

CANADIAN MINING JOURNAL

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No. 5.

"Pencil Records don't go!"

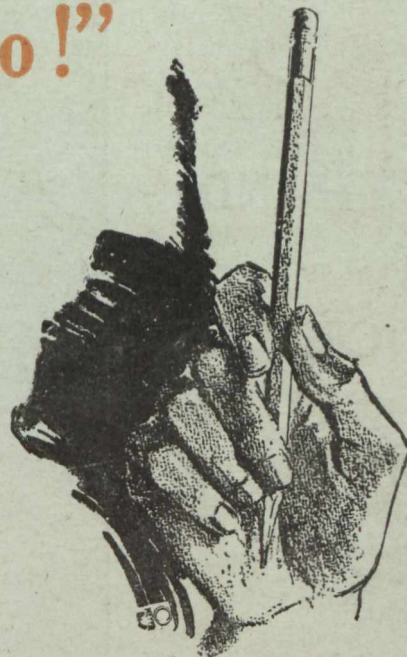
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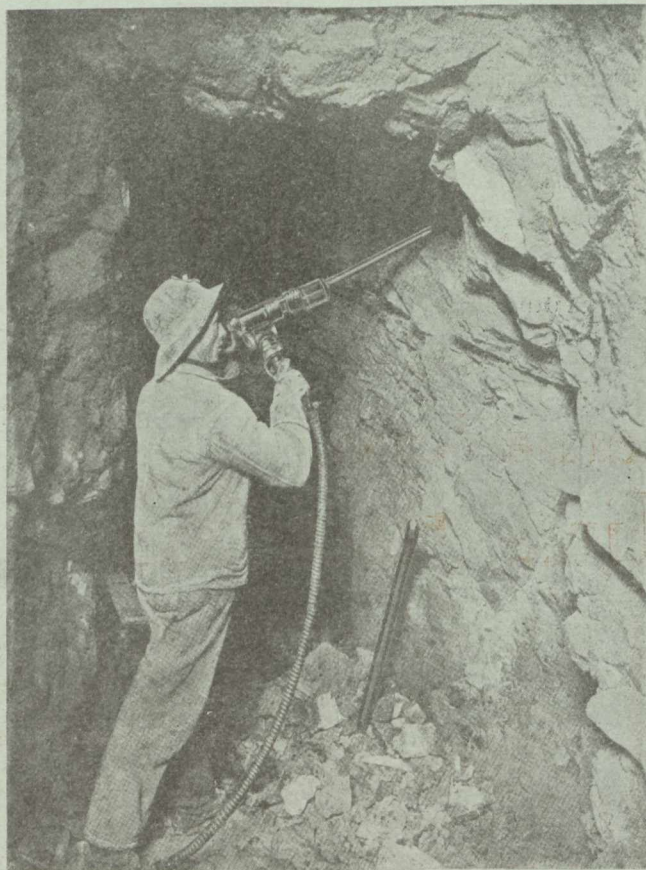
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PROVINCE OF ONTARIO



BUREAU OF MINES

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,

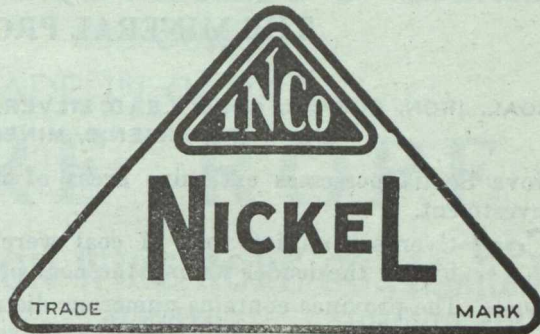
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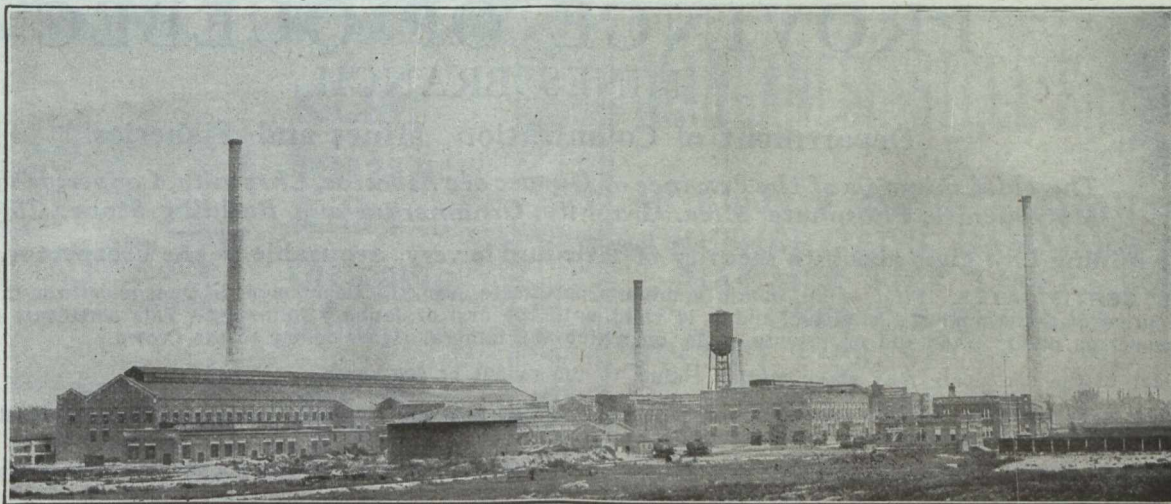
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Nova Scotia possesses extensive areas of mineral lands and offers a great field for those desirous of investment.

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

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

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

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

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

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

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

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

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

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.

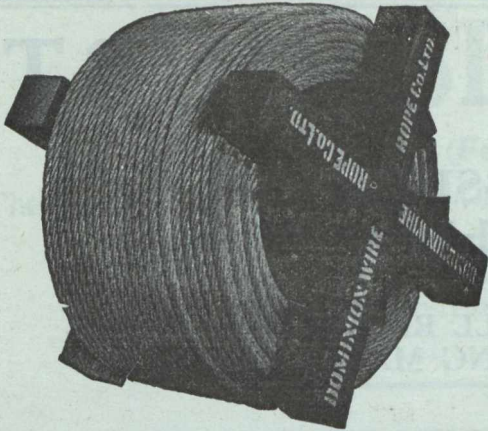
MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS

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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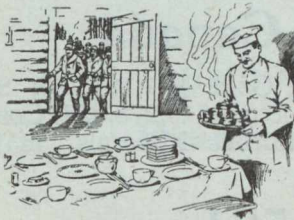
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Aggregate Value of \$637,353,581

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

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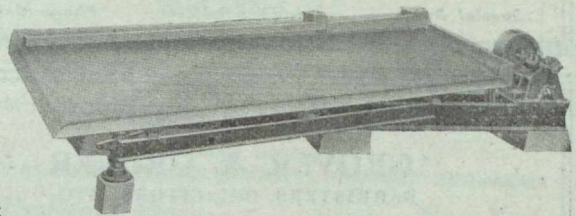
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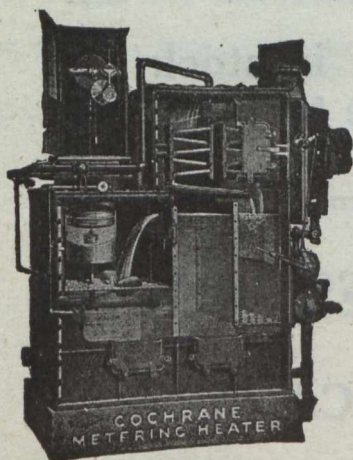
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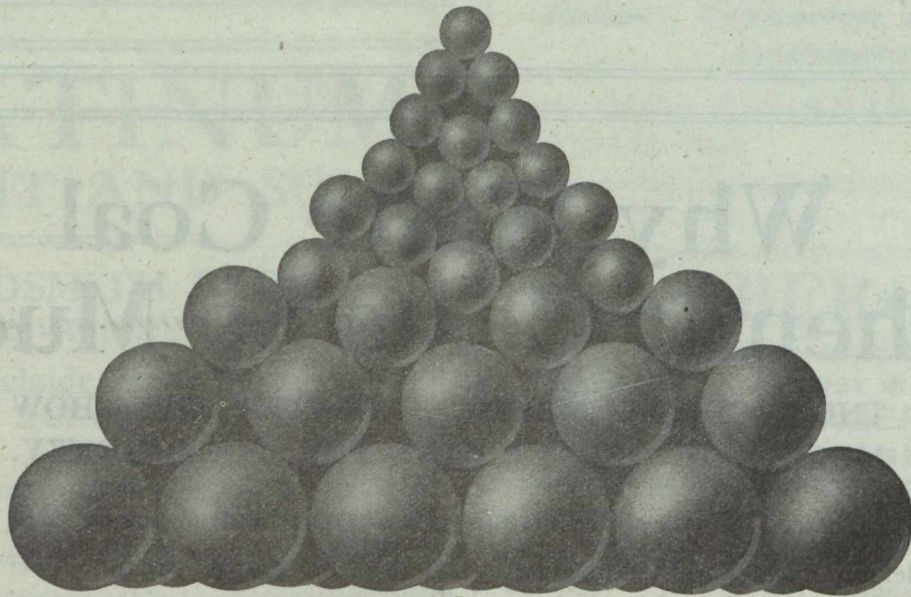
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EDITORIAL

Misplaced Parsimony

It has been intimated that certain of the members of the Geological Survey who have been compelled to resign their positions because of the insufficiency of the salaries permitted to them under the revised classification of the Civil Service list, may be given extended leave of absence, and that Canada may not entirely lose their future services. In case this intimation may create an impression that the incident is closed, some additional facts should be presented, for the information of the public, because we believe that the present anomalous position of the government geologist is primarily due to a widespread ignorance of his functions on the part of the public. The citation of particulars in one or two typical cases may bring enlightenment, and, while it has been considered best not to mention names, the particulars given will be sufficient to ensure identification by those interested.

One of the members of the Survey who has resigned, is the author of the most complete and scientific monograph on the Wabana iron-ore deposit. His work in this connection is accounted worthy of note in every bibliography on iron-ores that has since been published. His original speculations on the part played in iron-ore deposition by low forms of animal life have received recognition in later works. The application of these speculations to the origin of sedimentary iron-ores may quite conceivably lead to the discovery of important new deposits, and may also be of great assistance in determining the extent over which known deposits may be expected to be found by deductions from the probable extent and shape of the area of original deposition.

Another important work of this geologist is on the revision of the City of St. John, N.B., sheet, a district of much interest to geologists, and one which it is surmised may throw light on the area of deposition of the carboniferous sediments that may extend from Rhode Island to Grand Lake, Newfoundland; and the subsequent earth movements, followed by erosion and the deposition of newer sediments that have delimited the coalfields of the maritime provinces as we know them to-day. Such studies are, of course, the preliminary to the location of the hidden coalfields of the maritime provinces.

A further recent duty of this geologist has been the revision of a portion of the sheets of the Sydney coalfield.

To digress, for the purposes of further elucidation, it may be mentioned that in the case of the comparatively small coalfield of the Nanaimo district, the Geological Survey has provided no less than four most excellent maps, dealing respectively with the topography, the stratigraphical geology, the superficial geology, and the economic geology of the field. Of particular interest and usefulness to the miner is the sheet on economic geology, which shows the crops of the seams, the course of the folds and their continuance under the sea, and the delimitation of the economic working of the coal-seams by depth of cover and by the influences of the anticlines and synclines.

For comparison may be mentioned the sheets of the Sydney Coalfield which are compiled from surveys made in 1874-6, corrected to 1898. Not only are these sheets woefully out of date, as regards the revisions and new data revealed by actual mining and borings, but no attempt has ever been made to show the seaward course of the anticlines and synclines, or to show the economic delimitation of the undersea coal-seams, as affected by depths of cover, undersea outcroppings, and the seaward course of the folds.

If one-quarter the work had been spent on the Sydney coalfield that has been spent (and very properly spent) on the relatively smaller and less valuable deposit at Nanaimo, many of the purely technical questions that have been the subject of animated debate in recent months would never have arisen; and the problems of the undersea coalfield would have been half solved by being more accurately displayed and understood.

Three years or so ago, the gentleman we have in mind was detailed to supply some of the crying deficiencies of the Sydney sheets, and now, with his work half done, the only man who has any close acquaintance with the geology of this district is compelled to resign. Why? He is thirty-seven years of age, married, with ten years service in the Survey; the highest scholastic qualifications, an enviable scientific record and unique acquaintance with some of the neglected problems of the geology of the maritime provinces, and a salary of \$2,400 per year: C'est pour rire.

This instance is typical, and we propose to give others equally glaring, only we have some respect to the patience of our readers.

The maximum salary of the senior members of the Geological Survey is \$4,200. There are men in the survey with nearly forty years experience, and international reputations, who have reached this giddy pinnacle of affluence, and have had the pleasure of seeing many men get rich through their labours. There are men, and have been men, in the Geological Survey of Canada whose labours and deductions have added millions upon millions to our national wealth, and it has been their lot to sit by like cloistered monks vowed to penal poverty, seeking presumably,—otherwise their salaries are not explainable—to free themselves from breaches of the tenth Commandment.

THE SELECTION OF MINE INSPECTORS.

According to reports from Cobalt, the local Miners' Union is undertaking the task of finding suitable men to fill vacancies on the staff of mining inspectors of Ontario. They propose to recommend to the Minister of Mines that men selected by the Union should be appointed inspectors. They apparently are of the opinion that the Minister might be prevailed upon to patronize the Union instead of appointing men properly qualified to fill the positions.

The duties of an Ontario mine inspector as defined by the Mines Act are such that careful selection of inspectors is essential. If instead of selection according to qualifications we are to have the political party or class favoritism mode of selection, the recommendations of the Miners' Union will be in order.

The regulations governing the operation of Mines in Ontario impose duties and responsibilities on the inspector that could not be properly delegated to many miners or mine managers. They assume on the part of the inspector not only general engineering training, but special knowledge and interest in the safe and efficient operation of mines and an ability to guard the safety and health of the workmen without imposing unnecessary burdens on the mine managers. The inspector is frequently called upon to make important decisions concerning the application of sections of the Mines Act, for instance in the case of rules for protection of miners it is provided that "the following rules shall be observed and carried out at every mine except in so far as the Inspector of Mines may deem the same not reasonably applicable."

The inspector is empowered under the act to make such examination and industry as "he may deem necessary" to ascertain whether the provisions of the Act are complied with. He may order the immediate cessation of work in and the departure of all persons from any mine or portion thereof "which he considers unsafe," or to allow persons to continue to work therein on such precautions being taken as "he deems necessary." He may exercise such other powers as may be necessary for ensuring the health and safety of

miners and all other persons employed in or about mines, smelters, metallurgical and mining works. In conducting inquiry with respect to any accident he has power "to compel the attendance of witnesses and the production of books, documents and things and to take evidence upon oath."

The many provisions of the Mining Act devised with the intention of guarding the safety of workmen necessitate on the part of the inspector a very good knowledge of the machinery used in mining and of mining methods. It has been found advisable to invest the inspector with a good deal of authority and therefore in addition to his qualifications as a safety engineer he must, to successfully fill the position, be quite free of labor or company influences R.E.H.

EN PASSANT.

THE Montreal Meeting of the Engineering Institute of Canada, held from the 27th to 29th January, was a most successful gathering. More perhaps than any other technical body in Canada the Engineering Institute reflects the common interests and aims of the Canadian people in their two great racial sections of French and English-speaking peoples. The genius of the French people for the exact sciences, and their eminence in mechanical arts, in mathematics and general engineering is prominent in Canadians of French descent, and the leading position taken by the Province of Quebec in the development of water-powers, highways, and the ganglion of transportation that is known as the City of Montreal, are not mere outgrowths of geographical position, but are also evidences of the native talent of the citizens of Quebec Province. The speech of Major-General Mitchell at the Annual Dinner in proposing the toast of the Province of Quebec, in which he described the part taken by the 22nd Regiment at Courcellette; and the graceful diction of the ex-Speaker Marcellin in response, was an incident of much significance, and indeed of much hopefulness.

MUCH prominence has been given by newspapers to the indisposition of certain members of the United Mine Workers of America in Nova Scotia to ratify the agreement made between the U. M. W. Executive and the Dominion Coal Company. The wisdom of this extended publicity is to be doubted, especially when it is known that on the occasion of every new agreement on wages made between the labour leaders for the time being, and the coal companies; such disagreements have taken place. These disagreements usually take the form of a local adjustment, and the procedure is a well-known and recognized one. It is a great pity that efforts at labour conciliation should be hindered by giving wide publicity to matters of purely local detail, as thereby the general public is unnecessarily disturbed and fictitious importance is given to subjects that are of only local

and passing significance. An instance of this undue alarming of the public was the prominence given to a small strike at Minto, N. B., where all the three parties concerned, namely the miners, the Company and the Conciliation Board bungled an easily adjustable situation, largely through over-estimating the importance of the incident.

A SIGNIFICANT event is the overture made to the "salaried" or "new poor," as the middle-class people of Britain are now known, by the British Labour Party. How much of the present social unrest is traceable to the anomalous position of the lower professional and official classes in corporate and government employment is uncertain, but much of it probably originates with men whose position is very helpless and very irritating. Corporations who will attend to the demands of labour, insistingly and threateningly made, often forget the clerk and sub-foremen, on whose loyalty and personal comfort so much of the machinery of corporate organization depends. These men are the great buttress of modern society against the dissolving forces of these days, and, if through forgetfulness, or more unworthy motives, employers neglect to take care of these men, the forces of unstabilization will increase even more quickly than they have so far done.

SOME interesting information concerning the present cost of producing gold on the Mother Lode in California is contained in the recently published review of mining in that state. The State Mineralogist, Mr. F. N. Hamilton, quotes cost figures for several properties and states that any company working Mother Lode ores for less than \$4.75 is doing it at the expense of the future of the property or because they have ore blocked out ready to mine for a long time to come and do not have to carry on current exploration and development. At the Morgan mine, where an ore shoot 30 ft. thick and 150 to 165 ft. long is being very profitably worked, the operating cost is \$5.14 per ton and the development cost 65 cents per ton. The itemized cost statement for the Morgan mine for July 1919 and the preceding six months gives a good idea of the present cost of mining a large ore-body in California.

STRONG OPPOSITION TO ENGINEERS' BILL IN BRITISH COLUMBIA.

The British Columbia Prospectors' Association adopted ten resolutions at a recent meeting held at Nelson, B. C. The resolutions were a part of a petition to be placed before the Minister of Mines and Provincial legislature at the coming session. Among the resolutions was one asking for the "rejection of that section in the Engineers' Incorporation Bill that would compel foreign mining companies to employ local mining engineers."

Not only are members of the Prospectors' Association strongly opposed to this section of the Bill but many prospectors who are not members are outspoken in their opinions of this section of the Bill.

The other resolutions were as follows:—

Request for district ore-testing plants and free assays for prospectors, powder at cost to prospectors, a winter school of mine for the interior, accessible district engineers reports, a division of the Eastern District, the application of trail and cabin buildings as assessment work toward grants, the allotting to returned men of the half shares of delinquent partners, the prosecution of parties who misuse prospectors' cabins.

A resolution asking for a special transportation rate on small ore shipments will be presented to the railway companies and the Railway Commission and one asking for a special rate for such lots will be presented to the Consolidated Mining and Smelting Company of Canada.

THE BRITISH COLUMBIA CHAMBER OF MINES; NEW OFFICERS FOR 1920.

The officers elected for 1920 at the recent annual meeting of the British Columbia Chamber of Mines, are as follows:

Honorary President, Col. the Hon. E. G. Prior

Honorary vice-president, Hon. Wm. Sloan.

President, Dr. E. T. Hodge.

First vice-president, W. H. Hargraves.

Treasurer, Wm. Godfrey.

Executive: C. E. Cartwright, S. J. Crocker, F. J. Crossland, G. S. Eldridge, Major Fleck, B. G. Hawkins, Dalby Morkill, H. P. McCraney, G. W. Pettapiece, Noble W. Pirrie, W. W. Thomas, A. M. Whiteside, F. E. Woodside, P. W. Turnbull, N. Thompson.

Mr. A. M. Whiteside, the retiring president, predicted a big boom in British Columbia mining this coming Spring and stated that New York people were aware of this. He complimented the retiring executive on its excellent work during the past year, and spoke of the good accomplished by the convention held in Vancouver last Spring. From his own knowledge he could say that many of the activities in the Portland Canal district were definitely traceable to that Convention.

Mr. Whiteside could see no reason why Vancouver should not have as palatial buildings as those in Spokane, built of British Columbia materials.

Dr. E. T. Hodge, the newly elected President, on taking the chair for the first time expressed his appreciation of the honor conferred on him, and stated that the Chamber of Mines had a work of immense importance before it. He said that it was their duty to advertise to the world the minerals which B. C. actually had. They must also maintain the cordial relations which already existed with the governing bodies of the Province. He pointed out that apathy shown towards the work of the Chamber was not from the outside world, but rather from the citizens of Vancouver, who needed to be aroused to a sense of their own welfare.

"Mining will make Vancouver into a Metropolis" he said "and the Chamber of Mines should be situated in a building worthy of the work being done, in a main street of the city, where exhibits could be shown to visitors and those interested."

Mechanical Loading Devices for Underground Work

A Successful "Mucking" Shovel in Michigan.

The present, and prospective, shortage of men who are willing to undertake hard manual labour underground, has led mine managers to turn their attention to the perfecting of mechanical devices for underground use in substitution for manual labourers. A further compelling reason for studying the possibilities of these devices is the shortened working day, which requires intensive production if anything like full interest is to be earned on the plants that have been designed to handle greater quantities than it is possible to produce in a shortened working day.

The limiting conditions attendant upon the design and operation of mechanical devices for use underground are much more irksome than in the case of overground operation, because, in addition to the limitations of size imposed by the restricted area of mine passages, and a further restriction of weight required in order to achieve portability underground, there are considerations of ventilation and the presence of mine gases that limit the motive powers that may be used.

The conditions attending iron-ore mining and, in some favoured instances, copper and precious-metal mining, are less limiting than those associated with coal mining, and therefore the evolution of mechanical loading machines has proceeded most rapidly in metal mining.

The accompanying photographs show a mucking machine that was recently put into operation in a Michigan copper mine, and is giving satisfactory service. It loads from 15 to 30 tons of ore an hour, depending on the depth of the bank. It is operated by compressed air, and has a reach of eight feet on either side of the centre line of the track. The photographs show the machine in three working positions,

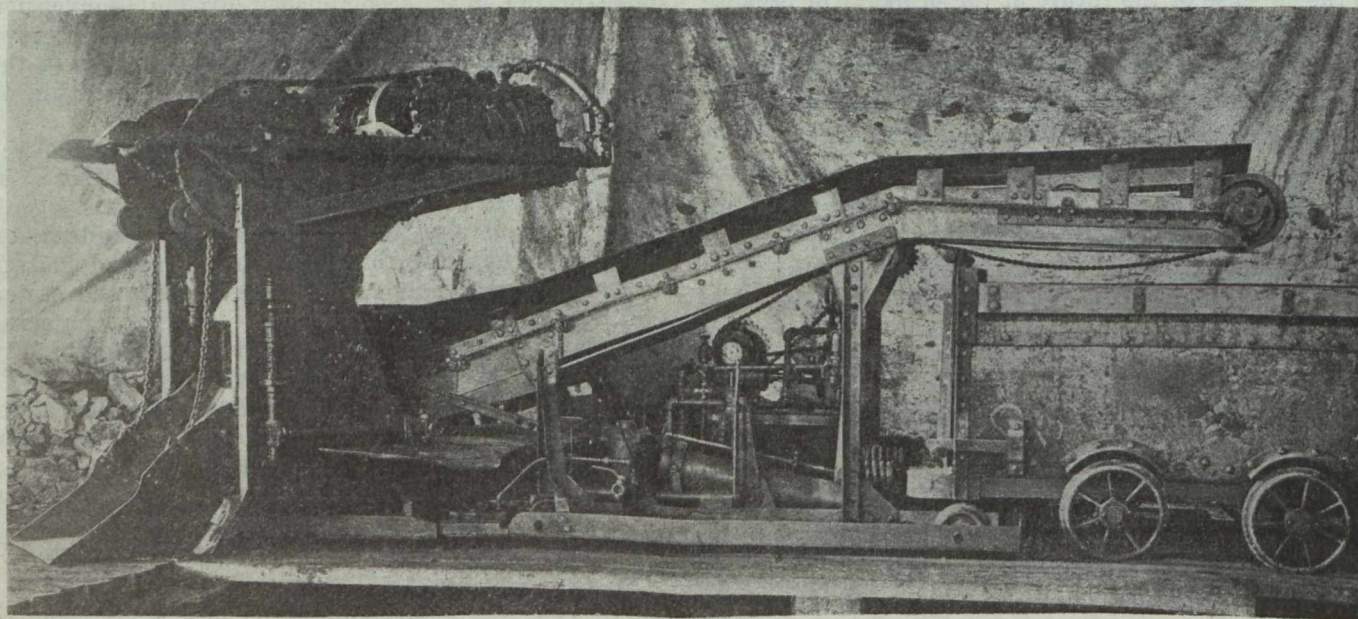
viz., empty, loading and loaded. We should be pleased to put any of our readers into touch with the designer of the device. It was designed and built at the mine where it is in use, and is shown in the photographs as it appeared when ready to leave the shop.

Loading shovels have been successfully operated for some time past in the mines of the Nova Scotia Steel Company and of the Dominion Steel Company at Wabana, Newfoundland. In these instances the great height of the seam, the width of the passages, and the tremendous blasts that are made provide an unusually favourable condition, as underground conditions go, for the use of a mechanical loader.

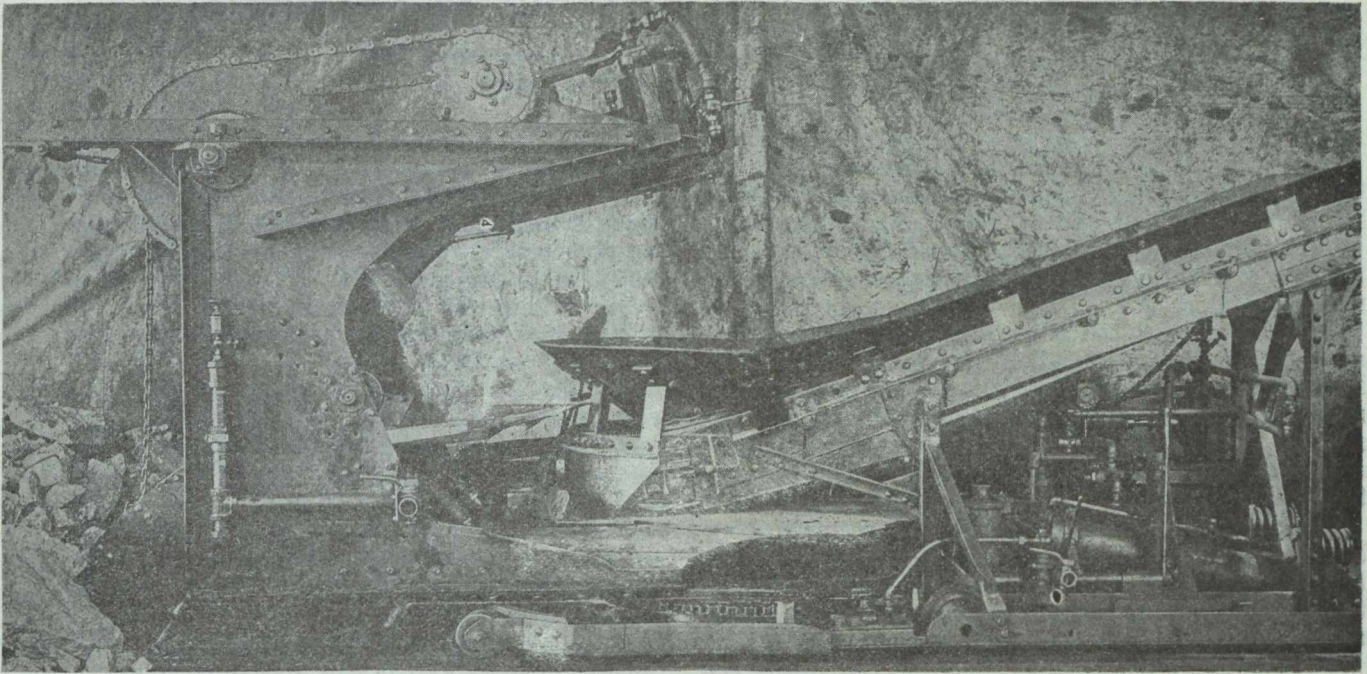
The Dominion Coal Company has also tried a shovel of a smaller type in its coal-mines at Glace Bay, and will in course of time evolve a satisfactory device, but the conditions of operations are very onerous, and probably a greater deterrent than anything else is the attitude of the workmen towards the introduction of these labour-saving machines. The further extended use of these devices will, however, be compelled by the growing and probably permanent shortage of unskilled labour in this district, and by the necessity to cut the costs of coal production by the adoption of every possible means.

It is also understood that the Hollinger Mines are experimenting with a mechanical loader, having been impelled to this by a similar shortage of suitable labour. At the Sullivan Mine, in British Columbia, similar experiments are being conducted.

About eighteen months ago, and before the signing of the Armistice, the "Journal" pointed out the likelihood of a growing shortage of unskilled labour, and the possibility that an exodus of south-European



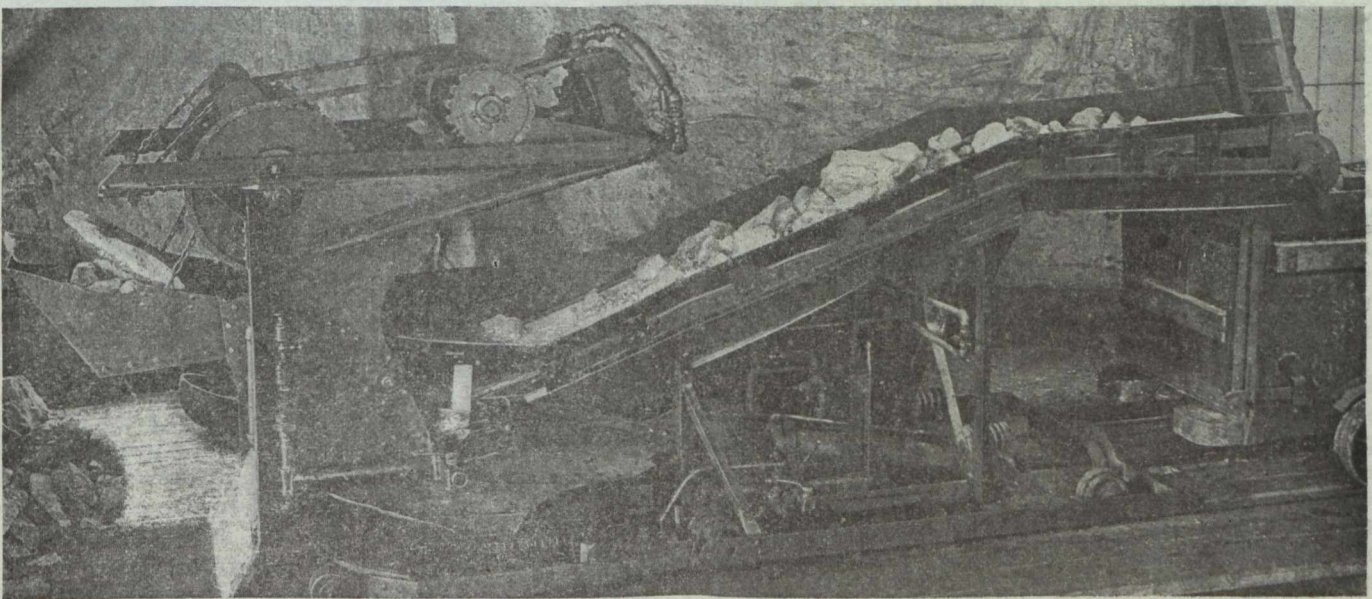
Empty Position of Shovel.



Loading Position of Shovel.

labourers following a conclusion of peace might be accompanied by an influx of British-born immigrants of a type unsuited and disinclined to replace the men who it was anticipated might return to Europe. This forecast has been fulfilled, altho' the continued unsettlement of southern Europe has delayed to some extent the efflux of labourers. It was counselled at the time referred to that investigation of the possibilities of mechanical devices in substitution for manual

labour would be repaid. The necessity to look into this question is now much more urgent. In the case of many large-scale mining operations on this side the Atlantic it has for some time been, and will continue indefinitely to be, not a question of getting unskilled labourers at a price, but of getting them at all; and those executives that proceed with the greatest rapidity to provide mechanical devices are most likely to show a good balance sheet.



Shovel Loaded.

The Zinc and Lead Deposits of Gaspesia

A Paper Read Before the Montreal Section of the
Society of Chemical Industry.

By J. C. BEIDELMAN.

Extending out in the Gulf of St. Lawrence with the Baie des Chaleurs as a southern boundary, is the Gaspé Peninsula—the oldest settled portion of the Dominion of Canada but yet so sparsely populated to-day that at places civilization reaches only several miles inland from the coastal line.

This Peninsula is 160 miles long and 75 miles wide and with the exception of the few miles above mentioned along the coastal line, it is a mountainous wilderness—void of all roads or inhabitants, and development has been at a standstill since Sir William Logan made his exploratory trip across the Peninsula in 1844.

Running in a northeasterly and southwesterly direction, and a considerable distance north of the Centre of the Peninsula, are the Shickshock or Notre Dame Mountains, the northeastern extension of the Appalachian chain. These mountains are very rugged and their peaks rise from 2,500 to 4,200 feet above sea level, consisting of rocks from Pre-cambrian to Devonian, which have been folded and faulted to a marked degree and in turn pierced by eruptive rocks, thus in an ideal manner producing conditions that are extremely favorable to the deposition of ore.

On the southern slope of the Shickshocks at the headwaters of Berry Mountain Brook, a tributary of the Grand Cascapedia river, and in a region showing great faulting, is an area of land with numerous fissure veins carrying sulphides of both zinc and lead.

The zinc and lead field is situated 46 miles in a northerly direction from the village of Cascapedia, Que., and is confined, as far as known, to the projected Township of Lemieux, County of Gaspé, P. Q. Following the east bank of the Grand Cascapedia river from the village of Cascapedia to the junction of the River and Berry Mountain Brook, a winter road has been built which is sadly in need of repair and whose grades, commercially, are impossible until depressed, which is easily accomplished. From this point a road is now being constructed connecting the zinc and lead fields with the winter road. This portion of the road is being made with low grades and suitable for tractors.

A railroad has been surveyed from Matane to Gaspé through the centre of the Peninsula, and the surveyed lines run within six miles of the present zinc and lead development. A portion of this railroad has been built, but the remainder has been held up owing to the financial situation.

For a number of years numerous stories had been circulated about discoveries of gold, copper, zinc and lead ores in the interior of the Gaspé Peninsula, and specimens of copper, zinc and lead had been exhibited as coming from said discoveries. These discoveries when investigated proved to be worthless until the year 1909 when several prospectors discovered lead and zinc float in large quantities on the side of a hill some fifty miles in a northerly direction from Cascapedia. The float principally galena, as the sphalerite had been leached, was found to exist to the top of the hill and a slight but unsuccessful effort was made to locate the source of the float. These efforts were soon discontinued and no further effort was made

until the following year (1910) when James McKinlay staked the hill and proceeded to search for veins. These efforts were only partially successful as far as the prospectors were concerned, as they paid particular attention to the soft rock (slates) and were adverse to disturbing the hard rocks which were the veins proper, but their efforts although misdirected, unknowingly outlines several rich values of ore.

Prospecting was carried along in the same loose manner for several years but no further discoveries were made, although trenches were cut in the slates and carried to within a few feet of the now so called main veins, but in no case did they cut these veins. One trench actually was carried up the hill at an angle of about 30 degrees and pierced the cropping of a vein at the crest of the hill two feet, and was then discontinued. This trench was 150 feet long in solid slate and the vein was visible to the naked eye at all times. Another trench cut the slates for a distance of twenty feet and jumped a space eight feet wide, and was then carried out for twelve feet further. The writer asked one of the prospectors why he left this "hump" of eight feet between the trenches, and he answered it was to keep the water from one trench draining into the other trench. This space of eight feet that the prospectors had never disturbed was a solid vein of ore. Where the prospectors' forge stood fifteen bags of solid galena were bagged from one shot "at grass roots."

This roughly outlines how ignorantly the work of prospecting was carried on in this area for five long years. In the fall of 1915 an effort was finally made to open up the area in a systematic manner, and development has been carried on until the present writing with great success.

Ore Occurrence.

The country rock of the zinc and lead area is Devonian and consists principally of slates, sandstones, porphyries, syenite and basalt. The rock in which the zinc and lead sulphides occur is generally a slate considerably tilted and greatly fractured with areas of porphyry close at hand—relatively. On the northern and eastern portion of the field proper, quartz-porphyry is present in very large flows. In fact, some of the hills at this point are all porphyry in the shape of lacoliths and dykes large and small, which have disturbed the country to a marked degree.

A detailed statement of the geology of the zinc and lead field is given in Prof. Adhemar Mailhot's report on the "Geology of a portion of the projected Township of Lemieux, County of Gaspé, P. Q." published in the Quebec Mines Report for 1917. In this report Prof. Mailhot (Ecole Polytechnique) deals with the geology in an able manner and in great detail, he having spent two summers in this field making a special study of same.

The fissuring in most cases is across the strike of the slates, filled with a quartz matrix, a small amount of dolomite being present. These quartz fissure veins crop strongly, and the system can be traced for a distance of over three miles by float, outcrops and openings, and wherever encountered impress one with

their strength. In all cases, these veins are well defined and show zinc and lead ore in about the same quantity and quality, and at every point where a vein has been opened to any extent, the metal contents have increased with depth.

The principal, and practically the only real development in the field, is the Federal mine. This property has made great progress in its development and has proven at least sixteen different veins within an area a little over fifty acres with widths of from four to sixty feet and traceable on their strike in some cases for over three thousand feet. These veins generally strike a little east of north cutting across the strike of the slates.

The present camp of the Federal mine is situated on the crest of a hill 450 feet above Berry Mountain Brook. This hill is fractured to a remarkable extent, showing a regular network of veins, each carrying practically the same zinc and lead contents.

At a number of places in the drifts and crosscuts of the Federal mine the slates are crushed to a marked extent by cross-fissuring and then cemented with a dolomite quartz carrying a good percentage of blende and galena. This breccia follows the strike of the veins and at places is over 100 feet wide. The blende and galena contents are lower than the metal contents of the veins proper but add greatly to the mineable area of the property, and will be very valuable assets whenever development is pushed on a very large scale, thus allowing of ore being mined whose metallic contents are considerably lower in zinc and lead than the main veins as now exposed.

One peculiarity of the breccia is that the mineral bearing solutions did not in any way attack the shattered and splintered fragments of the slates, and in all cases, the edges of these slates no matter how small are sharply defined.

Eleven hundred feet a few degrees west of south of the main shaft a vein is cropping sixty feet wide with an apparent horse of slate in the centre of same. This vein is known as the "McKinlay vein" and is cropping on the flank of the hill with crags 50 feet high, decomposed and leached but still showing the usual zinc and lead contents. This vein is also visible on the road below the main croppings, thus giving a vertical height of 110 feet of exposed ore which is all below the bottom of the main shaft.

One half a mile south of McKinlay vein, while grading a road, the vein system was cut 560 feet below the cloar of the main Federal shaft, thus proving that the slates have been enriched quite uniformly where fractured and to depth.

North and northeast of the Federal shaft prospecting has uncovered several additional veins—the extension of the main vein system—with ore contents practically the same. One half a mile northeast of the Federal shaft another shaft has been sunk to a depth of 64 feet, piercing a vein averaging nine feet in width thus showing a further extension to the length of the vein system. At this point the same general conditions were found to exist concerning the quantity and quality of ore uncovered. This vein has been proven to extend to be northeast of the shaft over 1120 feet, and to the southwest 1200 feet, thus adding nearly one half mile of vein averaging over five feet in width (as proved by trenching) and showing ore of good quality but badly leached for the entire distance.

Float is visible on the strike of this vein for nearly 1500 feet further, but owing to weather conditions, trenching has ceased for the winter months.

South of the Federal shaft about three miles, road grading uncovered a vein carrying zinc and lead with the same general north and south strike. This is of great interest, owing to the fact that this is the first indication that the veins were cutting the basic rocks.

North of the Federal shaft about 500 feet, a vein has cut syenite-porphry and is traceable for 400 feet, but is "narrowed up" while passing through the syenite-porphry.

Several veins at this main camp of the Federal are traceable for two and three thousand feet, while others, owing to the overburden are only traceable for from 300 to 700 feet.

One mile west of the Federal shaft and on a hill of the same general character as the hill on which the main camp is situated, a large quantity of float carrying the usual zinc and lead contents is found. The slope of this hill is towards Brandy Brook with a higher ridge between it and the main vein system at the Federal camp thus accounting for another occurrence of ore which has not been opened up at present.

In all the veins so far opened amethystine quartz is a part of the vein matrix. It seems to run with the strike of the vein in the form of veinlets and vugs and is generally barren of ore itself, but may be in very close proximity to very rich ore. The purple coloring is caused by a small amount of manganese.

Character of Ore.

The sphalerite and galena encountered in all of the openings and workings in the zinc and lead fields is of the highest grade, being equal to the ores of the Joplin Missouri field which are considered to be the highest grades of zinc and lead ores mined, and is of a honey yellow color generally. The sphalerite shows a zinc content of from 62 to 65 per cent with an average of less than one half ($\frac{1}{2}$) per cent iron. This is not only the average of the surface ores but in the underground workings on the main Federal vein the same average is carried out.

The ores, both zinc and lead, are in no way complex, and their treatment is simply one of concentration as at the present time they are free of silver, barium, arsenic, antimony or any other complexity whatsoever, other than that of separating the lead and zinc concentrates from their silicious gangues, which is easily accomplished owing to the considerable difference in specific gravity between the two sulphides—specific gravity of galena being 7.4 to 7.6 and of zinc blende 3.9 to 4.1.

The lead and zinc sulphides are mechanically combined at places throughout the veins, but not chemically, and at places large masses of lead and zinc sulphides exist that simply need hand sorting. A small amount of carbonates both smithsonite and cerrussite is found on the surface but only traces are found on the 100-foot level of the main vein. Considerable fine grinding will have to be provided for, as a portion of the ore is disseminated through the gangue in a finely divided state. The value of the ores does not lie in the saving of all these fine particles, but this operation with the aid of the soil flotation process will add materially to the amount recovered.

The usual bug-bear in zinc concentration—iron—will not be a disturbing factor as there is too little of it to be of any harm. This remark refers to all development in the district up to the present writing, but what the future will bring forth, I cannot state, but believe the iron contents will continue to be very low.

The zinc found in the breccia outside the main vein is sometimes of a brown color similar to the Joplin

"color" but upon analyzing same it was found to contain the same zinc contents as the honey-yellow blende.

As one of the veins approaches the porphyry area to the north, a varying amount of chalcopyrite is present in same, and this is the only ore so far discovered in the entire field that has any other valuable metal present in quantity, besides zinc and lead. The copper at spots is as high as four and five per cent and would lead one to believe that as depth is obtained on the veins of this section and porphyry is encountered, that copper values will be present to a more or less degree. This condition is found solely in the northern portion of the field and only when the veins are accompanied with or near porphyry.

In Bulletin 154 issued by the Bureau of Mines at Washington, D.C., Mr. Clarence A. Wright in co-operation with H. A. Bushler, State Geologist of Missouri, outlines the generally accepted practice of milling the "Joplin" ores as follows:—

"Concentration of the ore is commonly effected "by crushing to $\frac{1}{2}$ inch and roughing and cleaning "the crushed material over two or more large Cooley "jigs of the Harts type, and running the finer sands "over the usual types of sand and slime tables."

This practice, in addition to regrinding the "chats" and tabling the product, is followed by treating the slimes by flotation. This general scheme of concentration is particularly adapted to the Gaspé ores owing to their great similarity to the Joplin ores and to the further fact that the grains of blende and galena in the Gaspé ore separate from their gangue much more readily than the Joplin ores. This is due entirely to the gangue of the Gaspé ores being much more friable than the Joplin vein matter.

Owing to the character of the deposits in the Gaspé field, mills with greater degree of efficiency in concentration are made possible and can be built with the idea of permanency instead of being built for only a few years, which is the practice in the Joplin field—an average of three years being the life of the ordinary Joplin zinc and lead mine.

Development.

Numerous pits and trenches are in evidence over the field showing a great amount of surface ore but the main development consists in the Federal and Bois shafts and the undergrounds works from the first named shaft. A shaft has been sunk on Federal hill 142 feet (160 feet on the vein) from which drifts were run north and south (the strike of the vein being a few degrees east of north) and crosscuts driven east and west, making a total underground footage of 1816.6 feet.

The north and south drifts are driven on the strike of a very strong vein cutting the slates at right angle to the strike and dipping 78 degrees to the west. The vein is faulted but in no place does it show any material narrowing. Several veins intersect the main trunk system and wherever sampled carry the same general zinc and lead contents. The main vein on the 100 foot level is robbed to a considerable extent of its values by leaching and I confidently look for higher values on the 200-foot level. The ore at the bottom of the main shaft shows less leaching than at the 100-foot level and the blende has a lighter color.

This development "blocked out" above the 100-foot level in two veins a large amount of ore of an average value of \$10.00 per ton and accounted for a very large amount of probable and possible ore. The main vein was drifted on in ore for 870 feet before turning to the east to break through to "air," and showed an

average width of twelve feet of ore. From end to end of this 870 feet the ore body was continuous with here and there some very rich bodies extending over considerable areas. The average metal contents of the 870 feet together with the shaft, as proven by channel cuts, was 8 per cent metallic zinc and 4 per cent metallic lead—exclusive of the rich spots in the vein, or 13.33 per cent of 60 per cent zinc concentrates and 5 per cent of 80 per cent lead concentrates, as Joplin figures its ores. This compares very favorably with the contents of the Joplin-Oklahoma field as the above percentage of concentrates in the "mine run" of the latter field would be considered very high.

Mr. Walter Harvey Weed, mining geologist of New York and for over 20 years with the United States Geological Survey, examined the district in detail. I have taken the liberty of quoting from his report on the main property as follows:—

"The ore occurs in well defined fissure veins whose out-crops on the cleared tract are distinct and traceable across "the claims..... while no definite statement as to the genetic relation of ore and rock is perhaps warranted, an experience makes me feel positive that the observed geological "relations are extremely favorable."

"The conditions just noted together with others which need "not be described here, show movement indicating deep fracturing and persistence of ore values downward."

"I see no valid reason why these deposits should not be "as rich 1000 feet down as at the surface."

"There is practically no pyrite or marcasite in the ore. It "does occur, however, but in scanty amounts."

"The ore seen in the underground workings is typical of "that seen in the other veins nearby. From the statement "already made, I have shown that the property has a considerable body of commercial ore already opened up but this "is only a very small percentage of what may be expected "from deeper and more extensive mine development; moreover, the property has possibilities of a large tonnage from "other veins and from other claims as yet unprospected."

"The quality of the ore at every point is excellent and it "has no troublesome components."

"Concentration of the ore will in my opinion be easy because of its simple mineral composition and favorable mechanical analysis."

"This development is merely indicative of what future "work may show. The probable greatest value of the mine is "its undeveloped portion."

"The geological evidence indicates that the ore will extend "a great distance downward. A depth of 1500 feet or 15 years "supply for a 200-ton mill from this one ore shoot is quite "possible"

Dr. A. P. Coleman, Professor of Geology, of the University of Toronto, visited the zinc and lead field during the past summer and was very much impressed with the ore occurrences and the general geology of that section of the Peninsula, and in a paper written for publication makes the following statements:—

"Now folded and faulted sediments acted on by masses of "eruptive rocks which have cooled slowly and at great depths "furnish the natural conditions for the formation of ore deposits. In northern Ontario or British Columbia such conditions would be considered very promising; but in Gaspé "until recently nothing of value has been reported."

"On the mountain top several veins cut the slate and porphyry and have been opened up by stripping as well as work "underground."

"The most promising sulphide in the ore is zinc blende "of a honey yellow color, almost free from iron, unlike the "dark brown or black blende found in other parts of Canada. Galena comes next in amount. The gangue minerals "are quartz, often amethystine, and dolomite; and along with "the vein matter there is sometimes a breccia of slate fragments cemented by spar containing some ore, evidence of "important faulting in connection with the veins."

"The conclusion is reached that the mine has a large body "of ore of unusually high quality"

"The mine itself has been examined and reported upon by

"the well-known American mining geologist and engineer, Walter Harvey Weed, a very competent authority."

"As a vein has been cut in roadmaking in the valley, 560 feet below the outcrop at the camp, the ore may be expected to go to considerable depths, perhaps, as suggested by Weed, even to 1500 feet, making the mine one of the great zinc deposits of America."

"As the tunnel is only 92 feet below the surface this is only a very small percentage of what may be expected from deeper and more extensive mine development."

"The ore assays about 8 per cent of zinc and 4 per cent of lead, and the association of minerals permits an easy separation of the two metals. It is compared by Weed to that of the Joplin district of Missouri, and in general character it is surprisingly like the ores of that famous zinc mining region, in spite of the fact that the geological features of the two districts are as different as possible. At Joplin the zinc ores occur in flat sheetlike deposits at no great depth in carboniferous limestone, which is very little disturbed and nowhere pierced by eruptive rocks; while the Federal ores are in well defined veins reaching a known depth of hundreds of feet in slate, squeezed and faulted and penetrated by eruptives from which the metal bearing solutions are supposed to have come."

"The Shickshocks give promise of becoming a valuable asset to the Province of Quebec instead of a barrier to enterprise; and it may well be that the mines of the heart of Gaspé may before long surpass in value the forests or the fisheries of its coastal regions"

Adhemar Mailhiot, Professor of Geology at the Ecole Polytechnique of Montreal, in his report to the Quebec Provincial Government for the year 1917 concerning the zinc and lead field states:—

"The galena in the veins of the projected township of Lemieux occurs in the shape of grains of all dimensions from small flakes very thinly disseminated among the zinc-blende and the gangue to cubes measuring two inches. Sometimes it forms with the blende solid masses weighing over one thousand pounds. The gangue of the metalliferous veins, formed of quartz and dolomite makes the ore very easy to concentrate by the ordinary mechanical processes."

"The blende of the deposits in Lemieux County is very pure and almost free from iron; its color varies between waxy yellow and reddish brown."

"As the deposits are fillings of great fractures of the earth's crust, it would seem that they must go down to the base of the slaty sedimentary rocks."

"There are outcroppings of ore not distant from each other between which are differences of level of several hundred feet and it is almost certain that the highest deposits go down in depth to the level of the lowest ones."

"Some veins have been followed for distance of about 3000 feet and it is probable that they extend still further under the cover of superficial deposits"

"Then the natural inference is that these veins must go down to a considerable depth, for it is generally admitted that the length of a fissure is proportionate to a certain extent to its depth."

The only chemical by-product that will be commercially produced from the above character of ores is sulphuric acid, which is quite an item to the smelters at the present time treating the Joplin-Oklahoma zinc ores, but the character of the zinc concentrates renders it possible to produce cheaply from said ores the highest grade of spelter—free from all deleterious ingredients, thus commanding a ready sale and giving the British Empire reserves of the highest grades of spelter comparing favorably with the "Horse Head" and "Bertha" brands of spelter manufactured by the New Jersey Zinc Company and the "Mascot" brand of the American Zinc and Lead Company.

From what I have seen of other zinc fields, I am strongly of the opinion that the present area will prove on development to be one of the few zinc and lead fields of the world producing a high grade zinc blende, minus the usual complex ores, and if the depths are sustained, as I thoroughly believe they will be, then this field has a future before it of tremendous possibilities.

THE SILVER ISLET MINE IN LAKE SUPERIOR.

By J. J. O'CONNOR.

The Nepigon Mining and Lands Company, owners of the famous Silver Islet Mine, have granted an option to United States interests on all of their holdings comprised in the Wood Location, at Silver Islet, including the land covered by water, this location covers about ten thousand acres.

It is the intention of the parties taking the option to unwater the mine to a certain depth, to enable them to extract the ore in the roof of the mine, and to carry on systematic explorations on the mainland, where several promising veins are known, and on which considerable testing work had been done under the old operations. Vein values, that under the old regime had no attraction, are now well within commercial possibilities. The abnormally high price of silver, and the improved methods of recovery, more than counterbalance the increased costs of production, and offer a very promising future.

The roof of the Islet has been thoroughly tested by drilling, and is known to contain well over three hundred thousand ounces of smelting ore. Many schemes were planned for taking out this ore, but none were ever undertaken, or at least, put into operation. At one time a cargo of bricks were brought up from Southhampton, with the intention of constructing an artificial roof, but this scheme was abandoned, and the bricks were afterwards used in the construction of the Roman Catholic church in Port Arthur, in 1881.

Silver was discovered on the Islet by a man named Brown, in the employ of Thomas Macfarlane, M.E. in 1868, while placing pickets for a land surveyor.

The first silver mining was done in 1869, when 5/1-4 tons of ore were taken out, valued at \$6 976. Eight men were employed in mining during the winter of 1869-70. The Islet is exposed to the full force of the storms of Lake Superior, the weather in the spring of '70 was such that the boarding house and all other structures were washed away, and for a time the miners were in rather a hopeless condition. When matters got straightened away in the spring, they took out ore to the value of \$25,000 in one week.

These operations were carried on under the superintendance of Thomas Macfarlane. He visited the Montreal owners of the property, and requested them to advance \$40,000 to enable him to fortify the works against the storms of Lake Superior. They refused this request believing it to be impossible to carry on successful mining operations, and placed the property on the market for sale.

A sale was made for \$125,000, and the first payment of \$50,000 was paid in gold on September 1st, 1870. Mining was proceeded with, and \$108,000 worth of silver was mined and shipped before the close of navigation that year.

From this time on mining was carried on, on a very extensive scale. A 40 stamp mill was erected on the main land, in 1874, and the ore conveyed to it by scows, and tram. A village of quite extensive proportions grew up at the Islet several hundred miners with their families making up the population.

Mining was continued with varying degrees of success, until March 1884, when they were compelled to close down for want of fuel. The steamer "Hulbert"

carrying their winter's supply of coal to operate the mine, was storm-bound at Marquette, Mich. and did not reach the Islet until the opening of navigation. Finding operations at the mine closed down the coal cargo was discharged at the C. P. R. Horn elevator dock, Port Arthur.

During the time the mine was in operation there was mine dand marketed \$3,250,000 worth of silver.

The closing down of this property, saw the end, for the time, of one of the most picturesque and daring silver mining ventures ever undertaken.

It is confidently believed by well informed mining men, that this famous old property has a profitable future yet in store.

Manitoba Notes

Gabrielle Mines Ltd.

The "Journal" is informed by the Secretary of the Gabrielle Mines Ltd., that Major Pelletier has been placed in charge of construction work, and left Winnipeg on the 12th January, via Riverton, with all supplies and equipment necessary for the re-building of the permanent camp site. New buildings are to be erected, and some of the old ones made habitable. Water and ice supplies are being arranged for next Summer's work. The purchase and installation of permanent machinery will be decided upon when Mr. J. B. Tyrell, the Consulting Engineer of the Company, returns from England. Those in charge of operations are proceeding to develop the mine so as to avoid unnecessary expenditure, and propose to study the character of the deposit from every angle before committing the Company to large outlays. The management of the Company express the belief that the showing of the former operations, and the later development of the property, warrant the confidence of those who have invested in the enterprise. From the investor's standpoint, the engagement of a competent and reputable mining engineer as a permanent consultant is the best guarantee that the property will be made to yield any values that are contained in it.

Pan Extension.

Completion of the camp buildings, and progress with the foundations of the boilers, and permanent power-plant of this Company are reported by John Beckman, the Managing Director.

A New Flotation.

The Bingo Mines, Ltd., is the latest mining flotation in Northern Manitoba. Capitalization is \$2,000,000. Development shares of par value of one dollar are being offered at fifty cents. The advertising literature of the new venture is not marked by any restraint, and it is several times mentioned that the Bingo property contains "the richest vein in the richest camp since Cripple Creek". The mine is situated near the Rex Mine, in the Herb Lake District of Northern Manitoba, distant about 82 miles from Le Pas.

Reported Discovery of Improved Method of Electrical Transmission.

The Winnipeg "Free Press" announces that Captain J. W. Dorsey, Asst. Professor of Electrical Engineering at the University of Manitoba has completed experiments which enable him to publish the

the discovery of a new principle in electrical transmission which will reduce present costs of transmission by at least one-half.

"The principle," said Capt. Dorsey, "involves the use of an electric arc, several types of which I have invented as long as eight years ago. I have since been working on the application of this arc and a solution of one of the long-standing problems of electrical engineering. The principle gives rise to the invention of a number of new types of power machines. It may be applied from the time the power leaves the turbine generators to its use in electric motors in distribution centres."

Capt. Dorsey's experiments were interrupted when he went overseas with the 9th Americans in 1917. He was wounded at Chateau Thierry. Since his return from the war, he has applied himself to the carrying out of his experiments.

Gold Pan.

A general meeting of shareholders to receive the report of the President, J. H. Ashdown, will be held February 10th. At present a force of eleven men is employed on the exploration work.

TORONTO SECTION, A. I. ELECTRICAL ENGINEERS

(Lecture By Prof. A. E. Kennelly)

A lecture of unusual interest to electrical engineers took place at the regular meeting of the Toronto Section, the American Institute of Electrical Engineers, held at the Engineers club, Friday January 30. Professor A. E. Kennelly D. Sc. of Howard University delivered a lecture on artificial power and transmission lines.

During the past thirty years of the electrical industry a marvellous advance had been made in electrical theory and transmission-line formulae had been very thoroughly worked out by Heavyside and others. Much of this mathematical theory was of little use to the practising engineer owing to its complexity, and recourse has been had to more simple formulae, derived for practical uses.

Hyperbolic functions were of great use in the practical applications of electrical theory, and the speaker developed the mathematics of these functions at some length.

Of much use also to the engineer were the artificial lines built for laboratory investigation. By proper construction these could be made to duplicate actual full-scale conditions, and served to investigate the phenomena of transmission telegraph and telephone lines up to 500 miles in length or over.

Professor Kennelly while in the city is also speaking at the meeting of the Royal Canadian Institute on February 7th, on the subject of "Research in Engineering."

Personal

Mr. J. B. Tyrell is expected to sail for Canada by the "Adriatic" ex Southhampton for New York, January 28th.

Our Northern Ontario Letter

The first month of 1920 closed a favorable record for the producing mines at Cobalt. From the results achieved, and the preparations under way it is already possible that a greater number of mines will contribute to the 1920 output than was the case in 1919. It is interesting to find all the 1919 shippers continuing to produce, with the one exception, the Adanac. New shippers will probably include the Bailey-Cobalt, Lumsden, Nipissing Extension and Hargraves Consolidated. Among these the Bailey has the greatest indicated possibilities, but the other three mentioned properties are conceded to have a good deal of merit.

The Mining Corporation of Canada is continuing its aggressive policy of endeavoring to acquire new prospective mines in the newer fields. It is planned to carry out an exploration program on claims acquired last fall in the township of Butt, district of Nipissing. This work will be for the purpose of exploring for radium-bearing ore, encouraging quantities of which were discovered in that township late last summer. The company, in addition to keeping in touch with the newer fields in Northern Ontario is also active in the Port Arthur district as well as in British Columbia.

The sampling of the tailings pile on the Chambers-Ferland property has been completed, and it is understood the holders of the option are considering the erection of a 300-ton flotation plant. As to this, no official statement has been issued. It is generally believed, however, that the deal will go through.

At a meeting of the shareholders of the Tretheway-Cobalt Company held Jan. 30th the agreement entered into recently by the directors authorizing the sale of the Cobalt mine of the Thetheway Company to the Coniagas Mines, Ltd., was endorsed. This leaves the Tretheway in a position to concentrate its energies on its Castle property.

The Coniagas Company have acquired the mine and mill of the Tretheway will proceed to extend its workings over onto the Tretheway territory where a raise will be driven for the purpose of connecting up with the main workings on the Tretheway. The Coniagas would appear to be in a position to benefit considerably in that the overhead expense will not be increased while the volume of the ore available will be materially increased.

Favorable developments at the Beaver Consolidated continue. The new ore shoot encountered recently at the 530-ft. level is gradually being found to extend to quite large proportions, and ore of a medium grade is found to occur over a width sometimes amounting to ten feet. The location of the deposit leads to the belief that it will also be found to extend upwards and may be tapped on some of the upper levels. Coincident with this, the company is developing a large amount of high grade ore on its Kirkland Lake mine where at the 500-ft. level some five feet in width of vein matter is found to be rich in gold tellurides.

The support of mining companies in Cobalt is being solicited by the Thompson Power Company, with

head office and plant at Deseronto, Ont., and where it is proposed to manufacture a comparatively new explosive known as Thompsonite. The explosive has been tested at such mines as the Temiskaming, Beaver and Bourke's, and favourable testimony is submitted by the respective managers of the mines above mentioned.

In the Gowganda silver-area the number of outfits engaged in exploration work on various promising mining properties is steadily increasing and the camp is experiencing a boom of at least fair proportions. It is learned that the South Bay Power Company will again proceed with the development of Hanging Stone Falls. This enterprise was commenced two or three years ago, but was suspended owing to the concern apparently becoming financially embarrassed. As to this it is now stated that the requisite finances have been arranged for and that about one hundred tons of material is already in course of transportation to the scene of development. It is understood that the plans are to have the first unit in operation and electricity in Gowganda before the end of the coming summer.

Satisfactory progress is unofficially reported in the negotiations for the Miller Lake-Everett property. It is intimated that the Kilpatrick property may also be included in the deal and that strong financial interests are associated in a scheme to acquire a large acreage in the immediate vicinity of the proven area and with the object in view of carrying out a comprehensive scheme of exploration and development.

It is stated that a number of mining deals are in various stages of consummation, and that they range from more or less small transactions to deals of quite large proportions. In connection with the purchase of the Miller Lake-Everett the name of Sir Henry Pellatt of Toronto is mentioned, while in connection with the Kilpatrick property the name of C. L. Campbell of Montreal is mentioned.

Activity in the vicinity of Leroy Lake continues with promising results. It is learned that a deal is about closed for the purchase of the Dodds property.

Concerning the construction of a railway to Gowganda from Elk Lake, the Journal correspondent has been officially advised that the Canadian Light Railway Construction Company has received encouraging offers from oil operators in the Peace River district, Alberta, as well as the mining district of The Pas, Man. This company which desired to construct a light narrow gauge railway to Gowganda states that it is up to the people of Northern Ontario to decide whether or not they want quick relief in the way of a light narrow-gauge railway or prefer to wait some time for standard-gauge railways. In the meantime, Premier Drury has up to the time of writing failed to reply to queries as to his view of the possibility of having the standard-gauge railway extended from Elk Lake to Gowganda this year.

In the once active South Lorrain silver area, not a wheel is turning, but there appears to be some prospect of a limited amount of work being resumed in the early spring.

The Boards of Trade in Northern Ontario, at least those active in the district of Temiskaming, have again taken up the question of urging the Ontario Government to throw open Gillies Limit for prospecting. It is pointed out that a considerable part of the Limit contains geological conditions which are favorable, and that an aggressive prospecting campaign might reasonably enlarge the proven silver-producing areas of Cobalt.

During the week ended January 30th, four Cobalt companies shipped an aggregate of approximately 359,270 pounds of ore. The Coniagas was the heaviest shipper as shown in the following summary:

Shipper	Cars	Pounds
Coniagas	2	175,630
O'Brien	1	64,030
Hudson Bay	1	61,610
Dominion Reduction	1	58,000
Totals	5	359,270

Bullion Statement

During the week none of the mines shipped bullion, the only consignment of refined silver being sent out by the Dominion Reduction Company as a result of treating customs ore.

The Gold Mines.

The gold mines of Northern Ontario appear likely to be confronted with a request from the workmen for another increase in pay in the early Spring. It is intimated that the men have the issuing of such a request now under consideration. The attitude of the companies is not known for the reason that the workmen have not yet directly intimated their intentions. It is learned, however, that the workers will base their request on the present wage scale at Cobalt which amounts to about \$1 a day higher than in the gold camps. At the same time, according to information obtainable, it is understood they are calculating this comparison on a basis of silver at or above \$1.30 an ounce.

It is unofficially estimated that the 1919 output from the mines of Porcupine was well over \$9,000,000 which record would bear out previous estimates made in these columns that the 1919 production for the province amounted to around \$10,500,000. Further it is now assured that provided sufficient men can be procured and allowing for a reasonable temper in the workers, the 1920 production will greatly exceed any previous year on record in the province.

At the time of writing, the Hollinger Company is expected to declare a dividend of one per cent. payable February 15th, amounting to \$246,000. It is also believed that the annual statement will be issued within the next thirty days.

Local criticism is being directed at the continued reticent policy of the directorate of the Dome Mines. The crop of unofficial rumors pertaining to tonnage treated, gold produced, and costs of operation have not served to appease the hunger of the shareholders for definite information. It was expected that the interim dividend cheque of January 15th would be accompanied with at least a brief statement as to the present financial condition of the company. Failure to do this has aroused some uneasiness. The company will end its fiscal year March 31st. Also its option on the Dome Extension property will either have to be exercised, extended or rejected in March.

Unofficial reports concerning the McIntyre would appear to offer reason for speculation as to the manner in which the McIntyre-Porcupine will dispose of the option which it holds on the Plenaureum property. Here, also, opinion is divided, and all shareholders await the verdict.

The Hudson-Porcupine Gold Mines Company has been incorporated for the purpose of exploring and developing the property formerly known as the Whelpdale. The property is situated on the north side of Timmins.

Concerning the Porcupine Crown and its negotiations in connection with the Moneta, nothing of a definite nature can be learned, and apart from the fact that an examination of the Moneta was made by officials of the Porcupine Crown, no official statement has been issued.

In the Kirkland Lake district there is much to arouse the enthusiasm of those involved. This is not only true of the producing mines but also applies to various properties in the development stage as well as to mining claims in general.

The Lake Shore mine having been dewatered to its deepest level, the 400-ft. it is now finding it possible to produce at full capacity and the figures soon to be issued for the month of January promise to show a very substantial increase over the December record.

Work at the 500-ft. level of the Kirkland Lake Gold Mines is serving to develop a large tonnage of rich ore. Gold tellurides have been found to occur in rather spectacular quantities over a width of about five feet. The work of developing this ore body at the 400-ft. level, as well as at the 600 and 700-ft. levels is to be carried out at once.

At the Miller Independence property at Boston Creek, the central shaft has reached a depth of 500 feet and arrangements are being made to carry out extensive lateral operations. The annual meeting of the company will be held in Dayton, Ohio, this week.

At the Peerless property, formerly the Mondeau, the installation of a mining plant has been completed and will probably be set in operation by the beginning of next week. The capacity of the plant will make it possible to carry operations to a depth of at least 500 feet.

Shaft sinking at the Kennedy-Boston has been carried to a depth of 76 feet at the time of writing and will be soon completed to the 100-ft. level. It is understood further arrangements will be made to carry out lateral work at the first level.

Among the new mining companies recently incorporated is the Wood-Kirkland Gold Mines, Limited, with a capitalization of \$2,000,000 made up of 2,000,000 shares of the par value of \$1 each.

The Wood-Kirkland owns close to three hundred acres of mining lands situated in the township of Lebel, in the Kirkland Lake district. The property is located South of Mud Lake and is just one claim removed from the Bidgwood. The exploration and development of the property is to commence within the next month or so, toward which end Jack Murphy, a former mine captain at the Tough-Oakes Gold Mines has been engaged to superintend the work.

The directorate of the new company is made up of strong financial men, as shown below:—

Geo. W. Morris, Buffalo; N. R. Kirkpatrick, Dayton, Ohio; J. E. Day, Toronto; Fred C. Bonnet, Hamburg; A. L. Pfau, Haute, Ind.; E. L. Wettlaufer, and Henry J. Wood of Buffalo.

Reports from the Boston Creek district are to the effect that the exploration work being done on the Rice Mine, or commonly known as the Charette property, has been exceedingly satisfactory. It is reported unofficially that some very rich ore has been encountered in a diamond drill hole, commercial ore extending over more than twenty feet in width.

Lack of official confirmation has caused the report to be received with all due caution, but fairly general interest has been aroused among those holding claims in the township of Boston in the vicinity of the reported find.

HARMONY AT COBALT.

Employees' Sick Benefit Fund Proposed.

Among the first benefits to be derived from the scheme of "Employee Representation" at the mines of Cobalt is presented herewith. It has to do with the insurance of men during illness. The present practice at the mines of Cobalt is for the men to form into committees representative of the workmen at individual mines. These committees deal with questions arising in connection with the mine at which they are employed. No unions are recognized, but all employees whether members of unions or not are given full representation the scheme thus providing representation for one hundred per cent of the men employed.

Following is the full text of the rules governing the proposed "Employee Sick Benefit Fund" as applying to the employees of the Dominion Reduction Company. It is understood that the company has approved of this scheme and has offered a loan in order to place it on a satisfactory working basis. The rules follow:—

(1) That this Fund be called "The Dominion Reduction Employees' Sick Benefit Fund."

(2) That employees agree to pay into the fund one-half of one per cent. of his monthly wage based on a thirty day month at the daily rate, i.e. A man earning say \$3.50 per day receives \$105.00 for thirty day's work. His contribution to the fund will be 53 cents monthly no matter whether or not he works the full thirty days.

(3) The Dominion Reduction Company pays a like sum, 53 cents, making a total of \$1.06 per man to the fund.

(4) That employees who are sick for more than three days be entitled to receive from the fund an amount equal to 55 per cent. of his daily wage for each day's sickness up to 60 days. After 60 day's illness he shall be entitled to receive one-half of 55 per cent. of his daily wage for another period of 60 days' after which he shall cease to have any further claim on the fund. In cases of dire distress, however, if funds sufficient are on hand and the committee recommends it, a vote shall be taken on the question of additional relief among all the employees when a majority vote shall decide, also as to what additional relief (if any) shall be given.

(5) A medical certificate must accompany all claims for sick benefits, and men falling sick must see a doctor within 24 hours of his calling on the fund

and must obtain a certificate from such doctor certifying that he is unable to work. The claim will commence from the date of such certificate. He must also obtain a certificate calling him off the fund. No claim will be paid without the approval of a majority of the committee.

(6) That in cases where a man is placed in quarantine because of contagious diseases in his home or place of abode the benefits be the same as for sick pay provided he supplies a medical certificate to that effect.

(7) That no employe shall be entitled to receive sick pay where he has not been in the company's employe for at least 30 days immediately prior to his illness except in cases where he has been paying into a similar fund of another company which has previously made such arrangements as to permit each other's men the privilege of immediate full benefit.

(8) That the amount of payment to be made at death be governed by the amount on hand at that time, but at no time shall it exceed \$250. This amount will be paid if there \$500 in the fund. If not one-half of the amount of the fund will be paid.

(9) That all funds be deposited in the bank in the name of the fund and all cheques to be signed jointly by the manager and the Chairmaan of the committee.

(10) That in cases of accidents where employes are already protected these rules do not apply. There shall be no claim on the fund.

(11) That a balance sheet be issued at the end of each financial year and posted in a prominent place for perusal.

(12) That these rules, rates of pay etc., be subject to change at any time and that special assessments may be levied to meet the claims of sick members should conditions warrant it. In the event of the ceasing of operations, the fund on hand to be divided between the company and the men fifty-fifty."

TORONTO NOTES.

President F. L. Culver of the Beaver Consolidated Mines, Limited, has returned from the North, bringing further important news of finds on the Kirkland Lake and Beaver properties. At the Kirkland Lake mine the volume of rich ore in which exploration has recently been taking place has been found to be considerably larger than was previously known. This was ascertained through further drifting on the fourth and fifth levels. This work will be continued on the sixth level next week. The ore body is about five feet wide and as rich as anything previously encountered at the mine, showing free gold and tellurides all through the quartz at this point. These workings are the deepest at the Kirkland Lake camp and the further discovery of good ore at this depth is considered important.

Encouraging results have been found at the Beaver, the parent mine of the Kirkland Lake, in virgin ground at the 530-foot level, where some springers were followed, which have developed into a body of mill ore from 6 to 10 feet wide. Where the explorers have driven in on this the wall rock has been found impregnated with leaf silver. Also on the 400-foot level it has been found that the same conditions exist.

British Columbia Letter

METAL MINES.

Nelson, B. C.

Word from Salmo B. C. indicates that the Concentrator, which has been under construction at the Emerald Mine, Iron Mountain, near Sheep Creek, during the past four months, of San Francisco Cal., and erected under his supervision. It has a capacity of 30 tons a day on a double shift basis and stands at the mine site. The new plant is described as being more or less experimental as it is the intention of the Iron Mountain Ltd., if the ore developments warrant it, to erect a large plant on Sheep Creek, possibly of the hydro-electric type. This, however, is a matter for the future and meanwhile the new concentrator is expected to give entire satisfaction. The history of the Emerald Mine started in 1906. It was the first in the silver-lead belt of the Sheep Creek Camp and has shipped between 40,000 and 50,000 tons of ore to the Trail smelter.

One of the private bills to be brought before the Legislature of British Columbia for consideration at its forthcoming session provides for the granting to engineers, practicing in this Province, the right to organize and to insist on men of the same profession taking a Provincial Examination before being admitted to practice in British Columbia. This, in broad general terms, is the object of the measure to be placed before the legislatures for their approval or otherwise. It is argued that it is no more sweeping in its terms than the legislation affecting medical and dental doctors seeking to practice in this Province. Whatever arguments there may be pro and con there is no doubt that the bill will meet with strong opposition in-so-far as it affects mining engineers. The newly organized Prospectors' Association, with headquarters at Nelson B. C., already has taken a strong stand against a closed corporation of engineers. The most objectionable phase of the proposal to the prospectors is that American mining operations bringing capital into this province will be required to employ local engineers, if they wish to do more than look at properties. For a province so interested as British Columbia in attracting foreign capital for the purpose of development, this proposed restriction on the movement and employment of American experts, when their employers are American corporations, is regarded by the prospectors with disfavor. The "Daily Sun", of Vancouver B. C., considers the objection taken by the prospectors as sound. It observes that, while it has been apparent for many years that the profession of mining engineering required better definition and some recognized local status in the interests of both the public and the engineers themselves, "care should be taken that the bill should not have the effect of discouraging outside capital from coming to the province to develop our mining resources. To close our doors to American or other engineers would certainly have that effect." The paper goes on to say that "capital knows no international boundary in brains"; that "hitherto Canadian and American engineers have freely crossed the boundary line in pursuit of their calling"; and that "these men have influenced much of the development of British Columbia mines." However it is thought that "if the engineers of British

Columbia will set a high standard of qualification as a condition of membership, so that affiliation with their organization becomes a hall mark of efficiency, they will do a great deal towards establishing themselves in the confidence of both the public and the employing corporations."

Trail B. C.

During the first week of January, 1920, there were fifteen shippers to the Trail Smelter of the Consolidated Mining & Smelting Co. of Canada. The receipts amounted to 5,604 tons, of which 451 tons were concentrates and the balance ore. The Rossland Mines of the Company, the Centre Star, Le Roi, White Bear and Black Bear, lose their identity in the list now issued under the grouping "Rossland Properties, Rossland." Two properties have made contributions which were not in last year's list, the Kaaba, Washington, which sent concentrates and the Ptarmigan, of Athlamer.

Hazelton B. C.

The Sunset Claims, Nine Mile Mountain, in the Hazelton Section of the Omineca District, Northern British Columbia, are to be developed, it is reported, under the supervision of a representative of the American Mining and Smelting Co. A party has already gone into the properties with supplies etc. and work will be started as soon as conditions permit. Referring to this and other Nine Mile Mountain prospects in his 1918 report J. D. Galloway, resident engineer, says: "There are a number of veins on these claims, varying from a few inches up to several feet in width and mineralized with galena, zinc-blende, grey-copper, stibnite, and jamesonite. The galena is, as a rule, high in silver content, while the stibnite and zinc-blende also carry some silver. The grey-copper occurs sparingly, but carries a high silver content."

Cowichan B. C.

The Ladysmith Smelting Corporation is reported to have acquired fourteen copper claims on Mount Sicker, Vancouver Island, from the Mount Sicker and B. C. Development Co. This is in line with recent activity in this long-deserted mineralized zone, development work having started some months ago at the Lenora Mine and being still under way. The object is to re-locate the Tyee vein. If this is successful, and the result is likely to be known in the course of the next two months, and ore of commercial quality and quantity is found on the claims which have just changed hands there is no doubt that the Ladysmith Smelter, which recently has been operated but intermittently, and at present is inactive, will be again heated and maintained as a productive industry assured.

Vancouver B. C.

Arguing that the extension of the Pacific Great Eastern Railway from Prince George to Swan Lake at the eastern boundary of British Columbia will mean the opening up of a vast territory, rich in coal, oil, as well as other natural resources, members of the Vancouver Board of Trade at a recent conference impressed on Premier John Oliver and other representatives of the Provincial Government the desirability of forwarding this work with as little loss of time as possible. This railway now is under construction from Williams Lake to Prince George a distance of 100 miles. The distance from the latter town to Swan Lake is 300 miles. The first mentioned section will

be completed by January 1921 and Premier Oliver assured the delegation that the road would be carried to the boundary without delay, although he pointed out that it was a heavy financial burden for the Province to undertake the estimated cost being about \$60,000 a mile. It was the Premier's hope that the Dominion Government to take the railway of the hands off the Province but, failing that, construction would be continued, it being appreciated that the country's natural wealth in minerals and agriculture warranted the expenditure.

At the annual meeting of the Vancouver Chamber of Mines officers were elected for the year 1920 as follows: Honorary President, Hon. William Sloan; vice-presidents, J. M. Lay and W. H. Hargrave; treasurer, William Godfrey; executive committee, C. E. Cartwright, S. J. Crocker, F. J. Grossland, G. S. Dawson, Major Fleck, B. G. S. Hawkins, Dalby Morkill jr., H. P. McCraney, N. Thompson, Prof. J. M. Turnbull, G. S. Pettapiece, Noble W. Pirrie, Dr. E. T. Hodge was selected as president vice A. M. Whiteside, who retired after serving for several consecutive years.

Salmo B. C.

John Waldbeser, President of the Iron Mountain Ltd., states that the new Mill has not yet been started and that water conditions may make a test run impracticable until next June. However this trial will take place as soon as weather conditions permit.

Slocan B. C.

High grade silver-lead ore is being raw-hided from the Republic Mine, Lemon Creek, to Slocan City, advantage being taken of a recent heavy snowfall for this purpose. Twenty-three tons of ore were shipped from this property in the early part of last year to the Trail Smelter from which good returns were obtained. The Republic is being operated by a syndicate whose headquarters are at Calgary, Alberta.

The Ottawa is another property from which ore is being taken for shipment over the snow to railroad. It, too, is situated in the vicinity of Slocan City.

The Meteor and the Neale Claims, both located on Springer Creek in the same section, are among other properties which are active this winter.

Campbell River, V.I., B.C.

An immense outcropping of low grade ore, carrying copper, gold, silver and lead, is reported to have been located on Buttles Lake, Strathcona Park, or, to speak more generally, almost in the exact geographical centre of Vancouver Island. Representatives of the Temiskaming Mines Co., Toronto Ont., have visited these claims, if which there are a number, the ore body being said to have been traced for miles. That the Temiskaming Company has taken a bond on this property from the Vancouver holders and that it is proposed to initiate extensive exploratory work without loss of time are other statements made by those interested. The suggestion is that diamond drilling will be undertaken and that, if the surface indications are borne out by the disclosures of further development, Vancouver Island will have one of the biggest mines of the Province.

Until about a year ago Strathcona Park was under reserve by the Provincial Government for park purposes. No mining was permitted within its limits. The present Provincial Administration, however, removed this restriction and since there has been much prospecting within the park area.

Victoria B. C.

The Steel Smelter Co., of Seattle Wn., has conclusively demonstrated that it is practical to produce pig iron economically from the magnetite iron ores of British Columbia, by means of the electro-thermic process. This is the positive statement of F. A. Pauline, a member of the Provincial Legislature who has interested himself specially in the development of the iron ore resources of the Province and who recently made a special trip to Seattle to inspect the plant of the company named. Mr. Pauline found one furnace, capable of producing five tons a day, in operation. He learned that a unit of four furnaces is being installed and that the management is looking forward to reaching the maximum output of this plant very soon. The ore is being brought from a property situated on the coast of British Columbia at a cost of from \$3 to \$4 a ton. The product is described by Mr. Pauline as being the finest grade of pig, fully equal to the product of Sweden. There seems to be no question as to market, local demands being sufficient to absorb all that the Company can provide.

R. A. Grimes, manager of the Slocan Silver Mines Ltd., stated to Hon. Wm. Sloan, Minister of Mines, that development work on the Company's property, situated on the north fork of Carpenter Creek, near Sandon B. C., had given extremely satisfactory results. A considerable amount of good milling ore, carrying substantial silver values, had been blocked out and a small lead of very rich ore had been struck. The prospects were such that plans were under consideration for the installation of a concentrating mill and other equipment.

It was to express his gratification with reference to the working of the Mineral Survey & Development Act that was chiefly responsible for Mr. Grimes' visit to the Minister of Mines. He declared that there was no doubt whatever that the Mining Engineers appointed under that Act were doing much for the mining industry of the Province. In his own case prior to the taking over of the Carpenter Creek Property a copy of a report written in 1917 by A. G. Langley, Resident Engineer, was procured. This was favorable and its terms were confirmed by a personal interview with Mr. Langley, who rendered all assistance possible, particularly in regard to advice and suggestions as to necessary development. Thereupon Mr. Grimes and his associates proceeded to acquire the prospect which then was controlled by the McAllister Mining & Milling Co.

COLLIERIES.

Once more the title of the Granby Consolidated Mining and Smelting Company to the Vancouver Island coal area which they are developing is being contested in the courts of British Columbia. The action has been brought by the Esquimalt and Nanaimo Ry. Co., against Charles Wilson and Angus C. McKenzie, who are executors under the will of the late Joseph Ganner, and the Mining and Smelting company.

To the Ganner estate belong much of the coal lands to which the Granby Company acquired title from the Province of British Columbia under the terms of the Vancouver Islands Settlers' Rights Act, 1904, Amendment Act, 1917. Since the acquisition of this property the Company has installed collieries at a point colloqually known as Cassidy's equipped with modern plant, and has built up a community which, in respect of the accommodation provided for officials and workmen, is considered to be a model, at an expenditure aggregating approximately \$2,000,000. In the short space of little more than a year it has put the mines of Cassidy's on a producing basis of about 700 tons a day. Depending on the coal from this colliery it has installed at its smelting centre, Anyox, B. C., where it is engaged in the mining and the smelting of copper ore, by-product coking ovens at a cost of in the neighborhood of \$2,500,000. For these reasons the law suit referred to is of first importance to the Company and of much interest to the entire Western Canadian mining industry.

The Esquimalt and Nanaimo Ry. Co. ask the courts to declare that the Crown Grant issue by the Provincial Government to the defendants is null and void in-so-far as it purports to grant coal, coal-oil, stone, clay, marble, slate, mineral and substances in and under the said lands and that part of the surface of such lands to which, or upon which, the plaintiff is entitled to exercise acts of ownership, purchase or rights to easement. An injunction also is sought restraining the defendants "their servants, agents or workmen or assigns from entering and working or mining for coal and other materials and substances and from registering or applying to register any title to the surface of the lands." The plaintiff also seeks a declaration that the plaintiff always has been the owner of the lands and damages against the defendants.

With reference to this case it is well to note that the Settlers' Rights Act of 1917, which was passed by the Provincial Government and under the terms of which the Crown Grants now assailed were issued, was disallowed by the Dominion Government in May 1918. The Grants in question were given after the passage of the Act and before the Federal Government disallowed it. The point, therefore, arises as to whether the Settlers' Rights Act of 1917 was legally operative during the period that lapsed between the affixing of the signature of the Lieut. Governor and the receipt of the formal declaration of its disallowance at Ottawa.

The One Big Union does not appear to be dead among the coal miners of Eastern British Columbia and the Province of Alberta. Recently the O. B. W. forces of Alberta met at Calgary and forwarded a resolution to the Minister of Labour, Ottawa, stating they were willing to accept the 14 per cent increase in wages awarded them, pending further negotiations on which they are insistent, and absolutely opposing the order of the Fuel Commissioner that the United Mine Workers of America shall be the workers' organization to receive recognition. On January 14th the miners at Coal Creek, Crow's Nest Pass Coal Company, refused to enter the mines because the President of the Fernie Local of the One Big Union was ordered off the miners' train for refusing to pay his fare. They were idle for a day and no further information is

available as to further developments. As to the situation in the Province of Alberta a letter written by one of the O. B. U. officials on January 8th is interesting. He states that at the Western Gem, Monarch, and Brule Mines the operators have withdrawn the check-off, (the check-off was the system proposed whereby the management would withhold from the men's pay their union dues forwarding the same direct to U. M. W. of A. headquarters). He also asserts that everywhere the O. B. U. is making headway against the forces of the U. M. W. of A. How much of the latter may be accepted cannot be said but there can be no doubt that the miners are divided in their union affiliations, that counter propagandists are energetically at work, and that, meanwhile, the mines are on a productive basis with the assurance that there will be plenty of coal available for the imperative needs of the winter.

OFFICIAL ESTIMATE OF 1919 COAL PRODUCTION.

The official estimate of the coal production for British Columbia during 1919 places it at 2,504,423 long tons, of which 147,205 tons was made into coke, leaving the net production at 2,357,218 tons. These figures show a decrease as compared with 1918 of 74,301 tons gross and an increase of 54,973 tons net. The quantity of coke made was about 98,598 tons, which is a decrease of about 90,369 tons as compared with the previous year. The decline in coke production is explained by the very small output of the ovens of the Crow's Nest Pass Coal Co. It was affected in the first place by the long drawn out strike of the coal miners in the early part of the year and later by the closing down of the smelters of the boundary district.

The provincial production of coal is summarized as follows:

	Tons of 2240 lb.
From Vancouver Islands Collieries.....	1,690,724
From Nicola and Similkameen Collieries..	152,731
From Crow's Nest Pass Collieries.....	659,408
From Twelkwa Collieries.....	1,560
Total quantity coal mined.....	2,504,523
Less made into coke.....	147,205
Net quantity of coal produced.....	2,357,218

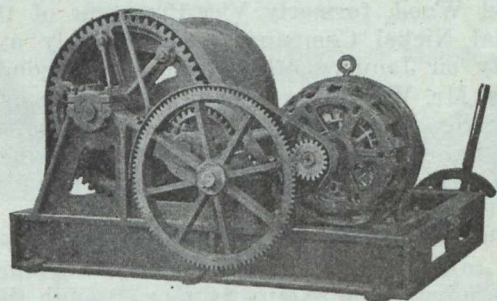
In addition to the above net production of coal there was made into coke the production shown as follows:

From Vancouver Island Collieries.....	43,517
From Nicola and Similkameen Collieries.....	nil.
From Crownsnest District Collieries.....	55,081
	98,598

It is observed that the coal mines of the Province have had a fairly good year but that there were some interruptions. Among the latter mentioned are the strike at Fernie, which closed the mines during June, July and August, work being resumed at the beginning of September, and the fact that the Vancouver Island mines, during the months of May, June and July, worked on slack time, losing a production of probably 160,000 tons.

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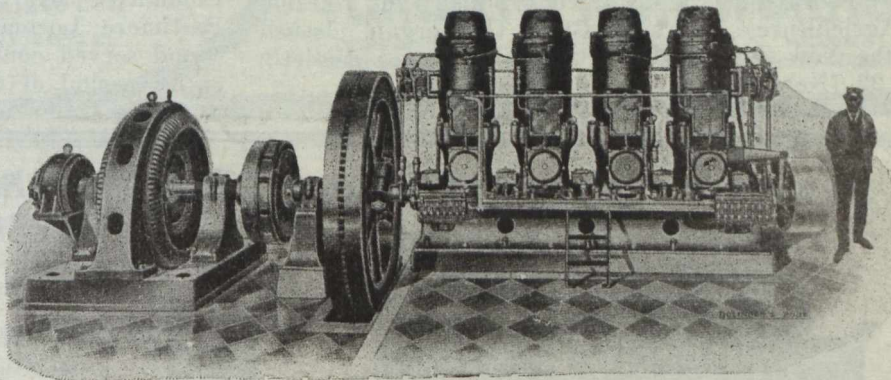
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THE LIMESTONE AND PHOSPHATE RESOURCES OF NEW ZEALAND.*

This admirable Bulletin was undertaken by the New Zealand Geological Survey at the request of the Department of Agriculture, which for the sake of the agricultural industry required a comprehensive report on the limestone deposits of the Dominion. Part I of the Bulletin, now to hand, summarises all the known information regarding the limestone deposits of New Zealand. It contains 316 pages of letterpress, with fourteen plates, six text-figures and two maps. Part II, which is to follow will not be so long, and will contain a general account of the plant and machinery used in the calcination and pulverization of limestone, followed by a description of the phosphate deposits of the country.

The scope of the monograph is ambitious, as will be seen from the following headings selected from the first chapter, which deals with general information regarding limestone and its uses, viz., the functions of lime in agriculture, the non-agricultural uses of lime, and the military importance of limestone and lime. The chemistry, geology, and economic utilization and treatment of limestone deposits are dealt with in great detail. Specific information as to limestone is given with regard to every known occurrence in New Zealand, and a notable feature of the monograph is the fine photographic plates of limestone occurrences, which not only are a fine collection of illustrations of the characteristic and often fantastic physical features of a limestone formation, but reveal incidentally that New Zealand is a country of much natural beauty. It is evident that the geologists who selected these photographs had not only an eye to topography, but a nice appreciation of the artistic values in a New Zealand landscape. The affection of New Zealanders for their country is not difficult to understand.

The monograph explains the property of lime to liberate plant foods from soil compounds, and the advantages to be gained from the use of ground carbonate of lime as compared with quicklime and slaked lime. The liberation of nitrogen by carbonate of lime proceeds more slowly, nor does the carbonate destroy the humus as quicklime does.

There are a number of concerns in Canada who are prepared to supply ground carbonate of lime for soil dressing. One firm that has done a good deal to edu-

* Note:—The Limestone and Phosphate Resources of New Zealand. (Considered principally in relation to Agriculture). Part I. By P. G. Morgan. Issued by the New Zealand Department of Mines. Bulletin No. 22 (New Series).

cate the public as to the usefulness of ground limestone uses the limestone near Windsor, Nova Scotia, and it would appear that in many parts of Canada, where acidity of the soil is a great drawback, the use of ground limestone to correct the sourness might find a large field. Heavy clay lands are much improved in texture for agricultural purposes by the addition of quicklime.

OBITUARY.

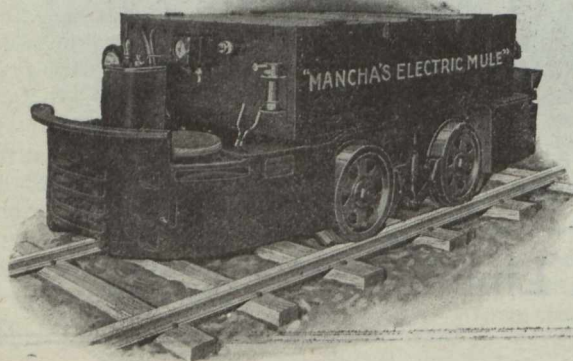
E. Fred Wood.

E. Fred Wood, formerly Vice-President of the International Nickel Company, died suddenly at New York City on January 5th, in the sixty-second year of his age. Mr. Wood was born in Milwaukee on August 28, 1858. He was educated in the public schools of his native city and later entered the University of Michigan where he was a brilliant student and graduated with distinction.

After leaving college Mr. Wood devoted himself assiduously to the study of metallurgy and in connection with his studies made extensive trips through the various mining camps of the West and lived for a year at Leadville and in other mining towns where he pursued his studies and obtained his practical experience. He later entered the employ of the Carnegie Steel Company and rapidly rose to the position of Assistant General Superintendent of the Homestead Plant, which position he filled for a number of years, and during the period of the big strike at the plant, when Mr. Frick was shot, Mr. Wood was in entire charge of the plant. He was looked upon by Mr. Carnegie and his associates as one of the valuable men of the organization and was one of the so-called "Carnegie Veteran Associates."

Because of the great reputation he had achieved he was invited to join the International Nickel Company, upon its organization, becoming First Vice-President of the Company and a member of the Board of Directors of its Executive Committee, and he was an important factor in developing the mining, smelting and refining business of the Company, so that from a small and unimportant undertaking it developed into the largest business of its kind in the world.

When the United States entered the World War, Mr. Wood resigned his official connection with the International Nickel Company to devote himself to public work, and became a member of the Committee on Production of the War Industries Board, of which Committee Mr. Samuel Vauclein, President of the Baltimore Locomotive Works, was chairman. Mr. Wood served continuously on this Board during the entire period of the war, without compensation



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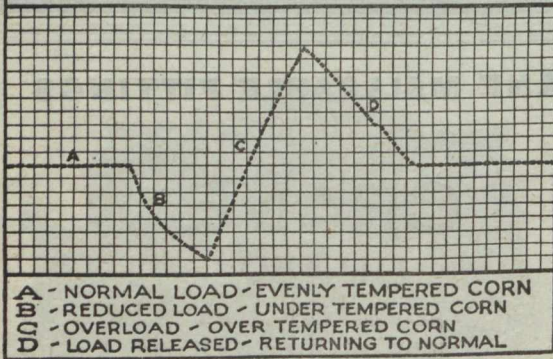
The fine rubber, which seals the seam, prevents ply separation.

Over 1000 Canadian industrials have found Extra Power Belting an economical proposition—in price, in length of service, in efficiency of service. Some of them have solved problems exactly similar to yours. Let a Goodyear-trained belting man tell you about it. No obligation. Just phone, wire or write the nearest branch.

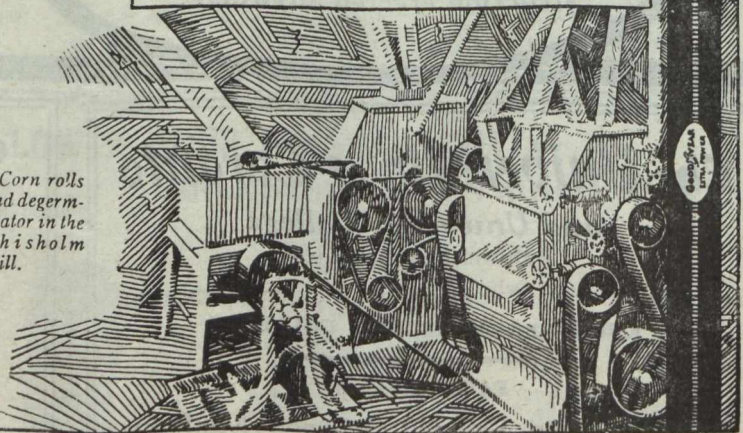
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The Goodyear Tire & Rubber Co. of Canada, Ltd., Toronto, Ont. Nov. 15th, 1919

Gentlemen:—

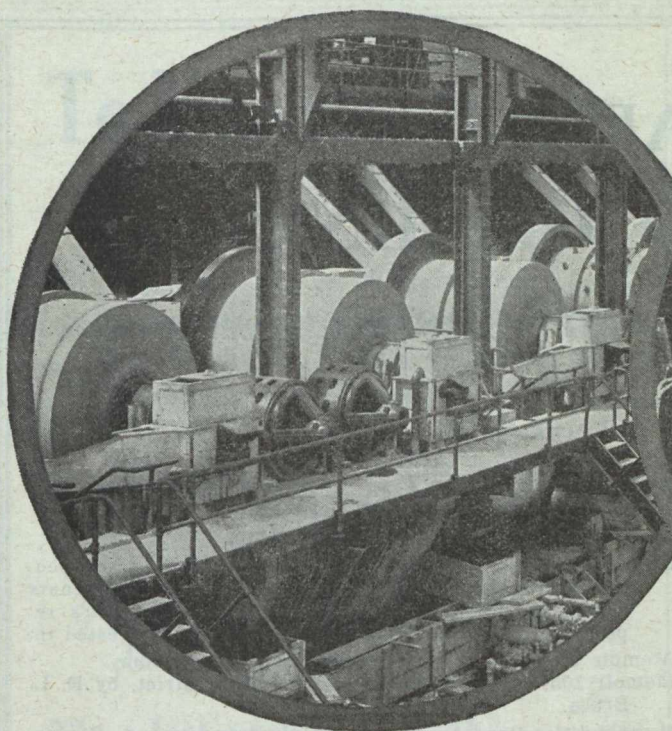
About five years ago we bought our first Goodyear Extra Power Belting. To-day half our belts are Goodyear Extra Power, and as fast as old belts wear out we are replacing them with Extra Power. The performance of the first belt has brought about this change.

We were having trouble with our corn degerminator. Every now and then the machine would stick. Although we were using the highest priced belts we could buy, they continually burnt through when the sudden load of a sticking degerminator came. One expensive belt went in two days. The next one lasted but little longer. Then we tried a Goodyear Extra Power Belt. IT gave us 18 months' service. When the degerminator stuck, Extra Power just seemed to buckle down to the job and pulled right through the peak load. It wasn't long before we decided to use Extra Power Belts on all our equipment.

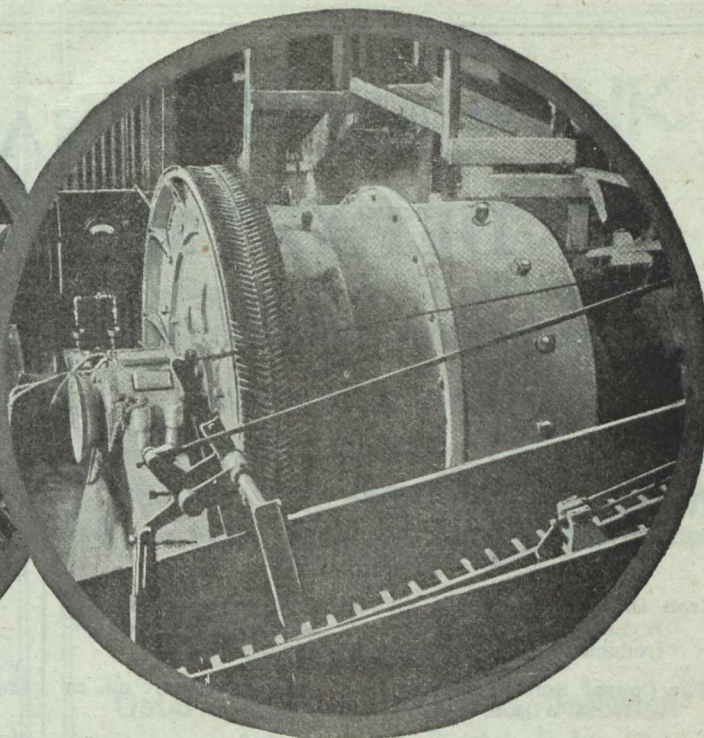
Now we have installed them on grinding mills, corn mill, shaft drives, etc.

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Yours very truly,
 W. Flegg
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For during the world war—

Copper soared and gold became "cheap"

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Recent Publications

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

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

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

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

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

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

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

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

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

Summary Report of the Mines Branch, 1917.

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

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

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

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

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

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

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

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

GEOLOGICAL SURVEY

Recent Publications

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

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

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

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

Memoir 108. The Mackenzie River basin, by Charles Cammell 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 Higwood 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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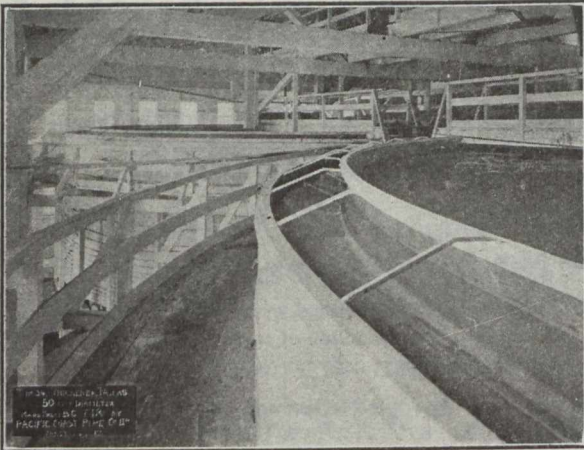
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The Canadian Miners' Buying Directory.

- 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.
Spielman Agencies, Regd.
- Aluminium:**
- Amalgamators:**
Northern Canada Supply Co.
Mine and Smelter Supply Co.
Wabi Iron Works.
- Antimony:**
Canada Metal Co.
- Antimonial Lead:**
Pennsylvania Smelting Co.
- Arrester, Locomotive Spark:**
Hendrick Manufacturing Co.
- Arsenic White Lead:**
Coniagas Reduction Co.
- Assayers' and Chemists' Supplies:**
Dominion Engineering & 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.
- Babbit Metals:**
Canada Metal Co.
Canadian Fairbanks-Morse Co., Ltd.
Hoyt Metal Co.
- Ball Mill Feeders:**
Fraser & Chalmers of Canada, Ltd.
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd.
- Ball Mill Linings:**
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd.
- Belting—Leather, Rubber and Cotton:**
Canadian Fairbanks-Morse Co., Ltd.
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.
The Mine & Smelter Supply Co.
Mussens, Ltd.
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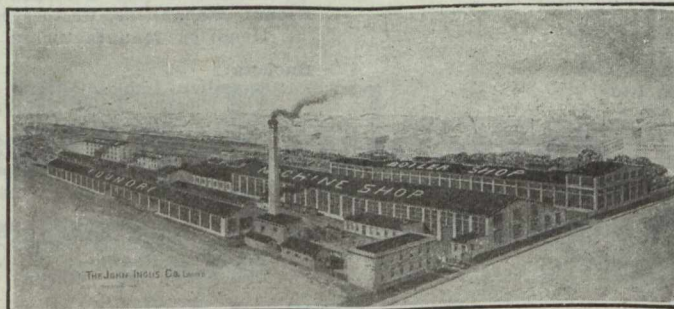
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Canada Wire & Cable Co.
Fraser & Chalmers of Canada, Ltd.
Northern Electric Co., Ltd.
R. T. Gilman & Co.
- Cam Shafts:**
Canada Foundries & Forgings, Ltd.
Hull Iron & Steel Foundries, Ltd.
- Car Dumps:**
Sullivan Machinery Co.
R. T. Gilman & Co.
Canadian 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
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The Wabi Iron Works
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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
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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 and Concrete Waterproofing:**
Spielman Agencies, Regd.
- 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.
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Canadian Laboratories
Campbell & Deyell
Thos. Heves & Sons
Milton Hersey Co.
Lefoux & 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.
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Sullivan Machinery Co.

Drills—Diamond:

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Northern Canada Supply Co.
E. J. Longyear Company

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

Dynamos:

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

Ejectors:

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

Elevators:

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

Engineering Instruments:

C. L. Berger & Sons

Engines—Automatic:

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

Engines—Gas and Gasoline:

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

Engines—Haulage:

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

Engines—Marine:

Canadian Fairbanks-Morse Co., Ltd.
MacGovern & Co., Inc.
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—Stationary:

Swedish Steel & Importing Co., Ltd.

Engineers:

The Dorr Co.

Ferro-Alloys (all Classes):

Everitt & Co.

Feed Water Heaters:

MacGovern & Co.

Flashlights—Electric:

Spielman Agencies, Regd.

Flood Lamps:

Northern Electric Co., Ltd.

Flourspar:

The Consolidated Mining & Smelting Co.
Everitt & Co.

Forges:

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

Forging:

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 & 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.
- Lanterns—Electric:**
Spielman Agencies, Regd.
- Lead (Pig):**
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co.
- Levels:**
C. L. Berger & Sons
- Locomotives (Steam, Compressed Air and Storage 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.

Paints—Special:
Spielman Agencies, Regd.

Perforated Metals:
Northern Canada Supply Co.
Hendrick Mfg. Co.
Greening, B., Wire Co.

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

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

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

Pipe Fittings:
Canadian Fairbanks-Morse Co., Ltd.

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

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

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

Platinum Refiners:
Goldsmith Bros.

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

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

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

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

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

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

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

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

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

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

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

Pumps—Diaphragm
The Dorr Company

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

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

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

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

Railway Supplies:
Canadian Fairbanks-Morse Co., Ltd.

Refiners:
Goldsmith Bros.

Riddles:
Hendrick Mfg. Co.

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

Rope—Manilla:
Mussens, Limited

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

Canadian Miners' Buying Directory.—(Continued)

Rope—Wire:

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

Rolls—Crushing

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

Samplers:

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

Scales—(all kinds):

Canadian Fairbanks-Morse Co., Ltd.

Screens:

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

Screens—Cross Patent Flanged Lip:

Hendrick Mfg. Co.

Screens—Perforated Metal:

Hendrick Mfg. Co.

Screens—Shaking:

Hendrick Mfg. Co.

Screens—Revolving:

Hendrick Mfg. Co.

Scheelite:

Everitt & Co.

Separators:

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

Shaft Contractors:

Hendrick Mfg. Co.

Sheet Metal Work:

Hendrick Mfg. Co.

Sheets—Genuine Manganese Bronze:

Hendrick Mfg. Co.

Shoes and Dies:

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

Shovels—Steam:

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

Siline:

Coniagas Reduction Co.

Saline Refiners:

Goldsmith Bros.

Smelters:

Goldsmith Bros.

Sledges:

Canada Foundries & Forgings, Ltd.

Smoke Stacks:

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

Special Machinery:

John Inglis Co., Ltd.

Spelter:

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

Spreckets:

Link-Belt Co.

Spring Coil and Clips Electric:

Canadian Steel Foundries, Ltd.

Steel Barrels:

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

Stamp Forgings:

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

Steel Castings:

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

Steel Drills:

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

Steel Drums:

Smart-Turner Machine Co.

Steel—Tool:

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

Structural Steel Work (Light):

Hendrick Mfg. Co.

Stone Breakers:

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

Sulphate of Copper:

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

Sulphate of Nickel:

The Mond Nickel Co., Ltd.

Surveying Instruments:

C. L. Berger

Switches and Switch Stand:

Canadian Steel Foundries, Ltd.
Mussens, Limited.

Switches and Turntables:

John J. Gartshore

Tables—Concentrating:

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

Tanks:

R. T. Gilman & Co.

Tanks—Acid:

Canadian Chicago Bridge & Iron Works

Tanks (Wooden):

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

Tanks—Cyanide, Etc.:

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

Tanks—Steel:

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

Tanks—Oil Storage:

Canadian Chicago Bridge & Iron Works

Tanks (water) and Steel Towers:

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

Canadian Miners' Buying Directory.—(Continued)

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

Transits:
C. L. Berger & Sons

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

Transmission Apparatus:
Jones & Glassco

Troughs (Conveyor):
Hendrick Manufacturing Co.

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

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

Trucks:
Canadian Fairbanks-Morse Co., Ltd.

Tubs:
Hadfields, Limited

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

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

Tube Mill Liners:
Burnett & Crampton
Fraser & Chalmers of Canada, Ltd.
Hull Iron & Steel Foundries, Ltd.

Turbines—Water Wheel:
MacGovern & Co.

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

Twincones:
Canada Foundries & Forgings, Ltd.

Uranium:
Everitt & Co.

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

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

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

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

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

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

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

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

Wolfram Ore:
Everitt & Co.

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

Zincium:
Everitt & Co.

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

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

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Dorr Co.	11	R		W	
Dresser, Jno. A.	11	S		Wabi Iron Works	
Drury, H. A. Company		T		Whitman, Alfred R.	11
Dwight & Lloyd Sintering Co., Inc	10	U			
Dominion Engineering & Inspection Co.	10	V			

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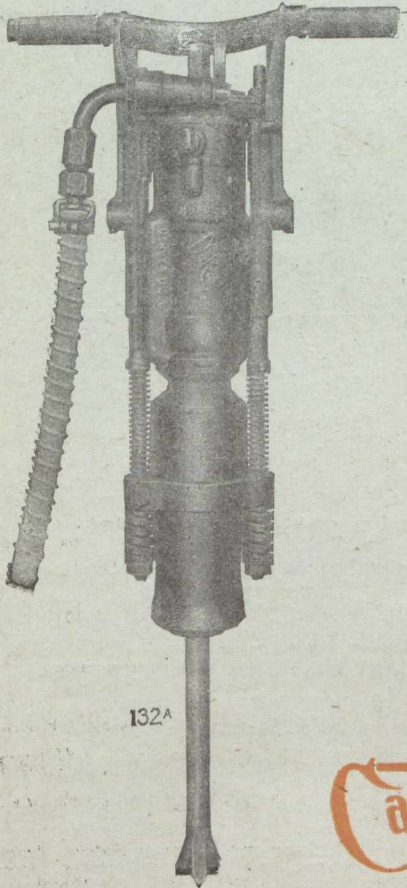
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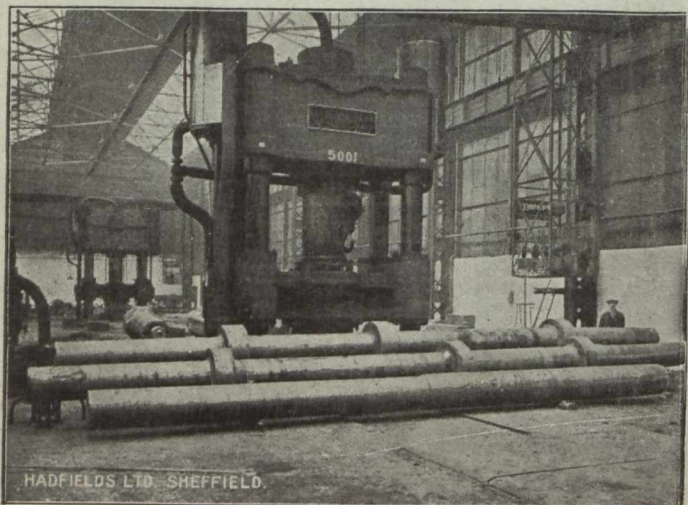
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