

CANADIAN MINING JOURNAL

VOL. XL.

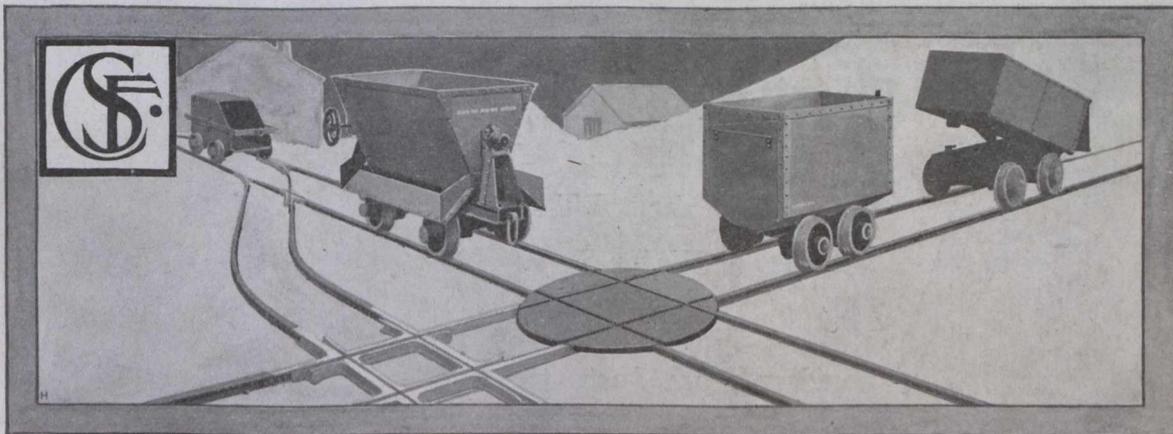
July 16, 1919.

No. 28

MINE DUMP CARS
CARS WHEELS & AXLES
INDUSTRIAL TRACKWORK

MANGANESE-STEEL CASTINGS

For TRACK INTERSECTIONS, DIPPER TEETH, BUCKET LIPS or any other parts exposed to heavy wear and tear. Unrivalled for durability, and therefore economical.



CANADIAN
STEEL FOUNDRIES
LIMITED

Transportation Building, : : : Montreal.

SULLIVAN NEW WATER STOPERS

*Wet Down the Dust,
Don't Wet the Runner.*

Sullivan Water Stoppers lay the dust at the back of the drill hole, as fast as it is made.

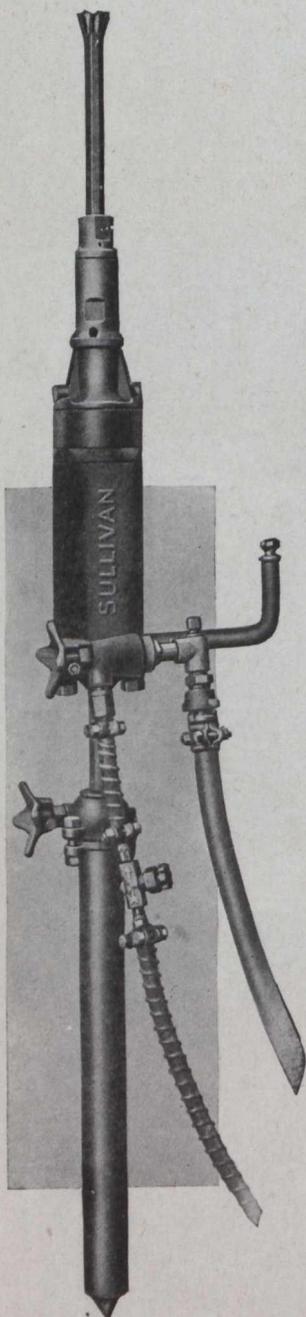
The water tube carries the water into the hollow drill steel, surrounded by an air jet which acts as a seal and prevents leakage.

A Single Throttle controls both air, water and feed, and discharges an air blast through the steel before the water is turned on and after it is turned off. This keeps water from entering the front end of the drill cylinder when stopping work.

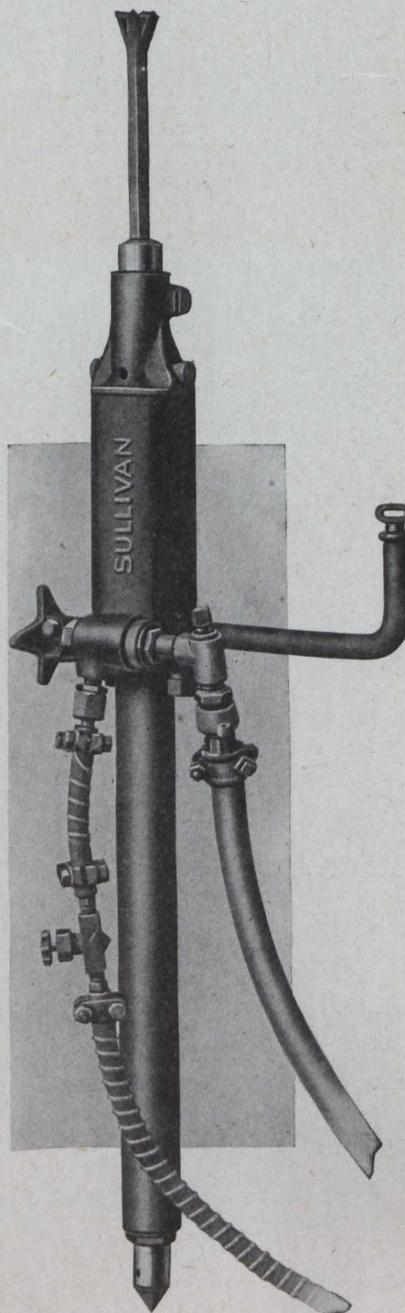
Two water stoppers are available, (1) a light, hand rotated machine, "DT-44." (2) a self-rotator, with reverse feed and brake, "DT-42."

Sullivan Water Stoppers are a proved success. Runners are enthusiastic, because of the freedom from dust, the fact that they can operate them day in—day out—without a wetting, and because of their simplicity, sturdiness and true running balance.

Ask for new Bulletin No. 670 M.



Sullivan Water Stoper
Rotating Type, "DT-42"



Sullivan Water Stoper
Hand Rotation, "DT-44"

SULLIVAN MACHINERY CO.

122 So. Michigan Ave.

::

Chicago

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



*The Best
By Test*

Hollow and Solid Swedish Drill Steel

It will be of interest to our many friends to know that we are again in a position to meet their demands for supplies of our well known "Double Ess" Brand of genuine Swedish Drill Steel, a large shipment having arrived from Sweden.

Swedish Steel & Importing Co., Limited

Montreal

Toronto

New York

Chicago

Denver

San Francisco

Deloro Smelting & Refining Co.

LIMITED

SMELTERS AND REFINERS OF

Silver Bullion

Cobalt Oxide and Metal

Nickel Oxide and Metal

Refined White Arsenic

“STELLITE” High Speed Tool Metal

Head Office and Works - - - - DELORO, Ont.
 Branch Offices - - - - 200 King Street West, Toronto
 315 Craig Street West, Montreal

HIGH GRADE MINE HOISTS

MADE BY

Marsh Engineering Works

LIMITED

BELLEVILLE, ONT.

HOISTS OF ALL KINDS
STEAM, ELECTRIC OR BELT

ALSO

CARS, BUCKETS, CAGES,
TANKS, ETC.

Mussens Limited

MONTREAL
WINNIPEG
VANCOUVER

TORONTO:
Confederation Life
Building

Dominion Coal Company

Limited

Glace Bay Nova Scotia

19 Collieries

Output—5,000,000 tons annually

“Dominion” Coal

Screened, run of mine and slack

“Springhill” Coal

Screened, run of mine and slack

Collieries at Glace Bay, C.B., and Springhill,
N.S.

Shipping Ports—Sydney and Louisburg, C.B.,
and Parrsboro, N.S.

For Prices and Terms Apply to:

Alexander Dick, General Sales Agent,

112 St. James Street, Montreal

or at their offices of the Company at
171 Lower Water Street, Halifax, N.S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N.B.
Buntain, Bell & Co., Charlottetown, P.E.I.
Hull, Blyth & Co, 1 Lloyds Ave., London, E.C.
Rarvey & Co., St. John's, Nfld.



The Babbitt Metal that's at the
Front in Efficiency and Economy

HARRIS HEAVY PRESSURE

The Aristocrat of Babbitts

For
Heavy Pressure
on
Ore Crushing Rolls
and all
Mining Machinery
it has
Strength and Wearing Qualities

*Our Booklet—All About Babbitt Metals—
mailed free on request.*

THE CANADA METAL COMPANY, Limited

Head Office and Factory: TORONTO

Branch Factories: Hamilton, Montreal Winnipeg, Vancouver

EVERITT & CO.

40 CHAPEL STREET, LIVERPOOL, ENGLAND

Tel. Address: "PERSISTENT"

BUYERS OF CANADIAN MINERALS, METALS, ALLOYS, METALLIC RESIDUES
COBALT ORE, OXIDE, RESIDUES, NICKEL ORE, OXIDE, ETC.

MOLYBDENITE, WOLFRAM, SCHEELITE, MANGANESE ORE, CHROME ORE, CORUNDUM, GRAPHITE
METALS & ALLOYS

COBALT, TUNGSTEN, MOLYBDENUM, NICKEL, ALUMINIUM, FERRO - SILICON, FERRO - CHROME, ETC

ASBESTOS—CRUDE, FIBRES, SHINGLE STOCK.

NICKEL



THE MOND NICKEL COMPANY, LTD

39 Victoria Street, London, S.W.

Also Makers of

Copper Sulphate,
Nickel Sulphate, and
Nickel Ammonium Sulphate

A NEW LINE

By an ESTABLISHED MANUFACTURING COMPANY

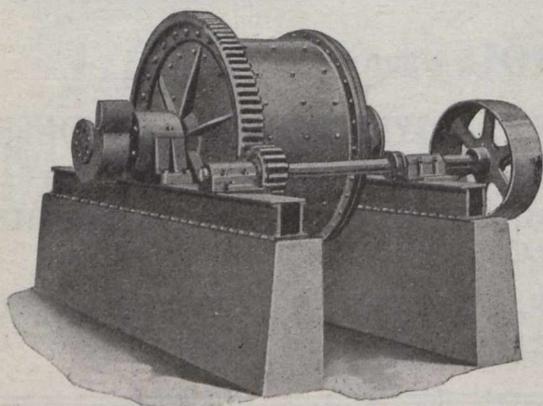
We are at the present time installing machinery in our new plant at Leaside, Ontario for the manufacture of all sizes and kinds of

STEEL WIRE ROPE

Within two months we will be in a position to supply all sizes of wire rope from sash cord to the largest hawsers, including steel-core and hemp-core cable.

Manufacturing **WIRE ROPE** will be one of our principal lines, and we have the **PLANT**, the **EQUIPMENT** and the **ORGANIZATION** to give you the same **REAL SERVICE** on steel wire rope as we give on electric wires and cables.

Canada Wire & Cable Company, Limited
TORONTO, ONT.



BALL MILLS, TUBE MILLS
MANGANESE CASTINGS
BALL AND TUBE MILL LINERS
MILD STEEL CASTINGS---
any weight

*WE ARE SPECIALISTS IN
MINING EQUIPMENT*

The Wabi Iron Works

New Liskeard, Ont.

American Zinc Lead and Smelting Co.

Purchasers of

**ZINC and
LEAD ORES**

Address

1012 Pierce Building, St. Louis, Mo.

Exploration Department

For the purchase of

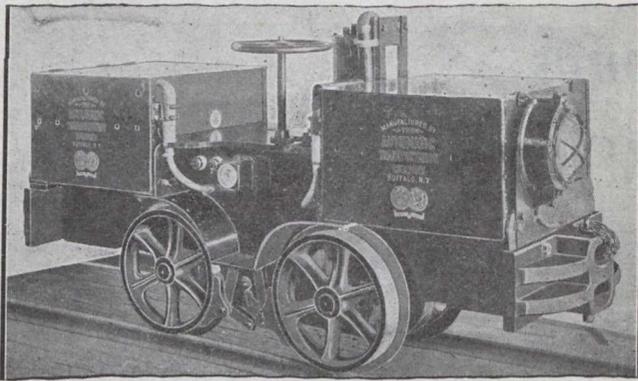
MINES

Gold - Silver - Lead - Zinc - Copper

Address

55 Congress Street, Boston, Mass.

REDUCE YOUR HAULAGE COSTS



A Storage Battery Locomotive installed in your mine will allow of a larger percentage of ore output, reduce your labor and haulage costs to a minimum. No trolley wires, track bonds or electric cables required—12" to 36" gauge—goes anywhere the mine cars go.

A small rugged spur gear drive Storage Battery Locomotive, capacity 12 to 15 tons, at a first and maintenance cost within your radius.

Write us for complete information

Automatic Transportation Company

POWLEY & TOWNSLEY

1004 Excelsior Life Building - - TORONTO

Specialists in Industrial Transportation

The University of Toronto and University College

with which are federated

VICTORIA TRINITY ST. MICHAELS
KNOX and WYCLIFFE COLLEGES

FACULTIES OF

Arts, Applied Science, Music, Medicine
Education, Household Science, Forestry

For further information apply to the Registrar of the University or to the Secretaries of the respective faculties.

C. L. CONSTANT CO.,

42 New Street - New York

SHIPPERS' AGENTS

FOR

**Selling, Sampling and Assaying Ore,
Metals and Furnace Products**

Entire charge taken of shipments from the receipt of bill
of lading to the collection of smelter's return

NOT CONNECTED WITH ANY SMELTER

Canadian Representative:

G. C. BATEMAN - Traders Bank Building, Toronto

THE BEST BY TEST

SISCO

Drill and Tool Steel

FOR SALE BY

**Northern Canada Supply
Co. Limited**

COBALT, HAILEBURY, SOUTH
PORCUPINE, TIMMINS

MANGANESE STEEL CASTINGS

FOR

All Kinds of MINING MACHINERY,
CRUSHER JAWS, HAMMERS AND
HAMMER TIPS, LINERS FOR
CYCLONE BEATERS
BUCKET TIPS, STAMPS AND DIES,
DREDGER POINTS

Mild Steel Castings for all purposes

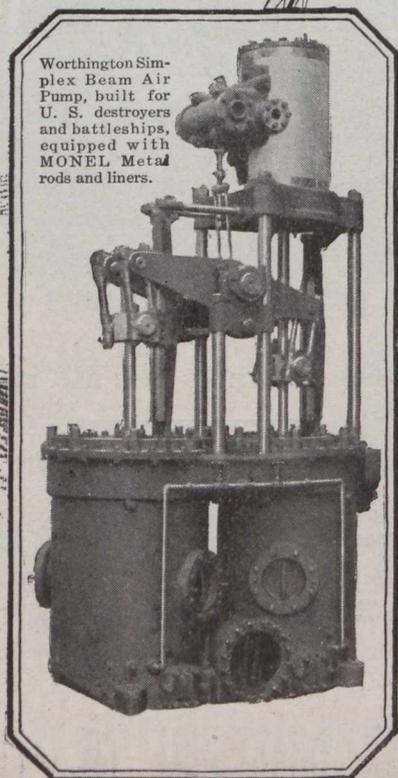
Electric Process—therefore the BEST

Our Special Quality "HYMANG"
BALLS FOR BALL MILLS RE-
DUCE COST OF ORE PER TON
CRUSHED

CANADIAN BRAKESHOE CO., LIMITED
SHEBROOKE, QUEBEC

*In designing Pumps
for the Navy
— U. S. Engineers specify*

MONEL



Worthington Simplex Beam Air Pump, built for U. S. destroyers and battleships, equipped with MONEL Metal rods and liners.



THE INTERNATIONAL NICKEL COMPANY

metal

Power and Packing Savings Effectuated

THE United States Government and many prominent shipbuilders were quick to realize the great strength and durability of MONEL Metal and its immunity from the corroding action of water, steam or acids and from salt-air exposure. Their engineers specify MONEL Metal for pump rods, pump liners, valves and valve seats, and for use in exposed locations on shipboard, such as stair-nosings and hand-rails, because other metal products last but a comparatively short time under nautical conditions.

The British, Japanese and Italian navies, as well as our own, use MONEL Metal extensively for shaftings, pump rods and various engineering and fitting purposes.

In service, MONEL pump rods acquire a smooth, glass-like polish which reduces friction to a minimum, lessens wear on packing, prevents leakage, and thus effects great savings in power and upkeep. Packing does

not harden, and this, coupled with the non-corrosiveness of MONEL Metal, virtually eliminates scoring and pitting of the pump or piston rod.

MONEL Metal is a natural alloy of nickel and copper—strong as steel—tough and ductile. Withstands acids, high temperatures and erosive action of hot gases and *superheated steam*. Can be machined, cast, forged, brazed, soldered and welded by electric or oxy-acetylene method. Takes and retains a perfect nickel finish.

In the mining field where corrosion is unusually injurious, MONEL Metal has proved its superiority over other metals for mine screens, coal chutes, valve trim, pump liners, pump rods and various other parts of mining machinery and equipment. Send for the MONEL booklets which tell all about this unique metal and the many other uses for which MONEL has proved superior.

Write us for detailed information as to whether MONEL Metal could be substituted with economy and greater satisfaction than the material you are now using. Our Technical and Research Department is at your service. Address:

The International Nickel Company
43 Exchange Place
New York, N.Y.

The International Nickel Company
of Canada, Limited
Toronto, Ontario



THE INTERNATIONAL NICKEL COMPANY



CUT GEARS

All Types - - - - Any Size
Large Capacity.

Hamilton Gear & Machine Co.
Van Horne St. - - - TORONTO

PROFESSIONAL DIRECTORY:

R. W. BRIGSTOCKE

MINING ENGINEER

Box 643

HAILEYBURY, - ONTARIO

FORGINGS

SEND PRINTS FOR PRICES

CANADA
FOUNDRIES & FORGINGS, LIMITED
WELLAND, ONT.

PENNSYLVANIA SMELTING CO.

Purchasers of

SILVER & LEAD ORES

Office: Pittsburgh, Pa. Works: Carnegie, Pa.

BURNS & ROBERTS

MANUFACTURERS OF STEEL PLATE WORK
Tanks, Air Receivers, Penstocks, Etc.
Dealers in Railway and Power Plant Machinery

BANK OF HAMILTON BDC. TORONTO LIMITED

DOMINION ENGINEERING & INSPECTION CO.
Testing Engineers and Chemists
Mill, Shop and Field Inspection of Steel Structures.
Tests and Inspection of Iron and Steel Pipe, etc.
Locomotives, Cars, New and Second-Hand Equipment.
Testing of Metals, Cement, Etc., — Industrial Chemistry,
Metallurgy a Specialty.
HEAD OFFICE & LABORATORIES
320 LaGauchetiere Street West, Montreal.
BRANCH OFFICES: Toronto, Winnipeg and Vancouver.

Balbach Smelting and Refining Co.

Newark, N. J.

Buyers of
Gold, Silver, Lead and Copper Ores.
Lead Residues and Copper Residues.

Electrolytic Copper Refinery

INQUIRIES SOLICITED

YOUR

Fine Ores, Concentrates and Fluedust

Can be Cheaply and Successfully
Sintered by the

DWIGHT & LLOYD SYSTEM

(Fully Protected by Patents.)

SIMPLE, EFFICIENT, CONTINUOUS
LOW COST OF INSTALLATION

Many plants now in daily operation in U.S., Dominion of Canada, Republic of Mexico, Australia and European Countries. For particulars as to Licenses in Canada, Estimates, etc., address

Dwight & Lloyd Sintering Co., Inc.

(Successor to Dwight & Lloyd Metallurgical Co.)

29 Broadway, New York.

Cable Address: SINTERER, NEW YORK.

"For information regarding sintering of iron ores and iron flue dust, consult special licensee."

American Ore Reclamation Co.

71 BROADWAY, N.Y.

PLATINUM

BOUGHT AND SOLD

GOLDSMITH BROS.

SMELTING & REFINING CO. LTD.

24 Adelaide Street West
TORONTO

NEW YORK CHICAGO SEATTLE

: 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 WINNIPEG
Consulting Mining Engineer

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

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

**SMITH & TRAVERS
 COMPANY
 LIMITED**
 Contract Diamond Drilling.
 Foundational Work a Specialty.
 Direction of Exploratory Work.
 Detailed Geological Mapping.
 Sampling and Valuation of
 Mines.
 Mines Explored for an Interest.
SUDBURY - ONT.

JAMES McEVOY
 Mining Engineer
 and Geologist
 (Specialty Coal Mining)
 210 POPLAR PLAINS ROAD, TORONTO, ONTARIO
 Phone Hillcrest 1461

TYRRELL, J. B.
 Mining Engineer,
 534 Confederation Life Building,
 TORONTO, - - CANADA.

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

Phone M. 1889 Cable address "Heys"
 Established 1878.
HEYS, THOS. & SON,
 Technical Chemists and Assayers,
 Rooms M and N, Toronto Arcade
 Yonge Street, Toronto, Ont.
 Sampling Ore Deposits a Specialty.

Alfred R. Whitman
 Mining Geologist
 43 Exchange Place, New York

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

JOHNSON, MATTHEY & CO. LTD.
 Buyers, Smelters, Refiners & Assayers of
 Gold, Silver, Platinum, Ores, Sweeps,
 Concentrates, Bullion, &c.
 Offices—Hatton Garden, London, E.C.
 Works—Patricroft, Manchester, England

FERRIER, W. F.
 Consulting Mining Engineer
 and Geologist
 204 LUMSDEN BLDG., TORONTO, ONT.

**Sudbury Diamond
 Drilling Company,
 Limited**
 We contract for all classes
 of Diamond Drill work.
 Saving a large percentage of
 Core is our specialty.
 We solicit enquiries.
Sudbury, Ont. - Box 958.

LEDOUX & CO.
 ASSAYERS AND SAMPLERS
 Office and Laboratory,
 99 John St., New York.
 Weigh and Sample Shipments at
 Buyers' Works, representing the
 Interests of Sellers in all Transactions.
 We are not Dealers or Refiners.

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

ROBERT H. STEWART
 Mining & Metallurgical Engineer
**VANCOUVER BLOCK
 VANCOUVER, B.C.**

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

LAWYERS

Telephone Main 3813 Cable Address: "Chadwick" Toronto
 Western Union Code
 E. M. Chadwick, K.C. Fasken, Robertson, Chadwick
 David Fasken, K.C. & Sedgewick
 M. K. Cowan, K.C. Barristers, Solicitors, Notaries
 Harper Armstrong Offices: Bank of Toronto,
 Alexander Fasken Cor. Wellington & Church Sts.
 Hugh E. Rose, K.C. 58 Wellington St. East
 Geo. H. Sedgewick. Toronto
 James Aitchison

J. M. CALLOW
President

GENERAL ENGINEERING COMPANY
(Canadian Branch)
CONSULTING METALLURGICAL ENGINEERS
363 Sparks St. Ottawa, Ont.

CALLOW PNEUMATIC SYSTEM OF FLOTATION
Complete Laboratory at 363 SPARKS ST., OTTAWA, ONTARIO, for the testing of Gold,
Silver, Copper, Lead, Zinc, Molybdenum, and Other Ores.

HEAD OFFICE, - - - SALT LAKE CITY, UTAH, (U.S.A.)
New York Office, 120 Broadway

H. H. CLAUDET
Canadian
Representative

PATENTS
TRADE MARKS AND DESIGNS
PROCURED IN ALL COUNTRIES

Special attention given to Patent Litigation
Pamphlets sent free on application

RIDOUT & MAYBEE
156 YONGE STREET, TORONTO, ONT.

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and
all Ores
and
Minerals

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

Largest Buyers, Best Figures, Advances on
Shipments, Correspondence Solicited
Cables—Blackwell, Liverpool, ABC Code,
Moreing & Neal Mining and General Code,
Lieber's Code, and Muller's Code.
ESTABLISHED BY GEO. C. BLACKWELL, 1869

DIAMOND DRILL CONTRACTING CO.
SPOKANE, - WASHINGTON.

Contractors for all kinds of Diamond Drill W.
Complete Outfits in Alberta and British Columbia.
Write for Prices.

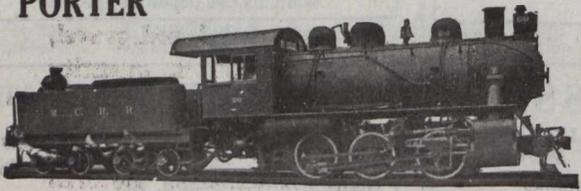
AGENCY :—
ROSSLAND, B. C.

**Milling and Mining
Machinery**

Shafting, Pulleys, Gearing, Hangers,
Boilers, Engines, and Steam Pumps,
Chilled Car Wheels and Car Castings,
Brass and Iron Castings of every de-
scription, Light and Heavy Forgings.

Alex. Fleck, Ltd. - Ottawa

**Reduce Your Haulage Costs With
A PORTER**



The safety and efficiency of compressed air haulage have
been brought to the highest standard in Porter Locomo-
tives. To these we have added an economy in cost and
upkeep that no man interested in mine haulage can
afford to disregard.

Write for full details to-day.
CANADIAN H. K. PORTER CO., 1218 UNION BLDG.,
PITTSBURG, PA.

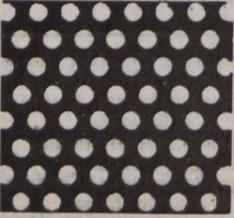
CAPPER PASS & SON, LTD.
Bedminster Smelting Works, BRISTOL
ENGLAND

SELL BUY
Antimonial Lead Ores, Mattes, Residues or Drosses,
Antimony Alloys Containing Tin, Copper, Lead or Antimony
Tin Alloy



BERGER
Monitor Transits & Levels
FOR USE IN MINES
C. L. BERGER & SONS
BOSTON, MASS., U. S. A.

Canadian Laboratories, Limited
ASSAYERS AND CHEMISTS
410 Crown Office Building, TORONTO
"We Analyse Anything."
Special Rates Send for Prices Phone Main 5063



PERFORATED METALS For Every and All
Purposes in all Metals

Elevator Buckets (plain and perforated).
Conveyor Flights and Trough, also
General Sheet Iron Work.

HENDRICK MANUFACTURING CO., Carbondale, Penna., U.S.A.
New York Office: 30 Church St.



PROVINCE OF ONTARIO



BUREAU OF MINES

Ontario's Mining Lands

Ontario, with its 407,262 square miles of area contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent. of the rocks being 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 Helen, Magpie and Moose Mountain mines.

Many other useful minerals, both metallic and non-metallic, are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluorspar, graphite, gypsum, iron pyrites, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt and tale.

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

Ontario in 1917 produced 46 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 1917 to be worth \$72,093,832, of which the metallic production was \$56,831,857.

Dividends and bonuses paid to the end of 1917 amounted to \$11,486,167.45 for gold mining companies, and \$70,821,829.34 for silver mining companies, or a total of \$82,307,996.79.

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. A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 240 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in surveyed or unsurveyed territory.

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

G. H. FERGUSON,

MINISTER OF LANDS, FORESTS AND MINES,

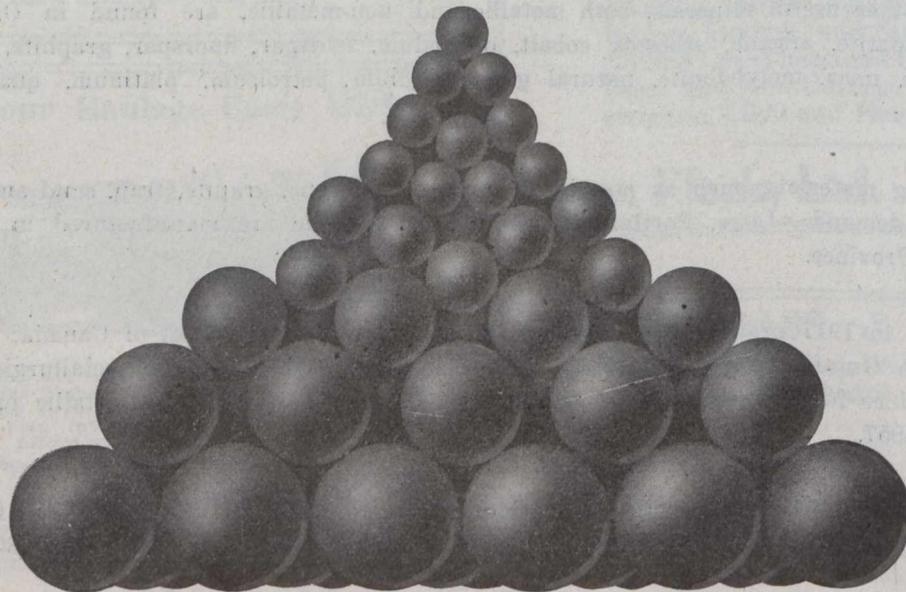
Toronto, Canada.

"HISCO BALLS"

A Canadian Product

Why not give a Canadian product the preference? We were the first manufacturers in Canada to make Forged Steel Balls. A customer in placing an order states—
"Thirty tons of 5½ in. Forged Steel Balls same material as in 6 in. balls previously supplied us by you."

Hisco Balls are first in quality as well as first in the market.



If quality counts with you specify "HISCO" Balls.

Write us for quotations on your requirements

Sizes 3, 4, 5 and 6 inch carried in stock.

HULL IRON & STEEL FOUNDRIES, LIMITED

Makers of Mining Equipment

HULL,

CANADA

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.

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

F. W. GRAY, Associate Editor,
Ste. Anne de Bellevue, Que.

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
Ste. Anne de Bellevue, Que.

No. 28

CONTENTS

Editorial:

- Canada's Coal Insufficiency 517
The "Canadian Fertilizer" 517

- Correspondence:—Exploration in the Porcupine
Gold Area 518

- Matachewan Gold Area—The Otisse and Davidson
Gold Deposits. (Description by H. C.
Cooke With Comments by R. E. Hore) . . . 519

- The Oil Concession Correspondence 524

- Personal Notes 527

- Oil Notes—In the Persian Oil-Fields 528

- Nova Scotia Notes 529

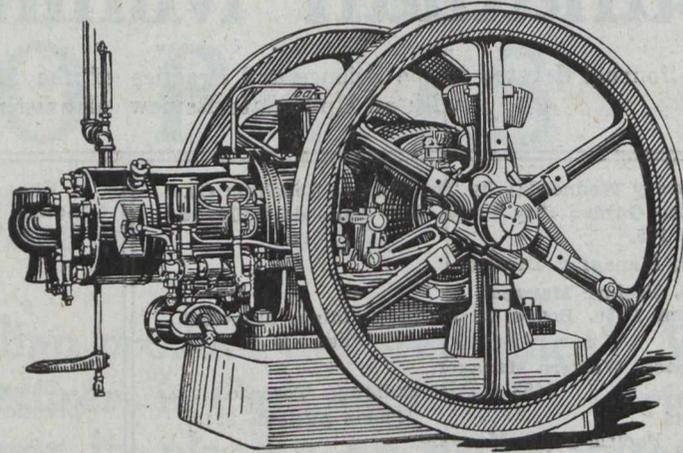
Special Correspondence:

- British Columbia 531

- Northern Ontario 532

- General Mining Notes 534

- Bowena Copper Mines, Ltd. 536



Reliable Power at Low Cost

Cut your power costs by reducing the cost of your fuel. This is the object of the

Fairbanks-Morse Type "Y" Oil Engine

The principle of operation of this engine is one of money-saving—the cheapest of fuels, no carburetor, mixers, timers, igniters, spark plugs or magnetos.

The Type "Y" operates on the two-stroke, moderately high pressure principle, with the fuel injected under pressure and the amount positively governed in proportion to the load. The heat remaining in the combustion chamber, together with the high compression of the air ignites the oil, which burns with more of an expansive pressure than the explosion in the ordinary combustion engine.

The Type "Y" burns Fuel Oil, Crude Oil, "Solar" Oil, Stove Oil, Gas Oil, Engine stillate or Kerosene.

10, 15, 20 and 25 H. P.

The Canadian Fairbanks-Morse Co., Limited

"Canada's Departmental House for Mechanical Goods"

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

EDITORIAL

CANADA'S COAL INSUFFICIENCY.

Mr. White, the Consulting Engineer of the Commission of Conservation, is directing the attention of the public to the menace to the general stability of Canada arising from the absence of a developed supply of coal within the confines of Canada.

Dealing with the dependence of Canada on the United States for coal, Mr. White remarks "a nation pressed by the demands of its own people may be compelled under certain conditions to deprive other nations, in part, at least, of even the necessities of life until the needs of its own citizens are met."

So far as coal is concerned, the United States can supply Canada with all the coal we require, and more, because the United States is the most richly coal-endowed nation in the world, and it has also brought the development of its coal seams to a point unprecedentedly and phenomenally large. There is no adjective to describe the United States coal industry more fitting than the favorite expression of our late enemies—"colossal." Superlatives are necessary when dealing with an industry that produces almost 900,000,000 tons of coal annually.

The danger, to our mind, that arises from the neglected and undeveloped state of Canadian coal mining, is not a danger of being deprived of our coal supply, except it be through congestion of traffic and insufficient transportation facilities aggravated by bad weather, but lies in the fact that undeveloped natural resources are the equivalent of non-possession of such resources.

Our readers will know that this Journal has urged for over a decade serious consideration of the dangers that lie in our utter dependence on the United States for a coal supply. We have submitted the proposition that economic dependence sooner or later must bring political subservience, and we can see no escape from the implications of this proposition.

A consideration of the coal statistics of Canada will show two outstanding features, first that Canadian coal production is either stationary or declining. We submit that if the coal production of Canada is stationary, it is on the down grade, because in this growing country, if an industry of such basic importance as coal production is not advancing it is losing ground. The second feature is that the per capita consumption of coal in Canada is increasing, and the total tonnage of coal consumed in Canada is going up very rapidly, but that the importation of United States coal is going up more rapidly than either.

The total production of coal in Canada was saved

from showing a disgraceful slump in the past two years by the increased production from the Alberta collieries, and it was then demonstrated that Canada can get along by consuming the product of its own coal-seams rather better than some faint-hearted people had dared to anticipate. We can always manage without that which we cannot obtain, and it is interesting to know how much greater a value attaches to a supposedly inferior product when no better is available. In times of stringency Canada is not forced to substitute "ersatz" products, or mere imitations of the real thing. Canada has coal-seams in abundance, containing a plentitude of excellent fuel, and while it is true that our greatest coal deposits are situated inconveniently far from our great centres of population, as they exist to-day, it is equally true that even those coal deposits which are close at hand are neglected and to a great extent despised. People in Winnipeg thought they were suffering hardships when asked to burn "soft" coal last winter, but they found it quite feasible, and it may be remarked that there is no "hard" coal in Europe.

If Canada's coal output were marching even on a "fifty-fifty" basis with her consumption, as it did for many years, the outlook would be more tolerable, but in the matter of coal-mining, as the United States figures go up, ours go down, and that is the discouraging feature.

Another discouragement is that we are paying for coal by a depreciated currency, at higher prices than coal has previously sold for, and we are buying more of it, to which we may add that every ton of coal mined in the United States that might have been mined in Canada, increases our financial embarrassment and disadvantage. This feature, however, is we trust a passing one, and while it is sufficiently serious, it is not so serious as the decay of our domestic coal-mining industry.

THE "CANADIAN FERTILIZER."

The latest addition to Canadian technical periodicals is the "Canadian Fertilizer" published by the Biggar Press of Toronto, and we think the appearance of such a paper has its significance and should interest mining men, who are quite closely concerned with the production of artificial fertilizers. Lime, sulphur, and phosphates in various combinations are all products of the mine, and the market for their sale is wide and capable of great extension.

The use of sulphate-of-ammonia and basic-slag fertilizer, two of the ordinary by-products of steel plants,

are only in the early stage in Canada. The home market for sulphate has hitherto been neglected by Canadian manufacturers because it could be more easily sold for export. There are great possibilities in the popularization of sulphate-of-ammonia for use by the amateur and allotment gardener, if a neutral salt, prepared in a dry and easily distributed form, were to be placed on the market in attractive packages. Sulphate-of-ammonia is usually a chief component of the "plant-foods" sold as proprietary preparations by wholesale houses, under fancy names. The sale of ground basic-slag has never in Canada reached the demand, and the value of this fertilizer is widely admitted by agriculturists.

It is interesting to know that there is a probability of the plant of the British Chemical Company at Trenton, Ontario, being used as a fertilizer manufactory. Canadian apatite being employed. The Canadian apatite mining industry was killed by the competition of the enormous and easily mined deposits of the Southern States, but the increase in freight rates has lessened the comparative disadvantage of the Quebec deposits. The combination of the fine sulphuric acid plant at Trenton, with locally produced pyrites and apatite should render possible a notable increase in home production of fertilizers.

If the "Canadian Fertilizer" provides a medium that will enable Canadian producers of fertilizing materials to get into touch with the Canadian agriculturists, and thereby cultivate and supply a demand that is only in its beginning, it will serve a very useful purpose. This country is under no necessity to import fertilizers.

CORRESPONDENCE.

Exploration in the Porcupine Gold Area.

To the Editor of the Canadian Mining Journal:

Sir.—During a recent hurried trip to the Porcupine district I was impressed by certain features regarding the development of the area as a whole. My object in wishing to record those impressions is not to criticize the operators in the district nor to air my own views, but to invite the discussion of other engineers who are better informed on the geology and development of the district.

The large number of mining or prospecting plants scattered over a large area is striking. The view obtained from the train window from the time it leaves Porcupine until it reaches Timmins gives an observer the impression of being in the midst of a great mining region, comparable to the copper or iron ranges of Michigan, or the gold-bearing blanket of the Rand. The galvanized-iron-covered shaft and power houses, which are universally used in the district, with the attendant dumps from exploratory openings, are to be seen on every hand.

The fact that many of these plants are closed at the present time is owing in part to the conditions brought about by the war, but probably the greater part of them would be closed if labor conditions had remained normal. This is inferred from the fact that of the large number of operations only a few have become producers. Evidently, the remaining plants

stand as monuments to the willingness of people to the long shots in the mining business. The advisability of occasionally taking a long shot in mining is not under discussion; the custom is too obviously essential to need argument. Rather, it is the object to scrutinize the practise from the standpoint of making the long shot as short as possible, and secondly to prove the likelihood of its hitting something as economically as possible.

The large number of properties at which extensive prospecting work has been carried on and the few mines resulting inclines one to the opinion that not sufficient discretion has been used in selecting ground for development. To erect expensive plants, sink shafts and drive shafts on a piece of ground which has as its only recommendation a certain nearness geographically to the Hollinger is too great a speculation. If nearness to a great mine is backed up by geological evidence the case for a property is strengthened, and if in addition a vein of good ore is exposed at the surface the expenditure of a limited amount of money is usually advisable. But to spend large sums without some such basis is rash indeed.

This brings us to the other point, namely, the expense necessary to be incurred in definitely proving that a piece of ground has or has not the makings of a mine. The impression that money has been spent too lavishly on exploratory plants is easily acquired at Porcupine. The buildings, headframes and other surface equipment are usually so elaborate as to suggest that they were erected to serve real mines rather than exploratory operations which had only possibilities of developing into real mines. Also the dumps accompanying these plants are large, and the question is pertinent whether diamond drilling, which requires such a small initial outlay for plant, could not in many cases have answered the requirements of the sinking and drifting operations.

Finally, it is my opinion that if a large proportion of the money spent in prospecting in this district had been used in well directed reconnaissance work in Ontario's vast expanse of unexplored territory the results probably would have been better. A group of mining men who are ready to take a reasonable mining chance would fare better by spending money looking for new districts or new mines with favorable geological conditions rather than gambling on unlikely looking ground which happens to be near a great mine. Also, when a decision is made to give a showing a try-out the prospecting and development expense should be kept at the lowest possible figure, at least until the work gives distinctly encouraging results.

I wish to repeat that these observations are not made in a spirit of criticism. They are based on a very brief stay in the district, and more careful investigation might have caused me to alter these views.

L. H. GOODWIN,
Mining Engineer,
New York.

At a meeting of the Manchester Geological and Mining Society on Tuesday, it was intimated that Lieut. Brown, one of the aviators in the Atlantic flight, was a member of the organization, and on the motion of the President (Mr. Orchard) it was decided to send a letter congratulating Lieut. Brown on his fine and historic performance.

Matachewan Gold Area

The Otisse and Davidson Gold Deposits

A description by H. C. COOKE, with introductory comments by R. E. HORE.

In the June number of "Economic Geology," H. C. Cooke, of the Geological Survey, Ottawa, has an article on "The origin of the gold deposits of Matachewan district, Ontario." The deposits referred to are those known as the Otisse and Davidson, some information concerning which was published in a preliminary report by A. G. Burrows, of the Ontario Bureau of Mines some time ago.

Since the report by Mr. Burrows, a considerable amount of work has been done on the Otisse proper-

the property carefully just before I visited it, and the operators have been looking forward to seeing the geological report. They should find in it much that would help them in obtaining information as to the nature of the deposits and the rocks that enclose them. During the past winter the property was idle. Work was resumed this spring, however, and important developments may be expected this summer.

Much remains to be learned about the deposit, but sufficient is known to encourage the operators to test the property carefully. When I visited the property, I found it to be a very promising one; but one that could only be properly described if I were given all the available information, so that I might intelligently put together my own observations, and the results of the operator's testing and sampling.

My purpose in writing this article is to make available to our readers some information concerning it which has been obtained at the public expense, but which, by permission of the Geological Survey, has been published in the United States instead of in Canada. Dr. Cooke has written an excellent paper. It is unfortunate that the policy of the Department of Mines should detract so much from the work of a competent and industrious geologist.

With regard to the nature of the ore and wall rocks I might be permitted to suggest that development will show that gold occurs in the Otisse deposits in the form of the native metal at depth as well as at the surface, for there is native gold in the deposits near the surface that was not near the surface when it was formed. I would also predict that in the altered wall rocks it will be found that much of what Dr. Cooke calls calcite is in reality an iron-magnesium-lime carbonate, such as occurs in many other Ontario gold deposits. Rocks largely composed of such carbonates I have called ferrodolomites. They are formed from rocks of many kinds by the carbonating action of solutions such as deposit gold. This characteristic of Ontario gold deposits is so common that I venture the suggestion with regard to the Otisse deposits without analysing the rocks, being quite satisfied in my field examinations at the Otisse that such is the case.

Gold deposits of this type in Northern Ontario are much the same at depth as near the surface. The gold is in the form of native gold. Much of the so-called "auriferous pyrite" is merely a mechanical mixture of native gold and pyrite. There is no known reason why such ore as occurs near the surface at the Otisse property should not be found at any minable depth. I believe that it will be. There is, of course, a little surface alteration and residual deposits that are locally quite rich in gold; but the freshly broken ore quite close to the surface is of a character that might be expected at any depth that is likely to be reached in mining operations. It is reasonable to expect that an important mine will be developed by Matachewan Gold Mines, Ltd., on the Otisse property.

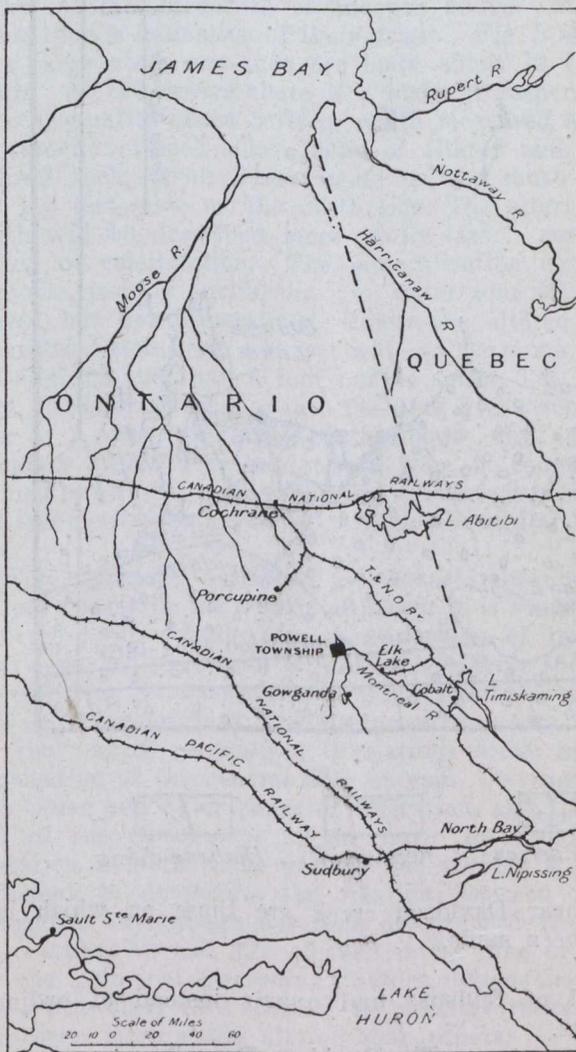


Fig. 1.—Sketch map showing location of Powell Township.

ty, now being operated by Matachewan Gold Mines, Ltd. Last summer, when the writer spent a few hours at the Otisse property, men were at work completing camp buildings and removing surface debris preparatory to sinking a shaft. A number of trenches had exposed the rocks and veins in many places. A diamond drill was in operation. Dr. Cooke examined

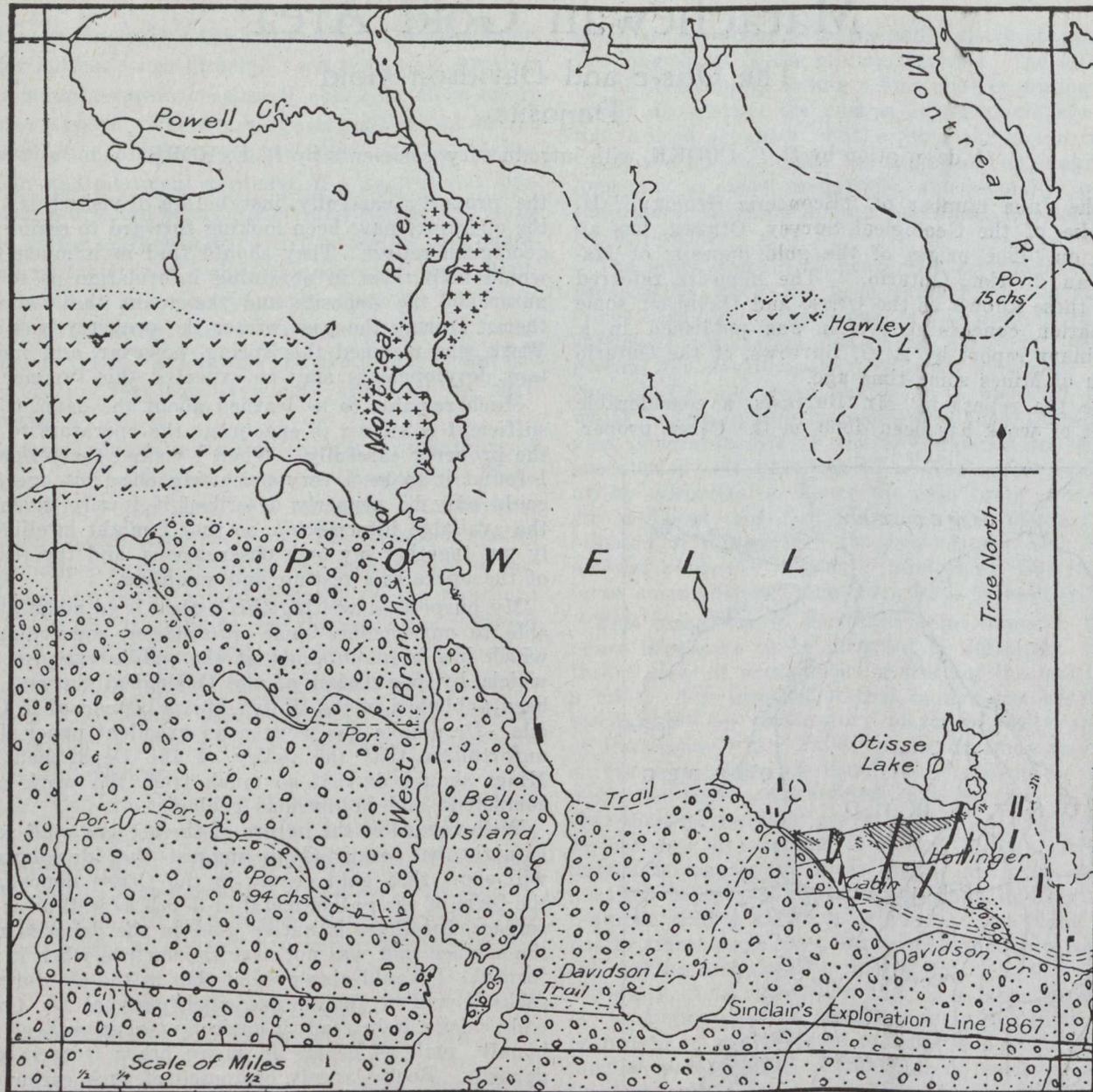


Fig. 2.—Powell Township, Northern Ontario. The claims near Davidson creek are those on which important discoveries have been made.

Dr. Cooke has, in his paper, directed attention to a type of deposit that gold prospectors will do well to examine carefully — small pegmatite masses enclosed by carbonated grey rocks that are sprinkled with pyrite. Early development work at the Otisse showed good gold values in such pegmatites and in the pyritic ferrodolomite. The latter is a dull finely-grained grey-colored rock, composed largely of carbonates that weather rusty, and other constituents which vary according to the original character of the rock and the degree of alteration. The rocks which are so characteristic of Ontario gold deposits. The carbonating is evidently done by solutions escaping from fissures and is common along auriferous quartz veins. In the case of the Otisse it is pegmatite com-

posed of feldspar and quartz instead of ordinary quartz.

The Davidson Deposits.

Of the Davidson deposits Dr. Cooke says: The ore bodies of this property are found in the schists surrounding the intrusive. Little is known as yet about the nature of the ore bodies beyond what can be seen on the surface, as drilling had not been carried far enough at the time of examination to show with certainty the connection of the subsurface ore bodies with the surface ores. Many of the statements here made will probably therefore have to be revised at a later date.

“The schist ore bodies are lenticular. While this has been proved in only two cases by the removal of

the drift from the whole outcrop of the ore body (namely those at the south ends of trenches 8 and 9, Fig. 5), the fact that ore bodies crossed by a trench can rarely be picked up in a parallel trench 50 or 100 feet distant, indicates a similar shape for these also. Drilling is at present being conducted with the object of testing the hypothesis that the lenticular outcrops are but the surface expression of ore shoots which may have a considerable downward extension. The size of the ore bodies varies greatly; small bodies a few inches or feet in width are numerous, while the largest so far found is about 75 feet in width. The large bodies lie with their long axes approximately parallel to the bedding planes of the tuffs, and may eventually prove to have some relation to the secondary folding. The position of the smallest bodies, those in general less than a foot in width, does not seem to have been controlled by the bedding, but by joint cracks, so that they lie in various positions.

The internal structure of the ore bodies of the Otisse type is indicative of their origin. Fig. 5 shows on a large scale one such ore body about 12 ft. in width. At the centre there is a body of rather siliceous pegmatite about 3 ft. in width measured along the trench; on each side a band of altered and mineralized rock, about 3 feet wide on the south side and $1\frac{1}{2}$ feet wide on the north side. The alteration, which will be described more fully later, consists mainly of calcitization. The mineralization consists of pyrite, usually auriferous. An outer zone of rock, altered but not mineralized, flanks the altered and mineralized zone; this is 6 feet wide on the north side, and slightly less than a foot on the south. The light grey, altered rock grades into the dark green country rock in a short distance, but without any sharp boundary line. The gradational zone is commonly an inch or two in width. The line of contact is wavy, and frequently embayed in a highly irregular manner.

"The structure described is characteristic of all the ore bodies in the schist, although it is sometimes rendered more complex by the intrusion of two or more veins of pegmatite within each other's zone of influence, or its recognition may be observed an insufficient development which exposed only ore without the central pegmatite. Variations occur in the composition of the central dike or vein, the width of both inner and outer zones of alteration, and the extent of the enrichment of the inner zone and the alteration in both. The data so far secured are not sufficient to determine the relation between these variations, but enough has been done to indicate that the composition and size of the central dike or vein are the principal governing factors, while there is also a possibility that some of the country rocks may have been more easily altered than others.

"The data bearing on possible differences in susceptibility to alteration in the country rocks are scanty. All of the volcanics are seen under the microscope to be similar in composition, their differences being mainly in the relative proportions of the constituent minerals. If one rock is more susceptible to alteration than another, it cannot be due to difference in composition, and the cause must be sought in physical differences, such as texture. The tuffaceous types, the rhyolite and basalt tuffs, undoubtedly had originally a more open texture than the massive basalts; and when sheared, their lesser competency resulted in their becoming more schistose

than the massive rocks. Both their original texture and their greater subsequent schistosity would make them more permeable to solutions, and allow of a larger degree of alteration. As Fig. 5 shows, most of the ore bodies are localized in the rhyolite tuffs and the basalt tuffs which directly underlie them. However, the fortuitous location of these tuffs next to the intrusive makes it impossible to conclude definitely that the localization of the ore bodies is due to the influence of the country rock and not to chance, until the development operations are carried further around the boundaries of the intrusive so as to allow comparisons to be made.

"Data connecting the size and composition of the veins and dikes with the width of the altered zones and the intensity of the mineralization and alteration are more plentiful, but not complete. Dikes of red porphyry, whose composition is closely that of the main body of intrusives, have had little effect on the country rock. These may be seen (Fig. 5) in trenches 5, 7, 14. Occasionally they have caused a small amount of pyritization in the wall rock, but never any visible alteration. An exception is the dike cutting trench No. 15. Flanking this dike is a wide zone heavily mineralized with coarse-grained pyrites, but the country rock is slightly, if at all, altered, while the pyrite, unlike that in other ore bodies, has a very small gold content.

"Two dikes of what the miners term "gray porphyry" are exposed by trenches 10-13 (Fig. 5). The outcrops of these dikes, which are lens-shaped, are about 100 feet long, and 10 to 20 feet wide. In their composition they are intermediate between a pegmatite and the red porphyry. The amount of feldspar present is so high that they would unhesitatingly be classes as igneous rocks in the field or from the hand specimen, but under the microscope they are seen to be considerably more siliceous than the red porphyry. Alteration of the feldspar to calcite has taken place. The dikes contain sufficient auriferous pyrite to yield gold values varying from \$3 to \$50 per ton, with an average of about \$10. The rhyolite tuff around and between the dikes has been only slightly altered, but has been somewhat pyritized over a distance varying from 10 to 25 feet from the dikes. The tenor, however, is low, on the whole \$2 per ton or less, although occasionally a high assay has been obtained, due no doubt to the accidental inclusion of a locally enriched portion in the specimen taken.

"The orebody indicated in Fig 5 at the south end of trenches 7 and 8, has as its centre a vein of pegmatite about 4 feet in width. This pegmatite is now much weathered, but can still be seen to have been highly feldspathic, probably about 40 to 50 per cent. feldspar, the remainder mainly quartz. The vein lies parallel to the bedding, and the mineralized and altered zone is approximately 12 to 15 feet in width on the southeast side, and 7 or 8 feet on the northwest side. Beyond the mineralized zone the rock is altered with but slight mineralization for 3 or 4 feet further. The gold content in this lens of ore is among the best on the property, averaging from \$12 to \$15 per ton. The alteration in the mineralized and altered portions has been intense, fully 75 per cent. of the rock having been replaced by calcite in the portions nearer the central vein of pegmatite.

"Fig. 6 also illustrates the general extent of the alteration and mineralization induced by a pegmatite containing about 8 per cent. of feldspar. It will be

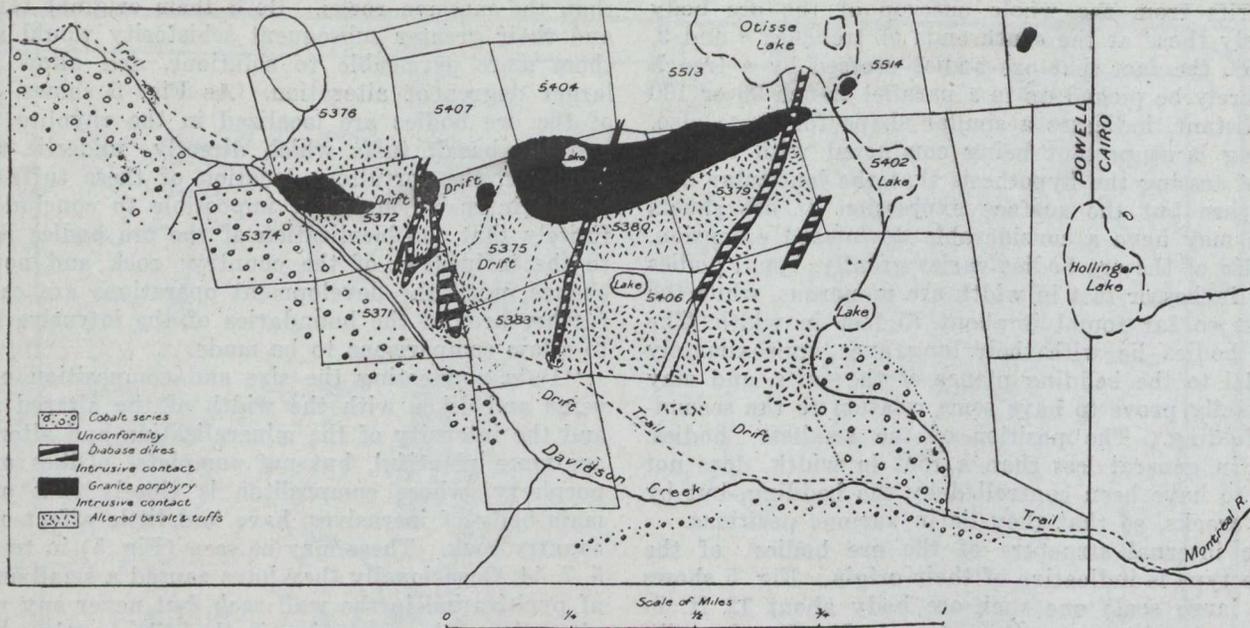


Fig. 3.—Geology of the gold area, Davidson claims 5371, 5372, 5374, 5375, 5383. Matachewan Gold claims 5379, 5308, 5402. (Colorado-Ontario)

observed that although the central vein averages nearly as wide as in the example just described, the total width of the mineralized zones on both sides of the vein is only 4½ feet, as opposed to 18-20 feet. The total width of altered rock with and without mineralization is only about 12 feet, as opposed to 25 feet or more. The gold content in the two cases appear to be about the same, while the intensity of alteration to calcite is slightly less.

“In trenches Nos. 3 and 4, among others, narrow veinlets both of pegmatite and quartz may be seen. The quartz veinlets are never more than about an inch thick. In trench 3 a pegmatite veinlet one quarter to one half inch in width is surrounded by a mineralized and altered zone about 2 feet in width. The pegmatite is about 30 per cent. feldspar. The mineralization is fairly heavy, sufficiently so to give about \$10 per ton. In trench No. 4 a similar narrow vein of pegmatite was observed, whose feldspar content is confined to a few small crystals along the wall of the vein. Alteration extends only about 2 inches from the walls, and mineralization is comparatively small. In the same trench a veinlet of quartz was observed, about an inch in width. On each side of it the rock is altered for a distance of about a foot, but the mineralization has been slight.

“The facts described appear to justify the following conclusions: (1) The ore bodies have been formed

by solutions emanating from the dike or vein at their centres. These solutions have altered and mineralized the country rocks. (2) The tuffs may have been more easily altered and mineralized than the altered basalts. (3) The extent of the mineralization and alteration are related to the size and the composition of the central dike or vein. The strongest alterative and pyritizing effects have been exercised by the pegmatites, while the effects of the end members of the series, the porphyry dikes and the quartz veins, have been slight. The pegmatites containing 25-50 per cent. of feldspar appear to have produced the most powerful mineralization and alteration. Other things being equal, the extent of alteration and mineralization is roughly proportional to the size of the dike or vein. (4) The gold content of the dike and vein-forming solutions was also dependent on their composition. The pyrite deposited by the dikes of red porphyry contains relatively little gold. Gray porphyry dikes carried more gold, sufficient to give a good tenor within the dikes themselves, but not, apparently, to mineralize the surrounding rocks to any great extent. Pegmatites appear to have carried the maximum of gold, which they deposited as auriferous pyrite both in the veins and in the altered wall rocks; while the solutions forming the pure quartz veins carried little gold.

“The only primary ore mineral present appears to be auriferous pyrite; however, a detailed study of the ores by the aid of the reflecting microscope has not as yet been made. If ore minerals other than pyrite are present, they are in minor amount. The gold occurs only in the pyrite, in what form is not known. Native gold is not found, except in oxidized surficial portions. In general a high pyrite content indicates a correspondingly high gold value, although in one or two places this has not proved true. In the pegmatites the pyrite is coarse-grained, in crystals and aggregates several mm. in diameter; but in the adjacent schists the pyrite is always fine-grained, 0.3-0.5 mm. in diameter of crystal. Only in one case was this not found to hold good—in the ore body in trenches 14 and 15 peripheral to the dike or red porphyry in 15. There, the pyrite is very coarse-grained.

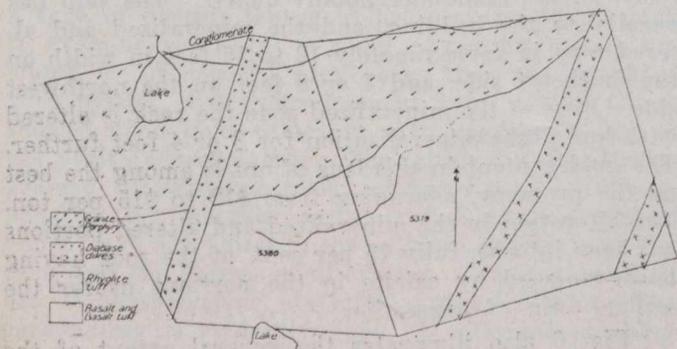


Fig. 4.—Geology of Otisse claims as shown by work done up to Oct., 1918.

“The wall rock alteration accompanying the mineralization of the portions farthest from the central vein is seen to consist of calcitization, pyritization and sericitization, with probably some albitization. Fine-grained magnetite originally present in the altered basalts in amount up to 5 per cent. is converted into sulphide, forming a few crystals up to 0.5 mm. diameter instead of a multitude of small grains. Possibly also some pyrite may be added. Feldspar, which is commonly oligoclase-albite either lath-like or irregular in shape, is entirely recrystallized into a fresh, clear, granular albite, with possibly a slight increase in soda content. Chlorite disappears entirely, while 10-15 per cent. of sericite is formed, and calcite, commonly forming 10-20 per cent. of the original rock, is increased in amount to 40 to 50 per cent. Nearer the central vein, under the more intensive action of the solutions, further changes take place. Albite and sericite tend to disappear entirely; a great addition of pyrite occurs, while the calcite content increases enormously, and may replace everything but the pyrite. A little quartz is sometimes present, but always in vague vein-like forms, and not a part of the true replacement. The pegmatite of the central vein itself also has very commonly suffered a partial alteration, in a replacement of a part of its feldspar by calcite.

“The composition of the solutions which deposited the ores may be inferred from the results of their action on the country rocks. They were evidently rich in sulphur, and also carried iron. A great deal of carbon dioxide was present, and the lime content was high. They carried potash and soda, but probably only in small amount. They dissolved and removed

silica, alumina, and magnesia primarily, while potash and soda were also carried away where the reaction was more intense, nearer the central veins.

Summary and Conclusions.

1. The internal structure of the ore bodies, consisting of a pegmatite vein at the centre, a middle zone of mineralized and altered rock, on each side, and an outer zone of altered rock without mineralization, which grades into unaltered country rock with irregular and embayed contacts, is clear evidence that the deposits in schist have been formed by the alteration and mineralization of the country rock by solutions coming up along the central vein. The partial calcitization of the feldspar of the pegmatite indicates a change in the character of the solutions during the formation of the ore bodies.

2. The serial composition of the various veins of pegmatite, varying from veins of pure quartz up through pegmatites of increasing feldspar content, to dikes of pure porphyry, indicates an igneous origin for all.

3. The satellitic arrangement of the veins, in that with few exceptions they are grouped within an area bounded by a line drawn about 1,000 feet from the edge of the porphyry mass, with the major number within 500 feet, points conclusively to their genetic connection with the porphyry intrusive.

4. Veins or dikes approaching the porphyry in composition, deposited little or no gold, but did in places deposit pyrite. They had no strong alternative action on the wall rocks. Pegmatites deposited auriferous pyrite, and had a powerful alterative action on

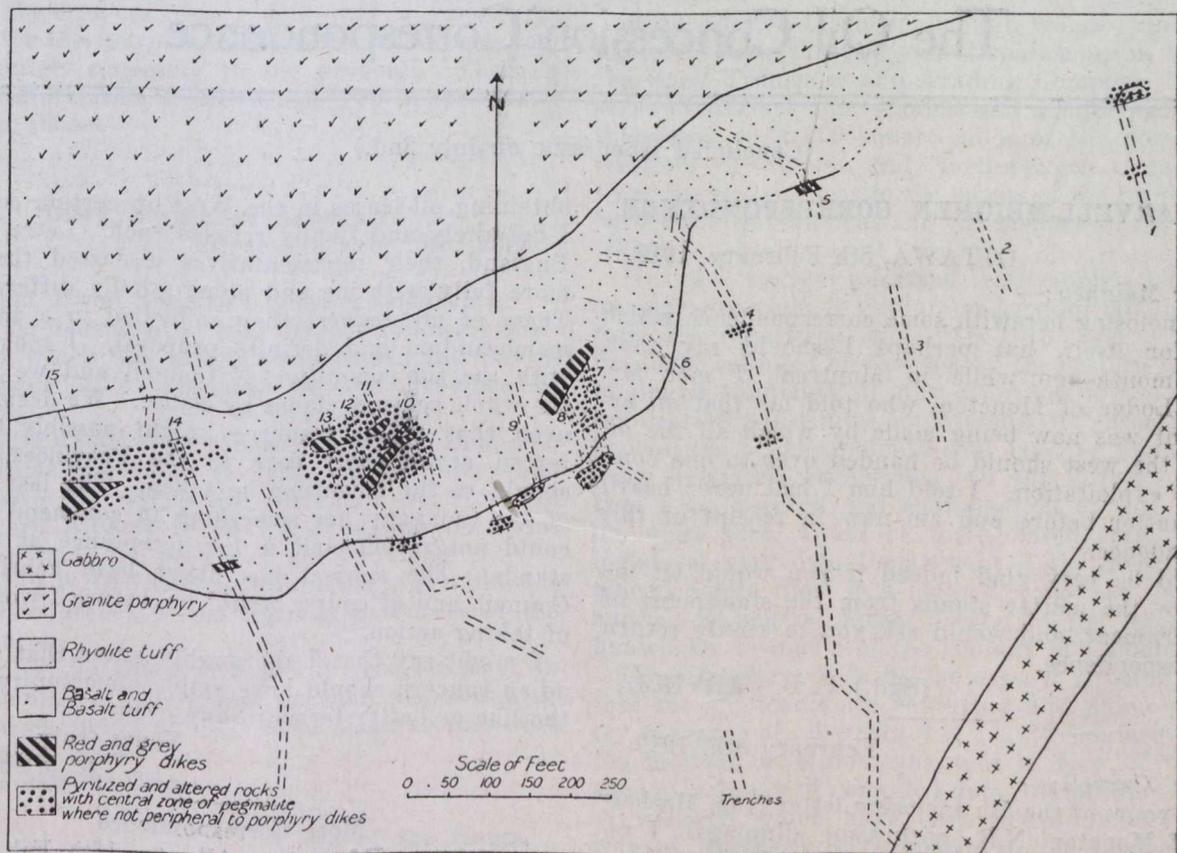


Fig. 5.—Sketch map of portions of claims 5379 and 5380, where the principal discoveries have been made.

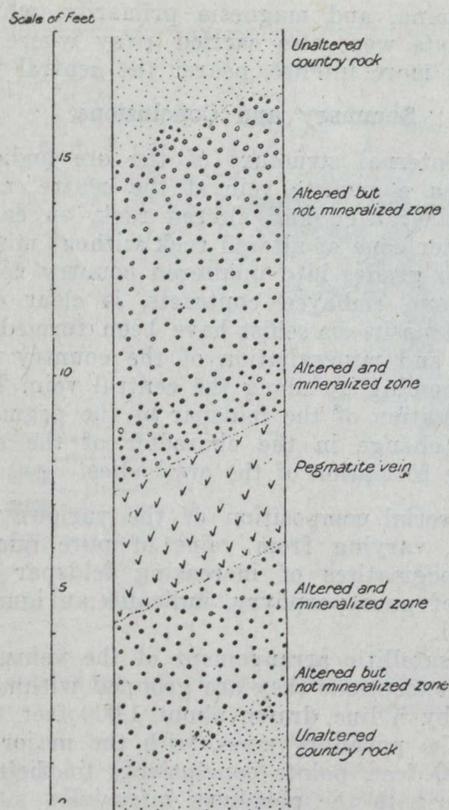


Fig. 6.—Sketch showing internal structure of orebody uncovered in No. 1 trench.

the wall rocks. Quartz veins had little action on the wall rocks, and deposited little or no pyrite. Other things being equal a rough proportion exists between the size of the vein and the size of the altered zone around it.

5. It is concluded, therefore, that the schist ores of the Matachewan district were deposited by juvenile solutions originating as the last products of the differentiation of masses of intrusive granite porphyry. The solutions were at first rich in silica, soda and alumina, which crystallized out first to form the material of pegmatite veins. The separation of these constituents left the solutions relatively enriched in lime, carbon dioxide, iron, sulphur, potash and gold, and their reactions with the wall rocks caused the formation of replacement deposits whose principal minerals are calcite and auriferous pyrite.

6. There is little direct evidence to connect the gold of the Davidson property with the porphyry, except the fact that the veins are confined within the intrusive mass. However, the proof that the neighboring stock, which is petrographically identical with the Davidson porphyry, carried gold, renders the conclusion inevitable that the gold of the Davidson property was also a magmatic constituent. The differentiation has here continued uninterrupted to the stage in which the mineral constituents of the magmatic solutions are silica and gold, and these are deposited as quartz with native gold.

The Oil Concession Correspondence

(Concluded from issue of July 2nd.)

THE CARVELL-MEIGHEN CORRESPONDENCE.

OTTAWA, 5th February, 1919.

My Dear Meighen:—

I am enclosing herewith some correspondence which speaks for itself, but perhaps I should say that, about a month ago, while in Montreal, I met Mr. Mathew Lodge of Moncton, who told me that an arrangement was now being made by which all the oil lands in the west should be handed over to one company for exploitation. I told him I had never heard of the matter before and am now in receipt of this correspondence.

I would be very glad indeed if you would let me know how the matter stands from the standpoint of the Government, and would ask you to kindly return the correspondence.

(Sgd.) F. B. CARVELL

February 8th, 1919.

Dear Mr. Carvell:—

I have yours of the 5th enclosing letter from Mathew Lodge of Moncton, N.B., with some clippings. I return the enclosures herewith as requested.

The Shell people made through their Canadian Agents two proposals in succession to me, looking to

obtaining oil leases in the West on certain conditions. I definitely and finally refused each. Later, when in England, their representatives discussed the subject more fully with me and along wholly different lines. These at my request they embodied in a subsequent memorandum and definite proposal. I took this up with the sub-committee of Council and we reviewed the whole scheme, clause by clause. We decided, however, that as the resources might possibly be transferred at an early date to the Provinces, no step should in the meantime be taken. The last proposal of the Company has something to commend it, but I could not recommend it for acceptance at all, as it stands. The subject has never been considered in Council, and of course would be, before I would think of taking action.

I might say that I thoroughly agree that any Canadian concern should have ample opportunity to offer the like or better terms in any event.

Yours truly,
A. MEIGHEN.

More Correspondence.

Edmonton, Alberta, 16th Feb., 1919.

Hon. Arthur Meighen:—

Rumors persist here that whole north country to

be blanketed by shell oil contract. Political opponents propose protesting in Alberta legislature Monday. Can you give us any information; can we deny allegations in toto. Contract would arouse fierce opposition among all here. Wire reply.

A. T. ERVINE.

Telegraph.

Ottawa, 17th February, 1919.

A. T. Ervine, Edmonton, Alta:—

No concession granted Shell Company. Government has not yet considered Company's proposals.

ARTHUR MEIGHEN.

Ottawa, February 17, 1919.

Dear Mr. Meighen:—

I understand that the Royal Dutch or Shell Company have under way the leasing of large areas in Canada for the purpose of drilling for oil or natural gas.

Any information you can furnish me with regard to concessions granted this firm or applications under consideration will be much appreciated.

J. E. ARMSTRONG.

Ottawa, February 19th, 1919.

Dear Mr. Armstrong:—

You evidently had brought to your attention certain suggestions that appeared in the Press respecting the setting apart of large areas in Northern Alberta to be placed at the disposal of a company which desired to drill for oil and natural gas. There is no intention on my part to consider and proposition of that kind at the present time. Owing to certain representations made in some of the Western newspapers that the Government was giving way a very large territory for this purpose, many letters have been sent to me strongly objecting to the proposal. There is really no information I can furnish you in the matter other than above.

A. MEIGHEN.

Clerk Legislative Assembly.

Edmonton, Feb. 19th, 1919.

Sir:—

Last night I sent you the following telegram:

"I am instructed to wire you the following resolution, which was unanimously passed this day in the Legislative Assembly of the Province of Alberta.

"WHEREAS it is reported that the Dominion Government is about to grant extraordinary and exclusive concessions of petroleum territory in Northern Alberta to an Oil Syndicate on terms oppressive to the people of this Province.

"AND WHEREAS negotiations are pending for the transference of the Natural Resources of the Provinces.

"NOW, THEREFORE, be it resolved that in the opinion of this House no such disposition of petroleum lands or any other natural resources should be made."

Which I now confirm.

JNO. R. COWELL,

Clerk of the House.

Ottawa, 20th February, 1919.

Dear Sir Thomas:—

I have yours of the 19th with copy of a telegram

received by you from J. R. Cowell, Clerk of the Legislative Assembly of the Province of Alberta, enclosed herewith. I have communicated with Mr. Stewart, the Premier of Alberta, expressing my surprise that such a resolution should have been submitted to the legislature based admittedly on a report, and which resolution assumes by its very wording an utter disregard of any sense of public duty on my part, and is intended to lead people to believe that some great wrong is about to be done, unless they take steps to avert it.

I have pointed out to Mr. Stewart that the application to which the resolution refers has not yet been introduced to Council, and that until the question of the natural resources has been settled, it is not my intention introducing it.

Yours very truly,

A. MEIGHEN.

Edmonton, Alta., Feb. 22nd.

Sir Thomas White, Acting Prime Minister:—

Large meeting of Citizens of Edmonton and Peace River Country unanimously protest against granting any monopolistic Concessions to Northern oil rights moved by Hon. A. G. McKay, seconded by James Ramsey, M.P.P., local members for city of Edmonton being requested to move for return of all papers of any such proposed agreement.

JOSEPH A. CLARK,

Mayor.

The Late W. J. Hanna's Letter.

Toronto, Ontario, March 1, 1919.

Hon. Arthur Meighen, Minister of Interior:—

Dear Sir:—

With relation to an application which I understand has been made through your Department on behalf of the Shell Transport and Trading Company for a reserve of 250,000 square miles, and a subsequent choice therefrom of 25,000 square miles of the potential oil territory of Alberta and Northwestern Canada, may I express my views as to the merits of the proposal laid before the Government and the menace to the country which it contains.

If I am rightly informed, this application is for an exclusive right to explore and exploit all that territory lying between the fifty-fifth and sixty-fifth parallels, bounded on the east by the eastern boundary of British Columbia. I must point out to you that this application constitutes an attempt to absorb, in one concession, all the potential oil land of Canada with some negligible exceptions. Of this I feel confident that I am correct, and confirmation of this belief, I am quite sure, would be forthcoming from the geologists of your own Department if the question were placed before them in a manner such that they could answer in general terms in and in the light of the knowledge available of the geology of Canada.

If, as I believe it to be the case, it is being implied that the applicants are venturing into unknown country in search of oil where it is merely assumed to exist, the implication is not consistent in view of the presence of volumes of compiled data, the product of years of research which have been piling up against the way of Northern Development in the Geological Department at Ottawa.

Or, if it is the intention of the applicants to have it appear that they are venturing into a wilderness toward the development of the resources of which noth-

ing had been done nor is likely to be done, except through their agency, then the credit that has been pledged by the Dominion of Canada and by the Province of Alberta in extending the railway lines to the great waterways of the north and the faith that has been demonstrated by the pioneers must surely have been hazarded in vain. I doubt very much if the Canadian people who have guaranteed these railways or the pioneers who have devoted the years to the opening of the North will view with dispassion any proposal to hand the greatest potential resource of the northern empire to a body of strangers attracted only by the possibilities made accessible and known by these pioneers.

Let me point out to you another aspect of the application. I refer to the size of the grant asked. I wonder if the applicants realize the extent of that for which they ask? A selection of twenty five thousand square miles (16,000,000 acres) of the best oil land within the dowry of Canada is what they ask. In the whole State of California, which produces a wealth in oil of one hundred million barrels a year, the second oil state in the American Union, the entire total area of oil land that is actually producing is not greater than one hundred thousand acres. In the State of Wyoming, which produces 40,000 barrels of oil a day, the whole producing area is not greater than twelve thousand acres. Just the amount that may be protected by one drill under the present regulation regarding leases in the country for which the application is made. The whole oil field of Western Ontario, from which millions have been taken and which is the source even to-day of the entire Canadian output, is not greater than thirty square miles all told. And yet me point out that there is not in the whole world to-day twenty-five thousand square miles of actual producing oil territory, including every acre in every latitude and in every country.

Until the application has been reduced to the form of an agreement it would be impossible to discuss its merits, but I feel that it should be realized that with the right of transfer, as asked for by the applicants, and with the privilege which such a right would entail of leading the profits through a number of subsidiaries before reaching the parent company, it would be possible that the announced profits of a parent company would not overcome the six per cent. cumulative which the applicants ask right to enjoy before sharing any part of the production with the Government of Canada. If a concession were granted on the tentative terms in which this application is made there would be a real danger that the Dominion of Canada would not receive a dollar therefrom.

It is being alleged in support of the application, so I am informed, that there is not the capital available to develop a Canadian Oil supply. In this connection I would like to point out to you that during this coming year the Imperial Oil Company is about to spend upwards of half a million dollars in the search for oil, a large part of which it is intended to devote to the territory for which this application is being made. This Company has on its staff some very competent geologists and has for the past five years had prospecting parties in the field. During the past two years, owing to the fact that some of the best men were called to the front, it has not been possible to carry this work forward as vigorously as would have otherwise have been done, but for this season the Company has already arranged for five field parties to leave Edmon-

ton as soon as the snow is off the ground. These parties will be headed by competent geologists, fully equipped to gather the most reliable data upon the possibilities of the country. Coincidentally, it is intended to test with the drill every reasonable prospect of oil located by the geological parties. Plant and equipment for this work has already been secured. Part of it (two rigs) are already at Edmonton, where they have been since last autumn, and the remainder is forthcoming.

This exploratory work is not a new departure upon the part of the Imperial Oil Company. Realizing the importance of developing a Canadian oilfield, the company has for a number of years been active by drilling in the search for oil. Last year operations were carried out in the Fort McMurray district, and for three years past operations have been in progress in the Viking district, both in Alberta. The former operations were within the boundary of the concession applied for by the Shell Company. In the Peace River country, also within the limits of the concession asked, the company, through agents have taken up a considerable area of oil leases and has subscribed to assist local companies in their drilling operations. In the Great Slave lake and McKenzie River districts, beyond the Northern Boundary of Alberta, but still within the limits of the concession asked, the company has had extensive geological search made, and as a consequence of the information brought in it is proposed this summer to send two rigs north by boat to points hundreds of miles beyond rail-head on the Athabasca.

I am speaking not only of what is being done by the Imperial. I am not in a position to speak with authority for anyone else, but in addition other individuals and syndicates amply financed have been active in the Peace River country and there are indications that there will be great activity and healthy rivalry during the coming summer. The allegation, therefore, that the capital is not available to develop the oil field has no basis in fact.

In speaking of these operations by the Imperial in search for oil, I would like to point out to you that any rights which the Imperial has acquired by the way of drilling leases has been the outcome of no special privilege. There have been no concessions of any kind granted to this company, nor have any been asked. We have always felt that under the law as it stands now there is reasonable latitude for any company, large or small, which has a desire to prospect for oil and we will never seek, by way of special privilege, any right which it is not open for others to enjoy. We feel that this policy, which has heretofore been pursued by the Government, will lead most quickly to the development of the oil resources of Canada.

As a grant such as that asked for would place the applicant company in a position of holding and absolute monopoly of the oil business through ownership of the oil resources of Canada. I feel that I cannot allow the application to go to consideration without outlining what the granting of such an application would mean to this company.

You are doubtless aware that the Imperial is an old-established institution, having been incorporated in 1880, and is to-day the second largest among Canadian concerns, admitting first place only to the greatest of Canadian railways. In four years, since the opening of the war, it has paid into the Dominion Treasury in the form of duties and revenues \$7,433,707.75, and in taxes of various kind to various municipal and gov-

ernmental authorities in the same period upwards of \$3,250,000. It furnished the Imperial Government during the war with 110,810,540 imperial gallons of oil fuel for the British Admiralty. To provide for urgent requirements of the Admiralty and to keep pace with the industrial demands during the war period, and with no balking at tremendously increased cost of construction, the Imperial has, during four years, outlaid on new plant \$20,175,954.76 and has invested in buildings \$575,812.76. From a purely pecuniary point of view the company could have profited by allowing this new construction to wait until the conclusion of the war had brought costs to a lower level, but assumed these larger capital expenditures rather than see the war work suffer handicap through shortage of supply of oil or for lack of service.

In the Imperial all employees are given an opportunity to become stockholders and a large percentage, both operatives and clerical staff, have done so, and the number is steadily increasing. Five hundred Imperial employees entered military service, and the company from a special appropriation has supplemented their army pay in a way that has been greatly appreciated by the men and their families. During the same period it has provided liberally for its injured workmen, and it carries a sick benefit and retiring allowance plan which protects everyone of its people from want or the fear of want during the entire term of their working years and for as long as they live after the term when, at 65, they become time-expired men in the industrial army of Canada.

The company have refineries at Vancouver, Regina, Sarnia, Montreal and Halifax; has eight hundred distributing stations located at points calculated to best serve its customers; it has eleven ships on the Pacific, Atlantic and Great Lakes and in the midst of stress of war-time conditions it has kept unflinchingly supplied the farm tractors of Western Canada, the fishing fleet of the Pacific Coast, the Mountain railways and in fact every activity essential to Canada's part in the war and all this has been done during the entire war period in the spirit that the necessities of the case were the first consideration, the profit secondary.

The Imperial has an investment in the oil business to-day of not less than ninety millions of dollars and within the past five years its stockholders have put in a new money—all cash—\$20,340,000. More than two dollars for every one dollar they have taken out.

That an industry touching as it does so intimately the welfare, business and livelihood of thousands of people should be subjected to threat of incursion and raid, such as could not fail to prejudice an investment built up over half a century and to handicap the steady flow of products from producer to consumer, to the loss and embarrassment of all, cannot be in the Canadian national interests.

You will no doubt recognize the effect that the circumstance of such an application as that made by the Shell Company being publicly regarded as under official consideration must inevitably exert upon the further enlistment of capital in the oil industry in Canada, and you will appreciate that the granting of such a concession would be very nearly equivalent to a destruction of the entire present investment in the Canadian oil industry. I do not for one moment think that the Government of Canada contemplates such a proceeding, but I think it well, nevertheless, to so place clearly before you the inevitable result of such

an act. I, therefore, submit the foregoing for your consideration.

Yours very truly,
(Signed) W. J. HANNA.

The Proposal is Not Accepted.

March 28th, 1919.

Dear Sir Reginald McLeod:—

Referring to application of the Shell Oil Group with respect to certain areas in the northern portion of Alberta, and the Northwest Territories adjoining such Province, and the carrying on of oil development there on co-operative basis with the Dominion Government, I have to say that this Department cannot recommend acceptance of the proposals you have submitted.

Yours very truly,
A. MEIGHEN.

Paris, March 30th, 1919.

Prime Minister, Ottawa:—

X185. for Meighen.—Sir Reginald McLeod on behalf of Shell Transport and Trading Company called on me to-day and expressed earnest hope that early decision will be reached as to Company's proposals. He claims that there are other theatres to which they desire to divert their energy without delay if Government decides not to accept their offer.

BORDEN.

Ottawa, 31st March, 1919.

Sir Robert Borden, Paris, France:—

Have decided cannot entertain Shell Company's proposals and notified them some days ago.

MEIGHEN.

PERSONAL.

Mr. A. A. Hassan has opened an office at Fort Worth as geologist.

Mr. George Rogers has resigned as manager of the Churchill Mining Company. Mr. Rogers is in charge of operations at the Wasapika, Westree and Herrick properties in the Wasapika gold area.

Mr. F. W. Gray is visiting the Cobalt silver and Porcupine gold districts.

Mr. R. E. Hore has returned to Toronto after visiting the Huntingdon copper mine near Eastman, Quebec. He is now visiting gold and silver mining districts in Northern Ontario.

Mr. F. M. Connell is at the Huntingdon copper mine, preparing for the resumption of operations there.

Lieut. H. K. Bowen, retired from the R. A. F., has just returned from overseas. Previous to enlisting for active service Lieut. Bowen was in practice as a mining engineer in the north country, and will shortly resume his work there.

Mr. H. J. McCann, has been transferred from the position of Purchasing Agent of the Dominion Steel Company at Sydney to the Montreal office of the Dominion Steel Corporation as Assistant to the President. Mr. McCann has been connected in various capacities with the Dominion Coal and Dominion Steel Companies for the past twenty years, and he has a comprehensive knowledge of the operations and commercial conditions in both the coal and steel ends of the business.

Oil Notes

IN THE PERSIAN OIL-FIELDS.

One drops down from the Imam Riza to the coal-fields. They lie in a Q-shaped cup, and the tail of the Q leads up from Tembi, where the power-house is at the foot of the pass. Two enormous columns of smoke told us where the wells lay. It was escape oil burning. The pipes, which had been cut by the Bawi and Anafizah tribes near Ahwaz in the disturbances of February, were still under repair. Meanwhile the oil which ought to have been feeding the refineries at Abadan had to be destroyed. Where there is a good flow, as at Maidan-i-Naftun, the oil floods up and discharges itself at high pressure into the pipes, and is carried by its own momentum into the storage tanks. No pumping is needed. The only difficulty is to control it. To close a valve in the pipe at the surface of the well is simple enough, but it is seldom wise, as the subterranean force which you have unloosed is eccentric and not easily disciplined. A block is apt to disturb the strata and plug up the channels, and create a commotion which may put the well out of action for weeks. So, when the passage to the refineries is stopped the oil and gas are carried off into side pipes and burned. The immense columns of smoke and flame where the escape oil was burning day and night depressed me with an uncomfortable sense of waste. The flames leaped up 60 feet in the air in a circumference of 20 with a roar like breakers, and above them rose a solid column of blue smoke. At a certain height it caught the breeze and was deflected, but it was still so dense that riding under it a full 500 yards from the flame one felt protection from the sun. The manager laughed at my economical scruples: "If you were a millionaire," he said, "you wouldn't mind if your butler opened an extra bottle of port. Besides, where could you store the oil? It would soon flood a respectable valley.

The oil, it seems, is inexhaustible, and if you humor it and give it its head underground it is singularly docile when it reaches the upper air. Its violence is all subterranean, and the miners' chief anxiety is lest it should spurt up in sudden gushes and carry away rig and derrick. Once above ground it finds its way to the storage tanks and power house. From the pumping station at Tembi it is lifted over the two ranges, the Imam Riza and the Tul-i-Khayyat; and from the second ridge it flows without obstruction to the refinery at Abadan on the Shatt-al-Arab, 142 miles from the fields. The pass over the Tul-i-Khayyat is 1,300 feet, and the pressure on the pipes here is 600 pounds to the square inch. One is struck by the economy of transport. Oil, unlike other products of mines, needs no railway with its costly rolling stock, imported fuel, and gangs of workmen. It supplies its own power like a rational monster pent up in the bowels of the earth and ready to lend a hand in its own release. Both in production and in transmission you have the same economy. Where a well is being bored you will find under one rig a single white mechanic and half a dozen wild-looking Bakhtiari assistants, whose limbs remind one of figures on a Greek frieze. The driller and the tribesmen communicate in a jargon which is neither English nor Persian, but understood by both. It comprises half a dozen adjectives very forcible and explicit,

the single inflection of some three common verbs which does duty for all tenses and moods, and a number of substantives mostly of a highly technical kind. The Lur or Bakhtiari in the Persian oil-fields is as familiar with spudding shoes, clamps, gauges, underreamers, and bits as the product of a Schenectady engineering school.

I was taken to a rig where a Canadian was fishing for lost gear. In boring the shaft the heavy blunt-nosed steel bit which pulverizes the rock is attached to the sinker, a sixteen-foot steel rod. This is connected with the wire rope by jars and swivel, and suspended from an oscillating walking beam which overhangs the shaft. The process of boring is simple so long as the string of tools hangs together, but the wire rope, sockets, jars, sinker and bit are put to an inordinate strain; and if any of these give the shaft is blocked and work comes to a standstill. Another source of trouble is when the casing of the shaft gives through heavy earth or gas pressure, or the parting of the joints. In any of these emergencies the driller has to lay aside his tools and fish. He may fish for months and not recover the lost part. In that case it is a question of a new shaft and the abandonment of the well—a tragedy of wasted labor, which is the worst thing that can happen to the mining engineer.

I found the Canadian solemnly and patiently fishing while the half-naked Bakhtiaris sat round him wistfully looking for a sign. The trouble had begun two months before with the breaking of the sand-pump, the cylindrical vessel which is lowered after every foot or two of boring to remove the pulverized debris. The pump had broken off and carried away some of the steel rope with it. The driller's first business was to fish for the gear with a tenacious barbed and pronged instrument known as the rope-spear. This he attached to a sinker and let fall heavily among the strands of the cable. He secured his grip, but the pump was so firmly imbedded that it would not give. It was impossible to shift the thing without breaking the line. Heavier machinery had to come into play. So the engineer cut the rope just above the swivel and ran in a series of iron fishing poles with a socket at the end to catch hold of the sinker to which the rope-spear was attached. The bottom pole gave with the socket. Thus the history of the House that Jack built repeated itself, only none of the parts played their part, and every lap in the story was a coup manqué. We have now in order from top to bottom—the iron fishing pole with the socket which would not catch the sinker, the swivel and sinker, the rope-spear, the sand-pump, all lying in layers of obstruction some thousand feet underground, blocking up the shaft. It was enough to take the heart out of a man, but the Canadian went on stolidly fishing, and the Bakhtiaris squatted on the floor of the rig looking dully expectant. After a month the Canadian dragged up the sand-pump, which ought by all rules of the game to have been at the bottom of the whole bag of tricks. His next catch was the swivel, which had parted from the sinker. Then he brought up the pole and socket. There remained the sinker and the rope-spear. These, as far as I know, were never recovered. They were probably jammed into the side of the shaft, for when next I heard of the well drilling had been continued. That Canadian fishing for his tools was the most monumental instance of patience and faith I have witnessed.—Edmund Candler in "Cornhill" (Extract.)

Nova Scotia Notes

Dominion Coal Output.—For the first half of the year the production of the Dominion Cape Breton collieries was approximately 1,537,000 tons, being 150,000 tons below the outputs of the first half of 1918. The Springhill Mines in the corresponding period produced 185,500 tons this year, and 201,752 tons in 1918.

It is understood that several of this company's coal freighting vessels have been released from requisition by the British Admiralty, and if this news is confirmed, there is a prospect that the mines may work more regularly than they have during the month of June, when production from the Cape Breton collieries reached only about 220,000 tons, or half of capacity of the mines.

Mr. Walter Herd, who was formerly the Assistant Mining Engineer of the Dominion Coal Company, has returned from overseas and has been appointed as Mining Engineer. Mr. Herd was one of the men selected by the Canadian Mining Institute for nomination to commissions offered to qualified mining engineers by the Militia Department early in the war. Before leaving Canada he was transferred to the Forestry Corps, in which he performed important duties, and was promoted to a lieutenant-colonelcy. Mr. Herd has had wide experience in coal-mining in Scotland and South Wales, and during his service with the Dominion Companies has been successively in charge of operations at the Springhill Mines, and at the ironstone mines at Wabana, Newfoundland. Mr. Herd's experience in undersea mining is very extensive, and he has also had acquaintance in the mining simultaneously or in close succession of coal-seams separated by a thin layer of measures. The problems connected with undersea mining and with the extraction of closely-superimposed coal-seams separated by a thin layer of measures. The problems connected with undersea mining and with the extraction of closely-superimposed coal-seams are prominent in the areas of the Dominion Coal Company, and in this regard, as in other ways, Mr. Herd is well qualified for his new position.

Acadia Coal Co.—This company has the distinction of being perhaps the only coal producer in Nova Scotia to show an increase in its output for the first half of the year. The production for the first six months of 1919 was 190,000 tons, about, which compares with 111,063 in the first half of 1918. The present rate of production does not, however, represent full-time work for this company's collieries, and the difference in favour of 1919 is due chiefly to the explosion in the Allan Shaft Mine, which disorganized production in the first half of 1918.

Intercolonial Coal Company.—The output of this company for the first half of the year was about 90,000 tons, which compares with 102,148 tons in the corresponding period of 1918.

Nova Scotia Steel & Coal Co.—Production at this company's collieries closely approached that of the first half of 1918, being 245,000 tons for the current year, against 257,788 last year. Some irregularity in work may be expected in the near future during the continuance of the shut-down of the Steel plant at Sydney mines. Production at the collieries of Scotia

has been very good recently, the output on one day in June reaching 2,522 tons.

Inverness Coal & Railway Co.—The production of Inverness mines was for the first half of 1919 about 69,000 tons, comparing with 108,282 tons in the first six months of 1918. Mr. John McGillivray, who has for a number of years been in charge of the operations of the mine and railway at Inverness, and who latterly has been acting as General Manager and Receiver, has resigned, and has been appointed to a position with the Canadian National Railways at Toronto. Mr. McGillivray has been a careful operator, and has kept the Inverness Colliery and Railway in operation under some exceptionally adverse conditions. Recently the Eastern Trust Company applied for permission to foreclose the mortgage on the properties, and in the meantime, negotiations have been proceeding between the Federal Minister of Railways and the Commissioner of Mines of Nova Scotia. It is now announced that the Government will take over the railroad on the same basis on which other roads in Nova Scotia have been taken over, and that a weekly order for 1,800 tons of coal for the National Railways is to be given to avoid the closing-down of the mine.

The aggregate production of the Nova Scotia collieries for the first half of 1919 is not exactly ascertainable, but is in the vicinity of 2,450,000 tons, and is about 150,000 tons below the production of the first half of 1918. From present indications and the known prospect of the future it would seem that the production for 1919 cannot exceed from $4\frac{3}{4}$ million to 5 million tons. The impression obtains that improved demand for coal will present itself about September. It is really more a matter of transportation than demand, however, and if the Dominion Coal Company can obtain release of its steamers, and can secure sufficient tonnage at freight rates which will permit of carrying coal to Montreal at saleable prices, then the pressure on the smaller companies will lessen, and business will revive locally.

The disinclination of the Board of the National Railways to pay the price for coal that the cost of production in Nova Scotia at the present time requires has been the subject of very vigorous resolutions by the miners' unions, and, in response, some unusually straight talk is being ascribed to the railway officials in semi-official communications emanating from Ottawa and appearing in the newspapers. The railway people say "we are running the railways as a business proposition, and, in competition with other railways, must buy coal in the cheapest market." Many considerations are involved in this statement, and for one thing it clearly discloses the difficulty which besets men who endeavour to run a state-controlled enterprise on business lines. It is doubtful whether in a country which has in the past approved of political patronage, and in which a quid pro quo has been the normal accompaniment of electoral approval, it is possible to do any such thing. Much more vital considerations, however, are involved in any matter that concerns the coal production of Canada at this time, conditions which may properly over-ride the question of price. Price is probably the least consideration in connection with coal production to-day, chiefly because no one really knows just what a dollar is worth. One thing is sufficiently clear, namely, that a Canadian dollar will not purchase a dollar's worth of United States products to-day, and every cent that is ex-

pendent outside of our own borders unnecessarily increases the Canadian disadvantage.

The semi-official communication from Ottawa referred to states further:

It is doubtful if the decrease in output of the Cape Breton mines is at all due to decrease in coal supplied the Government railways. In the Capital, it is believed it is due entirely to labor-unrest, which has had a deterrent effect on industrial progress and on the building trade. Sydney coal troubles are the direct effect of the attitude of labor throughout Canada. Owing to the unrest, the building programme projected in Canada last spring has been reduced by sixty per cent., and individuals and corporations refuse to increase plants or take extensive orders, owing to the uncertainty of the labor supply.

The situation in Sydney is viewed here as an indication of what may be expected in other centres this autumn and the coming winter. It is felt that the penalty must be paid for the unrest this summer throughout Canada and for the lack of thrift during the period of high wages and constant employment.

Presumably this is Ottawa's retort to the resolutions stated to have been passed by representatives of the miners in Sydney, protesting against the action of the Government in arresting the Winnipeg strike leaders, and practically asking for the confiscation of capital. The statement is not characterised by restraint, and to say that Sydney coal troubles "are the direct effect of the attitude of labour throughout Canada" is to mix a modicum of truth with a great deal of error. A statement by the local representative in the House of Assembly gives with exactness the specific causes for the slackness of work in the Cape Breton collieries at the present time. Mr. D. A. Cameron, M.P.P., stated that the following causes were responsible, namely:

Requisition by the Imperial Government of ships which were formerly engaged in the St. Lawrence trade. Even if ships are obtained for the St. Lawrence trade again, freight rates would be prohibitive unless the pre-war charters were held to. A second is the increase of freight rates which has been made by the C. N. R. The third factor, Mr. Cameron said, is that the cost of coal at the pit mouth in Nova Scotia exceeded the cost of American coal delivered as far east as Montreal, and probably as far east as Campbellton, N.B.

Mr. Cameron might have added that the increase of freight rates on the Canadian National Railways is a direct result of the increased cost of coal production.

MONTAGUE GOLD MINING CO., NOVA SCOTIA, MAKING STEADY PROGRESS.

Mr. E. S. Romilly Smith, General Manager of the Montague Gold Mining Co., brought from Montague recently some wonderfully fine specimens of gold quartz from the company's property, specimens which reminded those who saw them at the office of the old days of the Annand and Rose properties, both of which mines are now included in the Montague Company's holdings of about a mile and a half square in extent. The specimens show gold jutting out all over them, and include a fine nugget. The company has spent the past twelve months developing and has cut five new leads on the 300 foot level, having now suf-

ficient ore blocked out to keep the ten stamp mills continuously working for about twelve months approximately. If it were not for the set back experienced at the mines through the explosion of December, 1917, which smashed up the mill and machinery, work would have been in fuller swing now, as a result of the great and successful development. The company has now control of practically the whole Montague gold district for about eight years.

Mr. Smith is leaving on the Olympic on the 15th for England on a business trip, and will return in October, bringing his family to Montague with him, they having been unable to come to Canada during the war operations. While in England he will arrange for the installation of a new stamp mill and other machinery necessary to meet the requirements and bring the plant right up to date, the property having been thoroughly proven after having been worked five years by the company. In the meantime there will be no let up in work at the mines, but the present plant will be used to capacity pending installation of the new machinery. The new plant will include probably a ten stamp crusher of 1,600 to 2,000 pounds stamps as preliminary crushers, and Huntington mills will complete it with Wilfley tables and five vanners for salines, etc.

The company has ever been thoughtful of its employees at Montague, and a noticeable feature has been supplying the families with houses free of cost. They are now contemplating erection of a number of cottages and a boarding house for their employees.

Mr. A. Gerhardie, who has been associated with Mr. Smith in the mining management, has been appointed mine manager, and under his direction, he being a good mining man of much experience in different parts of the world, including South Africa, it is expected continued rapid progress will be made both in development and output during Mr. Smith's absence.

The company opened their mining operations at Montague on the Seymour Kaye property, and have since acquired adjoining properties. Their miners are still working below the "break," and are in virgin soil. Montague is one of the few gold mining districts in Nova Scotia that has come back strong, and the depth at which the Montague Company's operations have located such good paying ore would seem silent testimony as to the great possibilities of deep mining.

The company has recently acquired the whole of the Roderick McDonald areas, adjacent to its own, and now has virtually all the great properties in the Montague gold district.—Halifax "Chronicle."

It is reported that a rich lead of manganese was discovered at the New Ross Mine recently. The new lead was located but a few feet from the surface, and is said to be one of the very finest quality.

REPORTED DISCOVERY OF OIL ON VAN- COUVER ISLAND.

(From our British Columbia Correspondent.)

Oil is said to have been discovered on the west coast of Vancouver Island, petroleum records having been registered in the name of David Logan, a lineman in the employ of the Dominion Telegraph Service, with residence at Clooose. Mr. Logan states that he has found large seepages and has taken some samples to the town of Port Alberni for assay.

Special Correspondence

BRITISH COLUMBIA.

May Coal Production.

The output of the coal mines of British Columbia for the month of May was 187,726 tons made up as follows:
Vancouver Island.

	Tons.
Western Fuel Company, Nanaimo Collieries...	48,012
Canadian Collieries (D), Ltd., Comox Collieries.	44,297
Canadian Collieries (D), Ltd., Extension Collieries	20,068
Canadian Collieries (D), Ltd., So. Wellington Collieries	7,783
Pacific Coast Coal Mines, Ltd., Morden Colliery.	6,170
B. C. Coal Mining Co., East Wellington	1,508
Nanoose Collieries, Ltd., Grant Colliery	397
Granby Consolidated M. S. & P. Co., Cassidy ..	6,887
	135,122

Crow's Nest Pass Collieries.

Crow's Nest Pass Coal Company, Coal Creek Colliery	26,064
Crow's Nest Pass Coal Company, Michel Colliery	14,024
Corbin Coal & Coke Co., Corbin Colliery	4,287
	44,375

Nicola-Princeton District.

	Tons.
Middlesboro Colliery	3,108
Fleming Coal Co.	2,649
Merritt Colliery	771
Coalmont Colliery	706
Princeton Colliery	1,095
	8,229

Coal for the new bye-product ovens of the Granby Consolidated at Anyox, B.C., is being supplied from the Cassidy Collieries, Vancouver Island, where a new mine has been opened, a modern plant installed, and provision made for the housing of employees in a manner never before undertaken on the Pacific Coast. Cassidy's is considered an ideal coal mining centre and its output is constantly increasing.

Groundhog Coal Fields, Northern B.C.

The revival of interest in metalliferous mining throughout the Portland Canal District, northern British Columbia, has directed attention again to the Groundhog Coal Fields, as they are colloquially termed. These fields are situated about 90 miles from the mining town of Stewart and the coal, judging from the available reports, is of the highest quality and very plentiful. To open up the field found railroad construction would be necessary and in this connection three feasible routes are being discussed. The shortest would be from tidewater up the Naas River, but it from which point a railroad has been built fifteen miles in the direction of the coal fields. Another route would be from tiewater up the Naas River, but it is pointed out that this would be eighty miles longer. As against the handicap of distance, however, there

would be less rockwork and an easier grade. A third possible route is from the G. T. P. Railway at Hazelton, about 150 miles southward. The Groundhog Coalfields have been reported upon by a number of engineers and are known to extend some seventy miles, the strip being over thirty miles wide over which coal outcrops in different places.

Wellington and Canadian Collieries vs. Pacific Coast.

The action of the Wellington Colliery Co., Ltd., and Canadian Collieries (Dunsmuir), Ltd., vs. Pacific Coast Coal Mines, Ltd., has been before the British Columbia Court of Appeal. In the lower Court Mr. Justice Murphy found for the plaintiff whom he allowed \$84,000 damages for trespass in taking coal from the property of the Wellington Collieries and the Canadian Collieries. It may be explained that the properties of the respective companies are situated on Vancouver Island and are adjacent to each other. The defence was that W. Coulson, late manager for the Pacific Coast Coal Mines, Ltd., and now deceased, had given permission for the so-called trespass and for the taking from the plaintiff's property of a certain amount of coal. After hearing argument the Court of Appeal reserved its judgment.

Robert Henderson, fire boss at the Harewood Mine, Canadian Western Fuel Company, has been appointed manager of that mine, vice-president Richard Batty, resigned. Mr. Henderson formerly was manager at No. 4 mine, Canadian Collieries (Dunsmuir), Ltd., Cumberland.

Grand Forks Smelter & Phoenix Mine Closed Down.

The Granby Consolidated Mining, Smelting and Power Co., Ltd., has discontinued operations at its Grand Forks Smelter and Phoenix mine, and it is believed that the close down is permanent. The immediate cause is lack of coke owing to the strike in the Fernie coal fields. It had been the intention of the company to continue operations until the fall at least so that the trouble at Fernie has only hastened what was looked upon as inevitable. The company is offering all employees at Grand Forks and Phoenix free transportation to Anyox and positions with the company at that place. Among the Phoenix miners and business men there is a persistent feeling that Phoenix will rise again from its Granby ashes. It is pointed out that while the camp is closed the machinery is not being removed, the only exception being that of a few ore crushers. While the Great Northern Railway will pull up its tracks, the C. P. R. it is pointed out will not do so. Attention in this connection is directed to the report of the Granby Company of last June, which states that there were then 3,274,966 tons of ore remaining in the Phoenix mine. Since that time it is estimated that about 150,000 tons have been mined and smelted. On that figuring, therefore, there are about 3,000,000 tons still left. This, with the possibility of new development inclines those with confidence in the camp to the belief that the Consolidated Mining and Smelting Company of Canada is likely to step into the breach and to continue mining operations in the district.

Anyox Smelter Expects Great Increase in Copper Production.

That the Anyox Smelter of the Granby Mining and Smelting Company will produce twice the amount of

copper that has been turned out heretofore and may ultimately produce 100,000,000 pounds a year, is a statement credited to Dr. M. E. Nichols, President of the Company, on returning from a recent visit to Anyox. The optimism of President Nichols is believed to indicate the development of satisfactory conditions in some of the properties acquired recently among which is a group on Oxtall River, B.C., held under bond. The ledge on the Oxtall is said to be enormous. It is being developed by diamond drilling this year.

Consolidated Mining and Smelting Buy Claims in Sibola Country.

The Consolidated Mining and Smelting Company has bought five groups of claims in the Sibola country, situated twenty miles north of Sibola mountains and one hundred miles from the Grand Trunk Pacific Railway, and both silver-lead ore and silver-copper ore have been found on the property. The consideration is said to be in the neighborhood of \$250,000.

Activity in the Alice Arm District.

There is much mining activity in the Alice Arm District, Northern British Columbia. The Taylor Engineering Company, which has taken over the mine and railroad of the Dolly Varden Mining Company, is engaged in preparing to put the mine on a shipping basis. The two miles of railroad necessary to complete the line from tidewater to the Dolly Varden mines is being rushed to completion. Owners of other mining companies in the vicinity also are busy. Both the North Star mine and the United Metals mine have ore ready for shipment as soon as transportation facilities permit it being moved. Reports received from the north indicate that a consolidation of mining properties is likely to be effected. W. R. Tonkin and W. W. Warren, representing United States capital and John Peterson of Stewart, are reported to have bonded the North Star, the Vanguard, the Last Chance and the Second Thought. It is said that about half a million dollars is involved in this transaction. W. Somerville has bonded the Homestake mine and the Musketeer has been bonded by L. Meekin. A working option on the Ruby mine, situated opposite the Dolly Varden has been taken by the Taylor Mining Company, a subsidiary concern to the Taylor Engineering Company. The Temiskaming Mining Company of Cobalt, Ontario, from all accounts, is still interested in the District and is likely to take over the Moose group.

NORTHERN ONTARIO. Kirkland Lake District.

The feeling is getting abroad that at least some of the mines in the Kirkland Lake camp may soon begin to employ a limited number of men, preparatory to once more starting operations at the same rate of pay and under the conditions which prevailed before the labor strike was called. A number of the men have signified their willingness to return to work on the old basis.

A reconsideration of the entire situation, viewing the economic side of the question as it applies to precious-metal mining, may with reason serve to bring about a change in the attitude of the mine workers, and the possibilities of an early resumption of work in the Kirkland Lake field is decidedly more promising than at any previous time since the declaration of the strike.

The strike has caused more or less inconvenience in cases where property is held under working option

and where the option agreements do not protect the purchasers in case of enforced curtailment due to labor strikes. As long as the strike continues only three courses are left. The purchaser must either seek an extension of time covering the duration of the strike, failing which he will be obliged to either abandon the option or meet the obligations incurred without the opportunity of carrying out the proposed work of exploration. The latter course, in the majority of cases, would be very improbable. Indeed, in some cases, would be impossible, especially where the agreement specified the amount of work to be done each month. Among the properties affected by this phase of the situation is the Ontario-Kirkland, which is held under working option by the Crown Reserve Mining Company of Cobalt.

Mill heads at the Kirkland Lake Gold Mines during the two and a half months of operation prior to the labor strike, were comparatively low, according to information received from a usually well-informed source.

In a recent interview, Frank L. Culver, president of the company, refused to commit himself to any statement with regard to the average grade of the ore as so far determined. However, unofficial reports indicate an average gold recovery of a little under \$5 to the ton.

From definite statements made by Mr. Culver concerning ore at depth, and the general physical condition of the mine, the result of future mill operation should be decidedly more satisfactory.

The Bush Fires.

Bush fires throughout the north which had gained threatening proportions during first three days of July, and had resulted in the destruction of the mining and milling plant of the Patricia Syndicate at Boston Creek, were subdued somewhat by rains which began to fall on the morning of July 4th. At the time of writing, these fires have died down.

The destruction of the mining plant and mill of the Patricia Syndicate at Boston Creek was the only mining plant lost as a result of the forest fires which broke out in various parts of the north early in July. The mill had been closed down for some time. It had a rated capacity for treating about 30 tons of ore daily, and is stated to have had a value of about \$70,000.

Reports were in circulation with regard to the mill of the Dome Lake being destroyed, but this report was erroneous, the plant never being even threatened with bush fires. Late in June a small fire broke out in the pump-house, and did some damage, and it would appear that from this the other more serious reports took their root.

Misrepresentation re West Shining Free Gold Area.

Resentment is being openly expressed by mining engineers and geologists at the fact that promoters of unproven prospects in the West Shining Tree gold area are using the names of these men in connection with promotion literature that is in some instances at once misleading and incorrect.

It is freely admitted that the favorable geological conditions, and the rich patches of ore found in more or less narrow pay-streaks in the veins so far opened up, lend to the district a considerable amount of prospective merit. Beyond this no man can venture a definite statement.

THE CONIAGAS REDUCTION

COMPANY, LIMITED

St. Catharines - - Ontario

Smelters and Refiners of Cobalt Ores

Manufacturers of

Copper Sulphate

Bar Silver—Electrically Refined

Arsenic—White and Metallic

Cobalt Oxide and Metal

Nickel, Oxide and Metal

Telegraphic Address:

“Coniagas.”

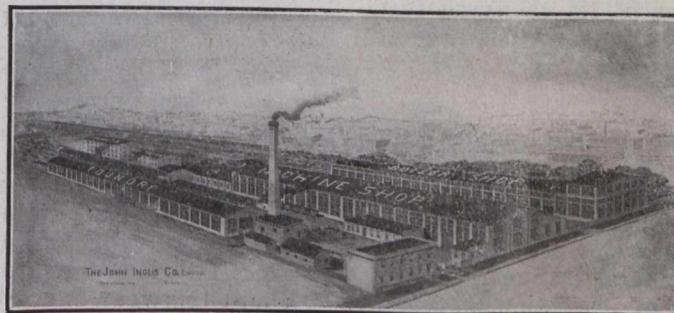
Codes: Bedford McNeill,

A. B. C. 5th Edition

Bell Telephone, 603 St. Catharines

ENGINES, BOILERS and TANKS

WRITE US
FOR PRICES
AND
SPECIFICATIONS



HEAVY
PLATE WORK
and
SPECIAL
MACHINERY

PLANT OF THE JOHN INGLIS CO. LIMITED

THE JOHN INGLIS COMPANY, LIMITED

14 Strachan Avenue, TORONTO, Canada

Representatives in Eastern Canada :
Ottawa Representative :

JAS. W. PYKE & CO., LTD., 232 St. James Street, MONTREAL
J. W. ANDERSON, 7 Bank Street Chambers

FOR SALE

2 Norwalk straight line three stage Compressors for charging air locomotives, having compound steam cylinders and two flywheels.

Air pressure 800 lbs. Steam pressure 110 lbs.

Size of steam cylinders—High pressure, 20 ins. diameter. Low pressure, 38 ins. diameter.
Stroke, 36 ins. diameter.

Size of air cylinders—23 ins., 16 ins., and 8 ins. in diameter.

ALSO THE FOLLOWING LOCOMOTIVES:—

Maker	Size	Description	Dia., Driver	No. Wheels	Wheel Base	Weight	Length Overall
2 Porter	7" x 12"	Simple	23"	4	4'0"	14000	13'4"
4 Porter	10½" x 14"	"	26"	4	5'3"	30000	19'4"
2 Porter	7" x 14"	"	24"	4	5'3"	20000	18'0"
1 Baldwin	11" x 14"	"	28"	6	6'6"	40000	22'8"
1 Baldwin	11" x 14"	"	28"	6	6'5"	34000	19'8"
1 Baldwin	9" x 14"	"	28"	4	5'6"	25000	17'0"

These locomotives are 3 ft. gauge and have a clearance height from top of rail of 4 ft. to 5 ft. 2 in.
This machinery is all in working order and is open to inspection at Glace Bay.

DOMINION COAL COMPANY Limited, Glace Bay, N.S.

GENERAL MINING NOTES.

The Rio Tinto group of claims, which are situated on the same vein as the Electric Point Mine at North Port Washington, has been sold by J. H. McDonald, of Rossland, to American capitalists. Recent development work on this property has revealed a considerable body of first-class silver-lead ore. The vein strikes east and west and has been opened up by a series of open cross-cuts over a distance of six thousand feet. It is understood that the new company will proceed with development on a large scale.

Extensive development work is planned on the Whitewater and Comstock groups of mineral claims on Cascade Creek in the Lardo District, and on the Nonpareil Group at Zineton. These properties belong to the Nelson Mining and Development Company, Spokane. W. W. Shaffner, general manager, has returned to Nelson, after a trip of inspection on which he was accompanied by Clarence Marsh, secretary-treasurer of the company, W. Euler of Soap Lake, Washington, and A. L. Maltbie, of Wenatchee.

They put some men to work continuing No. 2 tunnel at the Cascade Creek Mine. This tunnel has already been driven 120 feet and it is estimated that another seventy or eighty feet will strike the main ore body. The ore is silver, lead and gold. The nonpareil group is in the immediate vicinity of the Lucky Jim Mine, and is considered to be a prospect of much promise.

The Mansfield Mining Company is developing what is known as the Crescent group of mineral claims situated in the Alpine Bas near Trout Lake. The main vein was first tested by a shaft which showed up so well that it was decided to drive a tunnel to strike the ore at a considerable depth. This tunnel has been driven some 185 feet with satisfactory results. The company proposes driving a second tunnel for a depth of 450 feet on the ore body. The ore is silver-lead, running thirty to fifty ounces of silver and seventy percent lead. When development has advanced sufficiently it is the intention to erect a Gibson concentrator. Another promising property of the Trout Lake district is the Tribune Mine, which carries high values in silver. Development of the new body of ore which was worked to some extent last season will be continued this summer. The Crown property which is located above Trout Lake has been bonded by California mining men who are said to propose the erection of a mill this year.

Mining development is progressing energetically in the Salmon River Valley, Portland Canal District. At the well-known Premier mine an assay office is being built and accommodation provided for a considerable force of miners. A portable saw-mill already has started work and a road gang is engaged in putting the road in shape for heavy hauling. Similar operations are under way on the property of the Bush Mines, Ltd.

“Sirocco”

TRADE MARK

VENTILATION— Does It Pay?

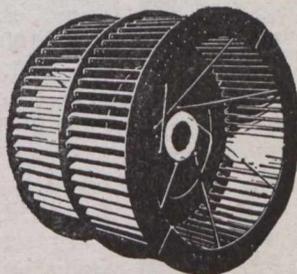
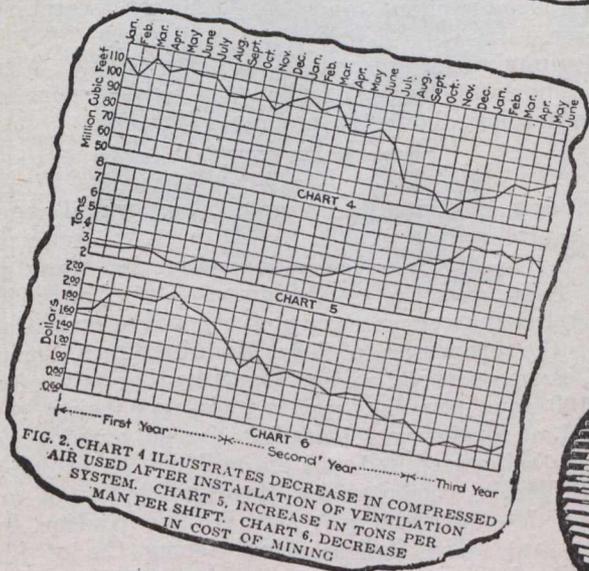
In order to maintain the maximum production, with a corresponding high standard in the quality of the work, it is absolutely necessary that every working place should have a good working atmosphere, and that the ventilation should be so kept up with the progress of the work that the men may continue to perform their duties in health and comfort. Mechanical ventilating systems which have been designed with careful study and are now in operation have fully justified the cost of their installation, as evidenced by the increase in tons per man per shift and the decrease in cost. In mines where such a system has been carefully worked out and conditions have been standardized as much as possible, there has always been a great saving in the amount of compressed air used. In fact, in some cases the economy in this item alone has more than balanced the cost of installation.

The accompanying extract and chart are from “Standardization of Mining Methods” by Charles A. Mitke, Engineering and Mining Journal, Nov. 30, 1918, and answer most conclusively the question, does it pay?

He says, among other things, “in some cases the economy in this item alone, (compressed air saving) has more than balanced the cost of installation.”

His charts of actual performances where mechanical ventilation has been installed show that after installation the output per man per shift was more than doubled; and the cost was cut to LESS THAN HALF.

Compressed air savings more than balance the cost of installation; your output is doubled; your costs cut in half. All these indicate there is something worth while investigating. SIROCCO fans are extra efficient in forcing large volumes of air through the tortuous and restricted passage-ways of the average mine.



Write at once for bulletin on Mine Ventilation and Mine Fans.

CANADIAN SIROCCO CO., LIMITED

WINDSOR, ONT.

Branches : CALGARY, ALTA.

VANCOUVER, B. C.

MONTREAL, QUE.

WINNIPEG, MAN.

TORONTO, ONT.

OxyAcetylene Welding and Cutting



"Rivetless" Metal Joining Makes Tanks Leak-Proof

Here is shown how permanently leak-proof sheet metal tanks are made by the Prest-O-Lite Process. The metal sheets are first cut to shape with a Prest-O-Lite cutting blow-pipe. They are then set in position, and all joints are welded by the Prest-O-Lite Process of oxy-acetylene welding. The joints are made stronger, neater, and at less cost than by riveting. All danger of leakage at joints is eliminated.

In repairing as well as in manufacturing the Prest-O-Lite Process is literally "blazing the trail" to efficiency and economy. It saves hundreds of thousands of dollars annually in Canadian factories, mines, machine shops—wherever metal or machinery is used.

Prest-O-Lite
PROCESS

employs both gases (acetylene and oxygen) in portable cylinders. Prest-O-Lite Dissolved Acetylene is backed by Prest-O-Lite service, which insures prompt exchange of full cylinders for empty ones. Provides dry, purified gas, insuring better welds, quicker work and lower operating cost.

Apparatus consists of an equal pressure blow-pipe, automatic regulators and gauges, and all necessary equipment. Adaptable for oxy-acetylene cutting by the addition of special cutting blow-pipe.

Thorough instructions are furnished free to every user of Prest-O-Lite Dissolved Acetylene. Any average workman who understands metals can learn the welding process quickly and easily.

We will gladly send illustrated literature and interesting data showing actual instances of sayings made by others. It may suggest valuable ideas to you. Write for it.

Address Department C -- 108

**Prest-O-Lite Company
of Canada, Limited**

Prest-O-Lite Building
Cor. Elm St. and Centre Ave.
Toronto

Plants at:—
Toronto, Ont. Shawinigan Falls, Que
Merritton, Ont. St. Boniface, Man.



World's Largest Makers of Dissolved Acetylene

BOWENA COPPER MINES, LTD.

The Bowena Copper Co. holds under license 3 claims of 150 acres each on the east side of Bowen island, 12 miles west of Vancouver. Development consists of 300 ft. of tunnelling, 50 ft. shaft work, and numerous open cuts. The ore contains about 2 per cent. copper and small values in gold and silver. A concentrating mill is practically completed and ready for milling operations.



The Bowena Copper Mines, Bowen Island, B.C.

The company is capitalized at \$300,000 in \$1 shares. There is outstanding 27,0820 shares. There has been expended on development and equipment \$30,000.

The officers are: L. A. Brown, president; T. W. Turner, vice-president, and C. M. Oliver, secretary-treasurer.

The annual meeting was held in March, 1919. Alex. Sharp reports ten to twelve thousand tons ore blocked out, containing about 1.8 per cent. copper

Corundum, Limited, a newly incorporated company, capitalized at \$250,000, was recently organized by E. B. Clark, formerly manager for the Manufacturers' Corundum Co., at Craigmont, Ont., from 1907 to 1918, for the concentrating of corundum ores. Control of the properties of The Manufacturers Corundum Co. was secured and a concentrating mill of at least 100 tons per day capacity is now being constructed at Craigmont, Ontario. Large burning engines are being installed and the mill will be equipped and 16 Wilfleys, classifiers, Hardinge ball mill and other modern machinery. Mr. W. W. Hudson, re-recently with The General Engineering Co. of Salt Lake City, is engineer in charge of construction. G. H. Ferguson, of Renfrew, is President of the new company, and E. B. Clark, of Craigmont, is Vice-President and Managing Director.

POSITION WANTED—Mining Engineer, 15 years' experience all kinds metal mines, 12 years Superintendent, Manager and Examination. College Graduate. Member C. M. I. Apply A, Canadian Mining Journal.

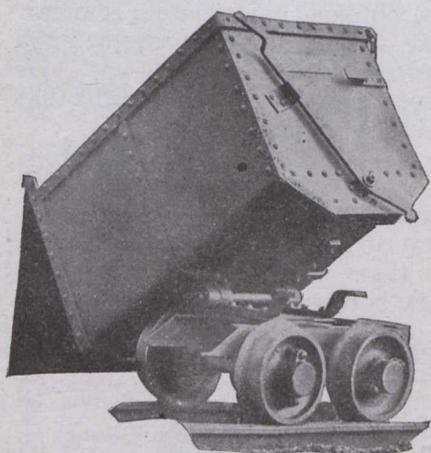
ROTARY MINE CARS

Roller Bearing, or not, as desired

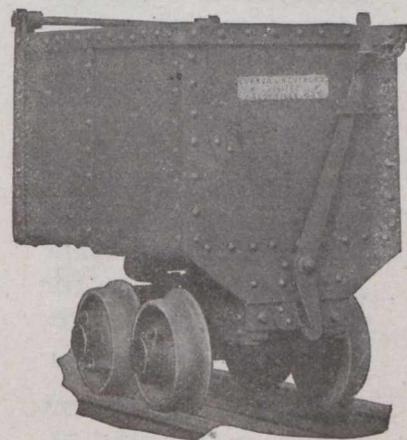
We equip these cars with either our Special Roller Bearings, with dust proof, oil retaining cap on wheels, or with our self-oiling, dust-excluding wheels, as may be preferred.

These cars are easy running, and simple to operate.

The bodies revolve on a turntable, and will dump at either side or either end, and positively will not dump until in the desired position.



Made any size or capacity, and to fit any gauge of track.



We also make any other type of Mine Car you want. Let us tender on your next order.

HAVE YOU SEEN OUR NEW MINING CATALOG?

It is just off the press, and is well worthy of your examination

Marsh Engineering Works Limited, Belleville, Ontario

ESTABLISHED 1846

Sales Agents: MUSSENS LIMITED, Montreal, Toronto, Winnipeg and Vancouver

More than ever the Mill determines the profit

As the mining industry swings forward mere "rocks" become "ores." Tailings piles spring into life as "bonanzas." Ores of lower and lower grade are worked.

It is all a story of treatment methods. Reductions in treatment costs turn one time waste into "gold." More than ever the mill determines the profit.

The possibilities of the Wilfley Table, the Marcy Mill and other Massco products for the mill warrant careful investigation.

Massco equipment has been making interesting changes in cost sheets.



The past few years have seen important advances in the design of mill equipment.

* * * * *

Many improvements have been added to the Wilfley Concentrating Table—increasing its already high metallurgical and mechanical efficiency. One of the newest features of the Wilfley is a fully enclosed, self-oiling head motion of great simplicity and strength.



One of the latest Wilfley Tables

A Wilfley Table may now be obtained for concrete foundations—the steel channels are not required—strength and other mechanical advantages are retained fully. The Wilfley Table has more than kept pace with the requirements of the times—it is a step ahead. Have you full facts?

* * * * *

In 1915 the Marcy Ball mill was introduced into commercial service. Its early results were revolutionary and it has since consistently given capacity that was thought impossible and costs far below the rock bottom figures set for other types of equipment.

The largest capacity ball mill plant in the world uses Marcy Mills and Marcy Mills are now grinding over 60,000 tons a day in approximately 200 plants. If you haven't the Marcy No. 42 Booklet you will certainly appreciate a copy. Just ask our nearest office.



The New 86 Marcy Ball Mill showing grates, liners and balls

* * * * *

Investigate the Scobey Tailings Sampler, Pierce Amalgamator, Perfection Oil and Acid Feeder.

Massco service backs them all

Write for further particulars

The Mine & Smelter Supply Co.

Denver

Salt Lake City

El Paso

New York Sales Office: 42 Broadway

The Canadian Miners' Buying Directory.

- Acetylene Gas:**
Canada Carbide Company, Ltd.
- Air Hoists:**
Canadian Ingersoll-Rand Co. Ltd.
Montreal, Que.
- Amalgamators:**
Northern Canada Supply Co.
Mine and Smelter Supply Co.
- Antimony:**
Canada Metal Co., Ltd.
- Assayers and Chemists:**
Milton L. Hersey Co., Ltd.
Campbell & Deyell, Cobalt.
Ledoux & Co., 99 John St., New York.
Thos. Heys & Son.
C. L. Constant Co.
- Assayers' and Chemists' Supplies:**
C. L. Berger & Sons, 37 William St., Boston, Mass.
Lymans, Ltd., Montreal, Que.
Stanley W. F. & Co., Ltd.
Mine & Smelter Supply Co.
- Brakeshoes:**
Can. Brakeshoe Co., Ltd.
- Babbit Metals:**
Canada Metal Co., Ltd.
Hcyt Metal Co.
- Balances—Hessner:**
Mine & Smelter Supply Co.
- Balls:**
Canadian Foundries and Forgings, Ltd.
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries Ltd.
- Ball Mills:**
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Belting—Leather, Rubber and Cotton:**
Northern Canada Supply Co.
Jones & Glasco.
- Blasting Batteries and Supplies:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Northern Canada Supply Co.
Canadian Explosives, Ltd.
- Blowers:**
MacGovern & Co., Inc.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Boilers:**
Northern Canada Supply Co.
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Marsh Engineering Works.
MacGovern & Co., Inc.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
The John Inglis Company.
- Boxes, Cable Junction:**
Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.,
- Buckets:**
Canadian Ingersoll Rand Co., Sherbrooke, Que.
Hendrick Mfg. Co.
M. Beatty & Sons, Ltd.
Marsh Engineering Works.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd.
- 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.
- Cages:**
Canadian Ingersoll Rand Co., Sherbrooke, Que.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Cables—Wire:**
Standard Underground Cable Co. of Canada, Ltd.
Canada Wire & Cable Co., Ltd.
Northern Electric Co., Ltd.,
- Car Dumps:**
Sullivan Machinery Co.
R. T. Gilman & Co.
- Carbide:**
Canada Carbide Company, Ltd.
- Cars:**
Canadian Foundries & Forgings, Ltd.
Canadian Ingersoll Rand Co., Sherbrooke, Que.
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
Marsh Engineering Works.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Car Wheels and Axles:**
Canadian Car Foundry Co., Ltd.
Marsh Engineering Works, Ltd.
- Castings (Iron & Steel):**
Canadian Steel Foundries, Ltd.
- Cement Machinery:**
Northern Canada Supply Co.
Hadfields Ltd.
Fraser & Chalmers of Canada, Ltd.
- Chains:**
Jones & Glasco.
Northern Canada Supply Co.
- Chemical Apparatus:**
Mine & Smelter Supply Co.
- Chemists:**
Canadian Laboratories.
Campbell & Deyell.
Thos. Heys & Sons.
Milton Hersey Co.
Ledoux & Co.
- Classifiers:**
niMe & Smelter Supply Co.
- Coal:**
Dominion Coal Co.
Nova Scotia Steel & Coal Co.
- Coal Cutters:**
Sullivan Machinery Co.
Can. Ingersoll-Rand Co., Ltd., Montreal, Que.
- Coal Mining Explosives:**
Canadian Explosives, Ltd.
- Coal Mining Machinery:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Sullivan Machinery Co.
Marsh Engineering Works.
Hadfields, Ltd.
Fraser & Chalmers of Canada, Ltd.
- Coal Pick Machines:**
Sullivan Machinery Co.
- Compressors—Air:**
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Northern Canada Supply Co.
MacGovern & Co., Inc.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
- Concrete Mixers:**
Northern Canada Supply Co.
Gould, Shapley & Muir Co., Ltd.
MacGovern & Co., Inc.
- Condensers:**
Smart-Turner Machine Co.
Northern Canada Supply Co.
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.
- Concentrating Tables:**
Mine & Smelter Co.
- Converters:**
Northern Canada Supply Co.
MacGovern & Co., Inc.
- Conveyor—Trough—Belt:**
Hendrick Mfg. Co.
- Cranes:**
Smart-Turner Machine Co.
M. Beatty & Sons, Ltd.
- Crane Ropes:**
Allan, Whyte & Co.
- Crucibles:**
Mine & Smelter Supply Co.
- Crushers:**
Canadian Steel Foundries, Ltd.
Lymans, Ltd.
Mussens, Limited.
Mine & Smelter Supply Co.
Hadfields Ltd.
Fraser & Chalmers of Canada, Ltd.
- Derricks:**
Smart-Turner Machine Co.
M. Beatty & Sons, Ltd.
Marsh Engineering Works.
R. T. Gilman & Co.
- Diamond Drill Contractors:**
Diamond Drill Contracting Co.
E. J. Longyear Company.
Smith & Travers.
Sullivan Machinery Co.
- Dredger Pits:**
Canadian Steel Foundries, Ltd.
Hadfields Ltd.
- Dredging Machinery:**
Canadian Steel Foundries, Ltd.
M. Beatty & Sons.
Hadfields Ltd.
- Dredging Ropes:**
Allan, Whyte & Co.
R. T. Gilman & Co.
- Drills, Air and Hammer:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Sullivan Machinery Co.
Northern Canada Supply Co.
Canadian Rock Drill Co.
- Drills—Core:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
E. J. Longyear Company.
Standard Diamond Drill Co.
Sullivan Machinery Co.
- Drills—Diamond:**
Sullivan Machinery Co.
Northern Canada Supply Co.
E. J. Longyear Company.
- Drill Steel—Mining:**
Hadfields Ltd.
- Drill Steel Sharpeners:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Northern Canada Supply Co.
Sullivan Machinery Co.
Canadian Rock Drill Co.
- Drills—Electric:**
Northern Electric Co., Ltd.
- Drills—High Speed and Carbon:**
Hadfields Ltd.
- Dynamite:**
Canadian Explosives.
Northern Canada Supply Co.
- Ejectors:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Northern Canada Supply Co.
- Elevators:**
M. Beatty & Sons.
Northern Canada Supply Co.
Hadfields Ltd.
Fraser & Chalmers of Canada, Ltd.
- Engineering Instruments:**
C. L. Berger & Sons.
- Engines—Automatic:**
Smart-Turner Machine Co.
Fraser & Chalmers of Canada, Ltd.
- Engines—Gas and Gasoline:**
Alex. Fleck.
Smart-Turner Machine Co.
Gould, Shapley & Muir Co., Ltd.
MacGovern & Co., Inc.
- Engines—Haulage:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Marsh Engineering Works.
Fraser & Chalmers of Canada, Ltd.
- Engines—Marine:**
Smart-Turner Machine Co.
MacGovern & Co., Inc.
- Engines—Steam:**
Smart-Turner Machine Co.
M. Beatty & Sons.
R. T. Gilman & Co.
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.
- Flood Lamps:**
Northern Electric Co., Ltd.,
- Forges:**
Northern Canada Supply Co., Ltd.
- Forging:**
M. Beatty & Sons.
Canadian Foundries and Forgings, Ltd.
Smart-Turner Machine Co.
Hadfields Ltd.
Fraser & Chalmers of Canada, Ltd.
- Frogs:**
Canadian Steel Foundries, Ltd.
- Furnaces—Assay:**
Lymans, Ltd.
Mine & Smelter Supply Co.
- Fuse:**
Canadian Explosives.
Northern Canada Supply Co.
- Gears, Machine Cut:**
Canadian Steel Foundries, Ltd.
The Hamilton Gear & Machine Co.
Fraser & Chalmers of Canada, Ltd.

If you want a Reliable Casting, let us quote you on our ALL PIG mixture
 Specialists in HIGH CLASS Machinery Castings
 Manufacturers of Mining and Cement Mill Parts
 STANDARD GEARS ALWAYS IN STOCK

Sole Agents and Manufacturers for "Kilbourn's" Patent Tube Mill Lining

FOUNDERS PATTERNMAKERS MACHINISTS
BURNETT & CRAMPTON, Rigaud, Que.



Wood Mining Tanks

Of All Descriptions

Wood Stave Pipe

ILLUSTRATION SHOWS DORR THICKENER TANKS 50 FEET DIAMETER. MADE FROM B.C. FIR. INSTALLED BY US.

Pacific Coast Pipe Co., Limited

1551 Granville Street, Vancouver, B.C.

The Consolidated Mining and Smelting Company

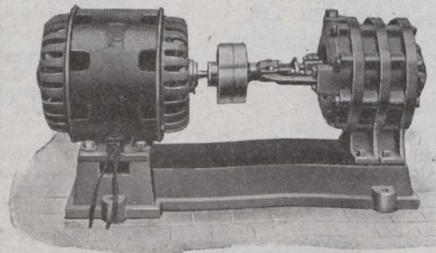
OF CANADA, LIMITED

Smelting and Refining : TRAIL, BRITISH COLUMBIA

Buyers of
 GOLD, SILVER, COPPER, LEAD and ZINC ORES

Producers and Sellers of
 Copper - Lead - Spelter
 Tadanac Brand

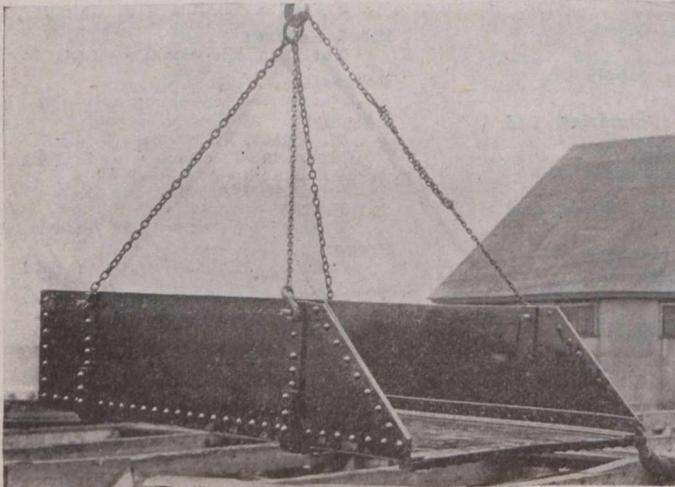
Sales Offices : - - C. P. R. Building, Toronto



STEAM
 and
 POWER

P
 U
 M
 P
 S

The Smart-Turner Machine Co., Limited
 HAMILTON, CANADA.



ANYTHING IN
**STEEL PLATE AND
 STRUCTURAL WORK**
 FOR THE MINES

SKIPS - AIR RECEIVERS
 AFTERCOOLERS ORE BUCKETS

MacKinnon Steel Co. Limited
 SHERBROOKE - QUEBEC
 Montreal Office - 404 New Birks Building

Canadian Miners' Buying Directory.—(Continued from page 29.)

- Gears:**
Canadian Steel Foundries, Ltd.
Smart-Turner Machine Co.
Northern Canada Supply Co.
The Hamilton Gear & Machine Co.
Fraser & Chalmers of Canada, Ltd.
- Hammer Rock Drills:**
Mussens, Limited.
- Hangers & Cable:**
Standard Underground Cable Co. of Canada, Ltd.
- High Speed Steel:**
Hadfields Ltd.
- High Speed Steel Twist Drills:**
Northern Canada Supply Co.
- Hoists—Air, Electric and Steam:**
Can. Ingersoll-Rand Co., Ltd., Montreal, Que.
Jones & Glassco.
M. Beatty & Sons.
Marsh Engineering Works.
Northern Canada Supply Co.
Mine and Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Hoisting Engines:**
Mussens, Limited.
Can. Ingersoll-Rand Co., Ltd.
M. Beatty & Sons.
Marsh Engineering Works.
Fraser & Chalmers Engineering Works.
Fraser & Chalmers of Canada, Ltd.
- Hose:**
Northern Canada Supply Co.
- Hydraulic Machinery:**
Hadfields Ltd.
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.
- Ingot Copper:**
Canada Metal Co., Ltd.
Hoyt Metal Co.
- Insulating Compounds:**
Standard Underground Cable Co. of Canada, Ltd.
- Jacks:**
Can. Brakeshoe Co., Ltd.
Northern Canada Supply Co.
- Laboratory Machinery:**
Mine & Smelter Supply Co.
- Lamps, Miners:**
Canada Carbide Company, Ltd.
Dewar Mfg. Co., Inc.
Northern Electric Co., Ltd.,
- Locomotives (Steam, Compressed Air and Storage Steam):**
H. K. Porter Company.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
- Link Belt:**
Northern Canada Supply Co.
Jones & Glassco.
- Manganese Steel:**
Canadian Steel Foundries, Ltd.
Hadfields Ltd.
Fraser & Chalmers of Canada, Ltd.
- Metal Merchants:**
Henry Bath & Son.
Geo. G. Blackwell, Sons, & Co.
Consolidated Mining and Smelting Co. of Canada.
Canada Metal Co.
C. L. Constant Co.
Everitt & Co.
- Mining Requisites:**
Canadian Steel Foundries, Ltd.
Hadfields Ltd.
Fraser & Chalmers of Canada, Ltd.
- Monel Metal:**
International Nickel Co.
- Motors:**
R. T. Gilman & Co.
- Nickel:**
International Nickel Co.
- Ore Sacks:**
Northern Canada Supply Co.
- Ore Testing Works:**
Ledoux & Co.
Can. Laboratories.
Milton Hersey Co., Ltd.
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.
Orford Copper Co.
Canada Metal Co.
Hoyt Metal Co.
Everitt & Co.
- Perforated Metals:**
Northern Canada Supply Co.
Hendrick Mfg. Co.
- Pig Tin:**
Canada Metal Co., Ltd.
Hoyt Metal Co.
- Pig Lead:**
Canada Metal Co., Ltd.
Hoyt Metal Co.
- Pipes:**
Canada Metal Co., Ltd.
Consolidated M. & S. Co.
Northern Canada Supply Co.
Smart-Turner Machine Co.
- Pipe—Wood Stave:**
Pacific Coast Pipe Co., Ltd.
Mine and Smelter Supply Co.
- Piston Rock Drills:**
Mussens, Limited.
- Plate Work:**
John Inglis Co., Ltd.
- Pneumatic Tools:**
Can. Ingersoll-Rand Co., Ltd.
Jones & Glassco.
- Prospecting Mills and Machinery:**
E. J. Longyear Company.
Standard Diamond Drill Co.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Pulleys, Shafting and Hangings:**
Northern Canada Supply Co.
- Pulverizers—Laboratory:**
Mine & Smelter Supply Co.
- Pumps—Boiler Feed:**
Smart-Turner Machine Co.
Northern Canada Supply Co.
Canadian Ingersoll-Rand Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
- Pumps—Centrifugal:**
Mussens, Limited.
Smart-Turner Machine Co.
M. Beatty & Sons.
Canadian Ingersoll-Rand Co., Ltd.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Pumps—Electric:**
- Pumps—Sand and Slime:**
Mine & Smelter Supply Co.
- Pumps—Pneumatic:**
Smart-Turner Machine Co.
Sullivan Machinery Co.
- Pumps—Steam:**
Canadian Ingersoll-Rand Co., Ltd.
Mussens, Limited.
Northern Canada Supply Co.
Smart-Turner Machine Co.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
- Pumps—Turbine:**
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd.
Fraser & Chalmers Engineering Works.
Fraser & Chalmers of Canada, Ltd.
- Pumps—Vacuum:**
Smart-Turner Machine Co.
- Quarrying Machinery:**
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.
Hadfields Ltd.
- Rails:**
Hadfields, Ltd.
R. T. Gilman & Co.
- Roofing:**
Northern Canada Supply Co.
- Rope—Manilla and Jute:**
Jones & Glassco.
Northern Canada Supply Co.
Allan, Whyte & Co.
- Rope—Wire:**
Allan, Whyte & Co.
Northern Canada Supply Co.
- Rolls—Crushing:**
Canadian Steel Foundries, Ltd.
Hadfields Ltd.
- Samplers:**
Fraser & Chalmers of Canada, Ltd.
C. L. Constant Co.
Ledoux & Co.
Milton Hersey Co., Ltd.
Thos. Heyes & Son.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Screens:**
Northern Canada Supply Co.
Hendrick Mfg. Co.
Hadfields Ltd.
- Screens—Cross Patent Flanged Lip:**
Hendrick Mfg. Co.
- Separators:**
Smart-Turner Machine Co.
- Sheet Lead:**
Canada Metal Co., Ltd.
- Sheets—Genuine Manganese Bronze:**
Hendrick Mfg. Co.
- Shoes and Dies:**
Canadian Foundries and Forgings, Ltd.
- Shovels—Steam:**
Canadian Steel Foundries, Ltd.
M. Beatty & Sons.
R. T. Gilman & Co.
- Smoke Stacks:**
Hendrick Mfg. Co.
MacKinnon Steel Co., Ltd.
Marsh Engineering Works.
- Special Machinery:**
John Inglis Co., Ltd.
- Spring Coil & Clips Electric:**
Canadian Steel Foundries, Ltd.
- Steel Barrels:**
Smart-Turner Machine Co.
Fraser & Chalmers of Canada, Ltd.
- Steel Castings:**
Canadian Brakeshoe Co., Ltd.
Canadian Steel Foundries, Ltd.
Hadfields Ltd.
- Steel Drills:**
Northern Canada Supply Co.
Can. Ingersoll-Rand Co., Ltd.
- Steel Drums:**
Smart-Turner Machine Co.
- Steel—Tool:**
N. S. Steel & Coal Co.
Hadfields Ltd.
- Stone Breakers:**
Hadfields Ltd.
Fraser & Chalmers of Canada, Ltd.
- Surveying Instruments:**
C. L. Berger.
- Switches & Switch Stand:**
Canadian Steel Foundries, Ltd.
- Tables—Concentrating:**
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Tanks (Wooden):**
Gould, Shapley & Muir Co., Ltd.
Pacific Coast Pipe Co., Ltd.
- Tanks—Steel:**
Canadian Ingersoll Rand Co., Sherbrooke, Que.
Marsh Engineering Works.
MacKinnon Steel Co.
Fraser & Chalmers of Canada, Ltd.
- Tanks—Cyanide, Etc.:**
Hendrick Mfg. Co.
Pacific Coast Pipe Co., Ltd.
MacKinnon Steel Co.
Fraser & Chalmers of Canada, Ltd.
- Tanks (water) and Steel Towers:**
Gould, Shapley & Muir Co., Ltd.
MacKinnon Steel Co.
- Tramway Points and Crossings:**
Canadian Steel Foundries, Ltd.
Hadfields Ltd.
- Transits:**
C. L. Berger & Sons.
- Transformers:**
R. T. Gilman & Co.
Northern Electric Co., Ltd.,
- Tubs:**
Hadfields Ltd.
- 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.
Imperial Brass Mfg. Co.
- Wheels and Axles:**
Canadian Steel Foundries, Ltd.
Hadfields Ltd.
- Winding Engines—Steam and Electric:**
Can. Ingersoll-Rand Co., Ltd.
Marsh Engineering Works.
Fraser & Chalmers of Canada, Ltd.
- Wire:**
Canada Wire & Cable Co., Ltd.
- Wire Cloth:**
Northern Canada Supply Co.
Greening, B., Wire Co.
- Wire (Bare and Insulated):**
Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.,
- Zinc Spelter:**
Canada Metal Co., Ltd.
Hoyt Metal Co.

THE CANADIAN MINING JOURNAL
ALPHABETICAL INDEX TO ADVERTISERS

A

Allan Whyte & Co. 6
American Zinc Lead & Smelting Co. 6

B

Balbach Smelting & Refining Co. 10
Blackwell, G. C., Sons & Company 12
Beatty, M. & Sons 12
Berger C. L. & Sons 12
Brigstocke, R. W. 10
British Columbia, Prov. of.
Burns & Roberts 10
Burnett & Crampton 30

C

Campbell & Deyell, Ltd. 11
Canadian Allis-Chalmers, Ltd.
Can. Chicago Bridge & Iron Works.
Canadian Explosives, Ltd.
Canadian Fairbanks-Morse Co., Ltd. 16
Canadian H. K. Porter, Ltd. 12
Canadian Milk Products
Canadian National Railways
Canadian Laboratories, Ltd. 12
Canadian Link Belt Co.
Canadian Ingersoll-Rand Co., Ltd.
Canada Foundries & Forgings,
Ltd. 10
Canada Wire and Cable Co. 6
Canadian Rock Drill Co.
Canadian Steel Foundries 1
Canada Carbide Company
Canada Metal Co. 5
Canadian Brakeshoe Coy. 7
Canadian Sirocco Co. 25
Capper Pass & Son, Ltd. 12
Consolidated Mining and Smelting
Co. 30
Conigas Reduction Co., Ltd. 23
Constant, C. L. & Co. 7
Can. Gen. Electric Co.

D

Deister Concentrator Co.
Denver Rock Drill Mfg. Co.
Deloro Smelting & Refining Co. 4
Department of Mines, Canada
Dewar Mfg. Co.
Diamond Drill Carbon Co. 32
Diamond Drill Contracting Co. 12
Dominion Coal Co., Ltd. 24-4
Dorr Co. 11
Dresser, Jno. A. 11
Dunlop Tire & Rubber Co., Ltd.
Dwight & Lloyd Sintering Co., Inc. 10
Dom. Engineering & Inspection Co.,
Ltd. 10

E

Electric Steel & Metals Co., Ltd.
Engineering & Machine Works of
Canada 5
Everett & Co. 5

F

Fleck, Alex. 12
Ferrier, W. F. 11
Fasken, Robertson, Chadwick &
Sedgewick 11
Fraser & Chalmers of Canada, Ltd. 34

G

Gartshore, John J.
General Engineering Co. 12
Gilman, R. T. Co.
Goldsmith Bros., Smelting & Refin-
ing Co., Ltd. 10
Greening, B. Wire Co.
Goodyear Tire & Rubber Co. of Can-
ada, Ltd.

H

Hadfields, Ltd.
Hall, G. C. & Co.
Hamilton Gear & Machine Co. 10
Hardinge Conical Mill Co.
Hassan A. A. 11
Hendrick Mfg. Co. 12
Hersey, Milton Co., Ltd. 11
Heys Thomas & Son 11
Hull Iron & Steel Foundries, Ltd. 14
Hoyt Metal Co.

I

Imperial Bank of Canada
Imperial Oil Co.
International Business Machines
International High Speed Steel Co.
International Nickel Co. 8-9
Inglis, J. & Co. 23

J

Johnston, Matthey & Co. 11
Jones & Glassco

L

Laurie & Lamb 34
Ledoux & Co. 11
Lindsey, G. C. S. 11
Longyear, E. J. Company
Lymans, Ltd.

M

McDonald, M. P. 11
MacGovern & Co., Inc.

MacKinnon Steel Co., Ltd. 30
Marsh Engineering Works, Ltd. 27
McEvoy, Jas. 11
Mine & Smelter Supply Co. 28
Mond Nickel Co. 5
Mussens, Ltd. 4 & 33

N

Northern Canada Supply Co., Ltd. 7
Nova Scotia Steel & Coal Co.
Nova Scotia Government

O

Ontario, Province of 13

P

Pacific Coast Pipe Co., Ltd. 30
Peacock Bros., Ltd.
Pennsylvania Smelting Co. 10
Powley & Townsley 7
Prest-O-Lite Co. of Canada, Ltd. 26

Q

Quebec, Province of 10

R

Ridout & Maybee 12
Rogers John C. 11
Rogers, Geo. R. 11
Reddaway, F. & Co.

S

Smart-Turner Machine Co. 30
Smith & Travers Company 11
Standard Underground Cable Co.,
of Canada, Ltd.
Stewart, Robert H. 11
Sudbury Diamond Drilling Co., Ltd. 11
Sullivan Machinery Co. 2
Swedish Steel & Importing Co. 3

T

Toronto Testing Laboratory, Ltd. 11
Toronto Iron Works
Tyrrell, J. B. 11

U

University of Toronto 7

W

Wabi Iron Works 6
Whitman, Alfred R. 11

Good Cores

Can only be obtained if proper care be exercised in the selection of diamonds. We are always ready to give our customers the benefit of our experience when selecting stones.

Write or wire at our expense for particulars.

THE DIAMOND DRILL CARBON CO.

Direct Importers
of
GARBONS & BORTZ
BALLAS

61 PARK ROW
New York - N.Y.



Hoisting Engines

MADE BY

MARSH ENGINEERING WORKS Ltd.
BELLEVILLE, ONT.

*Put Your Hoisting Problems
Up to Us*

— WE MAKE A SPECIALTY OF —

MINE HOISTS

STEAM, ELECTRIC,
or MOTOR DRIVEN

ALSO

**Mine Cages, Cars, Buckets,
etc., etc.**

Send for Illustrated Catalogue

MUSSENS LIMITED

MONTREAL

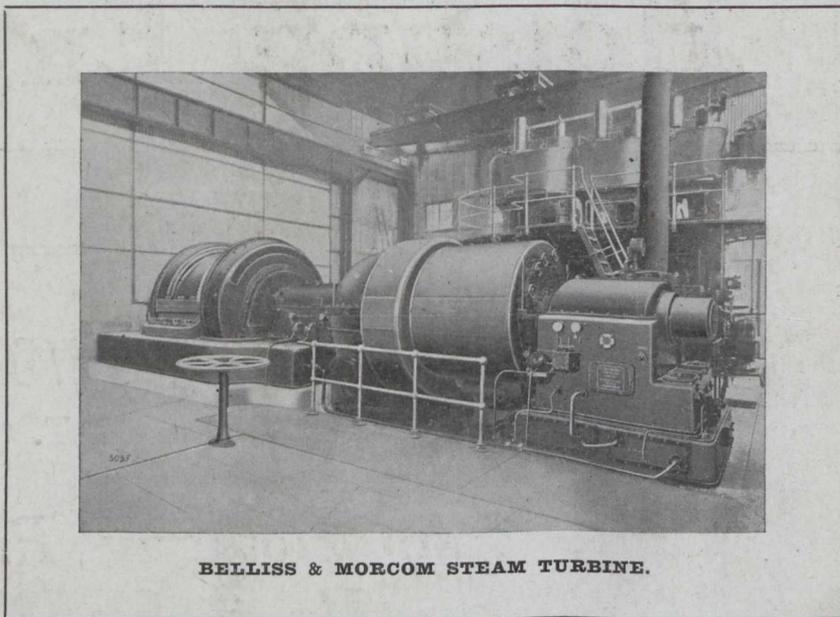
WINNIPEG

VANCOUVER

TORONTO : Confederation Life Building

BELLISS & MORCOM

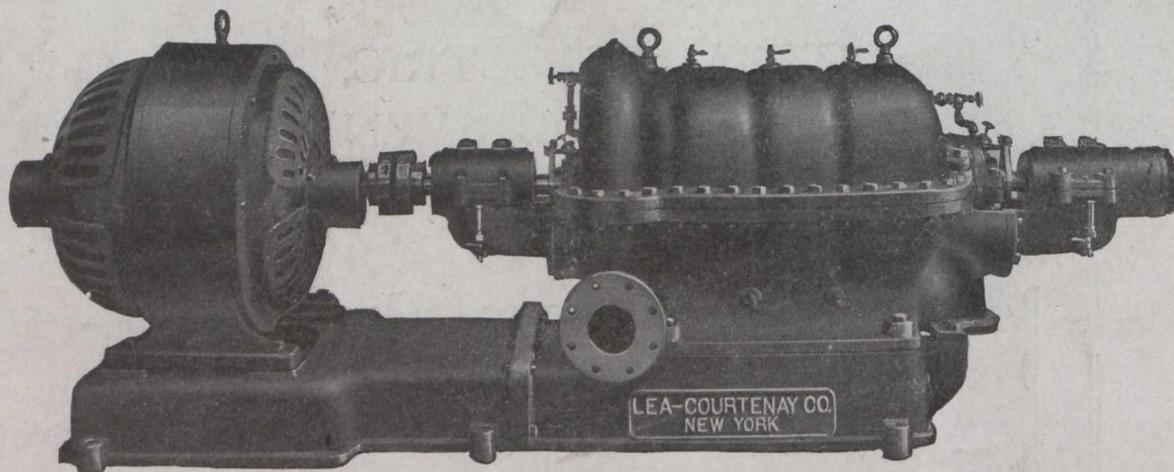
Air Compressors
Diesel Engines
Steam Turbines
Condensers
Steam Engines



BELLISS & MORCOM STEAM TURBINE.

**LAURIE
& LAMB**

211 BOARD OF TRADE BUILDING, MONTREAL



Lea-Courtenay 3-Stage Turbine Pump.

LEA-COURTENAY TURBINE PUMPS

These Pumps are built in both Vertical and Horizontal Types

Write for Bulletin Illustrating our Various Pumps.

FRASER & CHALMERS OF CANADA

Guarantee Building

LIMITED

MONTREAL, QUE.