

CANADIAN MINING JOURNAL

Vol. XL

GARDEN CITY PRESS, Ste. Anne de Bellevue, NOVEMBER 26, 1919

No. 47.

SANDERSON BROTHERS & NEWBOULDS



HEXAGON
HOLLOW
MINING
DRILL STEEL

LARGE STOCKS CARRIED BY

H.A. DRURY COMPANY
LIMITED

MONTREAL

::

::

TORONTO

**“HARDY SIMPLEX” HAMMER
DRILLS**

NEW AND IMPROVED TYPES

HAND
CRADLE

STOPERS
DRIFTERS

ALL THE VERY LATEST DESIGNS

“HARDIAX” COAL CUTTERS

Hold all British Records for
Cutting Speeds and Durability

“TITANIC” DRILL STEELS

HOLLOW AND SOLID

MANGANESE CASTINGS

ALL CLASSES

“TITANIC” WHEELS and AXLES

WIRE ROPE (RYLANDS)

WRITE FOR BULLETINS

SAM'L OSBORN (CANADA) LIMITED

Dominion Express Building

MONTREAL

Branches and Stock

Toronto

Winnipeg

Vancouver



THE CIRCO PAGE



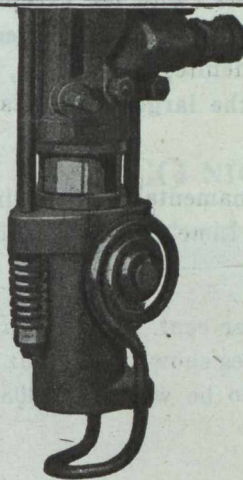
Illustrating Compressed Air Machinery, Tools and Appliances

The "JACKHAMER"

TRADE MARK REGISTERED AT OFFICE



THE NAME OF A SUPERIOR ROCK DRILL SERVICE



HOW IT IS MADE.

The JACKHAMER is of all steel construction, light in weight, easily handled, has a powerful rotation and is lubricated automatically. It may be run on steam or air, mounted or unmounted.

HOW IT IS USED.

Unmounted for shaft sinking, bench and ditch work, block holing, breaking up boulders or concrete and other down hole drilling.

Mounted, for flat hole work in tunneling, drifting, etc.

There is only one "JACKHAMER," and we make it

If you have not received the latest "Jackhamer" bulletins illustrating and describing wet and dry models with and without mountings, ask our nearest branch for your copies

CANADIAN INGERSOLL-RAND COMPANY, Limited

Sydney

Sherbrooke
Winnipeg

Montreal
Nelson

Toronto
Vancouver

Cobalt



PROVINCE OF ONTARIO



BUREAU OF MINES

G. H. FERGUSON, Minister.

Ontario's Mining Lands

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

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

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

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

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

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

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

Thos. W. Gibson,

Deputy Minister of Mines,

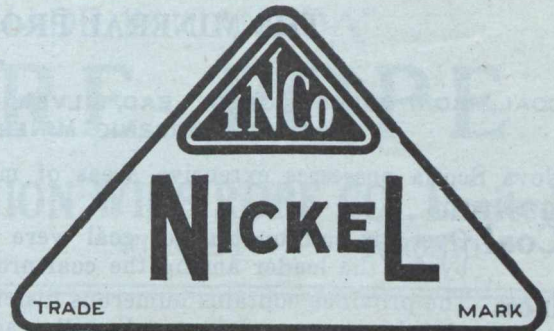
Toronto, Canada

Metallic Nickel. 98.40—99.00%

Shot
HIGH AND LOW CARBON

Ingots
25 LB. AND 50 LB. SIZES

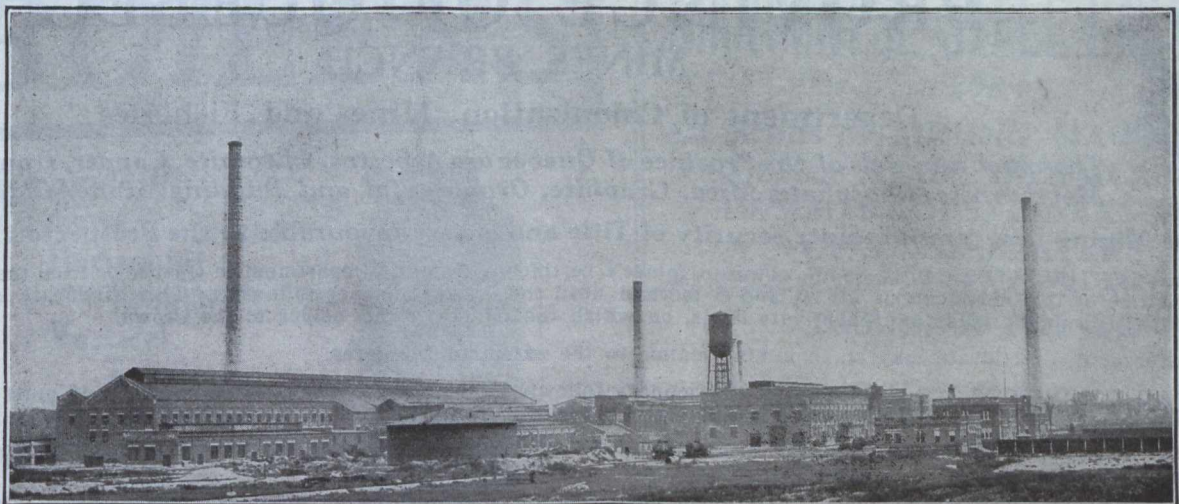
Nickel Oxide 77.2%



PRIME METALS OF UNIFORMLY HIGH QUALITY
AND HIGH NICKEL CONTENT FOR THE MANU-
FACTURE OF NICKEL-STEEL, NICKEL-SILVER,
ANODES AND ALL REMELTING PURPOSES.

Our best technical advice is at your service.

THE HOME OF INCO NICKEL



Refining Division

Port Colborne, Ont.

The International Nickel Company of Canada, Limited

HARBOR COMMISSION BUILDING

Toronto, Ont.

The Minerals of Nova Scotia

THE MINERAL PROVINCE OF EASTERN CANADA

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

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

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

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

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

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

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

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

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

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

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

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

Commissioner of Public Works and Mines



PROVINCE OF QUEBEC MINES BRANCH

Department of Colonization, Mines and Fisheries

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

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

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

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

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

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

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

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

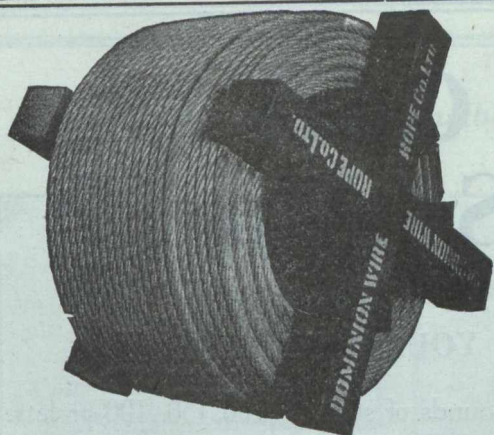
The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

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

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

HONOURABLE HONORE MERCIER,

MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.



Where **DURABILITY** counts

USE OUR

"MADE IN CANADA"

WIRE ROPE

The **DOMINION WIRE ROPE CO., Limited**
 MONTREAL WINNIPEG TORONTO

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 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 - Zinc

Tadanac Brand

General Sales Offices : - - Drummond Building, Montreal

BOILERS

We make them.

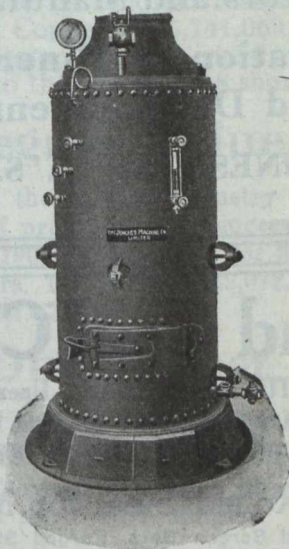
All types—

**Horizontal
 Tubular,
 Vertical
 Tubular,
 Locomotive.**

Also we make

**Ore Cars
 Ore Buckets
 Steel Tanks
 and
 Plate Work**

35 YEARS AT IT



**Engineering & Machine
 Works of Canada Limited**
 ST. CATHARINES, ONT.

Eastern Sales Office: Hall Machinery Co., Sherbrooke

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**

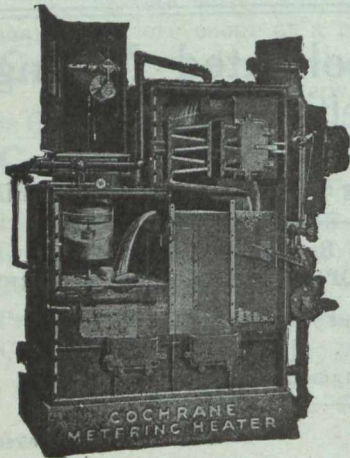
CANADIAN BRAKESHOE CO., LIMITED
 SHEPROOKE, QUEBEC

Why Waste Coal When It Costs So Much?

THE COCHRANE METERING HEATER TELLS HOW
MUCH YOU ARE GETTING FOR YOUR MONEY.

How many pounds of coal do you use to produce a thousand pounds of steam? 200, 150, 100 or less.

A Cochrane Metering Heater will tell how many pounds of water are evaporated per pound of coal, and it will instantly show any improvement in evaporation due to better fuel, better methods of firing, better condition of heating surfaces (removal of soot and scale), better condition of boiler setting (stopping up air leaks), etc.



Send for Catalogue No. 820

OFFICES---Toronto, Montreal, Quebec, Halifax, Sydney, Ottawa, Cobalt, S. Porcupine, Hamilton, London, Winnipeg, Calgary, Edmonton, Nelson, Vancouver.

CANADIAN ALLIS - CHALMERS
LIMITED

E. J. LONGYEAR COMPANY

EXPLORING ENGINEERS

Diamond Drill Contractors and Manufacturers

Examination and Exploration of Mineral Lands

Shaft Sinking and Development

MINNEAPOLIS, MINNESOTA, U. S. A.

Nova Scotia Steel and Coal Co., Limited

Proprietors, Miners and Shippers of SYDNEY MINES BITUMINOUS COAL. Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the Manufacture of Steel, Iron, Etc. COLLIERIES AT SYDNEY MINES, CAPE BRETON.

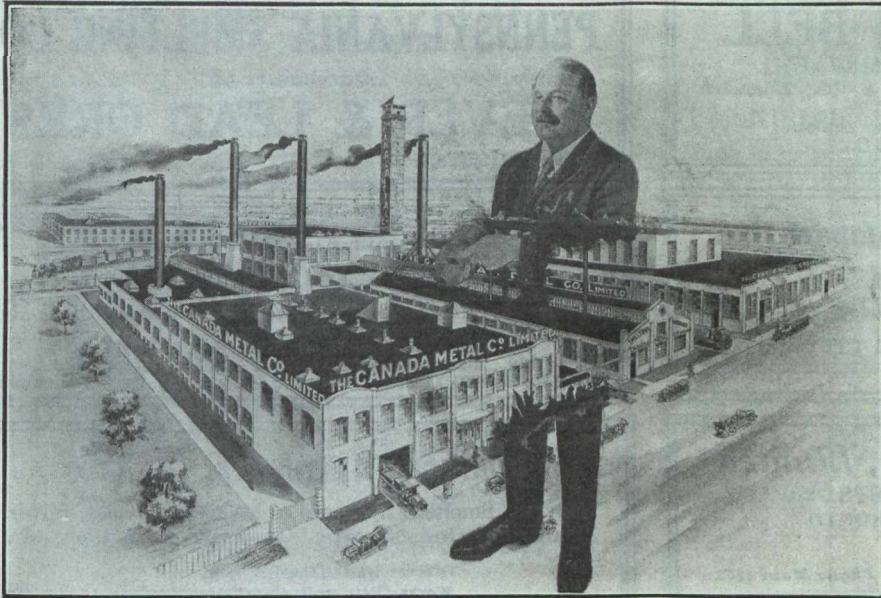
Manufacturers of Hammered and Rolled Steel for Mining Purposes

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies. Blued Machinery Steel 3-8" to 1-4" Diameter, Steel Tub. Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel, Forging of all kinds, Bright Compressed Shafting 5-8" to 5" true to 2/1000 part of an inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand.

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

Steel Works and Head Office: **NEW GLASGOW, NOVA SCOTIA**

It is a great responsibility to recommend a BEARING METAL where human life depends upon it.



W. G. Harris

President.

Tell us of your difficult Bearing Problems. We can help you.

Imperial Genuine Bearing Metal

For High Speed, heavy Engine bearings.

Harris Heavy Pressure

For General Machine bearings.

Aluminoid Bearing Metal

For Light countershaft work.

THE CANADA METAL COMPANY LIMITED

TORONTO

MONTREAL

WINNIPEG

VANCOUVER

BRITISH COLUMBIA

The Mineral Province of Western Canada

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

Aggregate Value of \$637,353,581

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

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

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

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

Mineral locations are granted to discoverers for nominal fees.

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

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

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

PROFESSIONAL DIRECTORY

J. MACKINTOSH BELL

MINING ENGINEER & GEOLOGIST

Office with Messrs. BAIN, BICKNELL & CO., Lumsden Building, TORONTO.
London Address: c/o Bank of New Zealand, 1 Queen Victoria Street, E.C.

PENNSYLVANIA SMELTING CO.

Purchasers of

SILVER & LEAD ORES

Office: Pittsburgh, Pa.

Works: Carnegie, Pa.

Dwight & Lloyd Sintering Company, Inc.

**SPECIAL PROBLEMS
IN ORE TREATMENT**

29 BROADWAY, NEW YORK CITY

Cable Address:—"SINTERER."

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.

Canadian Laboratories, Limited

ASSAYERS AND CHEMISTS

410 Crown Office Building, TORONTO

"We Analyse Anything."

Special Rates Send for Prices Phone Main 5063

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

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

Telephone Main 3813 Cable Address: "Chadwick" Toronto
E. M. Chadwick, K.C. Western Union Code
David Fasken, K.C. Fasken, Robertson, Chadwick & 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, Toronto
Geo. H. Sedgewick
James Aitchison

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.

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

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

SUDBURY DIAMOND DRILLING COMPANY LIMITED

We contract for all classes of Diamond
Drill work.

Saving a large percentage of Core is
our speciality.

We solicit enquiries.

SUDBURY, ONT. - - Box 958

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

JAMES McEVOY

MINING ENGINEER AND GEOLOGIST
(Specialty Coal Mining)

77 Toronto Arcade, Yonge St., TORONTO, Ont.
Phone Main 1889

ROBERT H. STEWART

MINING AND METALLURGICAL ENGINEER

VANCOUVER BLOCK
VANCOUVER, B.C.

GEO. R. ROGERS

MINING ENGINEER

905 TRADERS BANK BUILDING, TORONTO

Examinations, Sampling and Re-
porting on Mines and Prospects

Telephone M. 2625

Alfred R. Whitman

Mining Geologist

UNDERGROUND PROGRAMMES. OREBODY PROBLEMS

43 Exchange Place, - - New York
HAILEYBURY, ONT., Opposite Post Office

W. F. FERRIER

CONSULTING
MINING ENGINEER AND GEOLOGIST

204 Lumsden Bldg. Toronto, Ont.

J. B. TYRRELL

Mining Engineer,

534 CONFEDERATION LIFE BUILDING
TORONTO, - - CANADA
208 Salisbury House, London, E.C. 2, England

JOHN C. ROGERS

MINING ENGINEER

Examination and Exploration of Mining Properties
with a View to Purchase.

COPPER CLIFF - ONTARIO

Phone M. 1889 Established 1878. Cable address "Heys"

THOS. HEYS & SON

Technical Chemists and Assayers

Rooms M and N, Toronto Arcade
YONGE STREET, :: TORONTO, ONT.
Sampling Ore Deposits a Specialty.

Cable Address:
"Linsey"

Codes: Broomhalls
Western Union

G. G. S. LINDSEY, K.C.

BARRISTER, SOLICITOR, Etc.

Bank of Toronto Building - - TORONTO

Special attention given to Mining Law

Phone Adelaide 1032

R. W. BRIGSTOCKE

MINING ENGINEER

Box 643

HAILEYBURY, ONTARIO

REGINALD E. HORE

Consulting Geologist

(Specialty: Pre-Cambrian Ore Deposits)

Office: 1402 C. P. R. Bldg., TORONTO Phone Ad. 3310

A. A. HASSAN

CONSULTING GEOLOGIST
and ENGINEER OF MINES

Westbrook Hotel Bldg., FORT WORTH, TEXAS

Any Code

Cable Address: "HASSAN"



CUT GEARS

All Types - - - Any Size
Large Capacity.

Hamilton Gear Company Limited
Van Horne St. - - - TORONTO

L. P. BURNS, LIMITED
Manufacturers of STEEL PLATE WORK
Tanks, Penstocks, Smokestacks, etc.
Dealers in Railway and Power Plant Machinery
BANK OF HAMILTON BUILDING - TORONTO

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 Work.
Complete Outfits in Alberta and British Columbia.
Write for Prices.

AGENCY:—
ROSSLAND, B. C.

NEW **RAILS** RELAYING
12 to 85 lbs. per yard

Locomotives
Switches, Turntables, Cars, Tools
Portable Track, etc.

Railway, Contractors and Mining
Equipment

JNO. J. GARTSHORE
58 Front St. West . . . Toronto, Ont.

**PLATINUM
BOUGHT AND SOLD**

**GOLDSMITH BROS.
SMELTING & REFINING CO. LTD.**

24 Adelaide Street West
TORONTO

NEW YORK CHICAGO SEATTLE

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

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.

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.

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

SILVER!

(Nov. 24th, 1919—\$1.30)

The Deister Overstrom Diagonal-Deck tables operating in this mill are handling double the capacity of vanners and doing $6\frac{1}{4}\%$ better work.

1	Deister-Overstrom	Slimmer	Purchased	March	6, 1918
3	“	“	“	Sept.	27, 1918
3	“	“	“	May	30, 1919

DEISTER-OVERSTROM DIAGONAL-DECK CONCENTRATING TABLES

give a high-grade concentrate; greater capacity; a middling that is practically negligible; lowest tails.

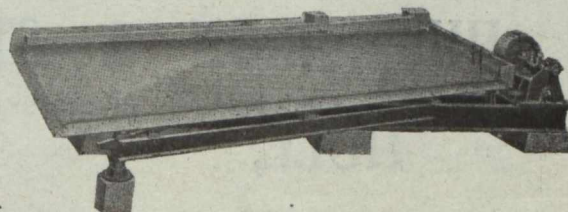
The services of our engineering staff are at your disposal for the solving of concentration problems.

THE
DEISTER CONCENTRATOR COMPANY

Manufactures of Deister and Deister-Overstrom Tables

Main Office, Factory and Test Plant: - FORT WAYNE, Ind.

Cable Address, “Retsied” A.B.C. 5th Edition, Bedford, McNeil

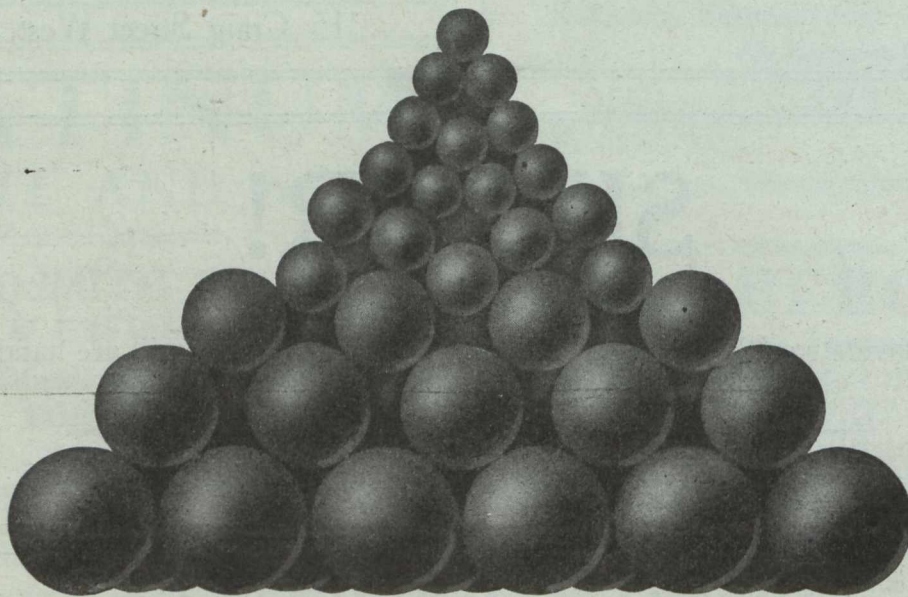


"If quality counts use 'HISCO' Products"

"HISCO" BALLS

"HISCO" products are noted for superior quality. "HISCO" products are made in Canada from Canadian ore by Canadian skilled workmen. The "HISCO" Forged Ball is one of the many "HISCO" products. Absolutely the best Ball on the market. The use of "HISCO" Forged Balls in your mills will substantially reduce your grinding costs. Money saved is money earned.

BUY "HISCO" BALLS



Sizes 3, 4, 5 and 6 inch carried in stock
Special sizes from 3 inch up, made to order

Write us for quotations on your requirements

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 F-30, Board of Trade Building, Montreal.
'Phone Main 2662.

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

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

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

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

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

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

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

VOL. XL.

GARDEN CITY PRESS, 26th November, 1919
Ste. Anne de Bellevue, Que.

No. 47

CONTENTS

Pages 879 to 896.

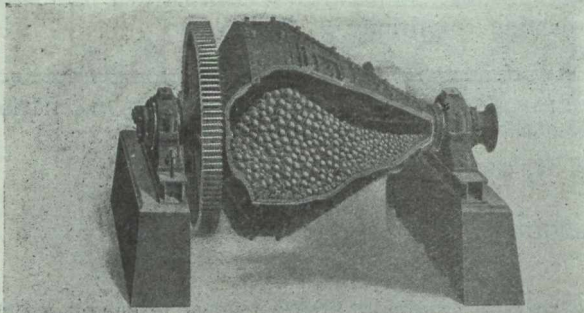
Editorial:

Are the Programmes of Technical Society Meetings too Crowded?.....	879
Workmen's Compensation in Great Britain..	880
The By-product Coke Ovens of Anyox, B.C., and the Cassidy Colliery of the Granby Consolidated Mining & Smelting Company....	881
Grizzley Screen with Adjustable Openings....	886
Canadian Coal Men	887
Granby Consolidated Mining Company	888
New Yukon Bulwark	888
The Advance in Silver	889
World's Coal Production	889
Personals	889

Special Correspondence:

British Columbia	890
C.M.I. Toronto Branch Meeting	892
Nova Scotia Notes	893
Manitoba Notes	894
Light Railways for the North.....	894
Wasapika Consolidated	895
The Fuel Question in Eastern Canada.....	895
Port Arthur Notes	896

—and it passed the “Censor”!



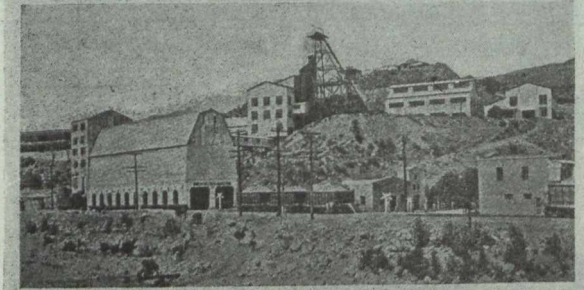
THIS IS THE MILL

that is doing the fine grinding at
The Ray Hercules Plant
Ray, Arizona

Three 6 ft. x 22 inch cylinder, Hardinge Conical Mills were selected as the fine grinding unit for this new and up-to-the-minute flotation plant, a mill designed to handle 120 tons per 8 hr. shift.

The Ray Hercules Plant has been in operation now for 10 months and their Hardinge Mills on a mixed ore consisting of mineralized granite, diabase and talcose schist are giving entirely satisfactory results.

Hardinge Conical Mill Company, 120 Broadway New York
SALT LAKE CITY, Newhouse Bldg. DENVER, First National Bank Bldg. LONDON, ENGLAND, Salisbury House
Cable Address—“Hardinge,” New York



WRITE US FOR COMPLETE INFORMATION ON GRANULAR OR FINE GRINDING—WET OR DRY

← This “Ad.”

recently appeared in the
‘Mining & Scientific Press’
and the
‘Canadian Mining Journal’

There are two errors in it
but—

We didn’t notice them!

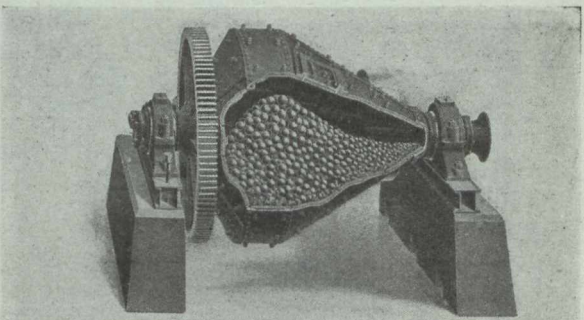
This is the “Ad.” →

as it should be.

Note the difference!

**HARDINGE
CONICAL MILL CO.**

120 Broadway, New York
Salt Lake City, Utah — Denver, Colorado
London, England



THIS IS THE MILL

that is doing the re-grinding at
The Arizona Hercules Plant
Ray, Arizona

Three 6 ft. x 22 inch cylinder, Hardinge Conical Mills were selected as the re-grinding unit for this new and up-to-the-minute flotation plant, a mill designed to handle 1200 tons per day.

The Arizona Hercules Plant has been in operation now for 10 months and their Hardinge Mills on a mixed ore consisting of mineralized granite, diabase and talcose schist are giving entirely satisfactory results.

Hardinge Conical Mill Company, 120 Broadway New York
SALT LAKE CITY, Newhouse Bldg. DENVER, First National Bank Bldg. LONDON, ENGLAND, Salisbury House
Cable Address—“Hardinge,” New York



WRITE US FOR COMPLETE INFORMATION ON GRANULAR OR FINE GRINDING—WET OR DRY



:-: EDITORIAL :-:

Are the Programmes of Technical Society Meetings too Crowded ?

A characteristic of recent meetings of technical societies, notably the September meeting of the American Institute of Mining & Metallurgical Engineers in Chicago, has been the bewilderingly large number of papers presented, the wide range of subjects dealt with in these papers, and the very specialised character of some of the subjects dealt with.

The state of mind of the man who conscientiously should try to compass the whole programme—or even that part of the programme in which he is specially interested—varies between amusement and despair, according to his temperament.

If one is of a social nature—conviviality being now an archaic term—he frankly abandons the attempt to attend the reading of papers and the discussions arising out of them, and betakes himself to the lighter diversions provided, promising that when he gets home he will read the papers—which he never does.

When, as now seems to be the prevailing mode, societies with associated interests have sideshows of their own, coinciding in time, but not in place with those of the major meetings, then one begins to see some advantages in what our theosophical friends term functioning on the astral plane.

Has not the multiplication of sections, the variety of subjects dealt with in the papers, and the number of coincident attractions rather exceeded the useful and practical limit at metropolitan meetings of technical societies in Canada and in the United States?

It will be conceded that the discussion on a paper, and not the actual reading of a paper itself, is the more profitable proceeding, except on those rare and outstanding occasions when some epoch-making improvement of practice is announced by the man who perfected the improvement, possibly as the crowning point of years of hard work.

A commendable innovation at the Chicago meeting referred to was the use of the symposium, which consisted in the combined discussion of a number of papers relating to phases of one general subject. A fine example of this method was the symposium on sulphur in coal. In this case, a number of papers, many of them previously printed in the Bulletin, were reviewed in a general discussion—a worth-while discussion.

As a further improvement on the symposium method it may be suggested that at the average metropolitan

meeting a judicious selection of four or at the outside six important papers would provoke really worth-while discussion, always provided that such papers had been previously printed in the Bulletin, and that the persons attending came prepared to discuss the subject selected after due deliberation and preparation. Written discussion would also be invited from those unable to be present.

The logical result of the method suggested would be that presentation of new papers at metropolitan meetings would not be asked, but that a signal honor would be conferred on the authors of a few papers, previously read at branch and local meetings, selected because of their merit, and because of their bearing on present and pressing problems.

In this way, concentration of thought and energy would be achieved, in place of the existing dissipation of mental effort, which leads either to negation or to superficiality.

From the point of view of a society secretary there is some objection to the change suggested, inasmuch as the metropolitan meetings are largely relied upon to provide the matter for annual transactions of respectable dimensions, but the question may be asked, should not the proceedings of the branches and technical sections provide a sufficient mass of material from which to cull a collection of annual transactions meriting publication?

There is, of course, another viewpoint, for which there is much to be said, which is the frank admission that the annual metropolitan gatherings of technical societies are really social functions, which would compel the conclusion that the solid work of reading and discussing papers should be done throughout the year in the branch meetings. If this admission is made, it discovers an added reason why the papers at the larger gatherings should be reduced to a few previously published, selected for discussion, rather than for initial presentation. There is also the consideration that authors of papers representing possibly months of work and years of observation will not be disappointed at the meagre audience and distracted attention which so often is the lot of persons who present their papers in person; especially as the qualifications which fit a man to prepare a technical contribution of merit do not necessarily coincide with oratorical gifts.

These considerations are set forth for discussion. Like many society papers, any merit they may or may not possess would be revealed by discussion. No destructive or captious spirit has suggested their postulation, and, to avoid misunderstanding, it may be stated that

no particular technical society is referred to, the tendency which is herein criticized being very general.

The "Journal" would be glad to receive and publish any comment which the considerations put forth may suggest to its readers.

Workmen's Compensation in Great Britain

A Committee appointed by the British Home Office is at the present time seeking information on the working of the Compensation Act there, and on the desirability of establishing a state scheme of insurance against liability for compensation payments. In making preliminary enquiries from the coal industry, which has been selected as one of the best organized trades, it was found that because of the very high premiums charged by private offices, the Coal Controller had for some time had under consideration some relief from the onerous burdens of the existing situation. As the premium rate paid to private insurance offices is reckoned on the payroll, and as the rate of wages paid today is at least one hundred per cent higher than it was some years ago, it follows that compensation premiums have increased in the same ratio, while at the same time the risk had not substantially increased. Herein is exposed one of the many weaknesses of a compensation law which permits of private insurance against a liability imposed by national legislation. There is no justification for permitting private companies to make profit out of a statutory liability. The insurance companies in Great Britain are powerful institutions, and it may well be, as was the case in the State of New York, that they have exerted and will exert their influence to prevent the coming of a state system of compensation insurance.

In the matter of workmen's compensation legislation Great Britain was a pioneer, but legislation in that country has not kept pace with Canada and the United States inasmuch as the system of lump sum payments is adhered to, recourse to the courts in cases of disputes is allowed, and no proper system of pensions has been elaborated.

The method adopted in many of the provinces of Canada and most of the States of the American Union, of administration by a State Board, having judicial powers of decision, eliminating all common law liability and all recourse to the courts, having its own medical officers and avoiding all possibility of dispute between the injured person and his employer, is in every way to be preferred to the existing arrangement in Great Britain.

The inadequacy of lump-sum payments of compensation in cases of fatal injury must be admitted by all

who have given dispassionate consideration to the position of dependent wives with large families. Insurance companies themselves have found it necessary to advise the payment of insurance benefits by an arrangement of monthly pensions in lieu of large single payments at death. The amount of compensation payable to the dependents should be as far as possible proportioned to their need, and the wife with one or two or no children is in a very different position to the woman who is left with a large family of young children. A fixed payment at death cannot fill the necessities of varying circumstances, but a system of monthly payments based on the number and age of the children left dependent does permit of adaptation to the necessity of individual cases. It is difficult to understand how the lump-sum payment of compensation for fatal injuries, and compensation liability insurance through private offices has survived so long in Great Britain, and it can only be attributed to the fact that the labour leaders in that country have been following the will of the wisp of socialism and other jack-o'-lanterns such as nationalization of mines instead of bending their energies to the accomplishment of practical reforms within reasonable compass of attainment, and already on the statute books of countries within the Empire.

In regard to the premium which an insurance company must ask for insurance against colliery disasters, it is quite evident that this must be high, because while the accident death rate of mineworkers averaged over a term of years and over all men employed in the industry is not relatively higher than many other trades in which the accident risks are popularly regarded as being ordinary, the gravity of the risk consists in the possibility that a large number of men in one mine may be killed at one time. The risk is a concentrated one, and the obvious course to minimise such a risk is to spread it over the whole industry and over as long a term of years as possible. This is exactly what disbursement of compensation payments through a state fund derived from collective assessment achieves. The method seems excellently well suited to equalise the peculiar risks attaching to the compensation liability of colliery enterprises, and its economy is undoubted, because a state board disburses exactly the amount prescribed by the Compensation Act, and no more, plus a negligible percentage for administration costs.

The By-Product Coke Ovens at Anyox B. C. and the Cassidy Colliery of the Granby Consolidated Mining and Smelting Company

By Our Victoria Correspondent.

To the enterprise of the Granby Consolidated Mining & Smelting Co. is to be credited the giving to British Columbia of the first important by-product coking plant on the Pacific Coast. The project, which was started during the war, was completed only a few months ago, the obstacles which were encountered, first in respect to the clearing of the necessary site at Anyox, the Company's mining centre on the northern Provincial coast, and second in the obtaining of material when what was required was at a premium in Europe, impeding progress somewhat more than was expected. Each difficulty however was surmounted and the modern 30 oven coke and by-product plant stands a monument to the faith of this great Company in the mineral possibilities of Canada's most westerly Province.

On July 9th of this year the first big red-hot cake of coke, measuring nearly nine feet high, forty feet long and nearly eighteen inches in width was pushed from one unit of the oven into the waiting car to carry it to the quenching station. That product, it is to be noted, was the first output of an installation which represents an expenditure of approximately \$5,000,000, if the plant at Anyox and its attribute, the coal mines of Cassidy, Vancouver Island, are both considered. The coal used in the ovens under discussion comes from Cassidy, it should be understood, where the Company, having acquired coal lands, developed them, installed equipment modern in every respect, built houses for its officials and for its men that are unequalled in the provision made for the well being of employees on the continent. These mines now are producing consistently, the output is shipped by barge to Anyox and there converted into coke for the operation of the Company's smelter.

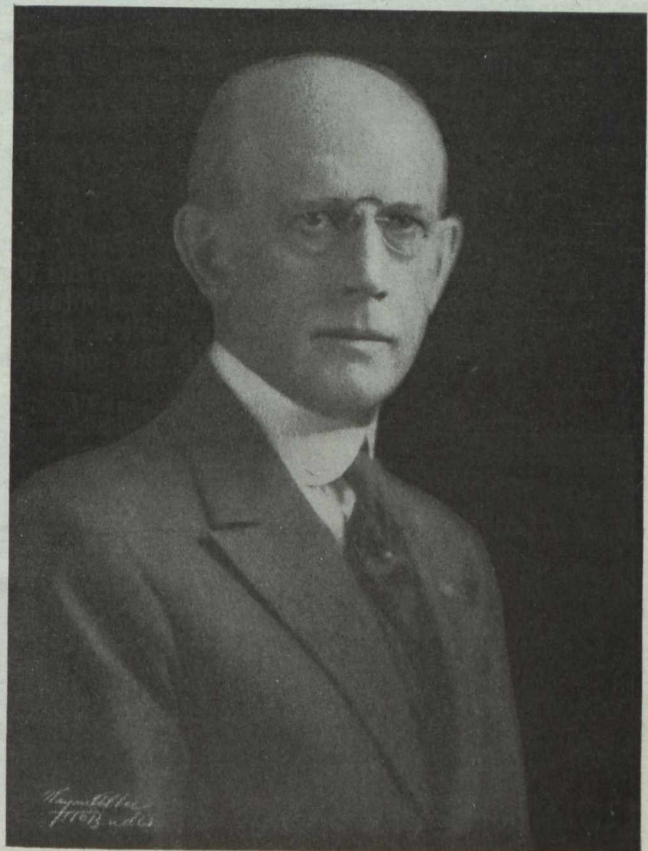
Of Anyox and its mines and its smelter, which contain the biggest copper converters in all of Canada, much has been written. The town itself and its works today represent an expenditure of practically \$8,000,000. Of this amount more than one half was spent before the Company marketed a single pound of copper to the world. To keep the smelter going huge quantities of coke were purchased from the ovens of the Fernie district. Sometimes strikes, which happened too frequently, made the problem of copper production one of endless worry and great expense. At one time the Company was forced to bring its coke from Pennsylvania. Hundreds of thousands of fuel oil have been transported to the northern camp.

Coke troubles, by virtue of the plant now in operation, are settled, while the vast amount of gas that is saved will be used in firing boilers in power houses when hydro conditions become such that water power is stilled by the lowering temperatures and ice. For the by-products there is a steady market.

Contrary to impressions which have been apparent this coke plant is not of foreign design. Every element of it is the product of the inventive genius of inventors of the North American Continent and every particle of material in its construction was fabricated

in Canada, and much of it in British Columbia. The contract for its construction was taken over by the Foundation Company Ltd., of Montreal, and it may be said to be an "All British Product". Only such material as it was possible to obtain in Canada has gone into its construction while the army of skilled artisans who put it together was brought from all sections of the Dominion.

The construction work of the big coal bins, the offices, the huge stacks, the coke ovens themselves, the big gas holder, scrubber and benzol plant, by-products house, all are of concrete, presenting an imposing sight by day and marked by night by immense gas torches where the overflow of fuel burns incessantly. The plant entire spreads over several acres, room for which was blasted out of solid rock, or filled in with the same material. On an eminence to the north stands the smelter, while between the smelter and the coke plant lies the town of Anyox, and up the valley of Hidden Creek are the mines which furnish the ore. Viewed from the waterfront Anyox represents a big industrial concern where two thousand or more skilled workmen ply their vocations for twenty-four hours each day, working in eight hour shifts. The reaches of Granby Bay skirt the town limits, and docking facilities bring the coal from Cassidy almost to the open maw of the coke ovens.



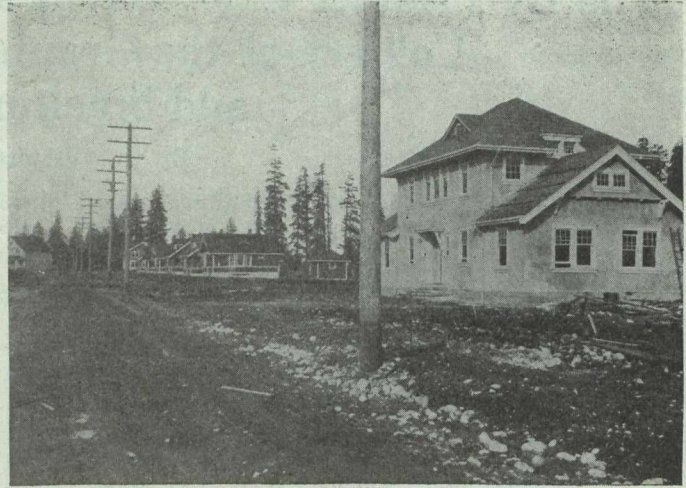
F. M. SYLVESTER
Managing Director, Granby Consolidated Mining & Smelting Company.

Encased in brick of many and peculiar shapes, brick made by a special process, and under the heat of which ordinary fire brick would fuse, the ovens, thirty in number, spread over an area of more than 200 feet and are more than twenty feet in height. It is scarcely necessary to say that the by-product coking ovens create the coke by an entirely different method to the "beehive" ovens which are in use in the Crow's Nest Pass District. No flames touch the coal in its raw state, the fuel passing through flues made of the special brick referred to which so heats the oven walls so as to make them incandescent, thus forcing the coal to throw off its wealth in by-product.

In the carbonization of coal, which is accomplished by the application of heat at 2,400 deg. fahr. the coal gasses are driven off from the ovens to the collecting main, a large "U" shaped steel tank running the full length of the ovens and connected from each oven unit by ascension pipes. Through the collector main gases are conveyed through a series of piping to the by-product house where the gasses go through a condenser. In this condenser the temperatures are dropped, causing the precipitation of the tar and ammonia vapors. The gas then passes through the exhauster to the tar extractor where the remaining tar and ammonia is recovered.

The tar from the condensers and from the tar extractor flows to a tar separating tank and in this tank the tar and ammonia liquors are separated by gravity, the tar flowing to the tar storage tank and the ammonia liquor to the ammonia liquor receptacle. The ammonia liquor is then sent to the Ammonia Still where it is driven off in the form of gas which combines with the gasses leaving the tar extractor and all gasses are then sent to the Saturator. In the Saturator the gasses pass through a bath of sulphuric acid, the ammonia combining with the acid, forming ammonia salts, or ammonia sulphate. These salts are deposited in the Saturator, then conveyed to a draining table, and when a sufficient amount of salts have been collected it is placed in centrifugal dryers and the moisture driven out. Then the Ammonia Sulphate is ready for the market.

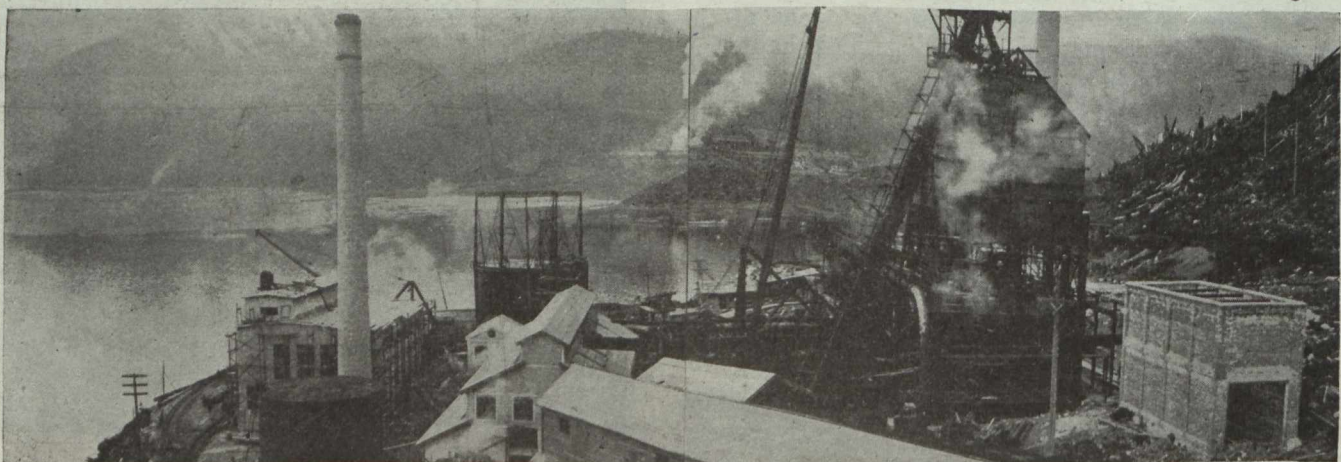
The operation at the by-product houses being completed all the gas passes to the final cooler in the benzol plant where the following by-products are obtained: Benzol and its homologues, which are toluol, solvent naphtha, crude naphtha and xylol. In the cooler the



General office, Cassidy Colliery, Vancouver Island.

gas is brought into direct contact with a water spray, and the naphthalene, as a result of the cooling gas, is carried off into a settling tank where the naphthalene floats to the top and is there skimmed off. The gas then goes from the final cooler to the scrubber, where the gas is washed and brought into direct contact with straw oil which absorbs the light oil in the gas. The latter then is carried to the gas-holder where it is stored. About 40 per cent of the entire amount of the gas generated is used in firing the coke ovens. The remainder will take the place of at least 1,800 barrels of oil daily during the winter months for heating the boilers of the power-houses which furnish compressed air to the mines and smelter.

The straw oil, or gas oil, which is a by-product of an oil refinery, takes from the gas the benzol and its homologues and the straw oil, when it has absorbed the light oil, becomes what is known as benzolized oil. It then is sent to a Still where it is thoroughly distilled and by the application of heat becomes benzol. The wash oil, when it collects in the Still, is sent to a cooler through a maze of pipes and is re-used in the scrubber. After the benzol has been driven off the temperature in the Still is increased and toluol is driven off. After this the temperature is again increased and solvent naphtha is driven off. By a process of re-distilling these products are made pure and marketable.



Coke Plant at Anyox, B. C. Smelter is seen in the distance.

The dimensions of the ovens are as follows:

At one end 18 inches wide, with a spread of three inches added to the other end in order that the big electric ram which pushes the coke from the oven will go clear; they are nine feet high inside measurement and forty feet long. With slight reduction that is the size of each cake or slab of coke as it leaves the oven.

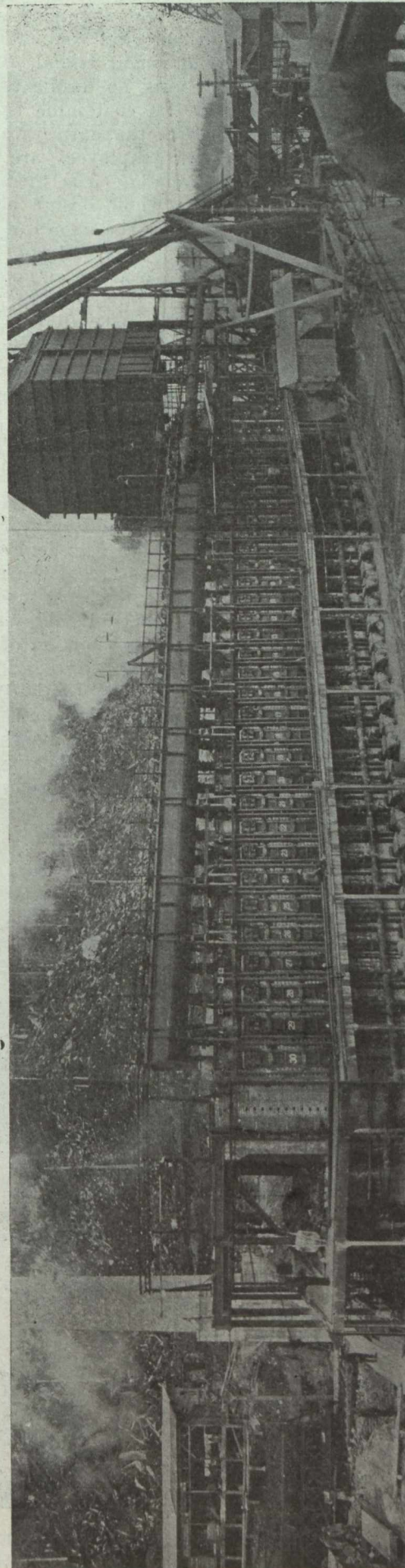
Charging of the ovens is done by the larry which is fed from the elevator at one end of the ovens where the pulverized coal has been transferred from the bunkers over an endless belt. This larry runs upon an electrified track, stopping over the hatches of each oven long enough to perform the mission of recharging. As the coal is carbonized to the finished state the oven doors are automatically removed from both sides of the ovens and an electric ram pushes the red hot cake of coke through the ovens and dumps it into a steel electrically propelled tramcar. It is then run into the quenching station, where water automatically flows upon it sending off great clouds of steam and shattering the coke by impact. It is then transported over the same line to coke bins conveniently placed where it is loaded into cars and makes its way to the smelter. Each oven holds $13\frac{1}{2}$ tons of raw coal which when carbonized leaves its residue of coke, 65% of the whole. The greater part of the balance has gone into by-products and gas. Carbonization in each one of the thirty ovens is effected in eighteen hours.

The by-product oven offers a complete solution of the fuel problem, the plant at Anyox having a capacity of 500 tons of coke daily. The raw coal passing through its transformation process is resolved into elements of solid and gaseous fuel, its impurities are removed and made into articles of commercial value, with a total loss of efficiency in the conversion that is already less than that of any gasifying process known.

Visualize the fleets of gasoline boats that may be supplied by the benzol alone that goes to waste in the ordinary process of raw coal consumption. It is a colorless liquid possessing great inflammability and mixed with gasoline takes up the burden of motive power at a cheap account. It is used in the manufacture of paints and as a solvent for rubber. It is used in explosives and in the preparation of perfume. Such are a few of its uses while its homologue ammonia, transformed into ammonium sulphate, furnishes a fertilizer market practically unlimited, particularly at this time as Chilean nitrate is becoming scarcer each year owing to the depletion of the mines.

From each single ton of raw coal out of the $13\frac{1}{2}$ that are carbonized every eighteen hours in the ovens of the Granby plant, there results 65% of the total weight in coke and 11,500 cubic feet in gas, ten gallons of tar, 21 pounds of sulphate of ammonia, 3 gallons of light oil, 1.55 gallons of benzol, 40 gallons pure toluol, 30 gallons solvent naphthalene and 4 pounds crude naphthalene.

From the tar the by-products are so numerous as to be staggering in their possibilities. Creosote is extensively used in all seaport cities where docks and wharves are built as a preventative against the inroads of the teredo, while the application of pitch is too well known to need comment. An immense tank of steel has been constructed at the Anyox plant to take care of the coal tar which runs in a steady stream from the coke ovens.



Coke side, Coke Ovens at Anyox, B. C., showing quenching car at left, and pusher at right.

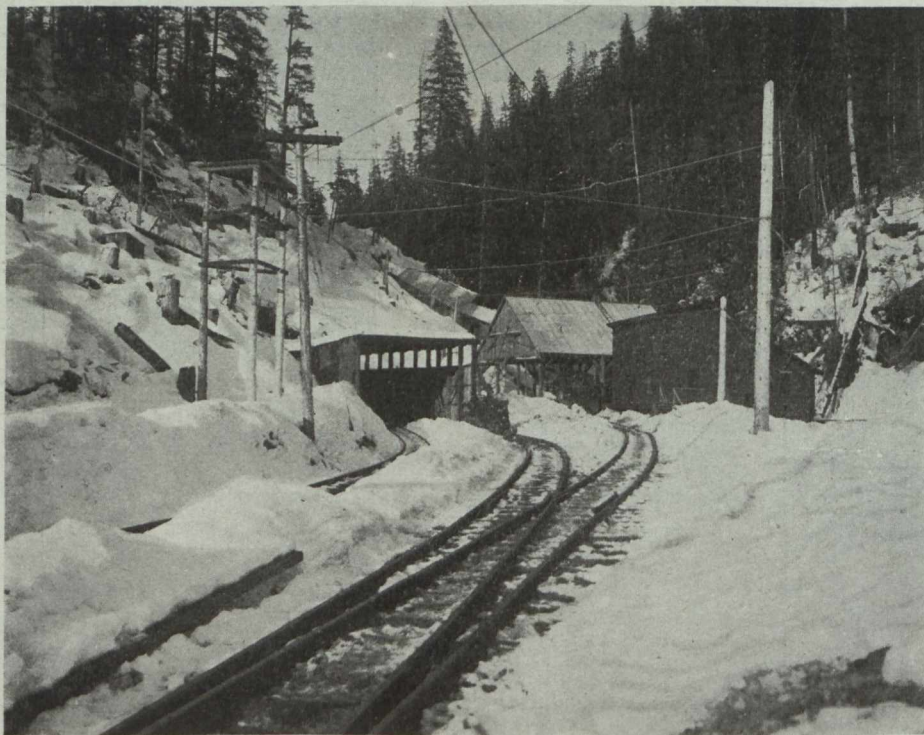
While the establishment of this fine plant at Anyox is an outstanding accomplishment, the Company also is to be congratulated upon the splendid coal mining centre opened up at Cassidy, Vancouver Island. Cassidy is regarded as a model, having no duplicate on the North American continent. Its coal mine is believed to be the best equipped in the entire world, while the comforts provided for employees are far ahead of anything known in Canada. The townsite is laid out with wide streets, the whole design being most artistic. Native trees designate the names of the streets, such as Hemlock Street, Cedar Street, Fir Street and so on through the native arboreal nomenclature. The product of the entire nursery was purchased to make the town and streets attractive, while borders of flowers lend a piquant charm. Electrically lighted at night the streets give the appearance of a city of pretensions. Mr. F. M. Sylvester, Managing Director of the Company, is largely responsible, and the comments of those who visit Cassidy and the appreciation of those who live there strikingly indicate his success.

For the married employees there are cottages of the bungalow type on ample ground space no less than fifty by a hundred feet. The houses are of the most modern build and are provided with the most modern sanitary equipment. They have hot and cold water, electric light and sewage systems. One portion of the townsite has been laid out for sports. Here will be found baseball grounds, tennis, cricket, football, lacrosse. A running track also has been laid out. Its location is one that is admirable. From a height of land surrounding it forms a perfect amphitheatre. A gymnasium is being provided and everything necessary to physical culture is being adopted.



Cassidy Colliery, Vancouver Island.

A model is again encountered in the rooming houses for the single men, while the mess house bears out the same idea and thought of cleanliness and comfort. The mess house can be compared only to a first class hotel. Trailing vines and rosebushes lead the way to the entrances. A wash and change house is provided. Waitresses are in attendance upon the tables and the selection of food is made from a well-balanced and splendidly wholesome bill of fare. Tables are not of the old style where hundreds of men sat in rows and scrambled for food. Each table seats six men and each one of the six at every table in this dining room, where 200 men can be accommodated, is given "service". The kitchen is another model. It is as nearly electrically operated as is possible.



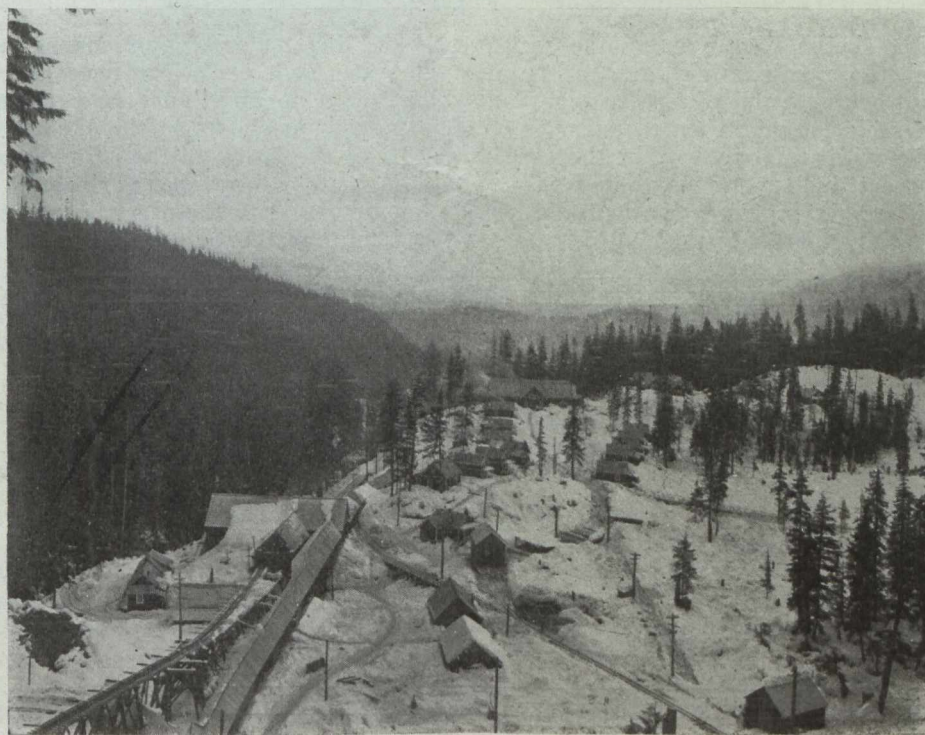
Hidden Creek Mine of the Granby Consolidated Mining Company.
150 ft. tunnel.

In the rooming houses the best that money can buy has been provided for comfort. In fact the room may be placed on plain with those found in the homes of the well-to-do. Up-to-date furniture is there, hot and cold water, steam heat. Each room in the two stories opens upon a verandah or balcony where flowers are growing. Every room is an outside room. The Company furnished the bed clothes and blanket. There is not an item overlooked to make these rooms sanitary and comfortable. Should a miner emerge from the mines with wet clothes there is an attendant to see to it that he gets clean and dry clothes to replace his soiled ones. Shower baths, hot and cold, form part of the scheme for cleanliness and health. The smallest detail along the lines indicated, besides the actual coal mine operations, receive the attention of R. R. Wilson the Superintendent.

The coal from Cassidy, that is supplied to the Coke plant at Anyox is mined from a slope following the dip of the seam at an angle of about eighteen degrees. This slope is open to a depth of about 2,000 feet. A manway has been provided as a safety-first measure and the men are not permitted to enter the mine by the working slope. The operations are pillar and stall.

The mine is splendidly timbered. Every precaution known is taken against explosion and indeed against every form of accident. The men are provided with electric mine lamps and a sirocco fan, with a capacity of 150,000 cubic ft. of air a minute, is the mainspring of the ventilation system. An accident at the mine cannot affect the fan, the fan house being situated so that it cannot be interfered with. The fan house is built of concrete. Mechanical stokers feed the coal to the boiler furnaces from the sludge of the washery period. Exhaust steam is used for heating and its return is made from the pipes to the condensers and used over again. There is not a particle of waste coal. Even the refuse from the washery is flumed to a dump where it may be taken care of, it being thought that some day a use may be found for it. Utilization of every resource in the Cassidy coal plant is the theory upon which its designers have worked. Screens provide four grades of coal. Anyox get the small coal and varying grades are placed on the market. With Anyox extracting every available by-product from coal taken from Vancouver Island for coke production the way has been pointed to a most desirable revolution in coal mining methods in British Columbia.

—From "Iron & Steel of Canada."



The Hidden Creek Mine Camp.



Grizzly Screen With Adjustable Openings

John S. WATTS, New Glasgow, N. S.

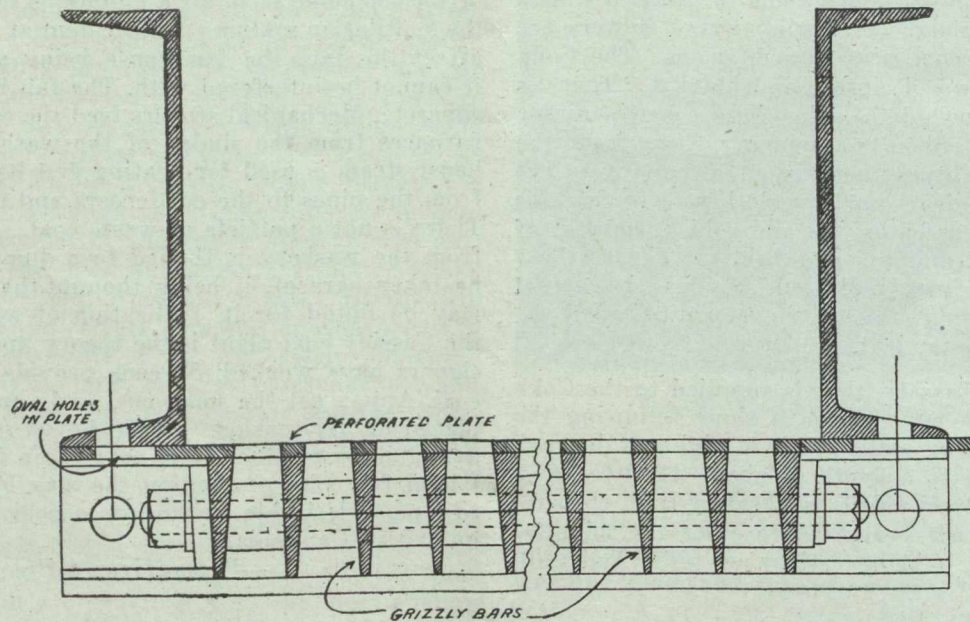


Fig. 1.

The accompanying sketch Fig. 1 shows the section of a grizzly screen, the openings in which can be adjusted to suit the working conditions. In screening out the fines from rock coming from a quarry it has been found that the width of opening, in the screen, which would be correct during dry weather, would be too fine to be efficient during wet weather and vice versa. The design shown will overcome this.

The distance pieces or spaces between the grizzly bars are made the width necessary to give the desired maximum opening, and the perforated plate is punched to suit as shown in the sketch, but with oval holes to take the bolts at the side, these holes being large enough to allow the perforated plate to slide an amount equal to the difference between the maximum and minimum openings.

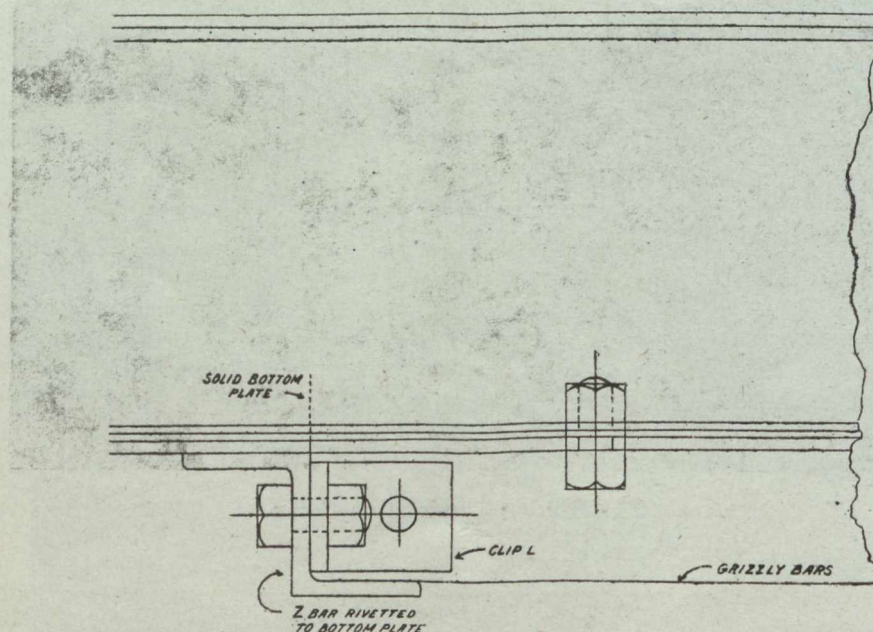


Fig. 2.

As shown in the drawing the plate is set for the maximum opening, when a smaller opening is required, the bolts at the sides are slackened, and the perforated plate slid over until the opening is closed to the desired amount.

As the screen will usually be run with the opening partly closed, it does not tend to get plugged up, and is

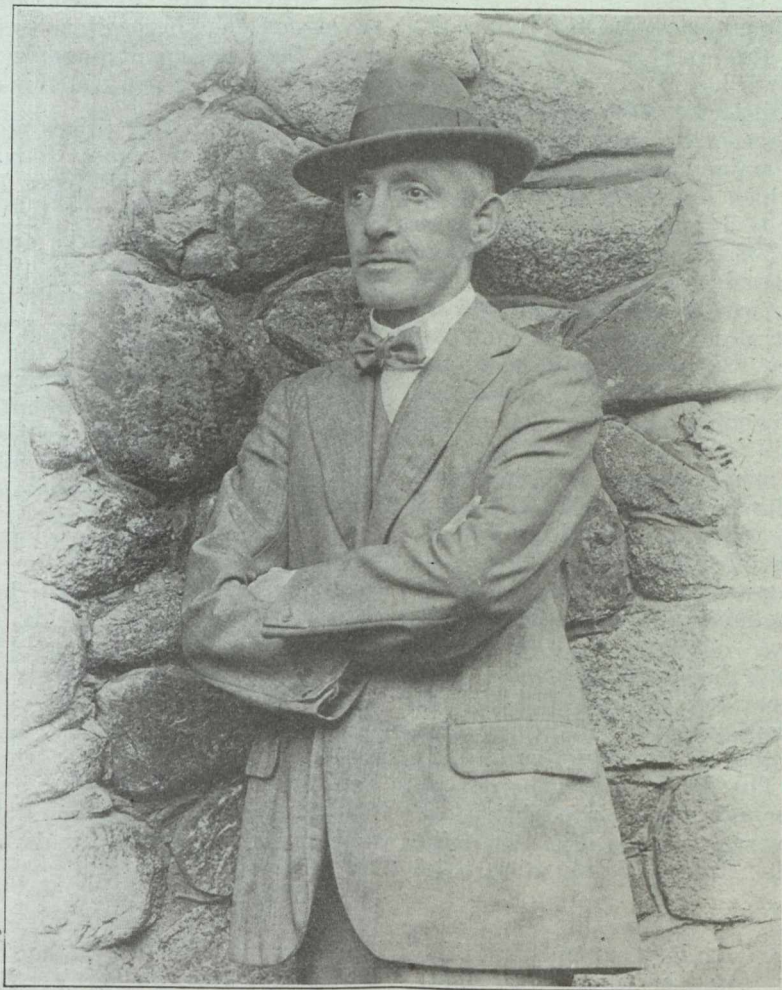
easily cleared by simply sliding the plate to the full opening when any obstructions will fall out.

The method of construction is plainly shown in the drawing, see Fig. 2. The grizzly bars are held together by thro bolts and spacers, and rest at each end on 2 bars rivetted to the bottom plate of the chute.

CANADIAN COAL MEN.

Mr. Tonge was educated at Bolton High School, Bolton Institute, and Victoria University, Manchester, England. At the university he won numerous distinctions, including first-class honours and the Queen's Medal in coal mining. This led to his appointment as lecturer in mining in several townships under the

of his special knowledge in this field he was appointed by the Lancashire Coal Owners' Association, the Manchester Geological and Mining Society, and the Lancashire Colliery Managers' Association to be the sole representative to give evidence before the Royal Commission on Electricity in Mines. In 1910 he was elected President of the Manchester Geological and Mining Society in succession to Sir W. E. Garforth.



MR. ALFRED J. TONGE,
General Superintendent Dominion Coal Company.

Lancashire County Council. He subsequently became agent and general manager of the Hulton Collieries in Bolton; and it may be recorded that under his supervision the output of these collieries was trebled. Later he engaged in a general consulting practice, and was the first to introduce, in Lancashire, if not in England, the use of large stream turbo-generators in collieries and to apply electricity to the general operation of running them. Doubtless, in recognition

In 1912 Mr. Tonge accepted the position of Mining Engineer to the Dominion Coal Company, and removed to Canada in July of that year. In 1917 he became General Superintendent of Mines, and last year was appointed General Superintendent of the Coal Company. He joined the Institute as a member in 1913, and at the annual meeting this year was elected a Councillor for 1919-1920. He is also 1st Vice-President of the Mining Society of Nova Scotia.

There are just two courses open to Canada. She can shape her fiscal policies so as to encourage the development of her coal and iron resources, thereby assuring herself of a modicum of political independence, and some powers of military resistance, or she can resign herself to depending on the United States for coal and iron, or in other words, can place our country unreservedly at the mercy of our neighbors. This is the issue.—Canadian Mining Journal, issue 16th April, 1919.

So far as Canada is concerned the very title "Fuel Controller" expresses a misconception, unless indeed the Government had more in mind the importation of coal from the United States than the encouragement of production at home. What we need in Canada is not a fuel "Controller," but a fuel "Booster." The coal industry does not require controlling, or restricting, in any way. It needs to be encouraged, to be enlarged and amplified to the utmost extreme.—Canadian Mining Journal, 1st Sept., 1918.

GRANBY CONSOLIDATED MINING CO.**Report for 12 months ending 30 June, 1919.**

Operating at a loss of \$219,839 and showing a deficit of \$984,409 after dividends, Granby Consolidated Mining, Smelting and Power Co., experienced a most unsatisfactory year in the 12 months ended June 30 last. The slowness with which copper moved after the armistice in November, 1918, and the construction of the new coking and by-products plant necessitated the raising of bank loans to \$5,035,243.

It cost the company 23 cents a pound to produce its copper last year while the average price received for copper actually sold was but 17,714 cents a pound.

The company sold but little more copper during the past fiscal year than it carried forward into the present 12 months as here remained on June 30 last, 12,001,573 pounds unsold which had been shipped at an average price of 16.23 cents a pound. Sales during the past year amounted to 16,333,137 pounds at an average price of 17,714 cents a pound.

Granby sold 395,915 ounces of silver at \$1.0143 an ounce and carried into the new year 172,093 ounces which was inventoried at \$1. Of the gold yield the company sold 13,657 ounces and had 9732 ounces at the year end, both sales and inventory being at \$20 an ounce.

Including a relatively small amount of purchased material the Granby smelters treated 1,007,862 tons of ore from which there was recovered 28,334,710 pounds of copper, 568,008 ounces of silver and 23,389 ounces of gold. Hidden Creek mines contributed 21,012,301 pounds while the Phoenix mines, now closed, furnished 6,108,314 pounds.

The average yield of all the company's mines was 27.97 pounds of copper per ton of ore. The highest average recovered was from ore at the IT mine which yielded 97.33 pounds per ton for a production of 151,829 pounds of copper. The Midas mine showed an average yield of 46.08 pounds and a production of 343,645 pounds. The average of the Phoenix mine was 19.51 pounds and the Hidden Creek mine 31.6 pounds.

Granby's balance sheet as of June 30 last shows current assets of \$5,692,087 against current liabilities of \$6,108,744. Under the latter heading were bank loans of \$5,035,243; accounts payable of \$518,413 and accrued charges of \$555,089. Current assets included cash of \$83,774; accounts receivable 253,304; copper, gold and silver on hand, \$1,963,264; metals in process and ore \$1,020,279; material and merchandise \$2,371,466; and total inventory of \$5,355,008 assigned June 30 and subsequently securing bank loans.

Development work during the past fiscal year added 1,321,250 tons to Granby's reserves against which there was extracted 664,847 tons. This applied to the Hidden Creek mine which now has 11,500,850 tons of ore. The old Phoenix property, shut down at the present time, has 2,513,636 tons of ore of average grade of which the management believes one half remains available. The average grade of ore mined at Hidden Creek during the year was 1.88 per cent copper against 2.14 per cent in the previous year and 2.08 per cent two years ago. The mining cost at this property last year was \$1,389 a ton against \$1,207 a ton in the previous 12 months.

NEW YUKON BULWARK.

News of the pronounced success of the cold water thawing process in the treatment of frozen alluvial placers is among the best that ever was announced in

the Klondike. It is given on authority that the thawing by that process beyond question is more satisfactory than the old steam system of thawing, and that the ground not only is better adapted to dredging but that the costs of thawing will be less than half. This means the bringing into the workable range of hundreds of miles of creeks near Dawson which heretofore were considered of questionable value. This will be the case in particular when normal prices of outside supplies are restored, and for the present the saving on thawing will act as an offset to the high costs, thus making it possible for the large companies to continue their work in this camp.

By reason of high prices, gold having a fixed standard of value, purchases today only half what it did in pre-war or normal times. Hence there was urgent need of some discovery for working frozen placers at lower cost if the works are to continue during the tiding over period. In face of the fact the gold brings relatively little in the market now, that is, that it takes so much of it to buy the necessary food and equipment for the operations, the gold mining operator cannot afford to advance wages on low grade propositions. It is inevitable he shut down when it comes to working low grade properties unless the newer and less expensive method of work be introduced or unless the government bonus the gold miner.

Not all gold operations, however, are in such places that the gold water thawing can be applied, and the government bonus also will be a pillar under the industry. Other mineral yields have been stimulated by that process. Why not gold? At the same time a vast area of the gold gravels of this region are of the kind where cold water thawing is adaptable, and the new process therefore may be counted another pillar under Klondike both for the present and for the future. Not only Klondike, but the entire vast frozen empire of the North from Bering sea to the Rockies, and possibly in future fields beyond will benefit from the process. Siberia will come in for its share of the good. It seems the whole top of the earth—the frozen era—will throb anew with gold industries from this new process, and first among the beneficiaries will be Klondike.—Dawson Weekly News.

How long will Canadians be content to follow the American cart around, picking up what coal drops on the road? How long will the nightmare of frozen impotence oppress and depress our people? The waste of our neglected coalfields never proclaimed Canada's immaturity and shame so strikingly as today, when a huge burden of national debt is lodged on the country's shoulders, and demands for our future welfare the use of every natural bounty available for development.—Montreal "Star," Nov., 1919.

From the national point of view, the increased revenues of the Customs Department in import duties is scarcely sufficient to offset the foolishness of spending millions on the purchase of United States coal, while simultaneously the Canadian coal production is steadily dropping. The effect on our national finances is tantamount to raising a loan in the United States at high rates of interest, and it adversely affects both our money exchanges with New York, and our national earning power, to say nothing of the larger question of dependence upon our neighbours for such an essential weapon of warfare as coal.

THE ADVANCE IN SILVER.

Explanation of Rise in Price to be Found Chiefly in Far East.

New York.—For an explanation of rise in the price of silver to above gold parity of silver dollars, one must look chiefly to the Far East. It is principally demanded from that quarter, first from India and latterly from China, which has driven the price to a level not witnessed in almost five decades.

Not many months after outbreak of the war, a scarcity of silver rupees appeared in India. With the placing of orders for Indian products by the Allied nations, the interior trade of the country commenced to expand on an enormous scale, and the requirements of the media of payment increased correspondingly. At the same time the political disaffection in India, which was more or less instigated by German agents, resulted in the public showing a decided preference for silver rupees as against paper currency, which is redeemable in silver coins.

In order to supply itself with silver and meet increased demand for the coins, the Indian government first turned to China. In 1915, Shanghai had a superabundant supply of the metal. Stocks amounted then to 96,000,000 ounces, which was an abnormally high figure. But in the course of the next few years, drafts made by India reduced supplies until they stood at the exceedingly low figure of 20,000,000 ounces in the early part of 1918.

It was now impossible for India to secure any further amounts of the white metal from China. But need of it was more pressing than ever, inasmuch as the native population had made a veritable run on the treasury, presenting notes for redemption in silver rupees. At this critical juncture, the Indian government through Great Britain appealed to the United States which had the only available stock of silver in the world, consisting of about \$568,209,000 silver dollars. Responding to this appeal, the United States Congress enacted in April of 1918 the Pittman act, which empowered the secretary of the treasury to melt down and ship to India a maximum of 350,000 silver dollars.

So acute was the crisis at the time in India that silver was shipped by the United States government even before the Pittman law was passed. It has been stated that had the shipments been delayed a few weeks, the Indian currency reserve would have been exhausted and the Indian government would have been forced to suspend payment on its currency notes.

A total of 260,000,000 silver dollars were reduced to bullion and sent to India. It is understood the Indian government paid \$1.101½ an ounce for the metal.

In the meantime, in order to conserve whatever stocks of silver were in the market, here and in Canada, the United States and Canadian Governments promulgated an embargo on all private exports of the metal. Ban continued until the middle of the present year, and with its removal the United States Government discontinued making any further shipments to India.

Since cessation of silver exports from this country to India, the Indian government has remained out of the market for silver. It has instead been fortifying its currency reserve with gold, which it has secured in this country and in London. Virtually all offerings of Transvaal gold made in London are now finding their way to India.

By the time demand of silver from there ceased, world shipping conditions had improved to such an extent that China was able to roll up a tremendous favorable balance has been chiefly met with shipments of the white metal from the United States, and the Chinese bank reserves, which were depleted by the Indian drain, have been thus replenished. In spite of the recent sharp advance in price for silver, Far Eastern exchanges continue to rule above the silver export parity. Thus China is still in a position to take silver from this country.—Boston News Bureau.

WORLD'S COAL PRODUCTION.

In the last year before the war the world's total output of coal approached a billion and a half tons, being 1,478,000,000 tons in round figures. The outbreak of hostilities caused a tremendous drop in production which had reached its lowest point in 1915, when production declined to 1,312,000,000 tons. Thereafter as the warring powers realized that the struggle was one of munitions quite as much as of men the world's production was greatly increased. During the last two years of the war it reached a level approximately that of 1913, being 1,473,000,000 tons in 1917 and 1,468,000,000 tons in 1918, as nearly as can be estimated, as exact figures cannot be obtained for Central and Eastern Europe during the war period.

All of the great coal fields of Europe lay within the belligerent countries, and in all of them production declined. Even those districts that were fortunate enough to escape devastation suffered from lack of man power and transport. Deprived of their normal imports from England and Germany, the neutrals and Italy endeavored to increase the output from their scant resources. The stimulus to production supplied by the scarcity in Europe was felt even in Africa, the South Seas, and the Orient.

Upon the United States, however, fell the chief burden of making up the deficit caused by the war. In 1913 the country was contributing 38.5 per cent of the world supply. During the war its share increased at the rate of about 2 per cent per year, until in 1918 approximately 46 per cent of the world's output of coal came from the United States.

PERSONALS.

Dr. J. Mackintosh Bell is at Almonte, Ontario. He is to give a series of 10 lectures, each dealing with a prominent mining area in Eastern Canada, Australasia and Siberia, at Harvard University in January. He will make his headquarters in Toronto.

Mr. C. E. Smith has been elected chairman of the Toronto branch of the Canadian Mining Institute.

Mr. J. C. Murray is at Port Arthur, being interested in development of properties in that district.

Mr. D. H. McDougall, President of the Canadian Mining Institute, is expected to sail from England for Canada about the 25th November.

Our readers will know that this journal 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.—Canadian Mining Journal, issue of 16th July, 1919.

Special Correspondence

BRITISH COLUMBIA.

Barkerville, B.C.

The district of which the historic town of Barkerville is the centre, well known to all old-time Cariboo prospectors, is described as being all agog with pleasurable anticipation of the permanent rehabilitation of the mining industry next year.

This activity is attributed to the quartz claims situated on Proserpine Mountain, about four miles to the north of the town, having been acquired by the Mining Corporation of Canada, headquarters Toronto, Ont., and the plans the latter have decided on, and already have commenced carrying out, for their development.

Under the direction of Robert H. Bryce, late of Cobalt and Porcupine, a crew of more than fifty men is now at work. Cabins have been built providing sleeping and eating accommodations for one hundred men, together with offices and other necessary buildings. John Bell, an old-timer in the district, has taken a contract for the driving of two tunnels of 200 feet each, while I. E. Moore has a contract for a third and a fourth is to be constructed. Two diamond drills are being shipped to the property and will be at work before long.

In short the lode is to be as thoroughly explored as possible before spring, between \$70,000 and \$100,000 being spent in test work alone. If the results are satisfactory, indicating that the values continue at depth, the town of Barkerville will be made and the district generally will benefit materially. That such will be the outcome appears to be the confident opinion of the company, prospectors, and all residents. The surface showing is good; the outcrops show a depth of at least 800 feet from the summit, and at that depth the width of the ledges holds uniform, one being 17 and the other 42 feet. The average assays hold all along this depth, the values to the ton being, roughly speaking, \$17.

J. D. Galloway, Government Mining Engineer, who returned recently from the district, refers enthusiastically to the outlook. After speaking of the proposed work of the Mining Corporation of Canada, he says that open cuts, shafts and tunnels are being dug into the hill with the object of proving before spring whether the property is a big low-grade gold property or nothing at all. All indications are most favorable, he says, that the results will be good. He states that, as a result of this company's activity, there has been a small-sized stampede into the Barkerville section, that claims have been staked all over the country, and considerable prospecting has been done. "There is good reason to suppose," he concludes, "that other properties will be discovered as a result of this work and that Barkerville will again come to the front as a gold mining camp."

Kamloops, B.C.

The difficulty of obtaining labor is hampering the completion of a number of British Columbia enterprises which are expected to benefit the mining industry. One of these is the branch line of the Canadian National Railways between Kamloops and Kelowna by way of Grande Prairie and Vernon. Another is the branch railroad from the Kettle Valley Railway to Copper Mountain, where the Canada Copper Company is opening up, on a large scale, extensive

deposits of low grade copper. A third is the construction by the Kootenay Power & Light Company of its power line from Bonnington Falls, where the power is developed, to Princeton, where it is to be used by the Canada Copper Company in its new mill. The new Kamloops—Kelowna Branch Road will afford transportation facilities necessary to the development of the gypsum deposits at Grande Prairie, which are owned by the Manitoba Gypsum Company and said to be of enormous extent.

Nelson, B.C.

John R. Cassin, president of the California Mining Company, states that the process by which the ore of the California Mine, situated near Nelson, B.C., is to be treated has been decided and that the necessary new machinery is to be ordered. Experimentation with the gold-silver ore of this property, carried on at the Athabasca Mill, provided the basis on which the process was determined. At present the mill, which was built to treat Athabasca Mine ore, is purely a stamp mill. To the ten stamps will be added a ball mill which will be used for primary grinding and which will operate in a close circuit with the classifier. The product will pass over the Senn amalgamating tables and finally will be treated by oil flotation. The experiments indicate that 90 per cent of the values may be recovered by the treatment outlined. No extension of the mill building will be required. The capacity of 25 to 30 tons may be increased by putting in additional grinders and tables, as the output may necessitate.

Some indignation is expressed in British Columbia mining circles because of the reports that Great Britain has been an inquirer in the United States for large quantities of zinc when difficulty is being experienced in the moving of Canadian zinc for want of a market. F. A. Starkey, commissioner of the Associated Boards of Trade for Eastern British Columbia has taken the matter up with Sir Robert Borden, Premier of Canada as follows:

"Sir: The reason for submitting you a copy of the enclosed resolution passed at the annual convention of the Associated Boards of Trade of Eastern British Columbia is for the purpose of impressing upon you the serious need for consideration of the request made therein, which is that a preference be given to the Dominions and Colonies by the Government of Great Britain in-so-far as the purchasing of raw and manufactured material is concerned.

Attached thereto you will note a clipping from the Engineering and Mining Journal, New York, which is an acknowledge authority on the metal markets. It will be seen that Great Britain, France and Belgium are all making inquiries for both lead and zinc metals. It is also shown that it is not the first purchase in quantities Great Britain has made in the United States market.

Therefore, we are most desirous to have your Government impress upon the Government of Great Britain the importance and imperative need of a preference being given to the Dominions and the Colonies in purchasing our raw and manufactured goods which, if consummated would be the means of bringing about a more favorable balance of trade in Canada's favor, thereby increasing the volume of trade within the Empire.

Hoping for your attention and personal consideration."

The resolution referred to requested the Prime Minister, then a delegate to the Peace Conference, to "place before the British Government the strong advisability of the British Dominions and Colonies being given a preference in the purchase of supplies for the reconstruction of devastated Europe; and for making good stocks of raw and manufactured material which have been depleted as a result of the war."

Thirty-five owners of mining properties, some of which are under development and some staked preparatory to similar work, are petitioning the Government to assist in the construction of a road to facilitate transportation. If the Government builds the road wanted, a further distance of 10 miles from what is known as the Edgewood-Pre-emption road, to Deep Creek on the Vernon Highway, it will bring the road within twelve miles of the camp and materially cut down ore shipping charges. The Killarney, Waterloo, and Rampolla Groups of mineral claims are reported to be showing up very satisfactorily and operators are looking forward to splendid results next season.

Vancouver, B.C.

With the depreciation in the purchasing power of gold the system of taxation of gold mines of the Province has become obsolete and unfair in the judgment of some members of the British Columbia Chamber of Mines. If the gold mining industry is to be maintained, they hold, the fundamental principle in fixing taxes must be the ability of the properties assessed to pay. Owing to the fact that, since taxes last were adjusted, mining costs had practically doubled. A joint committee, representing the B.C. Chamber of Mines, the Canadian Mining Institute, and the mine owners, has been appointed to investigate the matter and submit a report with a view to making whatever representations are thought advisable to the Provincial Government before the next session of the Legislature.

Golden, B.C.

The Tarheel Copper Mines, Golden Mining Division, are reported to have passed out of the control of J. C. Lincke, a majority interest having been secured by Calgary business men. A company has been formed and it is proposed proceeding with development. A contract will be let for the driving of a 100 foot cross-cut tunnel to tap the ore body. Transportation facilities are to be improved to the end that the ore may be hauled direct and by a shorter route to the Kootenay Central Railroad at Parson Station. The Provincial Government is constructing a road from Parson to open up the Spillimachene River Section which, it is asserted, will be the natural outlet for the mineral of that district.

Victoria, B.C.

With the announcement from Ottawa that the Governor-General-in-Council had ordered that no coal could be exported from Canada except under license issued on the recommendation of the Canadian Trade Commission, not a little consternation was manifested by the coal operators of British Columbia. The Collieries of Vancouver Island had been producing to capacity and taking care of both the domestic trade as well as the exceptional demand of the State of Washington, the latter undoubtedly created through the recent labor troubles on the American side. That is to say they had been providing ample for the home requirements and disposing of the surplus in Washington.

Consequently the news of Ottawa's action came as

a disagreeable surprise. They argued that, as long as no one in British Columbia suffered, the Island Collieries should be permitted to export. Hon. Wm. Sloan, Minister of Mines, who has been keeping an eye on the situation ever since the American strike, and who had been assured by the operators that nothing would be done to create a local fuel shortage, was approached to intervene with the Dominion Government. He promptly took this step and was advised that the export of coal, under such conditions as obtain in the Pacific Northwest, would not be interfered with. At any rate that was the construction generally placed upon the word which came from the Capital and, as a result, the collieries of Vancouver Island are not up to date affected, nor is their trade; it being possible to secure all the licenses required.

In a statement Mr. Sloan pointed out that during the year 1918 sales of British Columbia coal for consumption in Canada amounted to 1,010,938 tons, while 752,821 tons were sold for export to the United States and 58,417 tons were sold for export to other countries. It, therefore, was apparent that the Collieries of the Province were dependent to a very large extent on their export trade and it would be dangerous to interfere with it.

Some alarm was created shortly after the Ottawa order came to hand by a report that the management of one of the principal collieries had stated that, if the regulation were enforced, it would be necessary to close down the mine. This, however, was flouted by Mr. G. W. Bowen, general manager of the Canadian Western Fuel Company, who described it as nonsense.

The Canadian Western Fuel Company has announced that the price of its coal in British Columbia will be raised \$1.00 a ton, the same to take effect immediately. It was explained that this advance was made on October 1 on all coal exported to Seattle and other points in the United States. The increase in the local price was deferred, it is stated by the operators, because it was believed that local conditions might so alter as to make it unnecessary. While the Western Fuel Company is the only Company to make the advance thus far it is considered likely that others will follow suit.

This change in price brings local standard lump coal to \$12.50 a ton. The Seattle price to the consumer for the same coal runs between \$14 and \$15, according to the district in which it is delivered.

Reasons given for the increase are that the Canadian Western Fuel Company, in the exploitation of the Nanaimo Mines, finds that the percentage of lump coal has dropped from eighty to forty-eight per cent of the output; that there is little demand for the smaller grades although it costs more to handle; and that extension of the underground workings and the decline of some of the best seams, has resulted in longer and, of course, more expensive haulage, which has brought down the production per man per day from three and four tons to one and one-half tons.

It is stated that the greater quantity of the lower grades of coal are shipped to Washington, the greater percentage of British Columbia consumers insisting on having the lump coal.

Prince Rupert, B.C.

All fear of a coal famine this winter at Prince Rupert has been dispelled by the assurance that the city's requirements can be adequately cared for by the mines at Telkwa, a short distance inland on the line of the Grand Trunk Pacific Ry.

Dawson, Y.T.

The Yukon Gold Company has paid \$2,500 to each of the four widows of its employees who died of poisoning after eating a meal at the Hunker Boarding House. It was not clear whether the case came under the Workmen's Compensation Act, so the company offered the settlement indicated, which was accepted. The widow of another man, not an employee of the company, but who partook of the fatal meal, was given \$1,000. In all 12 men died, eight having no dependents, and several others were taken sick and were ill for some time. These latter were paid half time during their illness.

Trail, B.C.

Ore receipts in gross tons at the Trail Smelter of the Consolidated Mining & Smelting Company for the week from November 1 to 7 inclusive totalled 4,233 tons, making the aggregate for the year 279,828 tons. Of the independent shippers the largest contributors were: Josie, Rossland, 249 tons; North Star, Kimberley, 376; Rambler-Cariboo, Rambler, 235; Ruth, Cedar Creek, 115; Silver Standard, Silvertown, 293. The Centre Star, Rossland, was the only considerable shipper among the company's properties, its total being 2,319 tons. The strike still is in effect at Kimberley, so that the Sullivan Mine is not producing.

Lethbridge, Alberta.

Before the Alberta Coal Commission in Lethbridge it was declared by A. Bryant, representing the miners of Chinook Collieries, that much of the recent One Big Union strike trouble in District No. 18, U.M.W. of A. was caused by the agitators doing the thinking for the miners. When the strike was at its height the miners had voted to break away from the U.M.W. of A. and join the O.B.U. but later they had deserted the O.B.U. and again gone with the International. Two weeks later they had been swayed by the O.B.U. agitators and reversed their decision only to change their minds subsequently when it was thought better to retain their international affiliations. This evidence strongly substantiated the testimony of Commissioner Laughran, representing District No. 18, U.M.W. of A., who declared that much of the instability in the coal mines' industry in the Province of Alberta was caused by agitators who so easily swayed the rank and file that it made it almost impossible for the district officers to follow a straight course. Without these irresponsible spirits there would be fewer rash promises to the men and less pithead strikes.

Victoria, B.C.

Hon. T. D. Pattullo, Minister of Lands in the British Columbia Government, is in Ottawa interviewing the Dominion Government with reference, among other matters, to the construction of a branch of the Grand Trunk Pacific Railway into the Ground-Hog Coal Country. Situated at the headwaters of the Naas River in central British Columbia, the Ground-Hog is regarded as one of the richest coal areas of America. As yet it is altogether undeveloped. But there are showings, some of them of anthracite, which extend for miles across the country and the Provincial Government believes that if a railway can be secured to tap this section a great coal camp soon would be established. Such a road would have to be constructed from Hazelton, or some convenient point near that town, as the Ground-Hog is almost due north of Hazelton.

C. M. I. TORONTO BRANCH MEETING.**Minister of Mines and Attorney General Address
Institute Branch Meeting.**

The new Ontario Government was represented at the luncheon meeting of the Toronto branch of the Canadian Mining Institute, Saturday, November 15, by Hon. Harry Mills, Minister of Mines and Hon. W. E. Raney, Attorney-General. They were introduced by Mr. J. R. Tyrrell, chairman of the branch, who pointed out that most mining engineers intend to own a farm some day and should be regarded as potential farmers at least. He hoped therefore that the Ministers would find themselves in congenial company.

The Minister of Mines made it clear in a few words that he intends to devote his attention to development of mineral resources rather than to labor propoganda. He was chosen by the labor party as one of their representatives in the Cabinet, but he does not consider his work as Minister of Mines should be taken advantage of to further the interests of any class. He will expect the Department of Labor to deal with labor matters while he will devote his attention to the production of minerals. He said he recognized, as his constituents well recognize, that capital is necessary for the development of natural resources and he intended to do whatever he could to bring capital to the country for the mining industry. As a resident of Fort William he feels that Northern Ontario has a great future and that it has not yet received the recognition it deserves. He will endeavor to put Northwestern Ontario more prominently on the map.

The Attorney-General in a short address gave some idea of the aims of the new government and claimed that while it is a government, chosen by the farmers and labor, yet the Ministers can be counted upon to give all classes a fair deal. One of his first acts was to get rid of the political party governments, and he states that every endeavor will be made to win justice for all.

After the Ministers had spoken, Chairman Tyrrell called on Dr. W. G. Miller, a past president of the Institute and Prof. H. E. T. Haultain. Dr. Miller pointed out that development of mineral resources depended largely on the initiative of men who were ready to venture so long as they had good grounds for believing they would profit greatly if their ventures proved successful. The nickel industry in Ontario is a case in point, for the men who developed the nickel industry had a long hard struggle before they achieved success.

Professor Haultain thanked the Ministers for their plain speaking, and stated that he had never before had the pleasure of hearing Cabinet Ministers express themselves so frankly and simply. He thought that mining engineers would become more interested in politics if the people would approve of straightforward talk and action. As one of the senior members of the Mining Institute he invited the Hon. Mr. Mills to apply for admission to membership in the Institute.

The election of new officers for the branch resulted as follows: Chairman, C. E. Smith; vice-chairman, J. B. Tyrrell; secretary, J. P. MacGregor.

The Toronto branch holds meetings every two or three weeks during the winter months. Most of these are luncheon meetings on Saturdays at the Engineers' Club. There were 35 present at the meeting last Saturday.—R. E. H.

Note:—A short account of this meeting appeared in the last "Journal," for the additional details given warrant a second mention of an unusual gathering.—Ed

Nova Scotia Notes

Following the explanation of the Nova Scotia coal operators that they could not grant the schedule of wages asked by U. M. W. of Nova Scotia in replacement of the existing schedule, the union has asked for a Board of Conciliation which it is announced from Ottawa will be granted. It is also understood that this Board will be asked to consider the wage question at all the collieries in Nova Scotia. The composition of the Board has not yet been selected, but it is understood that Mr. J. C. Watters will probably be the nominee of the U. M. W. of Nova Scotia.

The Secretary of the United Mine Workers states that the union has not, as reported in the newspapers, agreed to the sending of coal from Nova Scotia to New England ports in proportion to the amount of United States coal supplied to Canada during the U. M. W. strike in the States. The Secretary's statement as reported in the Glace Bay "Gazette" is as follows:

"Our position is this—we refuse to let any coal be shipped into the United States while this strike is on; it is not a question of exchanging coal. The U. M. W. executive discussed this matter with Mr. Magrath at Truro, a couple of days ago. The U. M. W. will refuse to let any Canadian coal be shipped to the States."

This rather ties Mr. Magrath's hands, as there is no practicable method by which Nova Scotia coal can be delivered in the central provinces of Canada now that navigation is about closed in the St. Lawrence. It also rather effectually disposes of some of the arguments of influential persons in Ottawa who have advocated the extension of the jurisdiction of United States' labor organizations into Canada, and were particularly convinced of the benefits that Canada would experience when it came under the benign sway of U. M. W. headquarters at Indianapolis.

As a matter of practical politics, however, Ottawa will dispose of the available coal of Canadian origin to the best of its ability in order to keep Canadian citizens from freezing to death.

The Dominion Coal Company has made a number of improvements in its practice recently, which while not very important in detail, will in their combined effect tell favourably on costs and production.

Particular attention has been paid to the economy of compressed air, and pipe ranges of insufficient diameter, have been replaced by pipes of larger diameter. An investigation of the many little sources of air leaks has been undertaken, something that must be done every little while. The use of the portable air meter has proved of great advantage as a discoverer of unsuspected leaks and obstructions.

The undersea territory of some of the Phalen mines is being rapidly developed. The pillarage which must be left in the submarine tracts lessens the amount of extractable coal per acre, and necessitates a more extended and more rapid driving of the "narrow-work" than is required in the land areas. Double-shifting of the narrow work places is therefore required.

The pumping stations of the Company are also being concentrated. Larger lodgements, or gathering places for the water are being provided, and electrically-driven centrifugal pumps are being substituted for the air-driven pumps. The electric current is usually led

down a borehole, and the pump discharges to the surface through a cased bore of large diameter, usually twelve inches. Special provision is being made for dealing with the submarine areas, and the main pumping stations are situated as near the shore as possible, and are designed with special reference to the possibilities of undersea mining.

An unusual amount of prospecting has been done during the past few months on the Dominion Coal Company's areas, chiefly with regard to the lower seams, Emery, Gardiner and Mullins. The approximate position of these seams is of course known, but before accurate projections can be made for future openings, the seam must be actually uncovered and exactly located.

The Glace Bay "Gazette" suggests that the Dominion Coal Company has a good opportunity, in entering the North Sydney coalfield to create a model mining community, and the advice is good. There is just one way in which the ideal community can be brought about, which is one of the exemplifications of the possibilities for good in a monopoly. The Corporation that undertakes to create an entirely new mining community in an unpopulated district should be sole owner of all the adjacent property, and should itself own and control every municipal facility. The district of New Waterford is pointed to as an example of a good opportunity missed, and all who know that district will agree. The Dominion Coal Company in the first instance provided streets, lights, water and transportation, but the real estate speculator reaped the benefit, while the Company pays the major portion of the taxes.

The Sydney "Post" quotes the Glace Bay Gazette's editorial, which is unfortunately too long to be repeated in these columns, and makes the following comment thereon:

"If the expectations of the Dominion Coal Company's experts as to the value of the Bonar Head coal for metallurgical purposes are realized, this colliery is certain to become, in the not distant future, the centre of one of the large mining towns of Cape Breton. Timely measures should therefore be adopted by the Coal Company to protect the people against the greed of real estate speculators in this district. Extortionate prices for dwelling lots and business sites are among the conspiring factors in high rents and burdensome living expenses. High rents and excessive prices for the necessities of life are in turn responsible for much to the prevailing unrest among industrial workers. It is as much to the interest of the Dominion Coal Company as to that of its employees, to take the necessary steps to have plenty land available, at moderate prices, for residential and business purposes, within easy distance of the new mine at Bonar Head. It is often said that it is easy to be wise after the event. The Coal Company has had more than enough experience to give it wisdom in this connection."

Mr. J. P. Gordon, on whose property at Copper Lake a sensational gold discovery was made this summer, has gone to the property by dog team. It is probable that development work will be carried on vigorously next summer and the necessary supplies can most easily be assembled in the winter.

Manitoba Notes

Gold Pan.

Arrangements are being made for the resumption of development operations at the Gold Pan mine. The pumps have been in operation for some time and the mine is now dewatered. Mr. J. B. Tyrrell will visit the property shortly to complete his examination and advise the directors concerning development of the ore deposit.

Brooklyn.

Shaft sinking has been resumed at the Brooklyn. At the 100 ft. level some drifting was done and Foreman MacDonald reports that very good ore was broken, there being an abundance of five grains of gold visible in the ore. Owing to the heavy snowfalls and the lack of frost in the ground the roads have been in very bad shape and the company has had difficulty in obtaining the necessary wood for the boilers. It is expected that this difficulty will soon be overcome. At present the miners are drilling by hand. Superintendent Anderson who has been on a trip to Buffalo has returned to the mine.

Better road needed.

The operators in the Rice Lake district are not receiving the encouragement from the Manitoba Government that the pioneers in a new industry deserve. The development of the gold deposits will mean much profitable business for the people of Winnipeg, but there is no general appreciation of this fact yet. The winter road from Fort Alexander should receive some attention. The government has not even cut out the summer windfalls. Manitoba has yet to experience what the development of mineral resources means in the form of markets for supplies for companies and miners and their families. Ontario mining companies spend millions of dollars annually for supplies and their employees spend millions for food, clothing, housing and other necessities. The Manitoba Government would do well to help build up such an industry in that province.

Flin-Flon.

While the reported sale of the great Flin-Flon ore deposit to Hagden Stone & Co. of Boston has been denied, the property will receive some attention this winter. It is planned to open up the ore body by shaft and lateral work underground. The information so far obtainable is from the results of surface examination and numerous diamond drill holes. The proposed development work will be the first mining to be done on the property. The diamond drilling showed that there is an enormous body of ore.

LIGHT RAILWAYS FOR THE NORTH.

Toronto Company formed and work of constructing narrow gauge lines to start in the Spring.—Meeting of Ontario section Mechanical Engineers.

Toronto Notes.

(Staff correspondence Canadian Mining Journal)

Toronto mining interest are much interested in the formation of the Canadian Light Railway Construction Company, Limited, with an authorized capital of \$500,000 for the purpose of building light narrow gauge railways in the outlying mining districts of Northern Ontario. The company, which has been incorporated in Toronto, included J. Roebuck, C. J. Corless and W. B. Jones and is headed by Mr. Solo-

way. It is announced that work will not be commenced until spring and that the first section built will be between Elk Lake and Gowganda, a distance of 28 miles which will take about two months to construct. A system of roads such as it is proposed to construct after the style of the light railways for rations and munitions in France and Belgium, should command considerable assistance from the Ontario Government by reason of the fact that the Government would be relieved of the burden of constructing and maintaining expensive highways. The outcome of the first section will probably decide the advisability of extending the scheme to other camps such as Boston Creek, Larder Lake, Skead Township, Munro, Fort Matachewan and West Shining Tree.

Note:—Our readers will recollect that the use of light railways in the mining districts of Northern Ontario was first mooted by the Journal in its editorial columns (see issue 9th July 1919.)

An extensive development scheme will be undertaken on the properties of Gold Centre Mines, Ltd. in the Porcupine district in accordance with a report by B. M. Walton, M.E. to the secretary of the Company, M. P. Van der Voort of Toronto. The engineer says, that the property is exceptionally well located, adjoining the Hollinger Consolidated Gold Mines and that the mineralized area of the claims is large and the veins strong. The property, he declares, with serious development will amply justify the expenditure of a considerable amount of money with favorable chances of developing into a producing and paying mine. The report recommends the proving of the property by diamond drilling to a depth of about 5,000 feet and adds "I am convinced that this area alone would indicate a mine of large size and immense possibilities. Should the diamond drill holes along the contact prove the existence of commercial ore bodies, it would then be reasonable to assume that the entire line of contact will extend clear across the property running northeast by southwest for a distance of over 3,000 feet in length and would mean the probable existence of a very large mine which would compare favorably with some of the largest producing and dividend paying mines in the camp."

Action has been commenced in Toronto by Frank Samuels of Philadelphia against the Black Lake Asbestos and Chrome Company, claiming \$80,147 damages for alleged failure to supply 2,685 gross tons of chrome ore, which, according to plaintiff, was the undelivered balance of the ore called for in a contract. The defense claims the contract was conditional on being able to produce the ore, to obtain cars to transport it and on the Government placing no restrictions on export.

The American Society of Mechanical Engineers, Ontario Section held their first meeting for the season on the evening of November 14th in Toronto. The gathering took the form of a dinner at the Engineers' Club, following which General C. H. Mitchell, C.B., M.G., D.S.O., spoke on some phases of mechanical engineering in the war, which had come under his observation in France and Italy. General Mitchell, who went over with the First Contingent in 1914 as Intelligence Officer, served with great distinction, first in France and then as Intelligence Officer on the general staff of the British expedition sent to the aid of the Italians on the Piave. His address covered transportation matters and mobile shops and other engineering features of the advanced areas in France. He

made some very interesting observations on Italian hydro-electric developments as he found them at the end of the war in comparison with their condition and size at the time of a previous trip in 1906. He gave a vivid description of the Italian engineering feats in the construction of the "Teleferrica" or wire cableways which transported men and munitions in hanging carriers over mountain peaks and across great chasms, even when subject to a great hazard due to shell fire.

General Mitchell, who is the new Dean of Engineering, as well as an old graduate of the Faculty of Applied Science, University of Toronto, closed with a description of after-the-war conditions at the University and drew some deductions as to the trend of engineering opportunities in different channels, as indicated by the tendency of certain branches, notably mechanical engineering and engineering chemistry, to push ahead at the present time.

After the General's address the meeting proceeded to discuss plans for the season's work and the program of one meeting per month, alternately with a dinner with an address and a technical session, was decided upon. A large number of prospective members were present and all mechanical engineers of the district are invited to participate in these meetings, with the hope that they will ultimately join. It is felt that when members come from as far away as Chatham, London and Belleville to attend, there is little excuse for local engineers failing to identify themselves with the parent organization of this branch of engineering. Notice of the next meeting will be published in a later issue of this journal.

WASAPIKA CONSOLIDATED.

The successful development of the Ribble vein on the Wasapika Gold Mines property in the Shining-tree district has naturally directed attention to the properties north and south of it, for the Ribble vein is known to cross the north boundary and outcrops of similar ore and rocks have been found on several claims to the south. Owing to the heavy soil cover the vein is not easily followed on the properties south of Wasapika, but has been uncovered for a few hundred feet on the claim immediately north. The development of this northern property is provided for in a consolidation scheme recently approved by the directors.

Under the terms of the merger the Wasapika company will acquire three valuable claims. The owners of these claims will receive one-sixth of the shares of the consolidated company while the Wasapika owners will receive one-half of the shares, and the remaining third will remain in the treasury until required for development work and plant.

In addition to acquiring property of great speculative value the Wasapika company will gain access to the water, as the northern claims border Lake Michikawakenda. There are several good buildings on one claim, providing the necessary housing for all the present employees of the Wasapika company. The northern claims fortunately escaped the disastrous forest fires of last summer and will provide all the necessary mine timber, lumber and fire wood for some years.

The directors of the Wasapika company and the owners of the three northern claims have agreed on the consolidation scheme. A meeting of shareholders will be held on Dec. 2 and it is expected that they will approve.

Development work at the Wasapika property is steadily proceeding, attention for the present being directed to the deepening of the shaft. Manager Rogers wants to obtain as soon as possible some idea of the nature of the ore deposit at 200 and 300 ft. It is probable that the 300 ft. level will be chosen for extensive lateral exploration.

The company has under consideration the building of a 150-ton mill. It is probable that construction of the necessary buildings and installation of the machinery will not be long delayed.

To the Editor of the Canadian Mining Journal,
Sir,

THE FUEL QUESTION IN EASTERN CANADA.

The Eastern Provinces of Canada, including Ontario, owe the Hon. James Domville thanks for his masterly exposition, delivered lately in the Senate of the present parlous condition of their present fuel supply.

Those who are sufficiently interested and desire to study this so important question should read the Senator's speech.

The object of this letter is to create an interest in the minds of those who consider the welfare of the industrial workers as to the possibilities of heating the houses occupied by such workers and their families with oil fuel. The advantages that would accrue from the use of such fuel are herein plainly stated. The present and probable future cost of hard coal is a very serious financial consideration to the industrial worker, who, as a rule, has to pay higher prices than the users because he is compelled to purchase in smaller quantities and has to take delivery during the months when coal sells at high prices.

Were it possible and economical to use a good grade of gas oil (one of the many grades of oil produced from crude oil by fracturation) and were such a quality of oil always obtainable, the industrial worker would be able to purchase his fuel requirements week by week, a proceeding that would result in economy and which would also be less burdensome to the family exchequer.

The economic possibilities of the use of gas oil for fuel for the heating of small houses has not, up to date, been appreciated, but now that the high cost of hard coal fuel has caused more attention to be given to the re-construction of old time ideas for small house heating (as is evidenced by the construction of the "pipless furnace"), it seems to be the ideal time to consider the use of this new fuel.

The B.T.U.s (British Thermal Units, the quantity indicating the relative heat values) contained in one pound of hard coal varies from 12,000 up to 14,000. This is for the actual coal and not for the rock too often delivered as coal. It is probable that the average quality of the hard coal delivered to the homes of the industrial workers will not average 12,000 B.T.U. But let it go at 12,000 B.T.U. It is admitted that

in a house furnace, as generally looked after and fired, the actual efficiency is very low and seldom exceeds 25 per cent.

In a publication of the U.S. Fuel Administration, it is claimed that the following losses occur:

Heat lost up the chimney owing to improper draft regulations	40%
Heat lost through accumulation of soot.....	10%
Heat lost by radiation of heat when the furnace is located in the cellar	20%
Heat lost by removal of cinders and by the presence of the cinders	5%
Total loss	75%

When the heating of a small house is effected by the use of base burners, it is certain that the efficiency obtained is higher, as certain of the losses above mentioned are considerably reduced, but there are serious objections to the use of base burners with the smoke pipes passing through every room.

Be the losses what they may, it is certain that they are very heavy with the arrangements that are now in common use, and under the conditions that exist and under those conditions it is difficult to see how the losses can be lessened. But in houses that will have to be constructed in the future, more suitable conditions can be arranged for and at little and often no increased cost.

An oil fired furnaces scientifically designed should be able to secure an efficiency of over 80 per cent, but were but 50 per cent secured it would be double the efficiency of the present hot air or hot water furnace.

One pound of good quality of gas oil possesses 20,000 B.T.U.'s, as compared with average hard coal 12,000 B.T.U.s. At 25 per cent efficiency one pound of hard coal gives 3,000 B.T.U.s, whilst at 75 per cent efficiency gas oil gives 15,000 B.T.U.s, and at 50 per cent 10,000 B.T.U.s, so in one case one pound of oil gas will be as efficient as 5 pounds of hard coal, and in the other case as efficient as 3 1-3 pounds. To be conservative the value of 3 1-3 pounds will be taken.

The industrial classes pay from \$12 to \$16 per ton of 2,000 pounds for hard coal—say \$14 for 2,000 pounds of 3,000 effective B.T.U.s, or \$14 for 6,000,000 B.T.U.s.

A gallon of gas oil will weigh 8—6 pounds and at 10,000 effective B.T.U.s will total 86,000 or 70 gallons will give slightly more effective B.T.U.s than will 2,000 pounds of coal.

Therefore, gas oil at 20 cents per Imperial gallon, will yield as many effective B.T.U.s as will one short ton of hard coal.

Were the oil bearing shales of the Maritime Provinces developed an extremely high quality of gas oil would be produced, and this oil could be retailed at about 15 cents per gallon, so that the eventual cost of this fuel would be at least 25 per cent less than that of hard coal, whilst the labor and cost of repairs would be immeasurably less.

The use of gas oil, as fuel, supplementing the pipeless furnace, and the pipeless furnace so perfected,

would seem to solve the question of heating for houses occupied by the industrial worker.

It is time that a practical consideration of the housing question, as it affects the needs of the industrial workers, should be taken up. The work undertaken by a branch of the Commission of Conservation under Mr. Thos. Adams would appear to have resulted in farce, frills and fiasco. Engineers learn to put "garments according to the cloth available. Dreamers spirit the cloth in attempting to supply garments possessing unnecessary and too often undesirable "frills." What is wanted are comfortable and sanitary houses, without frills, built at the lowest possible first cost and liable to receive the smallest possible cost for up keep. Is it not time for the public to realize the immense account of time and money that is being wasted through the placing of Canada's housing affairs under the management of men, who understand neither the needs of the industrial workers, local construction conditions (which in a country so large as Canada must needs vary widely) nor the practical problems involved in the economical and low costing construction.

LOUIS SIMPSON.

172 O'Connor St., Ottawa.

Copies of the Senate Sheet, as long as the supply lasts, can be obtained by persons living in Eastern Canada by sending a request accompanied by a 2c stamp to pay postage.

PORT ARTHUR NOTES.

By J. J. O'CONNOR.

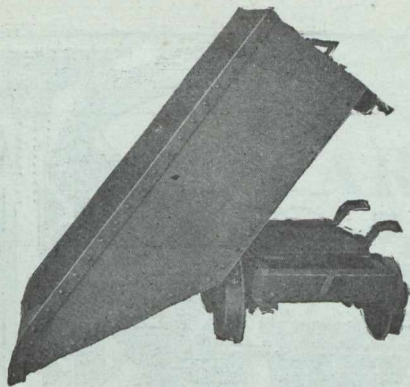
Twelve zinc claims in the Ozone Siding zinc area, hitherto owned by several different parties, have been consolidated under one ownership, headed by Dr. R. J. Manion, M.P., Fort William.

A new discovery of zinc has been made ten miles east of Ozone Siding. Full particulars of the new find have not reached the writer as yet. It is said to be of a most promising character. A number of claims have been staked, and the field is being thoroughly prospected.

About midway between Ozone Siding and the new zinc discovery, a ten foot vein of baryte has been uncovered, claims are being staked, and preliminary work being done on them.

Excellent shipping facilities are afforded all of the above properties, as they lie alongside the Canadian Pacific Railway, which at that point skirts the shore of Mazokama Bay, a deep water harbour, on Nepigon Bay, Lake Superior.

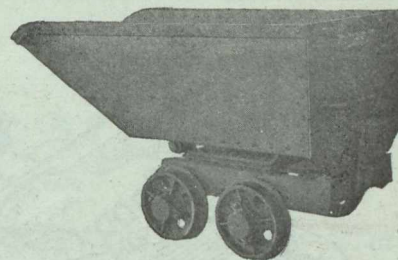
WANTED—A competent man with experience covering the principal departments of electrolytic copper refining. Must be prepared to go to Europe if necessary. State terms in application, also experience in design construction and operation, giving references. Mark envelope "Application" and address to W. J. Forrester, Imperial Bank Chambers, Leader Lane, Toronto.



Showing position when dumping at the side.

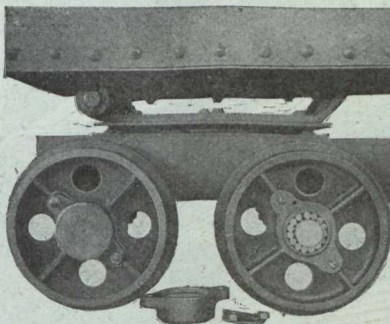
ROLLER BEARING Rotary "Scoop" MINE CARS

Will dump at either side or either end.



Showing car closed and ready for loading.

This is only one of the many types of cars we make for the use of mines. We make these Scoop Cars any size or capacity you want.



Showing the Roller Bearings supplied in all four wheels of our Mine Cars. Note the dust-excluding cap, with ample capacity for holding grease or oily waste.

Send for your copy of our Mining Catalogue showing many other types of Mine Cars. It will repay you.

MARSH ENGINEERING WORKS, LIMITED, Established 1846 **BELLEVILLE, ONTARIO**

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

BOLINDER'S

Heavy Crude Oil Engine

FOR MINING AND INDUSTRIAL PURPOSES

Built by a Firm who Stands Supreme in the Whole World as Oil Engine Experts.

The Bolinder operates on a cost of only ½ cent per Brake Horse power per hour—an enormous Saving as compared with a Steam plant. A 200 B.H.P. Bolinder (which is equal to a 250 I.H.P. Steam engine) costs only \$1:—per hour at full load.

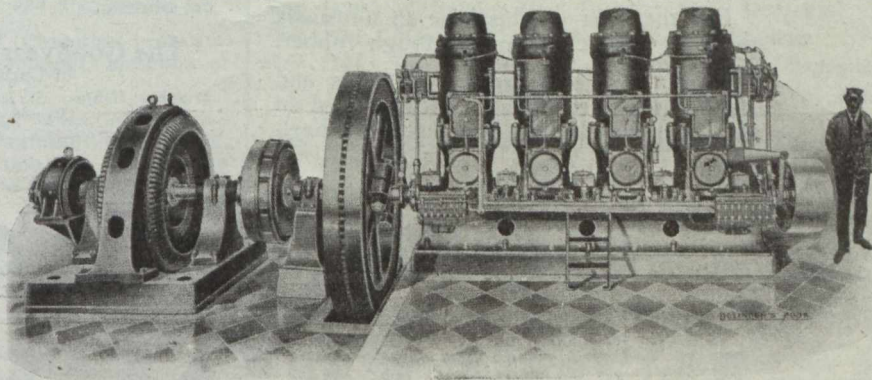
The Bolinder eliminates firemen and fire hazard.

The Bolinder is the result of 30 years' experience.

Simple

Reliable

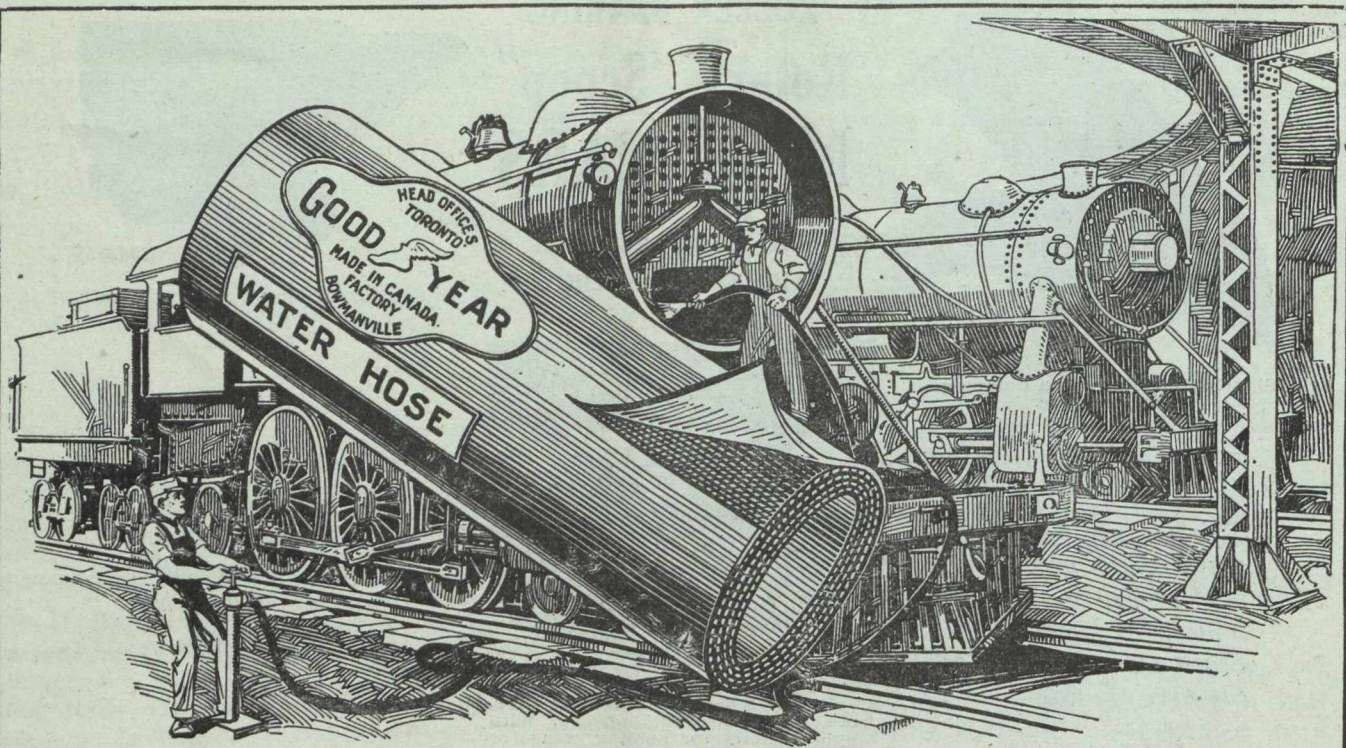
Durable



A 320 B.H.P. Bolinder Engine directly connected with a Generator.

Representatives:—

Swedish Steel and Importing Co., Limited, Shaughnessy Building, MONTREAL



This Cover Reduces Costs on Industrial Water Hose

We never heard of industrial water hose bursting because of internal pressure. Any fairly good water hose will stand all the pressure it will ever get in industrial use.

But we have seen and heard of thousands of feet of water hose which had to be discarded long before its time because the cover wore through.

That fact guided Goodyear scientists in designing Goodyear Water Hose.

They started with a good inner tube and strong fabric.

But they put on this hose an unusually thick cover of exceptionally tough rubber.

Water Hose is dragged over floors and pavements and steel plates. It is walked on and run over by hand-trucks and wheel-

barrows. It is left outside rain or shine. *The Goodyear cover on Goodyear Water Hose is built to stand this use.*

That is why Goodyear Water Hose wears longer and so costs less.

That is an example of the way Goodyear builds all Industrial Hose—

—finding out what conditions must be met, and then developing the materials and construction to meet them.

Goodyear has scientifically developed a hose for every industrial use. Samples of this hose, and the advice of a trained technical man, are yours for the asking—without obligation. Phone, wire or write the nearest branch.

**The Goodyear Tire & Rubber Co.
of Canada, Limited**

Branches: Halifax, St. John, Quebec, Montreal, Ottawa,
Toronto, Hamilton, London, Winnipeg,
Regina, Saskatoon, Calgary, Edmonton, Vancouver.

GOOD YEAR
MADE IN CANADA

INDUSTRIAL HOSE

CANADA

DEPARTMENT OF MINES

HON. MARTIN BURRELL, *Minister*

R. G. McCONNELL, *Deputy Minister*

MINES BRANCH

Recent Publications

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

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

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

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

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

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

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

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

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

Summary Report of the Mines Branch, 1917.

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

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

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

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

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

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

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

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

GEOLOGICAL SURVEY

Recent Publications

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

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

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

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

Memoir 108. The Mackenzie River basin, by Charles Cammell and Wyatt Malcolm.

Memoir 109. The Harricanaw-Turgeon basin, northern Quebec, by T. L. Tanton.

Memoir 110. Preliminary report on the economic geology of Hazelton district, British Columbia, by J. J. O'Neill.

Memoir 112. Geology of the district belt of southwestern Alberta, by J. S. Stewart.

Map 42A. Duncan sheet, Vancouver Island. Geology.

Map 44A. Sooke sheet, Vancouver Island. Geology.

Map 115A. Sheep river, Alberta. Topography.

Map 164A. St. John, New Brunswick. Topography.

Map 179A. Onaping; Sudbury and Timiskaming districts, Ont. Geology.

Map 183A. Harricanaw-Turgeon basin; Abitibi. Timiskaming and Pontiac, Que. Geology.

Map 1585. Mackenzie River basin. Geology.

Map 1680. Portions of Grenville, Harrington, Chatham and Wentworth townships, Argenteuil county, Quebec. Geology.

Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway,—in two sheets: Sheet 1 Gogama to Missonga, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.

Map 1690. Whiteburn Gold District, N.S. Geology.

Map 1702. Klotassin, Yukon Territory. Geology.

Map 1708. Bridge river, Lillooet district, B.C. Topography.

Map 1710. Bothwell-Thamesville oil region, Kent county, Ontario.

Map 1712. Foothills of Southern Alberta, St. Mary river to Hignwood river. Geology.

Map 1714. The Niagara peninsula, Ontario. Geology.

Map 1715. The Ontario peninsula. Geology.

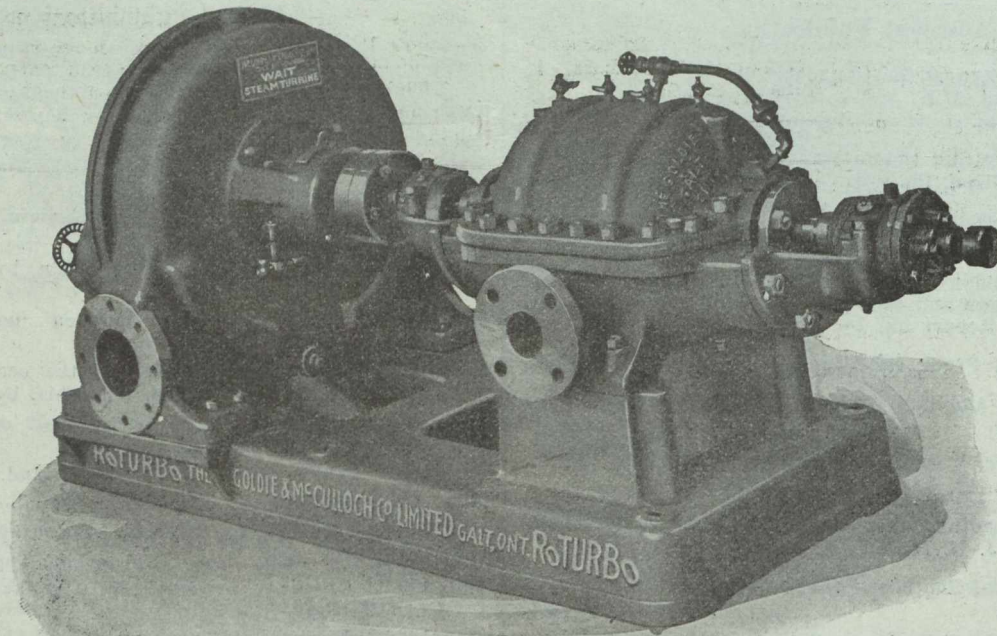
Applicants for publications not listed above should mention the precise area concerning which information is desired.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to The Director, Geological Survey, Ottawa.

REES RoTURBo CENTRIFUGAL PUMPS

Differ from many other makes of Pumps in that they are not merely efficient at the "design point", they go farther than that;—Regardless of ordinary variations in head & volume "RoTURBo" Pumps maintain practically a *Constant Speed & Efficiency* Because of their *Self Regulating Features*.



Showing a B² Multi-stage RoTURBo Pump direct connected to Goldie & McCulloch "WAIT" Steam Turbine recently built for The Salts & Potash Co. of Canada at Maskakee Springs, Sask.

No matter what happens to the discharge or suction—Sudden drop or overload—the "RoTURBo" will automatically adjust itself to the new conditions without damage to itself or to the prime mover.

REES RoTURBo Pumps are made in single & Multi-stage types for all heads & volumes and for either Belt, Motor, Reciprocating Engine or Steam Turbine Drive. They are in use the world over.

Ask for Catalogues, Prices and full information.

THE GOLDIE & McCULLOCH CO., LIMITED


Head Office and Works, GALT, ONTARIO, CANADA

TORONTO OFFICE:
Suite 1101-2,
Bank of Hamilton Bld'g.

WESTERN BRANCH:
248 McDermott Ave.,
Winnipeg, Man.

QUEBEC AGENTS:
Ross & Creig,
400 St. James St.,
Montreal, Que.

BRITISH COLUMBIA
AGENTS:
Robt. Hamilton & Co.,
Vancouver, B. C.

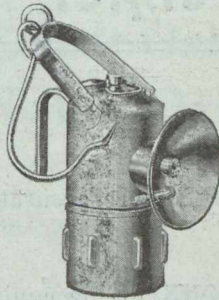
**The Astonishing Durability
Of  Lamps Has Won Its
Many Users.**

I.T.P. lamps purchased two; yes, three years ago, are in daily use, still giving complete satisfaction. An I.T.P. will not only give present but permanent satisfaction.

In measuring the cost of a lamp, the price you pay is not the only consideration. The quality of light and service it gives, as well as the repairs it will need after several years service, are important points.

ASK US
FOR A SAMPLE

Dewar Mfg. Co. Inc.
-Dew-ar-
100 Wellington St. W.
TORONTO, Ont.



LUCKY STRIKE!

COORS U.S.A.
Chemical and Laboratory
PORCELAIN



A Comparative Test:

No. 3 Casserole Acid Treatment,
15 hours at 180° C.—

	Loss Grams
Coors . . . . .	.0000
Royal Berlin . . . . .	.0004

Crucibles, Dishes, Etc.

Order now and avoid *Porcelain Troubles*; we know you've had them.

LYMANS, Limited
MONTREAL

To Manufacturers

Valuable economic minerals, of which the people of this country as a rule have little knowledge, are distributed in various sections served by the Canadian National Railways. The field of utility for these minerals is constantly expanding and entering more and more into the realm of manufacture.

Information on this subject can be obtained by writing:—

**The Industrial and Resources
Department Canadian National
Railways**

TORONTO :: ONTARIO

ESTABLISHED - 1875

IMPERIAL BANK
OF CANADA

HEAD OFFICE : TORONTO

Capital Paid Up	\$7,000,000
Reserve Fund	\$7,500,000

Branches in Northern Ontario at
Cobalt, South Porcupine, Cochrane, New
Liskeard, North Bay, Matheson, Smooth
Rock Falls, Kirkland Lake, Timmins and
Hearst.

Branches in Provinces of
Ontario, Quebec, Manitoba, Saskatch-
ewan, Alberta and British Columbia.

Money Transfers made in all parts of the
World. Travellers' Letters of Credit, Drafts,
Cheques, etc., negotiated

THE
Canadian Mining Manual

Edited by Reginald E. Hore

*The most authoritative and complete
 guide to Canada's premier industry*

Contains Information Covering:

CANADIAN MINERAL OCCURRENCES more accurate and complete than any text-book extant.

CANADIAN MINING INCORPORATIONS, giving equipment of plants and mines, comparative outputs, dividends paid, and composition of boards and management.

Special articles on new mining fields, and on established industries by acknowledged experts.

Illustrations are lavish and unique. Colored plates of Canadian ores, accurate maps of mineral areas, views of plants and new mining developments, photographs of the men who are guiding the industry.

*Should be on the desk of every person
 who is interested in mining in Canada*

INDISPENSABLE ACCURATE COMPLETE UP-TO-DATE UNIQUE

Bound in Cloth.
 360 Pages

Price \$5, post paid.

Bound in Leather, \$7
 290 Illustrations

MINES PUBLISHING CO.

Garden City Press,

Ste. Anne de Bellevue, QUEBEC

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.”

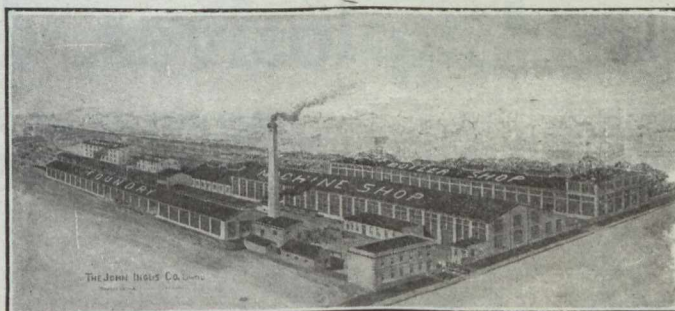
Codes: Bedford McNeill,

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 Stree Chambers

Successful Cold Weather Blasting



—depends upon your selection of dynamite. Temperature means considerable in the efficiency of your powder—in loss of time required in handling.

Polar Forcite

35 to 75 per cent. Gelatine Dynamite

will help keep up efficiency. Polar Forcite is a low-freezing dynamite that adds speed, safety and satisfaction to practical use.

Put your blasting problems up to our experts. There is a dynamite to suit your needs.

Canadian Explosives, Limited

Head Office MONTREAL, P.Q.
Main Western Office VANCOUVER, B.C.

DISTRICT OFFICES:

NOVA SCOTIA:	.	.	.	.	.	Halifax
QUEBEC:	.	.	.	.	.	Montreal
ONTARIO:	Toronto,	Cobalt,	Timmins,	Sudbury,	.	Ottawa
MANITOBA:	.	.	.	.	.	Winnipeg
ALBERTA:	.	.	.	.	.	Edmonton
BRITISH COLUMBIA:	Vancouver,	Victoria,	Nelson,	.	.	Prince Rupert

Factories at

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

The Canadian Miners' Buying Directory.

Acetylene Gas:

Canada Carbide Company, Ltd.
Canadian Fairbanks-Morse.

A.C. Units:

MacGovern & Co.

Agitators:

The Dorr Co.

Air Hoists:

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

Alloy and Carbon Tool Steel:

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

Alternators:

MacGovern & Co.

Amalgamators:

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

Antimony:

Canada Metal Co.

Antimonial Lead:

Pennsylvania Smelting Co.

Arrester, Locomotive Spark:

Hendrick Manufacturing Co.

Arsenic White Lead:

Conlagas Reduction Co.

Assayers' and Chemists' Supplies:

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

Assayers and Chemists:

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

Asbestos:

Everitt & Co.

Balls:

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

Ball Mills:

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

Balances—Heusser:

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

Babbit Metals:

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

Ball Mill Feeders:

Fraser & Chalmers of Canada, Ltd.
Hardinge Conical Mill Co.

Ball Mill Linings:

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

Belting—Leather, Rubber and Cotton:

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

Belting:

R. T. Gilman & Co.

Belting (Transmission):

Goodyear Tire & Rubber Co.

Belting (Elevator):

Goodyear Tire & Rubber Co.

Belting (Conveyor):

Goodyear Tire & Rubber Co.

Blasting Batteries and Supplies:

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

Bluestone:

The Consolidated Mining & Smelting Co.

Blowers:

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

Boilers:

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

Blue Vitriol (Coniagas Red):

Canadian Fairbanks-Morse Co., Ltd.

Bortz and Carbons:

Diamond Drill Carbon Co.

Boxes, Cable Junction:

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

Brazilian Rough Diamonds:

Diamond Drill Carbon Co.

Brazilian Mica:

Diamond Drill Carbon Co.

Buggies, Mine Car (Steel)

Hendrick Manufacturing Co.

Brazilian Ballas:

Diamond Drill Carbon Co.

Brazilian Rock Crystal:

Diamond Drill Carbon Co.

Brazilian Tourmalines:

Diamond Drill Carbon Co.

Brazilian Aquamarines:

Diamond Drill Carbon Co.

Bronze, Manganese, Perforated and Plain:

Hendrick Manufacturing Co.

Buckets:

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

Buckets, Elevator:

Hendrick Mfg. Co.

Cable—Aerial and Underground:

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

Cableways:

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

Cages:

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

Canadian Miners' Buying Directory.—(Continued)

Cables—Wire:

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

Cam Shafts:

Canada Foundries & Forgings, Ltd.

Car Dumps:

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

Carbide of Calcium:

Canada Carbide Company, Ltd.

Cars:

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

Car Wheels and Axles:

Canadian Car Foundry Co., Ltd.
Burnett & Crampton
John J. Gartshore
Marsh Engineering Works, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works

Carriers (Gravity):

Jones & Glassco

Castings—Brass

The Canada Metal Co., Ltd.

Castings (Iron and Steel)

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

Cement Machinery:

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

Chains:

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

Chain Drives:

Jones & Glassco

Chemical Apparatus:

Mine and Smelter Supply Co.

Chemists:

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

Chrome Ore:

The Electric Steel & Metals Co.
Everett & Co.

Classifiers:

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

Coal:

Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutters:

Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.

Coal Mining Explosives:

Canadian Explosives, Ltd.

Coal Mining Machinery:

Canadian Ingersoll-Rand Co., Ltd.
Sullivan Machinery Co.

March Engineering Works

Hadfields, Ltd.
Hendrick Mfg. Co.
Fraser & Chalmers of Canada, Limited
Mussens, Limited
R. T. Gilman & Co.

Coal and Coke Handling Machinery

Link-Belt Co.

Coal Pick Machines:

Sullivan Machinery Co.

Cobalt Oxide:

Coniagas Reduction Co.
Everitt & Co.

Compressors—Air:

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

Concrete Mixers:

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

Condensers:

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

Concentrating Tables:

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

Converters:

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

Contractors' Supplies:

Canadian Fairbanks-Morse Co., Ltd.

Consulters and Engineers:

Hersey Milton Co., Ltd.

Conveyor Flights:

Hendrick Mfg. Co., Ltd.

Conveyor—Trough—Belt:

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

Conical Mills:

Hardinge Conical Mill Co.

Copper:

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

Cranes:

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

Crane Ropes:

Allan Whyte & Co.
Greening, B., Wire Co., Ltd.

Crucibles:

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

Crusher Balls:

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

Crushers:

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

Canadian Miners' Buying Directory.—(Continued)

Cyanide Plant Equipment:

The Dorr Co.

D. C. Units:

MacGovern Co.

Derricks:

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

Diamond Drill Contractors:

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

Diamond Tools:

Diamond Drill Carbon Co.

Diamond Importers:

Diamond Drill Carbon Co.

Digesters:

Canadian Chicago Bridge and Iron Works

Dies:

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

Dredger Pins:

Canadian Steel Foundries, Ltd.
The Electric Steel & Metals Co.
Hadfields, Limited

Dredging Machinery:

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

Dredging Ropes:

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

Drills, Air and Hammer:

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

Drills—Core:

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

Drills—Diamond:

Sullivan Machinery Co.
Northern Canada Supply Co.
E. J. Longyear Company

Drill Steel—Mining:

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

Drill Steel Sharpeners:

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

Drills—Electric:

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

Drills—High Speed and Carbon:

Canadian Fairbanks-Morse Co., Ltd.
Hadfields, Limited

Dynamite:

Canadian Explosives
Northern Canada Supply Co.

Dynamos:

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

Ejectors:

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

Elevators:

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

Engineering Instruments:

C. L. Berger & Sons

Engines—Automatic:

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

Engines—Gas and Gasoline:

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

Engines—Haulage:

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

Engines—Marine:

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

Engines—Steam:

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

Engineers:

The Dorr Co.

Ferro-Alloys (all Classes):

Everitt & Co.

Feed Water Heaters:

MacGovern & Co.

Flou Lamps:

Northern Electric Co., Ltd.

Flourspar:

The Consolidated Mining & Smelting Co.
Everitt & Co.

Forges:

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

Forging:

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

Frogs:

Canadian Steel Foundries, Ltd.
John J. Gartshore

Frequency Changers:

MacGovern & Co., Inc.

Furnaces—Assay:

Canadian Fairbanks-Morse Co., Ltd.
Lymans, Limited
Mine & Smelter Supply Co.

Fuse:

Canadian Explosives
Northern Canada Supply Co.

Gears (Cast):

Hull Iron & Steel Foundries, Ltd.
The Link-Belt Co.

Gears, Machine Cut:

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

Granulators:

Hardinge Conical Mill Co.

Grinding Wheels:

Canadian Fairbanks-Morse Co., Ltd.

Gold Refiners

Goldsmith Bros.

Canadian Miners' Buying Directory.—(Continued)

- Gold Trays:**
Canada Chicago Bridge & Iron Works
- Hose (Air Drill):**
Goodyear Tire & Rubber Co.
- Hose (Fire):**
Goodyear Tire & Rubber Co.
- Hose (Packings)**
Goodyear Tire & Rubber Co.
- Hose (Suction):**
Goodyear Tire & Rubber Co.
- Hose (Steam):**
Goodyear Tire & Rubber Co.
- Hose (Water):**
Goodyear Tire & Rubber Co.
- Hammer Rock Drills:**
Mussens, Limited
The Mine & Smelter Supply Co.
- Hangers and Cable:**
Standard Underground Cable Co. of Canada, Ltd.
- High Speed Steel:**
Canadian Fairbanks-Morse Co. Ltd.
Hadfields, Limited
International High Speed Steel Co., Rockaway, N.J.
- High Speed Steel Twist Drills:**
Canadian Fairbanks-Morse Co., Ltd.
Northern Canada Supply Co.
- Hoists—Air, Electric and Steam:**
Canadian Ingersoll-Rand Co., Ltd.
Canadian Fairbanks-Morse Co., Ltd.
Jones & Glassco
M. Beatty & Sons
Marsh Engineering Works
Northern Canada Supply Co.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works
R. T. Gilman & Co.
Mussens, Limited
Link-Belt Co.
- Hoisting Engines:**
Canadian Fairbanks-Morse Co., Ltd.
The Electric Steel & Metals Co.
Mussens, Limited
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.
M. Beatty & Sons
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.
The Mine & Smelter Supply Co.
- Hose:**
Canadian Fairbanks-Morse Co., Ltd.
Northern Canada Supply Co.
- Hydraulic Machinery:**
Canadian Fairbanks-Morse Co., Ltd.
Hadfields, Limited
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works
- Industrial Chemists:**
Hersey, M. & Co., Ltd.
- Ingot Copper:**
Canada Metal Co., Ltd.
Hoyt Metal Co.
- Insulating Compounds:**
Standard Underground Cable Co. of Canada, Ltd.
- Inspection and Testing:**
Dominion Engineering & Inspection Co.
- Inspectors:**
Hersey, M. & Co., Ltd.
- Jacks:**
Canadian Fairbanks-Morse Co., Ltd.
Can. Brakeshoe Co., Ltd.
Northern Canada Supply Co.
R. T. Gilman & Co.
Mussens, Limited
- Jack Screws:**
Canadian Foundries and Forgings, Ltd.
- Laboratory Machinery:**
Mine & Smelter Supply Co.
- Lamps—Acetylene:**
Dewar Manufacturing Co., Inc.
- Lamps—Carbide:**
Dewar Manufacturing Co., Inc.
- Lamps—Miners:**
Canada Carbide Company, Limited
Canadian Fairbanks-Morse Co., Ltd.
Dewar Manufacturing Co., Inc.
Northern Electric Co., Ltd.
Mussens, Limited
- Lamps:**
Dewar Manufacturing Co., Inc.
- Lead (Fig):**
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co.
- Levels:**
C. L. Berger & Sons
- Locomotives (Steam, Compressed Air and Storage Steam):**
Canadian Fairbanks-Morse Co., Ltd.
H. K. Porter Company
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
- Link Belt**
Canadian Fairbanks-Morse Co. Ltd.
Northern Canada Supply Co.
Jones & Glassco
- Machinists:**
Burnett & Crampton
- Machinery—Repair Shop:**
Canadian Fairbanks-Morse Co., Ltd.
- Machine Shop Supplies:**
Canadian Fairbanks-Morse Co., Ltd.
- Magnesium Metal:**
Everitt & Co.
Hull Iron & Steel Foundries, Ltd.
- Manganese Steel:**
Canadian Steel Foundries, Ltd.
The Electric Steel & Metals Co.
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works
- Metal Marking Machinery:**
Canadian Fairbanks-Morse Co., Ltd.
- Metal Merchants:**
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
Coniagas Reduction Co.
Consolidated Mining & Smelting Co. of Canada
Canada Metal Co.
C. L. Constant Co.
Everitt & Co.
- Metallurgical Engineers:**
The Dorr Co.
- Metallurgical Machinery:**
The Dorr Co.
- Metal Work, Heavy Plates:**
Canada Chicago Bridge & Iron Works
- Mica:**
Everitt & Co.
Diamond Drill Carbon Co.
- Mining Engineers:**
Hersey, M. Co., Ltd.
- Mining Drill Steel:**
International High Speed Steel Co., Rockaway, N.J.
- Mining Requisites:**
Canadian Steel Foundries, Ltd.
Dominion Wire Rope Co., Ltd.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works
- Mining Ropes:**
Dominion Wire Rope Co., Ltd.
- Mine Surveying Instruments:**
C. L. Berger & Sons
- Molybdenite:**
Everitt & Co.
- Monel Metal:**
International Nickel Co.
- Motors:**
Canadian Fairbanks-Morse Co., Ltd.
R. T. Gilman & Co.
MacGovern & Co.
The Wabi Iron Works

Canadian Miners' Buying Directory.—(Continued)

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

Walls:
Canada Metal Co.

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

Nickel Anodes:
The Mond Nickel Co., Ltd.

Nickel Salts:
The Mond Nickel Co., Ltd.

Nickel Sheets:
The Mond Nickel Co., Ltd.

Nickel Wire:
The Mond Nickel Co., Ltd.

Oil Analysts:
Constant, C. L. Co.

Ore Sacks:
Northern Canada Supply Co.

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

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

Packing:
Canadian Fairbanks-Morse Co., Ltd.

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

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

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

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

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

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

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

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

Platinum Refiners:
Goldsmith Bros.

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

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

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

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

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

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

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

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

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

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

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

Pumps—Diaphragm
The Dorr Company

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

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

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

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

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

Refiners:
Goldsmith Bros.

Riddles:
Hendrick Mfg. Co.

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

Rope—Manilla:
Mussens, Limited

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

Canadian Miners' Buying Directory.—(Continued)

Rope—Wire:

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

Rolls—Crushing

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

Samplers:

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

Scales—(all kinds):

Canadian Fairbanks-Morse Co., Ltd.

Screens:

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

Screens—Cross Patent Flanged Lip:

Hendrick Mfg. Co.

Screens—Perforated Metal:

Hendrick Mfg. Co.

Screens—Shaking:

Hendrick Mfg. Co.

Screens—Revolving:

Hendrick Mfg. Co.

Scheelite:

Everitt & Co.

Separators:

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

Shaft Contractors:

Hendrick Mfg. Co.

Sheet Metal Work:

Hendrick Mfg. Co.

Sheets—Genuine Manganese Bronze:

Hendrick Mfg. Co.

Shoes and Dies:

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

Shovels—Steam:

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

Silene:

Coniagas Reduction Co.

Saline Refiners:

Goldsmith Bros.

Smelters:

Goldsmith Bros.

Sledges:

Canada Foundries & Forgings, Ltd.

Smoke Stacks:

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

Special Machinery:

John Inglis Co., Ltd.

Spelter:

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

Sprockets:

Link-Belt Co.

Spring Coil and Clips Electric:

Canadian Steel Foundries, Ltd.

Steel Barrels:

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

Stamp Forgings:

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

Steel Castings:

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

Steel Drills:

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

Steel Drums:

Smart-Turner Machine Co.

Steel—Tool:

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

Structural Steel Work (Light):

Hendrick Mfg. Co.

Stone Breakers:

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

Sulphate of Copper:

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

Sulphate of Nickel:

The Mond Nickel Co., Ltd.

Surveying Instruments:

C. L. Berger

Switches and Switch Stand:

Canadian Steel Foundries, Ltd.
Mussens, Limited.

Switches and Turntables:

John J. Gartshore

Tables—Concentrating:

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

Tanks:

R. T. Gilman & Co.

Tanks—Acid:

Canadian Chicago Bridge & Iron Works

Tanks (Wooden):

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

Tanks—Cyanide, Etc.:

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

Tanks—Steel:

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

Tanks—Oil Storage:

Canadian Chicago Bridge & Iron Works

Tanks (water) and Steel Towers:

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

Tramway Points and Crossings:

Canadian Steel Foundries, Ltd.
 Hadfields, Limited

Transits:

C. L. Berger & Sons

Transformers:

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

Transmission Apparatus:

Jones & Glassco

Troughs (Conveyor):

Hendrick Manufacturing Co.

Trucks—Electric:

Canadian Fairbanks-Morse Co., Ltd.

Trucks—Hand:

Canadian Fairbanks-Morse Co., Ltd.

Trucks:

Canadian Fairbanks-Morse Co., Ltd.

Tubs:

Hadfields, Limited

Tube Mills:

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

Tube Mill Balls:

Canada Foundries & Forgings, Ltd.
 Fraser & Chalmers of Canada, Ltd.
 Hull Iron & Steel Foundries, Ltd.

Tube Mill Liners:

Burnett & Crampton
 Fraser & Chalmers of Canada, Ltd.

Turbines—Water Wheel:

MacGovern & Co.

Turbines—Steam:

Fraser & Chalmers of Canada, Ltd.
 MacGovern & Co.

Twincones:

Canada Foundries & Forgings, Ltd.

Uranium:

Everitt & Co.

Welding—Rod and Flux:

Prest-O-Lite Co. of Canada, Ltd.
 Imperial Brass Mfg. Co.

Welding and Cutting—Oxy-Acetylene:

Prest-O-Lite Co. of Canada, Ltd.
 Canadian Fairbanks-Morse Co., Ltd.
 Imperial Brass Mfg. Co.

Wheels and Axles:

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

Winding Engines—Steam and Electric:

Canadian Fairbanks-Morse Co., Ltd.
 Canadian Ingersoll-Rand Co., Ltd.
 Marsh Engineering Works
 Fraser & Chalmers of Canada, Ltd.
 The Electric Steel & Metals Co.
 Mussels, Limited
 R. T. Gilman & Co.
 The Wabi Iron Works

Wire:

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

Wire Rope:

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

Wire Cloth:

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

Wire (Bars and Insulated):

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

Wolfram Ore:

Everitt & Co.

Woodworking Machinery:

Canadian Fairbanks-Morse Co., Ltd.

Zinc:

Everitt & Co.

Zinc:

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

Zinc Spelter:

Canada Metal Co., Ltd.
 Hoyt Metal Co., Ltd.

BUILD FOR THE FUTURE! U.S. STEEL CONSTRUCTION
ELEVATED STEEL TANKS
 RAIL-ROAD, MUNICIPAL
 and
 FIRE-PROTECTION SERVICE

INQUIRE / INVITED ON ALL OTHER CLASSES OF HEAVY PLATE WORK
CANADIAN CHICAGO BRIDGE & IRON CO., LIMITED
 103 Janet St., BRIDGEBURG, ONT.
 Chicago, Ill. : 2121 Old Colony Bldg. New York : 3115 Hudson Terminal Bldg.

FORGINGS
 SEND PRINTS FOR PRICES
 CANADA
 FOUNDRIES & FORGINGS, LIMITED
 WELLAND, ONT.

**FOR SALE
 AT BARGAIN PRICES**

ONE SET OF DOUBLE TOOTHED ROLLS 22" Dia. x 20" Face. Suitable for reducing fairly soft material from 6" to 1/2". Complete and in excellent order.

5 SAND TABLES. In excellent order.

9 SLIME TABLES. Ferraris Type. In excellent order.

2 TROMMELS 5' x 3'. Complete with casings and in excellent order.

5 HYDRAULIC CLASSIFIERS. In excellent order.

The above equipment is open to inspection, and we will gladly furnish prices upon application.

QUEBEC GRAPHITE CO., LTD.
 BUCKINGHAM, QUE.

THE CANADIAN MINING JOURNAL
ALPHABETICAL INDEX TO ADVERTISERS

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

B
Balbach Smelting & Refining Co. 10
Bell, J. M. 10
Blackwell, G. C., Sons & Company 12
Beatty, M. & Sons
Berger C. L. & Sons 12
Brigstoeks, R. W. 11
British Columbia, Province of 9
Burns, L. P., Ltd. 12
Burnett & Crampton

C
Canadian Allis-Chalmers, Ltd. 8
Can. Chicago Bridge & Iron Works 47
Canadian Explosives, Ltd. 40
Canadian Fairbanks-Morse Co., Ltd.
Canadian Milk Products
Canadian National Railways 37
Canadian Ingersoll-Rand Co., Ltd. . . . 3
Canadian Link-Belt Co.
Canadian Laboratories, Ltd. 10
Canada Foundries & Forgings,
Ltd. 10
Canada Wire & Cable Co.
Canadian Rock Drill Co. 49
Canadian Steel Foundries, Ltd.
Canada Carbide Company
Canada Metal Co. 9
Canadian Brakeshoe Co 7
Canadian Sirocco Co.
Capper Pass & Son, Ltd. 10
Consolidated Mining & Smelting Co. 7
Coniagas Reduction Co. 29
Constant, C. L. & Co. 7

D
Deister Concentrating Co. 13
Denver Rock Drill Mfg. Co. 49
Deloro Smelting & Refining Co. . . . 13
Department of Mines, Canada 35
Dewar Mfg. Co. 37
Diamond Drill Carbon Co. 48
Diamond Drill Contracting Co. 12
Dominion Coal Co., Ltd. 7
Dominion Wire Rope Co., Ltd. 7
Dorr Co. 11
Dresser, Jno. A. 11
Drury, H. A. Company 1
Dwight & Lloyd Sintering Co., Inc 10
Dominion Engineering & Inspection
Co. 10

E
Electric Steel & Metals Co.
Engineering & Machine Works of
Canada 7
Everitt & Co.

F
Fleck, Alex. 12
Ferrier, W. F. 11
Fasken, Robertson, Chadwick &
Sedgewick 10
Fraser & Chalmers of Canada, Ltd.

G
Gartshore, John J. 12
General Engineering Co. 12
Goldie & McCulloch 36

H
Goldsmith Bros., Smelting & Refin-
ing Co., Ltd. 12
Greening, B., Wire Co.
Goodyear Tire & Rubber Co. of Can-
ada, Ltd. 34

I
Hadfields, Ltd. 50
Hamilton Gear & Machine Co. 12
Hardinge Conical Mill 16
Hassan A. A. 11
Hendrick Mfg. Co. 12
Hersey, Milton Co., Ltd. 11
Heys Thomas & Son 11
Hull Iron & Steel Foundries, Ltd. . . 14
Hore, Reginald E. 11
Hoyt Metal Co. 50

J
Imperial Bank of Canada 37
International Business Machines . .
International High Speed Steel Co.
International Nickel Co. of Canada,
Limited 5
International Nickle Co.
Inglis, J. & Co. 39

K
Johnston, Matthey & Co. 10
Jones & Glassco

L
Laurie & Lamb
Ledoux & Co. 10
Lindsey, G. C. S. 11
Longyear, E. J. Company 8
Lymans, Ltd. 37

M
McDonald, M. P. 11
MacGovern & Co., Inc.
MacKinnon Steel Co., Ltd.
Marsh Engineering Works. 33
McEvoy, Jas. 11
Mond Nickle Co.
Mussens, Ltd.

N
Northern Canada Supply Co.
Nova Scotia Steel & Coal Co. 8
Nova Scotia Government 6

O
Ontario, Province of 4
Osborn, Sam'l Co., Ltd. 2

P
Pacific Coast Pipe Co.
Peacock Bros., Ltd.
Pennsylvania Smelting Co. 10
Prest-O-Lite Co. of Canada 47

Q
Quebec, Province of 6

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

S
Shayne & Jaffe Co., Ltd.
Smart-Turner Machine Co.
Smith & Travers Company 10
Standard Underground Cable Co.
of Canada, Ltd.
Stewart, Robert H. 11
Sudbury Diamond Drilling Co., Ltd. 10
Sullivan Machinery Co.
Swedish Steel & Importing Co. . . . 33

T
Toronto Iron Works
Tyrrell, J. B. 11

U
University of Toronto

W
Wabi Iron Works
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.

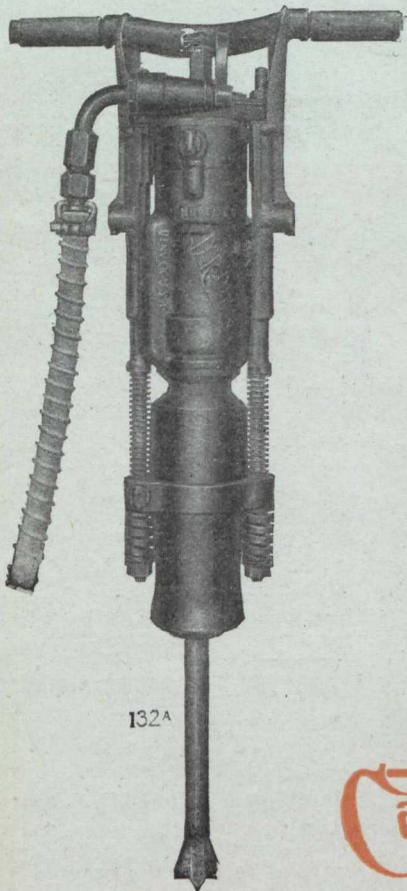
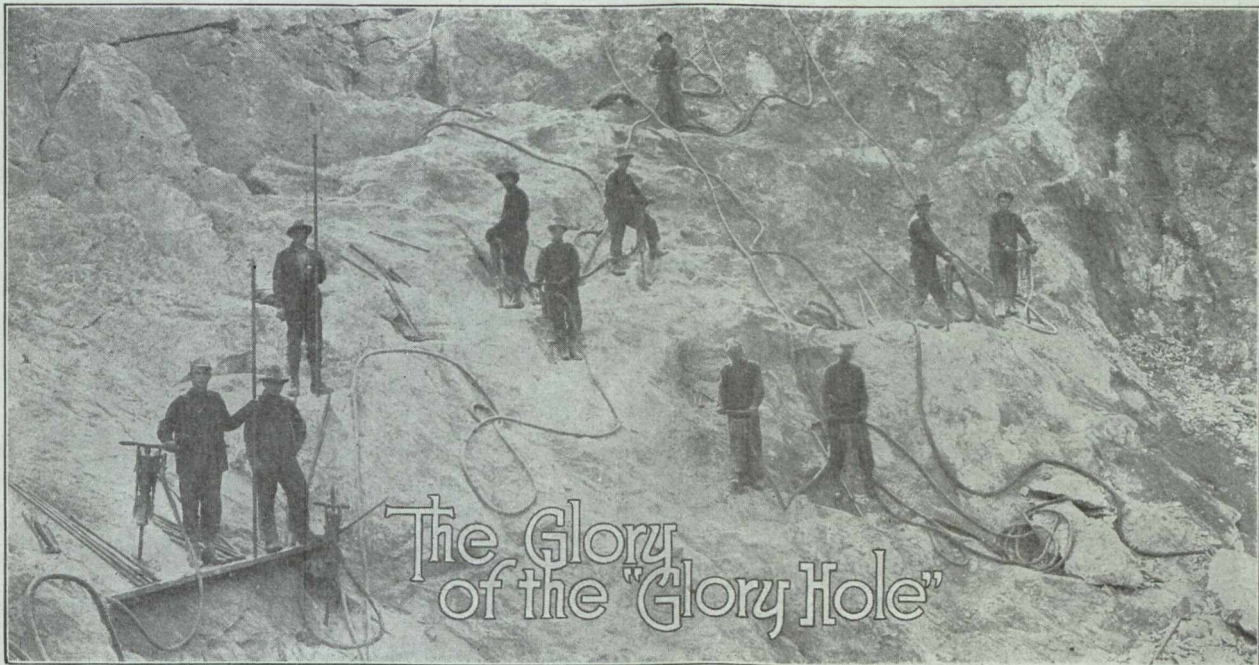
Write or wire at our expense for particulars.

THE DIAMOND DRILL CARBON CO.

Direct Importers
of
GARBONS & BORTZ
BALLAS

61 PARK ROW
New York - N.Y.





THE GLORY OF THE "GLORY HOLE" is the Waugh Dreadnaught drill. The mere size of these celebrated Britannia Mining workings affords ample proof of this drill's magnificent capacity for getting out the ore.

These stalwart British Columbian miners swear by the Dreadnaught because they know it is equal to any drilling task, however difficult. Their enthusiasm is founded on personal experience.

You, too, will be enthusiastic over Waugh drills.

Canadian Rock Drill Company, Limited

Toronto, Ont.
Cobalt, Ont.

Nelson, B.C.
Vancouver, B.C.

Sole Agents in Canada for

The Denver Rock Drill Manufacturing Company
OF DENVER, COLORADO, U.S.A.

BABBITT

PAR

EXCELLENCE

LARGEST MAKERS OF
WHITE METALS IN THE
WORLD



For crushers, mine tube mill bearings and heavy duty, high speed bearings of all kinds.



For rolling mills, all classes of stationary engines and general utility.

HOYT METAL COMPANY

Factories in

TORONTO
LONDON
GRANITE CITY, ILL.
PERTH AMBOY, N.J.

Sales Offices in

TORONTO
LONDON
MONTREAL
WINNIPEG

NEW YORK
ST. LOUIS
CHICAGO
DETROIT

SAN
FRANCISCO

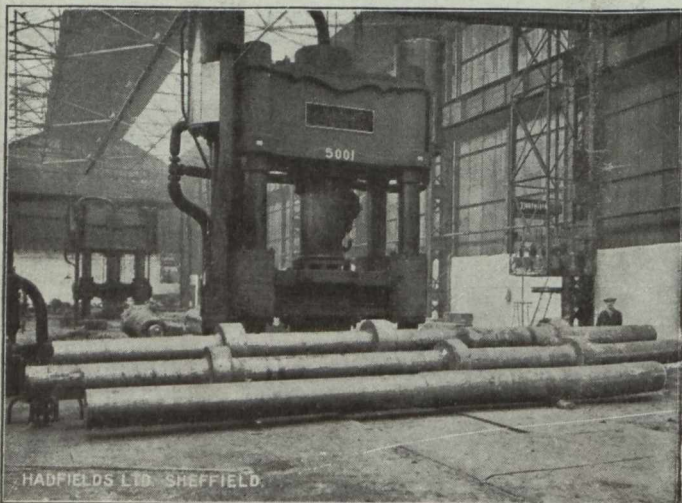
HADFIELDS Ltd.

Workmen employed
15,000

East Hecla and Hecla Works, SHEFFIELD, England

Works area
over 200 acres

Sole Agents: PEACOCK BROTHERS, 285 Beaver Hall Hill, MONTREAL



"HECLA"

STEEL FORGINGS

in the rough, rough machined, or finished,
FOR MARINE AND OTHER ENGINEERING PURPOSES
of any analysis and to pass any required test.

INGOTS, BLOOMS, SLABS

made by the
OPEN HEARTH OR ELECTRIC PROCESS



(Trade Mark)

Sole Makers of Hadfield's Patent
MANGANESE STEEL
THE SUPREME MATERIAL

for
Railway and Tramway Special Track-
work, also Wearing Parts of Stone
Breaking and Ore Crushing Machinery,
etc.

Hadfield's "Heclon Superior" High-Speed Tool Steel

The finest air hardening steel for machining the hardest and toughest material

SPECIAL ALLOY HIGH TENSILE STEELS for Aircraft and Motor Car Engines

Makers of the best kinds of

STONE BREAKING & ORE CRUSHING MACHINERY

MINING REQUISITES
of every description