CANADIAN MINING JOURNAL

Vol. XL GARDEN CITY PRESS, Ste. Anne de Bellevue, DECEMBER 31, 1919. No. 52

HAMMER YOUR DRILL BITS

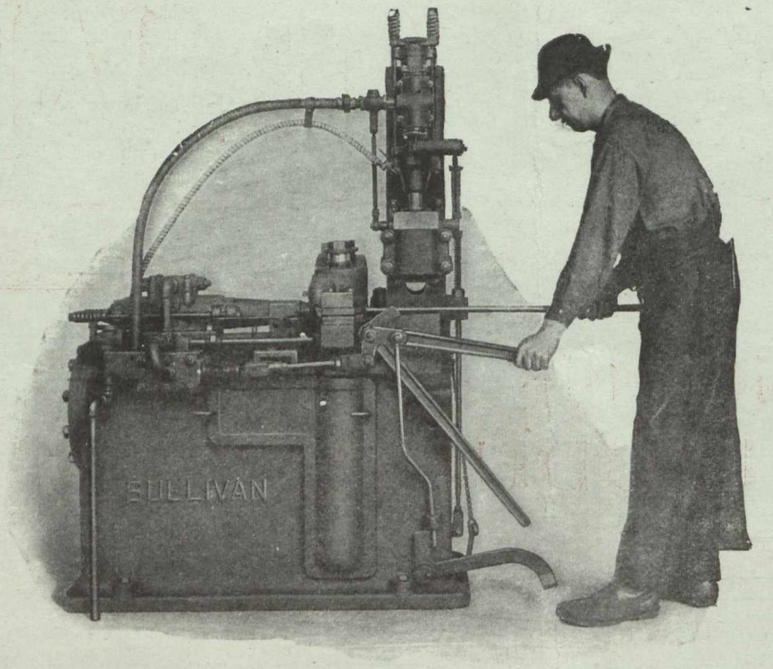


FIG. 1.

Put More Footage in Your Steel

Do not handicap your drills or delay your runners by using improperly formed or poorly sharpened steel.

Train your blacksmith to put as much footage as possible into each steel he sends underground.

"Hammer your drill bits" is a good watchword.

The more you hammer steel, the more "life," strength, cutting speed and resistance to wear and breakage you give it.

Watch a Sullivan Sharpener at work. See how the smith hammers out the bit, just as he would on an anvil.

He alternates between the horizontal, upsetting hammer dolly (Fig. 1) and the vertical, swaging hammer (Fig. 2), so that the bit is formed gradually, avoiding strains on the metal, yet quickly (new bits are made from bar stock in a minute or less).

Don't take chances with your steel—High temperatures with the attendant risk of "burning" the steel, are unnecessary in the Sullivan all-hammer method of sharpening; and "burned" steel means a crumbling edge and rapid wear of gauge.

A little additional time and care in the blacksmith shop will pay large returns in time and labor saved underground, and in additional footage gained per length of steel.

The Sullivan All-Hammer Sharpener does it

Ask for Bulletin 672-C.

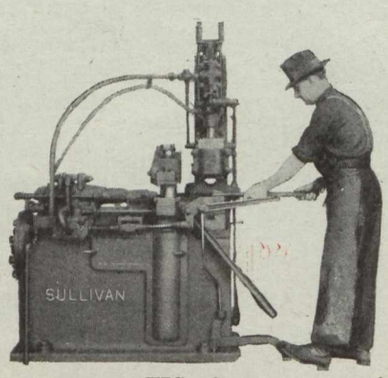


FIG. 2.

SULLIVAN MACHINERY CO.

122 So. Michigan Ave. :: Chicago

Boston Duluth Juneau London Nelson, B.C. New York Spokane Sydney, Aus. Toronto Vancouver

PROVINCE OF ONTARIO

DEPARTMENT OF LANDS FORESTS & MINES

BUREAU OF MINES

HON. H. MILLS, Minister of Mines.

Ontario's Mining Lands

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

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

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

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

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

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

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

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

MINING OPPORTUNITIES IN NORTHERN MANITOBA

Mineral Areas

Approximately three-fifths of the total area of Manitoba is Pre-Cambrian, and all but a small part lies in Northern Manitoba. In the Pre-Cambrian in Ontario, the well-known camps of Sudbury, Cobalt and Porcupine have been developed. In Northern Manitoba there was practically no prospecting until the Hudson Bay Railway gave access to the mineral districts. There are three fields in particular to which attention is now directed—The Pas Mineral Belt, the Cross and Pipestone Lakes area, and the Oxford Lake, Knee Lake, God's Lake and Island Lake area.

Development

Since 1915, development has been rapid in The Pas Mineral Belt. Twenty million tons of low-grade copper ore have been explored by diamond drilling at Flin-Flon Lake. High-grade copper is exported from Schist Lake to the smelter at Trail, B.C.; three and three-quarter million pounds of copper have already been realized. Copper prospects are under development on Athapapuskow Lake, Copper Lake and Brunne Lake. The building of a smelter will give impetus to the development of a large copper industry. Gold is now produced at Wekusko Lake, and important discoveries have been made on Copper Lake, and on Knee Lake on the Hayes River route.

Transportation

Transportation is available by the Hudson Bay Railway, by the Ross Navigation Co. Steamboats on the Saskatchewan River, and by wagon roads built into the producing areas by the Manitoba Government. Wekusko Lake may be reached in less than one day from The Pas. The Hudson Bay Railway gives easy access to several promising districts where little prospecting has yet been done.

Mining Regulations

The mineral resources are under Federal control, and the Dominion Mining Laws apply to Northern Manitoba. No mining license is required. Work to the value of $100 per year must be performed for a period of five years on claims filed under the quartz mining regulations. The office of the Mining Recorder for Northern Manitoba is at The Pas.

Opportunities for Capital

The district is comparatively new, and there are several very promising properties which may be acquired at reasonable prices. Financial and mining companies would be well advised to have their engineers inspect these properties at an early date.

For maps, reports and general information, apply to—

THE COMMISSIONER OF NORTHERN MANITOBA

THE PAS, MANITOBA.

PROFESSIONAL DIRECTORY

PROFESSIONAL DIRECTORY

M. P. McDONALD
MINING ENGINEER
EXAMINATIONS, SAMPLING, REPORTING
EXPLORATION AND ASSESSMENT WORK
Telephone 6 COBALT

MILTON HERSEY COMPANY LTD.
MINING ENGINEERS AND ASSAYERS
EXAMINATION OF MINERAL PROPERTIES
MINE OPERATION AND MANAGEMENT
ASSAYING AND ANALYSING OF ALL ORES
MONTREAL JAS. G. ROSS *Consulting Mining Engineer* WINNIPEG

THE DORR COMPANY
Metallurgical and Industrial Engineers
DENVER 1009 17th St. | NEW YORK 101 Park Ave. | LONDON, E.C. 16 South St.

JOHN A. DRESSER
MINING GEOLOGIST
701 Eastern Townships Bank Building
MONTREAL, CANADA

JAMES McEVOY
MINING ENGINEER AND GEOLOGIST
(Specialty Coal Mining)
77 Toronto Arcade, Yonge St., TORONTO, Ont.
Phone Main 1889

ROBERT H. STEWART
MINING AND METALLURGICAL ENGINEER
VANCOUVER BLOCK
VANCOUVER, B.C.

GEO. R. ROGERS
MINING ENGINEER
905 TRADERS BANK BUILDING, TORONTO
Examinations, Sampling and Reporting on Mines and Prospects
Telephone M. 2625

Alfred R. Whitman
Mining Geologist
UNDERGROUND PROGRAMMES. OREBODY PROBLEMS
43 Exchange Place, - - New York
HAILEYBURY, ONT., Opposite Post Office

W. F. FERRIER
CONSULTING
MINING ENGINEER AND GEOLOGIST
204 Lumsden Bldg. Toronto, Ont.

J. B. TYRRELL
Mining Engineer,
534 CONFEDERATION LIFE BUILDING
TORONTO, - - - CANADA
208 Salisbury House, London, E.C. 2, England

JOHN C. ROGERS
MINING ENGINEER
Examination and Exploration of Mining Properties with a View to Purchase.
COPPER CLIFF - ONTARIO

Phone M. 1889 Established 1873. Cable address "Heys"

THOS. HEYS & SON
Technical Chemists and Assayers
Rooms M and N, Toronto Arcade
YONGE STREET, :: TORONTO, ONT.
Sampling Ore Deposits a Specialty.

Cable Address: "Linsey" Codes: Broomhalls Western Union

G. G. S. LINDSEY, K.C.
BARRISTER, SOLICITOR, Etc.
Bank of Toronto Building - - TORONTO
Special attention given to Mining Law
Phone Adelaide 1032

R. W. BRIGSTOCKE
MINING ENGINEER
Box 643
HAILEYBURY, - ONTARIO

REGINALD E. HORE
Consulting Geologist
(Specialty: Pre-Cambrian Ore Deposits)
Office: 1402 C. P. R. Bldg., TORONTO Phone Ad. 3310

A. A. HASSAN
CONSULTING GEOLOGIST
and ENGINEER OF MINES
Westbrook Hotel Bldg., FORT WORTH, TEXAS
Any Code *Cable Address: "HASSAN"*

Canadian Mining Journal

A Weekly Journal devoted to the Science and Practice of the Mining, Metallurgical and Allied Industries, with an Up-to-date Review of existing conditions.

Published every Wednesday by The Mines Publishing Co., Limited, at the Garden City Press, Ste. Anne de Bellevue, Que. 'Phone 165.

J. J. Harpell, Managing Director.

A. S. Christie, Eastern Manager,
Room B-30, Board of Trade Building, Montreal.
'Phone Main 2662.

H. W. Thompson, Western Manager,
1402 C.P.R. Building, Toronto.
'Phone Adelaide 3310.

F. E. Payson, Pacific Coast Manager,
507 Board of Trade Bldg., Vancouver, B.C.
'Phone Sey. 3920.

Changes in advertisements should be in the Publishers' hands ten days before the date of issue.

F. W. GRAY, Editor,
Ste. Anne de Bellevue, Quebec.

REGINALD E. HORE, Consulting Editor,
1403 C. P. R. Building, Toronto.

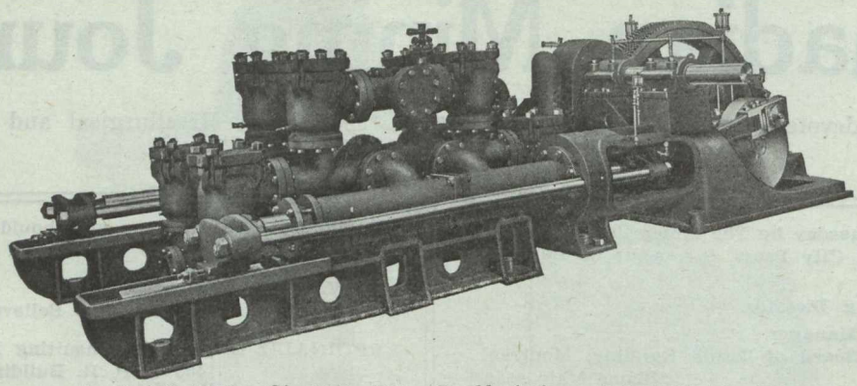
The editor cordially invites readers to submit articles of practical interest which, on publication, will be paid for.

Subscription to any address in Canada, United States and British Empire, $5.00 yearly. Other countries postage extra. Single copies, 15 cents.

VOL. XL. GARDEN CITY PRESS, 31st December, 1919 No. 52
Ste. Anne de Bellevue, Que.

CONTENTS

Pages 985 to 1,000



Gould Fig. 1612. Size 6⅛" x 20". Double-Acting. Outside End Packed Horizontal Duplex Plunger Pump. For High Pressure Service

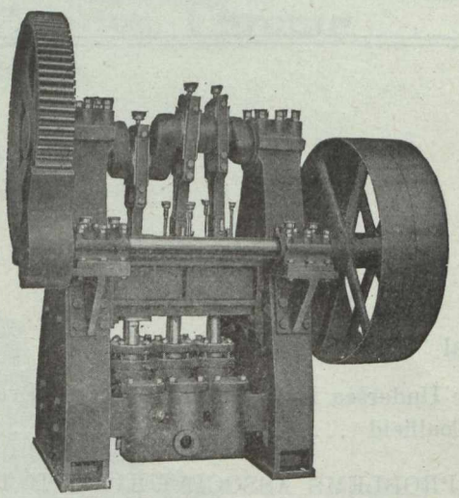
FOR General Water Supply, Municipal Waterworks, Oil Pipe Lives, and General Services, requiring high pressure and large capacities.

Capacities ranging from 155 gallons per minute at 1500 pounds pressure to 705 gallons per minute at 335 lbs. pressure. Complete data and description in bulletin 115. Copy on request.

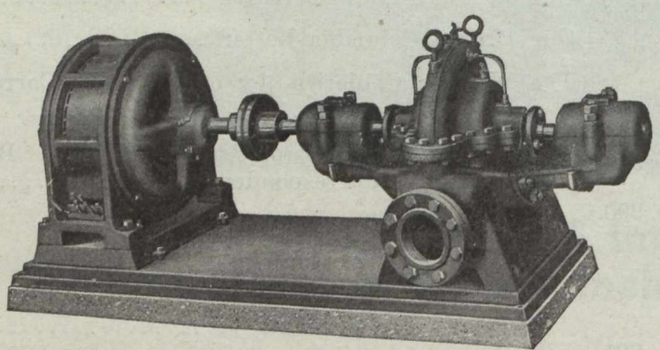
FIG. 1628. For general water supply, Municipal Waterworks, Mine Pumping, etc., where the total net head does not exceed 1305 feet. Made in six sizes, with capacities ranging from 9,360 gallons to 37,500 gallons per hour and for 140 to 565 pounds Working Pressure.

The Frame consists of two standards carrying the main bearings. Crank shaft is steel, accurately machined and the bearings are phorsphor bronze. The gearing, Cylinders and valve boxes are charcoal iron. Crossheads are fitted with adjustable bronze shoes which run in bored Guides. Connecting Rods are cast steel and the plungers cast iron, accurately machined.

Complete data and description in Bulletin 103. Copy on request.



Goulds Single-Acting Triplex Pump



Goulds Fig. 3030. Single Stage, Double Suction Centrifugal Pump, direct connected to an open type motor

FIG. 3030. For general water supply, hot water circulating in heating systems for irrigating, drainages, booster and mine service, and many similar services, where the total net head does not exceed 150 feet, the Goulds Single Stage, Double Suction Centrifugal Pump excells on account of the high efficiency obtained. 80 to 8000 gallons per minute, based on cold, clear water 150 feet head or 65 pounds pressure.

Complete data and description in Bulletin 110. Copy on request.

GOULDS PUMPS *FOR EVERY SERVICE*

COMPLETE SET OF BULLETINS ON REQUEST

THE CANADIAN FAIRBANKS-MORSE CO. Limited

St. John, Quebec, Montreal, Ottawa, Toronto, Hamilton, Windsor, Winnipeg, Saskatoon, Calgary, Vancouver, Victoria.

EDITORIAL

The Undersea Extension of the Cape Breton Coalfield

A public discussion of the problems connected with the extraction of coal from the undersea coalfield of Cape Breton Island is not to be lightly undertaken without compelling reasons, for the subject bristles with difficulties, and is likely to bring in its train more kicks than ha'pence.

The public interest involved is, however, of precisely such a compelling nature as to justify some plain statements for the purpose of correcting a widespread misunderstanding of the reasons which caused the Nova Scotia Legislature to provide the machinery for the appointment of a Commission of Enquiry into the effect of the existing arrangement of the undersea lease lines upon the workability of the submarine coalfield.

There are two main sets of considerations involved, namely, legal questions, and engineering problems. So far, much prominence has been given to the legal aspects of the lease arrangements, but next to nothing has been heard of the engineering questions. Now it really happens that the primary and deciding questions are those connected with the actual winning of the coal from the undersea territory, and all the legal difficulties that have been so seriously discussed are secondary in importance, and will in fact not arise at all if the engineering problems are first examined in sincerity and decided on their technical merits.

It has been assumed that if the corporate interests that are now believed to conflict—an entirely incorrect belief in our opinion—were reconciled, that the existing difficulties would disappear. This is only partially true, because the lease difficulty is only one phase of the problem, and in this connection we would remark that the physical configuration and arrangement of the undersea lease lines is so contrary to any arrangement that ordinary good mining practice would call for, that it has only to be explained and understood to ensure that its palpable absurdity will prevent its continuance.

The undersea extension of the Sydney coalfields is much larger in extent than the land area, and it is, we believe the most valuable and important undersea coal deposit in known existence. The conservation of this deposit is therefore of great relative importance, but to the Province of Nova Scotia it is all important, and we believe the people of that province thoroughly approve of the intention of the Local Government to appoint a competent commission, but the public will desire to have *all* the problems of the undersea coal area reviewed at this time.

The very best advice that can be obtained should be secured, and there should be no hesitancy on the score of expense in retaining the most eminent engineers known to the profession of mining.

We would emphasise the point that the problem is primarily and in all important respects an engineering one, and that none but engineers can pass upon it usefully.

Briefly the problem is this. How can the undersea coal—as yet largely intact—be mined so as to ensure that it shall be mined to the last ton, at the lowest cost, and so as to preserve the accessibility of the remoter areas in view of possible advances in the arts, and in motive powers, that may permit coal to be extracted at indefinite distances from the shore?

Long views are needed, unbiased opinions, and competent conceptions of scientific breadth and understanding. The task is worthy of the greatest masters of the science and art of mining, and if the Government will rise to the full necessities of the case, the Province will back them, and future generations of miners will acclaim their wisdom and foresight.

The present unfortunate set of conditions is nobody's fault. It is the accidental and purposeless outgrowth of years, and just happened. Any recrimination of past administrators of the public domain of the Province would be inviduous and very unfair, because any fool can be wise after the event. But the future of the submarine coalfield is not yet endangered, it being fortunately, as we have already stated, largely intact, and the Government is presently empowered to review the facts, aided by the most competent advice, and to apply such remedies as full enquiry may disclose to be applicable.

The duty imposed upon the Government of Nova Scotia is unpleasant, but it is also inescapable, and the longer the undertaking of the duty is deferred, the less happy will be the ultimate result.

Some Problems Associated with the Undersea Coalfield of Cape Breton Island

Problems Include Necessity for Re-arrangement of the Mining Privileges, Preservation of Accessibility of Remote Undersea Coal-Bearing Areas, Loss of Coal in Pillarage, Possibility of Introducing Longwall Methods and Hydraulic Stowing of Coal—Immediate Appointment of Enquiry is Urged

By THE EDITOR*

A year ago the writer expressed the opinion that the whole question of the submarine coalfield was due for review.

In the meantime, much has been said and written on this vexed question, but, unfortunately, the real point at issue has been obscured by the conflicting business aims of the two large companies which between them hold the bulk of the undersea leases lying off the eastern shores of Cape Breton Island.

The word controversy has been freely used, and it has been assumed by some, and unthinkingly accepted by many, that some dispute—the word has been used on many occasions—existed between the two rival coal companies. This assumption is wide of the mark. There is no dispute, but there is a very real and pressing problem. This problem, which the Nova Scotia Government, by virtue of the legislation of 1919, undertook to solve, and was duly authorized and instructed by both houses of parliament to solve, is much wider and graver than any conflict of interest between two commercial rivals. In order that our readers may be under no misapprehension of what is really at stake, it is necessary to make a considerable quotation from last year's review. The writer urged the appointment of a competent commission, as follows:

"A plan should be made of the whole coalfield "from Cape Dauphin to Mira Bay showing the exist- "ing submarine workings, the course of the land and "submarine outcrops, the course and nature so far "as known of the parallel folds and faults that trav- "erse the coalfield. Due consideration should be "given to the facts as disclosed by soundings at sea, "the nature of the sea-bottom, the depths of super- "incumbent strata, the spacing of the coal-seams, and "the probable extent of the submarine coalfield.

"The plan should be viewed as a whole by compe- "tent mining engineers, who should disabuse their "minds of any questions concerning lease lines, and "it should be conceived as one operation, from the "viewpoint of the owners of the coal, not the view- "point of the leaseholders.

"The conservation of the submarine coal, its pro- "tection from inundation, creep, incompetent mining, "and the preservation of its accessibility over the "maximum period of operation, should be the guid- "ing ideas, and, if this were done, it is certain that "a radical re-arrangement of the submarine leases "would result that would benefit everyboly concerned, "even those competing coal operators who do not "today apprehend the true significance of the signs "of the decadence of the local coal industry, and the "necessity for compromise and reasonableness unless "all alike are to be involved in a common future dis- "aster."

There are other matters in connection with the operation of the undersea coal areas, which the people of the Province of Nova Scotia are so fortunate as to own, that are not mentioned in the foregoing summary, and it seems proper, seeing that the Government is now empowered to appoint a Commission of Enquiry, to mention these additional considerations.

The existing regulations regarding the extraction of coal in undersea areas, which are part of the statory law of the Coal Mines Regulation Act, prescribe the practice to be followed until a cover of 500 feet of solid strata has been attained. Beyond that depth of cover the system adopted must have the approval of the Mines Office.

Methods of Extraction Should Be Reviewed

So far, the method of extraction has been that of pillar and stall, which necessitates the leaving of pillars, the size of which is increased as the workings progress seawards, and is a matter of agreement between the operator and the Inspector of Mines. Large areas of wrought territory are today standing on pillars and one matter that would form a proper question for investigation is whether the present system of pillar and stall mining is a necessary one, or the best one to be followed. Writing in 1916, the writer stated:

"If it is found necessary to leave permanent pillars "in submarine workings, this will entail the com- "plete loss of the coal contained in the pillars, and it "will also bring into operation the limitation of ex- "traction by the increased cost of mining at an ear- "lier date than if it is found possible to dispense with "permanent pillars, as the existence of a large area "of permanently abandoned workings supported by "pillars increases all mining costs, particularly that "of ventilation, and adds an element of danger that "is not present where the abandoned waste is com- "pletely filled, either by complete subsidence of the "roof, or by some method of stowing."

There are two instances in Canada where undersea coal is being completely extracted by the longwall method in one operation without leaving any pillars, and there can be no question of the advantages of such a method, whereever it is possible, as it ensures complete recovery of the coal, and moreover, it lessens the danger of inundation from the sea by breaks in the overlying strata, because it ensures an even and gentle subsidence of the roof. In neither of the Canadian instances in point is the thickness of the coal seam

*—Being a portion of an article prepared for the New Year edition of the "Halifax Chronicle."

so great as in the case in, for example, the Sydney Main Seam at Sydney Mines, or the Phalen Seam at Glace Bay. In Britain, very large areas of undersea coal have been successfully extracted by the longwall method; and in at least one colliery, which is under the direction of a former official of the Dominion Coal Company, the space from which the coal has been extracted—known to miners as the goaf or waste—is filled with sand and other suitable substances carried in by water, a system known as hydraulic stowing.

There are some serious technical difficulties in adapting the longwall method to a thick seam, but they are not by any means insuperable, and seams quite as thick as those which have been hitherto most extensively worked in the undersea areas off Cape Breton Island are being successfully extracted by the longwall method elsewhere. It should also be borne in mind that there are at least four seams, of somewhat lesser thickness than those hitherto worked under the sea in the Sydney field, that will some day be mined, when their turn comes, and there is no apparent reason why these seams could not be worked in one extraction without leaving pillars throughout their entire land and accessible seaward extension.

Reasons Why Submarine Problem Has Arisen

In regard to the arrangement of the leases, which the Government has recognized as being in need of remedy, and which, as the Hon. Commissioner of Mines has stated, will, if not altered "make the development and operation of some of these areas difficult and economically impossible," it may be of technical interest to enquire why this unfortunate situation should have arisen, and some consideration of the circumstances will reveal that it has come about through the ignoring of three main principles of accepted mining. These three omissions are:

a. The statutory limitation of the discretionary powers of the Commissioner of Mines.

b. The non-application of the principle of "discovery."

c. The failure to recognize, in time, the importance of the ownership powers residing in the access to undersea minerals through the foreshore.

In what does the right of the Province of Nova Scotia to lease coal areas under the waters of the sea consist? Primarily, of course, in its ownership of the foreshore, or, to put it still more exactly, in its control of the means of access to the coal. Ownership of coal seams under the sea is a meaningless claim unless it includes free access thereto, and consequently, ownership of undersea minerals is inseparable from, and is in fact synonymous with access to these deposits.

Access being so primary a consideration, what follows? That to each advantageous point of access on the seashore there should be attached, for the purposes of mining, **all the undersea coal which can be best and most economically mined to that point of access.**

What has actually occurred? Undersea coal areas have been leased in detached blocks miles out to sea, not only without regard to the means of access, but worse still, so leased as to **block and to prevent access.**

Still less understandable, and certainly indefensible, is the fact that undersea coal areas have been leased in shapes that will prevent their being mined commercially, but most extraordinary is it to find that some of the worst examples of impractically and absurdly shaped leases are plotted on the lease map four and five miles out to sea!

It cannot be said that a system of leasing which not only permits such absurdities, but **causes** them is not in need of abolition.

It is open to doubt that where—as already shown—the only actual value of the undersea coalfield to the Province resides in its ownership of the foreshore, where the coalseams dip under the sea and give access to the seaward coal, whether the Province had any actual prescription to do more than grant permission to a chosen operator on a given and defined stretch of foreshore to mine all the coal that it is possible for him to extract seawards.

In Great Britain, the question of the ownership of the undersea coal has not been raised, because it has been realized that it necessarily attaches to the ownership of the foreshore. Each operator in Great Britain, along a given stretch of foreshore, mines coal from under the sea by virtue of a special lease from the Crown, applicable to his particular circumstances, and the requirements of the locality, and capable of modification to meet changing conditions. The representative of the Crown is therefore an officer with discretionary powers, and it is his duty to make the best possible bargain for the Crown that each individual set of conditions will allow.

Commissioner of Mines in Nova Scotia Has No Discretionary Powers

The position of the Commissioner of Mines for Nova Scotia, under the existing lease laws, gives him no discretionary powers whatever. His office consists in applying a hard and fast general regulation to varying conditions of great complexity connected with the leasing of coal under the sea, such general regulation having been originally designed to cover the conditions connected with the leasing of coal under land areas, and even then, applicable to only one set of circumstances. No matter how impracticable from the point of operation, nor how injurious to the interests of the Province an application for an undersea lease might be, if the application is legally made as to form, and the statutory lease rental is proferred, the Commissioner of Mines can do nothing but issue the lease. The Crown therefore has no protection against application for leases designed to block the mining operations of a competitor, **and such leases have been issued on a number of occasions.**

It is much to be questioned whether any undersea lease which has been issued by the Crown in Nova Scotia is tenable except as it retains contact with and access to the shore. The old and generally accepted principle of "discovery" in mineral claims could very well be applied to the privilege of mining the undersea coal seams.

When the Crown leases an area under the sea presumed to contain coal, is the "lease" really anything more than priority of permission to mine coal when "discovery" actually takes place? Can it be more, when the presence of coal in such a position cannot be demonstrated at the time of issuing the "lease," and is nothing more than a presumption regarding the unknown proceeding from analogy to the known?

What possible right, in fact, can the Crown possess to **lease**—in the usual understanding of that term—coal which is merely presumed to be contained in measures underlying the waters of the ocean in a detached

block situated four miles from shore? What right or justification can be advanced for leasing a detached block, such as that referred to, contained within such boundaries and having such a configuration as to render the block unworkable, and also to render unworkable the adjoining areas of other lessees should coal ultimately be discovered in the unknown area?

Leases have been given of detached blocks under the sea which were entirely surrounded by the holdings of other lessees. It is evident that a "lease" given under such conditions is in reality untenable, and is in fact not a lease at all. The Government sought to remedy this anomaly by enacting legislation which permits the lessee of a detached area to proceed through an intervening lease for the purpose of gaining access to the detached area, but the consent of the lessee of the intervening area must first be obtained and a compensation awarded for the passage. Such a method of access is however impracticable, because, firstly, it is bad mining practice and too costly, and, secondly, it would result in cutting up the intervening coal leases into a series of up-get-at-able "islands" of coal, absolutely unmineable, and of not use to anyone—indeed much worse than useless.

Should not the Government of Nova Scotia, which, by a series of fortunate accidents has inherited the ownership of the coal-seams, exercise the ordinary discretionary powers of a real estate agent in disposing of the property of the people of Nova Scotia, of which it is the steward and guardian?

Does it not seem as if the policy of the Government has been wrong, not only from the viewpoint of commonsense and engineering—the terms are interchangeable—but wrong fundamentally? Has not the lease law, designed for minerals underlying the land, been in error assumed to apply to undersea minerals, and has not the Government attempted to convey to lessees certain rights which have no certain existence? To put it another way, has not the Government issued documents giving priority of permission to mine coal in areas where it is not certain that coal exists? Has not the whole matter of the undersea coal leases been an unfortunate misconception, on which blunders have been founded which happily it is not yet too late to correct?

The Government cannot remedy the existing lease law by any half measures. It is so bad that it cannot be mended. It should be ended. An entirely new method of granting undersea mining privileges must be devised.

Apply the Principle of "Continuous Discovery"

If the principle of access is made the basis of the new arrangement, then the principle of "discovery" can be well applied by granting permission to mine coal in undersea territory to the operator whose colliery workings first reach the coal, which would mean the application of the principle of "continuous discovery," and would have as a result continuous development of the undersea coalfield under the most desirable conditions.

Commissioner of Mines Should Have Real Powers

The Commissioner of Mines should be given absolute discretionary powers, not only in the matter of granting permits to mine coal, but also in the application of the submarine law. The present hard and fast statutory regulations should be withdrawn. In any case they have no place in the Coal Mines Regulation Act. In lieu thereof the Mines Office should be vested with complete discretionary powers, which will permit of the conditions of supervision being varied and the regulations being modified to suit the ever-varying and progressive conditions of undersea coal-mining, and the widely different physical conditions accompanying the presence of coal in the several submarine coalfields. For example, it is obvious that a law which is suited to the conditions of deposition and strata existing in the Sydney coalfield is quite unsuited to the conditions at Inverness.

Let the Commissioner of Mines be given real powers. Put him in the position to act as the steward and agent of the people. No longer let his hands be tied by the dead hand of precedent, falsely and erroneously applied to conditions that have no precedent.

Past Errors Should Not Spoil the Future

Because the Government has erred in ignorance, because many men now dead have made omissions, and because certain priorities have been conferred that do not represent absolutely demonstrable values, should this error be persisted in if it means the gradual destruction of the greatest asset of the Province, the undersea coalfield of Cape Breton? This, and nothing less, will be the result of attempting to mine coal to conform with the jigsaw puzzle that is dignified by the name of the lease map of the undersea coalfield of Cape Breton.

Recall the leases of the undersea coalfield, and then re-arrange the mine territories so as to permit the workings of the existing collieries to proceed to sea as far as may prove possible. The "leases" should not be dignified by such a name. They are actually permits to mine coal on the payment of a certain royalty per ton, and the royalty could just as well be levied as a "wayleave" on each ton of coal that emerges through the shore line from an undersea colliery.

Give Maximum Life to All Existing and Future Collieries

Where stretches of the foreshore are as yet unoccupied by collieries, provide that every new colliery approved by the Commissioner of Mines shall be given free access to all the seaward coal. Lease colliery sites on the seashore, and with them submarine areas designed to give the maximum life and the maximum extraction of coal to each colliery, and abandon the the practice of leasing unmineable and detached areas of impracticable shape situated anywhere and nowhere in particular.

Problem Must Be Solved Now or Never

The problem is capable of solution today, because only two or three of the undersea coal seams have been mined in the subarine areas. In some sections of the coalfield, however, there are from seven to eight workable seams, the working of which, under existing conditions would complicate the problem to an inextricable degree. A solution is possible, moreover, without endangering the vested rights or the bonded assets of any individual or corporation. A re-arrangement of mineable areas is possible that will greatly enhance the assets and increase the stability of all the interested parties, for of what use to any corporation are areas that are not mineable at a profit, and in some instances probably not mineable at all, if present conditions are permitted to continue?

Competent Commission of Enquiry Should Be Immediately Appointed

The Government should proceed to appoint the Commission of Enquiry which is authorized by Parliament, and should extend the scope of its enquiry to include all the problems of the submarine coalfield. Fortunately, in this instance the best interest of the Province is also the best interest of the operators mostly concerned, as will speedily become apparent if a scientific, impartial and complete survey of the problem is undertaken by competent persons.

MINING COAL AT GREAT DEPTH.

Sir William E. Carforth, in an address recently delivered before the Yorkshire Geological Society made some references to the problems of mining coal at great depth which are very applicable to the problems of mining coal in the undersea coalfields of Cape Breton Island, where not only will it be necessary in the future to mine coal under great depth of cover, but also at point remote from the point of entrance or generation of motive power and fresh air for ventilation.

Sir William, whose services to coal mining are such as to make his opinions carry great weight, said in the course of his remarks that modern mining had proved that in deep mines, pillars of coal became crushed and caused other complications if left in the old method of working by pillar and stall. Hence had been substituted the long-wall method with its numerous modifications of getting the coal by one operation. Deep mining had already demanded the discarding of many usages of working coal. In future, if deep coal seams were to be successfully won, a practical knowledge and utilization of certain natural laws and their effects would be obligatory to colliery officials and workmen. Whilst the long-wall method had displaced the pillar and stall system, yet the sinuous or crooked long-wall face had until recent years unfortunately been maintained in many collieries. Sir William described some of the advantages of cutting coal by machinery, the most important of which he indicated, were the reduced risk of accidents to the miners, fewer subsidences affecting surface property, and greatly increased output, per man per shift. The straight line of coal face had also opened the way for the introduction of further mechanical appliances, and the use of conveyors or continuous troughs, which enabled the collier to throw his coal from the face right on the conveyor, instead of having to fill it into tubs, and afterwards tram or push the tub for some distance to the pony road, whence it was conveyed to the mechanical haulage road. Whilst a miner with a pick and shovel was only able to get about 3¼ tons of coal per shift, with the help of coal-cutters he was able to get about 6¼ tons. With coal-cutters and conveyors combined, the production of coal per man per shift had increased to as much as 8 to 10 tons. If the thick seams of the West Riding coalfield, he said, had been to a great extent exhausted during the past 150 years, then the coal to supply domestic and industrial requirements would have to be from the thinner seams. He suggested that the question of cheap fuel in the future should form a subject for the consideration of geologists, a special class of engineers, and of mining students at the universities and technical schools. Mechanical means must be found for conveying coal long distances underground. Discussing the question of reducing temperatures so that the deepest coal seams could be worked, Sir William suggested that the experience and knowledge of the makers of modern refrigerators and of cold storage experts should be made use of. He thought compressed air, which had proved a useful means of obtaining power in working haulage engines, pumps, and other appliances, would prove of equal service in reducing the temperature of mines.

Sir William's remarks on the smaller damage to the surface, and this applies of course whether the surface is submerged or not, is direct confirmation of the views we have expressed in the "Journal" as to the suitability of the longwall system of coal extraction to the seams of the undersea extension of the Cape Breton coalfield.

Another suggestion made by Sir William is that the question of cheap fuel should be made a subject of special study by geologists, a special class of engineers and mining students. Dean Brock of the University of British Columbia recently remarked that the study of our coal deposits had been greatly neglected by geologists in Canada, and Dean Brock is right. For example the stratigraphical position of the Cape Breton coal deposits has never been fixed with absolute certainty, no really exhaustive examination of the paleontology of this deposit has ever been undertaken in recent years, no study of the earth movements has ever been attempted, and no more is known with regard to the correlation of the several basins of the Cape Breton coalfield, to say nothing of the correlation of the coalfields of Nova Scotia, than was known to Richard Brown, Sir J. W. Dawson and Sir Charles Lyell. In short, no attempt has been made to apply the greatly enlarged knowledge of coal geology that has come with recent years to any one of the coalfields of Canada. The Geological Survey has done its best, but its personnel is too limited, and the salaries which are paid to its officers are a fair index to the importance which the Canadian people attaches to economic geology. And yet, to crack an old joke, there are some people who are fools enough to put stock in these things.—Ed.

CATALOGS RECEIVED.

The Link-Belt Co. of Chicago has issued "Book No. 380, Link-Belt Electric Hoists and Overhead Cranes" and No. 375, Link-Belt Labor-Saving Elevators and Conveyors." These catalogues are fully illustrated with industrial applications of the well-known products of the Link-Belt Co.

The Aeroil Burner Co. of 400 Main St. Union Hill, New Jersey, U. S. A., issue an illustrated pamphlet describing a flame-projector device for thawing cars, hoppers, pockets, tracks, etc., which should prove extremely useful around mining yards and buildings in Winter. They seem well adapted for colliery railway yards, particularly where it is necessary to clean up switches and release traffic quickly.

The League of Nations seems to have gone a glimmering, largely through a misunderstanding by Europeans of President Wilson's powers. They conceived him to be the fully accredited representative and plenipotentiary of the nation of which he is President, but apparently that is not the case—and more's the pity.

NICKEL COINAGE AND CANADA'S NATIONAL METAL

In a letter to The Globe, published today, Professor W. G. Miller, Provincial Geologist of Ontario, makes out a strong case for the adoption of nickel coinage for Canada. He sums up his argument with these reasons: —"Nickel is the most beautiful and the most durable metal for minor coins; ;it cannot be successfully counterfeited, and it can be called Canada's national metal, since this country produces over 80 per cent of the world's output."

Commenting upon a former Globe editorial on the subject, Professor Miller says that coins of pure nickel or nickel alloys are in use by over fifty countries, Britain and Canada being "almost the only important countries that have not employed nickel in coinage." That is not very flattering to Canada, at any rate. The conservatism of Britain is not so surprising. That Canada, with the raw material within her own borders, should in the matter of nickel coinage lag behind countries that do not produce nickel is as much a matter for wonder now as it was in the days when the project was first urged, and was brushed aside on various unconvincing pretexts.—*The Toronto Globe.*

Dr. Miller's Letter.

To the Editor of The Globe: During the last month the subject of nickel coinage has been receiving much attention from the press of Toronto and elsewhere. Your own editorial of the 12th instant induces me to address you on the subject. There are a few points concerning which there seems to be a misapprehension:

(1) France is not now introducing nickel coinage. She has been using it for years. In fact, Great Britain and Canada are almost the only important countries that have not employed nickel in coinage. Coins of pure nickel or of nickel alloys are in use by over fifty countries.

(2) Nickel coinage will consume only a small proportion of the nickel produced. Although this coinage has long been in use, it is believed that the total nickel employed for this purpose does not exceed 15,000 tons. France, for instance, used probably about 250 tons in 1918. In that year the production in Ontario was over 44,000 tons, and the quantity of New Caledonia nickel, refined partly in Europe and partly in the United States, was several thousand tons.

(3) France and several other countries have pure nickel coins—the kind that we should have in Canada. The United States "nickel" contains only 25 per cent of nickel to 75 of copper. It is not such a durable or attractive coin as the pure nickel ones of France and other countries. It was long after the United States coin was introduced that a process was discovered to roll, hammer and stamp pure nickel. These pure nickel coins are the most excellent that have been made, they are most durable in wear, they never oxidize, and it is simply out of the question to counterfeit them successfully.

(4) The Mint authorities will probably say that pure nickel coins are more costly to produce than are those of alloys of the metal. This is owing to the fact that pure nickel has a higher melting point than the alloys and is harder. But surely if France and other countries produce coins of this metal Canada can do so.

(5) Canada should have a pure nickel coinage for the following reasons: Nickel is the most beautiful and the most durable metal for minor coins, it cannot be successfully counterfeited, and it can be called Canada's national metal, since this country produces over 80 per cent of the world's output.

For years the officials of the Ontario Bureau of Mines have been urging the use of nickel in Canadian coinage. The present position of silver coinage is another reason for the employment of nickel coins.

Toronto. W. G. Miller.

DOMINION STEEL CORPORATION.

Col. Grant Morden, M.P. for the Brentford Division of Middlesex, has discussed the purchase by him and his associates of the controlling interest in the Dominion Steel Corporation. Previously they had large holdings in the concern, but their acquirement of the balance of the unissued capital held by the Treasury of the Corporation gives them control of the firm, with its ten millions capital. Col. Morden says: "We propose to consolidate and develop these properties to a much greater extent than ever before." He emphasized the potentialities of the companies with their 5,000 million tons of coal, and 5,000 million tons of ore, so well situated on the seaboard. Lord Furness is one of Col. Morden's associates. Col. Morden leaves for Canada next month, and will be accompanied not only by some of his associates in the deal, but also by a staff of skilled engineers, and together they will examine the working of the companies and their possibilities.—"Colliery Guardian."

PORT ARTHUR NOTES.

By J. J. O'CONNOR.

Another diamond drill has been put in operation on the Leitch iron lands on the Nepigon range. The parties having this range under option appear to be highly satisfied with the disclosures made by the drill-operations and intend continuing these operations during the winter. About three thousand feet of drilling has been performed to date.

J. A. Johnson and Senator W. H. Fowler, of the Swedish-Canadian Mines, Limited, returned to Port Arthur on the 21st from their gold property near Mine Centre. While at the Mine, Mr. Johnson let contracts for 2000 cords of wood and also contracts for the timber necessary for their 1600 feet aerial tramway, shaft house, and for remodelling the Mill. It is the intention to use coal for steaming purposes in the near future, instead of wood, until they develope the necessary water power. Senator Fowler left for Ottawa, and Mr. Johnson for Montreal on the 22nd.

The accident referred to in the "Journal" of the 17th, by which two men were killed owing to the explosion of an air receiver occurred at the Rognon Mine, Contact Bay, and not at the Northern Pyrites Mine, North Pines, as was incorrectly stated.

J. A. McVickie, former manager of the Chambers-Ferland Mine, has returned to Cobalt after spending several months in the Southern States.

THE C.M.I.—A YUKON APPRECIATION.

The Canadian Mining Institute has just dealt with the subjects of the utilization of returned soldiers for prospecting and the free importation of mining machinery. These are subjects of much concern to every mining section of Canada. Mining is the second industry in importance in the Dominion. It is second only to farming in volume of wealth produced.

Yukon shares in common with the other mining districts of the Dominion the need of encouragement of the development of her mineral resources, and will be pleased to see that the mining institute take up something practical and specific in the way of aiding the miner.

It is seldom that one hears of any plan for encouraging the miner. The daily press throughout the land teems with suggestions for aid to agriculture and schemes of getting returned soldiers, immigrants and others located on farming lands. How often does one hear of a scheme to give some practical public aid to the prospector or the man honestly struggling to open the mineral areas of the land with capital, brawn or brain.

It is high time there be some specialized effort for getting the assistance the miner requires. The farmers have forged ahead and have even formulated great political parties throughout the various parts of the continent. How about the miners? The coal miners are perhaps in advance of others in organizing and demanding consideration. The mineral miners are behind in the procession.

In Ontario the other day an entire provincial government was captured by the farmers. At the same time not one miner was elected from all that vast and tremendously important mineral producing area of northern Ontario. Why? What representation will the miner receive in the Ontario legislature? What will the miner receive anywhere if he does not get in and, like any others who desire special attention for his own wants, organize and fight for them.

The Canadian Mining Institute is one channel. It can make recommendations. Not all the recommendations of mining organizations of the past have been in accord with the best interests of the individual miner or th miner as a whole, but in the recommendation for free machinery for mining and for some plan to assist the returned soldier in the mining enterprise, the Canadian Mining Institute is on the right track.

Canada wants the best mining machinery and wants plenty of it, and it does not want to have to pay inflated values on the same in order that some protected or profiteering manufacturer might make a fat thing.

Let the mining machinery be supplied by those who can put up the best article regardless of where it comes from, and let it come in free.

Yukon has enjoyed this benefit in a degree through the efforts of its member. Yukon is about to expand its mineral operations. The more assistance it can secure on machinery imports and the more aid it can get for its returned soldier-miners, the speedier will the country advance, and the sooner will the national government share the prosperity and the faster will the gold and silver reserve which the Empire now so much stands in need increase.

London is crying for more gold and silver. Now is the chance for the various representatives of the people to take the recommendation of the Canadian Mining Institute and grant all the aid possible.

Let Yukon's various soldier, political, commercial, mining and other institutes support the movement and do so while it is warm.—*Dawson Weekly News.*

ACTIVITIES OF THE BRITISH COLUMBIA CHAMBER OF MINES.

So far this season there have been five lectures held in the lecture rooms.

December 4.—A cheaper and Better Fuel, Alexander Sharp. Read by Nichol Thompson.

December 9.—Recent Copper Smelting Practice. Prof. H. N. Thompson.

December 11.—Mine Sampling and Estimation of Tonnages, P. W. Racey, M. E.

December 16.—Preparation of Prospects for Examination, P. W. Racey, M. E.

December 18.—Ore Crushing for Concentration, Prof. Geo. A. Gillies, M. E.

The next lecture will be on January 6th, and will probably be given by Dean R. W. Brock of the University of British Columbia on "The Relationship of Geology to Mining." All the lectures given so far have created interest and have been well attended. Considerable discussion has taken place at each lecture. The Chamber of Mines deserves credit for conducting these lectures under the chairmanship of Professor J. M. Turnbull, as the dissemination of accurate information leads to a better understanding of mining problems, and a more discriminating attitude on the part of the public.

The nominating Committee of the B. C. Chamber of Mines have placed the following names before the members for election of officers for 1920.

President, Dr. Hodge of the University of British Columbia; first vice-president, W. H. Hargraves, Victoria; treasurer, William Godfrey, manager of the Columbia; first vice-president, J. M. Lay, manager of the Imperial Bank; second vice-president, W. H. Hargraves, Victoria; treasurer, Wm Godfrey, manager of the Bank of Montreal (Hasting and Richard street branch); honorary president, Col. E. G. Prior, lieutenant-governor-elect.; honorary vice-president, Hon. Wm Sloan, minister of mines; executive (fifteen to be elected) Messrs. A. M. Whiteside, C. E. Cartwright, J. M. Turnbull, J. A. Dawson, D. Read, P. W. Racey, B. G. Hawkins, G. M. Wooster, Nichol Thompson, N. W. Pirrie, W. T. Newman, Major Fleck, F. W. Crossland, R. S. Lennie, Chris. Spencer, Gordon Drysdale, H. G. McCraney, E. C. Gibson, G. S. Eldridge, R. D. Morkill and N. T. Burdick.

Mr. Dalby B. Morkill, a surveyor of Stewart, B. C. has presented the B. C. Chamber of Mines with a valuable and up to date map of recent stakings in the Salmon River Valley of the Portland Canal district. This gives the location of the Premier, Bush, Forty Nine and Big Missouri and other well known properties in this much talked of district. The map is on view and all are welcome to use it for reference.

A most important and valuable specimen of native and ruby silver from the La Rose claim at Alice Arm, B. C. has been recently received by the B. C. Chamber of Mines at Vancouver, This is on view at the Chamber of Mines exhibit. This is a part of a shipment of 23 tons sent to the Trail Smelter.

A previous shipment of ten tons to the Granby Smelter gave a return of about $1000 per ton. The owners of the claim propose to drive a 450 foot tunnel to enable them to carry on operations twelve months in the year.

Dr. E. T. Hodge, Asst. Professor of Geology in the University of British Columbia, recently lectured before the Rotary Club in Vancouver on "Geology as applied to Mining Prospects." The relations between the business men of Vancouver and the staff of the B. C. University seem to be unusually pleasant, and there seems to be a mutual desire to disseminate and to receive first-hand technical information. After all, this is one of the functions of an educational institution.

Montreal Branch of the Canadian Mining Institute

At a regular meeting of the Montreal Branch held in the evening of the 16th December at headquarters, the Chairman of the Branch, Capt. J. G. Ross, read a paper on the asbestos industry. The reading of the paper was followed by a discussion on the draft of a proposed bill entitled, "The Regulation of the Engineering Profession in Canada." The draft of this bill will be found in the June issue of the Bulletin.

ACTIVITY OF THE CANADIAN MINING INSTITUTE IN THE WEST.

The very successful meeting of the C. M. I. recently held in Vancouver has greatly stimulated interest in the Institute, and will result in a substantial addition to the membership. One significant feature of the Vancouver meeting was the presence of students from the University of British Columbia, and it is expected that the Institute will this year receive probably the greatest accession of student members in its history. The entrance in mining engineering classes at the Canadian universities have been unusually large, and everywhere the Registrars of the universities report not only a large enrollment, but a distinctly good grade of students.

At a meeting of the Western Branch of the British Columbia Division of the Institute held on November 29th, Mr. Charles Camsell was elected Secretary, succeeding Mr. George Wilkinson, who has latterly been in poor health. Mr. Camsell is Director of the Western Branch of the Geological Survey, with headquarters in Vancouver.

The officers and councillors of the Western Branch are now as follows:

Chairman: E. E. Campbell, Anyox, B. C.; Vice-Chairman: J. M. Turnbull, Vancouver, B. C.; Secretary: Charles Camsell, Vancouver, B. C.; Councillors: W. Fleet, Robertson, Vancouver, B. C.; W. M. Archibald, Trail, B. C.; Major R. W. Brock, Vancouver, B. C.; Thos. Braham, Cumberland, B.C.; Jas. Buchanan, Trail, B.C. ;A. G. Larson, Nelson, B.C.; Henry Lee, Britannia, B.C.; R. R. Bruce, Invermere, B.C.; C. C. Campbell, Phoenix, B.C.; A. G. Langley, Revelstoke, B.C.

As a direct result of the stimulus given by the Vancouver Meeting a Vancouver Branch of the Institute has now been formed. Although the plans for the formation of this new branch had been discussed for some time previous to the meeting of the 26th November, they really crystallized at this meeting. At a gathering held in the buildings of the B. C. University on December 9th the formal commencement of the Vancouver Branch was decided upon, and the following officers were elected:

Chairman: Major R. W. Brock; Secretary: V. Dolmage; Councillors: E. T. Hodge, S. J. Crocker, J. M. Turnbull, E. A. Haggen, P. W. Racey.

"A REAL MINISTER OF MINES"

Editor, Canadian Mining Journal:

Dear Editor,—I was very much gratified on reading the report in your issue of Dec. 10th (p. 930) about the speech made by a "real Minister of Mines" at the banquet of the Canadian Mining Institute held recently in Vancouver. This appears to have been a glorious old time banquet with everybody mellow, it could not possibly have been one of the dry affairs that have been in vogue lately. The "real Minister of Mines" announced that the government was offering a bonus of $3.00 per pound on all pig iron manufactured in the province from local ore. How much nicer this was of him than it would have been if he had said anything about taxes or nasty things like that! Pleasant visions arose before me of what this would mean—on a 300 ton plant $1,800,000 per day—the real Minister of Mines stated that this offer had not been taken advantage of. It seems to me that this is where the electric furnace would come in. I wonder none of the advocates of the electric furnace took advantage of it. But unfortunately the Minister reduces this to only $675 per day on a 300 ton plant and even then he does not allow it to operate on Sundays apparently, as he states that this would mean $213,975 per year. If the plant is run 317 days in the year at $675 per day that will give exactly the amount mentioned above, 365 — 48 = 317, that is, they are allowed to run one Sunday in each quarter. If that is not the way, what is it? Any information you can give on this point Mr. Editor would be much appreciated by all mining men. I remain,

Yours in suspense,

HOPEFUL READER.

Yes, it was a perfectly good banquet, but dry as—dry as a caucus of the U. F. O. We regret the error that our truly hopeful correspondent has detected, but we have always found departmental arithmetic difficult to follow.—Ed.

COAL COMPANY DISPOSES OF ITS INTEREST ON VANCOUVER ISLAND.

A deal has been put through by which the Nanoose-Wellington Coal Company of which Lewis Williams, of Seattle, is the president, becomes the owner of the interests of the Nanoose Collieries Company in the Grant Mine at Nanoose Bay, Vancouver Island. While the transfer price of the property could not be learned, it was stated that a very large amount is involved, the property being considered a most desirable one with exceedingly bright prospects for future development. The property comprises 1,200 acres including submarine area, it being the intention of the new owners, according to the statement of Mr. Williams, to commence immediately, operations in the development of the property with the object of largely increasing the output in the near future.

With this aim in view the company will start at once on construction work, the company's engineer having prepared plans for the erection of bunkers, a washer and other top works. These will involve an expenditure of $100,000. Contemporary with the surface improvements, underground development will be carried on. The new owners anticipate increasing the present output to 500 tons daily and, within a month to double the present number of employees which will mean an increased output. The coal area which the Nanoose-Wellington Coal Company is to develop was opened by the sinking of the Grant shaft.—Western Canada Coal Review.

Our Northern Ontario Letter

The Silver Camps

Perhaps one of the most noteworthy developments in connection with the mining industry of Ontario is the decision of the mine operators to organize in such a manner as to be able to voice in concise form the unanimous opinion of the mine operators, relative to questions which have a vital bearing upon the industry The movement has been under contemplation for some time, but it has been given added impetus and takes on greater importance because of the unexpected political developments in the province.

Northern Ontario, particularly the mining interests, is apprehensive over the present situation. There seems to be no reason for longer denying the fact that genuine fears are entertained that the trend of affairs in general is more or less in the direction of sectionalism. With the political arena being invaded, in quite a constitutional manner, by various sections, namel: Liberal, Conservative, United Farmers, Independent Labor, Soldier Candidates and Liberty Leaguers, the decision of the mine operators to form a completely representative organization appears to be quite in keeping with the times, and perhaps necessary to offset the possibility of unwise legislation at a time when the reins of government is in the hands of novices. The new organization may be known as the Ontario Chamber of Mines, or some such name, and will have branches in all the centres of mining activity in the province.

Activity at the silver mines continues at full blast. Due to a number of high grade discoveries it is quite evident that the silver output for the last quarter of 1919 has exceeded any previous quarer during the year.

According to the annual report of the Coniagas Mines, that company produced some 940,267 fine ounces of silver during the fiscal year ended October 31st, and received an average of $1.06 an ounce, or a total of not far under $1,000,000. This compares with an output of 954,264 ounces during the preceding year at which time the price of silver averaged 94¼ cents an ounce. It will be seen, therefore, that the 1919 record exceeds that of the previous year. This is pointed to as a remarkable achievement owing to last summer's labor strike having caused the complete loss of 47 days. The financial statement shows total assets of $652,837.84; current liabilities $204,092.01. Reserve for depreciation, $255,000. Surplus $2,103,-745.83.

At the Crown Reserve it is believed the shoot of high grade ore recently encountered will yield about $140,000. This comes as almost total profit over current earnings for the reason that the shoot was opened up during the course of proceeding with the development of medium grade mill rock. At the time of writing it is understood that upwards of 50,000 ounces have been bagged, with a rich floor yet to mine, and the picking over of some muck. The floor is expected to contain close to 20,000 ounces. With silver at around $1.34 an ounce plus the exchange on New York funds the shoot should have a value of $140,000, as above stated.

A financial statement just received from the Nipissing Mining Company shows a surplus of $4,463,087, made up of securities amounting to $3,556,457 and ore and bullion worth $906,630. This is the greatest surplus ever accumulated by any precious metal mining company in Ontario. Until the annual statement is issued it will be impossible to secure exact figures relative to ore reserves, but it is intimated that as of the ending of 1919 the reserves will have a value of around $10,000,000.

Alfred R. Whitman, mining geologist, has completed his survey of the Genesee mine and after spending Christmas in the district returned to New York.

On account of the great demand for silver, together with the improved outlook in the Gowganda and Elk Lake districts, traffic to these outlying districts is steadily growing in volume. The disappointing information from that district this week consists of the curtailment of milling operations at the Reeves-Dobie and the definite closing down of the Camburn property at Leroy Lake. The curtailment at the former appears to be only temporary. However, these two disappointments are more than offset by the favorable progress in other directions. On the Walsh property the camp buildings and equipment are being put in shape for a comprehensive scheme of development. The property is pointed to as being one of the most promising of the prospective mines in the Gowganda field. It is located in close proximity to the Miller Lake O'Brien and the Castle.

The deal for control of the Everett property, among the purchasers of which is said to be Sir Henry Pellatt of Toronto, is stated to be making satisfactory progress. From the property of the Eastman Kodak interests, situated on the east arm of Gowganda Lake, a small shipment of ore has been made for testing purposes. The work of tunnelling into the hill from the shore of the lake is proceeding. Montreal interests which are operating the Diadem property at Bloom Lake (formerly known as the Powerful) are learned to be the interests which recently secured a working option on the Silver Lode property at the south end of Miller Lake. Work is to be carried forward aggressively.

In connection with the question of meter gauge railways for the outlying mining camps, W. E. Simpson, representing the Castle Cyanide Company, in an interview with your correspondent appeared to be quite optimistic over the project. From experience in West Australia, however, Mr. Simpson offers many reasons for much care in connection with building such lines. He emphasized the difficulty of linking up trunk lines where the gauge undergoes a change and strongly intimates the likelihood of the Gowganda line some day becoming a trunk line. In this connection Mr. Simpson said:— The Gowganda district is the past, as has been said, has suffered severely, but in spite of the neglect the merit of its mines is being proved and it looks as if the day of relief is coming quickly. Doubtless the government realizes that railways are the life sustaining arteries of every industrial community and may possibly recognize during the coming year that better transportation facilities are absolutely necessary for the exploitation of the mineral wealth not only at Gowganda but also in the belt extending indefinitely to the west in continuation of the proposed railway expansion. Sooner or later the time will come when the line at present known as the Elk Lake branch will be extended not only to Gow-

ganda but will connect the T. & N. O. Railway at Earlton with the Canadian Northern at some point about sixty or seventy miles west of Sudbury. In such an event, therefore, any deviation from standard gauge might prove a serious handicap to the whole district and its consideration is a matter of the greatest importance."

The Gold Mining Camps

The scope of gold mining operations in the various camps throughout Northern Ontario is gradually being enlarged. It is being found less difficult to procure men, although it is still impossible for some of the larger mines to get full requirements. The condition is well beyond its worst, however, and the future of the industry is certain to eclipse all achievements of the past.

At the Dome Mines, work at the 600 ft. level has resulted in the blocking out of a large tonnage of ore on the Dome Extension. In addition to this, it is stated that all is in readiness to cross-cut to the Dome Extension at a depth of 1,150 feet. The option which the Dome holds on the Dome Extension is good until March and promises to be the centre of considerable attention during the next sixty days. Provided the result of the treatment of a thousand tons or so of mill rock from the Extension proves satisfactory, and the Dome decides to exercise its option, the Extension will be taken over on a basis of 30 shares of Dome Extension for one share of Dome Mines. Opinion in Porcupine leans strongly to the belief that the deal will go through.

The opening of the new year once more adds the Dome Lake to the producing list, the mill which was damaged by fire last summer being once more in shape for operation.

The sampling of the Moneta property by the Porcupine Crown interests is proceeding and some kind of a deal is believed to be likely between these two companies, either on the basis of purchase of the Moneta by the Porcupine Crown or a merger of the two properties. In so far as the Moneta has considerable prospective merit but has no mining plant or mill, and considering that the Porcupine Crown is well equipped as regards mining and milling plant as well as having some $500,000 in ore reserves, the consolidation of these two properties would appear to be to their mutual benefit.

The output of the Hollinger Consolidated for the fiscal year ended December 31st, 1919, is unofficially estimated at approximately $7,000,000. Basing calculations on official figures which show an output of $4,839,845.49 for the first thirty-six weeks of the year, or an average of $134,440.01 a week, the indicated output for the whole year works out at $6,990,880.52. This does not take into account any increase during the closing sixteen week, and which increase would appear likely to bring the year's total to approximately $7,000,000. This compares with an output of $5,752,370.87 during the preceding year, and thus shows an increase of close to a million and a quarter dollars above the previous best year in the company's history. This record has been established at a time when the number of men available only permitted the operation of the plant at about seventy per cent capacity and holds out assurance of a further big increase in 1920 provided the desired number of men can be procured. The output to date from the Hollinger amounts to between $32,000,000 and $33,000,000. Owing to a typographical error, a former unofficial report referred to a production to date of close to $43,000,000.

In regard to the outlying gold areas, it has been suggested that if narrow gauge railways are to be given a trial, the Kirkland Lake-Larder Lake-Boston Creek-Skead Township areas comprise an ideal field in which to apply it. Such a line, some fifty miles in length, could serve all of the four districts mentioned. It would commence at Swastika and run east through Kirkland Lake, pass the Argonaut mine at Bearverhouse Lake, touch Larder Lake, and thence run south to Skead after which it would turn west through Catherine township and the Boston Creek district and terminate at Boston Creek. It is estimated that a narrow gauge railroad could be built for about $15,000 a mile and that the entire "loop" line as above mentioned could be built for about $750,000. As a means of financing the enterprise it is suggested that some 20,000 bonds each of $50 denomination be issued, and that a canvass of the property holders be made to see how many can be disposed of. The plan, if carried out, would appear likely to have the support of all small claimholders as well as operating companies in the districts affected. At any rate, the proposal has been drawn to the attention of the Ontario Government.

At the Miller Independence the new central shaft is nearing the fifth level, at which point cross-cutting will be carried out to the downward continuation of the rich ore bodies explored in the upper workings. It is estimated that the power plant will be completed and the electricity turned on before the annual meeting which will be held in Dayton during the first week of February.

A contract has been let to continue the shaft on the Kennedy-Boston from the former depth of 48 feet to the 100-ft. level. The work will probably be completed some time in February, after which lateral work will be commenced.

In the Fort Matachewan district work will be confined this winter chiefly to diamond drilling some of the leading properties inclusive of the Matachewan Gold Mines and the Robb-Clemens. On the Nelson claims in the township of Baden, some very rich gold ore is being encountered, and bids fair to enlarge the possibilities of the outlying parts of the Fort Matachewan district.

Following is an Order-in-Council passed by the Ontario Department of Mines, on December 19th, 1919:—

"Upon the recommendation of the Hon. Mr. Mills, the Committee of Council advise that the relief against forfeiture or loss of rights under section 84 of the Mining Act of Ontario, in the case of a recorded holder of an interest in a mining claim, who has enlisted for active service at home or overseas, against the King's enemies, be extended to the 1st day of January, 1921."

During the week ended December 26 two Cobalt companies shipped two cars containing approximately 130,696 pounds of ore, as shown in the following summary:—

Shipper	Cars	Pounds
La Rose	1	65,696
Dominion Reduction	1	65,000
Totals	2	130,696

During the corresponding period there were no bullion shipments.

MINING PERSONALS

R. J. Ennis, general manager of the McIntyre-Porcupine, paid a recent visit to the Gowganda district in connection with the Castle property.

Major Dunlap has returned to Cobalt after paying a brief visit to the Gowganda district.

Neil Morrison, superintendent of work at the Kells property, is spending the holidays in Haileybury.

Alfred R. Whitman, mining geologist, spent Christmas with Arthur A. Cole, before returning to New York.

Capt. Gordon W. Nicholson.

Capt Nicholson who recently returned to Toronto from overseas, was formerly in the employ of A. E. Osler and Company, Toronto. He has been elected a member of the Standard Stock Exchange and will open an office in Toronto.

The many friends in Toronto and elsewher of Major George A. Grover will be interested in learning that he has opened a law office in the Continental Life Building, Toronto, where he will be in partnership with his brother, Capt. J. I. Grover. The firm will be known as Grover & Grover. Major Grover will be remembered in the mining industry through his connection with the firm of J. B. Holden & Co., in the flotation of La Rose and Hollinger mining companies. He is a graduate in mining engineering of 1902 and graduated in law from Osgoode Hall in 1911. The Major had long overseas service, having been attached to the Princess Pats.

OUR BRITISH COLUMBIA LETTER.

The Metal Mines.

Stewart, B. C.

The bonding of the Northern Light, comprising eight claims, owned by Charles and William Bunting; the Woodbine group of two claims and fraction owned by Dave O'Leary and Charles Lake; and the Cobalt Group of three claims owned by John Hevland, is announced from Stewart, B. C. These properties, situated in the Salmon River Section of Northern British Columbia have been taken over by W. A. Melloche, M. E., for the Alquaquin Syndicate of Belgium. It is stated that Mr. Melloche has let a contract with Lynch Bros., of Seattle, Wn., to put three diamond drills on the ground in the spring.

C. F. Caldwell, a British Columbia operator of many years experience, has bonded the New Alaska, situated in Alaska, just across the boundary on Salmon River. Mr. Caldwell, who returned from the North a short time ago, states that development in the mining camp continues favorable. The New Alaska has three shown values already ranging from $25 to $35 a ton and energetic development is to be undertaken. The Montana Group has produced ore running from $70 to $100 a ton. Adjoining the New Alaska is the New Alaska Extension, which has been bonded by a Vancouver Syndicate and of which encouraging reports are received.

The road between the towns of Stewart and Hyder, the former on the Canadian side and the latter in American territory, has been completed. This has been an expensive work and has called for considerable engineering skill. The Provincial Government is responsible for the road, which was decided upon solely to extend mining men the necessary facilities for the opening up of the rich mineral region lying back of the Coast. The road is two and one-eight miles long. one and one-eights of this being the old Dominion Government approach. The remaining mile is entirely rock and threstle work skirting a steep bluff. There are three large trestles. The new road connects the Salmon and Bear River Valleys and makes the mines of either sections easily accessible to either Stewart or Hyder. Wagons or motors may now go from Red Cliff Mine, fourteen miles up the Bear River Valley to the Premier Mine, fifteen miles up the Salmon River, a distance of twenty-nine miles in all. Of course it is now being used by sleighs.

Alice Arm, B. C.

A. J. T. Taylor, President of the Taylor Engineering Company, Limited, has addressed a short report to Hon. John Oliver, Premier of British Columbia, bearing on last season's operations of the Dolly Varden Mine and Railroad. He states that the railroad was completed last September and was in continuous operation up to the 15th of December, 1919. During the period named the Company has hauled from its own mine approximately 7,000 tons of ore, and also has been able to supply transportation for all freight to its own property as well as for that destined to other properties operating in the district.

If reports in circulation in mining circles recently are a criterion of what may be expected there can be no doubt that there will be marked development

activity in the Alice Arm region next season. It has been stated that the Dolly Varden Mine has been sold to wealthy Eastern capitalists and that the majority of the other properties of the locality have been bonded. As to the Dolly Varden it is emphatically stated by Mr. A. J. T. Taylor, President of the mining company, that the mine had not been sold and that there is no present intention of disposing of it. Of the other reports it is learned authoritatively that the Tiger and Last Chance mineral claim, situated adjacent to the Dolly Varden, have been bonded by Eastern American interests and will be thoroughly explored next year.

Greenwood, B. C.

The Bell Mine, situated on Wallace Mountain, is a promising property which is being successfully operated by P. E. Crane, a graduate of the mines school at Pullman. The ore lies in narrow bodies containing high values in silver, this being characteristic not only of the Bell but of other claims in the same region. The product of the Bell contains 100 ounces of silver in a general way, although a carload shipped some time ago containing an average of 502 ounces and was sold for $17,000 after the deduction of all charges. Among other contributors of the districts are the Salt, Napanee, Rob Roy, Duncan and Bounty Fraction.

Princeton, B. C.

That the Canada Copper Corporation has proceeded with the construction of its concentrating mill and the development and equipment of the mine at Copper Mountain as far as possible without a railroad and electric energy is reported from Princeton. The Mill, has a capacity of 2,000 tons daily and is practically complete. In the meantime the construction of the railroad, which is to cost $1,000,000 or more, and of the power line, the cost of which will be at least $200,000, is proceeding steadily. Some 500 men are employed on the railroad. Half of the construction has been completed, including much of a tunnel which will be several thousand feet in length. A large gang of men is employed on the power line between Greenwood and Princeton. This work was started last Spring. It is believed that the railroad and the power line will be ready for operation by next Summer when the Canada Copper Company will be in a position to commence the production of ore and concentrates.

Trail, B. C.

The site of the copper mill of the Consolidated Mining and Smelting Co., at Trail, B. C., is being cleared for a new structure of steel and concrete, the cost of which is placed at $50,000. It will be much larger that the former mill which was destroyed recently by fire. The Company also is doubling the capacity of its machine shop.

The superintendence of the electrical department is being taken over by Mr. T. Hopkins, who for the past five years has been associated with one of the large Imperial Munition Plants in England. Owing to the fact that the scope of the electrolytic process of ore treatment is constantly widening Mr. Hopkins duties will be of first importance. His qualifications and his many years of experience specially fit him for the post to which he has been called.

Vancouver, B. C.

On behalf of the Tivani Electric Steel Company, now operating at Belleville, Ont., an offer of an iron and steel industry has been made to the City of Vancouver by A. P. Gillis on condition that the City undertakes the provision of 50,000 horse-power at $10 per H.P. with 24 hours continuous service guaranteed. If Vancouver agrees, the purchase of a bond issue of $5,000,000 for the establishment of an electric iron smelter in British Columbia, with a capacity of 200 tons per day for the first unit, and which will have open hearth furnaces and rolling mills, is assured according to Mr. Gillis. He asks that the question of guaranteeing the bonds be placed before the citizens to be accepted or rejected.

Barkerville, B. C.

The Bryce Syndicate, which is developing gold quartz properties on Proserpine Mountain, near Barkerville, now has options on the Dufferin Group of Claims as well as the Independence and Imperial Groups. This presumably pretty well rounds out their holdings and makes the property a big thing if the work now in progress results satisfactorily. Contracts for three 500 foot tunnels are under way, two of which are in over 100 feet each. A lot of surface trenching on the strike of the veins has also been done and two diamond drills are en route to the property.

Lillooet, B. C.

That the Lorne and another of the operating properties of Cadwallader Creek has been bonded by the Mining Corporation of Canada is reported on good authority. This corporation recent acquired the Pioneer Mine on the same waterway.

Victoria, B. C.

An application has been made to the Provincial Government by W. T. Ward and Associates for the cancellation of rental dues on the placer leases, situated in the Cariboo District, which charges have been accumulating during the years that W. T. Ward and John Hopper have been fighting the question of title through the courts. The opinion is expressed that Mr. Ward has a good case. No decsion, however, has been reached the matter being left in the hands of the Minister of Mines for investigation and report.

THE WESTERN COLLIEREIES

(From our Victoria Correspondent.)

An agreement is reported to have been reached between the operators and the miners of District 18, U. M. W. of A., which comprises Eastern British Columbia and the Province of Alberta. Negotiations as to wages, etc., were in progress at Calgary, Alta., for several days between representative of both sides, assisted by W. H. Armstrong, director of coal operations. The agreement reached covers an increase of 14% in the men's pay and also stipulates that only members of the United Mine Workers of America may work in the mines of District 18.

In discussing the situation Senator G. Robertson, Minister of Labor, said that upon receipt of a notice from the Dirtcor of Coal Operations that there was likely to be difficulty in the near future in the Alberta coal fields, and as such an occurrence could not but result in hardship and suffering in the western provinces which are absolutely dependent on these coal fields for their winter supply of fuel, he had deemed it both important and necessary to take steps to meet the situation and to cope with it before any interruption occurred.

"I have no statement to make regarding the One Big Union," he continued, "other than contained in a letter to Henry Beard in reply to a communication that he addressed to me, a copy of which I am addressing to the press. I feel that from the information contained in my reply the public will approve and endorse the course taken by the coal operators, the United Mine

Workers, and approved by the Director of Coal Operations for the purpose of preventing as far as within their power a deliberate attempt, without cause, on the part of the O.B.U. to bring about a tie-up in the coal industry unless they were recognized. That, of course, is out of the question."

The main points in the Minister's letter to Henry Beard are that it is odviously impossible to recognize two organizations as having jurisdiction to negotiate wage agreements for the same workmen; that the United Mine Workers have a well established reputation for respecting and fulfilling agreements made; that the organization Mr. Beard represents (the O.B.U.) has by its acts and utterances of its leaders indicated no tendency to respect or fulfill any contractual obligation, and that the O.B.U. as an organization was wholly unreliable and untrustworthy. The Senator then adds: "If any action is indulged in by your organization at a time when miners have no justifiable grievance, and which would bring upon the community inconceivable hardship, those responsible for such action must expect to assume the responsibility therefor."

Reports from Calgary and other points on the prairies are to the effect that the shortage of fuel is likely to be felt more or less seriously in the western province of Canada this winter. Describing the situation in Calgary a writer points to its incongruity: with the Drumheller and Three Hills coal fields to the east; the Lethbridge and Crow's Nest Coal Fields to the south; the Bankhead and Canmore Mines to the east; and the Brazeau and Edmonton fields to the north, Calgary, having only 75,000 population, finds it hard to get enough coal for ordinary domestic use in cold weather. Of course, the trouble is that the One Big Union strike of last summer prevented the accumulation of surplus stocks and now that the demand is heavy the coal is being shipped straight from the mines to the hands of the consumer. The city of Calgary is expected to undertake the introduction of a system both to increase the production and facilitate distribution.

The Wakesiah Mine of the Canadian Western Fuel Company, which was opened up recently near Nanaimo, is producing some 200 tons of coal daily. This mine has not been doing much until lately, and the results now being obtained are considered satisfactory. The output, however, evidently is not to be allowed to remain at that level, it being the company's intention to bring it up to 600 tons a day in the course of a few weeks.

Figures issued by the Canadian Western Fuel Co. indicate that, whereas a few years ago the bulk of Nanaimo's coal was marketed in the United States, today the reverse is the case. In 1917, 41.5 per cent of the coal mined by the Canadian Western Fuel Company was sold in British Columbia. In 1918 the percentage had risen to 58.5 per cent and for the first ten months of the present year 70 per cent of the output was sold in the province. In November when the big coal strike started in the United States, this percentage was further increased. Instead of shipping more coal to the other side as might have been expected under the circumstances the company sold 75 per cent of its output in the province. The only coal going to the United States from this company's mines is coal for which contracts were made last summer, when there was not enough business in the province to take care of the output and the mines had to be kept running by seeking foreign contracts. Before the war the company sold most of its coal in the United, but when the war started this policy was changed so that when the war ceased it found itself without foreign markets and more output than it could sell to the domestic trade. This resulted in the seeking of contracts in Seattle, Wn., which since have been retained.

Reports received from the Lignite Utilization Board by the Research Council of Canada indicate that a plant will be in operation near Estevan, Saskatchewan, in August next which will turn out 30,000 tons of briquettes a year, and these briquettes will sell for about $9.40 a ton in Winnipeg, Manitoba.

This plant, it is said, will be the beginning of an industry which will, in a great measure, solve the fuel problem of western Canada, as these briquettes will be equal, ton for ton, to anthracite in heat value.

Dr. A. A. MacCallum, administrative chairman of the Research Council, instances the case of some 30,000 tons of Alberta coal of the inferior variety having been shipped to Winnipeg last year, which gave such poor results that the users declared they would have no more Alberta coal and this winter purchased their supplies across the line at higher prices. This, it was asserted, has taken place despite the fact that much of the Alberta coal is of excellent heat and keeping quality.

The Research Council of Canada has adopted a recommendation that a careful and thorough survey should be made of the oil shales of Canada under Dominion auspices.

The Council also recommends the establishment of a central bureau to collect and disseminate all possible information regarding all natural resources.

MOLYBDENUM RESOURCES OF BRITISH COLUMBIA

(By our Victoria Correspondent.)

With the announcement that John Oliver Arnold, Professor of Metallurgy at the Sheffield University, has perfected an improved method of manufacturing a higher grade of steel by a process in which molybdenum is declared to be the important factor, interest in molybdenite among mining men of British Columbia has revived. For a time during the war when the mineral was so much in demand and its value so high there was much prospecting for it, as well as for other of the rarer minerals brought into prominence at that time.

While molybdenite was found in different parts of the Province, and while in a few instances the indications were declared by engineers to be promising, no property was developed for this mineral alone. Before much progress could be made the war had ceased and the demand immediately fell off. If, therefore, Professor Arnold's announcement proves of the importance that is claimed for, it is expected that the work of discovery, of devlopment, and ultimately of steady shipping will be taken up where it stopped some time ago because of market conditions.

It was known at the time that the mineral was supposed to be very important to the allied cause that a deposit existed at Alice Arm, northern British Columbia. This was the one property of this character which had been developed to any extent. In 1918 it was in-

spected by Mr. George Clothier, Government Mining Enginer, who, in his annual report, said: "The only property on Alice Arm that I visited was that of the Molybdenum Mining & Reduction Company. This property was fully described in the Minister of Mines Report for 1916. It has been inactive ever since and I will therefore omit going into details. I was rather favourably impressed with the ore possibilities and it is to be regretted that the property should lie idle while the demand for molybdenum was so urgent. "It is understood that litigation was responsible for this inactivity, and it is not known whether there has yet been a settlement.

A little over six miles from the Grand Trunk Pacific Railway on Molybdenum Creek there is the Molybdenum Group of three claims, of the development of which the 1918 Report does not speak. In the Bear River Section is situated the Molly Group of four claims on which there has been some development and of which the engineer speaks encouragingly. Without sampling he estimates that the vein averages about 2 per cent molybdenite. "On the whole," he says, "it is a good showing, well located for transportation, and having all the natural advantages of timber, water, and of being easily developed by tunnels."

The New Hazelton Gold-Cobalt Company, whose property is situated on the western slope of Rocher Deboule Mountain is worthy of special mention in this connection. J. D. Galloway, Government Engineer, inspected and reported on this property in 1918. Describing the development he said that "a lower tunnel was started 250 feet below the main tunnel; it was driven as a cross cut for 75 feet and then as a drift on the vein. On November 1st this drift was in 149 feet and work was being continued. Throughout this working the vein carries a shoot of ore, more or less continuous, and varying in width from six to eighteen inches. The ore is a mixture of sulphides and arsenides of iron and cobalt and some molybdenite." Again he says: "The molybdenite content of the vein is quite variable. During the year a car-load of gold-cobalt-molybdenum ore, which came from the upper tunnel, was shipped to the concentration plant of the Mines Branch at Ottawa. The car contained 53,288 lb. dry weight, and the analysis on it was: Gold, 1.24 oz.; $Mo.S_2$, 1.40 per cent; $Mo.O_3$, 0.18 per cent; cobalt 1.12 per cent; nickel, 0.60 per cent; arsenic, 8.98 per cent."

Wm. M. Brewer, Government Mining Engineer, refers to "several occurrences of molybdenite ore found on Buttle Mountain Vancouver Island, near Cowichan Lake, as well as others on the mainland. Unfortunately for the discoverers none of the deposits was developed to a shipping stage previous to the signing of the armistice."

Later on Mr. Brewer deals with the Stave River Group situated in the New Westminster Mining Division, near the upper Stave Lake. He observes that it is possible that a mine of commercial importance "may be developed here, providing the vein material, which carries molybdenite, is concentrated on the ground. The extent of this material is apparently so great and the structure of the occurrence of the deposit of such character that mining operations can be carried on by quarrying, and possibly after further prospecting it will be determined that a steam shovel could be operated to advantage. While the assay results from the samples taken by the writer do not show a high percentage of molybdenite, it is quite possible that this feature may be overcome by the low cost at which mining, concentration, and transportation can be carried on."

Attention also has been directed to the property of the Index Milling & Mining Company, situated on Texas Creek, twelve miles from Lillooet. This company claims to have the highest grade molybdenite on the continent, assaying between 15 and 19 per cent. The Texas Creek Mine was opened in 1914 and taken over by the present company in September, 1918. Since then they have made cuts to 900 feet and have taken out 16 tons of ore, half of which was shipped to Ontario, while the remainder still is on the dump. All shares in this company are said to have been taken off the market.

It is apparent from these notes that British Columbia has potentialities as far as molybdenum is concerned and that if the demand should again become marked, important developments may be considered assured.

Note: As stated in last week's "Journal," the cabled despatches from England regarding Professor Arnold's reported new formula for molybdenum steel are so obviously incorrect in the main particulars, and so patently cabled with a political bias, that it will be well to await Prof. Arnold's own publication of his discovery before assuming that molybdenum deposits have assumed a new and increased value.—Ed.

BOOK REVIEW.

INDUSTRIAL FUELS, by J. Stephenson. Published by the Westman Press, Ltd., 72 Queen St. W., Toronto. 190 pages, 107 drawings. Paper backs, $2.25, Cloth, $3.00. 9¼ by 6 inches.

The author of this comprehensive brochure is also the author of "Elements of Water Gas," of which a second edition is in preparation, and is with the United Gas and Fuel Co. of Hamilton, Ont. As is stated in the preface, the scope of the subjects treated is unusually broad, but for executives who have the choice of several fuels and desire to make quick comparisons. the book affords a concise survey of all the better known and some of the lesser known fuels that are adapted to industrial uses. The fuels treated on include coal, natural gas, coal gas, oil gases, producer gases, coke, and fuel briquets. The application of gases as commercial sources of fuel is fully dealt with, and a chapter is devoted to fuel analysis. The concluding chapter deals with fuels of the future, including domestic garbage, and alcohol, the possible sources of fuel alcohol being enumerated.

A perusal of the work reveals an astonishing variety of fuels available for industrial uses, but we believe the most important indication afforded by the author's survey of a varied field is that the fuel of the future will tend more and more to be used in a gaseous state, or in the condition that most closely approximates to the gaseous state, namely, dust fuels, allowing an intimate admixture during combustion with the oxygen of the air and consequently approximately complete combustion.

The "Journal" is pleased to be able to review a work of this nature, written and published in Canada, and takes this opportunity to congratulates the author and the publisher thereon.

BOOK REVIEW.

Petrology for Students. An introduction to the Study of Rocks under the Microscope. By Dr. Alfred Harker, Reader in Petrology to the University of Cambridge. Revised fifth edition, 1919. Price 8s. 6d. Cloth, 5 by 7¼ inches. 300 pages with Index. Illustrated. Cambridge University Press. This little volume is a textbook designed for the use of students under the direction of a teacher and having access to demonstrations on actual rock specimens under the microscope. No colored plates are shown. The work is a standard students' textbook used in British schools, under the circumstances mentioned, and the rock specimens illustrated are chiefly drawn from British sources, with the addition of some specimens from the British Colonies and the American Continent.

REASONS FOR EMIGRATION OF MID-EUROPEANS FROM CANADA TO THEIR HOMES.

The following explanation of the reasons which are impelling many former residents of central Europe to return to their homes was given by the travelling agent of a steamship line to the Glace Bay "Gazette" recently, and is of sufficient general application to suggest re-publication for the benefit of our readers.

The steamship representative stated:

"The chief reason for these foreigners going home is that they have their families in the old country. They have not heard from them during the war and are only now receiving letters from home. Almost every one of them is a born farmer. There has not been any production in the war stricken countries for the past five years, and for that reason the value of the land has decreased. They have been receiving letters from their people lately stating that land can be purchased very reasonably.

"During their stay in Canada every one has accumulated from $2000 to $3000 in Canadian currency and at the present low rate of exchange in their own country money,, if a foreigner possesses $2000 in Canadian money it is worth about 200,000 kronen in his native money, which in their own countries is considered a vast fortune.

"That is one of the main reasons why the foreigners wish to leave the country. They feel they can do much better in their own native country, especially as the country needs them more than they ever did. In the most devastated portions of Europe, the majority of people left I imagine, are cripples, under-aged, over-aged and helpless women and children. Thus there are not many people to rebuild the country to its pre-war condition.

Most of the foreigners leaving this country will be Galicians and Poles, which represent the majority of the foreign element in Canada. After the ratification of the peace treaty almost all this element in Canada will depart for their native lands."

Nelson, B.C.—C. A. Seaton, of the staff of the Sullivan Mine, Consolidated Mining & Smelting Co., Kimberly, has taken over the management of the Molly Gibson Mine, situated on Mount Kokanee, a property operated by the Company. H. L. Batten, who has held this position for some time, is moving to the Coast.

IDLE PITY GIVING WAY TO PRACTICAL EFFORT ON BEHALF OF CANADA'S SIX THOUSAND BLIND.

You have doubtless been interested in what you have read or heard regarding the progress of a national effort on behalf of the blind of Canada.

Do you realize just what this effort means?

Here are some of the things that are being done:

Industrial training and employment is being provided for the blind in centres established in Halifax, Toronto, Winnipeg and Vancouver.

Useful handicrafts and the reading and writing of embossed characters are taught in the homes of those blind people who for various reasons are unable to take training at one of the regular centres.

The product of the home-workers is bought and sold.

Personal contact is established with recently-blinded persons, and with cases which are sometimes so old that they become new in a very real sense. This work is done by an experienced Field Agent.

Books, magazines, and music in embossed types are circulated free to the blind of Canada. The monthly average circulation of books, etc., is close to eight hundred. The Institute also arranges for the transcription of music for any of its members at cost-price.

An active publicity propaganda dealing with various dangers to which the eye is subject is carried on, and this is followed up with personal work, looking to the larger co-operation of medical men and nurses, employers of labor, Boards of Education, etc., in the vital matter of preventing blindness.

A residence and training-centre, "Pearson Hall," has been provided where blind soldiers may find congenial conditions while taking vocational instruction. In this connection it may be interesting to know that the Institute has entered into an agreement with he Department of Soldiers' Civil Re-Establishment, under which the Institute has established an after care department for Canadian Soldiers blinded in the war.

There are other things, but they may all be summed up by saying that the Institute endeavors in every practical way to advance the interests of the blind and to ameliorate the conditions under which they live.

Will you aid in supplying the most vital need of this work?

Then mail your cheque to the Canadian National Institute for the Blind, 36 King St. East, Toronto, Ont.

Note: We are glad to give space to the foregoing announcement.—Ed.

The Canadian Miners' Buying Directory.

Acetylene Gas:
Canada Carbide Company, Ltd.
Canadian Fairbanks-Morse.

A.C. Units:
MacGovern & Co.

Agitators:
The Dorr Co.

Air Hoists:
Canadian Ingersoll-Rand Co., Ltd.
Mussens, Limited.

Alloy and Carbon Tool Steel:
H. A. Drury Co., Ltd.
International High Speed Steel Co., Rockaway, N.J.

Alternators:
MacGovern & Co.

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

Antimony:
Canada Metal Co.

Antimonial Lead:
Pennsylvania Smelting Co.

Arrester, Locomotive Spark:
Hendrick Manufacturing Co.

Arsenic White Lead:
Coniagas Reduction Co.

Assayers' and Chemists' Supplies:
Dominion Engineering & Inspe tion Co.
Lymans, Limited
Mine & Smelter Supply Co.
Pennsylvania Smelting Co.
Stanley, W. F. & Co., Ltd.

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

Asbestos:
Everitt & Co.

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

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

Balances—Heusser:
Canadian Fairbanks-Morse Co., Ltd.
Mine and Smelter Supply Co.

Babbit Metals:
Canada Metal Co.
Canadian Fairbanks-Morse Co., Ltd.
Hoyt Metal Co.

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

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

Belting—Leather, Rubber and Cotton:
Canadian Fairbanks-Morse Co., Ltd.
Link Belt Co.
The Mine & Smelter Supply Co.
Northern Canada Supply Co.
Jones & Glasco.

Belting:
R. T. Gilman & Co.

Belting (Transmission):
Goodyear Tire & Rubber Co.

Belting (Elevator):
Goodyear Tire & Rubber Co.

Belting (Conveyor):
Goodyear Tire & Rubber Co.

Blasting Batteries and Supplies:
Canadian Ingersoll-Rand Co., Ltd.
Mussens, Ltd.
Northern Canada Supply Co.
Canadian Explosives, Ltd.

Bluestone:
The Consolidated Mining & Smelting Co.

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

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

Blue Vitriol (Coniagas Red):
Canadian Fairbanks-Morse Co., Ltd.

Bortz and Carbons:
Diamond Drill Carbon Co.

Boxes, Cable Junction:
Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.

Brazilian Rough Diamonds:
Diamond Drill Carbon Co.

Brazilian Mica:
Diamond Drill Carbon Co.

Buggies, Mine Car (Steel)
Hendrick Manufacturing Co.

Brazilian Ballas:
Diamond Drill Carbon Co.

Brazilian Rock Crystal:
Diamond Drill Carbon Co.

Brazilian Tourmalines:
Diamond Drill Carbon Co.

Brazilian Aquamarines:
Diamond Drill Carbon Co.

Bronze, Manganese, Perforated and Plain:
Hendrick Manufacturing Co.

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

Buckets, Elevator:
Hendrick Mfg. Co.

Cable—Aerial and Underground:
Northern Canada Supply Co.
Standard Underground Cable Co. of Canada, Ltd.

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

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

Canadian Miners' Buying Directory.—(Continued)

Cables—Wire:
Standard Underground Cable Co. of Canada, Ltd.
Canada Wire & Cable Co.
Fraser & Chalmers of Canada, Ltd.
Northern Electric Co., Ltd.
R. T. Gilman & Co.

Cam Shafts:
Canada Foundries & Forgings, Ltd.
Hull Iron & Steel Foundries, Ltd.

Car Dumps:
Sullivan Machinery Co.
R. T Gilman & Co.
Canadian Fairbanks-Morse Co., Ltd.

Carbide of Calcium:
Canada Carbide Company, Ltd.

Cars:
Canadian Foundries and Forgings, Ltd.
Canadian Ingersoll-Rand Co., Ltd.
Canadian Fairbanks-Morse Co., Ltd.
John J. Gartshore
MacKinnon Steel Co., Ltd.
The Electric Steel & Metals Co.
Northern Canada Supply Co.
Marsh Engineering Works
Mine and Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
R. T. Gilman & Co.
The Wabi Iron Works

Car Wheels and Axles:
Canadian Car Foundry Co., Ltd.
Burnett & Crampton
Hull Iron & Steel Foundries, Ltd.
John J. Gartshore
Marsh Engineering Works, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works

Carriers (Gravity):
Jones & Glassco

Castings—Brass
The Canada Metal Co., Ltd.

Castings (Iron and Steel)
Burnett & Crampton
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works

Cement Machinery:
Northern Canada Supply Co.
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
Canadian Fairbanks-Morse Co., Ltd.
The Electric Steel & Metals Co.
R. T Gilman & Co.
Burnett & Crampton

Chains:
Jones & Gltssco
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd.
Link-Belt Co.
Greening, B., Wire Co., Ltd.

Chain Drives:
Jones & Glassco

Chemical Apparatus:
Mine and Smelter Supply Co.

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

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

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

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

Coal Cutters:
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.

Coal Mining Explosives:
Canadian Explosives, Ltd.

Coal Mining Machinery:
Canadian Ingersoll-Rand Co., Ltd.
Sullivan Machinery Co.
March Engineering Works
Hadfields, Ltd.
Hendrick Mfg. Co.
Fraser & Chalmers of Canada, Limited
Mussens, Limited
R. T. Gilman & Co.

Coal and Coke Handling Machinery
Link-Belt Co.

Coal Pick Machines:
Sullivan Machinery Co.

Cobalt Oxide:
Coniagas Reduction Co.
Everitt & Co.

Compressors—Air:
Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd.
Northern Canada Supply Co.
MacGovern & Co., Inc.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
The Mine & Smelter Supply Co.

Concrete Mixers:
Canadian Fairbanks-Morse Co., Ltd.
Northern Canada Supply Co.
Gould, Shapley & Muir Co., Ltd.
MacGovern & Co., Inc
Mussens, Limited
R. T. Gilman & Co.

Condensers:
Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
Northern Canada Supply Co.
MacGovern & Co., Inc.

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

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

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

Consulters and Engineers:
Hersey Milton Co., Ltd.

Conveyor Flights:
Hendrick Mfg. Co., Ltd.

Conveyor—Trough—Belt:
Canadian Fairbanks-Morse Co., Ltd.
Link-Belt Co.
Hendrick Mfg. Co.
Mussens, Limited
Jones & Glassco (Roller, Belt and Chain)
Hendrick Mfg. Co.
The Wabi Iron Works

Conical Mills:
Hardinge Conical Mill Co.

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

Cranes:
Canadian Fairbanks-Morse Co., Ltd.
Link-Belt Co.
R. T. Gilman & Co.
Smart-Turner Machine Co.
M. Beatty & Sons, Ltd.

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

Crucibles:
Canadian Fairbanks-Morse Co., L d.
Mine and Smelter Supply Co.

Crusher Balls:
Canada Foundries & Forgings, Ltd.
Hull Iron & Steel Foundries, Limited, Hull, Que

Crushers:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
Hardinge Conical Mill Co.
The Electric Steel & Metals Co., Ltd.
R. T. Gilman & Co.
Lymans, Ltd.
Mussens, Limited
Mine and Smelter Supply Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Canadian Miners' Buying Directory.—(Continued)

Cyanide Plant Equipment:
The Dorr Co.

D. C. Units:
MacGovern Co.

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

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

Diamond Tools:
Diamond Drill Carbon Co.

Diamond Importers:
Diamond Drill Carbon Co.

Digesters:
Canadian Chicago Bridge and Iron Works

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

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

Dredging Machinery:
Canadian Steel Foundries, Ltd.
M. Beatty & Sons
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
R. T. Gilman & Co.

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

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

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

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

Drill Steel—Mining:
H. A. Drury Co., Ltd.
Hadfields, Limited
International High Speed Steel Co., Rockawaw, N.J
Mussens, Limited

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

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

Drills—High Speed and Carbon:
Canadian Fairbanks-Morse Co., Ltd.
H. A. Drury Co., Ltd.
Hadfields, Limited

Dynamite:
Canadian Explosives
Northern Canada Supply Co.

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

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

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

Engineering Instruments:
C. L. Berger & Sons

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

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

Engines—Haulage:
Canadian Ingersoll-Rand Co., Ltd., Montreal, Qu
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.

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

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

Engineers:
The Dorr Co.

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

Feed Water Heaters:
MacGovern & Co.

Flood Lamps:
Northern Electric Co., Ltd.

Flourspar:
The Consolidated Mining & Smelting Co.
Everitt & Co.

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

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

Frogs:
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
John J. Gartshore

Frequency Changers:
MacGovern & Co., Inc.

Furnaces—Assay:
Canadian Fairbanks-Morse Co., Ltd.
Lymans, Limited
Mine & Smelter Supply Co.

Fuse:
Canadian Explosives
Northern Canada Supply Co.

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

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

Granulators:
Hardinge Conical Mill Co.

Grinding Wheels:
Canadian Fairbanks-Morse Co., Ltd.

Gold Refiners
Goldsmith Bros.

Canadian Miners' Buying Directory.—(Continued)

Gold Trays:
Canada Chicago Bridge & Iron Works

Hose (Air Drill):
Goodyear Tire & Rubber Co.

Hose (Fire):
Goodyear Tire & Rubber Co.

Hose (Packings)
Goodyear Tire & Rubber Co.

Hose (Suction):
Goodyear Tire & Rubber Co.

Hose (Steam):
Goodyear Tire & Rubber Co.

Hose (Water):
Goodyear Tire & Rubber Co.

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

Hangers and Cable:
Standard Underground Cable Co. of Canada, Ltd.

High Speed Steel:
Canadian Fairbanks-Morse Co. Ltd.
H. A. Drury Co., Ltd.
Hadfields, Limited
International High Speed Steel Co., Rockaway, N.J.

High Speed Steel Twist Drills:
Canadian Fairbanks-Morse Co., Ltd.
H. A. Drury Co., Ltd.
Northern Canada Supply Co.

Hoists—Air, Electric and Steam:
Canadian Ingersoll-Rand Co., Ltd.
Canadian Fairbanks-Morse Co., Ltd.
Jones & Glassco
M. Beatty & Sons
Marsh Engineering Works
Northern Canada Supply Co.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works
R. T. Gilman & Co.
Mussens, Limited
Link-Belt Co.

Hoisting Engines:
Canadian Fairbanks-Morse Co., Ltd.
The Electric Steel & Metals Co.
Mussens, Limited
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.
M. Beatty & Sons
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.
The Mine & Smelter Supply Co.

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

Hydraulic Machinery:
Canadian Fairbanks-Morse Co., Ltd.
Hadfields, Limited
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Industrial Chemists:
Hersey, M. & Co., Ltd.

Ingot Copper:
Canada Metal Co., Ltd.
Hoyt Metal Co.

Insulating Compounds:
Standard Underground Cable Co. of Canada, Ltd.

Inspection and Testing:
Dominion Engineering & Inspection Co.

Inspectors:
Hersey, M. & Co., Ltd.

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

Jack Screws:
Canadian Foundries and Forgings, Ltd.

Laboratory Machinery:
Mine & Smelter Supply Co.

Lamps—Acetylene:
Dewar Manufacturing Co., Inc.

Lamps—Carbide:
Dewar Manufacturing Co., Inc.

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

Lamps:
Dewar Manufacturing Co., Inc.

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

Levels:
C. L. Berger & Sons

Locomotives (Steam, Compressed Air and Storage Steam:
Canadian Fairbanks-Morse Co., Ltd.
H. K. Porter Company
R T. Gilman & Co
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited

Link Belt
Canadian Fairbanks-Morse Co. Ltd.
Northern Canada Supply Co.
Jones & Glassco

Machinists:
Burnett & Crampton

Machinery—Repair Shop:
Canadian Fairbanks-Morse Co., Ltd.

Machine Shop Supplies:
Canadian Fairbanks-Morse Co., Ltd.

Magnesium Metal:
Everitt & Co.
Hull Iron & Steel Foundries, Ltd.

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

Metal Marking Machinery:
Canadian Fairbanks-Morse Co., Ltd.

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

Metallurgical Engineers:
The Dorr Co.

Metallurgical Machinery:
The Dorr Co.

Metal Work, Heavy Plates:
Canada Chicago Bridge & Iron Works

Mica:
Everitt & Co.
Diamond Drill Carbon Co.

Mining Engineers:
Hersey, M. Co., Ltd.

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

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

Mining Ropes:
Dominion Wire Rope Co., Ltd.

Mine Surveying Instruments:
C. L. Berger & Sons

Molybdenite:
Everitt & Co.

Monel Metal:
International Nickel Co.

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

Canadian Miners' Buying Directory.—(Continued)

Motor Generator Sets—A.C. and D.C.
MacGovern & Co.

Nails:
Canada Metal Co.

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

Nickel Anodes:
The Mond Nickel Co., Ltd.

Nickel Salts:
The Mond Nickel Co., Ltd.

Nickel Sheets:
The Mond Nickel Co., Ltd.

Nickel Wire:
The Mond Nickel Co., Ltd.

Oil Analysts:
Constant, C. L. Co.

Ore Sacks:
Northern Canada Supply Co.

Ore Testing Works:
Ledoux & Co.
Can. Laboratories
Milton Hersey Co.
Campbell & Deyell
Hoyt Metal Co.

Ores and Metals—Buyers and Sellers of:
C. L. Constant Co.
Geo. G. Blackwell
Consolidated Mining and Smelting Co. of Canada
Oxford Copper Co.
Canada Metal Co.
Hoyt Metal Co.
Everitt & Co.
Pennsylvania Smelting Co.

Packing:
Canadian Fairbanks-Morse Co., Ltd.

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

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

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

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

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

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

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

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

Platinum Refiners:
Goldsmith Bros.

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

Prospecting Mills and Machinery:
The Electric Steel & Metals Co.
E. J Longyear Company
Standard Diamond Drill Co.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, 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.
Mussens, Limited
Northern Canada Supply Co.
Smart-Turner Machine Co.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

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

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

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

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

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

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

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

Pumps—Diaphragm
The Dorr Company

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

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

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

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

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

Refiners:
Goldsmith Bros.

Riddles:
Hendrick Mfg. Co.

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

Rope—Manilla:
Mussens, Limited

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

Canadian Miners' Buying Directory.—(Continued)

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

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

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

Scales—(all kinds):
Canadian Fairbanks-Morse Co., Ltd.

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

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

Screens—Perforated Metal:
Hendrick Mfg. Co.

Screens—Shaking:
Hendrick Mfg. Co.

Screens—Revolving:
Hendrick Mfg. Co.

Scheelite:
Everitt & Co.

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

Shaft Contractors:
Hendrick Mfg. Co.

Sheet Metal Work:
Hendrick Mfg. Co.

Sheets—Genuine Manganese Bronze:
Hendrick Mfg. Co.

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

Shovels—Steam:
Canadian Foundries and Forgings, Ltd.
M. Beatty & Sons
R. T. Gilman & Co.

Siline:
Coniagas Reduction Co.

Saline Refiners:
Goldsmith Bros.

Smelters:
Goldsmith Bros.

Sledges:
Canada Foundries & Forgings, Ltd.

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

Special Machinery:
John Inglis Co., Ltd.

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

Sprockets:
Ltnk-Belt Co.

Spring Coil and Clips Electric:
Canadian Steel Foundries, Ltd.

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

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

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

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

Steel Drums:
Smart-Turner Machine Co.

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

Structural Steel Work (Light):
Hendrick Mfg. Co.

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

Sulphate of Copper:
The Mond Nickel Co., Ltd.
Coniagas Reduction Co.

ulphate of Nickel:
The Mond Nickel Co., Ltd.

Surveying Instruments:
C. L. Berger

Switches and Switch Stand:
Canadian Steel Foundries, Ltd.
Mussens, Limited.

Switches and Turntables:
John J. Gartshore

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

Tanks:
R. T. Gilman & Co.

Tanks—Acid:
Canadian Chicago Bridge & Iron Works

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

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

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

Tanks—Oil Storage:
Canadian Chicago Bridge & Iron Works

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

Canadian Miners' Buying Directory.—(Continued)

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

Transits:
C. L. Berger & Sons

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

Transmission Appuiances:
Jones & Glassco

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.

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

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

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

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

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

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

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

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

Wolfram Ore:
Everitt & Co.

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

Zirconium:
Everitt & Co.

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

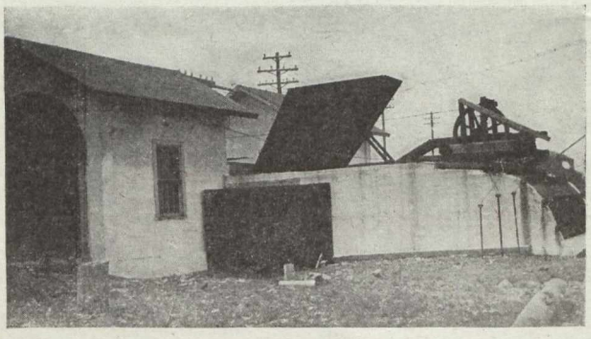
Zinc Spelter:
Canada Metal Co., Ltd.
Hoyt Metal Co., Ltd.

ALPHABETICAL INDEX TO ADVERTISERS

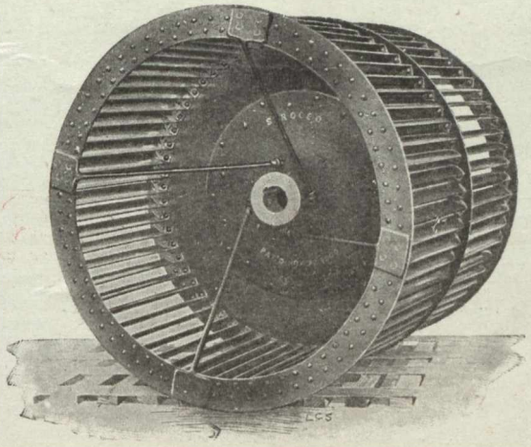
"Sirocco"

TRADE MARK

MINE FANS



Equipment in use at the Nova Scotia Steel & Coal Company's Mine.



DELIVER
MORE AIR WITH LESS POWER

Ordinary mine fans use a lot of power, and did you ever figure out how much that power is costing a year?

Suppose you are using 200 h.p., an average of 7000 hours a year. If that power delivered to the fan costs less than 5 cts. per horsepower hour you are doing better than the average.

$$\text{Now figure:} \quad \frac{200 \times 7000 \times 5}{100} = \$70{,}000$$

In many mines the figure is greater—we know of one mine where the yearly cost of power to operate the fans is figured at nearly $125,000.

So when we say that Sirocco Mine Fans deliver more air with less power, we are talking money—getting right down to brass tacks.

The limited space at our disposal here prevents going into the reasons for Sirocco superiority, but they are explained thoroughly in our 66-page illustrated booklet on mine ventilation.

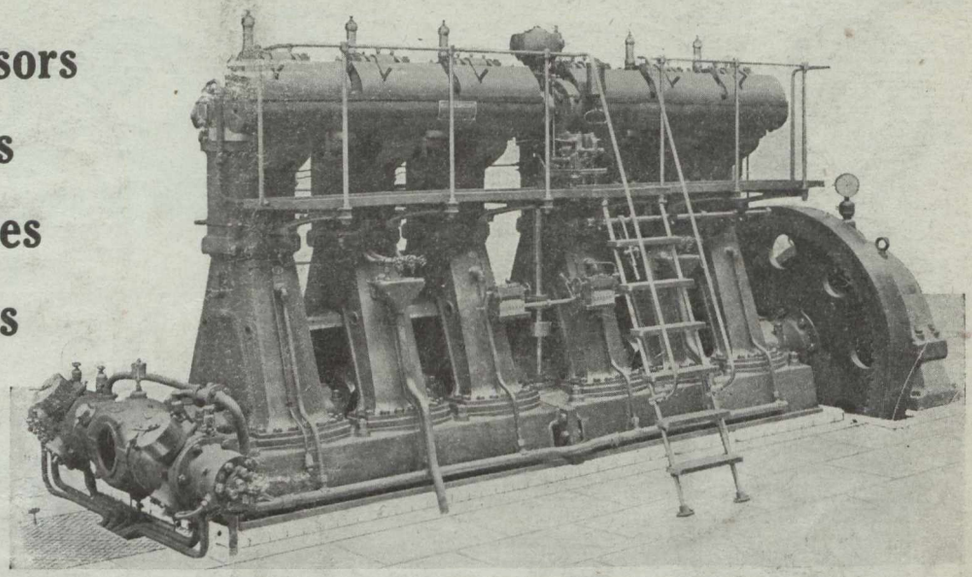
CANADIAN SIROCCO CO., Limited
WINDSOR, ONTARIO

BRANCH OFFICES:—

CALGARY, Alberta
TORONTO, Ontario
WINNIPEG, Manitoba
MONTREAL, Quebec

BELLISS & MORCOM

Air Compressors
Diesel Engines
Steam Turbines
Steam Engines
Condensers

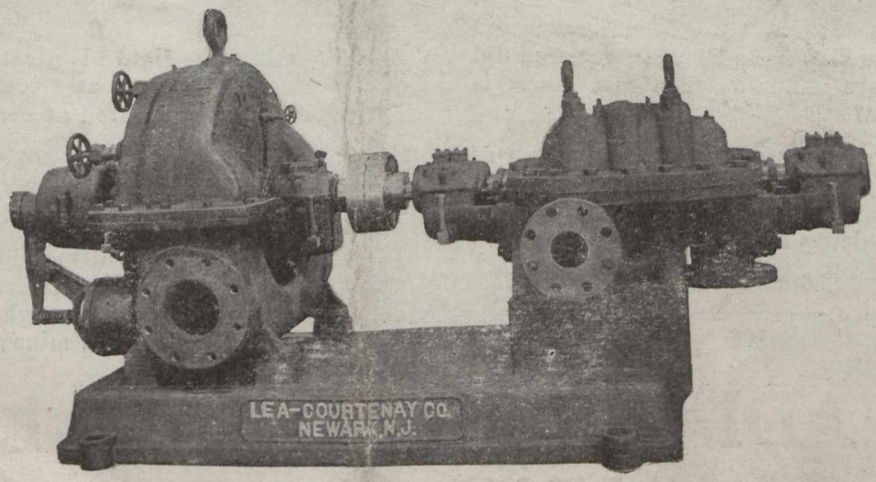


BELLISS & MORCOM DIESEL CRUDE OIL ENGINE.

LAURIE & LAMB

211 Board of Trade Building - - - - MONTREAL

For boiler-feed service—a centrifugal
For a centrifugal—a Lea-Courtenay



Ask for bulletin describing this Terry Steam-Turbine driven boiler-feed centrifugal or the same type of pump with motor drive—also other types of centrifugal pumping machinery.

FRASER & CHALMERS OF CANADA, Limited

GUARANTEE BUILDING :: :: MONTREAL, QUE.