicted by R. W. Thomson, Government Mining Engineer, in discussing the mining industry of his district comprising the middle interior of the Province with the City of Kamloops as its centre. He looks to the future optimistically, however, for the following reasons:

1st.—Activity in connection with the Snowstorm Group of Mineral Claims in the Highland Valley Section, Ashcroft Mining Division.

2nd.—The Whitewater Limonite occurrences in the Clinton Mining Division.

3rd.—The work in connection with the development of the Aspen Grove Copper Occurrences in the Nicola Mining Division.

4th.—The Ladner Creek Gold Bearing Argillite Belt in the Yale Mining Division.

With reference to the Snowstorm Group it is stated that diamond drill operations were started about the middle of January 1919 by the B. C. Department of Mines. Work was carried on through the summer under contract by the International Diamond Drill Contracting Company of Spokane, Wash., using a machine cutting a seven-eighths inch core. Eight holes were put down at dips varying between 30 and 60 degrees and running in lengths between 400 and 1125 feet, aggregating a total of 5,736 feet. The country rock is of a granitic nature with occasional indications of copper mineralization on the surface, but no particularly large well defined ore bodies showing. Out of the eight holes put down six passed through mineralized zones which indicated bodies of commercial ore not represented on the surface. In all the holes three typical rock formations were passed through which, in the absence of technical classification, are described as follows:

1—Granitic country rock.

2—Dark colored, fairly fine grained porphyritic rock, with white porphyrites. Cores show well defined contact with granitic country rock not represented on the surface to any extent.

3—Mineral bearing rock, grey to dark colored, some places sericitic, mineralized with chalcocite, pyrite, bornite (erubescite) and in places specular iron. Where mineralized usually carries considerable pale green epidote. Looks like an altered basalt or diabase. This formation is shown by drill holes to be much more extensive than is indicated on the surface.

From the results obtained to date on the Snowstorm Claims the statement is justified that there are very extensive ore bodies going to considerable depths and of commercial value.

### Limonite Deposits on Whitewater River

Wm. M. Brewer's report on the Limonite Ore Deposits of the Taseko (Whitewater) River is quoted to show that there would appear to be a large body of mineral of commercial value available. The importance of this is emphasized inasmuch as the mineral is what British Columbia has needed to flux with the magnetites of the Coast in the ordinary blast furnace. An Iron and Steel Industry, therefore, becomes practical, the only question being the provision of transportation from the deposits to the Pacific Great Eastern Ry. This problem is discussed by Mr. Thomson, using Mr. Brewer's observations as his basis. The Department of Mines intends taking up the whole question of the extent and quality of the deposits as

soon as the weather permits in 1920. The Geological Survey of the Dominion Government is expected to send one of its geologists into the district to investigate and prepare a further report. Other engineers will consider the transportation phase of the situation.

Considerable interest attaches to the Aspen Grove District by reason of the fact that operations now are underway which will determine whether or not all of the numerous low grade copper showings of this vicinity have sufficient body to justify the statement that a real mine can be developed. During the autumn of 1918 options were taken on a large number of claims (approximately seventy-five) by strong financial interests represented by Joseph Errington. During the past summer Mr. Errington has had very thorough geological and petrographical investigations carried out in connection with the geology and rock genesis of the district. As a result it was decided to thoroughly explore the field by diamond drilling and no time was lost in starting. Two drills have arrived for this work, a camp has been erected including an assay office.

Ladner Creek runs south easterly to the Coquihalla River which it joins about sixteen miles above Hope. This creek traverses a series of argillites which are ascribed generally as belonging to the Cache formation. This argillite belt appears to be of considerable width and extends north westerly to Siwash Creek on which the Emigrant Mine is situated. The Emancipation Mine on the north slope of the Coquihalla Valley also is situated on the same belt. Numerous occurrences of quartz either of lenticular or vein conformation are present throughout this whole argillitic formation and a number carry gold values of commercial importance.

The Pioneer Mine, Cadwallader Creek, is mentioned as the only producer of importance in the Lillooet Mining Division. Up to the end of the month of October the recovery was approximately 2450 ounces of gold. This is the property reported recently to have been acquired by the Mining Corporation of Canada. In the same section the Lorne Mine, the Ida May and other properties are under development.

The Iron Mask Mine, Kamloops Mining Division, has been working steadily throughout the year and its production is placed at the same as 1918, namely, half a million pounds of copper. The Lydia Group, Queen Bess Mines Co., Ltd., the Copper King and Camp McLeod Group and the War Colt Group are mentioned as having been developed to a considerable extent, although output was negligible.

Work on the Donohoe Mines, Stump Lake, is mentioned in connection with the Nicola Mining Division. The workings of the Joshua Shaft have been unwatered to below the 400 foot level, exposing considerable bodies of ore ready for stoping. A small shipment of ore has been made and it is the intention of the management to continue shipping the better grade ore, at the same time installing a new concentrating plant. The Mary Reynold Mine in the same section has been opened up by R. R. Hedley, development consisting of: deep open cutting, 60 feet; tunneling, 140 feet; drifting, 74 feet; raising, 30 feet. There has been a shipment of 97 tons and 33 tons are in transit.

#### District No. 4

Commenting on conditions in District No. 4, comprising Mining Divisions of Grand Forks, Greenwood, Osoyoos and the Similkameen, it is stated by P. B.

Freeland, Government Mining Engineer, that there have been no new discoveries of note during the past year, probably because prospectors are scarce and large areas are covered by Crown Granted Mineral Claims. The latter ground has been neglected by reason of the fact that the owners seem to have lost interest and newcomers generally avoid such sections. Some of these, Mr. Freeland observes, are well mineralized and though the ores are somewhat complex, the present facilities for power, transportation and new methods of concentration, might make them attractive to capital, providing an area large enough for operating purposes could be acquired at a reasonable figure. The mining industry as a whole in the District is said to be affected by a "marking time" period, during which experimentation is going on to demonstrate the possibilities of ores which hitherto have been too complex for self smelting.

The Copper Mountain Group of Mineral Claims on Copper Mountain. Canada Copper Co., Ltd., is referred to as one of the largest mines of the section. Approximately twelve million tons of low grade copper-gold ore have been blocked out. Active operation has been delayed because of the strike of workmen employed on the construction of the railway between Copper Mountain and the town of Princeton. The 2,000 ton concentrator at Allenby, B. C., which is to treat the Copper Mountain ores, is practically complete. It is probable that the railway will be finished in the early part of 1920, when the mine will commence operation.

The Granby Consolidated Mining & Smelting Co.'s mines at Phoenix produced 142,546 tons of low grade copper-gold ore from January 1st to June 18th, 1919, when the mine closed down on account of a strike at the coal mines of Fernie, which created a shortage of coke at the smelter. This mine has continued closed up to the present time. The cessation of mining at Phoenix has reduced the output of copper in the district to practically nil, and also cut down the production of gold and silver to a considerable extent. It has been reported that mechanical means may be resorted to in the concentration of the ores remaining in the mines at Phoenix.

One of the year's outstanding events has been the development and construction of the Rock Candy Mine and Mill on Kennedy Creek near the north fork of the Kettle River by the Consolidated Mining & Smelting Co. of Trail, B. C. In the mine the following development was done: Drifting, 170 feet; crosscuts, 25 feet; open cuts, 20 by 15 feet. The mill, built about two miles north of Lynch Creek Station on the Kettle Valley Ry., has a capacity of 100 tons a day. The concentration of fluorite is accomplished by screening and depreciation of material in kilns, heated with oil flares.

Some activity has been manifested on Wallace Mountain, Beaverdell, where several new leads of high grade silver-lead ore were discovered. Further development on the Rob Roy opened up two new leads of high-grade silver ore.

A 75-ton ball mill and oil flotation plant is in course of construction at the Carmi Mine, Carmi.

In spite of the high price of platinum, only a few ounces of the metal have been placed in the Tula-meen.

There will be a decline in the production of all minerals except Fluorite.

**District No. 5**

That section of British Columbia most developed as to its mineral resources, and from which comes a very large proportion of the provincial output, is included in what is known as District No. 5. This embraces the East and West Kootenays and many of the best known Mining Divisions. Within its boundaries are the Trail Smelter of the Consolidated Mining & Smelting Company, the Slocan, Rossland, Nelson and other mining centres of note, as well as the Crows Nest Pass Coal Field.

A. G. Langley, Government Mining Engineer, is of the opinion that the production, within the District confined, of gold, silver, and lead will show a decline in 1919 as compared with the previous year. Zinc production has been maintained principally by the Sullivan Mine, the output of which would have been considerably greater had it not been for a strike called by the One Big Union, which resulted in the property closing down on September 12th last, and the "walk out" of over 200 men. The balance of the zinc produced in the District is derived from the mines of the Slocan and Ainsworth Divisions. This is in the form of concentrates from the silver-lead-zinc ores and invariably carries high silver values. As the Trail Smelter has not been accepting zinc ores until quite recently, the bulk of this material has been shipped to the United States, which is possible only on account of the silver content. Since the closing of the Sullivan Mine, the Consolidated Mining & Smelting Co. has been confronted with the alternative of closing down its zinc plant or buying custom zinc. The latter course was chosen and recently, it is reported, zinc ores have been purchased in the Slocan.

The Slocan Mining Division is the largest silver producing area in the Province so that the output of silver can be gauged by its activities. Although information regarding shipments is not yet to hand, it is considered safe to predict that the production will show a decline as against 1918. One of the reasons for this is the depletion of high grade ore in the Standard Mine at Silverton which in past years has been by far the largest shipper. The comparative inactivity at the Galena Farm, Van Roi and Hewitt properties will have its effect as will the fact that the Surprise Mine, the largest shipper in 1918, probably will show a falling off in the value of its output. The Queen Bess is in the same position. These statements, however, are based on surmise, the ore having been sent to the United States and the figures being unavailable at the time of writing. Active development is being carried on at all these properties and it is confidently expected that the lull in production indicated will be of short duration.

There is likely to be a decrease in the production of lead for the same reasons as have been recited in connection with silver.

The principal source of gold production in latter years has been the Rossland Camp. During the year the output has been somewhat curtailed as the Consolidated Mining & Smelting Co. had to confine its attention to the highest grade ore, owing to high costs. To remedy these conditions the Company has decided to install a large concentrator either at Rossland or Trail, the probability being that the former will be the site.

There also will be less copper production as the Rossland Camp is the chief source of supply in this district.

Generally speaking metalliferous mining in District No. 5 has been handicapped by shortage of labor during the first months of the year. Since the advent of winter the conditions have improved in this respect. The only properties that have been troubled with strikes are the Sullivan and the North Star in East Kootenay. The North Star, which employs only a few men in comparison with the Sullivan, was not closed long but the Sullivan still is affected. The slight decreases in the prices of lead, zinc and copper did not have any serious adverse influence while the unprecedented rise in silver not only will enhance the value of the silver-lead deposits not being worked but will tend to renew interest in many of the prospects and old properties which have been lying idle for some years.

The completion of Clarence Cunningham's 150 ton Concentrator at Alamo, the erection of a 100 ton Mill at the Noble Five Mine and the decision of the Consolidated Mining & Smelting Company to install a 1500 ton Concentrator marks an active year in mill construction work and a new era in the metallurgical history of the district. All these mills are designed for the treatment of ores by flotation; the existing mills were designed for water concentration and have had flotation units added.

The fact that the mineral production probably will show a decrease for 1919 is no reason for pessimism as to the new year. With the new mills in operation, and in view of the development which now is being carried out, the outlook is bright for an increase in the output of gold, silver, lead and zinc in 1920. Further, with the Sullivan Mine running at full capacity, and an increase from the Rossland Camp, which conditions may be expected, these increases are certain providing labour trouble does not intervene.

**North Eastern District.**

The North Eastern Mineral Survey District (No. 2), in charge of J. D. Galloway, Government Engineer includes all that vast territory lying off the Coast and to the North. Mr. Galloway predicts that the total production during 1919 will compare favorably with that of the previous year. The output of placer gold will show an increase owing to the greater activity in the Ariboo and Quesnel Divisions. The production of Silver Lead and Zinc is mostly from the Silver Standard Mines at Hazelton. This Mine has had a satisfactory year with about the same production as in 1918. The Copper production will be considerably lower than before owing to the Rocher de Boule Mine having been closed down all year.

Mr. Galloway goes on to speak of the activity of the Kitselas Copper Company in the Skeena River Section, considerable progress having been made in the development and the equipping of the Cordillera Mine. The Kleanza Company also is referred to, it being explained that this concern was organized to keep up mining and lumbering at Usk, and that, in this connection, a hydro-electric plant is being developed and a large sawmill erected on Kleanza Creek. The Golden Crown Group has been acquired by the Kleanza Company and a crew of men has been kept constantly at work. Two quartz veins have been stripped. They carry values in gold and copper. These will be further opened by means of drift tunnels but this work will be postponed until power is available. After outlining the accomplishments of the management of the Silver Standard Mine, Hazelton District, during 1919 and

giving its plans for 1920 it is stated that Hudson Bay Mountain properties have been showing up well and that, while there has been no production, this may be looked for shortly. The Skeena Mining & Milling Company, holding the Victory and Coronado Claims, is one of the active companies. It has purchased the machinery for a hydro-electric power plant and for a 50 ton water concentrating mill. The ore consists of galena and zinc blende occurring in a gangue of siliceous rock.

There has been a material advance in mining in the old Cariboo District. The production up to the present has been almost entirely placer gold but the development of claims now taking place give fair promise of lode production. A considerable revival of interest also is taking place in placer mining and a number of new properties have been taken up and are being equipped. The production of placer gold in 1919 will show an increase, it being estimated that about 5500 oz. were recovered. Near the town of Barkerville the most important happening has been the development of the Gold quartz properties on Prosperpine Mountain. If, as is expected, the development proves satisfactory a new area of mining will be opened up in the Cariboo and quartz mining will receive attention where it has been popularly supposed the only possibilities were in placer. The groups of claims now being tested are typical of many quartz showings and if these prove successful others undoubtedly will be developed. The showings on these properties are quartz veins varying in width from a few feet up to twenty feet and carrying small quantities of pyrite, arsenic, pyrites and smaller amount of galena. The main valuable metal content is gold which is apparently associated with the iron sulphides. The distribution of the gold values is quite irregular and much development will be required to determine the average gold tenor of the veins as a whole or in workable portions of the vein. It is apparent that when any considerable body of the quartz is considered the average gold value will be low, but it is expected that it will prove sufficient to mine and mill on a large scale and still leave a margin of profit. In other words low grade mine is the possibility for these properties.

In the Quesnel Section the Lightning Creek Gold Gravels and Drainage Co. has been engaged chiefly in construction, repair work, and Keystone drilling. A new shaft was started in the Fall. It will be sunk through the stream gravels and is for the purpose of opening up the deep channel of Lightning Creek, where drilling has shown good values on bedrock. Shafts have been sunk on this property before but have been lost owing to the heavy water pressure. The plant now is well equipped with pumps to handle a large flow of water and it is hoped that this shaft will be successful in reaching the channel. The equipment of the property of the Placer Mine Ltd., situated on the Fraser River, 12 miles below Quesnel, with a Sanerman scraper was commenced during the summer. During the year a Company was organized by S. J. Marsh to work gravel deposits on the Quesnel River, 10 miles above Quesnel. It is intended to work the ground by means of a scraper and the necessary machinery has been bought but not yet delivered.

As to Harper's Camp it is stated that the International Dredging Company operated its plant, consisting of a drag line scraper, during the Season but the ground being worked as yet is mainly on old tail-

ings. The prospecting of this area by Keystone drilling has been under consideration by the Mines Department for some time and about the end of November work was commenced. If weather permits drilling will be continued throughout the winter. In respect to this area it is explained that a small part of it, lying in the bend of the Horsefly River at Harper's Camp, was very rich placer ground, having produced from \$500,000 to \$1,000,000. The character of the gold found here showed that it had travelled some distance. Therefore it is maintained by many that the small rich area at this point must have a feeding channel. A certain amount of prospecting by means of hand sunk shafts has been done in attempts to find a continuation of the rich ground but without success. For such prospecting Keystone drilling is the most satisfactory method. The work to be done by the Government this winter will be of great assistance to the International Dredging Company in outlining their pay areas and, if successful, the drilling will mean much to the Harper's Camp Section.

#### Southern Coast District.

Wm. M. Brewer, Government Mining Engineer for the southern coast district, observes that the mining industry has made much progress, although production is not so large as heretofore for the reason that owners of metalliferous and coal mining properties today are carrying on development ahead of production in order to demonstrate the producing capacity of the properties. He refers to the Britannia Mine, Howe Sound; the Old Sport, on Elk Lake, Northwestern Vancouver Island; the Indian Chief, Sidney Inlet, about the centre of the West Coast of the Island; and the Sunlook Mine, Jordan River, forty-two miles from Victoria on the Island, as being proven copper mines on which tonnages of positive or actual ore could be measured up that are sufficient both in quantity and grade to guarantee the production of a large tonnage for several years.

As to the Britannia reference is made to the recent extended development work done recently, demonstrating that there are approximately 9,000,000 tons of actual ore in addition to an enormous tonnage of what may be termed probable and possible ore. The positive ore will yield an average of two per cent copper in addition to low gold and silver values.

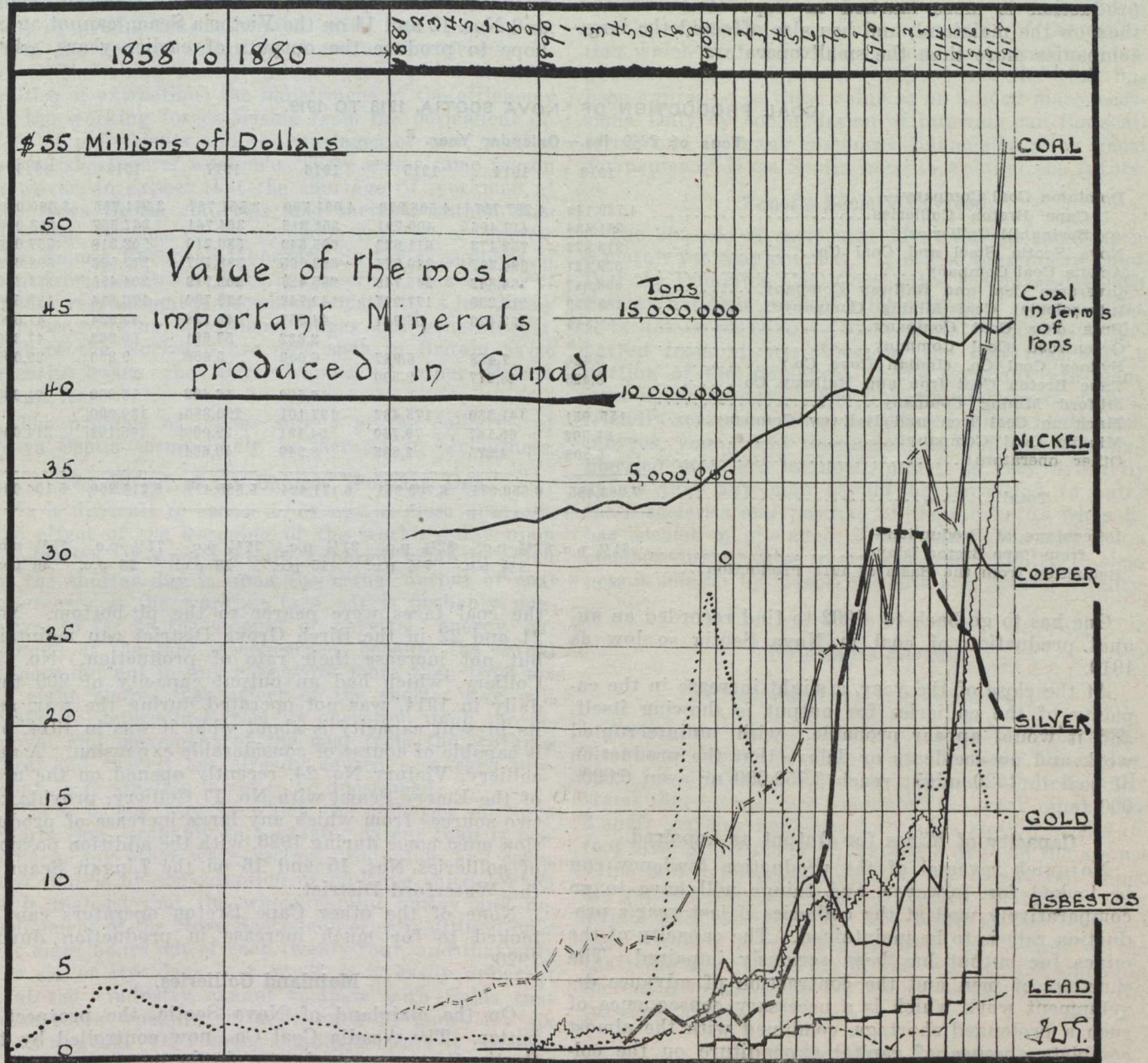
The Sunlock Mine, Jordan River, has reached the point which it is demonstrated that there is sufficient positive ore in sight to warrant the erection of a five hundred ton concentrating plant which has been designed and work on which will start in the early future. The Consolidated Mining & Smelting Co. of Trail, B. C. has secured a controlling interest in this property and W. M. Archibald, the Company's Chief Consulting Engineer, has been appointed Managing Director with R. H. Stewart as Consulting Engineer.

Fire, which burned down the compressor plant and other buildings interfered with development on the Old Sport Mine but these have been renewed with improved equipment and work now is progressing steadily. A concentrating plant capable of treating 500 tons of ore a day has been designed and construction will start shortly.

Development on the Indian Chief, Sidney Inlet, West Coast of the Island, has resulted in exposing a considerable tonnage of concentrating ore, sufficient being blocked out to guarantee operation continuously of the concentrating mill for some time. On the north side

of the mineral zone, and the mountain, a new ore body has been discovered which proves to be over eighty feet in width, this being demonstrated by a crosscut tunnel. The grade of this ore is high enough to produce a profit if treated by flotation concentration. On the southerly side of the mineralized zone

drifting in the No. 2 Adit has demonstrated that the ore body on that level is maintaining its continuity towards the northerly side and work is being continued by driving to connect the north and south zones, with a view to establish whether they are one or separate bodies.



The foregoing graph can be used to plot the approximate figures for 1919 issued by the Mines Branch at Ottawa, and is re-produced from a former issue of the Canadian Mining Journal for that purpose.

# The Coal Production of Nova Scotia During 1919

By The EDITOR

The following record of annual coal outputs in Nova Scotia shows that 1919 was the sixth-consecutive year of falling production of coal, output being now at a discount of thirty per cent from the minimum figures of 1913. It will also be noticed that the lessening of production is more marked in Cape Breton Island than on the mainland, and has also affected the large companies more than the small operators.

the Hub Seam, and No. 8 Colliery on the Harbour Seam,, mines with an aggregate output at that time of 1,450 tons daily. Another colliery, No. 5 on the Phalen Seam, is near exhaustion, and will shortly be closed. The older collieries, such as Nos. 1, 2, 4, and 6 on the Phalen Seam, No. 9 on the Harbour Seam, and Nos. 12 and 14 on the Victoria Seam, cannot again hope to produce the outputs of earlier years, when

## COAL PRODUCTION OF NOVA SCOTIA, 1913 TO 1919.

Tons of 2240 lbs.—Calendar Year.

	1913	1914	1915	1916	1917	1918	1919
Dominion Coal Company—							
Cape Breton Collieries.....	4,739,149	4,287,717	4,608,979	4,091,790	3,551,787	3,271,755	3,090,000
Springhill Collieries.....	381,434	417,406	400,791	351,315	364,761	367,557	393,000
Nova Scotia Steel and Coal Co.....	813,877	752,173	611,923	605,649	580,310	502,018	557,000
Acadia Coal Company.....	539,121	394,397	340,975	392,065	398,507	277,526	398,000
Inverness Coal and Railway Company.....	293,847	264,842	245,749	265,427	202,719	204,495	139,200
Intercolonial Coal Mining Company.....	189,550	213,289	177,977	143,748	179,700	176,814	185,500
Bras d'Or Coal Company.....	65,844	53,420	56,941	44,357	42,126	49,924	41,000
Greenwood Coal Company.....				2,332	53,581	50,263	41,300
Sydney Coal Co. (Indian Cove Co.).....	5,420	7,458	5,987	6,000	5,600	9,800	20,000
Cape Breton Coal Iron and Railway Co.....	8,425	48,277	2,500				
Milford Mining Company.....				8,500	16,402	18,000	21,000
Maritime Coal Iron and Railway Company.....	155,051	141,830	175,482	197,101	200,380	180,000	
Minidie Coal Company.....	65,562	65,147	79,760	54,191	29,000	105,108	214,000
Other operators .....	6,205	4,275	2,885	8,949	40,604		
<b>Total.....</b>	<b>7,263,485</b>	<b>6,650,031</b>	<b>6,709,951</b>	<b>6,171,424</b>	<b>5,665,477</b>	<b>5,213,260</b>	<b>5,100,000</b>
Percentage of Production—							
from Cape Breton Island.....	81½ p.c.	81½ p.c.	82½ p.c.	81¼ p.c.	77½ p.c.	77½ p.c.	75½ p.c.
Reduction from the Basis of 1913 Production.....		8½ p.c.	7½ p.c.	15 p.c.	22 p.c.	28 p.c.	30 p.c.

One has to go back to 1902 to find recorded an annual production of coal in Nova Scotia so low as 1919.

At the close of the year, a slight increase in the capacity of the collieries for output is showing itself, and it would appear probable, with uninterrupted work and no accidents or delays that the production of coal in 1920 might reach 5,750,000 or even 6,000,000 tons.

### Capacity of Mines for Output as impaired.

No quick reversal of the production tendency can be looked for, however, and things will have to go comparatively well at the collieries if last year's production rate is to be maintained. The capacity of the mines for output has been seriously impaired. The shortage of men and the contraction of advance development work which is a necessary consequence of such a prolonged shortage, combined with the almost complete absence of capital expenditure on the collieries during at least the past seven years, has put the operating mines into a condition from which they cannot recover completely except through intensive development continued over a number of years.

### Cape Breton Collieries.

Furthermore, the war period happened to coincide with a time when a number of old collieries were approaching exhaustion, and the effect of the war was to prevent the development of new collieries which otherwise would doubtless have been undertaken about the year 1914. For example, the Dominion Coal Company, since the beginning of 1914, have closed down No. 3 Colliery on the Phalen Seam, No. 7 Colliery on

the coal faces were nearer to the pit-bottom. Nos. 21 and 22 in the Birch Grove District can maintain, but not increase their rate of production. No. 17 Colliery, which had an output capacity of 200 tons daily in 1914, was not operated during the war, and its present capacity is about what it was in 1914, but is capable of course of considerable expansion. A new colliery, Victory No. 24, recently opened on the crop of the Emery Seam, with No. 17 Colliery, provide the two sources from which any large increase of production must come during 1920, with the addition possibly of collieries Nos. 15 and 16 on the Lingan Seam in the Waterford District.

None of the other Cape Breton operators can be looked to for much increase in production during 1920.

### Mainland Collieries.

On the mainland of Nova Scotia, the prospect is better. The Acadia Coal Co., now controlled by the Scotia Company, ought to obtain outputs almost as large as those of 1913. The Joggins Field has also fairly well of late, and although the number of small operations will not survive for any length of time, should there be any trade depression, yet there are a number of small openings in that field which together add very appreciably to the mainland production.

The Springhill Mines of the Dominion Coal Company have maintained their production throughout the war period better than any other group of collieries in Nova Scotia, and have the unique distinction of producing in 1919 more than they did in 1913. These mines, given fair luck, might during 1920 reach a production of 450,000 tons.

Summarising all the probabilities, however, it is to be doubted whether under the most favorable conditions of labour supply and demand the capacity of the collieries during 1920 will exceed six million tons.

#### **Coal Problem is World-Wide.**

There seems every reason to anticipate a continuance of a brisk demand for coal, because the same conditions which are acting as a deterrent to production in Nova Scotia are also operating in all other coal-producing countries. These include increased cost of production, associated with and proceeding from the general inflation of commodity prices; decreased working hours, and increased physical difficulties of extraction; the impairment of the efficiency of the working forces arising from the permanent effect of enlistments and the wastages of war, and an actual shortage of workmen. There seems some reason however, to expect that the shortage of workmen at the Nova Scotia collieries may increase rather than diminish, because of the probable reversal of emigration among European labourers. So far as supplies of men from the British Isles is concerned, this source of labour recruitment is becoming constantly a less likely one, as working conditions, wages and general comfort of the workmen are now such in Britain as to greatly lessen the attractiveness of other British countries.

The problem of labour supply at the collieries of Nova Scotia seems likely to increase in seriousness.

#### **The Effect of the Shorter Working Day.**

It is difficult to estimate, except at close quarters, the effect of the lessening of the working day upon production. It is not yet quite apparent what the effect of the shorter day is upon the actual output of coal producers at the working face. It is probably negative, so far as the amount of physical energy expended at the face is concerned, because the actual miners did not in any case work more than from six to eight hours. The effect of the shorter day will really be determined from its operation upon the removal and movement of the coal from the working face, and that it has already caused a marked lowering in production is not to be questioned.

There is one way in which the collieries of Nova Scotia can—probably to a greater extent than is possible in any other way—restore production and costs, and that is by the adoption of multiple shifts. When it is realised that the whole capital outlay and development of the Nova Scotia collieries is utilised only for eight hours out of each twenty-four, and that only for six or less days in a week, it is easily apparent that the industry cannot compete with fields that have three working shifts in each 24 hours for six days a week. Of course, a multiple shift is not possible except with a sufficient supply of workmen, and this is not in sight.

Among events of the year of some importance may be mentioned the following:

#### **St. Lawrence Shipments Resumed.**

The Dominion Coal Company received back from Admiralty requalification most of its coal freighters, and was able to make a commencement in the restoration of its former Montreal sales by sending some coal up the River in 1919, the first shipments of any note since 1915. This Company has also undertaken such prospecting of the lower seams on its properties during the year.

#### **Consolidation of Coal Mining Properties Probable.**

The acquisition by the Nova Scotia Steel Company of the control of the Acadia Coal Company is important as being, in the writer's opinion, the first of a series of consolidations of coal-mining interests that must take place if the coal mining industry is not to decline still more disastrously. In making this statement, the writer has no knowledge of, and intends no reference to the foolish crop of rumors that have amalgamated coal and steel companies in every conceivable, and many inconceivable combinations, but is merely expressing a personal conviction of the evolution which the coal trade of Nova Scotia must undergo before it attains real stability, a belief that has been expressed in these columns on a good many occasions. Only by consolidation of interests can the scattered, and in many instances financially weak coal companies of Nova Scotia hope to weather the future.

#### **Benefit Society Revived.**

The absence of serious accident during the year is a matter for thankfulness. It is also pleasing to know that the Dominion Coal Company's Employees Benefit Society has been revived after a lapse of some months. It is not so pleasing to know that the Society is debarred from all usefulness by the fact that only a portion of the employees of the Company are members of the Society. The financial soundness of these friendly societies cannot be assured unless all the employees, young and unmarried, as well as older and married men, are included, and it is very distinctly unfair that any man should be permitted to enter these societies and partake of their benefits when he has become middle-aged, if this same man was not a member during those years when his liability to sickness is smaller by reason of youth and greater vitality.

### **TORONTO NOTES**

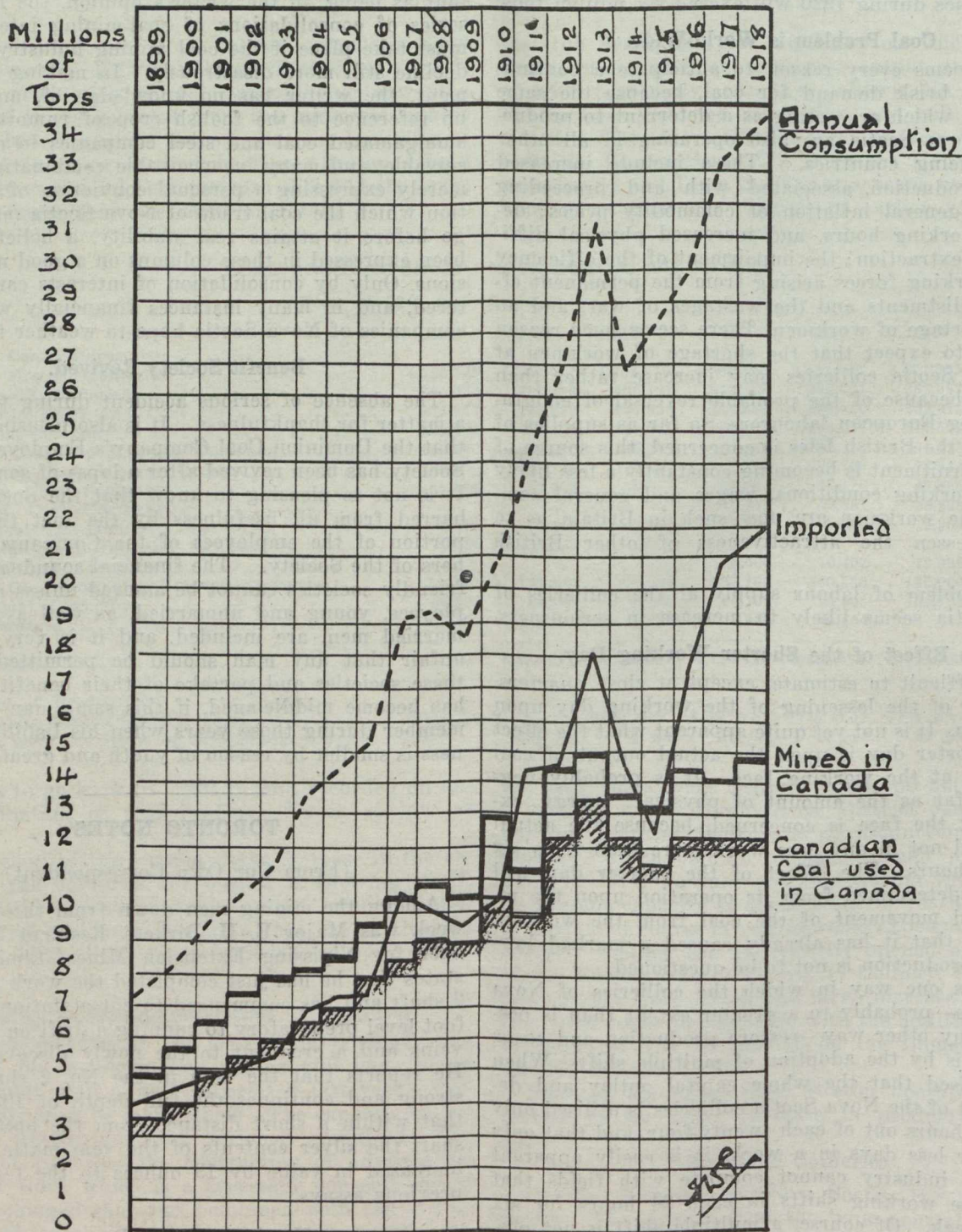
(From Our Own Correspondent)

Among the mining men down from the North this week was Major E. H. Birkett, Resident Mine Manager for Nipissing Extension Mines, Limited. He states that he has just completed the work on the No. 2 shaft and has commenced to cut a station at the 75-foot level preparatory to running a drift on the known veins and a cross-cut to the newly discovered veins. He reports that the vein in the No. 2 shaft is very strong and continues the full depth of 100 feet and that within a short distance from the bottom of the shaft the silver contents of the vein matter suddenly increased in value by 19 ounces to the ton over the previous assays.

#### **North Davidson Progress**

L. G. Harris, General Manager of the North Davidson Mines, Limited, who recently returned to Toronto after having successfully financed his proposition in England, states that the company are getting out plans for a mill which will be built in units and which will be of sufficient capacity to take care of 450 tons of ore a day. Some very successful diamond-drilling work has been done, the power line has been completed into the property and everything is rapidly taking on such shape as will enable the company to make the mine a producing one. The property is located three and a quarter miles north of South Porcupine and one mile from the Davidson.





— Production and Consumption of —  
Coal in Canada —

The foregoing graph is reproduced for comparison of 1919 coal production with former years. Canada produced during 1919 only 12½ million tons, the smallest coal yield since 1911.

# Review of 1919 Mineral Production

By JOHN McLEISH, Chief of the Division of Mineral Statistics, Ottawa, from the Globe Annual Review, Toronto.

"The mining and metal production of Canada will be an important factor in post-war conditions, as an abundance of metals will be required during the building-up stage, and with the influx of labor Canada should be able to supply these from her developed and undeveloped resources." Thus written Dr. S. F. Kirkpatrick, an eminent Canadian metallurgist, in discussing "Metals and Metallurgical Research."

The public records and the investigations of the Canadian Federal and Provincial Departments of Mines clearly show that Canada occupies a pre-eminent place amongst the world's geographic groups as a potential source of vast mineral wealth. Long since the greater production created by the war this country had already become the world's principal source of nickel, asbestos and cobalt, and an important producer of gold, silver, copper, lead, zinc and a number of rare metals. Few countries possess greater coal resources, and the Canadian production of arsenic, chromite, feldspar, graphite, gypsum, mica, magnesite, pyrites, and talc stand high in records of world's production.

During the past four years, under the stimulus created by war's demands, Canada's mineral production had increased from a total value of \$128,863,075 in 1914 to a value of \$211,301,897 in 1918. Notwithstanding that much of the increased value indicated by this record was due to higher prices many metals and minerals reached their highest recorded production in the latter year.

With the close of the war, however, came an almost immediate cessation of demand for nickel, copper, lead, zinc and other metals, with large stocks accumulated. Mining activity in these metals either ceased for the time or was greatly restricted, and the year 1919 will probably be looked back upon as the transition period, or, we trust, the greater part of the transition period between the insatiable demands of war for many products of the mine, and the legitimate requirement of peace industries supplemented by what we are pleased to term the demands of the period of reconstruction.

## Effect of Armistice.

The effect of the armistice was immediate in the complete cessation of demand for many mineral products; the replacement by reconstruction and peace demands has of necessity been slow. Further, both the speed of the change and its methods are being most strongly influenced by the difficulties encountered in adjusting human relations. Production of gold, silver and of coal, would have been much greater during the past year but for an actual shortage of mine labor and the closing down of active operations for several months through strikes.

Definite records of production will not be available till some time after the close of the year, but on a broad survey of the results obtained the total value is estimated at \$167,000,000.

During the past six years the annual totals have been:

	Metallic.	Non-Metallic.	The total value of Production.
1914 .. .. .	\$ 59,386,619	\$69,476,456	\$128,863,075
1915 .. .. .	75,814,841	61,294,330	137,109,171
1916 .. .. .	106,319,365	70,882,169	177,201,534
1917 .. .. .	106,455,147	83,191,674	180,646,821
1918 .. .. .	114,549,152	96,752,745	211,301,897
1919 .. .. .	73,000,000	94,000,000	167,000,000

During the war nickel production was more than doubled; copper production increased by nearly 60 per cent; zinc production increased to five times its former output. Following the armistice the prices of food and of clothing continued to increase; the demand for such products could not abate as could the demand for metals of which accumulated stocks were for a time sufficient to meet current requirements. Silver and iron were two great exceptions, for widely different reasons. As the year advanced, however, stocks are evidently being rapidly absorbed, and the rate of production increased with rising prices.

The value of the production of non-metallic products is largely dominated by that of coal. The output of coal in 1919 was less than that of 1910, but greater in value by over \$22,000,000.

The value of the production of asbestos in 1918 was over \$5,000,000 in excess of its value in 1915, and its output in 1919 has been well maintained.

Notwithstanding the progress that has been achieved in the development of Canada's mineral wealth, there are three great products—probably the most important products—upon which industrial activities is built, viz., coal, iron and petroleum, for which Canada has become dependent in large measures upon foreign sources of supply. The total value of the imports of these products, much of the iron and steel in a manufactured form, and petroleum as refined oils, amounted in 1918 to no less than \$286,115,000. Expressing the imports of petroleum as crude oil, and the iron and steel as pig iron, the total would probably be not less than \$140,000,000. These figures serve to indicate the great possibilities for development of domestic resources, if satisfactory solutions can be obtained for the economic utilization of our Canadian coals, low grade iron ores and oil shales, and they demonstrate the great necessity of intensive prospecting for higher grade iron ores and for oil fields.

## Copper and Nickel.

Copper and nickel followed by gold and silver, are the metals of first importance as wealth-producers in Canada. The nickel is derived from one main source, viz.: The ores of the Sudbury district. The other metals are derived from various sources, though the greater part of the silver is from the Cobalt district.

The production of nickel in 1918 was 92,507,293, of which 2,400,000 pounds were recovered as refined metal, the balance being exported in the form of matte, or mill residues. In 1914, the total production was 45,517,937 pounds. The production during 1919 has been about 43,000,000 pounds, or about one-half of the last war year, and slightly under the rate of production during the three years immediately preceding the war.

About one-fourth of the production during the year has been in the form of refined metal, the refinery of the International Nickel Company at Port Colborne having been in active operation throughout the year. The new nickel refinery of the British-American Nickel Corporation, under construction at Deschenes, near Ottawa, is rapidly approaching completion, and will be placed in operation early in 1920.

The price of nickel has not varied as greatly as that of other metals, either during the war, or subsequently. During 1918 the price in London varied from a maximum of £260 per long ton in May, to £196 per ton at the end of the year. In December, 1919, the London price was from £215 to £220 per ton. New York quotations varied from 45 to 50 cents per pound during 1918, and in December of 1919 were 42 cents per pound for ingots and 45 cents for electrolytic.

The production of copper during 1919 is estimated at \$1,500,000 pounds, or slightly less than 70 per cent. of the previous year's output, which was 118,769,434 pounds. Even at this figure the copper production has been greater than that of 1914, or any previous year, and having in view the fact that the price fell from 26 cents per pound in November of 1918 to less than 15 cents in March, 1919, and the effect of labor difficulties in British Columbia may be viewed as highly satisfactory.

In 1918 the production included 5,800,000 pounds from Quebec; 47,000,000 pounds from Ontario; 2,340,000 pounds from Manitoba; 62,860,000 pounds from British Columbia and a little over 600,000 pounds from the Yukon District. In 1919 the production from Quebec, which is derived from the pyrites ores of the Eastern townships, and that of Ontario from the Sudbury nickel-copper ores has been at slightly less than half the rate of the previous year.

Development operations at Copper Mountain by the Canada Copper Corporation now in progress for several years have proved the existence of 10,000,000 tons of ores, with an additional tonnage probable. A 2,000-ton mill is about completed.

At Rossland active mining has, on the whole, been well maintained. The copper is now being recovered in the electrolytic refinery, as refined metal, and it is proposed to install mills for the production of rolled copper forms. On the coast there has been a good production at Anyox and Britannia, though these operations have not been continued without some interruption because of labor difficulties.

With the continued development of larger ore bodies at Hidden Creek, Britannia and Copper Mountain, improvements in treatment of the Rossland ores, the construction of a smelter in northern Manitoba for the reduction of the ores of the Mandy and other mines, resumption of capacity operations at Sudbury, and with the numerous lesser deposits that are under investigation with the hope of developing into big mines, considerably increased copper production in the immediate future may be confidently anticipated.

#### Gold and Silver.

Gold and zinc are the only metals apparently for which an increased production is recorded in 1919. The value of the gold production is estimated at \$16,275,000, as against \$14,463,689 in 1918. This output however, is still less than that of 1916, when a total value of \$19,234,967 was obtained, and far below the output during the hey-days of the Yukon, when, in 1900, a maximum of \$27,908,153 was produced.

In 1918 the production included \$2,118,325 from the Yukon district, \$3,624,476 from British Columbia, and \$8,516,299 from Ontario, with smaller amounts from Manitob, New Brunswick and Nova Scotia. The Yukon district output was about the same in 1919 as in the previous year. It is less than half the average output of the previous ten years, and one-tenth the output of 1900. British Columbia's production of gold is believed to have been also about the same as in 1918.

Manitoba produced \$139,628 in gold in 1918, and probably a greater value in 1919. Some very spectacular finds made during the past year are attracting considerable attention to the new mining districts in this Province.

Ontario's gold production in 1919 has increased to at least \$10,000,000, derived principally from the Hollinger, Dome and McIntyre mines, with smaller contributions from the Lake Shore, Davidson, Kirkland Lake and others. It is already well known to the reader of Northern Ontario mining news that production would have been larger had more labor been available, that in a number of properties large ore reserves had been developed, and that with decreasing costs of supplies and a greater labor supply a much larger annual production will shortly be obtained. The wide extent of territory over which gold discoveries have been made and new gold camps established give excellent reason for anticipating that this Province will in the near future occupy a much higher position among the gold-producing areas of the world.

#### Lead and Zinc.

Lead and zinc are obtained chiefly from British Columbia sources. Ore shipments materially declined during the early months of the year. Considerable dissatisfaction was manifested by a number of shippers with the prices and purchasing conditions offered by the Trail smelter, the only lead smelter in Western Canada. A special committee of investigation was appointed who were given full access to the books and records of the smelting company. Evidence was also solicited from shippers. The conclusions of the committee were that the rates imposed by the smelter's lead schedule "B", at the time of its going into effect, were reasonable. Many lead shippers, however, sought markets for their lead ore shipments in the United States, and during the first nine months of the year lead ores were exported containing over 10,000,000 pounds of lead.

The production of lead in 1918 was 51,398,002 pounds, of which 47,594,328 pounds were obtained from British Columbia, and the balance chiefly from Ontario and Quebec, with a small production from the Yukon District. Of the total, 32,782,000 pounds were recovered as bullion, the balance being lead contained in ore exported.

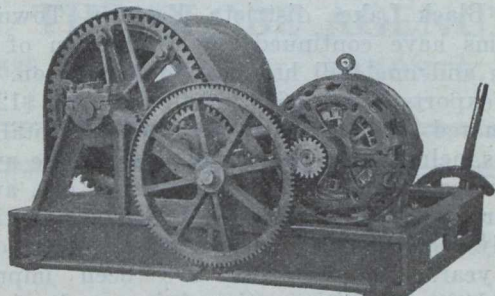
Zinc production in 1918 comprising actual recoveries of refined zinc at the Trail refinery and estimated recoveries from ores and concentrates exported was 35,083,175 pounds. Of this amount 2,802,928 pounds were credited to Quebec Province and the balance to British Columbia.

Estimates based upon the quantities of ores shipped from mines and exported would appear to indicate that the lead production in 1919 was but little less, if any, than that of the previous year, and the zinc production

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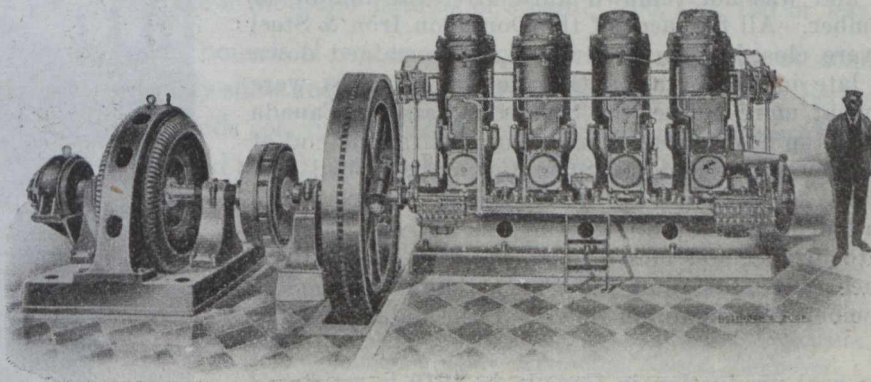
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probably somewhat in excess. The prices of both metals have been considerably less than during the last war year, that of lead having averaged about 5.73 cents (New York) and zinc 7.03 cents in 1919, as compared with 7.4 cents and 8.16 cents respectively in 1918.

The prospects for the future are, however, quite encouraging. The zinc reduction plant at Trail is claimed to be operating on a much more efficient basis; large resources of ore are assured in the Sullivan Mine, and the Consolidated Mining & Smelting Company, which operates both mine and smelter, is currently reported to have successfully arranged for the marketing of its surplus zinc products in Europe.

#### Iron and Steel.

In metalliferous mining different methods naturally exhibit varying conditions. Canada's metallurgical industry in iron and steel has become an important factor in our industrial situation, but has been based very largely upon imported ores, a situation which has not been materially altered by the war. A comparatively small production of beneficiated iron ores continues to be obtained from the siderite deposit at Magpie, and from the magnetites at Moose Mountain.

The total shipments of iron ores from Canadian mines in 1918 were only 211,608 short tons and probably about the same tonnage will have been shipped during 1919, the two properties above mentioned being the principal ones that have been operated.

The production of both pig-iron and steel has been less than in 1918, when the total production of pig-iron was 1,195,551 tons (of 2,000 pounds) and of steel 1,873,708 tons (of 2,000 pounds.)

The estimated production of pig-iron in 1919 is 920,000 tons, a falling off of about 23 per cent, and the production of steel ingots and castings is estimated at 1,020,000 tons, a decrease of about 45 per cent.

In 1918 pig-iron was made in electric furnaces from scrap steel to the extent of 32,031 tons. The corresponding production in 1919 was probably less than 8,000 tons. Electric furnace steel production in 1918 was 119,130 tons. It is doubtful whether the 1919 production reached 15,000 tons.

In Nova Scotia the blast furnace of the Nova Scotia Steel & Coal Co. was closed down toward the end of June and was not reblown until after the middle of November. All furnaces of the Dominion Iron & Steel Co. were closed down in August and remained down until late in October. In Ontario the furnaces were somewhat more active, the Steel Company of Canada at Hamilton having all furnaces in blast at the end of September. The Algoma Steel Corporation had two furnaces active and two closed down, and the Canadian Furnace at Port Colborne was active. The Deseronto furnace was closed down in June, the Midland furnace in August and the Parry Sound furnace in September, all remaining down for the balance of the year.

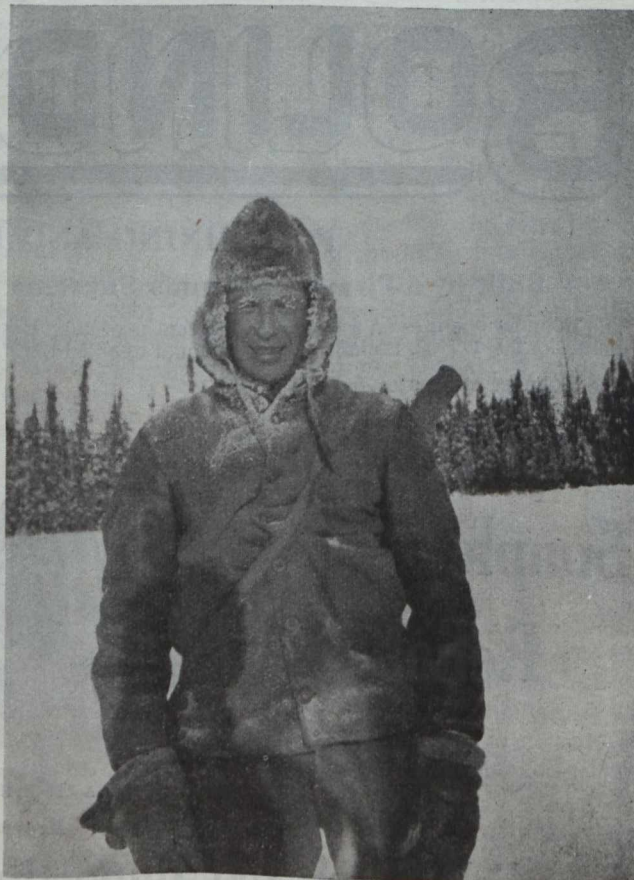
The coal production in Canada in 1919 is estimated at 12,500,000 short tons. (This product is dealt with more fully on another page.)

#### Other Products.

Among other ores and mineral products for which particular demand was created by the war and by the

production of which Canada was able to contribute important quantities were: Cobalt, molybdenum, arsenic, asbestos, chromite, magnesite, graphite and pyrites. The mining of asbestos has been fairly steady throughout 1919, though that of the other products will show the effects of a lack of market. The exports of molybdenite to the end of August were 56½ tons, valued at \$84,226, and were probably derived almost entirely from the Quyon, or Marsh Mine, near Ottawa. At this time all active production operations had ceased.

In the Black Lake district, Eastern Townships, three firms have continued the production of chromite ores and one mill has been in operation. Six months' exports were 4,669 tons, valued at \$124,505. The estimated shipments for the year will total 8,400 short tons, including 5,750 tons of concentrate averaging 50 per cent., and 2,650 tons of crude ore, averaging 40 per cent. chromic oxide. This production is practically equivalent to about one-half that of the previous year. The operators have been improving their production facilities. Canada's production of pyrites ores had greatly increased during the war, rising from 158,566 tons in 1913, to 416,649 tons in 1917. Nine months' shipments in 1919 were 129,157 tons, as compared with 322,282 tons during the corresponding period of 1918.



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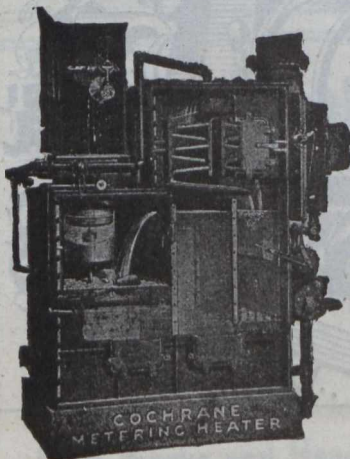
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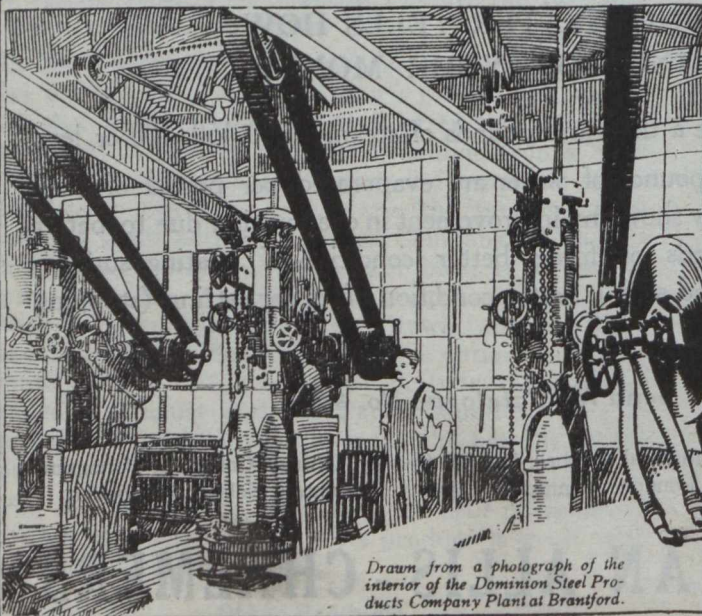
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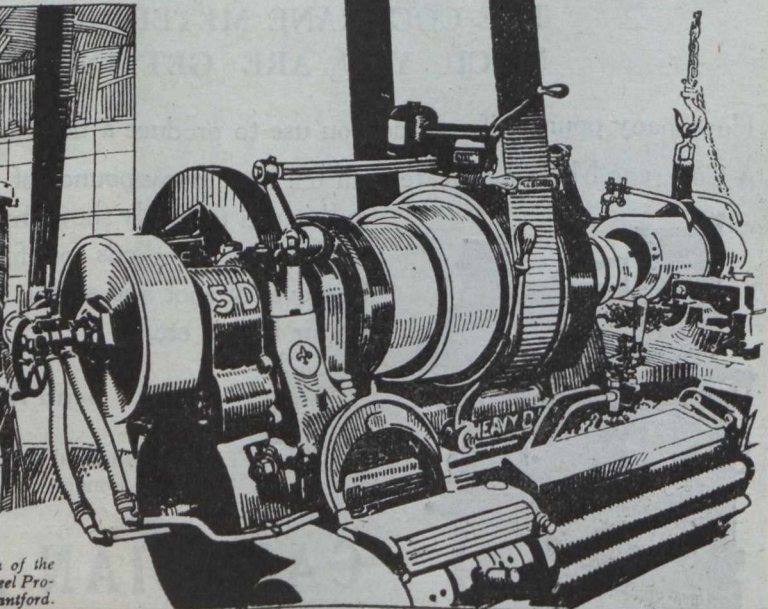
Yours very truly,

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Superintendent.

1007/B.



Drawn from a photograph of the interior of the Dominion Steel Products Company Plant at Brantford.



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HON. MARTIN BURRELL, *Minister*

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### MINES BRANCH

#### Recent Publications

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

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

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

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

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

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

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

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

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

Summary Report of the Mines Branch, 1917.

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

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

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

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

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

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

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

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

### GEOLOGICAL SURVEY

#### Recent Publications

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

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

Memoir 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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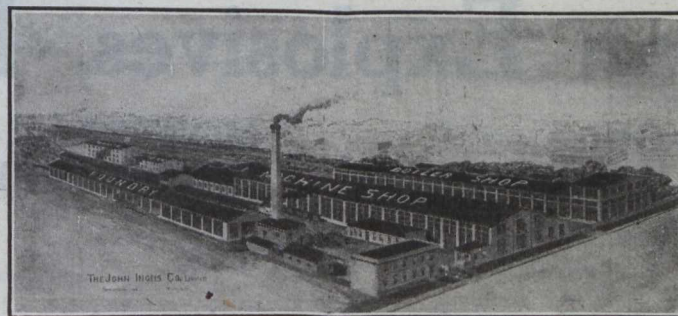
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BRITISH COLUMBIA:	Vancouver,	Victoria,		Nelson,		Prince Rupert

### Factories at

Beloeil, P.Q., Vaudreuil, P.Q., Windsor Mills, P.Q., Waverley, N.S., James Island, B.C.,  
Nanaimo, B.C. Northfield, B.C., Bowen Island, B.C., Parry Sound, Ont.

# The Canadian Miners' Buying Directory.

**Acetylene Gas:**

Canada Carbide Company, Ltd.  
Canadian Fairbanks-Morse.

**A.C. Units:**

MacGovern & Co.

**Agitators:**

The Dorr Co.

**Air Hoists:**

Canadian Ingersoll-Rand Co., Ltd.  
Mussens, Limited.

**Alloy and Carbon Tool Steel:**

H. A. Drury Co., Ltd.  
International High Speed Steel Co., Rockaway, N.J.

**Alternators:**

MacGovern & Co.

**Amalgamators:**

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

**Antimony:**

Canada Metal Co.

**Antimonial Lead:**

Pennsylvania Smelting Co.

**Arrester, Locomotive Spark:**

Hendrick Manufacturing Co.

**Arsenic White Lead:**

Coniagas Reduction Co.

**Assayers' and Chemists' Supplies:**

Dominion Engineering & Inspection Co.  
Lymans, Limited  
Mine & Smelter Supply Co.  
Pennsylvania Smelting Co.  
Stanley, W. F. & Co., Ltd.

**Assayers and Chemists:**

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

**Asbestos:**

Everitt & Co.

**Balls:**

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

**Ball Mills:**

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

**Balances—Heusser:**

Canadian Fairbanks-Morse Co., Ltd.  
Mine and Smelter Supply Co.

**Rabbit Metals:**

Canada Metal Co.  
Canadian Fairbanks-Morse Co., Ltd.  
Hoyt Metal Co.

**Ball Mill Feeders:**

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

**Ball Mill Linings:**

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

**Belting—Leather, Rubber and Cotton:**

Canadian Fairbanks-Morse Co., Ltd.  
Link Belt Co.  
The Mine & Smelter Supply Co.  
Northern Canada Supply Co.  
Jones & Glasco.

**Belting:**

R. T. Gilman & Co.

**Belting (Transmission):**

Goodyear Tire & Rubber Co.

**Belting (Elevator):**

Goodyear Tire & Rubber Co.

**Belting (Conveyor):**

Goodyear Tire & Rubber Co.

**Blasting Batteries and Supplies:**

Canadian Ingersoll-Rand Co., Ltd.  
Mussens, Ltd.  
Northern Canada Supply Co.  
Canadian Explosives, Ltd.

**Bluestone:**

The Consolidated Mining & Smelting Co.

**Blowers:**

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

**Boilers:**

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

**Blue Vitriol (Coniagas Red):**

Canadian Fairbanks-Morse Co., Ltd.

**Bortz and Carbons:**

Diamond Drill Carbon Co.

**Boxes, Cable Junction:**

Standard Underground Cable Co. of Canada, Ltd.  
Northern Electric Co., Ltd.

**Brazilian Rough Diamonds:**

Diamond Drill Carbon Co.

**Brazilian Mica:**

Diamond Drill Carbon Co.

**Buggies, Mine Car (Steel)**

Hendrick Manufacturing Co.

**Brazilian Ballas:**

Diamond Drill Carbon Co.

**Brazilian Rock Crystal:**

Diamond Drill Carbon Co.

**Brazilian Tourmalines:**

Diamond Drill Carbon Co.

**Brazilian Aquamarines:**

Diamond Drill Carbon Co.

**Bronze, Manganese, Perforated and Plain:**

Hendrick Manufacturing Co.

**Buckets:**

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

**Buckets, Elevator:**

Hendrick Mfg. Co.

**Cable—Aerial and Underground:**

Northern Canada Supply Co.  
Standard Underground Cable Co. of Canada, Ltd.

**Cableways:**

M. Beatty & Sons, Ltd.  
Fraser & Chalmers of Canada, Ltd.  
Mussens, Ltd.  
The Wabi Iron Works  
R. T. Gilman & Co.

**Cages:**

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

## Canadian Miners' Buying Directory.—(Continued)

- Cables—Wire:**  
Standard Underground Cable Co. of Canada, Ltd.  
Canada Wire & Cable Co.  
Fraser & Chalmers of Canada, Ltd.  
Northern Electric Co., Ltd.  
R. T. Gilman & Co.
- Cam Shafts:**  
Canada Foundries & Forgings, Ltd.  
Hull Iron & Steel Foundries, Ltd.
- Car Dumps:**  
Sullivan Machinery Co.  
R. T. Gilman & Co.  
Canadian Fairbanks-Morse Co., Ltd.
- Carbide of Calcium:**  
Canada Carbide Company, Ltd.
- Cars:**  
Canadian Foundries and Forgings, Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Canadian Fairbanks-Morse Co., Ltd.  
John J. Gartshore  
MacKinnon Steel Co., Ltd.  
The Electric Steel & Metals Co.  
Northern Canada Supply Co.  
Marsh Engineering Works  
Mine and Smelter Supply Co.  
Fraser & Chalmers of Canada, Ltd.  
Mussens, Limited  
R. T. Gilman & Co.  
The Wabi Iron Works
- Car Wheels and Axles:**  
Canadian Car Foundry Co., Ltd.  
Burnett & Crampton  
Hull Iron & Steel Foundries, Ltd.  
John J. Gartshore  
Marsh Engineering Works, Ltd.  
The Electric Steel & Metals Co.  
The Wabi Iron Works
- Carriers (Gravity):**  
Jones & Glassco
- Castings—Brass**  
The Canada Metal Co., Ltd.
- Castings (Iron and Steel)**  
Burnett & Crampton  
Canadian Steel Foundries, Ltd.  
Hull Iron & Steel Foundries, Ltd.  
The Electric Steel & Metals Co.  
The Wabi Iron Works
- Cement Machinery:**  
Northern Canada Supply Co.  
Hadfields, Limited  
Hull Iron & Steel Foundries, Ltd.  
Fraser & Chalmers of Canada, Ltd.  
Canadian Fairbanks-Morse Co., Ltd.  
The Electric Steel & Metals Co.  
R. T. Gilman & Co.  
Burnett & Crampton
- Chains:**  
Jones & Glassco  
Northern Canada Supply Co.  
Canadian Fairbanks-Morse Co., Ltd.  
Link-Belt Co.  
Greening, B., Wire Co., Ltd.
- Chain Drives:**  
Jones & Glassco
- Chemical Apparatus:**  
Mine and Smelter Supply Co.
- Chemists:**  
Canadian Laboratories  
Campbell & Deyell  
Thos. Heyes & Sons  
Milton Hersey Co.  
Ledoux & Co.  
Constant, C. L. Company
- Chrome Ore:**  
The Electric Steel & Metals Co.  
Everett & Co.
- Classifiers:**  
Mine and Smelter Supply Co.  
Mussens, Limited  
Fraser & Chalmers of Canada, Ltd.  
The Wabi Iron Works  
R. T. Gilman & Co.  
The Dorr Company
- Coal:**  
Dominion Coal Co.  
Nova Scotia Steel & Coal Co.
- Coal Cutters:**  
Sullivan Machinery Co.  
Canadian Ingersoll-Rand Co., Ltd.
- Coal Mining Explosives:**  
Canadian Explosives, Ltd.
- Coal Mining Machinery:**  
Canadian Ingersoll-Rand Co., Ltd.  
Sullivan Machinery Co.
- March Engineering Works  
Hadfields, Ltd.  
Hendrick Mfg. Co.  
Fraser & Chalmers of Canada, Limited  
Mussens, Limited  
R. T. Gilman & Co.
- Coal and Coke Handling Machinery**  
Link-Belt Co.
- Coal Pick Machines:**  
Sullivan Machinery Co.
- Cobalt Oxide:**  
Coniagas Reduction Co.  
Everitt & Co.
- Compressors—Air:**  
Canadian Fairbanks-Morse Co., Ltd.  
Smart-Turner Machine Co.  
Canadian Ingersoll-Rand Co., Ltd.  
Northern Canada Supply Co.  
MacGovern & Co., Inc.  
R. T. Gilman & Co.  
Fraser & Chalmers of Canada, Ltd.  
Mussens, Limited  
The Mine & Smelter Supply Co.
- Concrete Mixers:**  
Canadian Fairbanks-Morse Co., Ltd.  
Northern Canada Supply Co.  
Gould, Shapley & Muir Co., Ltd.  
MacGovern & Co., Inc.  
Mussens, Limited  
R. T. Gilman & Co.
- Condensers:**  
Canadian Fairbanks-Morse Co., Ltd.  
Smart-Turner Machine Co.  
Northern Canada Supply Co.  
MacGovern & Co., Inc.
- Concentrating Tables:**  
Mine & Smelter Co.  
Deister Concentrator Co.  
The Wabi Iron Works
- Converters:**  
Northern Canada Supply Co.  
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
- Crude Oil Engines:**  
Swedish Steel & Importing Co., Ltd.
- Crushers:**  
Canadian Fairbanks-Morse Co., Ltd.  
Canadian Steel Foundries, Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Hardinge Conical Mill Co.  
The Electric Steel & Metals Co., Ltd.  
R. T. Gilman & Co.  
Lyman, 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.  
Hull Iron & Steel Foundries, Ltd.**Dredger Pins:**Canadian Steel Foundries, Ltd.  
Hull Iron & Steel Foundries, Ltd.  
The Electric Steel & Metals Co.  
Hadfields, Limited**Dredging Machinery:**Canadian Steel Foundries, Ltd.  
M. Beatty & Sons  
Hadfields, Limited  
Hull Iron & Steel Foundries, Ltd.  
R. T. Gilman & Co.**Dredging Ropes:**Allan, Whyte & Co.  
Greening, B., Wire Co., Ltd.  
R. T. Gilman & Co.**Drills, Air and Hammer:**Canadian Ingersoll-Rand Co., Ltd.  
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:**H. A. Drury Co., Ltd.  
Hadfields, Limited  
International High Speed Steel Co., Rockaway, N.J.  
Mussens, Limited  
Swedish Steel & Importing Co., Ltd.**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.  
H. A. Drury Co., Ltd.  
Hadfields, Limited**Dynamite:**Canadian Explosives  
Northern Canada Supply Co.**Dynamics:**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 &amp; 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.  
Swedish Steel & Importing Co., Ltd.**Engines—Steam:**Canadian Fairbanks-Morse Co., Ltd.  
M. Beatty & Sons  
R. T. Gilman & Co.  
MacGovern & Co., Inc.  
Fraser & Chalmers of Canada, Ltd.**Engines—Stationery:**

Swedish Steel &amp; Importing Co., Ltd.

**Engineers:**

The Dorr Co.

**Ferro-Alloys (all Classes):**

Everitt &amp; Co.

**Feed Water Heaters:**

MacGovern &amp; 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.  
Hull Iron & Steel Foundries, Ltd.  
Smart-Turner Machine Co.  
Hadfields, Limited  
Fraser & Chalmers of Canada, Ltd.**Frogs:**Canadian Steel Foundries, Ltd.  
Hull Iron & Steel Foundries, Ltd.  
John J. Gartshore**Frequency Changers:**

MacGovern &amp; Co., Inc.

**Furnaces—Assay:**Canadian Fairbanks-Morse Co., Ltd.  
Lymans, Limited  
Mine & Smelter Supply Co.**Fuse:**Canadian Explosives  
Northern Canada Supply Co.**Gears (Cast):**Hull Iron & Steel Foundries, Ltd.  
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.  
H. A. Drury Co., Ltd.  
Hadfields, Limited  
International High Speed Steel Co., Rockaway, N.J.
- High Speed Steel Twist Drills:**  
Canadian Fairbanks-Morse Co., Ltd.  
H. A. Drury 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.  
Hull Iron & Steel Foundries, Ltd.
- Manganese Steel:**  
Canadian Steel Foundries, Ltd.  
The Electric Steel & Metals Co.  
Hadfields, Limited  
Hull Iron & Steel Foundries, Ltd.  
Fraser & Chalmers of Canada, Ltd.  
The Wabi Iron Works
- Metal Marking Machinery:**  
Canadian Fairbanks-Morse Co., Ltd.
- Metal Merchants:**  
Henry Bath & Son  
Geo. G. Blackwell, Sons & Co.  
Coniagas Reduction Co.  
Consolidated Mining & Smelting Co. of 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:**  
H. A. Drury Co., Ltd.  
International High Speed Steel Co., Rockaway, N.J.
- Mining Requisites:**  
Canadian Steel Foundries, Ltd.  
Dominion Wire Rope Co., Ltd.  
Hadfields, Limited  
Hull Iron & Steel Foundries, Ltd.  
Fraser & Chalmers of Canada, Ltd.  
The Electric Steel & Metals Co.  
The Wabi Iron Works
- Mining Ropes:**  
Dominion Wire Rope Co., Ltd.
- Mine Surveying Instruments:**  
C. L. Berger & Sons
- Molybdenite:**  
Everitt & Co.
- Monel Metal:**  
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.  
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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.  
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The Wabi Iron Works

**Pumps—Pneumatic:**  
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Smart-Turner Machine Co.  
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**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:**  
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Smart-Turner Machine Co.  
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**Pumps—Vacuum:**  
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 MacKinnon Steel Co.  
 Fraser & Chalmers of Canada, Ltd.  
 Mine & Smelter Supply Co.  
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**Tanks—Steel:**

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 Canadian Ingersoll-Rand Co., Ltd.  
 Canadian Chicago Bridge & Iron Works  
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 MacKinnon Steel Co.  
 Fraser & Chalmers of Canada, Ltd.  
 The Electric Steel & Metals Co.  
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The Electric Steel & Metals Co.  
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Canadian Ingersoll-Rand Co., Ltd.  
Marsh Engineering Works  
Fraser & Chalmers of Canada, Ltd.  
The Electric Steel & Metals Co.  
Mussens, Limited  
R. T. Gilman & Co.  
The Wabi Iron Works

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Canada Wire & 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.

**Zincium:**  
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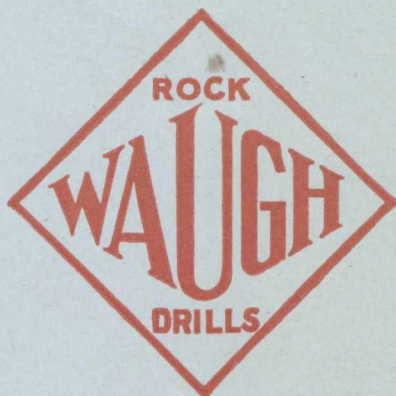
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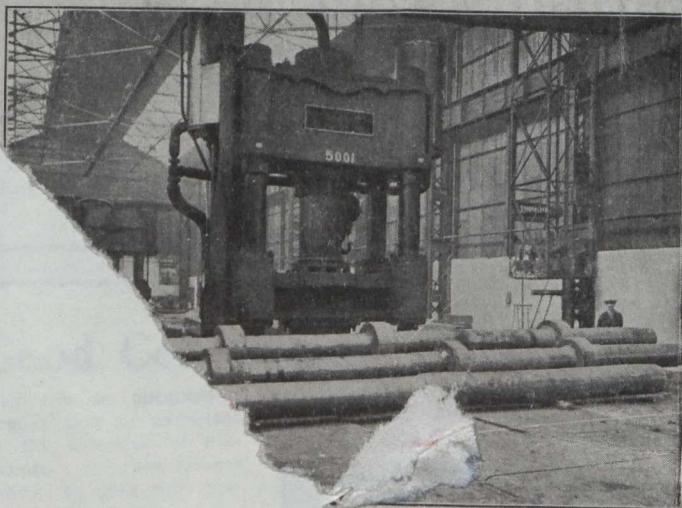
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