CANADIAN MINING JOURNAL

Vol. XLI. Gardenvale, P. Q., October 22, 1920. No. 42.

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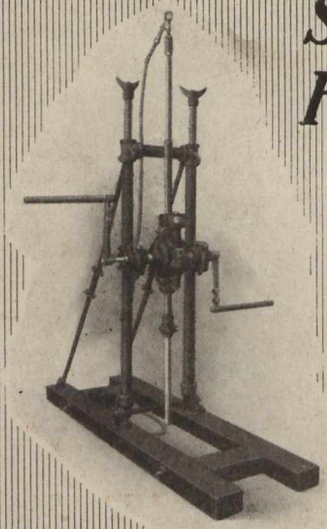
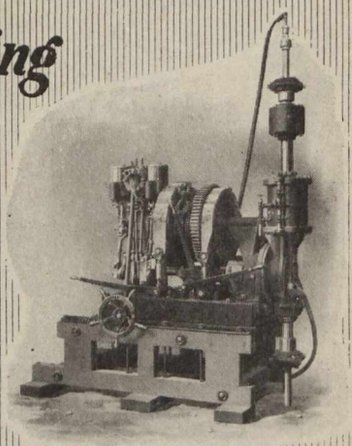


"BRAVO" Hand Power 300 feet



"B" 3500 feet

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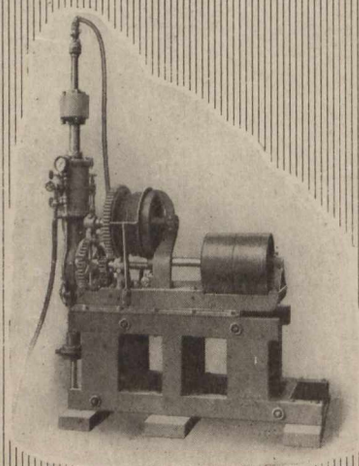
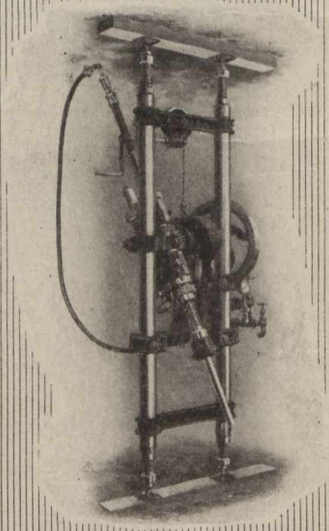
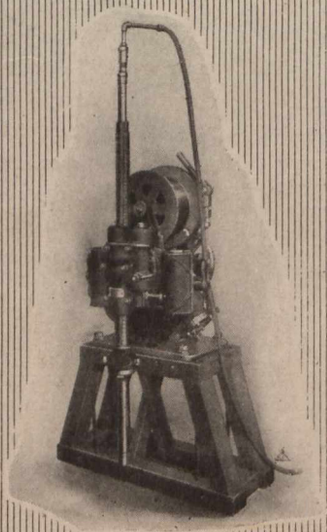


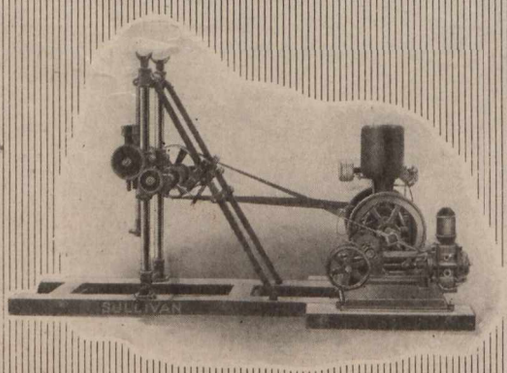
"H" Belt Driven 1600 feet



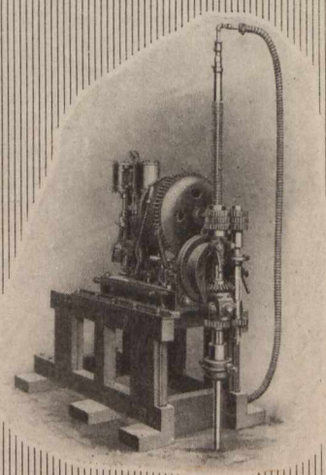
"E" (underground) 500 feet



"BEAUTY" 800 feet



"BRAVO" Gas Engine Drive, 600 feet



"HG" Screw Feed, 1600 feet

PROVINCE OF ONTARIO

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

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

Ontario in 1919 produced 38 per cent. of the total mineral output of Canada. Returns show the output of the mines and mineralogical works of the Province for the year 1919 to be worth $58,583,916, of which the metallic production was $41,590,759.

Dividends and bonuses paid to the end of 1919 amounted to $15,545,238 for gold mining companies, and $78,335,943 for silver mining companies, or a total of $93,881,181.

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 abundant, and many undevedoped 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 days' 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 unsurveyed or surveyed territory.

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Thos. W. Gibson,
Deputy Minister of Mines,
Toronto, Canada

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Canadian Mining Journal

PUBLISHED WEEKLY.

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EDITORIAL

McGILL ESTABLISHES ENGINEERING PHYSICS COURSE.

The establishment of a course in Engineering Physics in the Faculty of Applied Science in McGill University, with special facilities for the teaching of electrical science, is a sign of the times, and of the virility of a famous University.

The contributions to scientific knowledge made by the research departments of the great electrical companies, in the United States, in Britain and in Germany, have in recent years been most noticeable. The researches of such men as Langmuir are symptomatic of the entirely novel views on matter, space and time that have been arrived at by those who are attempting to solve the mystery of electrical energy.

No branch of science is today so abstract in theory and so concrete in application as electrical phenomena, or demands for its reasonably full understanding so generous a grounding in mathematics and physics. The studies required to fit a young man to enter the ranks of really well-equipped workers in electrical science are so severe that while probably many will consider themselves called, few will be found among the chosen. It must also be admitted that Canadian universities, when they can refer to such names as Rutherford and McLennan (to select without invidious intent two names from among many) can not be accused of backwardness in physical science, yet the faculties have not been so thoroughly equipped to give such extended and progressive instruction in physical science as is now the purpose of the authorities at McGill University.

One of the objects of the new course is stated to be: "To institute a class of highly-trained engineers "who are capable of overcoming the difficulties and "improving the practice in electric power generation and distribution". This is an object felicitously chosen to suit Canadian resources, particularly in that portion of Canada within McGill's territorial radius. A paucity of fossil fuel and a plentitude of waterpowers, awaiting improved methods of transmission and industrial application, characterise the district served by McGill, and there can be little doubt that the natural necessities of the East, assisted by the facilities for technical specialization that the University has undertaken to provide, will in time develop a local technique that will worthily carry on the traditions of this University.

MINE TAXATION AND MINE ACCOUNTS.

Our British Columbia correspondent reports that the Local Government is being urged to amend the Taxation Act so as to provide for the depletion of ore reserves in mining properties. The representatives of mining interests in British Columbia ask for statutory recognition of the effect of diminishing ore reserves upon the value of a mine for taxation purposes, in lieu of the present method of mine taxation, which does not admit this principle, but make all allowances as a concession, following an investigation by government officials, and not as a right.

The request is reasonable, and it is pleasing to hear that it was given a sympathetic hearing by the Government.

The equitable assessment of taxation upon mining property is one that has bothered many governments in recent years, and in one or two instances, the finance ministries have frankly appealed to mining engineers and mine accountants to assist in framing regulations that will meet not only the varying conditions of mining, but also the difficulties presented by the differing stages of development of any one selected mine. In the United States, the American Institute of Mining Engineers, in Britain, the Institution of Mining Engineers and the Institution of Mining and Metallurgy were asked by the governments to assist them in regard to this extremely involved question of mine taxation. The proper body to advise our own governments, local and federal, is, of course, the Canadian Institute of Mining and Metallurgy, and it is to the credit of the British Columbia Division of the Institute that it has taken a really constructive interest in the discussion of mine taxation, and the onerous position that existing economic conditions have placed the precious metal mines in.

The principle of diminishing assets is, of course, the one that is most important in deciding a taxation basis for producing mines. There is another principle, however, that is bound up with that of diminishing assets, and arises from the same cause, namely the principle of increasing cost of production, usually found to be in more or less direct ratio to the age of the mine under consideration. The problem which has presented itself to governments in assessing mine taxation has to a large extent originated in the haziness of the accounts of the mining companies themselves, and the general disinclination of mine accountants (or mine directors) to saddle the produc-

tion costs of a mine in its early productive stages with a proportion of the enhanced costs which are inevitable in the last producing stages of the same mine. Mine production costs should not only contain a proper provision for depreciation of equipment and for depletion of ore reserves, but also for the disabilities attending production which are inseparable from increased length of haulages, increased depth of deposits, increased costs of ventilation and pumping and the upkeep of widely extended underground excavations.

The tendency in mining enterprises is unfortunately to let posterity look after itself, and the succession of managements (which is, if not an unmixed evil, yet certainly an evil too common in mining enterprises) leads to a partial view of mine accounts. Partial views are always wrong views, and no system of mine accounting can be actuarially-correct that does not conceive of a mine as an enterprise that has a beginning and a definite end, usually comprised within a period that can be ascertained with some accuracy.

There has been too great a tendency in mining enterprises to concentrate on the items of labor and material entering into the mine production costs, and a deliberate avoidance of equally important items, such as bond interest, depreciation, reserves for depletion of areas, reserves for purchase of properties to replace the depleted areas, provision for redemption of capital and disaster insurance. Each of these items has a proper and unquestionable place in a mine cost-sheet, yet so hazy are the ideas of mine directors on these questions, that when government control has forced them on the unwilling attention of mining boards and operating executives, there has been some dubiety of mind as to whether these items were actually permissible.

Many a mining company would have been deterred from paying out unwarranted dividends, voted by boards that based their decisions on partial, and necessarily incorrect information, if mine accounting had been actuarially correct.

The formulation of a standard mine-cost sheet that shall contain every proper charge against production is suggested as a worth-while activity of the Canadian Institute of Mining and Metallurgy. Even if the attempt did not produce a form that satisfied all requirements, the discussion of the many-sided problem of mine taxation might clarify individual thinking and add to the general fund of ideas.

THE BRITISH COAL STRIKE.

The coal strike in Britain is in many respects a more dangerous occurrence than the outbreak of war in 1914. Britain could never have gone down before the German so long as she remained sound at home, and so long as she had access to the whole world supply of bituminous coal except that in Central Europe, but a coal strike is aimed at Britain's most vital and vulnerable spot, and is excessively dangerous, because the effect, if not the intent, of a strike of coal producers is to bring about a general cessation of work barely distinguishable from a general strike. An uneasy questioning can also hardly be avoided when simultaneously with the British strike similar action is announced by the miners in Belgium and France, and there have been "conversations" between the British leaders and the coal unions on this side of the Atlantic. There is too evident a connection between the Geneva Convention and subsequent happenings to be ignored. We suggested some weeks ago that the miners of the countries represented at the Geneva Convention had accepted their selection to lead a frontal attack upon society as it now exists, because of the absolutely essential and irreplaceable nature of the commodity which they produce, and subsequent events have not dispelled this impression.

The strike can hardly succeed in its object, even if that be limited to obtaining increased wages, because the market value of the product of the British coal mines will not pay the rate of wages demanded by the miners, even though they absorb every cent of profit, unless it is accompanied by increased individual production. England has always been a free trade market for raw materials from abroad, and it would be an easy matter, even at the present time, for the United States to land coal in Britain at a cheaper delivered price than it can be mined there. When the United States has really sized up the European coal market, and measured its own tremendous advantage in coal areas and production costs against Europe's needs, it will become apparent that even in the home markets, let alone such formerly exclusively British coal markets as South America and the Scandinavian countries, the United States is in a position to limit the wages which the British miner can be paid by his employer, whether that employer be an individual or the State itself.

At the present time the United States can mine the same tonnage of coal with one-quarter the workmen employed in British coal mines. The United States also possesses today a tidy mercantile marine, and is not looking for ships to carry freight, but is looking for freight to employ its ships.

It is also becoming evident that the workers in the United States are just as shy of foreign labor entanglements as they are of foreign political entanglements, and if the British miner goes dancing after the bubble of communism, he will not be followed by the American worker. The public in the United States possesses probably the highest general level of informed intelligence in any country outside of Canada insofar as relates to business matters. The people of the United States see clearly the trend of the

times. They know that whatever goes up must also come down, and market movements, the recurrent cycle of depression and prosperity, commodity prices, and all the significant information contained in the financial pages of the newspapers, are popular knowledge in the United States, but this is by no means the case across the sea, hence the greater instability of the workers.

The United States coal operator, and the mine-workers in that country will see nothing more in the British situation than an enlargement of their country's newly-founded coal export trade, and they will wonder at the curious insanity which has driven the British miner to strike for additional wages at a time when unemployment parades have commenced in London, and a scaling-down in commodity prices is energetically in progress.

So far as markets are concerned, Britain's defect as a coal producer will not affect Canada, inasmuch as we have not yet attained to the decent dignity of being self-supporting in coal supply. It should, however, increase the demand upon the British Columbia coalfields.

In all other matters of trade and commerce the British coal strike, if prolonged, will be an unmixed evil to Canada. It will further depreciate our exchange, and will close off one of our best markets. We have every reason to hope that the strike will be of short duration and limited extension.

SELECTION OF WORKS COAL BY THE MICROSCOPE.

The microscopic examination of thin coal sections is commencing to yield useful results. Early observers, as Lomax in Lancashire, laid the basis for empirical deductions by examining and tabulating the appearance revealed by the microscope; and eventually Lomax was able to build up sections disclosing the nature of coal seams from floor to roof, which when correlated with accepted theories of the formation of coal seams from forest growths, annually deposited over periods of inconceivable vastness, and chemical investigations of the main constituents of coal, as disclosed by the microscope, have thrown light upon problems connected with the suitability of selected coals for industrial uses, that ultimate chemical analyses of coal did not explain.

For example, two coals of similar appearance and identical chemical analysis will act dissimilarly, say in the coking process.

A paper read before the Iron and Steel Institute at the Autumn Meeting (Sept. 21-22) by Mr. A. L. Booth of Manchester intimates that Messrs. Armstrong, Whitworth and Co. have used the microscope in the selection of some 250,000 tons of coal used annually for different purposes. It was found that coals that had for years been found satisfactory for certain purposes, when examined microscopically, had certain characteristics of color and structure which made them distinguishable as a type, and that coals selected because of recognizable type resemblances—irrespective of analysis—were found satisfactory upon trial.

A series of colored plates (which typographical limitations prevent reproduction of) accompany Mr. Booth's paper, and show clearly three main types of coal, namely humic, spore and cannel coals.

There is now fairly general agreement among investigators of coal substance that the original vegetable component of coal has much more to do with its behavior in the various processes of industrial use, than the subsequent forces of heat, rock pressure or geological age, and it is the nature of this original substance that the microscope is eminently fitted to disclose.

Mr. Booth states that the microscope not only helps in the selection of coals, "but in some cases is of use in deciding whether or not it will pay to wash them, and will explain why an apparently good, clean coal has, for instance, a high ash content. Washing may be quite useless in such a case."

The presence of disseminated free sulphur, of infinitesimal fineness, is also detectable by the microscope, as has been shown by Dr. Rheinhardt Theissen.

Coal sections from representative Nova Scotia bituminous seams indicate by their characteristic reddish tinge and abundance of cuticle matter that they belong to the group of "humic" coals, which are stated by Mr. Booth to coke well, and to give a good hot fire without too long a flame. This describes accurately the behavior of these Nova Scotia coals.

Other qualities that are determinable from microscopic examination are tendency of a given coal to yield an inflammable dust, or liability of coals to spontaneous combustion.*

Coal from a given seam will show generally uniform characteristics, over large tracts, which points to the employment of microscopical examination to determine the correlation of seams separated by folds in the stata, or areas of denudation.

In deciding upon the suitability of seams of unknown qualities, and in formulating opinions on such limited evidence of suitability as may be obtainable say from a diamond-drill core, the combined use of the microscope, with chemical analysis, for comparison with sections of well-known coals, suggests itself.

The microscopic study of coal sections is a younger and in some respects, a more difficult art, than the related sciences of metallography and petrography, but it bids fair to yield equally important results, and to become as indispensable a part of industrial laboratory equipment, in the allied steel and coal industries more particularly.

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*See Lomax, Trans. Inst. Min. Eng., Vol. XLVI, Pt. IV.

The Pas Mineral Belt in 1920

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

During the present summer development work in that territory from Flin-Flon Lake eastwards to Herb Lake, now generally known as The Pas Mineral Belt, has been confined mainly to the western and eastern ends of the district. There has, indeed, been considerable diamond drilling in Copper Lake and a good deal of interest in gold discoveries at the north end of Elbow Lake, as well as a larger amount of prospecting in the Reed Lake territory than during any previous summer. The fact remains, however, that the two pivotal points are the Flin-Flon ore body in its importance to the copper mining industry in the western part of the belt and to the mining industry in the eastern part of the belt. As far as copper development is concerned in particular, there has been a tendency to await the development of railway facilities consequent on the operation of the Flin-Flon property before any very considerable expenditure of capital is made on other copper properties in the western part of the belt.

The Flin-Flon Ore Body.

From the work that has been done during the present summer by the Thompson interests, through the Longyear Exploration Company, it is now possible to study the ore body underground and to get a clearer conception of its relationships to the country rock than heretofore. There are many questions of very great importance in this connection which need not be discussed here. The work which has now been done has exposed an ore body in which the Province of Manitoba will legitimately take very considerable pride.

In No. 1 (the south) shaft there has been two hundred feet of sinking, and in the beginning of September two hundred and ten feet of cross-cut, as well as some hundred feet of southward drift. When the cross-cut has been completed to a width of two hundred and fifty feet there will be exposed over a hundred feet of solid sulphides, thirty feet of high-grade disseminated copper ore and some ninety feet of low-grade disseminated.

In No. 2 (the north) shaft the cross-cut has been run at the hundred-foot level to a length of some hundred and seventy feet, entirely in ore with the exception of some forty feet of horse. Sinking is now proceeding to the three hundred foot level.

The work already completed underground has been of great value, not only in checking up the diamond drilling but particularly in determining the costs of mining and best method of mining development. There are undoubtedly many problems ahead which will attract the most skilful metallurgists before the best method of ore treatment and smelting practice is determined for this ore body. The fact that is so satisfactorily established is, however, that there is an ore body of very large dimensions in the Flin-Flon deposits; an ore body which will become increasingly important, not only to Northern Manitoba, but to the Province as a whole. It is for all who are interested in provincial development to assist by all the means in their power in the work of seeing this property placed on an operating basis, not so much for the sake of those who are financially interested in the property as for the sake of the development of the Northland and the Province as a whole.

Other Copper Properties.

There has been considerable activity in the district immediately north of the North Arm of Lake Athapapuskow, the district which would seem to provide at the present time the best field for intensive prospecting in the whole belt.

In a property held by Baker and Patton, in which the country rock is a quartz porphyry striking north and dipping 80 deg. east, an iron sulphide body has developed on surface showing at least one hundred and thirty feet in width and bounded on one side by muskeg, in which there is a probability that the ore body also will be found. Generally speaking, this iron deposit is similar to many others in the mineral belt. There is, however, for a width of eighteen feet in the centre of the body, very considerable copper mineralization, and in other places more limited copper pyrite. The surface showings of copper are sufficiently important to warrant expenditure on diamond drilling in order to determine the extent of the copper mineralization underground. It must be remembered that a deposit like the Flin-Flon is simply an iron sulphide deposit with sufficient copper mineralization to make an ore body. All iron sulphide bodies which show surface copper should be prospected underground. It is understood that there are other showings of copper sulphide of somewhat similar type in this area. A very interesting discovery during the summer, from a mineralogical point of view, was that made by Rosen, east of the Big Island Lake district, which it was impossible, owing to limited time, for the writer to visit, but on which very full notes were kindly furnished by Mr. L. G. Thompson. At the contact between granite and greenstone there has developed very considerable mineralization of cobalt minerals, particularly smaltite in very fine grains weathering into cobalt bloom. Associated with this, and more particularly in a trench seventy-five paces to the East, chalcopyrite mineralization is found in the greenstone and also in the granite. The occurrence of cobalt minerals is an interesting one in the district and seems, judging by other work in the mineral belt, to be fairly wide-spread. The importance of cobalt minerals and the cobalt bloom stain in the Cobalt country in Ontario has been the close association of cobalt minerals in narrow calcite veins, with native silver and silver sulphides. Unless the geological conditions are similar there is no necessary connection in this field between cobalt minerals and native silver. If, however, a late diabase and associated narrow calcite veins can be found in this territory, it should be considered to be a favorable prospecting ground for silver.

Copper and Elbow Lake Territory.

In this central part of the mineral belt diamond drilling proceeded during the summer months upon the large quartz property of J. P. Gordon of Copper Lake. It is understood that the diamond drilling showed the quartz to be associated underground with very considerable prophyhy, and that mineralization with iron sulphides was found in a heavier degree than on surface showings. No further work has been done on the Red Rose vein of high-grade ore. Work is now proceeding on some claims east of Bear Lake, imme-

diately north of the Third Cranberry, in which stringers of chalcopyrite are found in a fairly solid greenstone and more particularly in quartz porphyry intrusions into the greenstone rock. The quartz porphyry holds a clean ore, which, if developed in sufficient quantity, will readily concentrate.

At the north end of Elbow Lake considerable prospecting was done during the earlier part of the summer, owing to the fact that discoveries were made by Webb of high-grade quartz veins on the Sherlock claim, immediately west of the mouth of Webb Creek. The quartz is irregularly distributed through a twisted hornblende schist, and at the present time a showing about one foot in width of highly quartzitic rock is being mined and hand crushed and pulverized in order to recover the gold by sluicing. In the same property several exposures of quartz, one at least four feet in width, occur, the value of which has not yet been determined. Interest has also been taken in other properties at the east end of an island in the north part of Elbow Lake. The Bow vein was staked in greenstone schist, and as its name implies, is characterized by reduplicated folding. The average is probably fifteen inches; the vein in places is thirty inches thick. This vein has been found, on careful sampling, to give high gold values. Immediately east of this vein, and parallel to it, is an intrusion of quartz porphyry varying in width from four feet to twelve feet and extending over the greater part of two claims. This porphyry is mineralized with pyrite and a little galena and is criss-crossed with narrow quartz veins. It would appear to be a rock of a type which might prove of value for fluxing purposes.

The Herb Lake Situation.

While considerable prospecting was done in the Reed Lake district this year, the men in the field confined their attention mainly to the working of properties in the Herb Lake and Little Herb Lake areas. A very interesting discovery was made north of Little Herb River, at the right-angle bend, by R. Kerr and P. Gasse in a rock which is an altered sediment, and which varies in composition from a typical mica schist to a quartzite. Very considerable galena has been deposited by replacement apparently from a granite, contact of which with the sediment is immediately west of the main discovery. Associated with the galena is pyrite, a little pyrrhotite and arsenical iron and here and there stibnite (antimony sulphide) in considerable quantity. From the trenching which has been done it would seem that the mineralization has taken place in more or less parallel bands which strike at an angle of about 30 deg. west of the schistosity of the rock. In the main trench, for a distance of fifteen feet, there is heavy mineralization, mainly of galena, partly of pyrite and to a slight extent of pyrrhotite and stibnite. The importance of the discovery is that the galena carries high values in silver. It is interesting that north-west of Osborne Lake galena has also been found in a very similar rock type by J. Kerr, while east of the main discovery galena is found by P. Kobar and stibnite by E. Stewart. It would thus appear that the mineralization is fairly extensive and much surface trenching, and particularly diamond drilling will undoubtedly be carried on in this district in order to determine the extent of the silver values. This is a new type of mineralization in the belt and adds one more to the possibility of economic development of a belt which is remarkably many-sided in its mineral types.

During the past year R. Woosey and others have prospected the northwest end of Herb lake. On an island immediately south of Woosey's Island a heavy mineralized basic rock shows iron and copper sulphides over a width of fifty feet from the top of the cliff to the lake shore. The rock, which is rather unusual for the district, is of a type in which a basic segregation of sulphides is possible, and the occurrence has particular interest for that reason.

On the east side of the lake, the Rex mine and the Bingo property have been responsible for the development work during the Summer. On the Rex mine work is now proceeding to develop the mine to the 300-foot level, and at the same time to stope from the 100-foot level in order to supply the mill, which is now operating. Great credit is due the management for carrying on under considerable difficulties. It will now be possible to stope over 150 feet in the south drift with an average width of three feet, and 70 feet on the north drift with an average width of two and a-half feet, at the same time as sinking is continuing to the 300-foot level. When there is sufficient labor available to run the mill to capacity, the clean-up from those remarkably large stopes should be sufficient to place the property on a good footing for subsequent development on a much larger scale.

At the Bingo property sinking has been completed to 50 feet, the vein averaging to this depth approximately eight inches, with at the bottom some quartz coming in, which will increase the average width by perhaps two inches. A contract has now been taken by Mr. Kennedy to sink to the 300-foot level and to do considerable trenching and cross-cutting. The assay values obtained to the depth at which the shaft has developed the vein are very high.

To many observers of the situation in the eastern part of the mining field, it has been clear for some time that the advisable procedure would be to consolidate several properties on the east side of Herb Lake, making the Rex the centre of operations and conveying ore by an air line from the other properties to the Rex. If a strong mining corporation could succeed in effecting such a consolidation, the future for the Herb Lake district would be very good. The vein at the present time developed on the Rex mine is such as should attract a strong corporation, provided that a sufficiently large number of other properties could be consolidated with the Rex, in order that practically all the capital expenditure on mining machinery could be concentrated on the one property. There is a feeling in favor of such a movement on the part of owners of property in the district who realize that in this way the Herb Lake mining field will come to its own much more successfully and satisfactorily than in any other possible way.

INCREASE OF WAGES AT WABANA IRON ORE ORE MINES, NEWFOUNDLAND.

The Dominion Steel Company has increased the wages of day-rate men employed at the ore mines by four cents an hour. An increase of fifteen per cent has also been granted to the staff.

It is understood the Dominion Company has made satisfactory arrangements with the Newfoundland Government in connection with the export tax that the Government proposed, and that this will not unduly penalise the export trade which, it is anticipated, will eventually attain large proportions.

The McIntyre Porcupine Mines Ltd.

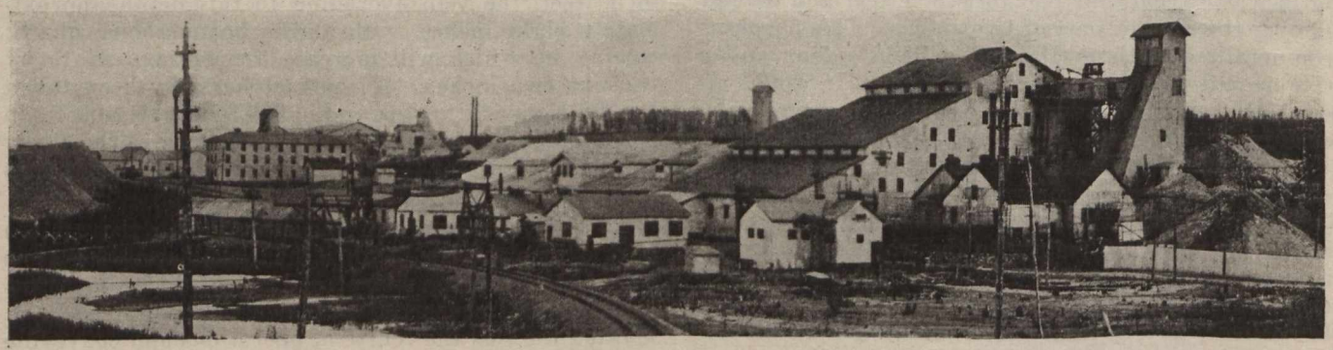
Making Strong Bid For Position of Second Greatest Gold Mine in Canada.

By J. A. McRAE.

The McIntyre-Porcupine Mines, Ltd., situated at Schumacher, in the heart of the Porcupine gold area, has now challenged all others for the position of second place among the gold producing mines of Canada, and at the time of writing is establishing a record second only to that of its big neighbor the Hollinger Consolidated.

Output at this time is being maintained at a rate well over $2,000,000 a year, and the ore reserves are being added to in an extensive way. The deposits, which close to surface were extremely erratic, have been found to be uniform below the 700-ft. level, and a future of great magnitude has opened up before this company.

Mining interests who may find their early efforts disappointing, and who may feel somewhat discouraged, may turn their attention to the experience of the McIntyre and find consolation in the fact that this concern, only a few years ago, was also obliged to flirt with chance. At times, money was difficult to secure, and on certain occasions the McIntyre mine might reasonably have been classed as an exceedingly long shot, with the chances pointing strongly toward failure.



THE McINTYRE-PORCUPINE MINE, SCHUMACHER, ONT.

From the humble beginning of a doubtful prospect, optimism on the part of a few men has finally overcome all adversities, has brought the mine to the position of second producer in Canada, and has enabled the company to disburse large dividends. As an illustration of its growth, the McIntyre mine, in addition to producing over two million dollars during the past fiscal year, and realizing net profits of around one million dollars, was able to add nearly a million dollars to its ore reserves. That is to say, in a period of twelve months, and at a time when economic conditions were exceedingly unfavorable for gold mining, this company was able to develop close to three million dollars.

The McIntyre History.

The original McIntyre claim of 40 acres was located by "Sandy" McIntyre, one of the best known prospectors in Northern Ontario. Shortly after its location, the property was purchased by the present company. Development work commenced in 1911. During that year, the West McIntyre of 34 acres, and 68 acres under Pearl Lake, were purchased. It was in 1912 that the first mill was erected and placed in operation. The plant consisted of only 10 stamps.

Up to the time of the labor strike which lasted from Nov. 1912, to June 1913, a total of 1,400 tons of ore were milled from which $31,243 was recovered. Operations were greatly retarded by the strike, but a 150-ton cyanide mill was carried to completion, and development work got well under way by the end of that year.

During each of the next three years, the mill was enlarged by adding equipment to treat an additional 150 tons daily, bringing the total up to close to 600 tons in 1916. Since that time, no milling additions have been made, attention having been directed toward enlarging underground operations and adding to the physical condition of the mine.

The Merged Properties.

During 1915, the McIntyre Extension Company was organized, taking over 120 acres formerly belonging to the Pearl Lake Company. Also, in November of the same year, the McIntyre-Jupiter Company was formed, taking over the holdings of the Jupiter mine. On the 31st of December, 1916, an amalgamation between the McIntyre, McIntyre Extension, and McIntyre Jupiter was effected. And, with a view to still further pursuing the policy of expansion, an option was taken on the Plenaurum mine, a property of very attractive possibilities which is situated adjacent and on the east side of the Jupiter in direct line with the strike of the main vein system of the Jupiter. This option is still held, and the 130 acres which it involves would give the McIntyre-Porcupine a total of 462 acres.

The McIntyre-Porcupine also holds an option on the Newray, but this is regarded as very speculative and should not be as yet referred to as a likely addition to the holdings of the company. The company has also recently purchased coal lands in Alberta, taking a half interest with the Temiskaming Mining Company in the Blue Diamond Coal Mine and the Canadian Coalfields. These properties are generally regarded as of speculative value.

The present policy of underground development work on the McIntyre itself, is gradually placing the mine in such a strong physical condition as to lead to the belief that further milling additions may soon be considered, in which case the yield would be accordingly increased.

Ore Richer at Depth.

An extremely favorable feature has been a steady increase in gold values encountered as the workings of th mine reach deeper levels. The following figures

illustrate the increasing value of the ore per ton, and the steady increase in total production:—

Year	Val. per ton Recovered	Production
1912	$5.25	$ 76,166
1913	7.05	225,752
1914, to March 31, 1915	8.39	718,332
1916 (fiscal)	7.38	779,991
1917 (fiscal)	9.55	1,864,914
1918 (fiscal)	9.61	1,714,258
1919 (fiscal)	9.29	1,671,646
1920 (fiscal)	11.02	2,080,178
		$9,131,237

The Dividend Record.

The company paid its first dividend of 5 p.c. on Feb. 15, 1917, the disbursement amounting to $180,514. Up to Sept. 1st, 1920, dividends totalling 55 per cent, and $1,985,656 have been paid.

In addition to returning this amount to its shareholders, the company has built up an ore reserve of $5,595,500 and has a surplus of $1,445,000.

The Pioneer Work.

Any written history of the McIntyre-Porcupine would be quite incomplete without mention of the few men who steered the enterprise through its days of uncertainty, the outstanding figure being the late Col. Alexander M. Hay. It is to Col. Hay that the greatest credit is given for the sound basis upon which the affairs of the company were placed, and although he died in January, 1917, just one day before the company declared its first dividend, he handed down to those who succeeded him a mine already developed to a place of importance.

Among others who contributed to the successful efforts in a manner second only to Col. Hay, is R. J. Ennis, the general manager, as well as a former president, Albert Freeman, and Director C. B. Flynn.

The company is capitalized at $4,000,000 made up of 4,000,000 shares of the par value of $1 each. Of these some 3,600,000 are issued.

From these figures, and keeping in mind that profits are exceeding $1,000,000 a year, dividends at the rate of about five per cent quarterly appear reasonably to be looked for in the immediate future as compared with interim disbursements during recent years at the rate of five per cent at intervals of each four months.

Conclusions.

In concluding, the point should perhaps be made clear that the success of the McIntyre has hinged upon the development of what is known as No. 5 vein, upon which development work has been carried to a depth of nearly one-third of a mile. In its brief history, the work done has revealed a total of approximately $14,700,000 of which $9,131,237 has been produced, with $5,600,000 in sight, and the reserve increasing from year to year. To grasp the full significance of the possibilities of the future, it is necessary to keep in mind the fact that the company controls 462 acres, and that only during recent months has discoverd another ore body below the 1000-ft. level which is believed to be the eastward continuation of the No. 83 ore body of the Hollinger, and appears not unlikely to develop into a healthy rival of the great No. 5 deposit. This new ore body is a tremendous potential asset.

CANADIAN INSTITUTE OF MINING AND METALLURGY.

Annual Western Meeting, Winnipeg, Oct. 25th to 27th.

Owing to unforeseen circumstances the complete programme of the Winnipeg Meeting of the Institute is not available for publication, but the following provisional arrangements indicate the scope of the Meeting.

On Monday the 27th, the meeting will be opened by the Address of the President, Mr. O. E. S. Whiteside. The Institute will be the guest of the City at luncheon, and will be welcomed by Mayor Gray, who is himself an engineer.

In the afternoon a paper will be read describing the Manitoba Rolling Mills at Selkirk, and a general discussion on the outlook for an iron and steel industry west of the Great Lakes will take place. The subject will be considered in relation to location in British Columbia, Alberta, Manitoba and Western Ontario.

The evening gathering will include general papers with popular addresses, and lantern slides and moving pictures showing water-powers and mineral resources of the West.

Tuesday's proceedings will hinge largely on questions connected with coal. Mr. Lewis Stockett and Mr. F. W. Gray have prepared papers on this subject.

At luncheon, the Institute will again be a guest, this time of the Winnipeg Board of Trade.

In the afternoon, coal matters will again be taken up. An account of the result of steaming tests carried out on Alberta coals by E. H. Oliver of the Alberta Department of Mines will be given. The work of the University of Alberta in connection with the more efficient utilization of western coals will be reviewed by Professor Norman C. Pitcher, of the Department of Mining Engineering. Mr. David King is expected to discuss the problems connected with the marketing of Western coal.

The Smoker and usual entertainment will take place on Tuesday evening.

On Wednesday morning papers on the mineral resources of Northern Manitoba, Southern Manitoba, Saskatchewan, and the West generally are expected to be given by Mr. J. A. Campbell, M.P., Commissioner R. C. Wallace, Prof. J. S. DeLury and others.

The luncheon will be an Institute affair, addressed by local Institute celebrities.

The afternoon will be taken up by a sight-seeing trip and a visit to the Selkirk Steel Mills.

The Banquet will be held on Wednesday evening, and will conclude what bids fair to be a worth-while programme.

Mr. R. R. Rose, the Assistant Secretary will attend the meeting.

CANADA AS A COAL CADGER.

Canada's unnecessary dependence upon the United States for coal involves the Dominion and, industrially, the British Empire in American domestic affairs, Canada is pictured always as a suspicious character prowling around Uncle Sam's coal-bin. At a time when the American public is naturally anxious and apprehensive as to the fuel supply for the on-coming winter, to represent Canada before the people as a cunning appropriator of fuel needed in the United States is to arouse feelings destructive of international sympathy and good-will. Yet this will be done, every year, regardless of the facts, until Canadians work their own coal deposits.

"Montreal Star."

VISIT OF BRITISH CHAMBERS OF COMMERCE TO HAILEYBURY, ONT.

The first half of October was marked by a visit to Northern Ontario of the members of the delegates of the Chambers of Commerce of the British Empire. These men, representing all portions of the Empire, expressed keen pleasure and surprise at the advanced stage to which the mining industry of this new country has been developed, and showed actual amazement over the magnitude of the potential resources awaiting utilization.

The visitors were shown through the Cobalt silver field as well as the gold mining district of Porcupine. They were shown more than a score of mines in operation, and their journey by railway and by motor through the vast stretch of territory lying along the T. & N. O. Ry, and around the mining centres which have sprung into being during the past few years, left them deeply impressed and they left with the promise that they would spare no effort in making known throughout other parts of the Empire the opportunities presented in Northern Ontario.

At the conclusion of their visit to Cobalt, the delegates were tendered a reception in the Armories at Haileybury, at which some 600 guests were present.

During the course of the evening, Balmer Neilly, speaking on behalf of the mining industry of Ontario, and making special reference to the silver mines which has just been shown the visitors, tendered the following address, the full text of which is given, the "Canadian Mining Journal" being specially represented at the gathering.

The Address.

Since the discovery of Cobalt, in 1903, we have had the honor of entertaining many distinguished people and great among those distinguished parties are our guests of this evening. On behalf of those interested in the Mining Industry, we would bid them a most hearty welcome here tonight. We hope their visit to this North Country will prove not only interesting, but that from an Imperial standpoint, it will provide fair and conclusive evidence that Canada is indeed developing at a pace that can only be understood by those constantly in touch with the situation. When this Congress last met in Canada, Cobalt had not been discovered, but to-day — 17 years later — we have a new, vast country stretching from North Bay to Cochrane and ere long to the waters of the Arctic Ocean.

The land has been cleared, railways built, numerous mining camps of world prominence have been opened up, providing a ready market for the pioneer settler and farmer. From an agricultural standpoint we are gradually becoming self supporting and our great forest resources are being called upon to supply a world deficiency in the paper market.

Temiskaming proper has an estimated population of 45,000 people, all optimistic as to Canada's future within this Empire, and during the war sent overseas some 5,000 men, who classed second to none and who won commissions on the field ranging from the junior position to that of Brig.-General. Those who remained at home worked to support those overseas and their families who remained at home. Without casting reflections upon the efforts of other towns here, but speaking particularly of Cobalt because I am personally familiar with their work there, let me say that that camp, with a population of say 7,000 people, produced and shipped one per cent of all Red Cross Supplies, sent overseas from Canada. This was, of course, mostly the work of the women and we are proud of them, but the men were not idle and with the assistance of the ladies, raised almost $5,000 every month, so that the raw material could be purchased and the families of the soldiers assisted through the Patriotic Fund on a scale somewhat better than that generally prevailing throughout Canada, during the war.

And we didn't stop there. Our welcome to those brave men whom the fortunes of war permitted to return, was genuine and sincere. Club houses have been provided in nearly every town in Northern Ontario for the exclusive use of these men and not only, have they received their old jobs, but better and more suitable position have been provided where possible.

Many of our men, unfortunately, were not permitted to return and while we sorrow with their relatives, we also join in their pride because of a noble sacrifice given freely that right and justice may prevail and that this old Empire may continue to function, standing for relief and freedom to all mankind.

Tonight I have been asked to speak concerning the Mining Industry in Northern Ontario, and Cobalt in particular.

The Discovery of Cobalt.

The Cobalt Camp was found purely by accident in 1903. A blacksmith named LaRose, working with the contractors then constructing the present T. N. O., either found or had brought into his little shop a fair sized piece of a peculiar looking mineral. Little attention was paid to it and the story goes that it was hammered and examined by many a man before the suggestion came that it might be valuable. Samples were sent south and finally, Dr. Miller, our Provincial Geologist, came North and pronounced the find of silver — cobalt — nickel and arsenic genuine.

Every effort was made by the Dept. of Mines to enlist interest in this new mineral field, ,but the people of the Province knew little and cared less about mining and the men of experience reasoned that ore so rich indicated pocket formation and would probably amount to little in importance.

In 1904 some four veins were worked, but little staking was done, and not until 1905 was the real value of the discovery appreciated. Indifference gave way to unbounded enthusiasm and prospectors, from all parts of the world, flocked to this district.

The veins are comparatively narrow, averaging perhaps 2" to 4" in width, but the ore is phenominally rich. The ore taken from the surface in boom days probably averaged over 3,000 ozs. silver to the ton and miners, in many cases, with only hand steel, produced a fortune.

A boom developed and many properties, with little or no merit, were sold to the public at fabulous prices.

However, many of the prospects did develop into mines and have returned to fortunate shareholders, many times their investment.

Gradually real miners were attracted to the country, inexperience gave way to experience and mining methods were developed suitable to this class of deposit. Working constantly to improve their process, the men of Cobalt have contributed several very important improvements to the art of metallurgy and ore dressing.

Growth of Output.

Cobalt's production increased in leaps and bounds and in 1911, when the apex of production was reached, the Camp produced 31,507,790 fine ozs. silver, or 14 per cent of the world's production for that year. Since then the production has gradually declined, for two reasons. Firstly, it was but natural to mine the high grade deposits with the least possible delay. Secondly, with concentrating machinery, the mines were able to give proper consideration to the lower grade ores and as the price raised, the grade workable at a profit naturally lowered. This is well illustrated by pointing out that while the production in 1918 had dropped to 17,661,694 ozs. as compared with the 1911 production of 31,507,791, the money return for 1918, by reason of the higher price of silver, was some $1,387,943 in excess of that obtained in 1911.

Dividend Record.

Up to the end of 1919, Cobalt had produced silver to the value of $182,145,699 and had paid dividends to the entent of $80,780,513. If to the dividends we add the liquid reserves of the operating companies, it is found that the mines have returned to their fortunate shareholders, up to this time, about one-half the value of their gross output, and we are proud of this record.

Lead to New Fields.

Those who were successful in Cobalt struck out to prospect and develop the surrounding country and to-day in addition to the Sudbury Nickel Mines, supplying as you were told 85 per cent of the world's nickel requirements, we have Porcupine, producing at the rate of nearly $12,000,000 a year; about 60 miles Northeast, we have Kirkland Lake Camp,, just coming into the profitable production stage. About 50 miles Northwest we have Gowganda, another silver camp of importance, and 20 miles South of here, the South Lorraine Camp, where British capital will apparently reap a bountiful reward.

You may be inclined to ask as to the future promise of this Camp. The deposits are high-grade and erratic and you may be interested to learn that few mines have ever been in a position to announce over two years' positive ore reserve. New discoveries continue to be made and they in turn suggest other possibilities, but the big factor in any estimate must turn on the future price of silver. The amount of ore classified as profitable or unprofitable in any mine will continue to fluctuate with that price.

Nationalization Impossible.

Mining is described as a gamble. In the same way insurance is a gamble, if you confine consideration to any one individual

risk. However, it can be proved mathematically that insurance, by grouping many risks and working on known averages, is after all the very opposite of gambling. Positive data, such as insurance companies have available, is impossible in the case of mining and a certain hazard must always be connected with the industry. For this reason, if for no other, it is not possible to nationalize the industry. If a Government were to take over our industry to-day for the benefit of the State, the hope of individual reward would, to a great extent, be removed and the prospectors would not, nor could they be expected to risk their time, health and money, sowing for others to reap.

Gradually the known ore deposits would be worked out, the money thus made and perhaps large additional amounts, would be spent in prospecting with little hope of success. Not only is nationalization impossible, but great care must be taken to prevent any lessening of the prize, that now keeps prospectors interested in their calling.

There is no known method whereby the profitable risks may be separated from the bad risks, be it mining or insurance. Nevertheless we would not be justified in accepting all risks. Careful investigation of all the conditions surrounding or pertaining to any risk, is essential. And that investigation must be made by those who have had long and successful experience. Sending a plumber, described for the job as a "well known mining engineer," to take grab samples and having those samples assayed to the third and fourth decimal place, is not economy and should be a criminal offence. We were asked by some of the members of the Imperial Press Conference how best we could co-operate to prevent flotations of ill advised ventures on the British market. Our answer is that you have in the Institution of Mining and Metallurgy, London, an organization well fitted to function in this respect. Their membership is world wide and their opinion may be generally accepted at par.

Per Capita Output.

Canada's position from a mining standpoint is so promising that only the truth and nothing but the truth will serve her best interests. To trace the growth of our mineral production, tion, let us quote as follows: Canada's per capita production in mineral wealth was in

1886	$ 2.33
1896	4.38
1906	12.81
1912	18.27
1918	24.59

And let me say here in all sincerity and as one who has spent the last 14 years in this country, that we have only begun.

Statistics at a function of this kind are generally tiresome,, but in order to give you some definite idea as to the distribution and present production in Ontario alone, let us quote the following figures for 1918, giving the market value in the nearest thousand of dollars:—

Nickel	$27,840,000
Silver	17,416,000
Copper	8,533.000
Gold	8,503,000
Cobalt	1,616,000
Iron Pyrites	1,145,000
Iron Ore	625,000
Arsenic	567,000
Talc	247,000
Graphite	209,000
Fluorspar	154,000
Feldspar	112,000
Molybdenum	60,000
Mica	50,000
Corundum	27,000

Turning to the purely metallic production of this Province note that in 1903 the year in which Cobalt was discovered and Temiskaming born, the total value of Ontario's production was $12,870,000, while in 1918 that total had increased to $80,-309,000.

In 1903 taking Canada's mineral production as a whole, the value was $61,741,000 and in 1918 that total was $211,302,000.

We are, therefore, progressing, but by no means as fast as conditions would warrant.

We are advised that of all railroad borne freight in the U. S. 53.09 per cent originates in the product of the mine. On our T. N. O. the last available report shows that their income from handling products of the mine is 48 per cent of the total freight returns.

A similar report from Dept. Railways & Canals, Canada, shows only 38 per cent and when it is admitted, as it is on all sides, that Canada's mineral resources are second to that of no other country in the world, it is but fair to assume that we are behind in our proper development, at least to the extent of an annual tonnage equal to 15 per cent by weight of all goods freighted on our Canadian Railways.

So much authentic information is available in the way of Government reports concerning the wealth and distribution of our mineral resources, that I think we may fairly take their possession for granted. Let us then consider what we have in the way of ready resources that will assist in the proper development of new mines.

Summary of Resources.

1. We have in the great pre-Cambrian area radiating North-West and North-East from say North Bay to the shores of the Arctic, a country dotted with numerous lakes and rivers so distributed that it is possible by means of short portages to travel the whole district by canoe. Water is everywhere wholesome. Fuel abounds, game and fish will supply much of the prospectors food requirements.

2. Railways and telegraph lines supply a ready means of communication as between different districts.

3. The mining laws are simple and equitable and administered without partiality.

4. While we lack coal, fire-wood is available for the early stages and nature has been lavish in her distribution of water power in this North Country. In 1918 Government reports show that in all Canada water power had been developed to the extent of 2,305,310 H.P. and of this Ontario had developed 53 per cent. The possible amount to be developed is to-day unknown but it might be interesting to state here that in Northern Ontario there has been developed for the use of the mines approximately 50,000 H.P., and the financing of this development has been largely the work of the mining companies.

5. There has been attracted to this district a fine class of citizen — men and women who are not easily discouraged, but on the other hand, are full of hope and resource and constantly striving to the end that success must eventually crown the efforts of those who ever and honestly use the talents with which nature has endowed them.

What Are Our Difficulties?

(1) The people of Old Ontario have a very different knowledge of the problems of the Mining Industry. Their ideas have been obtained from brokers' circulars describing astounding profits made and predicted. As a result of these mistaken ideas many honestly believe that practically all the profits derived by successful mining companies should be taken by the Government to pay for improvements in Old Ontario.

(2) While we as pioneers in a new country must clear the land, develop water power, build roads, bridges, construct telegraph lines and railroads, provide schools, hospitals, water, fire protection and many other public utilities, we are taxed as though all these things were provided by the community, as in Old Ontario.

(3) City life, with high wages and expensive tastes as developed during the war-time munition-manufacturing period, has permanently unfitted many for the privations and hardships of pioneer life. City population has approached the point of saturation and only a gradual decrease in industrial development within the cities coupled with immigration from countries where the people are not socially above handling a pick and shovel, can remedy the present grave labor shortage.

What We Hope To Do.

(1) We hope to provide the load that will make the development of our water powers an economic possibility and provide power in such abundance as to largely offset our lack of coal,

(2) We hope to develop our iron ore resources by means of beneficiation to the point where Ontario and Canada may depend upon our own resources, in place of importing 95 per cent of our iron ore, and iron and steel products to the extent of some $180,000,000 as in 1918.

(3) We hope to educate the people of Old Ontario and incidentally the Government, to the problems and possibilities of the North Land and then persuade them that our necessities should in no sense be contingent upon conditions in Old Ontario alone,

(4) We hope to encourage an influx of real men in sufficient numbers to permit industry to follow well-balanced and economic plans,

(5) We will welcome capital carefully invested, from any quarter, and more especially will we welcome the interest and council that would naturally follow capital coming from other parts of this Empire.

(6) Finally, by more intensive prospecting we hope to broaden the scope of the mining industry, until the whole pre-Cambrian country is a hive of industrial activity. Mining will continue to do the pioneer work with agriculture, lumbering, pulp and paper-making following in our wake.

The objects of the Chambers of Commerce, as we understand it, is to foster a better understanding between the different partners in the Imperial Commonwealth. But it must go further than that and seek a better understanding among the nations of the world. Surely then there is no place better fitted to carry on this plan of education, than on the frontiers of

civilization. The boundary lines are ever moving outwards. The lure of the new country is drawing men from their old homes and old surroundings, social caste disappears, old prejudices are forgotten, a broader vision is the result, and plans for the future can be formulated on the basis of merit rather than expediency.

Our appreciation of the honor done Temiskaming through this visit of the Chambers of Commerce is genuine. We are full of unbounded faith in and loyalty to the Empire, and we hope that through discussion of the various problems unfolded through observation, as you travel across Canada, much good will result and that your memory will ever keep green the possibilities and the promise of this North Land, the land of lakes and rivers, farms, forests and mines.

LABOR SITUATION AT THE NOVA SCOTIA COLLIERIES.

The coal operators, with the exception of representatives of small companies, failed to meet the Wage Scale Committee of the United Mine Workers in conference at Truro as requested. The large companies take the stand that if the recommendations of the Royal Commission are not accepted by the union as a basis of agreement, the award of the Mc. Kinnon Conciliation Board and the agreement of January last which resulted from the work of the Conciliation Board, automatically come into effect. This agreement provides the machinery for adjustment of any interim disputes during the life of the contract, and the operators stand prepared to meet the men as provided under the January 1920 agreement.

The Executive of the Union is taking a strike vote on the 22nd October, and there is little doubt that a majority of the miners will vote for a strike, although, under a secret vote, the issue would not be so certain.

A conference is to be held in Montreal on the 20th between representatives of the larger companies and the union officials. The conference is being held at the suggestion of the Minister of Labor, who is expected to be present.

While the large companies are adopting a definite attitude and insisting upon the carrying out of existing agreements, there is a tendency among the smaller operators to take advantage of the brisk market which will be available should the workmen of the big operators go on strike. This disunity among the operators has for some time been very skilfully employed by the union officials, who in their public statements make no distinction between the small or large pits, but accord to each individual operator equal importance, much to the mystification of the newspaper readers at a distance. The deciding factors nevertheless are the Dominion Coal Company, the Nova Scotia Steel Company and the Acadia Coal Company, which between them mine 85 percent of the coal produced in Nova Scotia.

Should a strike take place, about 12,000 mine-workers will be directly affected, and possibly 8,000 steel and railway workers would be immediately thrown idle. The running of the trains on the Canadian Government Railway, and other public utilities would not be immediately effected, as resources would be had to winter stocks, but curtailment of service, both freight and passenger would be necessary within a week, should the strike take place.

The course of events will turn upon the Montreal conference, and at the time of writing cannot be forecasted.

NOTES ON ASBESTOS & OTHER MINING IN QUEBEC.

By Mr. THEO. C. DENIS (In C. M. I. Bulletin).

The Asbestos Corporation of Canada has given a contract to the firm of Fraser, Brace & Co., for the removal of 600,000 cubic yards of overburden at the King mine, Thetford, to enable them to extend their operations. An hydraulic transportation system is being installed to remove the soil and sand to a dump across the Thetford river, a mile and a quarter from the mine. This will uncover an area of asbestos-bearing ground 1,300 feet by 1,000, that had previously been proved by diamond drilling. Prospecting by drilling is being continued over the property, and reserves are said to be now assured at that mine for some thirty years of operation at the present rate of mining.

The Reed property near Black Lake has been leased to the Maple Leaf Asbestos Company, in which the Wiser interests, of Prescott, have a controlling share. Plans are being made to remodel the small mill, which was built some twelve months ago by Messrs Blais & Fillion, the previous lessees.

The Consolidated Asbestos Company, which took over the properties formerly controlled by the Jacobs Asbestos Mining Company, are hastening the underground development work on the second level at the Jacobs mine to begin mining as soon as possible. Hoisting from the first level is now proceeding satisfactorily. At present the underground development work at this mine comprises a total length of nearly three miles of haulage ways, cross-cuts, inclines and shaft.

The Mutual Chemical Company of Canada which is working a chrome mine near Caribou lake, between Black Lake and Coleraine, has sunk the shaft to 300 feet, but all mining is done on the 200-foot level. The lens of chromite on which they are now working appears to be about 500 feet in its longest dimension. The new concentrator is giving good results and shipments of chrome concentrate have been continual all summer.

J. V. Bélanger Mining Company, which is working the chrome property adjacent to that of the Mutual Chemical Company of Canada, started the new concentrator early in July, and it has been in operation practically without a stop ever since. The mill capacity is 180 tons of ore per day.

Metal mining is extremely quiet in the province. At present the only metal mine in operation is the Weedon mine, working a deposit of copper-bearing pyrite, at Weedon, north of Sherbrooke. Steps are being taken to resume operations at the Montauban mine, of the Zinc Company, Ltd., at Notre-Dame des Anges, where mining had been suspended some time ago in order to concentrate the work on diamond-drilling exploration.

Quarrying and brick-making are extremely active throughout the province. The operations are only limited by the shortage of labour. Production of lime has also been handicapped by the shortage of coal for the kilns, to the great inconvenience of the paper-pulp industry, which uses a very large quantity of lime in the production of pulp. The output of one of the largest lime companies in the province is practically all taken by the pulp mills.

Northern Ontario Letter

THE SILVER MINES.

The Cobalt Field.

Cobalt mine operators have taken an optimistic view of the silver situation. They believe the recent decline in quotations is only temporary, and will be marked by a gradual rise to not far under the price obtaining in the United States. For instance, on Oct. 12th, quotations declined to 83 cents an ounce with no sales reported. On Oct. 13th, the bid increased to 87 cents an ounce with no sales reported. Meanwhile, the United States Treasury continues to pay 99½ cents an ounce for all silver produced in the United States, and this is regarded as the factor which seems certain to so deplete the market for general consumption that the world price of the metal cannot long remain below that point.

According to advice just obtained, the Mining Corporation of Canada is on a fair way to establish a production record for 1920 equal to that of 1919. The output for the year will actually exceed the amount of silver estimated in the reserves at the beginning of the current year. As to this, in common with other important silver producers in this field, the Mining Corporation is mining over a large part of its underground workings and finds that early operations were directed toward mining high grade ore shoots and that a large tonnage of medium and low grade ore was passed up. In view of the great extent of the underground workings of the Mining Corporation, the life of the mine is expected to be comparatively long. In this connection, it is significant to note that no ore has as yet been drawn from the Buffalo mine which was acquired early this year. The Buffalo, with its large amount of medium and low-grade ore remains a big reserve asset. Added to this is the 350,000 tons of old tailings which are being treated at the rate of about 3.50 tons daily, and which will last for nearly three years.

W. G. Miller, Ontario Government Geologist, together with Thos. W. Gibson, Deputy Minister of Mines, have just completed a visit to the leading mining district of Northern Ontario, including Cobalt, Gowganda, Porcupine and Kirkland Lake. This is the first general visit for a long time, and the press of Northern Ontario has made special comment, the following editorial appearing in the "Mining Review:—

"The visit to Northern Ontario this week by "Dr. W. G. Miller, Provincial Geologist for "Ontario, together with Thos. W. Gibson, Deputy "Minister of Mines attracts interest. These "gentlemen are in charge of important Depart- "ments bearing vitally upon one of the basic "industries of the Province.

"In the North, the visit is welcome, and is only "marred by the thought that their coming should "of necessity be referred to as a "visit".

"Surely the mining industry of Northern "Ontario should receive more frequent calls, and "surely the requirements of the industry could "be better ascertained by frequent tours through "the mining areas.

"The Mining Review has no complaint to "register in regard to the ability of either of "these men who have won the good-will of mining "men in general in Northern Ontario. We "merely desire to urge upon those filling impor- "tant posts the advisability of making personal "close-up observation of progress and results. "We are confident the industry would benefit "from such added attention."

The mines have as yet found no relief from the shortage of underground workers, and with attention being directed toward maintaining production, the amount of exploration and development work is suffering as a consequence.

The wage problem at the silver mines is due for consideration on or before Nov. 1st. In Aug. 1919, the mining companies in dealing with their employes after breaking up the Western Federation organization, agreed to pay a flat wage on silver below 80 cents an ounce. On 80 cent silver or over, an extra bonus of 25 cents a day was agreed upon, with an extra 25 cents for each 10 point advance. As a consequence, when silver went to $1.37 an ounce early in the year, the bonus amounted to $1.50 above the flat wage. Later on, when it commenced to decline, the mining companies, in May, last spring, announced voluntarily that they would continue to pay a $1.25 bonus daily until Nov. 1st, even though silver should decline below $120 an ounce. Therefore, although according to the former agreement with the men, the bonus on silver at under 90 cents an ounce would be only 25 cents daily, the mine workers have received the benefit of an extra $1 a day.

As regards what action will be taken on Nov. 1st, it is difficult to say. But, in view of the $1.25 bonus plus the flat wage combining to make a total just about equal to the wage being paid in Porcupine and at Sudbury, it is believed the mines in Cobalt will continue to pay this rate of bonus, at least until the cost of living declines or other factors enter into the situation and make it necessary to reduce the bonus.

Cyril Knight, Ontario Government Geologist, who is making a re-survey of the geology in the Cobalt district, is now engaged in a study of conditions at the Kerr Lake mine and that vicinity. Mr. Knight will discontinue the work a little later in the year, and will resume in the spring with a view to completing the task next summer.

Elk Lake and Gowganda.

Announcement is made that operations are to be commenced on the property of the Anvil Lake Silver Mining Company, situated at Anvil Lake in the Maple Mountain district. Chas. Dalby has been engaged to manage the work, and operations are to be carried on throughout the winter. The property lies close to the White Reserve mine.

In the meantime, negotiations are still under way between the White Reserve Mining Company and British interests, whereby it is hoped to complete a deal which would cause the property to be worked in an aggressive manner. Just now, only two men are kept at the property, pending the outcome of the negotiations. It is understood the White Reserve Company is itself prepared to proceed with work even though the present deal does not materialize.

Considerable disappointment has been caused over the failure of the Canadian Light Railway Construction Company to provide Gowganda with a narrow-gauge railway this year. However, with the advent of good sleighing, transportation will again be made more satisfactory, and is expected to lend added impetus to activity in this area during the coming winter.

During the week ended Oct. 15th. five Cobalt companies shipped an aggregate of thirteen cars containing nearly one million pounds of ore, the weeks shipments ranking among the highest during the current year.

The Mining Corporation was the leader, with the Nipissing a close second. Following is a summary:—

Shipper	Cars	Pds.
Mining Corporation	6	391,042
Nipissing	4	307,307
McKinley-Darragh	1	100,976
Hudson Bay	1	63,756
Kerr Lake	1	61,137
Totals	13	924,208

THE GOLD MINES.

The Porcupine District.

The gold mines of the Province of Ontario are receiving a premium on their gold, at the rate of over a million dollars a year. This added income has offset to some extent other adverse economic factors, and the total income of the gold mines for the current year will be greater than ever before in the history of gold mining in this province.

This record is being established at a time when labor is so scarce as to permit the mining plants to be operated at only two-thirds capacity, and for that reason the achievement is doubly significant. In due time, with a full force of workman available, the increase in output and net earnings will be large and may reasonably signalize a general increase in the rate of dividend disbursements.

Achievements in the gold mining industry of Northern Ontario, where the mines of Porcupine and Kirkland Lake are alone producing nearly twenty-five per cent as much gold as the entire United States, are regarded as exceptionally remarkable. The gold output of these mines has been increased at a time when the production from mines in many other countries has been gradually falling off. For instance, in 1915 the gold output of the United States amounted to $101,000,000. For the year 1920 it is estimated as likely to be below $50,000,000. This state of affairs is alarming for the United States, Canadians, therefore, have reason to be especially pleased to witness the steady increase in production of the yellow metal in Northern Ontario, with the promise of this output being greatly increased just as soon as sufficient workers can be secured.

It is reported in unofficial circles that the Dome Mines Company is considering some plan to increase its capitalization. Officials are reticent regarding this, but the object in view is to prevent unreasonable taxation, according to rumor. This would in no way alter the dividend policy, and would give the present stockholders the benefit of any increase in capitalization. As regards the present operations, the developments at depth are understood to point to the likelihood of the Dome Mines experiencing very little difficulty in going on a dividend paying basis of 20 per cent annually, just as soon as the necessary number of workers can be procured.

The extra dividend of 1 p.c. declared by the Hollinger Consolidated, payable No. 3rd, is the seventh disbursement made this year. The disbursement will amount to $246,000 and makes total of $1,722,000 paid so far this year.

During recent years, the Hollinger has made 1 p.c. disbursements every eight weeks, with one extra in December, making 7 p.c. a year. The custom has been to have a regular disbursement fall early in December with the extra at the end of the month. Therefore, it is believed the stockholders will as usual receive the two December disbursements, in which case the total for this year will be brought up to 9 p.c. or a total of $2,218,000.

Provided the December disbursements actually materialize, the Hollinger Consolidated will again regain its position of being the largest dividend paying mine in this district, the second largest being the Nipissing with an annual record of $1,800,000.

Not only this, but the Hollinger achievement is being accomplished at a time when workers are scarce and when it is possible to operate the company's mill at about two-thirds capacity. This holds out great promise for the future when workers are available in adequate numbers.

The Hollinger has close to 1,000 men on its pay-roll, but is anxious to secure several hundred more. In the meantime, pending the securing of these additional men, the mill is operating at about two-thirds capacity, and the output for the current year promises to approximate $6,000,000.

A diamond drilling program of 1,200 feet has been completed on the Porcupine-Miracle property. A wide zone of mineralization was intersected, and the core has been shipped away for assay. Provided the gold content is sufficiently encouraging, further drilling may be undertaken during the winter.

Work has not yet been resumed on the Premier-Langmuir Barite Mine, in Langmuir township. The directors recently visited the property in company with an expert, and this gave rise to an earlier report that work had been resumed.

The Kirkland Lake District.

Outstanding features in connection with the Kirkland Lake district include the fact that the main shaft of the Lake Shore Mine is well on its way from the 400 to the 800-ft level, that the mill of the Wright-Hargreaves mine will be completed by the end of the current year and that machinery for a new mill on the Ontario-Kirkland will be hauled to the property during the coming winter.

The Tough-Oakes mine is still idle, and it is believed no move will be made toward resuming general operations until next spring at least. The cost of heating the plant is a factor against deciding to start up at this season, while the difficult of securing men is another. The chief underlying cause of the prolonged idleness is difficult to determine, as arrangements were made last spring to start up. The opinion has taken form locally that the causes may be more serious than is generally believed, and may have something to do with the amalgamation arrangement between the Tough-Oakes, Burnside and Aladdin-Cobalt.

A deal is said to be pending for the Elstone-Duncan property, situated about half way between the proven part of the Kirkland Lake district and the Argonaut mine at Beaverhouse Lake. Although sand overburden conceals the greater part of the rock in this territory, it is generally believed the gold-bearing formations extend all the way from Kirkland Lake to the Argonaut. For that reason, any movement or deal calculated to develop the Elstone-Duncan would be interesting and success in such work would open up possibilities over a wide field.

Clifford E. Smith, Chairman of the Toronto Branch of the Canadian Mining Institute has just completed a brief examination of the Associated Goldfields of Larder Lake. Mr. Smith has found the large low-grade bodies do not carry sufficient gold to make them profitable to mine on a large scale at a profit, and will probably recommend an entire change in policy. Provided this proves to be the case, the advertised plan to construct a large low-grade mill will have to be abandoned, and mining will take the form of prospect work to learn whether or not it will be possible to make a profit out of the smaller streaks of ore. This will no doubt come as a distinct disappointment to stockholders who had been led to believe in the latest annual report that a huge volume of ore exists in which the gold values average $11.15 to the ton, the total indicated value being over 159 million dollars. To fall from such high hopes to the fact of having only a mining prospect with really no assurance of success is something which is reducing the enthusiasm born in the past of vague inference and mysterious reports.

A party of men left Haileybury this week for Lightning River where they will carry on operations throughout the winter on the property of the Lightning River Gold Mines. They were accompanied by Dr. Lucy of Guelph, who is going in to make a brief inspection of the property.

Operations are being resumed on the Mondeau property, at Boston Creek. Work was suspended a few weeks ago, at which time an official announcement was made that the step was only temporary and was not in any way due to lack of merit in the property.

On the Miller Independence mine, cross-cutting operations are proceeding in three directions at the 500-ft. level. As yet, no high grade ore has been encountered at this depth, although favorable indications are in evidence.

COAL PRICES.

Toronto, Oct. 22.—It is considered likely that the British strike will have a tendency to advance the export market for coal. Another feature which will have more or less effect on the market is the calling off by the Attorney General at Washington of the Fair Price Commission which may have the effect of stiffening the market. Hard coal is still quoted at from $8 to $16.00 gross tons at the mines, American funds. Mine run is quoted at $13.85 to $14.25, f.o.b. Toronto and smokeless rules at from $13.50 to $14.50.

Vancouver.

Bituminous coal retails in Vancouver at $14.50 for lump coal, delivered in sacks, $13.50 for nut coal, and $10.00 for slack coal. The use of slack coal, combined with wood, in domestic furnaces is common, and permissible because of the milder climate of the Coast.

Sydney.

A general increase in the price of coal will be necessitated by the findings of the Royal Commission, as notwithstanding the failure of the parties to agree, some increase in the expenditure of the operators on wages is certain, and there is little disposition on the part of the miners to increase production. Sydney operators have already increased the price of runmine coal to local consumers from $5.50 to $6.50 per short ton. Screened coal is quoted at $6.75. Higher prices are likely.

TORONTO MINING STOCKS.

Following are of average quotations for active gold, silver and miscellaneous stocks on the Standard Mining Exchange for the week ending 17th October, 1920.

Silver.	High	Low	Last
Adanac Silver Mines, Ltd.	2¾	2½	2½
Bailey	4½		4½
Beaver Consolidated	39	38½	39
Cobalt Provincial	48¼	47½	47
Crown Reserve	27¾	26	26
Foster	2½	2½	2½
Hargraves	1⅞	1⅞	1⅞
La Rose	32	30	32
Lorrain Con. M. Ltd.	4⅞	4	4⅞
McKin.-Dar.-Savage	55	50	55
Mining Corp. of Can	1.74	1.59	1.70
Nipissing	9.40	9.30	9.40
Ophir	2½	2	2½
Peterson Lake	13¼	13	13
Right of Way	2	2	2
Silver Leaf	2	2	2
Temiskaming	34¼	34	34½
Trethewey	25	24¼	24¾
Gold			
Apex	1¾	1¼	1½
Atlas	12	12	12
Dome Extension	40½	39	39½
Dome Lake	5	4¾	4½
Dome Mines	12.50	12.25	12.25
Gold Reef	3½	3¼	3½
Hollinger Cons	5.85	5.60	5.75
Hunton Kirkl'd G.M.	11½	10	10
Keora	17	16½	16¾
Kirkland Lake	47¾	45	46
Lake Shore M. Ltd	1.06	1.02	1.02
McIntyre	2.05	2.01	2.02
Moneta	11½	10	11½
Newray Mines, Ltd	5½	4	5
Porcupine Crown	24	22¾	23¼
Porc. Gold .. EX.R	1	1	1
Porcupine V.N.T	26	25	25
Preston East Dome	2¾	2	2¾
Schumacher	21½	21	21½
Tech-Hughes	8	8	8
Thompson Krist	7¾	7½	7½
West Dome	6½	6	6¼
West Tree Mines Ltd.	5	5	5
Wasapika Gold M. Ltd	10	10	10
Miscellaneous			
Petrol Oil (The)	53	50	53
Rockwood Oil, Gas	3½	3½	3½
Vacuum G.	27½	26	27½

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal, October 20th 1920. (In less than carload lots).

	Cents per lb.
Copper, electro	21
Copper castings	20½
Tin	47½
Lead	8¼
Zinc	9⅛
Aluminum	35
Antimony	8¼

British Columbia Letter

The Metal Mines.

Representatives of the Mining Operators of British Columbia are anxious to induce the Provincial Government to amend the Taxation Act in order that allowance may be made for the depletion of ore reserves in mining property. As it now stands anything that is allowed comes as a concession from the Minister of Finance after an investigation. The opinion among mining men is that the principle of allowance for depletion of ore reserves should be recognized in arriving at the basis for the taxation of a producing mine. A delegation from mining companies interested in this Province recently met the Premier and members of the Executive to discuss this and other phases of the Taxation Act. The hearing given them was sympathetic and they are confident that the force of their arguments will have the effect of producing the desired amendments at the next session of the legislature.

Instructions have been given the Provincial District Mining Engineers of British Columbia to prepare to deliver a series of lectures at the different important centres of their several districts during the winter months. They will deal with elementary geology and mineralogy, the idea being to give prospectors and others interested an opportunity to obtain the knowledge necessary to guide them in selecting prospecting ground and to enable them to recognize mineral when encountering it. Hon. Mr. Sloan, Minister of Mines, in adopting this policy has accepted a suggestion from the Prospectors' Protective Association of British Columbia. This organization made a number of recommendations, and that of the establishment of schools for the benefit of the prospector and the "would-be" prospector was among them. Mr. Sloan thought it a good suggestion, especially in view of the decline in the numbers of the men who search for mineral wealth in the Summers and return to think out what they are going to find next season, and also because of the extensive field offered by this Province for this class of pioneer work.

Members of the Canadian Geological Survey, who have been at work in British Columbia, are beginning to return and to leave for Ottawa to compile their reports. J. B. MacKenzie, who conducted a party into the Taseke (Whitewater) Valley, Clinton Mining Division, for the purpose of making a geological and topographical survey with special reference to the reported large deposits of limonite and hematite iron ore deposits of that Section, is one of the latest to be heard from. He states that on arriving in this District he met F. J. Crossland, who was at the head of a party sent in by the Provincial Government to pursue investigations bearing particularly on the tonnage of iron ore available. The two expeditions co-operated in their researches and their reports are being awaited with interest. Mr. McKenzie explains that he is unable to make any statement of values in connection with the iron deposits. He explains, however, that "the ores are derived from a pyrite, iron sulphide, which occurs in some places near the base of a great series of volcanic rocks, and these cover a very large area in Central British Columbia. The iron has been extracted from the pyrite by a process of oxidization, has been carried down the slopes, and deposited in the flatter ground. The beds of limonite, the subject of investigation, thus are found in different parts of the lower sections of the valley. "In September, Mr. MacKenzie make a reconnaissance across the eastern Coast Range, passing the headwaters of Tyaughton and Churn Creeks, and the Yalakon River down French Bar Creek to the Fraser River. Only general geological work could be done owing to the lateness of the season but nevertheless the trip was of importance because it was the first geological survey of any kind of that country.

W. E. Cockfield and M. F. Bancroft, also of the Geological Survey, are other workers in the western Canadian field who are en route East. The former has been working in the Keno Hill, Mayo, and other adjacent sections of the Yukon while the latter has spent the summer obtaining material necessary to tie-up geological maps of the Lardeau District of the Province.

Of the Keno Hill region Mr. Cockfield has little to say regarding general development except that there is much activity and that much development is being carried on by the Yukon Gold Company, one of the Guggenheims' enterprises. The Company expected to ship 3,000 tons of ore this winter. The ore assayed high-grade silver-lead, running from 200 ounces of silver and from 50 to 60 per cent of lead to the ton.

The principal ore was galena, occasionally carrying freibergite. The gold content was small, not exceeding, as a rule, $4 to the ton.

On the upper Stewart River there were some stamp mills in operation but little placer mining was being done. A gold dredge had been in operation on Highett Creek during the summer.

Referring to the Lardeau Mr. Bancroft explained that he had examined the central mineral belt where are located such mining properties as the Silver Cup, Triune, Nettie L., and further north, the Truefisher, Broadview and Great Northern. Lack of capital was retarding development work. The belt was remarkable for its fissures, the rocks being carboniferous with fine grained sedimentary rocks, such as quartzites and limestones, much in evidence.

Discussing general conditions it was stated that much of the mineral had been Crown granted and left without development. The difference between this section and the Slocan was that in the latter the ore deposits were found closer to the surface, so that the expenditure required in opening and proving them was not so great.

A shipment of ore from the Nettie L. ran $290 silver to the ton while other shipments have given returns of 21 ounces of gold, 230 ounces silver, a considerable percentage of lead and a small percentage of zinc.

Vancouver, B. C.

Drilling for oil continues in the Fraser River section of British Columbia and, from reports, the indications at the Empire Company's well, which is down 2,200 feet, are encouraging. A gray gumbo, thickle studded with what is described as oil sand, has been encountered. Small quantities of oil have been brought to the surface in mud, it is asserted, and the statement has been made that the Well, as it stands, is capable of producing a considerable quantity of oil.

Nelson, B. C.

At the Nelson Fall Fair one of the features was a Mineral Exhibit collected by the prospectors and operators of that section of the Kootenays. A specimen of copper ore from Iron Mountain, Beasley, was awarded first prize in competition with samples of other dis-

coveries made during the past year. A collection of gold ores from the Bayonne District was highly commended. These specimens averaged $75.30 in gold, besides carrying silver and lead. A first-class sample of placer galena from Boulder Lake was much admired. Copper-silver and copper ores from Crawford Bay, silver ore from the Providence Mine near Greenwood; and lead ore from the Lardo were among other samples that held the attention both of local and visiting mining men.

Trail, B. C.

During the last nine days of the month of September ore receipts at the Trail Smelter, of the Consolidated Mining Smelting & Power Co., aggregated 12,744 tons, bringing the total for the year to 251,735 tons. The Washington Mine, of Sandon, is added to the list of shippers. Mines of the smelter company contributed 11,549 tons of the total for the last days of September leaving 1195 to the credit of independent operators.

Stewart, B. C.

W. R. Tonkin, president and manager of the Fish Creek Mining Co., is quoted as stated that seven years work on their property, situated on the west of Salmon River and on the American side of the Portland Canal area, has justified a continuance of work and that shipment of ore will commence as soon as transportation facilities are secured. The leads, he states, are quartz fissures carrying high values in silver and gold and it is proposed to instal a concentrator. Mr. Tonkin declares that as large a tonnage of ore will be developed on the American side of Salmon River as within Canadian territory, affirming that it has been only because of the remarkable showing of the Premier Mine that the adjoining section has not received the attention its merit deserves.

About 600 feet of diamond drilling is to be done on the Titan Group of Claims, located on Fisher Creek. This property possesses a well defined quartz vein. The Riverside Group also has been under development, 350 feet of tunnelling having been done with satisfactory results.

On the Premier Mine the concentrating mill, which will have a capacity of 100 tons a day, is making good progress. Water power is to be utilized and electricity will be available both for the mine plant and for all buildings of the camp. Employees will be provided with comfortable housing, being supplied not only with light but as well with hot and cold water. Equipment now is being hauled over the road on the American side, over the border and the river to the mine. A warehouse has been built on the new dock for storage of the ore pending shipment. There are 200 men on the payroll at the Premier Mine Camp.

THE COLLIERIES.

The situation in the coal fields of Eastern British Columbia and the Province of Alberta has not mended during the past week. In Alberta it is about the same. The claim is made by representatives of the U. M. W. of A. that the tie-up is not general and that few of the mines are seriously affected. The O. B. U. officials, however, declare that the strike call has been responded to by the majority of the workers and that more have been coming out every day. The Crow's Nest Pass District, B.C., the mines have been practically closed down since the 6th inst.

It is an unusual condition because the issue does not appear, at any rate at present, to concern the operators so much as the two rival labor organizations, viz., the United Mines Workers of America and the One Big Union. The latter want the "check-off" system abolished, this being the practice of taking from the men's wages the dues which go to the U. M. W. of A. The U. M. W. of A. asks that its Agreement with the Operators be re-opened so that provision may be made for an increase of wages to day-workers. The O.B. U. failing to get satisfaction called a strike. The U. M. W. of A., did not go that far, advocating negotiation. Consequently the original dispute seems to be somewhat obscured in the heat of the struggle for control between the two labor factions. The Operators, for their part, have declared that there can be no action on the question of a revision of the Agreement to provide for additional wages until the men go back to their work.

The possibility of a fuel oil famine in the northwest is turning the attention of transportation companies to the task of providing for a substitute. Joshua Green, president of the Puget Sound Navigation Co., in testifying before the Washington State Public Service Commission recently, stated that his Company probably would continue to use oil as long as it could be had, but that it was increasing so in price that increased passenger and freight rates were imperative. It was his opinion, however, that within the next two years the use of oil for fuel and gas making would have to cease in the Pacific Northwest. Consumers of fuel oil would have to turn to something else, presumably coal. "We are experimenting now with powdered coal", he said, "but the result still is doubtful. We find that the coal cannot be pulverized at plants on shore but must be powdered aboard the boats." It is difficult and dangerous to handle, Mr. Green asserted, because of its inflammability.

The total coal production by the collieries of Vancouver Island for the month of September was 150,807 tons. This is made up as follows :

	Tons.
Canadian Western Fuel Co., Nanaimo	56,775
Canadian Collieries (D) Ltd., Comox	42,005
Canadian Collieries (D) South Wellington	8,461
Canadian Collieries Extension	14,545
Pacific Coast Coal Mines Ltd. S. Wellington	7,088
Nanoose-Wellington, Nanoose Bay	5,456
Granby Consolidated Mng., S., & P. Cox, Cassidy	16,477
	150,807

These figures indicate that the coal fields of the Island are holding their own in point of output. The outstanding feature is the increase in the production of the Granby Collieries at Cassidy, 16,477 tons for September as against 9019 tons for the month of August.

PORT ARTHUR NOTES.

By J. J. O'CONNOR.

The Port Arthur Shipbuilding Company announce that negotiations are proceeding for the manufacture of mining machinery at their plant here.

Mr. Samule Hoare, representing the Canadian Mining Shovel Company, of Virginia, Minn., and closed contracts for the construction of a considerable num-

ber of Armstrong shovel loaders, in addition to the contract already in hand. The first of those completed was thoroughly tested out during the past week, and came up to requirements. Others are being assembled, and the first shipment of them will go forward the early part of next week.

In addition to mining machinery, the company will add the manufacture of a full line of papermaking machinery including all classes of grinders, wet-machines, chippers, digesters and heavy paper making machines.

The acreage, and floor space of the shops are ample to accomodate an enterprise of this kind, in addition to the shipbuilding operations of the company.

Vice President P. G. Chase, states that the company is assured of steady work for another year, and that with negotiations for further shipbuilding contracts that have reached a favorable stage, he expects to be able to announce the signing of new contracts in the near future.

The Reliance Mill and Trading Company, of New York, will handle the sales of the paper-making machinery for the company.

A magnetic survey is being carried out on a large tract of iron ore lands, lying east of Poplar Ledge, Lake Nepigon. These lands were recently diamond drilled by United States interests, with very gratifying results.

A new shaft house has been constructed at the Grace Mine, Eagle Lake, and an Ingersoll steam hoist, with ventilating fan attachment is being installed. The old Camp, and mine buildings have been put in thorough repair, preparatory to an active campaign of mining development work, on or about November 1st. next.

DOVER OIL FIELD, ONTARIO.

Messrs. Kiely & Smith, stock and bond brokers, Toronto, have sent out the following circular:

New developments are under way in the Dover Oil field which undoubtedly will be of considerable importance to the different companies operating in this district.

A franchise has been granted to the Petrol Oil & Gas Company, giving this company the right to build an independent pipe line from the producing field a distance of about twelve miles to connect with the Southern Pipe Line Company, a subsidiary of the well-known Doherty interests of New York. This new pipe line should be completed within two weeks, and will allow of the producing companies in the Dover field obtaining a market for their gas at a price over three times that now obtainable.

The Petrol Company has already accepted a contract to deliver gas to the Southern Pipe Line Company, and no doubt other companies in the field such as the Vacuum Gas & Oil, Eureka, Thames Oil & Gas, Inland Oil & Gas, etc., will be very glad of the opportunity to enter into arrangements with the new interests for the sale of their gas when producing wells are brought in by them.

The fact that these important United States interests have become interested in the Dover field indicates that from this district very great things are expected in the way of production.

The Petrol Company has at present two wells producing oil and about 1,000,000 feet of gas per day, and a third well nearing completion. The Vacuum Gas & Oil Company is drilling at a depth of about 2,900 feet with every indication an important producing oil and gas well will be brought in within the next thirty days. The No. 3 well of the Petrol has reached a depth of something over 2,800 feet, and expectations are that this company will soon have three producing wells in this district. English interests are drilling a well near Paincourt which has reached a depth of something over 2,700 feet, and we understand already shows indications of oil. These interests have something like 5,000 acres under lease.

The building of this new pipe line at considerable expense will naturally encourage and benefit all those interested in this important oil and gas field. The higher market available to the producer will mean in the case of the Petrol Company increased net yearly earnings of not less than $60,000. While a number of wells are at present being drilled by different companies, the fact that a better market for gas is obtainable, due to the new pipe line coming into the district, will undoubtedly result in extending the field of operations.

LADY GEOLOGISTS IN CANADA.

Shortage of the right kind of men, presumably, has led the Canadian Geological Survey to engage women. Two lady geologists are reported to be in the field. They ought to be able to collect all the information necessary for a useful report; indeed, they are said to carry a gun and a revolver as part of their outfit, so that if anybody is slow in coming forward with the necessary data they will be in a position to exercise persuasive powers of more than usual feminine effectiveness. We shall expect sundry distinctive touches in the writings of these ladies, and the introduction of new descriptive terms. For instance, they are likely to find pleats in the shale, ruching in the rhyolite, and tucks in the trachyte. Stranger things have happened. The "selvage" of a vein is akin to the "self-edge" of a piece of cloth. "Seams" came into mining by grace of the seamstress. Joking apart, geologizing by women is no new thing. The oldest Geological Society, namely the one in England founded by Lyell and Murchison, includes a considerable number of the gentler sex. Many of them have contributed valuable articles to the proceedings. Geology used to be considered a polite study, it was one that was untainted by commercialism, it appealed to gentlemen and ladies, that is, to amateurs. And that is why the geology of the Victorian period in England contributed so little to the aid of mining. The geologists of both sexes looked askance at any phase of their subject that touched on money-making. They delved in fossils, they delighted in glacial drift, they enthused over stratigraphic difficulties. All that is changed, and the ladies too. Undoubtedly the new recruits to the Canadian Survey will have an eye to the economics of their subject; they will be in sympathy with the miner, and they will collect the data helpful to him in his search for metals. We welcome them with the grave courtesy suitable to the occasion. There is plenty of work for men to do; many of them are doing the work that women can do; it is well that there should be a proper distribution of talent and energy into suitable channels.

"Mining & Scientific Press".

PITY "POOR" MINERAL INDUSTRIES

ALEXANDER GRAY.

"The output of the property is dependent upon the supply of native labour".

"Orders amounting to over six months output are now in hand; in fact, owing to the uncertain conditions of labor, it is necessary to refuse orders for execution so far ahead".

This is the crux of the situation prevailing at the New Modderfontain property—the second largest gold mine in the world—at the Rand, and at the properties of the Cape Asbestos Company, in Cape Colony.

The statements re-echo throughout mineral industries, everywhere and anywhere.

Gold is needed to replenish the depleted treasuries of the nations. The New Modderfontein is producing nearly $13,000,000 per annum.

The Chairman of the Cape Asbestos Company confidently declares "the general outlook is distinctly promising; the asbestos industry is still in its infancy, each year seeing some new application of the materials".

Like views in endless reiteration might be offered in behalf of coal and silver producers—the nickel industry—the copper mines—it is altogether too obvious that go-as-you-please-seek-the-line-of-least-resistance policies are hobbling them. Mineral industries are running on flat tires—while politicians and economists prescribe speed limits of production, without thought of how that can easiest be brought about—by the immediate provision of domestic or imported labor, as well as by the elimination or material modification of surtaxes. No surer sources of new wealth exist than in the diversified mines of the Dominion. Lloyd George very aptly took the stand that advances in wages must be based upon increased production. With this as the datum line, the do-as-little-as-possible dictum of trades organizations would have a reciprocating action not much in evidence at present. Languishing industries have to make other than lean purses. Mineral industries were not privileged to operate during the War on a cost plus basis. Nickel producers abstained from profiteering. The gold mines could not retain their labor and were confronted by special taxation and war costs of everything.

So, a National Policy by which mineral resources more speedily can be brought into the credit balance is something which might receive official consideration. The shortage of basic materials is no less acute than that of precious metals.

A MODERN PLANT FOR MINING, CONCENTRATING & SMELTING MAGNETITE FORTY MILES FROM NEW YORK.

Lean Siliceous Ore of 36 per cent Iron Content.

An iron-ore mining enterprise of significance to Canadian readers as bearing upon some much debated problems of the utilization of magnetite, is that of the Replogle Mine near Wharton, New Jersey, which is described at length, with many illustrations, in the "Engineering & Mining Journal" of 2nd October.

The ore is described as lean, and high in silica, running about 36 per cent iron. It is being concentrated, first in a dry mill by magnetic separators, and the tailings by tables in a wet mill. At Wharton, two new blast furnaces are being built with a capacity of 500 tons of pig iron daily from each furnace.

New Jersey in 1882 produced 920,000 tons of iron-ore, but the industry has decayed owing to competition of lake ores. Increased cost of carriage from the lakes and the improved methods of concentration now available are tending to revive magnetite mining.

The deposit controlled by the Wharton Steel Co., which owns the Replogle Mine, is estimated to contain 27 million tons of ore, as proved by diamond drilling. About 875 to 1,000 tons of crude ore are being crushed daily. The ore body is described as a lens of magnetite in gneiss, without definite contact between the magnetite and the gneiss, there being a gradual change from one to the other. The installation of the wet mill was made necessary by the occurrence of martite ($Fe._2O_3$) intimately mixed with the magnetite, which makes a portion of the ore non-magnetic and not susceptible to the magnetic separation process used in the dry mill.

A sintering plant of 800-900 tons per 24 hours capacity is being erected, intended to sinter a portion of the concentrates, mixed with flue dust from the old furnaces, of which a considerable accumulation is available. Lime for fluxing is being obtained from Ogdensburg, N. J.

The article describing the Replogle Mine is by A. H. Hubbell, and it is interesting in Canada because of the somewhat parallel conditions of ore occurrence. The Replogle Mine has, however, the advantage of being close to an industrial centre, being about forty miles from New York.

THE USE OF GRAPHITE, TALC AND MICA IN SOLID LUBRICANTS.

(Condensed from "Financier and Bullionist")

Quite a number of solid materials can be used for lubricating purposes, as graphite, talc, soapstone, mica, white lead and flowers of sulphur. Some of these, as flake graphite or mica possess a tough and flaky character which allows them to withstand considerable pressure without disintegration. Others, such as amorphous graphite or sulphur, are easily crushed into a very fine powder under pressure.

Again, certain solid lubricants can be changed into a colloidal form and carried in suspension in liquid so as to render them easier of application. Examples of these are the colloidal graphite preparations known as oildag and aquadag being diffusions of graphite in a colloidal form in oil and water respectively.

Of all solid lubricants graphite in one or more other of its forms is perhaps of the most use to engineers, as it is not changed in composition by high temperatures and will resist the action of acids and alkalis.

Talc, which is very soft ,resists acids and alkalis, and also cold and heat, and commercial preparations of this should find a number of uses in the engineering world. The refuse from mica works, when finely ground, forms a material suitable for lubricating purposes.

This problem of preventing separation of solid and liquid lubricants is one that is causing many difficulties and no satisfactory method of dealing with the matter has yet been devised. Some little time ago a firm patented a mixture of finely-pulverised graphite and glycerine for lubricating the cylinders of steam engines. Before mixing the graphite with the glycerine it was impregnated with a sufficient amount of petroleum or other similar material insoluble in glycerine so as to reduce the specific gravity of the more solid portion to that of the glycerine itself, so that there was no tendency for the mixture to settle out. This compound was quite satisfactory in use and could

be pumped by a mechanical lubricator in the ordinary way.

Solid lubricants of all kinds can, of course, be mixed with oil to any consistency and applied by hand to bearings or parts requiring lubrication, but for general purposes it would seem that the colloidal preparations of graphite give the most satisfactory results. A report recently received from a British railway is to the effect that good results have been obtained by using either colloidal graphite or flake graphite mixed with the ordinary locomotive engine oil. The graphite is not used for regular running, but only as a temporary remedy whenever important bearings are inclined to heat. In a number of industrial works excellent results have been obtained on heavy duty bearings, such as those of pumping engines, by the continued use of colloidal graphite mixed with pure mineral oils.

This form of lubrication has been remarkably successful with bearings which previously gave trouble, even when using oils heavily compounded with fixed oils. Not only did the bearings run cooler, but there was an appreciable reduction in the consumption of oil. Bearings of high speed machinery, such as draught or ventilating fans, which were troublesome with oil alone, ran reasonably cool when the same kind of oil mixed with graphite was used.

QUICKSILVER PRODUCED IN THE UNITED STATES DURING THE SECOND QUARTER OF 1920.

From April 1 to June 30, 1920, inclusive, 3,685 flasks of quicksilver of 75 pounds net, was produced in the United States, according to F. L. Ransome of the United States Geological Survey, Department of the Interior, who obtained the figures from the producers. This is 1,214 flasks less than was produced in the first quarter of 1920 and 255 flasks less than was produced in the second quarter of 1919. Only 13 mines were reported as productive—8 in California, 1 in Nevada, 1 in Oregon, and 3 in Texas. California produced 2,704 flasks, Texas 952 flasks, and Nevada and Oregon together 29 flasks.

The average monthly price of quicksilver per flask in San Francisco for the quarter, as quoted in the Mining and Scientific Press, was $100 in April, $87 in May, and $85 in June. The average price for the quarter was therefore about $91 as compared with about $86 for the first quarter.

The chief cause of the decrease in production during the second quarter was the destruction by fire, on June 20, of the reduction plant of the New Idria mine, in California, and the consequent loss of quicksilver already reduced during the earlier part of that month. Because of this misfortune the production for the third quarter of 1920 will probably be still smaller than that for the second quarter. Reconstruction is in progress, and it is expected that the plant will be in partial operation in August or September of this year. Other causes that contributed to the decrease in production were a shortage of efficient labor and a reduction in the average grade of the ore.

At a time when initiative in the quicksilver-mining industry is at a low ebb and the tendency is rather to abandon enterprises already begun than to embark on new ones it is of interest to note that the formerly productive Klau mine, in San Luis Obispo County, Calif., has been reopened under very capable management as the Carson mine, and that its 50-ton furnace has been put in repair, so that the mine is likely to become a considerable producer.

The Canadian Miners' Buying Directory.

Acetylene Gas:
Canada Carbide Company, Ltd.
Canadian Fairbanks-Morse.
Prest-O-Lite Co. of Canada, Ltd.

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 & Inspe tion Co
Lymans, Limited
Mine & Smelter Supply Co.
Pennsylvania Smelting Co.
Stanley, W. F. & Co., Ltd.
Ash Conveyors:
Canadian Link-Belt Company
Ashes Handling Machinery:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt 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.
Canadian Link-Belt Co., Ltd.
The Mine & Smelter Supply Co.
Northern Canada Supply Co.
Jones & Glasco.
Belting:
R. T. Gilman & Co
Gutta Percha & Rubber, Ltd.
Belting—Silent Chain:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Que
Jones & Glassco (Regd.)
Belting (Transmission):
Goodyear Tire & Rubber Co.
Belting (Elevator):
Goodyear Tire & Rubber Co.
Belting (Conveyor):
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.
Blasting Batteries and Supplies:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Ltd.
Northern Canada Supply Co.
Canadian Explosives, Ltd.
Giant Powder Co. of Canada, 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.
Bridges—Man Trolley and Rope Operated—Material Handling:
Canadian Mead-Morrison Co., Limited
Bronze, Manganese, Perforated and Plain:
Hendrick Manufacturing Co.
Buckets:
Canadian Ingersoll-Rand Co., Ltd.
Canadian Mead-Morrison Co., Limited
The Electric Steel & Metals Co.
R. T. Gilman & Co.
Hendrick Manufacturing Co.
Canadian Link-Belt Co., 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:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co.
Cable—Aerial and Underground:
Canada Wire & Cable Co.
Northern Canada Supply Co.
Standard Underground Cable Co. of Canada, Ltd.
Cableways:
Canadian Mead-Morrison Co., Limited
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.
The Wabi Iron Works

Canadian Miners' Buying Directory.—(Continued)

Cables—Wire:
Standard Underground Cable Co. of Canada, Ltd.
Canada Wire & Cable Co.
Fraser & Chalmers of Canada, Ltd.
Northern Electric Co., Ltd.
Osborn, Sam'l (Canada) Limited.
R. T. Gilman & Co.

Cable Railway Systems:
Canada Wire & Cable Co.
Canadian Mead-Morrison Co., Limited.

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
Canadian Mead-Morrison Co., Limited.

Carbide of Calcium:
Canada Carbide Company, Ltd.

Cars:
Canadian Foundries and Forgings, Ltd
Canadian Ingersoll-Rand Co., Ltd.
Canadian Fairbanks-Morse Co., Ltd.
Canadian Mead-Morrison Co., Limited.
John J. Gartshore
MacKinnon Steel Co., Ltd.
The Electric Steel & Metals Co.
Northern Canada Supply Co.
Osborn, Sam'l (Canada) Limited.
Marsh Engineering Works
Mine and Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
R. T. Gilman & Co.
The Wabi Iron Works

Car Wheels and Axles:
Canadian Car Foundry Co., Ltd.
Burnett & Crampton
Hull Iron & Steel Foundries, Ltd
John J. Gartshore
Marsh Engineering Works, Ltd.
Osborn, Sam'l (Canada) Limited.
The Electric Steel & Metals Co.
The Wabi Iron Works

Carriers (Gravity):
Jones & Glassco

Castings—Brass
The Canada Metal Co., Ltd.

Castings (Iron and Steel)
Burnett & Crampton
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd
Osborn, Sam'l (Canada) Limited.
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.
Osborn, Sam'l (Canada) Limited.
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.
Canadian Link-Belt Co., Ltd.
Greening, B., Wire Co., Ltd.

Chain Drives:
Jones & Glassco (Regd.)

Chain Drives—Silent and Steel Roller:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal Que

Chemical Apparatus:
Mine and Smelter Supply Co.

Chemists:
Canadian Laboratories
Campbell & Deyell
Thos. Heyes & Sons
Milton Hersey Co.
Ledoux & Co.
Constant, C. L. Company

Chrome Ore:
The Electric Steel & Metals Co.
Everett & Co.

Classifiers:
Mine and Smelter Supply Co.
Mussens, Limited
Fraser & Chalmers of Canada, Ltd
The Wabi Iron Works
R. T. Gilman & Co.
The Dorr Company

Clutches:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Q

Coal:
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutters:
Osborn, Sam'l (Canada) Limited.
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd

Coal Crushers:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Co., Ltd.

Coal Mining Explosives:
Canadian Explosives, Ltd.
Giant Powder Company of Canada, Ltd

Coal Mining Machinery:
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd
Osborn, Sam'l (Canada) Limited.
Canadian Ingersoll-Rand Co., Ltd.
Sullivan Machinery Co.
Marsh Engineering Works
Hadfields, Ltd.
Hendrick Mfg. Co.
Fraser & Chalmers of Canada, Limited
Mussens, Limited
R. T. Gilman & Co.

Coal and Coke Handling Machinery
Canadian Mead-Morrison Co., Limited.
Canadian Link-Belt Co., Ltd.

Coal Pockets:
Canadian Mead-Morrison Co., Limited.

Coal Pick Machines:
Sullivan Machinery Co.

Coal Screening Plants:
Canadian Link-Belt Co., Ltd.
Canadian Mead-Morrison Co., Limited.

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:
The Mine & Smelter Supply Co.
Deister Concentrator Co.
The Wabi Iron Works

Converters:
Northern Canada Supply Co.
MacGovern & Co., Inc.

Conveyors—McCaslin Gravity Bucket:
Canadian Mead-Morrison Co., Limited

Contractors' Supplies:
Canadian Fairbanks-Morse Co., Ltd

Consulters and Engineers:
Hersey Milton Co., Ltd

Conveyors:
Canadian Link-Belt Co., Ltd.
The Mine & Smelter Supply Co.
Jones & Glassco (Regd.)

Conveyor Belts:
Gutta Percha & Rubber, Ltd.

Conveyor Flights:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co., Ltd.

Conveyor—Trough—Belt:
Canadian Fairbanks-Morse Co., Ltd
Canadian Link-Belt Co., Ltd.
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

Couplings:
Hans Renold of Canada, Limited, Montreal, Q

Cranes:
Canadian Fairbanks-Morse Co., Ltd
Canadian Mead-Morrison Co., Limited.
Canadian Link-Belt Company
R. T. Gilman & Co.
Smart-Turner Machine Co.

Crane Ropes:
Allan Whyte & Co.
Canada Wire & Cable Co.
Greening, B., Wire Co., Ltd.

Crucibles:
Canadian Fairbanks-Morse Co., Ltd
The Mine & Smelter Supply Co.

Crusher Balls:
Canada Foundries & Forgings, Ltd
Hull Iron & Steel Foundries, Limited, Hull Que
Osborn, Sam'l (Canada) Limited.

Swedish Steel & Importing Co., Ltd.

Crushers:
Canadian Fairbanks-Morse Co., Ltd
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
Hardinge Conical Mill Co.
Osborn, Sam'l (Canada) Limited.
The Electric Steel & Metals Co., Ltd
R. T. Gilman & Co.
Lymans, Ltd.
Mussens, Limited

Canadian Miners' Buying Directory.—(Continued)

The Mine & Smelter Supply Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Cut Gears:
Hans Renold of Canada, Limited, Montreal, Que.

Cyanide:
American Cyanamid Company.

Cyanide Plant Equipment:
The Dorr Co.
The Mine & Smelter Supply Co.

D. C. Units:
MacGovern Co.

Derricks:
Smart-Turner Machine Co.
Canadian Mead-Morrison Co., Limited.
Marsh Engineering Works
R. T. Gilman & Co.
Canadian Fairbanks-Morse Co., Ltd
Mussens, Limited

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

Diamond Tools:
Diamond Drill Carbon Co.

Diamond Importers:
Diamond Drill Carbon Co.

Digesters:
Canadian Chicago Bridge and Iron Works

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

Dredger Pins:
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
The Electric Steel & Metals Co.
Hadfields, Limited

Dredging Machinery:
Canadian Steel Foundries, Ltd.
Canadian Mead-Morrison Co., Limited
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
R. T. Gilman & Co.

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

Drills, Air and Hammer:
Canadian Ingersoll-Rand Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Sullivan Machinery Co.
Northern Canada Supply Co.
Osborn, Sam'l (Canada) Limited.
The Mine & Smelter Supply Co.
Mussens, Limited

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

Drills—Diamond:
Sullivan Machinery Co.
Northern Canada Supply Co
E. J. Longyear Company

Drill Steel—Mining:
H. A. Drury Co., Ltd.
Hadfields, Limited
International High Speed Steel Co., Rockaway
Osborn, Sam'l (Canada) Limited.
Mussens, Limited
Swedish Steel & Importing Co., Ltd.

Drill Steel Sharpeners:
Canadian Ingersoll-Rand Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Northern Canada Supply Co.
Sullivan Machinery Co.
Osborn, Sam'l (Canada) Limited.
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
Osborn, Sam'l (Canada) Limited.
H. A. Drury Co., Ltd.
Hadfields, Limited

Dynamite:
Canadian Explosives
Giant Powder Company of Canada, Ltd
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:
Canadian Mead-Morrison Co., Limited.
Canadian Link-Belt Co., Ltd.
Sullivan Machinery Co.
Northern Canada Supply Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.
Jones & Glassco (Regd.)
Mussens, Limited
The Wabi Iron Works

Engineering Instruments:
C. L. Berger & Sons

Engines—Automatic:
Canadian Fairbanks-Morse Co., Ltd
Canadian Mead-Morrison Co., Limited.
Fraser & Chalmers of Canada, Ltd.

Engines—Gas and Gasoline:
Canadian Fairbanks-Morse Co., Ltd.
Alex. Fleck
Fraser & Chalmers of Canada, Ltd
Osborn, Sam'l (Canada) Limited.
Sullivan Machinery Co.
Gould, Shapley & Muir Co., Ltd.
MacGovern & Co., Inc.
The Mine & Smelter Supply Co

Engines—Haulage:
Canadian Ingersoll-Rand Co., Ltd., Montreal.
Canadian Mead-Morrison Co., Limited.
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.
Canadian Mead-Morrison Co., Limited.
R. T. Gilman & Co.
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.

Engines—Stationery:
Swedish Steel & Importing Co., Ltd.

Engineers:
General Engineering Co., New York
The Dorr Co.

Ferro-Alloys (all Classes):
Everitt & Co.

Feed Water Heaters:
MacGovern & Co.

Fire Fighting Supplies:
Gutta Percha & Rubber, Ltd.

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:
Canadian Mead-Morrison Co., Limited.
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
Giant Powder Company of Canada, Ltd.
Northern Canada Supply Co.

Gaskets:
Gutta Percha & Rubber, Ltd.

Gears:
Hans Renold of Canada, Limited, Montreal, Que.
Jones & Glassco (Regd.)

Gears (Cast):
Hull Iron & Steel Foundries, Ltd.
Canadian Link-Belt Co., Ltd.

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.
Gutta Percha & Rubber, Ltd.
Hose (Fire):
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.
Hose (Packings)
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.
Hose (Suction):
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.
Hose (Steam):
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.
Hose (Water):
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.
Hammer Rock Drills:
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Osborn, Sam'l (Canada) Limited.
Mussens, Limited
The Mine & Smelter Supply Co.
Hangers and Cable:
Standard Underground Cable Co. of Canada, Lt
High Speed Steel:
Canadian Fairbanks-Morse Co. Ltd.
H. A. Drury Co., Ltd.
Osborn, Sam'l (Canada) Limited.
Hadfields, Limited
International High Speed Steel Co., Rockaway,
High Speed Steel Twist Drills:
Canadian Fairbanks-Morse Co., Ltd.
H. A. Drury Co., Ltd.
Northern Canada Supply Co.
Osborn, Sam'l (Canada) Limited.
Hoists—Air, Electric and Steam:
Canadian Ingersoll-Rand Co., Ltd.
Canadian Fairbanks-Morse Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd
Jones & Glassco
Canadian Mead-Morrison Co., Limited.
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
Canadian Link-Belt Co., Ltd.
Hoisting Engines:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
The Electric Steel & Metals Co.
Mussens, Limited
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.
Canadian Mead-Morrison Co., Limited
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.
The Mine & Smelter Supply Co.
Hoisting Towers:
Canadian Mead-Morrison Co., Limited.
Hose:
Canadian Fairbanks-Morse Co., Ltd
Gutta Percha & Rubber, Ltd
Northern Canada Supply Co
Hose (Steam, Air, Water):
Gutta Percha & Rubber, Ltd.
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.
Hoyt Metal Company.
Levels:
C. L. Berger & Sons
Locomotives (Steam, Compressed Air and Storage Ste
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
Canadian Link-Belt 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
Osborn, Sam'l (Canada) 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 Canad
Canada Metal Co.
C. L. Constant Co
Everitt & Co
Hoyt Metal Company.
Metallurgical Engineers:
General Engineering Co., New York
The Dorr Co.
Metallurgical Machinery:
General Engineering Co., New York
The Dorr Co.
The Mine & Smelter Supply 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.
Osborn, Sam'l (Canada) Limited
International High Speed Steel Co., Rockaway, N
Mining Requisites:
Canadian Steel Foundries, Ltd.
Dominion Wire Rope Co., Ltd.
Hadfields, Limited
Osborn, Sam'l (Canada) 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 (Wire, Rod, Sheet and Foundry Metal):
International Nickel Co.
Motors:
Canadian Fairbanks-Morse Co., Ltd
R. T. Gilman & Co.
MacGovern & Co.
The Mine & Smelter Supply 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 International Nickel Co. of Canada
The Mond Nickel Co., Ltd.

Nickel Wire:
The Mond Nickel Co., Ltd
The International Nickel Co. of Canada

Oil Analysts:
Constant, C. L. Co.

Ore Handling Equipment:
Canadian Mead-Morrison Co., Limited.
Canadian Link-Belt Co., Ltd.

Ore Sacks:
Northern Canada Supply Co.

Ore Testing Works:
Ledoux & Co.
Can. Laboratories
Milton Hersey Co.
Campbell & Deyell
General Engineering Co., New York
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
Gutta Percha & Rubber, Ltd.

Paints—Special:
Spielman Agencies, Regd.

Perforated Metals:
Northern Canada Supply Co.
Hendrick Mfg. Co.
Canada Wire and Iron Goods Company.
Greening, B., Wire Co.

Permissible Explosives:
Giant Powder Company of Canada, Ltd.

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

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

Pillow Blocks:
Canadian Link-Belt Company

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
R. T. Gilman & Co.

Powder:
Giant Powder Company of Canada, Ltd.

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, L
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.
The Mine & Smelter Supply 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.
Canadian Mead-Morrison Co., Limited.
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
mart-Turner Machine Co.

Quarrying Machinery:
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
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.

Roller Chain:
Hans Renold of Canada, Limited, Montreal, Que.
Canadian Link-Belt Co., Ltd.

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

Rope—Manilla:
Osborn, Sam'l (Canada) Limited.
Mussens, Limited

Rope—Manilla and Jute:
Jones & Glassco
Northern Canada Supply Co
Osborn, Sam'l (Canada) Limited.
Allan, Whyte & Co.

Canadian Miners' Buying Directory.—(Continued)

Rope—Wire:
Allan, Whyte & Co.
Canada Wire & Cable 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.
Osborn, Sam'l (Canada) Limited.
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.
Canada Wire and Iron Goods Company.
Canadian Link-Belt Co., Ltd.

Screens—Cross Patent Flanged Lip:
Hendrick Mfg. Co.

Screens—Perforated Metal:
Hendrick Mfg. Co.

Screens—Shaking:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co.

Screens—Revolving:
Canadian Link-Belt Co., Ltd.
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.
Canadian Mead-Morrison Co., Limited.
Osborn, Sam'l (Canada) Limited.
R. T. Gilman & Co.

Ship Bunkering Equipment:
Canadian Mead-Morrison Co., Limited.

Silent Chain:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Que.

Silent and Steel Roller:
Canadian Link-Belt Co., Ltd.
Jones & Glassco (Regd.)

Silver:
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

Solder—Bar and Wire:
Hoyt Metal Company

Special Machinery:
John Inglis Co., Ltd.

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

Sprockets:
Hans Renold of Canada, Limited, Montreal, Que.
Canadian Link-Belt Co., Ltd.
Jones & Glassco (Regd.)

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.
Osborn, Sam'l (Canada) Limited.
Hull Iron & Steel Foundries, Ltd.
The Electric Steel & Metals Co.
Hadfields, Limited
The Wabi Iron Works

Steel Drills:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Sullivan Machinery Co.
Northen Canada Supply Co.
The Electric Steel & Metals Co.
Osborn, Sam'l (Canada) Limited.
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.
Osborn, Sam'l (Canada) Limited.
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.
Osborn, Sam'l (Canada) Limited.
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
The Mine & Smelter Supply Co.

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
Osborn, Sam'l (Canada) Limited.
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
The Mine & Smelter Supply Co.

Tanks (water) and Steel Towers:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Chicago Bdidge & Iron Works
Gould, Shapley & Muir Co., Ltd.
MacKinnon Steel Co.
Mine & Smelter Supply Co.
The Wabi Iron Works

Tires—Auto, Truck and Bicycle:
Gutta Percha & Rubber, Ltd.

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 Appuiances:
Jones & Glassco (Regd.)

Transmission Machinery:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Que.
Jones & Glassco (Regd.)

Troughs (Conveyor):
Hendrick Manufacturing Co.

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

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

TTrucks:
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.

Weighing Larries:
Canadian Mead-Morrison Co., Limited.

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

Winches—Power Driven:
Canadian Mead-Morrison Co., Limited.

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—Bare and Insulated:
Canada Wire & Cable Co.

Wire Rope:
R. T. Gilman & Co.
Canada Wire and Iron Goods Company.
Canada Wire & Cable Co.
Dominion Wire Rope Co., Ltd.

Wire Rope Fittings:
Canada Wire and Iron Goods Company.
Canada Wire & Cable Co.

Wire Cloth:
Northern Canada Supply Co.
Greening, B. Wire Co.
Canada Wire & Iron Goods Company

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

Zirconium:
Everitt & Co.

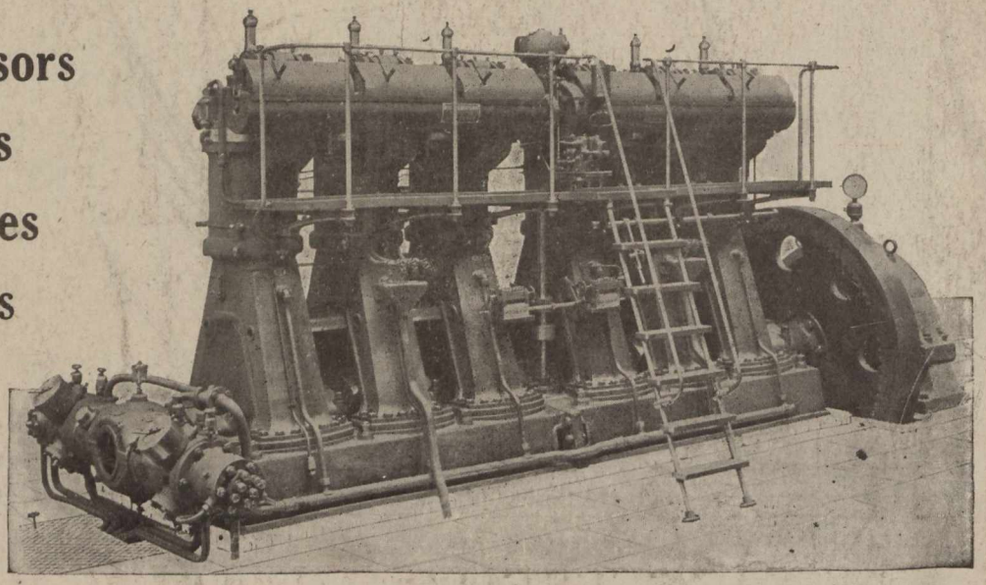
Zinc:
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co.

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

ALPHABETICAL INDEX TO ADVERTISERS

BELLISS & MORCOM

Air Compressors
Diesel Engines
Steam Turbines
Steam Engines
Condensers



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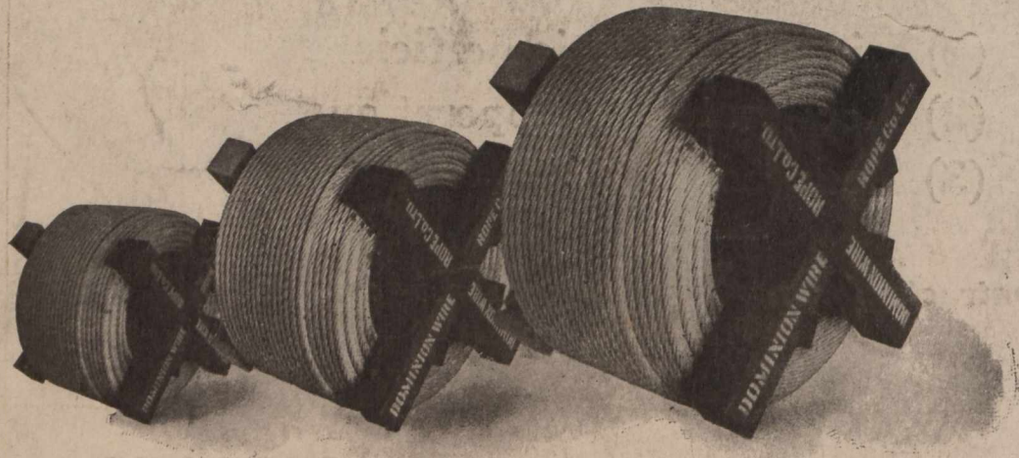
LAURIE & LAMB

211 Board of Trade Building - - - - MONTREAL

"MADE IN CANADA"

"DOMINION" WIRE ROPE



for
Mining, Hoisting, Haulage.

for
Cableways, Tramways.

The Dominion Wire Rope Company, Limited

Head Office: MONTREAL

Stocks carried at: **TORONTO WINNIPEG**