

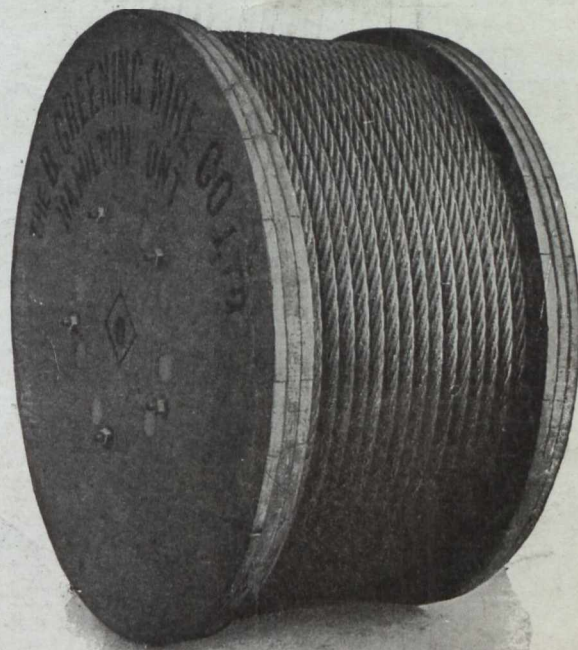
CANADIAN MINING JOURNAL

Vol. XL

GARDEN CITY PRESS, Ste. Anne de Bellevue, OCTOBER 1, 1919.

No. 39.

WIRE ROPES



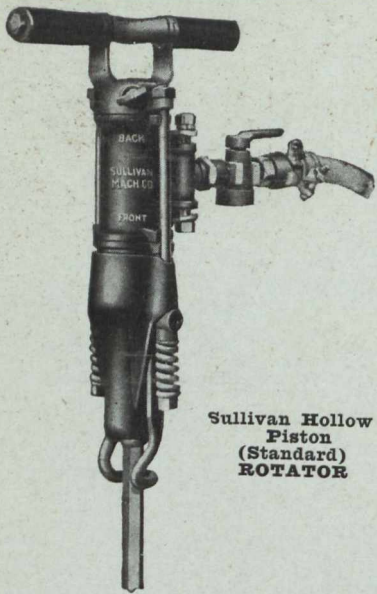
HOISTING HAULAGE

CABLEWAYS DREDGES STEAM SHOVELS

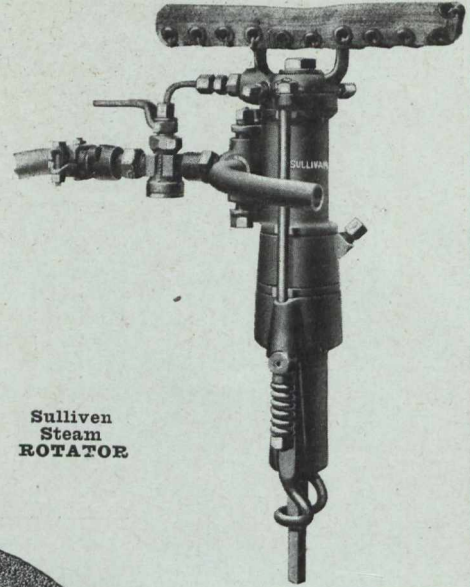
THE B. GREENING WIRE CO., LIMITED

HAMILTON, ONT.

MONTREAL, QUE.



Sullivan Hollow
Piston
(Standard)
ROTATOR



Sullivan
Steam
ROTATOR

If shaft or drift or tonnage records are what you want,
—if you are short of men,—if low mining costs mean something to you,
do your drilling in 1919 with—

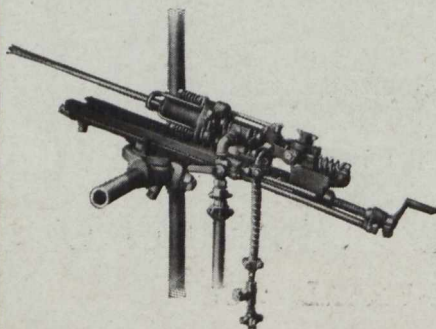
Sullivan Rotators

—the all-around, one-man hammer-drills. Six types of Rotators and two styles of mountings are in stock for you to select from.

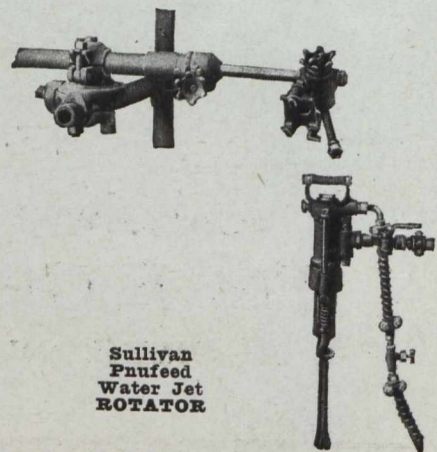
Let us send Bulletin 670-F

Sullivan Machinery Company

122 S. Michigan Ave., Chicago
Toronto Vancouver



Sullivan Cradle, Water Jet ROTATOR



Sullivan
Pnufeed
Water Jet
ROTATOR

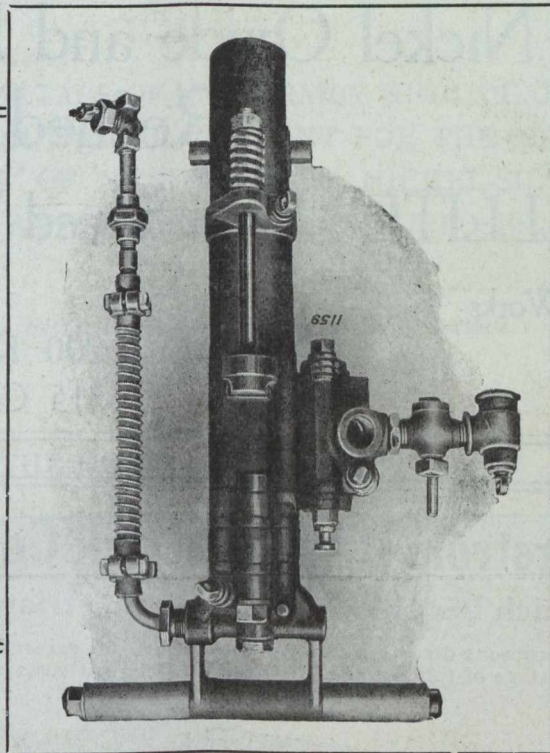


THE CIRCO PAGE



Illustrating Compressed Air Machinery, Tools and Appliances

DDR-13 JACKHAMER Doing Well Up North



A mine superintendent in the Cobalt district says this: "The results we have obtained from the little Leyner machine (DDR-13 Jackhammer) are more than satisfactory. The machine has worked in the same rock and in the same heading with larger machines, and it is drilling a fourteen hole round in seven hours."

DRR-13
Dry

DDWR-13
Wet

Both types have the new powerful blowing device

*New descriptive bulletin
K-205-A*

CANADIAN INGERSOLL-RAND COMPANY, Ltd.

Sydney

Sherbrooke
Winnipeg

Montreal
Nelson

Toronto
Vancouver

Cobalt

Deloro Smelting & Refining Co.

LIMITED

SMELTERS AND REFINERS OF

Silver Bullion

Cobalt Oxide and Metal

Nickel Oxide and Metal

Refined White Arsenic

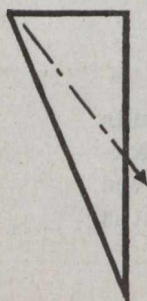
“STELLITE” High Speed Tool Metal

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

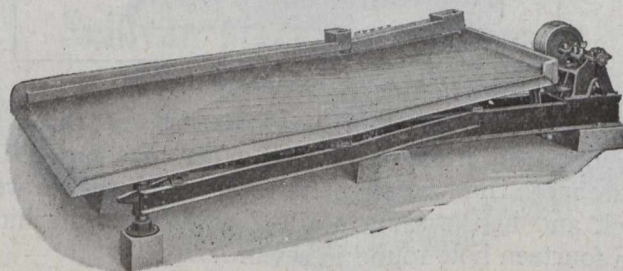
Deister-Overstrom Diagonal Deck Concentrating Tables

Which has the greater area, one triangle or two ?

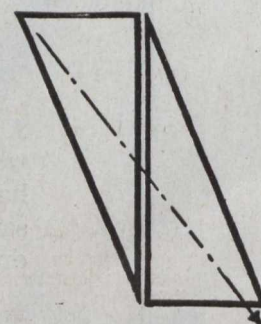
The arrows represent direction of pulp flow. Note the greater length of travel, and the greater percentage of table surface utilized on Deister-Overstrom Diagonal Deck Tables.



This route good as far
as it goes



BUT



Is this not better ?

PRACTICALLY ALL OF THE TABLE SURFACE IS USED EFFECTIVELY

The deck area of a Deister-Overstrom table is so disposed as to take the greatest possible advantage of the oblique pulp flow. Shallower riffles can therefore

be used, thus permitting a freer inter-movement of the particles, a better stratification, and consequently a better separation of the mineral from the gangue.

NET RESULTS

A higher extraction of values
A higher grade concentrate

Greater capacity
Minimum percentage of middlings

Write for Bulletin No. 3 illustrating our Deister-Overstrom Diagonal Deck Tables

THE DEISTER CONCENTRATOR COMPANY

Manufacturers of Deister and Deister-Overstrom Tables

MAIN OFFICE, FACTORY AND TEST PLANT—FORT WAYNE, IND.

CABLE ADDRESS “RETSIED”

Metallic Nickel. 98.40—99.00%

Shot
HIGH AND LOW CARBON

Ingots
25 LB. AND 50 LB. SIZES

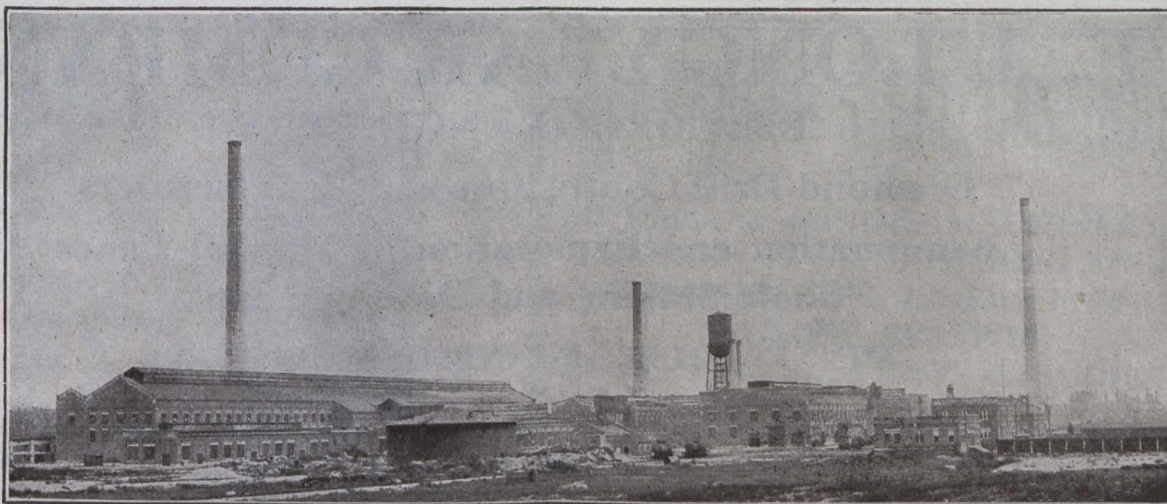
Nickel Oxide 77.2%



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

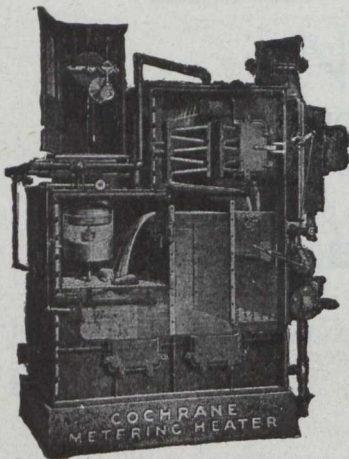
Toronto, Ont.

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

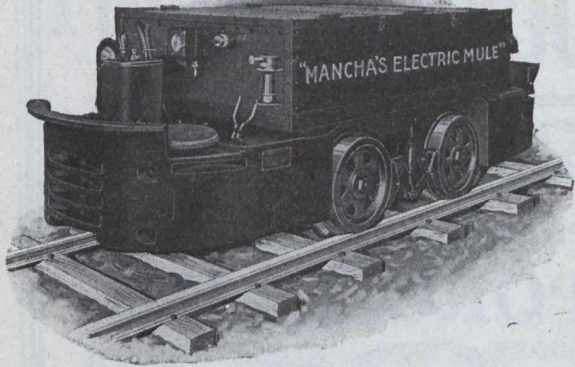
Proprietors, Miners and Shippers of SYDNEY MINES BITUMINOUS COAL. Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the Manufacture of Steel, Iron, Etc. COLLIERIES AT SYDNEY MINES, CAPE BRETON.

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**



LOW COST OF HAULAGE—

A Storage Battery Locomotive will allow of a larger ore output, reduce labor haulage expense, relieves congestion, and is thoroughly reliable and practical.

Made in standard stock sizes, 500-2,400 lbs. D. B. P., larger sizes, special orders, and in all gauges to standard. Being equipped with EDISON Batteries ensuring long life and low maintenance.

LET US GIVE YOU A PROPOSITION

POWLEY & TOWNSLEY

907 Excelsior Life Building - - TORONTO

Industrial Transportation Specialists

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 University of Toronto

and University College

with which are federated

VICTORIA TRINITY ST. MICHAELS
KNOX and WYCLIFFE COLLEGES

FACULTIES OF

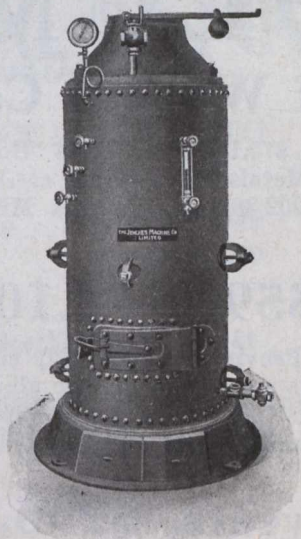
Arts, Applied Science, Music, Medicine
Education, Household Science, Forestry

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

BOILERS

Horizontal
Tubular
Vertical
Tubular
Locomotive
Types

Ore Cars
Ore Buckets
Steel Tanks
Steel Plate
Work



35 years of "Made in Canada" experience. Try us. We make good.

ENGINEERING & MACHINE WORKS OF CANADA, LIMITED

ST. CATHARINES, : ONTARIO

Eastern Sales Office:
Hall Machinery Co., Sherbrooke, Que.

MANGANESE STEEL CASTINGS

FOR

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

Mild Steel Castings for all purposes

Electric Process—therefore the BEST

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

CANADIAN BRAKESHOE CO., LIMITED
SHEBROOKE, QUEBEC

BUILD FOR THE FUTURE! USE STEEL CONSTRUCTION
ELEVATED STEEL TANKS
 for
 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.

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

BRITISH COLUMBIA

The Mineral Province of Western Canada

Has produced Minerals valued as follows: Placer Gold, \$75,116,103; Lode Gold, \$93,717,974; Silver, \$43,623,761; Lead, \$39,366,144; Copper, \$130,597,620; Other Metals (Zinc, Iron, etc.), \$10,933,466; Coal and Coke, \$174,313,658; Building Stone, Brick, Cement, etc., \$27,902,381; making its Mineral Production to the end of 1917 show an

Aggregate Value of \$595,571,107

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.

Production During last ten years, \$296,044,925

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

FOR SALE USED MACHINERY

Located at Various Points from Coast to Coast, including :

RAILS

New and Relaying from 8 to 100 Lbs.
SPIKES — BOLTS — TIES — FROGS and SWITCHES
LOCOMOTIVES STEAM SHOVELS
AIR COMPRESSORS
BOILERS BUCKETS DUMP CARS
DERRICKS HOISTS WIRE ROPE
DRILLS ENGINES GENERATORS
MOTORS TRANSFORMERS PUMPS
CONCRETE MIXERS BELTING PIPE

Detailed List Mailed Weekly on Request

Quick Deliveries our Specialty

We are always open to Buy Good Used Equipment

R. T. Gilman & Co. 211 MCGILL MONTREAL

We'll Give You 30 Cents

To convince you that we can cut your present carbide and lamp expense 30%, we will send you a sample.

HAND  LAMP

Works Without Watching.



Thousands in daily use are making this saving. Can you afford not to investigate?

Write and say
**SEND ME
 A SAMPLE.**

Dewar Manufacturing Co., Inc.
 -Dew-ar- 100 Wellington Street, West
 TORONTO, ONT.

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, Elk Lake,
 Cochrane, New Liskeard, North Bay
 and Timmins.**

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

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



CUT GEARS

All Types - - - - Any Size
Large Capacity.

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

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.

FORGINGS

SEND PRINTS FOR PRICES

CANADA
FOUNDRIES & FORGINGS, LIMITED
WELLAND, ONT.

PROFESSIONAL DIRECTORY:

PENNSYLVANIA SMELTING CO.

Purchasers of

SILVER & LEAD ORES

Office: Pittsburgh, Pa.

Works: Carnegie, Pa.

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 Lagachetiere Street West, Montreal.
BRANCH OFFICES: Toronto, Winnipeg and Vancouver.

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

Telephone Main 3813
E. M. Chadwick, K.C.
David Fasken, K.C.
M. K. Cowan, K.C.
Harper Armstrong
Alexander Fasken
Hugh E. Rose, K.C.
Geo. H. Sedgewick.
James Aitchison

Cable Address: "Chadwick" Toronto
Western Union Code

Fasken, Robertson, Chadwick & Sedgewick
Barristers, Solicitors, Notaries

Offices: Bank of Toronto,
Cor. Wellington & Church Sts.
58 Wellington St. East, Toronto

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

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

PLATINUM BOUGHT AND SOLD

GOLDSMITH BROS.
SMELTING & REFINING CO. LTD.

24 Adelaide Street West
TORONTO

NEW YORK

CHICAGO

SEATTLE

SUDBURY DIAMOND DRILLING COMPANY LIMITED

We contract for all classes of Diamond
Drill work.

Saving a large percentage of Core is
our specialty.

We solicit enquiries.

SUDBURY, ONT. - -

Box 958

: PROFESSIONAL DIRECTORY :

M. P. McDONALD
MINING ENGINEEREXAMINATIONS, SAMPLING, REPORTING
EXPLORATION AND ASSESSMENT WORK

Telephone 6

COBALT

MILTON HERSEY COMPANY LTD.

MINING ENGINEERS AND ASSAYERS

EXAMINATION OF MINERAL PROPERTIES
MINE OPERATION AND MANAGEMENT
ASSAYING AND ANALYSING OF ALL ORES

MONTREAL

JAS. G. ROSS
Consulting Mining Engineer

WINNIPEG

THE DORR COMPANY

Metallurgical and Industrial Engineers

DENVER
1009 17th St.NEW YORK
101 Park Ave.LONDON, E.C.
16 South St.**JOHN A. DRESSER**

MINING GEOLOGIST

701 Eastern Townships Bank Building
MONTREAL, CANADA**JAMES McEVOY**

MINING ENGINEER AND GEOLOGIST

(Specialty Coal Mining)

210 POPLAR PLAINS ROAD, TORONTO, ONTARIO

Phone Hillcrest 1461

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. FERRIERCONSULTING
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. HASSANCONSULTING GEOLOGIST
and ENGINEER OF MINES

Westbrook Hotel Bldg., FORT WORTH, TEXAS

Any Code

Cable Address: "HASSAN"

J. M. CALLOW
President

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

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

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

H. H. CLAUDET
Canadian
Representative

PATENTS

TRADE MARKS AND DESIGNS
PROCURED IN ALL COUNTRIES

Special attention given to Patent Litigation
Pamphlets sent free on application

RIDOUT & MAYBEE
156 YONGE STREET, TORONTO, ONT.

Oldest Experts in

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

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

Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

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

Dwight & Lloyd Sintering Company, Inc.

**SPECIAL PROBLEMS
IN ORE TREATMENT**

29 BROADWAY, NEW YORK CITY
Cable Address:—"SINTERER."

L. P. BURNS, LIMITED

Announce a change in the firm's title from
BURNS & ROBERTS to the above.
We manufacture and repair Tanks, Boilers, Smokestacks,
and Plate Work. We Fabricate and Erect Light Structural
Steel of every description, and specialize in new and
Used Machinery of all kinds.

BANK OF HAMILTON BUILDING - TORONTO.

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

SELL Antimonial Lead
Antimony Alloys
Tin Alloy

BUY Ores, Mattes, Residues or Drosses,
Containing Tin, Copper, Lead or Antimony



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

Canadian Laboratories, Limited
ASSAYERS AND CHEMISTS
410 Crown Office Building, TORONTO

"We Analyse Anything."
Special Rates Send for Prices Phone Main 5063



PERFORATED METALS For Every and All
Purposes in all Metals

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

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



PROVINCE OF ONTARIO



BUREAU OF MINES

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 talc, feldspar, mica and graphite.

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

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

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

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

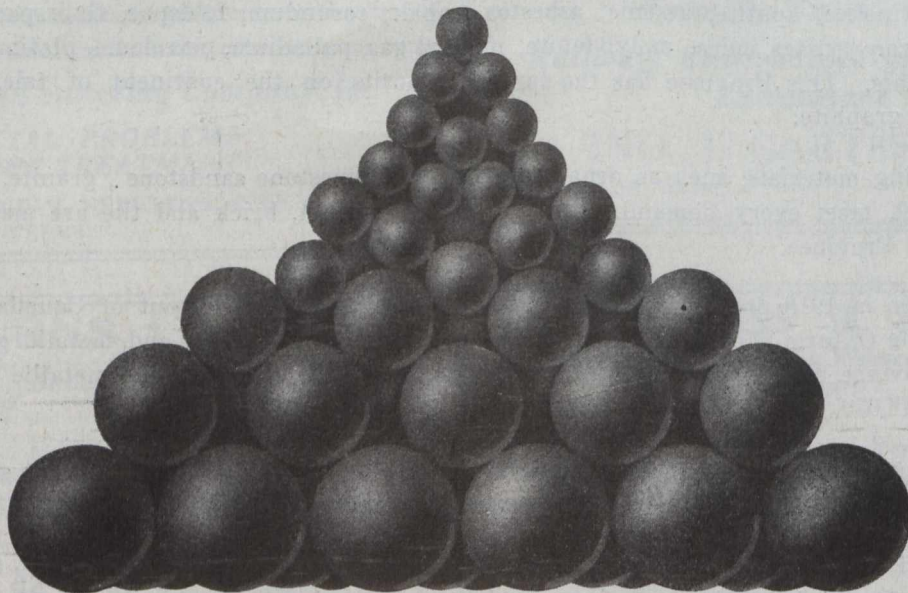
Toronto, Canada

"If quality counts use 'HISCO' Products"

"HISCO" BALL

"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 P-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
Ste. Anne de Bellevue, Que.

No. 39

CONTENTS

Editorial:

Editorial:

- Newfoundland needs a Government Geologist 729
Asiatic Coal Supremacy 729
The Desirability for Standardization of Mine-
Rescue Apparatus 730
The Tale Industry 730

The Gold Discovery at Copper Lake, Northern
Manitoba, by R. C. Wallace, Commissioner of
Northern Manitoba 731

The Natural Gas & Petroleum Association of Can-
ada First Annual Convention, Hamilton, Ont.. 733

The World's Coal Resources, from the "Econom-
iste Francaise" 734

The Desirability for Standardizing Mine-Rescue
Training and Plan for Same, by D. J. Parker,
U.S. Bureau of Mines..... 735

Special Correspondence:

- British Columbia 737
Northern Ontario 740
Port Arthur & Nipigon District 743
Silver Mining in Thunder Bay Region..... 743

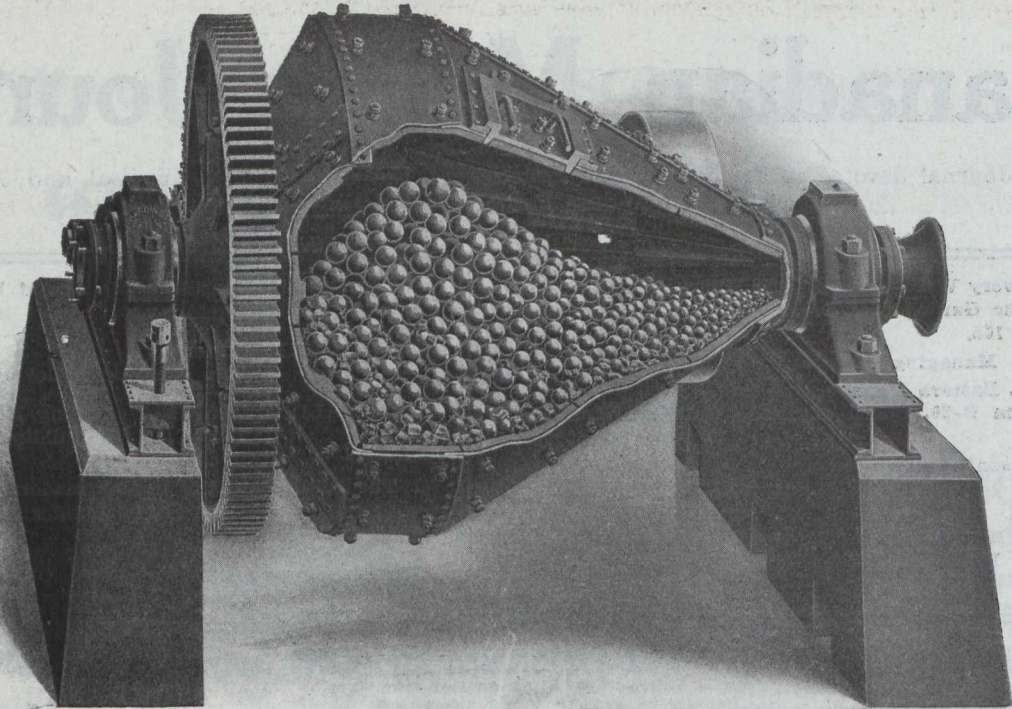
The Outlook for Coal Exports from the United
States & Canada 743

Professor Stanley Graham goes to Nova Scotia
Technical College 744

Mining Exposition Progressing in New York.... 744

British Iron & Steel Institute considers Fuel Eco-
nomy 745

Tale & Soapstone Industry in the United States.. 745



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 1200 tons per 8 hr. shift.

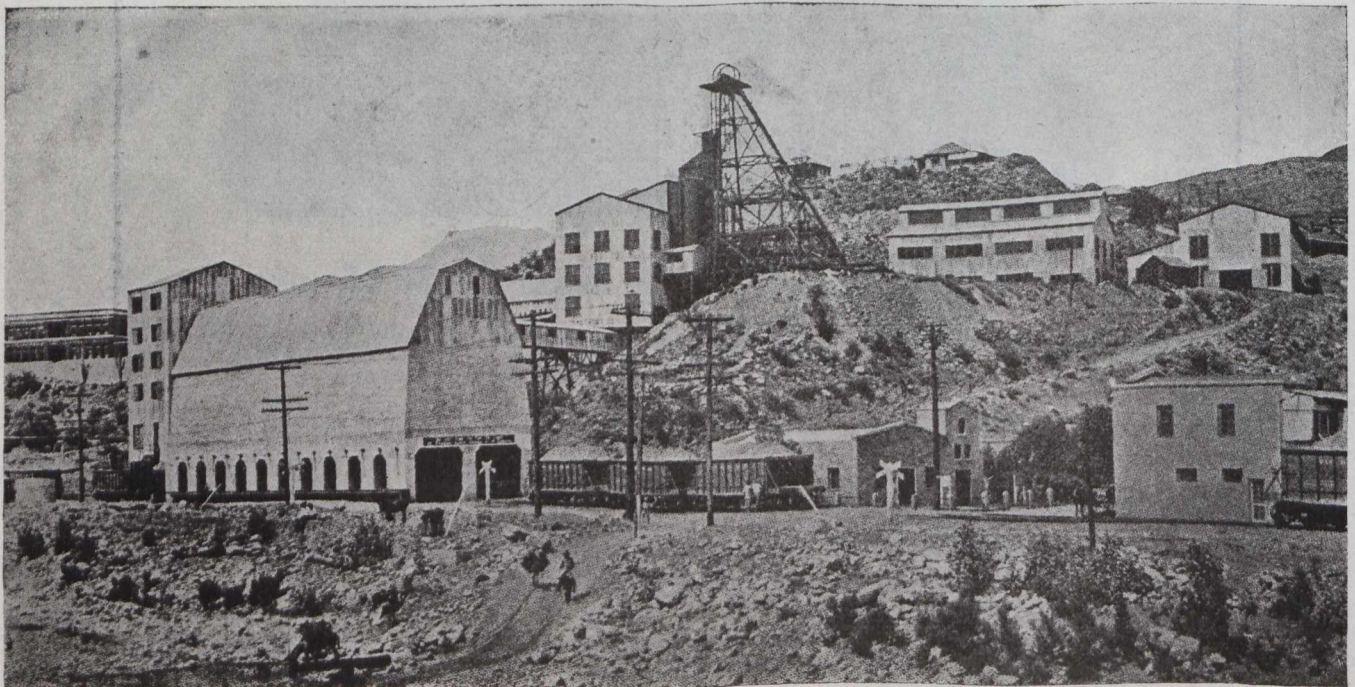
The Ray Hercules Plant has been in operation now for 10 months and their Hardinge Mills on a mixed ore consisting of mineralized granite, diabase and talcose schist are giving entirely satisfactory results.

Hardinge Conical Mill Company, 120 Broadway New York

SALT LAKE CITY, Newhouse Bldg.

DENVER, First National Bank Bldg.
Cable Address—"Halharding, New York"

LONDON, ENGLAND, Salisbury House



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

EDITORIAL

ASIATIC COAL SUPREMACY.

The "Journal" reprints a condensed extract from the *Economiste Francaise* on the coal resources of the world, which is interesting in that the writer, Gaston Cadoux, has grasped, what the "Journal" several years ago pointed out, that the great anthracite reserve of the world lies in the Continent of Asia, and nearly all of it at that within the borders of China. M. Cadoux points out that it is already established that in China alone there is four times as much anthracite as in the rest of the world put together, and that while the coal reserves of Europe and America are fairly well defined as to quantity, the coal occurrences of China are only partially prospected.

China is one of the mysteries of the present age, and a greater mystery of the future. A perusal of the history of China will reveal that this vast territorial unit has passed through periods of magnificence, followed by periods of decay, and again followed by a rise in extent of territory and government, that have succeeded each other with almost monotonous alternation. In the history of China, the record of a single dynasty may cover 600 years, and be but an episode in the long story of successive decline and rise of national importance.

Should China repeat her traditional historical phases, and under some strong hand rise once more with all the resources of modern science, backed by internal reserves of coal and iron that exceed those of all the outer world, what may not this patient and resourceful nation achieve?

Many careful people fear the rise of Japan as a world power, but Japan must always be limited by her small resources of coal and iron, and by the small extent of her native islands, and the potentialities of the Japanese are meagre compared with the infinite possibilities of China. The vast reaches of Asia which lie between Tibet and the headwaters of the Yang'tse, are unknown, but time was when the rule of China extended to the borders of India. It may conceivably do so again.

If it is true that national power is derived largely from the possession of coal and iron, and who can doubt it after 1914-1919?—the hordes of Cathay are worth our attention. They have the essential raw materials of modern industrial civilization, they are very very numerous, and their form of national culture, while it may not appeal to Western minds, has not indeed occasioned a greater catastrophe than befell Europe but lately.

NEWFOUNDLAND NEEDS A GOVERNMENT GEOLOGIST.

Since the death of Mr. Howley, the Government of Newfoundland has not appointed a successor in the appointment as Government Geologist which Mr. Howley held for many years.

This strikes us as a regrettable omission. If any country needs a competent geologist it is the newly created Dominion of Newfoundland. The agricultural wealth of Newfoundland can never occupy the status it does in countries with longer hours of sunshine and fewer pre-Cambrian exposures. Newfoundland is known to contain asbestos, chrome, iron, in tremendous quantity; some coal, copper, limestone, lead, and many other minerals, but the country has never been thoroughly geologically surveyed and mapped. The task of doing this would be a difficult and expensive one, but it would be well worth while.

A recent article in the "Journal" told of some of the humors and some of the tragedies of prospecting and mining in Newfoundland, and in too many cases lost endeavour and mis-spent expenditures have been caused by inexact information. No country can hold its own in the modern race if it does not strive to the utmost to develop its natural resources, and when these resources are largely mineral, the services of a competent geologist are of first-class importance.

A country that possesses what is probably the most important hematite ore reserve in the north temperate zone is justified in employing the very best geologist obtainable. It is difficult to over-estimate the value of the Wabana iron ore deposit to the British Empire. The quality of the ore, its geographical location, its ownership by one of the associated British peoples as sturdy and valiant as Newfoundland has proved itself to be; the apparently illimitable quantity of ore present, and the lessening quantity of iron ore in the known reserves of North America, all go to make the Wabana deposit enormously important. The most authoritative report on the Wabana deposit was compiled under the direction and at the expense of the Canadian Department of Mines. The information contained in that Report was considered to be necessary to Canada. How much more does Newfoundland need such information for herself. A government geologist in Newfoundland is not a luxury, but a business necessity.

THE DESIRABILITY FOR STANDARDIZATION OF MINE-RESCUE APPARATUS.

In this issue of the "Journal" will be found a paper summarizing the development of mine-rescue apparatus, or, as we prefer to call it, the development of self-contained oxygen breathing-apparatus for use in mine rescue operations, which is a plea for standardization of apparatus and of training methods. Few who have had experience in these matters will dissent from the views expressed.

The paper mentions that the first oxygen breathing apparatus to be used in the United States were four sets imported in 1907 by the Anaconda Company, followed in September 1908 by purchases for the Technologic Branch of the U.S. Geological Survey for use in mine rescue work.

It may be of interest to mention that a self-contained breathing apparatus of the Giersberg type, the forerunner of the Draeger apparatus (the Draeger apparatus having been developed from the Fleuss apparatus), was purchased much previous to this date by the Nova Scotia Steel & Coal Company at Sydney Mines. In 1907, the Dominion Coal Company erected the first rescue station in America, and equipped it with Draeger apparatus. A sample apparatus was brought to Glace Bay in the Spring of 1907. As an instance of how little was known of these devices, it may be mentioned that the Captain of the Allan liner that brought this apparatus over, in passengers' baggage, insisted that it be housed on the boat-deck of the steamer in case it might explode and prove a source of danger to the vessel. Since this time, self-contained oxygen breathing-apparatus has become a recognized part of the fire-fighting equipment of a modern liner, and they were used in the Navy during the war for purposes that the ordinary gas mask will not accomplish.

We believe that great damage has been done to the proper understanding of the functions of breathing apparatus by the use of the term "rescue-apparatus." The proper function of these devices is as an adjunct to the colliery fire-brigade. Their usefulness in fighting mine fires has always been less open to question than their utility as a means of rescuing the victims of a coal-mine explosion.

The United States was not first in the introduction of breathing apparatus as a device to assist in mine-rescue work, but since these devices were adopted by our neighbours, they have shown a much better understanding of their proper function than has been the case in England for example. In England, the Home Office authorities prescribed the provision of breathing apparatus, but neglected to provide machinery to regulate their manufacture, or in any way to develop a standard approved type suited to English methods and ideas. In the United States, however, the Government led the way, and has developed a standard apparatus, after much trial and expenditure; and by a

lavish dissemination of literature, it has educated the mining world not only to the great advantages of the self-contained breathing apparatus, but has directed attention to its limitations and its special functions. This is a much better proceeding than the damming of one apparatus by the sales agents of a rival type, resulting in an unsettled public confidence in all types.

The mining engineer who neglects to avail himself of the advantages which arise from the provision of modern breathing apparatus, and a corps of trained users, is not well advised.

The use of breathing apparatus is not by any means confined to mines. During the war, breathing apparatus was twice used in Sydney Harbour to remove burning sugar cargoes, on each occasion very successfully. Of other uses of breathing apparatus during the war, every member of a Tunnelling Corps is able to give first-hand evidence.

THE TALC INDUSTRY.

Of some interest to Canada is the formation of the Talc and Soapstone Producers' Association of the United States. While the production of talc from Canadian mines is not large, yet the industry is growing very quickly, the value of the talc mined in Canada being in 1918 three times what it was in 1914, and twice the value of the 1917 production.

The imports of talc into the United States ground or prepared, amount to approximately \$250,000 worth per year, but importations are declining because of the growth of the home industry.

The formation of the new Association will doubtless occasion improvements in the practice of talc preparation, and will also no doubt keep prominently before it the welfare of the United States producer. Some attention to the proceedings of the Association will be worth the while of Canadian talc miners, as a great deal of the talc mined in Canada is exported to the United States to be prepared for the various uses to which talc is put. The use of talc for the manufacture of face powder is not the main outlet for the product of the industry, as might be popularly supposed.

PERSONALS.

A fair number of the members of the Canadian Mining Institute attended the Chicago meeting of the A.I.M.M.E., which opened on the 22nd September. Among these were included Dr. Alfred W. G. Wilson, of the Geological Survey, and Mr. John McLeish of the Mineral Resources Bureau of the Mines Branch. Mr. W. R. Rogers of the Ontario Mines Department was in charge of a complete and representative exhibit of Ontario minerals at the National Exposition of Chemical Industry, associated with the A.I.M.M.E. meeting.

The "Journal" was represented by Mr. H. W. Thompson, of the Toronto, and by the Editor.

Mr. A. R. Chambers, assistant mining engineer of the Nova Scotia Steel & Coal Company, New Glasgow, was also in attendance at the meetings.

The Gold Discovery at Copper Lake, Northern Manitoba

By R. C. WALLACE.

As fairly wide publicity has apparently been given to the discovery of gold at Copper Lake, Northern Manitoba, the following details with reference to the situation may be of service.

Location and Means of Access.

Copper Lake is situated on the headwaters of the Grass River, which empties eastward into the Nelson River. The Grass River may be reached from Mile 82, Hudson Bay Railway by a wagon road 10¾ miles in length into Herb Lake. The easiest route to Copper Lake, is, however, via Cumberland House and Sturgeon Landing, to which there is a weekly steamboat service from The Pas, and thence by canoe into Athapapuskow Lake and eastwards into the Cranberry Lakes at the headwaters of the Grass River. Copper Lake empties from the north through Brunne and Bear Lake, into the Second Cranberry Lake. The steamboat journey is made in one and a half days, and the canoe route from Sturgeon Landing to Copper Lake can be traversed in two days.

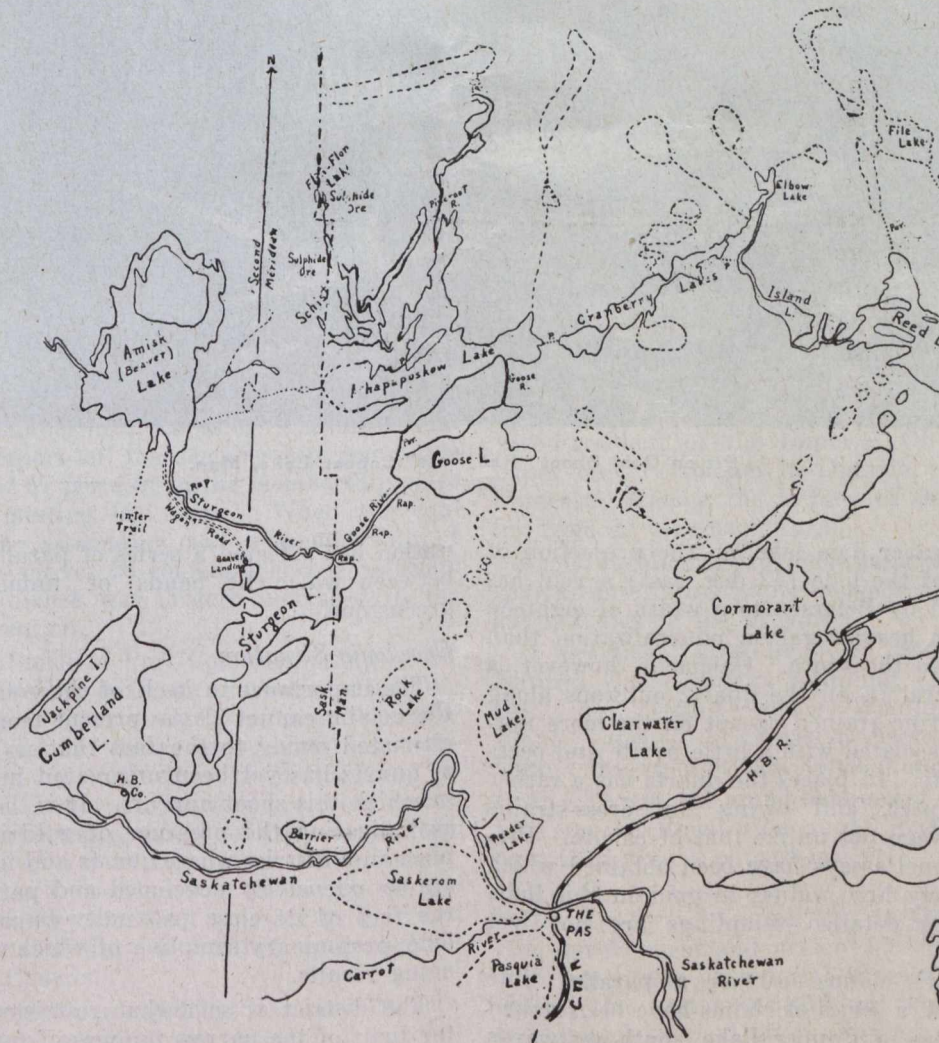
Geological Features.

Copper and Brunne Lakes lie in a somewhat restricted band of sheared greenstone and fine grained porphyry flanked on the east and west by a reddish granite

which on the western contact is fairly basic. The strike of the rock is forty degrees east and the belt is elongated in the direction of the strike. Within the belt lie Copper and Brunne Lakes, and the mineral discoveries have been made on the east, but mainly on the west side of these lakes. The intrusions from the granite into the belt consist of irregular veins and masses of a very fine grained pinkish granite which is apparently identical mineralogically with the main granite.

Mineral Occurrences.

While there is a variety of mineral occurrences in this district, the discovery of a very rich shoot of gold on the property now known as the Red Rose has served to attract attention to this district as a whole and to the other properties already discovered in the district. The shoot appears on the east wall of a vertical quartz vein eighteen inches wide and occupies three inches on that wall. A pit has been sunk six feet deep on the shoot which apparently pitches steeply northwards in the vein and which may be seen at the bottom of the pit on the north side. The highly sheared and somewhat decomposed greenstone on the east wall of the vein shows very coarse gold in panning across 2½ feet at the bottom of the pit. The vein has been stripped



Canoe Route from Sturgeon Landing to Athapapuskow and Cranberry Lakes.

for two hundred feet and varies in width from eighteen inches to six inches. There has been considerable shearing in the zone in which the vein lies and breaking has taken place on planes transverse to the strike of the rock. On the adjoining claim to the south, in what is probably the same zone, reduplicated folding of a vein eighteen inches thick is very clearly shown. The pit on the Red Rose has been roofed over and locked down.

Less than a claim's width west of this vein a parallel quartz lode has been prospected over five claims by J. P. Gordon who later staked the Red Rose. This lode is well exposed over two thousand feet on the two most northerly claims, with cross trenches varying in width from fifteen to thirty feet. The other claims have not yet been sufficiently prospected to determine the extension of the lode, but on the fourth claim a large vein of quartz and country rock, less than half of which is quartz, is exposed for a width of 100 feet. The total length of the lode cannot be estimated until more work is done on the claims. To the north, three-quarters of

of the group molybdenite and pyrite are the chief sulphides in a vein up to three and a half feet in width, while on claims 4 and 5 west of Brunne Lake, somewhat irregular masses of quartz carry abundant pyrite, some galena and chalcopyrite and no molybdenite. No information is yet available as to values on these (the "Dominion") claims. Still further east on a parallel line of strike a carbonaceous schist has been impregnated with pyrite and phyrrotite. Prospecting has been done on the northeast arm of Copper Lake and at the extreme end of the south arm of Copper Lake and along the west shore of Brunne Lake. Some idea of the extent of this iron sulphide mineralization may be obtained from the fact that on the Caribou claim west of Brunne Lake a rounded hill is well exposed on the line of strike of the iron formation at least seventy-five feet wide and is mineralized throughout with practically solid pyrite and phyrrotite. In places, as at the south end of Copper Lake, the iron sulphide bands are associated with bands of quartz only sparsely mineralized with pyrite. It would appear that this type of mineral-



Pit on Gold Shoot "Red Rose" Copper Lake, Man.

a mile beyond a beaver dam lake, on the projection of the line of strike of the lode (42 deg. east) a vein has been cross-trenched by Petersen to a width of eighteen feet, showing much heavier galena mineralization than on the properties to the south. Galena is, however, a characteristic mineral in all the quartz outcrops along the line of strike, fine-grained except on the more northerly showings, associated with a little pyrite and occasionally chalcopyrite. In places the quartz has a rather peculiar cherty aspect, and owing to cross-strains breaks with a cleavage not unlike that of calcite. Preliminary cross-channel assays have been obtained which have indicated fairly high values in gold in this lode. The results of more detailed samplings are not yet known.

South of Gordon's claims and on a parallel line slightly further east, a series of claims have been staked from the south shore of Copper Lake, south-westwards along the west shore of Brunne Lake. These claims are now being prospected and on the more northerly claims

ization has affected a series of parallel bands of schist, between which lie bands of unmineralized massive greenstone.

Economic Situation.

The importance in itself of the gold shoot on the Red Rose claim cannot at the present moment be accurately estimated owing to the fact that no considerable body of quartz has yet been uncovered in the line of strike in which this shoot appears. It is, however, significant as indicating the presence of gold in quantity at one place in a district where quartz and iron sulphide bodies are so extensively developed and particularly owing to the fact of its close proximity to an extensive quartz lode, preliminary sampling of which shows very encouraging results.

The district is somewhat restricted in area, though the limit of the narrow tongues of greenstone which extend northeast and southwest from the main area have not yet been fully defined. There is a remarkably

diversified mineralization within this area. The gold showing on the Red Rose points to the fact that at the time of the mineralization which affected the large quartz bodies as well as the smaller veinlets, very considerable gold was being carried into the quartz. The quartz and iron sulphide lodes should be thoroughly investigated by companies which are prepared to handle development work on an extensive scale.

Considerably more ground has been staked in the district than has yet been prospected even in a preliminary fashion. Apart from this unprospected territory, attention might well be directed to the greenstone belt northwest of the First Cranberry Lake, to that belt north of Twin Lake and west of Brunne Lake and to the extension of the Copper Lake belt northeast towards Separate Creek.



Big Lode Contact-Extension Claim, Copper Lake, Man.

THE NATURAL GAS AND PETROLEUM ASSOCIATION OF CANADA.

First Annual Convention.

The Natural Gas and Petroleum Association of Canada held its first annual convention at Hamilton, Ont., on September 19, 1919.

The sessions were held at the Royal Connaught Hotel. There was an attendance of upwards of 90 members and guests, and the report of the membership committee showed a growth of 57 per cent in the membership since the organization meeting last June. When the convention opened the association had a membership of 106, including 85 active, 18 company and 3 associate members. This number was largely increased in the course of the convention.

President C. E. Steele of Port Colborne, occupied the chair throughout the sessions. At the business meeting opening at 2.30 p.m. reports were presented from several committees; and the laws and legislation committee was empowered to further to the best of its ability a number of important matters involving assessment of gas enterprises, disposal of salt water from wells, introduction of a snort form of gas lease, amendments to the Boiler Inspection Act to permit the use of boilers of oil country standard type for drilling and reduction or removal of duty on drilling equipment not manufactured in Canada.

The financial report presented by Secretary-Treasurer S. A. Morse showed a substantial balance.

The following were unanimously elected honorary members of the Association: T. W. Gibson, Deputy Min-

ister of Lands, Forests and Mines, Toronto; Dr. M. Y. Williams, Geological Survey of Canada; Dr. Dresser, Vice-President of the Canadian Mining Institute; W. B. Way, Secretary of the Natural Gas Association of America; E. S. Estlin, Natural Gas Commissioner for Ontario; G. R. Mickle, Mine Assessor for Ontario; and the President of the Canadian Gas Association.

Following the business session, A. M. McQueen, Vice-President of the Imperial Oil Company, gave a paper on "Petroleum in Ontario, Reminiscence and Forecast" tracing the history of the petroleum industry from its very beginnings.

Mr. G. R. Mickle, provincial mine assessor for Ontario, gave an interesting paper on some phases of the natural gas industry in the province.

A practical paper by J. H. Stoliker of the Union Natural Gas Company pumping plant at Port Alma, Ont., on "Oxo-Acetylene Welding in an Isolated Plant," opened an extensive discussion of the various uses of the oxo-acetylene torch in repair work.

At 6.30 p.m. the annual banquet of the Association was held in the Royal Connaught grill-room, with President C. E. Steele as toast-master.

Mr. D. A. Coste gave a very interesting paper on "The History of Natural Gas in Ontario," tracing the rise, development and present situation of the industry. The paper was of especial interest in that Mr. Coste drilled the first successful gas well in the old Essex field, which marked the beginnings of the industry in a practical form; and has been identified with the gas development in the province ever since.

Dr. M. Y. Williams of the Geological Survey of Canada outlined the findings of his recent survey trip to the prospective oil areas in the James Bay district, which will later be covered in detail by an official report. Short addresses were also given by W. B. Way, secretary of the Natural Gas Association of America, by T. W. Gibson, Deputy Minister of Lands, Forests and Mines, and by Dr. Dresser, Vice-President of the Canadian Mining Institute.

Resolutions were passed authorizing the board of directors to take up the matter of increased gas rates should they deem it advisable, and to secure data regarding the demand for nitro-glycerine for well-shooting in Ontario, with a view to the establishment of a factory in the province.

The convention will hold its next annual meeting at Chatham, Ontario, on October 15 and 16, 1920.

The association was organized at a meeting held at London on June 18, 1919, and the officers elected on that occasion will hold office till the 1920 meeting. They are:

President—C. E. Steel, Port Colborne.

First Vice-President—A. M. McQueen, Toronto.

Second Vice-President—T. P. Pinckard, Windsor.

Secretary-Treasurer—S. A. Morse, Chatham.

Directors:—R. F. Miller, Selkirk; A. W. Parks, Oil Springs; J. B. Williams, jr., Sarnia; D. A. Coste, Niagara Falls; P. S. Coats, Chatham; H. R. Davis, Buffalo, N.Y.

WORLD'S COAL RESOURCES.

America's Supremacy.

The Importance of Extracting By-Products.

Gaston Cadoux recently contributed an article to the *Economiste Francaise* on the coal resources of the world.

The subject is an important one, says the writer, despite the progress made in the methods of exploiting water-power. Industrial supremacy in the future will lie with the people who possess the greatest reserves of solid mineral fuel at the best prices; and as far as is known of the coal deposits of the world, Europe and even America will be out-distanced by Asia, unless Europe takes prompt measures to retain its superiority.

According to the report submitted to the International Geological Congress at Toronto in August, 1913, the world's reserves of solid mineral fuel are 7,397,553 million tons, of more or less easy extraction and all at a workable depth. This figure comprised bituminous or dry coal, lignite, anthracite, and anthracite coal, and was divided as follows: 3,902,944 mill. tons dry coal, 2,997,763 mill. tons lignite, 496,846 mill. tons anthracite. The distribution is shown below in million tons:

	Lignite.	Coal.	Anthracite.	Total.
America	2,811,906	2,271,080	22,542	5,105,528
Asia	111,851	760,098	407,637	1,279,586
Europe	36,682	693,162	54,346	784,190
Oceania	36,270	113,481	659	170,410
Africa	1,054	45,123	11,662	57,839
Totals	2,997,763	3,902,944	496,846	7,397,553

The relatively small deposits in Africa and Oceania may be disregarded in the present connection. America has by far the richest store; but the cost of exploitation detracts from the industrial value of the fuel as compared with that of Chinese coal, and the future Asiatic industry seems likely to be able to deliver coal at much

lower cost. Although Asia contains much less lignite and bituminous coal than America, there is in China alone four times as much anthracite as in the rest of the world put together. Moreover, there is in Asia about 67 milliard more tons of coal than in Europe, and it must be remembered that although recent prospecting has discovered extensive anthracite beds in the plains of Shansi, Szechuan and Honan, no satisfactory or complete investigations have been made with regard to other coal reserves; while the returns for Europe, in particular for Britain, Germany, Belgium and France, leave little room for any future increase. Such considerations show that while Europe has little to fear from American rivalry, the new Asiatic industry will probably offer considerable competition, being in command of unlimited labour and abundant cheap coal. Every effort must therefore be made to retain the low price of coal and to achieve perfection in its utilization. The discovery and exploitation of natural gas, petrol reserves, and water power cannot, at present, bear any comparison with the advantages to be derived from the distribution of reserves of solid fuel.

In France, for instance, it is calculated that a thorough utilization of all water power will result in an annual economy of 8 to 9 mill. h.p.; but as industry will continue to develop while this result is being achieved, the consumption of coal will remain large. Pre-war consumption totalled 60 mill. tons per annum, and it may safely be estimated that the extension of electric power will represent from 30-35 or even 40 mill. tons each year. The demand for power will in all probability have doubled by that time, and if, out of a total consumption of fuel equal to 120 mill. tons of coal, 40 mill. may be economised by the use of electricity the annual consumption of coal will still be 70 to 80 mill. tons.

In order to compete successfully against the low prices of iron-ore, cast-iron and coal which will obtain in Asia, it is essential that all manufacturing processes be perfected as far as possible, and that the greatest economy and most scientific utilization of fuel be achieved. This problem has occupied manufacturers and economists for some years past, and a very clear exposition of the question as well as its solution appeared in the review *Chimie et Industrie*, November, 1918.

The solution is the substitution of electric power, wherever possible, for other kinds of power, and the use of coke, gas, heavy oils, benzol, etc., the by-products of coal, instead of raw coal as extracted from the mine. If the amount of coal at present consumed in a raw state was distilled before use, 5 milliard cu. m. of gas, 35 mill. tons of coke, 500,000 tons of heavy oils, 1,250,000 tons resin, 600,000 tons sulphate of ammonia, and 250,000 tons benzol would be obtained from 50 million tons, and, at the normal pre-war prices, would value 2,221,250,000f.

In addition to the advantages to be derived therefrom by industry, such a production of sulphate of ammonia, in conjunction with the potash of Alsace, would produce the quantity imported annually by France before the war. Every acre of ground could be cultivated.

Among those who proceeded to Pittsburgh to attend the opening ceremonies of the U.S. Bureau of Mines on the 29th September were Messrs. McLeish and Chambers, and it was expected that Mr. B. F. Haanel of the Mines Branch would also be present at the proceedings and the Safety First meeting that follows.

THE DESIRABILITY FOR STANDARDIZING MINE RESCUE TRAINING AND PLAN FOR SAME.

by D. J. Parker, U. S. Bureau of Mines.

The modern mine rescue breathing apparatus is a self-contained device, the function of which is to permit the wearer to penetrate irrespirable gases formed by mine fires or mine explosions.

There are several types of breathing apparatus, one of which depends on liquid air for the breathing supply, a second depends upon the generation of oxygen from a chemical compound, a third depends upon normal air under pressure, and a fourth, which is most widely known in America, depends upon pure oxygen under high pressure for its air supply.

The history of breathing apparatus dates from the year 1868, when a device was used similar to the submarine diver's helmet. Practically all succeeding forms were built along similar lines until 1896, when the present portable self-contained type was devised and used abroad. The first self-contained apparatus to be used in the United States were four sets imported in 1907 by the Anaconda Copper Mining Company of Butte, Montana. In September, 1908, breathing apparatus was purchased by the Technological Branch of the United States Geological Survey, for use in mine rescue and recovery work, which at that time was in charge of that branch.

Today the Bureau of Mines has ten rescue cars, five rescue trucks, and eight safety stations distributed

throughout the mining regions of the United States, equipped with some 300 complete sets of such apparatus, while several thousand sets are owned by State mining departments and mining companies having rescue crews trained in their use.

Breathing apparatus may be divided into two types as regards the length of time the apparatus will furnish pure air on one charging; these are the half-hour type, principally used on vessels or where men are only exposed to dangerous atmospheres for short periods of time, and the two-hour type which is the kind used in mines. In mine rescue and recovery work the apparatus wearer may have to travel considerable distances from his base and two hours has been adapted as the maximum period of service compatible with lightness and convenience of portability. Only the two-hour type is considered in this paper.

In the United States there has been a steady growth in the use of breathing apparatus by the mining industry. As with many other new devices when they first appear mine operators and owners were at first decidedly skeptical as to the merits of the apparatus. However, owing to the progressive spirit of numerous operators, both coal and metal, the ingenuity of apparatus manufacturers, and persistent effort of the Bureau of Mines, a more intelligent understanding of the use and limitations of the apparatus has been attained.

As a result of the combined efforts of those appreciating the necessity for such a device penetrating



New Laboratory of the U. S. Bureau of Mines opened for the Research Work in Mine Safety, 29th September 1919.

noxious atmospheres, a tremendous impetus has been given to its use in the mining industry, especially within the last three or four years.

I believe that all of you will agree that the apparatus occupies an essential and permanent position in the mining industry, so it does not seem necessary at this time to point out instances where lives have been saved directly by the use of the apparatus, or to give even approximately the figures showing the value of the vast amount of property saved to the nation annually.

Today there is not a mining district in the United States that cannot on short notice in time of disaster obtain the services of trained men equipped with apparatus either from State or privately owned rescue stations or from the Bureau of Mines. Also, most of the larger companies have rescue equipment and organized safety crews.

On account of the constantly increasing demand for apparatus training, the Bureau of Mines has for some time appreciated the necessity for standardized course of such training.

Thorough and systematic training are essential to insure the safe and economic use of the apparatus. Such training can best be insured through standardization of training methods. As a result of a standardized course, it is believed that more attention will be paid to the selection of the proper type of men for rescue crews, efficiency will be increased, and higher appreciation of the value of the apparatus will result.

The reasons for standardization are, in fact, so obvious that it hardly seems necessary to dwell further on this phase of the subject. It might be mentioned, however, that there are two essential reasons, in addition to those already mentioned, for such standardization.

(1) It is policy of the Bureau of Mines, upon request, to give a thorough examination to men trained either at privately or State-owned rescue stations, with a view of qualifying them for mine rescue certificates as issued by the Federal Government. A standard course of training would most assuredly be tremendously advantageous to both the examiner and the examined.

(2) Trained men going from one mine to another mine would be decidedly at a disadvantage when called upon to wear apparatus, assuming that the men at each mine had received a different course of instruction. This would hold true even though their training had been with the same type of apparatus. As an illustration, it has been known to occur that where one instructor would require vacuation of the apparatus of all normal air, another would require the inflation of the breathing bag with exhaled air, while another would permit the wearer to don the same type of apparatus containing normal air. Such diversity of instruction may result in serious difficulty for the wearer.

It is believed that a course similar to that pursued by the Bureau of Mines in the standardization of first-aid instruction should be followed in this case, i. e., by the wide dissemination of a publication on the subject.

I will now attempt, without going into details, to give a few of the fundamental principles that might form a basis for such a publication.

On account of the extremely hazardous work of wearing rescue apparatus in deadly atmospheres, too much attention cannot be given to the selection of an apparatus and the training of the wearer.

Many of us are inclined to think of a course in apparatus training as so many hours under oxygen in an irrespirable atmosphere. In reality, this phase of the course, though essential, is second in importance to a thorough and scientific knowledge of the use and the mechanical and physiological limitations of the apparatus.

No one should be accepted for training without first receiving a thorough physical examination by a competent physician or surgeon.

The length of the course should not be less than five periods of four hours each. At least eight hours should be spent under oxygen and in an irrespirable atmosphere. Wherever possible the apparatus work should be given underground. The course should include standard lectures on each of the several types of apparatus now in use in this country. Such lectures should dwell at length on the various tests of the apparatus, in order that the wearer may know to a certainty that his apparatus is functioning properly before entering a zone of poisonous gases. A person to be skilled in the use of apparatus should not only have a thorough knowledge of the use and care of the apparatus and oxygen pump, but he must also have a working knowledge of mine gases, that is, he should be familiar with their methods of occurrence, physical properties, effects on man, and methods of testing for their presence, particularly those gases encountered after mine fires and explosions. Knowledge of at least two types of flame safety lamps is desirable on the part of the apparatus man trained for work in coal mines. This is not so essential in the training of metal miners. The standardized course should specify the purity and method of manufacture of oxygen to be used in the apparatus. Oxygen manufactured by the electrolytic process may contain a certain percentage of hydrogen. The Bureau of Mines has, therefore, tentatively specified to manufacturers who supply oxygen for use in mine rescue apparatus, that the oxygen shall not contain more than 2.5 per cent nitrogen nor more than 0.2 per cent hydrogen. Also the purity of the regenerating material should be specified.

In addition, the course should deal at some length with the method of procedure following mine fires and explosions, including the duties of the captain of the rescue squad.

Publication regarding such course of standardization is now contemplated by the Bureau of Mines.

The necessity for such standardization is now, I believe, universally recognized among the manufacturers and users of breathing apparatus. By the wholehearted cooperation of apparatus manufacturers, safety engineers and the mining public, such standardized training will be established and oxygen breathing apparatus made a safer and more efficient agent for the help of mine owner and miner in times of trouble and disaster.

An address delivered at the Eighth Annual Safety congress, National Safety Council, Cleveland, Ohio, by D. J. Parker, Mine Safety Engineer of the U. S. Bureau of Mines.

Special Correspondence

BRITISH COLUMBIA.

Victoria, B. C.

The possibility of an iron and steel industry being established in British Columbia has been the subject of animated discussion since the publication of the report that large and rich deposits of limonite have been located in the Whitewater River District, some distance from the town of Lillooet, B. C. J. H. Hawthornthwaite, M. P., who is interested in the properties and who made a trip into the Interior to inspect them, goes so far as to say that there are now assured to this Province "blast furnaces, rolling mills and all other necessary accessories to the operation of a great steel plant." Mr. Hawthornthwaite, with whom were competent engineers, gives it as his belief that the region lying between the Klino on the north of the Chilco Lake on the south, a distance of nearly one hundred miles, contains the largest known exposure of iron ore. He says that such a large deposit of high grade iron ore, including hematite, limonite, and ironstone, cannot remain unused for long. Small mountain ranges, he says, can be seen in all directions which are literally clothed with iron from the summits down to far below the timber line. As to transportation he explains that a comparatively short spur line would furnish connection with the Pacific Great Eastern Railway, and thus provide a ready means of access to the coast. While Mr. Hawthornthwaite would like to see the Provincial Government take hold of the property, develop it, and back financially the launching of a steel industry he declares that "no difficulty whatsoever will be experienced in commencing operations at once by the introduction of outside capital. "If the same energy is displayed, "continues this member of the Provincial Legislature" in prosecuting this enterprise as was expended in carrying on the war it should be possible to have the project well underway within thirty days. Where the rolling mills and subsidiary plants will be placed is, of course, a matter for careful discussion and investigation. But I am of the opinion that there can be no question that Ladysmith offers an ideal location for the establishment of blast furnaces. Two great corporations are engaged in that neighborhood in mining the finest coke producing coal to be found on the Pacific Coast. A coking plant in connection with these mines could be readily and economically established which, together with the blast furnaces, would provide labor for several thousand men. Thus would a long step be taken towards solving one of the problems that Vancouver Island, as well as the rest of the Province, will have to meet sooner or later.

The Nanoose Collieries Company, of which J. J. Grant is the managing director, owners and operators of the Grant Mine at Nanoose Bay, have sold their interests to the Nanoose-Wellington Coal Company, of which Lewis Williams, of Seattle, Wn., is president and with whom are associated other Washington State and St. Paul Capitalists. The property comprises approximately 1,700 acres, including submarine area, and it is the intention of the new owners, according to Mr. Williams, to immediately start operations to the end that the output may be largely increased. Construction work is to commence without delay, plans already being underway for new bunkers, a washer

and other top equipment. Surface improvements and underground development will mean an expenditure of at least \$100,000. The object said to be aimed at is to bring the daily production up to 500 tons as quickly as possible. John John, superintendent under the former owners, has been retained in the same position.

Stewart, B. C.

Sir Donald Mann, owner of the Big Missouri Group of Claims, in the Salmon River District, Portland Canal, which property is to be diamond drilled, is paying another visit, the second in six weeks, to the part of northern British Columbia in the mineral development of which he is so keenly interested. Coincident with Sid Donald's arrival there are many rumors of possible development, one of which refers to the construction of railroad from Stewart to the Big Missouri, which ambitious project is justified on the ground that an important discovery of gold-silver ore has been made on the Laura and E Pluribus Claims. Professor Bancroft, of McGill University, Montreal, recently left to inspect the Big Missouri and other claims in the district while F. H. Minard, of New York, consulting engineer Sir Donald Mann, also is making an inspection of the former property.

Boyle Bros., diamond drill contractors, have started work on the property of the Forty-Nine Mining Co., Salmon River. The same company had taken a third drill into that section for work on a property, the name of which is not given. Boyle Bros. have the contract for drilling the Big Missouri.

P. Welch, of the John W. Stewart Contracting Co. and the Foley, Welch and Stewart interests, accompanied by his son, Lieut. J. A. Welch, of Spokane, Wn., has gone into the Salmon River Country to inspect the Mineral Hill Property. With the party were R. W. Martin and H. J. Fetters, who also are interested in the property, and Al. Harris, superintendent of development work.

Kaslo, B. C.

The equipment of the Silver Bell and Silver Bear Mines, situated on the south fork of Kaslo Creek, is being improved, a number of houses for the accommodation of the men having been completed. These silver-lead properties are being worked under the direction of W. E. Newton, mining engineer. They are controlled by R. F. Green, M. P., with whom is associated his brother, S. H. Green, of Kaslo, so far as the Silver Bell is concerned, and in association with Senator Clide Pringle, of Ottawa, in respect of the Silver Bear. The Silver Bell recently shipped a carload of rich ore to the Trail Smelter and ore still is being sacked from the upper workings of equally high grade, development proceeding simultaneously. The Silver Bear is being opened up and is reported to be showing promise.

Recoveries from the concentrator of the Cork-Province Mine, situated on the south fork of Kaslo Creek, have been running 51 ounces of silver and 67 per cent lead per ton of ore treated. A shipment of four cars of concentrates is being made to the Trail Smelter. Previous shipments made this year totalled 122 tons. The production of this property last year was 642 tons of lead-silver concentrates and 110 tons of zinc-silver concentrates.

F. J. Edwards, manager of the Index Mine on the south fork of Kaslo Creek, states that the installation of an air compressor at the Mine is complete and that two drills are in operation. Both machine and hand work is in progress. A long crosscut is being driven to No. 2 vein while a drift is being made on No. 1 vein from the intersection of the crosscut. Silver-lead is the chief content of the ore.

Merritt, B. C.

Joseph T. Knapp, who is in charge of development work at the Donohoe Mine, Stump Lake, reports that the work of unwatering the Joshua Shaft is making good progress and that active mining operations will be started as soon as the 200-foot level has been emptied. Air compressors are on their way and a new motor truck has been purchased to transport ore to the railway at Nicola. Mr. Knapp states that it is planned driving a long tunnel to crosscut the several planned driving a long tunnel to crosscut the several veins of the property. When it reaches the Joshua vein it will be some 1200 feet in length, cutting the latter at a depth of about 550 feet. It is expected that the tunnel will cut the Tubal Cain Vein at a distance of about 500 feet in and another, known to exist between that point and the Joshua vein. The Donohoe Mine ore contains values in gold, silver, lead and copper, its chief content value being in silver.

Alice Arm, B. C.

The Taylor Engineering Company is planning the erection of a 3,000 tons ore bunker at the wharf at Alice Arm to facilitate shipping. The railway is transporting 150 tons of ore a day from the Dolly Varden Mines to tidewater.

The Sweetwater Claim, situated across the river from the Dolly Varden, has been purchased by D. J. Hancock, who is interested in a number of other claims in the district. Mr. Hancock recently announced that all right, title and interest in the United Metals Company had been sold to him for \$25,000 and that the only interest the stock-holders have remaining is the division of such moneys as has been and is to be paid by him on the property.

The La Rose Mine is taking out some good silver ore, two shipments having been made, one to Anyox and the other to the Trail Smelter.

Samples taken from the Climax Claim is reported to have assayed high in silver while rich ore of the same character is said to have been taken from the North Star Mine.

Barkerville, B. C.

For years E. E. Armstrong and other Cariboo prospectors have been searching for the motherlode which fed the placers of that district, from which many millions in gold were taken over fifty years ago. In the last year or so the quest resulted in discoveries of importance two quartz ledges being uncovered and traced for a distance of nearly 20 miles, the strike being northwest by southeast. Mr. Armstrong and his associates, F. J. Tregillus, J. H. Blair, and Pat Carey, prospected these ledges which are respectively 17 feet and 42 feet in width. Assays run from \$17.50 to \$19.00, while as high as \$500 to the ton has been obtained. For a depth of 20 to 30 feet the ledge matter is much decomposed and the gold is free. By grinding a piece of the rock in a mortar and panning the powder fine gold is readily recovered in the decomposed material. Below that depth the ore tuns base and will have to be either concentrated and smelted or cyanided. No great depth has been achiev-

ed on the ledge, about 30 feet in one shaft being the greatest, but it will be prospected at depth and crosscut and tunnelled during the coming months on a large scale. Recently a deal was concluded by which eight claims were turned over for \$250,000, the purchasers being Robert & Bryce, M. E., of Toronto, Ont. and associates, the former now being in the district with A. W. Newberry making preparations to commence work. Mr. Bryce already has located water and mill sites and a stamp mill will be installed next Spring for treating the free-milling ore. In addition to the claims involved probably 20 others have been staked along the zone.

Nelson, B. C.

As a result of a statement that the Canadian Consolidated Mining and Smelting Company of Trail, B. C. has been selling its lead at a low price to a subsidiary concern, thus treating the independent ore shippers unfairly inasmuch as all the lead produced at the smelter is pooled and sold in the best market, particulars have been given to Fred. A. Starkey, commissioners of the Associated Board of Trade of Eastern British Columbia, by the Company of what happened to the 205 lead shipments made during the months of April, May, June and July. For each of these bulk shipments the Company has made a tabulation giving the sale number, advice number, lot number, car number, weight in pounds, price per pound, amount of invoice, name of consignment and destination.

An analysis of the shipments made with reference to the consignees shows that the smelter had 21 customers during the four month period of whom nine received shipments in April, eight in May, fifteen in June, and eleven in July. Twenty of these customers were Canadian firms and one was American. The last named, the Pacific Orient Company, of San Francisco, received seventeen consignments in June for export, this being the only month in which it figured.

The five largest customers were: The Carter White Lead Company of Montreal, 50 shipments; The Northern Electric Co., of Montreal, 40 shipments; The Canada Metal Company, of Montreal, Toronto, Winnipeg and Vancouver, 25 shipments; Jas. Robertson & Co., of Montreal, Toronto and Winnipeg, 16 shipments; and the Steel Company of Canada, of Atwater and Montreal, 12 shipments. The other fifteen customers averages three shipments each, the destinations including, besides the cities named, St. Johns, Sherbrooke, Quebec, Hamilton, and Walkerville.

The average price for April was 5,452 cents per pound; May, 5,579; June, 5,556; July, 6,084. Shipments for the four months reduced to tons were: April, 675 tons; May, 1,456 tons; June, 3,278 tons; July, 1,334 tons.

A comparison between the New York prices and the prices that the smelter obtained shows that the Canadian purchasers of pig lead paid, and the lead ore shippers of the district received settlement at, a considerable premium over New York. This is shown by the following table:

Month.	Average Sales of	
	New York	Consolidated
April	5	5.45
May	5.04	5.58
June	5.26	5.56
July	5.23	5.67

Thus, on the average, the Canadian shipper has received for his lead content, 44 cents more per hundred-weight, or \$8.80 per ton, during the four months, than the American shipper. But for the necessity of meeting the competition offered by cheap Mexican lead, and preserving the home market for the future, it is intimated that the advantage of price would be still greater.

On the upper part of Cascade Creek there are located the Comstock and Whitewater Groups of Mineral Claims, belonging to the Nelson Mining & Development Co., the E. & M. Mine, operated by P. Sheran, of Nelson, as well as other properties. This region was visited recently by A. G. Langley, Government Mining Engineer for the East Kootenay District, with a view to reporting on the prospects referred to and on an application from those interested that the government assist in the construction of a mining trail to the shipping point, namely, Bosworth, Trout Lake. The mining men claim that this will give them a shorter route with an easier grade and that the facilitate will very materially assist them. Mr. Langley visited the properties on which work is underway and it is reported that on the E. & M. a cross-cut now is more than 250 feet in, being well past the centre line of the boar's back on which the claims are situated. Less than 50 feet more is estimated as sufficient to cross-cut the nearer of the two parallel inclined veins, both of which were exposed in the 40-foot shaft which constituted the first development.

John McIntyre, of Fairview, B. C., a well-known prospector, has staked a silver claim within the limits of the municipality of the City of Nelson. This recalls to those who have reported the occurrence the early days when Nelson consisted of nothing more than a shack and two tents.

The road to the second Relief Mine is being restored. It was burned over on July 16. There are three bridges to be rebuilt.

The 6,000 foot wagon road being built from the California Mine to the Athabasca Mill by the California Mining Co., is through to the mine, although the work is not quite complete. The company propose employing motor trucks for the transport of the ore to the mill.

Trail, B. C.

Ore receipts in gross tons for the week from August 21 to 31 inclusive at the Canadian Consolidated Mining & Smelting Company's smelter, Trail, B.C., were 11,551. The largest shipment from any property, independent of those belonging to the company, came from the Mandy, of the Pas, Manitoba, with 1023 tons. There were no other large shipments from the independent operators but of the company's mines the Sullivan, Kimberley, contributed 7,467 tons and the Centre Star, of Rossland, 1,804 tons.

Ore receipts in gross tons for the week from Sept. 1st to Sept. 7th, 1919, inclusive, received for treatment at the smelter of the Canadian Consolidated Mining and Smelting Company, Trail, B. C., totalled 6,610, making the total tonnage handled to date this year 241,148. The largest independent shipper again was the Mandy, Le Pas, Manitoba, with 571 tons while the Quilp, of Washington State, was a close second with

442 tons. The Company's mines, of course, were heavy shippers. From the centre Star, Rossland, came 1687 tons and from the Sullivan, Kimberley, 2720 tons. The Sullivan Mine has passed the 100,000 mark for zinc ore shipments for the current year. During the same period the same mine has contributed a considerable tonnage of lead ore. A new shipper is the Silverite, of Alamo, recently taken over by Clarence Cunningham.

Greenwood, B. C.

The 100-Ton mill being installed at the Carmi Mine, situated 40 miles west of Greenwood, is making good progress. The foundations are being laid for a five drill steam compressor. This property has a showing five feet wide with an exposure of 1200 feet.

Vancouver, B. C.

Prizes were awarded competitors in the mineral exhibit of the Vancouver Exhibition, as follows:

Best exhibit of natural mineral salts, Basque Chemical Products.

For the best general exhibit of ores from any of the six mining districts—Gold medal to the Kootenay District, per Fred. A. Starkey; Silver medal, Portland Canal per Stewart Prospectors's Association.

For exhibit of ores from any mine or prospect from each of the six mining districts from which two or more exhibits are entered from separate properties in the competing district—Coast District, gold medal to the Drum Lummon Mines, Limited; Kamloops Districts, gold medal to Kathleen Groupe (Max Cameron).

Best exhibit of silver ore.—Dolly Vanden Mines.

Best exhibit of copper ore.—Drum Lummon Mines.

Best exhibit of gold ore.—Surf. Inlet Mines.

Best exhibit of copper-gold ore.—Drum Lummon Mines.

Best exhibit of copper-silver ore.—Bowena Copper Mines.

Best exhibit of products extracted from coal.—The Barratt Company.

Best exhibit of molybdenite.—Index Molybdenite Company.

Best exhibit of hand samples by individual prospector—1st, Gretna Group, Alberni District; 2nd, P. Gilboe, Spences Bridge; 3rd, McKinnon Group, Howe Sound.

Golden, B. C.

C. J. Lincke, superintendent of the Tarheel Copper Co., Limited, has imported a car-load of horses for use in mine work in the Golden district. The first use to which he will put them is the bringing out of a carload of ore, which is ready for shipment. It is expected to go 15 per cent copper. It is hoped to ship three carloads before the close of the season.

Winnipeg, Manitoba.

Of interest in British Columbia mining circles is the announcement that the Manitoba Government may build a 72 mile railway to furnish transportation facilities for the rich mines of the Pas, Manitoba. The Provincial Government, evidently, appreciates the necessity of such a work but thinks that it is the duty of the Dominion Government to take the initiative. The Canadian Pacific it is stated contemplates the construction of a line to the Pas and thence to the mining region but it is likely to be several years before this is done.—In the meantime the mines are operating under a heavy handicap, some shipping ore for smelter treatment to Trail, B. C., and handling it several times en route.

NORTHERN ONTARIO.

The Gold Mines.

Position of Hollinger Consolidated sufficiently good not to require exaggeration.

The "Financial Post," Toronto, in a recent issue contains information which does not find corroboration in actual facts. It says, regarding the Hollinger Consolidated: "Hollinger, it is said, will increase its dividend rate from one per cent a month to five per cent quarterly at the turn of the year. There is about \$5,000,000 in the company's cash reserve, and it is likely that a substantial part of this will be divided among shareholders in the shape of a bonus around Christmas time. The shares are selling between \$6.50 and \$7 now and there is said to be a pool working to get control of all the stock available. The ore reserves of the Hollinger property are estimated by the company's engineer at \$50,000,000, while other mining men say that \$80,000,000 would be a conservative estimate."

The actual facts are these: Hollinger surplus as of June 17th, last, was officially stated to be \$2,853,043.92. Of this \$781,756.91 was added during the first half of this year. The indications appear to be that the surplus may exceed \$3,500,000 by the end of this year. Dividends are not being disbursed at the rate of one per cent a month. A disbursement of one per cent is made every eight weeks. The ore reserves have never been officially estimated at \$50,000,000, the official estimate at the beginning of the year was a little over \$41,000,000. Further, if other mining men estimate ore at \$80,000,000 such an estimate is not to be relied upon. The estimates of the management have always been found to be exceedingly reliable.

The Hollinger Consolidated has taken its place as the leading gold mine in the Western Hemisphere, and appears about to make a strong bid for world leadership. It would seem a pity were ridiculous statements to get abroad that might confuse the actual strong physical condition of the mine and the conservative policy of the company with claims that are at once irresponsible and not true.

The Dome's Position.

The Dome Mines had close to ten million dollars in ore blocked out as of March 31st, last. The gold content of the ore is estimated to contain between \$5 and \$6 to the ton, the 1918 figures being \$5.10 to the ton. The milling equipment is adequate to treat an average of about 40,000 tons monthly, or at the rate of approximately half a million tons annually. It is therefore evident that ore already in sight is sufficient on which to operate present milling equipment at full blast for a period of four years. This estimate takes into consideration the ore blocked out above the 700-ft. level. All that zone lying below the 700 and down to a depth of close to a quarter of a mile is omitted from the estimate for the reason that although sinking has been carried down to that depth, yet sufficient lateral work does not appear to have been done to determine the volume of the ore. The Dome is the second largest gold mine in Canada, being second only to the Hollinger Consolidated. Operating at full blast it should produce at an average of not far under a quarter of a million dollars a month, or perhaps close to three million a year. The company is capitalized at 500,000 shares of the par value of \$10 each. Some 400,000 shares, or \$4,000,000, have been issued. The indicated output, therefore, is close to seventy-five per

cent of the issued capital. Allowing two-thirds to be consumed in costs, the remaining one-third would represent about twenty-five per cent net profit on the company's issued capital.

The McIntyre Report.

The recently issued annual report of McIntyre Porcupine Mines, Ltd., covering the year ending June 30, 1919, is of more than ordinary interest. Developments at the mine during the year resulted in the opening up of very large bodies of ore of good grade. There have been numerous reports and rumors concerning these developments and it was generally known that the ore deposits were proving to be better at depth than near the surface. The official statement shows that these favorable reports were well founded.

Manager Ennis presents a report that should delight the shareholders and at the same time increase the faith of the public in the mineral resources of Ontario. The development of No. 5 vein on the 1,125-ft. level of the McIntyre is an event of great importance in the history of gold mining in the Porcupine area. When Mr. Ennis made his report the vein had been opened up 900 ft. and showed an average width of 9.5 ft. and assayed \$18 per ton. If such ore extends even a short distance below the drift it will yield a very large tonnage of ore that can be mined at a profit of about \$12 per ton. If such ore continued to the 1,250-ft. level there would be in this small section of the vein 90,000 tons that would contain \$1,620,000 in gold that could be recovered at a profit of over \$1,000,000. With such possibilities ahead, and with the demonstrated facts concerning the ore above the 1,125-ft. level, the operators can well look hopefully to the future.

The ore reserves as of June 30th were estimated at 433,057 tons, containing \$4,777,324, the assay value of the ore being estimated at \$11 per ton. Assuming operating costs to be about \$5 per ton, this ore should yield a profit of roughly \$2,500,000. There is very little said in the report as to the exact location of this estimated ore, and there are no stope maps with the report. The estimate can mean little therefore, except supplies, 12 cents; power, 22 cents; timbering, 18 contained in the report. It seems probable, however, that the company's biggest asset is the ore of unknown value—the yet undeveloped ore. The really important information given in the report is Manager Ennis's statement that "the 1,125-ft. level is opening up in a very satisfactory manner, showing a more continuous length, width and average grade of ore than any previous level opened up in the property."

Operating costs at McIntyre mine.—The McIntyre produced in the year ended June 30, 1919, 179,874 tons ore of which the gross value was \$1,755,059. The operating expenses totalled \$914,779. The average value per ton was \$9.76, and the average cost \$5.09 per ton.

The cost of mining the ore was \$2.89 per ton, including 82 cents for development and 5 cents for exploration. Crushing and concentration cost 16 cents; milling, \$1.01; repairs to buildings, etc., 6 cents; heating, lighting, etc., 27 cents; head office, 22 cents; mine office, 19 cents; taxes, insurance and workmen's compensation, 22 cents; marketing bullion, 4.6 cents, and examination of prospects 1.6 cents.

Mining costs.—An analysis of the mining costs shows that the labor cost \$1.14 per ton; explosives, 38 cents; supplies, 12 cents; power, 22 cents; workshops, 1.3

cents; rock drill maintenance, 6 cents; workshops, 1.3 cents; hoisting, 35 cents; sharpening steel, 8 cents; pumping and ventilating, 9 cents; assaying and sampling, 7 cents; superintendence, 4 cents; surveying and engineering, 6 cents, and general charges 1.2 cents.

Milling costs.—An analysis of milling costs shows that labor cost 20 cents per ton; supplies, 61 cents; power, 17 cents, and workshops, 3 cents.

The cost per ton for crushing and elevating was 2.5 cents; ball mills, 19 cents; classifiers and tube mills, 19 cents; reagents, 19 cents; agitators, 5.6 cents; thickeners, 3 cents; clarification, 3 cents; precipitation, 15 cents; pumping and elevating, 3 cents; refining, 9 cents, and assaying, 1.5 cents.

The mill treated 179,874 tons ore during the year. The recovery was 95.2 per cent.

The McIntyre shaft.—Results at depth are so encouraging at the McIntyre mine that it is proposed to proceed steadily during the coming year with the sinking of the main shaft, which has now reached a depth of over 1,400 ft. Levels will be established at each 125 ft. Stations have been cut at 1,125, 1,250 and 1,375 ft. Ore and waste pockets will be cut at the 1,375 ft. level and a haulage level established to handle the ore from ore passes raised to the 1,250 and 1,125 ft. levels.

More Hollingers.—Mr. A. F. Brigham, manager of Hollinger Consolidated Mines, is optimistic as to the future of gold mining in Northern Ontario. Mr. M. O. Hammond of the Toronto "Globe" quotes him as saying: "A country covered with bush and muskeg like this, that has one Hollinger on it, has every chance of having several more Hollingers."

There is much more bush than muskeg in Ontario gold areas, but we agree with the idea conveyed in Mr. Brigham's remarks. The Hollinger out-crops are inconspicuous enough now that the forest has been cleared, but the place where the Hollinger buildings now stand was ten years ago a "dirty bit of tangled forest." Where the stamps now roar almost unceasingly there was little to attract the prospector. Fortunately, gold quartz was found and the great Hollinger mine has taken the place of an uninviting tract of the forest.

When one considers that only a very small part of rock surface is exposed, it is easy to agree with Mr. Brigham that there may be many more Hollingers yet undiscovered.

Developing gold at depth.—There is much encouragement for Ontario gold mine operators in the recently issued report of the manager of the McIntyre mine. At the lowest level, 1,125 ft., there has been developed the best and biggest stretch of ore yet opened in the mine.

This announcement is not only of interest to shareholders of the McIntyre. It is of importance to all who operate gold mines in the Pre-Cambrian areas of Ontario. There has been too much pessimism as to the downward extension of Ontario gold deposits. There is no sound reason for the frequently quoted "surface enrichment" so far as our glaciated Pre-Cambrian areas are concerned. The present surface should be taken as a fairly representative horizontal section of deposits that may continue to great depth.

Men needed at gold mines.—While good progress is being made at the big gold mines of the Porcupine

area, there is still reported to be a shortage of miners at the Hollinger and Dome mines. Several hundred additional men could be used to advantage at these properties.

Prospecting Kirkland Lake area.—Mr. Percy E. Hopkins of the Ontario Bureau of Mines, who has been until recently working in the Kirkland Lake area, states that a good deal of prospecting has been done this summer. There are more prospectors at work in the area than for several years. Mr. Hopkins and Mr. A. G. Burrows are making a detailed geological map of the area. Mr. Hopkins is now at the Shiningtree area and Mr. Burrows at Matachewan, but both will return to Kirkland Lake area soon. Mr. Burrows will first visit the Gowganda area.

THE SILVER MINES.

All Leading Mines Again Operating at Cobalt.

The Nipissing mine resumed production Sept. 24th. This makes it possible to state that the leading mines of the camp are once more fully operating. The recovery from a camp closed and partially flooded mines at the end of the first week of September, to a normal state of operation before the close of the month, is a tribute to the efficiency of the managerial staffs.

Owing to the extensive underground workings of the Nipissing having been partially flooded the general impression had been that anything like normal operations would not commence before the first week in Oct. Now, as matters stand, the entire workings will be completely dewatered by about October 5th.

The Mining Corporation has again attained full capacity. A greater number of stamps are being operated today than during the period preceding the strike. This would seem to indicate a likelihood of the company being able to make up for a large part of the time lost.

At the Beaver Consolidated, operations are proceeding at capacity and marked success is stated to be resulting from development work. It is learned that considerable high grade ore is being taken out, a fair quantity running several thousand ounces to the ton.

Work for the time being is confined to between surface and a depth of about 700 feet, the latter level being in the diabase sill. For the present, no work is being done in that zone lying below the diabase sill and at a depth of between 1,600 and 1,700 feet.

The indications appear to be that the Coniagas mine will produce about 800,000 ounces of silver during the current year. The mine resumed operations at full capacity during the opening days of the second week of September and is in a physical condition to speed up production to such an extent as to almost make up for the loss of time incurred by the recent labor strike.

Production for this year bids fair to average about 67,000 ounces monthly, worth, at the present price of silver, about \$75,000. It should, however, be kept in mind that during the first few months of the year the price of silver averaged about \$1.01 an ounce and that production evidently averaged about \$67,000 a month.

Last year the cost of producing silver averaged about 34 cents an ounce. Including all charges for marketing, etc., the total cost approximated 40 cents an ounce. Taking everything into consideration a slight increase

in the cost of production appears probable. Opinion appears to be that profits may average about 60 cents an ounce or about \$480,000 for the year.

Assays taken from the new vein recently opened up at the Adanac showed a silver content of 112 ounces to the ton, according to official information. The vein continues to appear promising.

During the week ended September 26, three Cobalt companies shipped an aggregate of sixty cars containing over half a million pounds of ore. The Buffalo was the heaviest shipper. A summary follows: Buffalo, 3 cars, 291,165 pounds; McKinley-Darragh, 2 cars, 172,125 pounds; Nipissing, 1 car, 85,873 pounds. During the corresponding period the Nipissing and the Mining Corporation made heavy shipments of bullion, the Nipissing sending out considerably over a quarter of a million dollars. In addition to this the Nipissing sent out over 200,000 ounces at the end of last week. Following is a summary of this week's shipments: Nipissing, 170 bars, 225,587 ounces; Mining Corporation, 68 bars, 68,603.99 ounces. With quotations for silver not far under 1.20 an ounce the week's silver shipments from Nipissing and Mining Corporation had a value of not far under \$350,000.

South Lorrain District.

Interviewed this week, a property owner in the South Lorrain district expressed himself as being quite optimistic over the outlook in that area. He emphasized the fact that the activity in South Lorrain occurred at a time when quotations for silver averaged between 50 and 60 cents an ounce as a consequence of which effort was directed almost entirely toward the mining of high grade ore. Now, however, conditions have changed. Ore that formerly would have barely paid for operating expenses would now constitute a big source of revenue. For illustration: Ore containing twenty ounces of silver to the ton would then have been worth only about \$10 a ton with costs amounting to the value of the silver. Now, with silver quoted at about 114 cents an ounce such ore would be worth \$22.80 a ton, about one half of which would be net profit.

The opinion was expressed that the Keeley mine even now gave evidence of probably yielding a substantial amount of low grade commercial ore, and that in due course a revival of activity appeared likely. He predicted that the next year would see added attention being directed to the area, and presented the greatly increased price of silver as his chief contention for believing that favorable results might reasonably follow.

Elk Lake News.

The Ontario government is being severely criticized for the slow progress made in building the macadam road from Elk Lake to Gowganda. Of the 28 miles, only about two miles have so far been macadamized. Prior to the past season the government has spent close to \$200,000 on this road, and, at the present rate, at least an equal amount will be required to complete it.

Activity in the Elk Lake field is increasing. Work at the Paragon-Hitchcock is being carried on at the 200-ft. level with more or less encouragement. It is reported locally that there are some prospects of the Beaver Consolidated again resuming work on the Beaver Auxilliary, where work was suspended at the outbreak of the war. The Kells claims on which considerable silver is showing on surface are the object of more or less competition among prospective buyers. In

other directions, also, there are gathering signs of renewed activity throughout the district.

According to advice coming from the Gowganda district, a promising silver find has been made on surface at the Castle property of the Tretheway Company.

An option held for some time by Col. H. McKee and J. Auger on the Silver Alliance property near Elk Lake has been turned over to T. J. Flynn, and arrangements are to be made to carry on exploration work.

Gen. Morrison, of Ottawa, is in the Elk Lake district looking over the property of the Northern Mining Company with the object in view of making arrangements to commence exploration work in the near future.

The Ontario Government will build a road from Elk Lake to Mountain Chutes on the Montreal River, according to information just received. It is learned that the work will be of the usual kind, that of clearing and grading.

The Late Charles O'Connell.

Charles O'Connell, one of the most widely known mining engineers in Northern Ontario, died at his home in Haileybury on Saturday, last. He had been seriously ill for but one week, although suffering from heart trouble for the past several years. He was interred in the Haileybury cemetery on Tuesday.

Mr. O'Connell was one of that old school of mining engineers who in all mining operations which he managed during the past fourteen years in this country commanded the deep respect of all those in his employ. It was characteristic of him to always look at the optimistic side. To him the pessimist seemed quite out of place in the North country. Due to keen human interest shown toward his wide circle of friends, Mr. O'Connell's passing leaves a vacancy in this mining district which is regretted, yet cherished by those who at one time or another were privileged to call him their chief.

In every sense of the word he was a genuine and an invaluable pioneer. The early days of Cobalt, the first actual mining operations in the Kirkland Lake camp, and the first mining development in the Boston Creek field bear ample testimony of this.

He died at the early age of 47 years, and was buried by the Masonic Order of which he was a member in the highest standing. His wife and three children survive.

That it behooves all those who wish to offer stocks or bonds for sale in Ontario to make a careful study of the Ontario Company's Act is made exceedingly clear by Attorney General I. B. Lucas. It is pointed out by Hon. Mr. Lucas that in the past there have been many legitimate offerings of stocks and bonds, but with failure to comply with the provisions of the act as to filing prospectus and giving information in all advertisements, as required by the act. It is evident, therefore, that not only the doubtful propositions will come under the scrutiny of the authorities, but all offerings will be dealt with without any evidence of partiality. The matter is one of vital interest to a veritable army of shareholders, and appears to be meeting with the genuine approval of mining men of the north in general.

Labor Situation.

The membership of the Cobalt Miners' Union is rapidly falling off, and evident signs of lack of confidence in the present executive of the union are noticeable. The resentment of the mineworkers against the strike leaders is natural, as there was

never any doubt but that the strike call was unnecessary and was bound to result calamitously.

It is reported that the Kirkland Lake strike will continue as the result of a majority of 15 votes in a poll of 125 votes. If these figures are correct, taken in conjunction with the isolated and ill-advised nature of the strike, it is only possibly to feel sorry for those "non-combatants" on whom the brunt of the suffering will fall during the coming Winter. It is already probably too late to expect a resumption of work in this camp until next Spring even were the men to decide to resume work at once.

NOTES FROM PORT ARTHUR AND LAKE NIPIGON DISTRICT.

Mr. J. C. Bateman, of the LaRose Mine, Cobalt, has been making preliminary exploration of the old Beaver Silver Mine.

A. J. Jaskson has placed six silver claims, located near Schreiber, under option to the Mining Corporation of Canada, after an inspection by their representative Mr. Hughes. The Mining Corporation are gradually extending their investigations in this district.

The Dominion Mineral Resources Co. Limited are making good progress at Silver Creek, are planning an active winter operation.

The Nicholls Chemical Co. have re-opened their mine at North Pines, and will employ over four hundred (400) men.

Preparations are also being made by the company to open up the property at Mokoman, twenty miles west of Port Arthur, which they purchased from Bruce Morrison.

The expenditure as planned, will be considerably over a million dollars, and will establish this immediate district as a strong factor in Iron Pyrite production.

Mr. Hitchcock, representative of Smith and Traverse of Sudbury, who have the contract for diamond drilling on the Peter Leitch iron claims, east of Lake Nipigon, has been spending a few days in Port Arthur, accompanied by Mr. A. K. Walsh of Detroit who holds the option on these claims.

The preliminary diamond drilling results have been satisfactory and Mr. Walsh has renewed his option, and has arranged for an extensive program of diamond drilling and exploration.

In this connection the development of the Nipigon for power purposes is important. At the present time the Hydro Electric Commission are engaged in the development of Cameron Falls on the Nipigon, at an expenditure of four million dollars. The power is to be transmitted to Port Arthur and Fort William and is thus made available for mining purposes in the district.

At Schreiber over three hundred claims have been staked in the last month as a result of a new gold and silver discoveries. A good deal of work is being done and a number of outside capitalists have visited the district, and secured options on promising properties.

SILVER MINING IN THE THUNDER BAY REGION.

The expected revival of silver mining in the Thunder Bay region is gradually becoming an accomplished fact. While the plans of the mining corporation have not been announced, its representatives are still securing options and conducting preliminary investigations.

It is believed that within the near future they will equip two or more properties and start production. The Canadian Mineral Resources Company, Limited, with headquarters in Toronto and Winnipeg, have begun work on the Silver Creek property in the Rabbit Mountain area. In the same area, a Chicago mining operator has employed a small gang for the whole summer with most encouraging results. In the west end area, approximately fifteen miles to the southwest of the Rabbit Mountain, three groups of claims will be opened up within the next fortnight.

While the reaction has been slower than had been hoped, there seems now to be no question at all that steady progress will be made.

A significant fact is that both United States and Canadian investors are competing for control of certain sections. It is quite natural that, in the circumstances, the persons interested do not wish to encourage public announcement of their activities.

THE OUTLOOK FOR COAL EXPORTS FROM THE UNITED STATES AND CANADA.

Mr. George S. Rice, Chief of the Mining Division of the U.S. Bureau of Mines, has made the following report on the prospects of coal export business from United States' ports to Europe. In this connection what is true of the United States is also true of Canadian coal districts on the Atlantic coast, and some indication of the European demand is to be seen in the recent shipments of coal from Nova Scotia for Scandinavia, Italy, France and Holland, and the prospect that further shipments will be sent to Mediterranean ports, including the Levant.

So far as the supplying of its own requirements is concerned, the problem of the United States is not one of coal production, but primarily one of transportation. The coalfields of the United States are so vast, and so accessible that they can be developed to any extent desired, provided sufficient labour can be obtained.

The existing situation strikingly corroborates the soundness of the policy of those who developed the Montreal market for Nova Scotian coal. These pioneers of Canadian coal export perceived that cheap transportation was a deciding factor in the obtaining of entrance into foreign markets, and they provided the type of vessel most suited to large scale coal transportation. Unfortunately, the demands made on British shipping by the war nullified the endeavours of these far-seeing men, and prevented advantage being taken of the present European situation to the extent that would have been possible had shipping been earlier released from requisition.

The stronger position now occupied by the mercantile marine of the United States is a factor just as important at the present juncture as that country's ability to furnish the coal at the shipping port.

Mr. Rice's Report.

The coal situation in Europe was brought prominently before the public by a meeting of the Supreme Economic Council in London, at which a warning was given by Mr. Hoover, that Europe's coal production was 35 per cent below normal, and according to the press dispatch, Mr. Hoover stated, "That England's annual coal production has fallen from 292,000,000 tons in 1913, to 183,000,000 tons and Germany's decline is slightly greater." "Europe," he added, "at the present rate will produce 443,000,000 tons next year, while the amount needed is estimated at 614,369,000 tons." Following this meeting, shipping and fuel representa-

tives of France, Belgium and Italy conferred with Mr. Hoover in Paris, and decided to urge the Supreme Economic Council to appoint a European Coal Commission to co-ordinate the distribution of European coal, in order to avoid what threatens to be a disaster. Mr. Hoover declined to accept the permanent directorship of the Commission, stating that "he believed the problem to be strictly European, and that the situation cannot be relieved materially by the slight help which the United States can give." It is thought that Mr. Hoover wished to spur the Europeans to put forth their utmost endeavors to meet the dangerous situation.

Without fuel, the railroads cannot transport food and produce; factories are closed both because of inability to get fuel and inability to ship their product. The United States is vitally concerned in helping its principal allies, both from an economic and humanitarian standpoint, and whatever coal as can be sent, will be of the greatest benefit, and perhaps ward off disastrous conditions. Many persons of the United States, on account of the impending shortage of fuel next winter, feel it is unwise to encourage export business, but winter shortage in the United States usually is very temporary in times of peace, and except from November to February, there is ordinarily no difficulty in supplying home needs. From March to September, the bituminous mines usually work only part time. If during the slackest periods in the Appalachian fields, coal could be loaded for shipment abroad, it would both improve the financial status of these mines, and also help in the shortage abroad, which is going to continue for a long time.

The principal causes for this shortage abroad are:

- (1) Strikes to improve conditions;
- (2) Individual absenteeism from the mines;
- (3) Shortening the hours of labor;
- (4) Lowered individual effort;
- (5) Shortage of mine supplies on the continent;
- (6) Insufficient railroad trucks and poor train service on the continent.

The first four of these causes are due to the worldwide labor unrest which affects even the native labor in South Africa, according to a recent address of the retiring president of the South African Institution of Engineers, in which he states that in his group of mines the output per native has fallen 30 per cent since 1914. In Europe, the writer observed during his recent visit, that there is a very general feeling among the miners that they are not willing to go back to the old order of things in the matter of low salaries, housing and other conditions, this feeling is particularly acute in Great Britain.

In Great Britain, on July 16th, 1919, there went into effect the so-called Sankey award, which shortened the hours of labor from 8 to 7, not including the average time of lowering and raising the workmen, but including the time he takes in travelling to and from the working place, the mine owners contending that with the 7 hour work day, there was less than 6 hours effective work performed. While to some extent, this might be taken care of in the future, by increasing the number of employees, there are no unemployed miners at the present time, and moreover the workings which are laid out for the longwall system, would not provide places at the working faces. This with the other causes has lead to a tremendous slump in the production in Great Britain, and it is now a question of how long England will be able to supply its former export trade markets. In 1913, the exports were 77,000,000 tons (2240 lbs.).

Unless there is serious restriction of home industries and consumption of coal, there will be little or no coal available for export.

In France, the fuel conditions continue serious. There is a loss of 20,000,000 tons output of the mines wrecked by the Germans, which has not been made up by imports from Germany or the Saar fields where the normal output of 17,000,000 tons per annum has been reduced to about 35 per cent by reason of less efficiency of the miners, claimed in part due to poor feeding.

It was expected that Westphalia, when peace had been made, would at once respond, and resume its former large production, but strikes and labor troubles have continued, and there is a most serious shortage of coal so that the remarkable situation is found of coal being imported from the United States to Switzerland and now going up the Rhine on barges through the great Westphalian fields. Sweden, Denmark, and The Netherlands continue to receive coal from the United States, though normally, all the Baltic ports should be supplied by English coal. France and Italy are also importing from the United States.

Great interest is now manifested in the various trade journals of the United States in the export business. The large exporting companies have their own facilities for handling the business, but many of the smaller operators are desirous of getting into this lucrative business, but the greatest difficulty arises first, in getting the allocation of ships, second, in arranging the matter of payment by the foreign consignees, and third, in agreement as to grade and quality of coal.

It would appear that one very important thing must be done,—the establishing of standardized methods of taking samples and making analyses. At the present time, the U.S. Bureau of Mines is sampling and analyzing American coal purchased by the Swiss and Holland governments. It would seem desirable that similar standardized methods should be followed in shipments to commercial foreign buyers to guarantee the quality of what they receive, owing to the very great differences in the kinds and quality of coals heretofore used abroad, as compared with those obtained from this country, and also because of the varying methods of sampling, analyzing, and the interpretation of results.

PROF. STANLEY GRAHAM GOES TO N. S. TECHNICAL COLLEGE.

Prof. Stanley Graham, graduate of the faculty of applied science, at Queen's University, who has been acting as professor of mining at Queen's during the absence of Prof. J. C. Gwillim, at the coast, for the benefit of his health, is leaving for Halifax, where he has been appointed to the department of mining, at Nova Scotia Technical School.

MINING EXPOSITION PROGRESSING IN NEW YORK.

From present indications, the International Exposition of Mining Industries will open in Grand Central Palace, New York City, on October 15. Originally, it was planned to have the opening of this permanent exchange on November 1st, but the interest manifested in it by the mining industry was so gratifying and the list of prospective exhibitors so large that the date was set for two weeks earlier, at which time most of the other permanent industrial expositions in the Palace will be inaugurated.

All of these are being staged by the Merchants' & Manufacturers' Exchange of New York, which will

operate eight large expositions on the eight upper floors of the huge structure—the largest exposition building in the world. The four lower floors will be used for short term shows of various sorts, such as the annual automobile shows, flower shows, motor boat expositions, chemical expositions, etc.

This Mining Exposition is to be one of the most advanced steps made in the industry since the war ended. It is expected that by the opening date many machines will be shown in actual operation on the floor. The exposition will occupy 50,000 square feet of space and will include a most comprehensive display of modern machinery used in the development and exploitation of metal mines, non-metal mines, and oil wells, also machinery used in the subsequent extraction, reduction or refining of the raw products by concentration, leaching, cyanidation, flotation, smelting, distillation, coking, etc.

Howard R. Ward, manager of the International Exposition of Mining Industries, has been making an extended tour through the mining centers, including all of the Colorado territory, has returned to New York City to prepare for the opening. He is being assisted by an able staff.

The Nemours Trading Corporation, of which Alfred I. du Pont is president, owns and controls the Merchants & Manufacturers Exchange of New York. It has branches in all of the leading cities of the world, consisting of 19 branch offices and 3,000 foreign selling agencies.

Visitors at the Mining Machinery Exposition will also find the other expositions in this building of considerable interest. Included among them are the International Factory Appliance Exposition, International Farm Tractor and Implement Exchange, International Machinery Exposition, International Hardware Exchange, International Exposition of Municipal Equipment, etc. The advantages of this great world trade clearing house are obvious. Manufacturers will have their exhibits side by side affording easy comparison. Interchange of ideas and the opportunity to observe what is new and improved in machinery, will be of decided benefit to all who are connected with the industry. Then too, familiarity with the implements and machinery of one industry so often leads to appreciation of their applicability to another.

The offices of the International Mining Machinery Exposition are now installed in Grand Central Palace, and all communication should be addressed there.

BRITISH IRON & STEEL INSTITUTE CONSIDERS FUEL ECONOMY.

The Iron & Steel Institute at its Autumn meeting in London on the 18th and 19th September will consider the question of fuel economy, at which the report of the Committee on Fuel and Ores will be discussed. A joint report on "Fuel Economy in Steel Works" will be presented by Dr. W. A. Bone, Sir Robert Hadfield and Mr. A. Hutchinson (representing the Fuel Economy Committee of the British Association). A report will be read from Mr. H. J. Yates on "Fuel Economy in Foundry Practice." Messrs. Cosmo Johns and L. Ennis will read a paper on "Fuel Economy in German Iron and Steel Works."

This selection of subjects is significant of the chief problem that is today before the steel industry, namely the lessening of fuel costs.

TALC AND SOAPSTONE INDUSTRY IN THE UNITED STATES.

A meeting of the talc and soapstone producers, held in New York, August 12, 1919, it was voted to form an association to be known as the Talc and Soapstone Producers Association. About 90 per cent of the producing capacity was represented at this meeting either in person or by proxy. The purposes of the association, broadly speaking, are the betterment of the industry, both technically and in a business way, and the promotion of a spirit of mutual cooperation and solidarity. An important phase of the meeting was the discussion of the need of a revision of the tariff on talc. A committee was formed to investigate the matter and take whatever action necessary. After some discussion of the objects of the association, organization, problems for investigation and similar matters, a committee on permanent organization was appointed for the purpose of drawing up a constitution and presenting plans for the future work and conduct of the association.

The production of talc in the United States has increased about 90 per cent in the last ten years. During this period the production of ground talc has increased about 115 per cent. This indicates a great expansion in the use of this grade of material, and suggests the possibilities of even greater expansion under favorable conditions. These conditions can be brought about through technical research and publicity. Over forty uses for talc are now known, of which only a few have been exploited at all extensively. The principal uses of ground talc at present are in the paper plant, rubber, roofing, and toilet powder industries.

Technical research in the production and utilization of talc should include both field and office studies. Some of the definite problems which are worthy of investigation are suggested below:

I. Field Problems:

Study of methods of mining to produce most efficiently a clean, dry product.

Study of most efficient methods of crushing and grinding, grading and sizing to produce a pure, clean, uniform product free from grit, and of good color.

Solution of detail problems of milling, such as the economy of dryers, the use of bagging or packing machines, etc.

Study of methods of utilization of talc in consuming industries in order to determine more accurately the most suitable grades and sizes for each use.

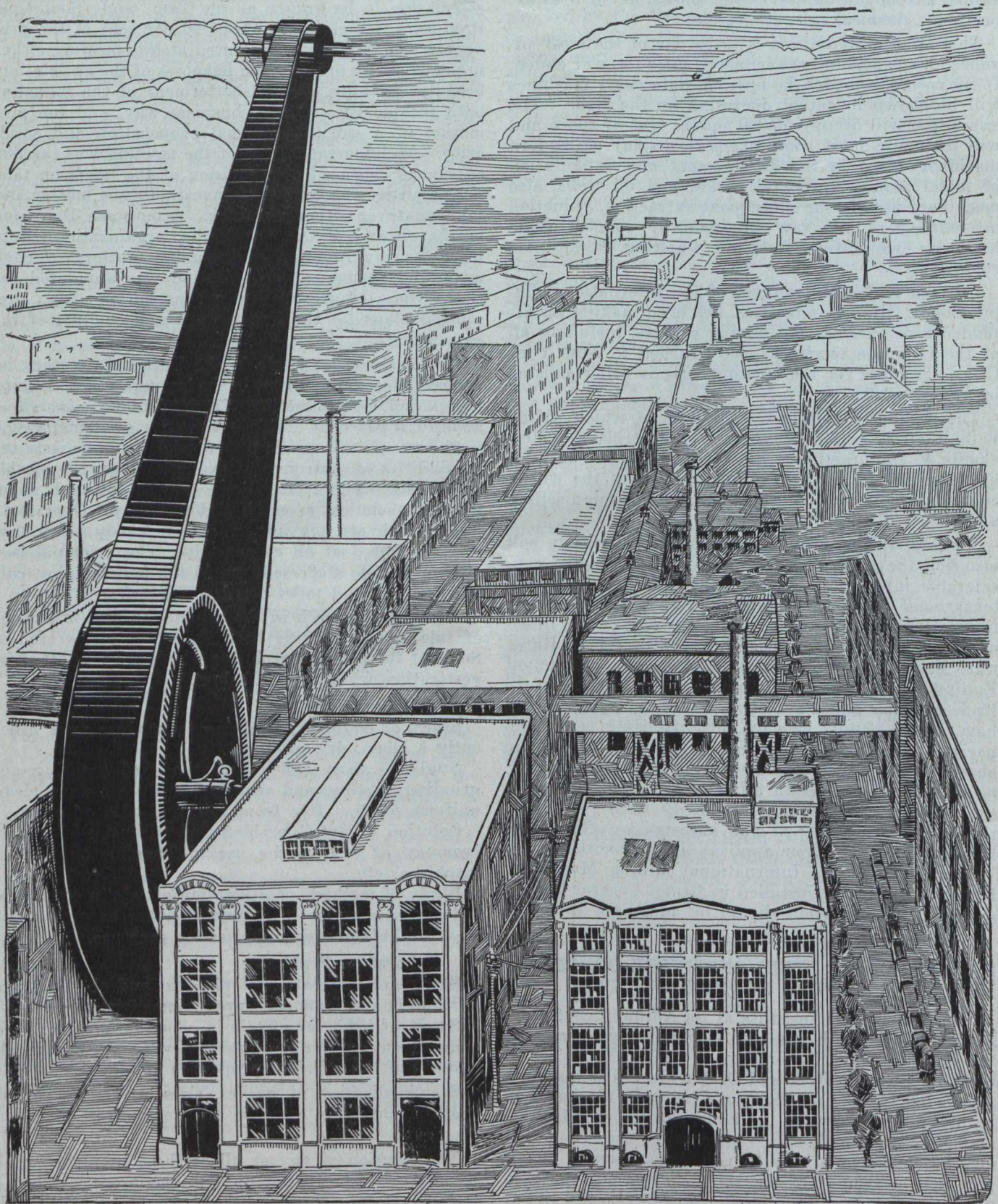
II. Laboratory Problems:

Study and tabulation of physical and chemical properties of tales from each producing district.

Study of behavior of talc in combination with other compounds in order to discover new uses: for example, a study of the colloidal properties of talc.

Standardization of grades, sizes, and tests so that uniform products may be marketed from different districts.

The solution of any or all of these problems would be of great benefit not only to the producers but to the consumers. The producers would benefit by the reduction of waste, increase of safety and efficiency, lower costs and wider markets, while the consumers would benefit by uniformity in grades and sizes and accurate knowledge upon which to base specifications and choice of the most suitable grade for each use.



OVER 1000 INDUSTRIALS USE

GOODYEAR  **YEAR**
MADE IN CANADA

EXTRA POWER BELTING

ON RECORD in our offices alone are the names of over 1000 Canadian industrials who are satisfied users of Goodyear Extra Power Belting.

A vast hive of industry, giving employment to thousands upon thousands of men. Engaged in every form of industrial activity known in the Dominion. Turning out millions of dollars worth of Canadian products every year.

What an overwhelming endorsement of Goodyear Extra Power Belting this is. Belts bought to fill every transmission requirement. Working under varied conditions. All required to deliver satisfaction.

Think of the great power-saving because Extra Power Belting is flexible. It grips the pulleys and combats slipping. Greater production has almost invariably followed the use of Goodyear Extra Power.

Over a thousand trained engineers and superintendents cannot be misled. You cannot blind over a thousand purchasing agents. There must be—there is—something vital in the Goodyear Extra Power Belting story. Let us send a man trained by Goodyear in belting problems to talk it over with you. He will tell you about Extra Power as it applies to your plant. Should Extra Power not be suited to your needs, we would rather have your friendship than your order. Phone or write the nearest branch.

The Goodyear Tire & Rubber Co. of Canada, Limited

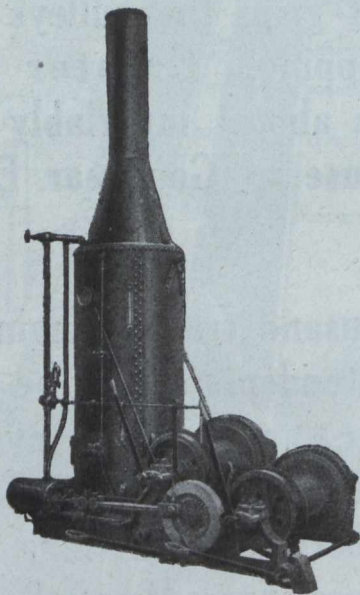
Halifax, St. John, Quebec, Montreal, Ottawa, Toronto, Hamilton, London, Winnipeg,
Regina, Calgary, Edmonton, Vancouver.

Labor is Costly

Yes—More Costly than Machinery

Labor costs are entirely too high now to warrant you in using hand power in any place whatever where steam, or electric or gasoline power can be made use of

Why not reduce as much as possible the drudgery of mining by making use of the machinery which experts have devised for the purpose. Not only will your work be done much more easily and quickly, but you will find a great saving effected in your operating costs.

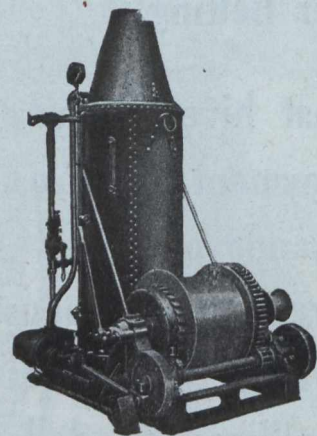


**THE STANDARD DERRICK
HOIST**

Made with either one Drum, or two Drums, as shown, and in seven sizes, from the little 10 horse power machine to the massive 50 horse power size.

No matter how small your mine or prospect, if you are trying to develop it, you will find plenty of use for a Hoist to lift and move your heavy loads.

We make many types and sizes of Mine Hoists, and among them is the right kind and size for your work.



**MINE HOIST, WITH
BOILER**

A complete power equipment. Light, compact and strong. Choice of seven sizes, from 10 horse power up, to suit your needs.

Let us send you a copy of our New Mining Catalogue showing the Hoists, Buckets, Cars, Skips, Cages, etc., we offer Miners.

MARSH ENGINEERING WORKS, Limited

ESTABLISHED 1846

BELLEVILLE, ONTARIO, CANADA

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

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.

Alternators:

MacGovern & Co.

Amalgamators:

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

Antimony:

Canada Metal Co.

Antimonial Lead:

Pennsylvania Smelting Co.

Arrester, Locomotive Spark:

Hendrick Manufacturing Co.

Arsenic White Lead:

Coniagas Reduction Co.

Assayers' and Chemists' Supplies:

Dominion Engineering & 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.
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.

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

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 Cam-sell 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 Highwood 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.

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.
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
Marsh Engineering Works, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works

Carriers (Gravity):

Jones & Glassco

Castings (Iron and Steel)

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

Cement Machinery:

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

Chains:

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

Chain Drives:

Jones & Glassco

Chemical Apparatus:

Mine and Smelter Supply Co.

Chemists:

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

Chrome Ore:

The Electric Steel & Metals Co.
Everett & Co.

Classifiers:

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

Coal:

Dominoion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutters:

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

Coal Mining Explosives:

Canadian Explosives, Ltd.

Coal Mining Machinery:

Canadian Ingersoll-Rand Co., Ltd.
Sullivan Machinery Co.
March Engineering Works
Hadfields, Ltd.

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

Coal and Coke Handling Machinery

Link-Belt Co.

Coal Pick Machines:

Sullivan Machinery Co.

Cobalt Oxide:

Coniagas Reduction Co.
Everitt & Co.

Compressors—Air:

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

Concrete Mixers:

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

Condensers:

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

Concentrating Tables:

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

Converters:

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

Contractors' Supplies:

Canadian Fairbanks-Morse Co., Ltd.

Consulters and Engineers:

Hersey Milton Co., Ltd.

Conveyor Flights:

Hendrick Mfg. Co., Ltd.

Conveyor—Trough—Belt:

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

Conical Mills:

Hardinge Conical Mill Co.

Copper:

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:

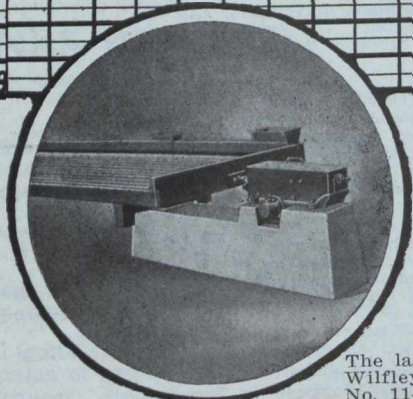
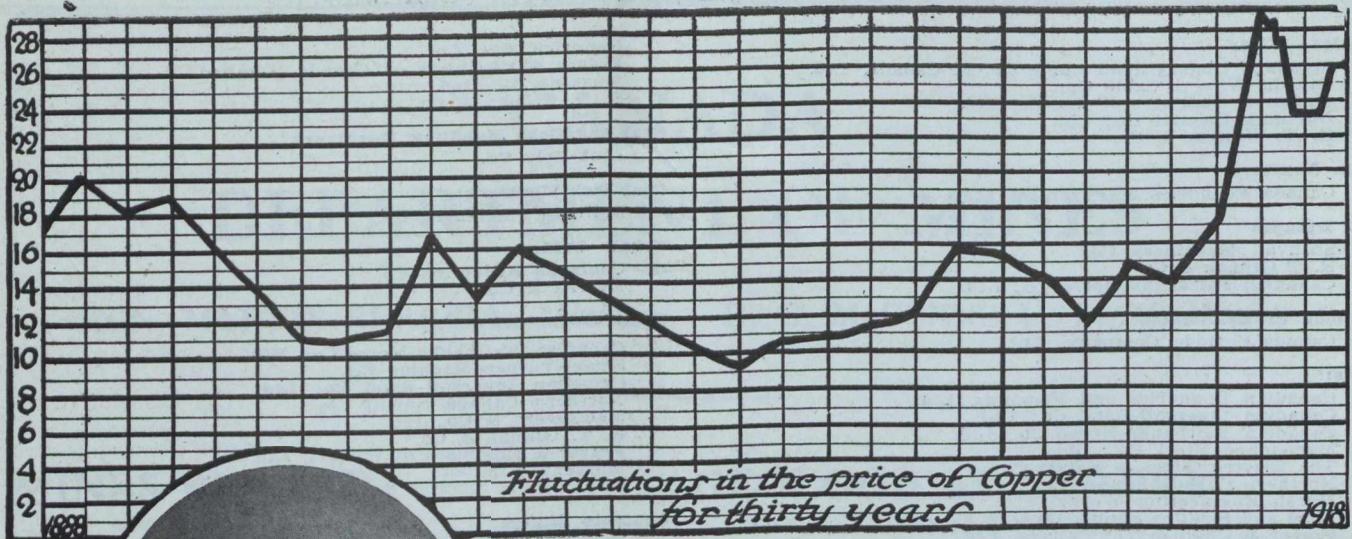
Canadian Fairbanks-Morse Co., Ltd.
Mine and Smelter Supply Co.

Crusher Balls:

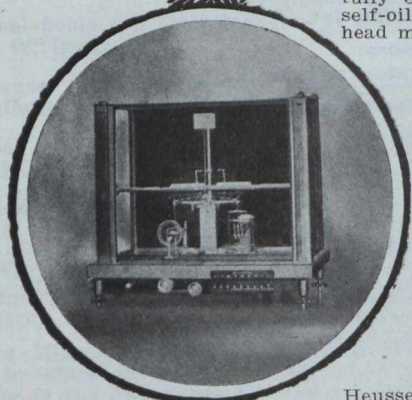
Canada Foundries & Forgings, Ltd.

Crushers:

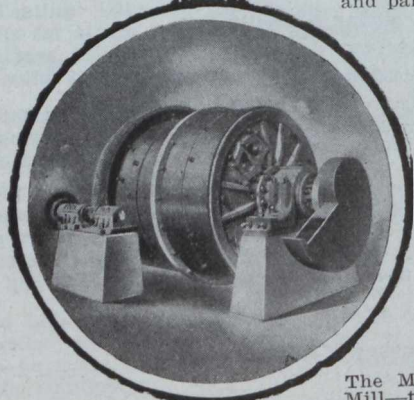
Canadian Fairbanks-Morse Co., Ltd.
Canadian Steel Foundries, Ltd.
Hardinge Conical Mill Co.
The Electric Steel & Metals Co., Ltd.
R. T. Gilman & Co.
Lymans, Ltd.
Mussens, Limited
Mine and Smelter Supply Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works



The latest
Wilfley Table
No. 11-D.
Concrete
foundations and
fully enclosed
self-oiling
head motion.



Heusser Balance
showing multiple
weight attachment
and pan extractor



The Marcy Ball
Mill—the giant
of all grinding
equipment.
Capacities of
single Marcy
Mills have ex-
ceeded 800 tons
per day—with
low cost.

Production and Profit at any of these prices

The fluctuations in the prices of copper are typical of the fluctuations in the prices of other metals—typical of the conditions which Mascco products have met successfully for a long period of years.

MASSCO PRODUCTS

Count on Mascco products—whether for record production at high metal prices or for good profits on the narrow working margins of low price.

The long experience of Mascco engineers in solving the problems of the past certainly fit them to be of real help in the future—look to Mascco products for profitable production and to Mascco service for satisfaction.

These are a few of the Mascco Specialties:

- Wilfley Concentrating Tables—single and double deck
- Marcy Ball Mills
- Assay and Laboratory Equipment.
- Massco Furnaces and Oil Burners
- Holman Stretcher Bar Hoist
- Electrical Equipment
- Pierce Amalgamators
- Perfection Oil and Acid Feeder

The Mine & Smelter Supply Co.

The Geo. Taylor Hardware Co. of New Liskeard, Cobalt and Cochrane handle Mascco Assay and Laboratory Equipment; The Wabi Iron Works, New Liskeard, Ont., manufacture Wilfley Tables.

A SERVICE STATION WITHIN REACH OF YOU

DENVER

SALT LAKE CITY

EL PASO

New York Office: 42 Broadway

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.

Dredger Pins:Canadian Steel Foundries, Ltd.
The Electric Steel & Metals Co.
Hadfields, Limited**Dredging Machinery:**Canadian Steel Foundries, Ltd.
M. Beatty & Sons
Hadfields, Limited
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
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.

Flood Lamps:

Northern Electric Co., Ltd.

Flourspar:The Consolidated Mining & Smelting Co.
Everitt & Co.**Forges:**Canadian Fairbanks-Morse Co., Ltd.
Northern Canada Supply Co.**Forging:**M. Beatty & Sons
Canadian Foundries and Forgings, Ltd.
Smart-Turner Machine Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.**Frogs:**

Canadian Steel Foundries, Ltd.

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):**

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.

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.

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
- 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 (Pig):**
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.
- Manganese Steel:**
Canadian Steel Foundries, Ltd.
The Electric Steel & Metals Co.
Hadfields, Limited
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 Requisites:**
Canadian Steel Foundries, Ltd.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works
- 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

THE CANADIAN
Crocker-Wheeler Company
LIMITED

Service Transformers and Induction Motors

can be had at any of our Branch Houses. Northern Electric service and Canadian Crocker-Wheeler Company apparatus are going hand in hand. Our aim is to give the best possible service with the highest grade apparatus.

These induction motors and transformers excel in modern design and sturdiness of construction. Use motors having **open slot stator construction with form wound coils** and **cast aluminum bars and rings in small sizes**, or **cast welded end rings in larger sizes**.

Northern Electric Company
LIMITED

MONTREAL
HALIFAX
OTTAWA

TORONTO
LONDON
WINNIPEG
VANCOUVER

REGINA
CALGARY
EDMONTON

Canadian Miners' Buying Directory.—(Continued)

Motor Generator Sets—A.C. and D.C.

MacGovern & Co.

Nails:

Canada Metal Co.

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

The Mond Nickel Co., Ltd.

Nickel Salts:

The Mond Nickel Co., Ltd.

Nickel Sheets:

The Mond Nickel Co., Ltd.

Nickel Wire:

The Mond Nickel Co., Ltd.

Oil Analysts:

Constant, C. L. Co.

Ore Sacks:

Northern Canada Supply Co.

Ore Testing Works:Ledoux & Co.
Can. Laboratories
Milton Hersey Co.
Campbell & Deyell
Hoyt Metal Co.**Ores and Metals—Buyers and Sellers of:**C. L. Constant Co.
Geo. G. Blackwell
Consolidated Mining and Smelting Co. of Canada
Oxford Copper Co.
Canada Metal Co.
Hoyt Metal Co.
Everitt & Co.
Pennsylvania Smelting Co.**Packing:**

Canadian Fairbanks-Morse Co., Ltd.

Perforated Metals:Northern Canada Supply Co.
Hendrick Mfg. Co.
Greening, B., Wire Co.**Pig Tin:**Canada Metal Co., Ltd.
Hoyt Metal Co.**Pig Lead:**Canada Metal Co., Ltd.
Hoyt Metal Co.
Pennsylvania Manufacturing Co.**Pipes:**Canadian Fairbanks-Morse Co., Ltd.
Canada Metal Co., Ltd.
Consolidated M. & S. Co.
Northern Canada Supply Co.
R. T. Gilman & Co.**Pipe Fittings:**

Canadian Fairbanks-Morse Co., Ltd.

Pipe—Wood Stave:Pacific Coast Pipe Co.
Mine & Smelter Supply Co.**Piston Rock Drills:**Mussens, Limited
Mine & Smelter Supply Co.**Plate Works:**John Inglis Co., Ltd.
Hendrick Mfg. Co.
The Wabi Iron Works
MacKinnon Steel Co., Ltd.**Platinum Refiners:**

Goldsmith Bros.

Pneumatic Tools:Canadian Ingersoll-Rand Co., Ltd.
Jones & Glassco
R. T. Gilman & Co.**Prospecting Mills and Machinery:**The Electric Steel & Metals Co.
El. 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—ElectricCanadian 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
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.

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

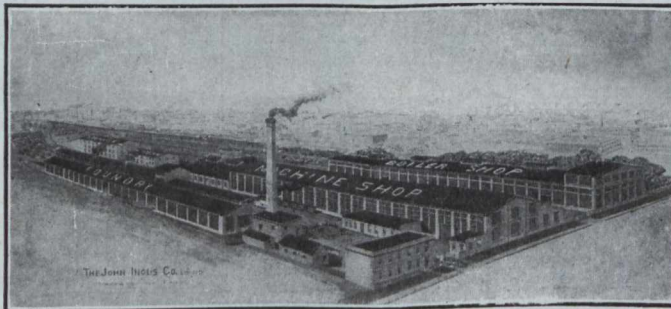
Telegraphic Address:
"Coniagas."

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

Canadian Miners' Buying Directory.—(Continued)

Rope—Wire:

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

Rolls—Crushing

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

Samplers:

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

Scales—(all kinds):

Canadian Fairbanks-Morse Co., Ltd.

Screens:

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

Screens—Cross Patent Flanged Lip:

Hendrick Mfg. Co.

Screens—Perforated Metal:

Hendrick Mfg. Co.

Screens—Shaking:

Hendrick Mfg. Co.

Screens—Revolving:

Hendrick Mfg. Co.

Scheelite:

Everitt & Co.

Separators:

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

Shaft Contractors:

Hendrick Mfg. Co.

Sheet Metal Work:

Hendrick Mfg. Co.

Sheets—Genuine Manganese Bronze:

Hendrick Mfg. Co.

Shoes and Dies:

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

Shovels—Steam:

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

Silice:

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:

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.

Steel Castings:

Canadian Brakeshoe Co., Ltd.
Canadian Steel Foundries, Ltd.
Fraser & Chalmers of Canada, 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.

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

CXL EXPLOSIVES

Forcite fumes minimum, force maximum.

Orders solicited and cared for.

Results assured.

Can be used in wet or dry work.

Insist on Forcite for hard rock work.

Tamping bags facilitate tamping, use CXL. bags.

Efficiency and "Forcite" go together.

Canadian Explosives, Limited

Head Office - - - MONTREAL, P.Q.
Main Western Office - VICTORIA, 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.

Canadian Miners' Buying Directory.—(Continued)

Tramway Points and Crossings:

Canadian Steel Foundries, Ltd.
Hadfields, Limited

Transits:

C. L. Berger & Sons

Transformers:

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

Transmission Apparatus:

Jones & Glassco

Troughs (Conveyor):

Hendrick Manufacturing Co.

Trucks—Electric:

Canadian Fairbanks-Morse Co., Ltd.

Trucks—Hand:

Canadian Fairbanks-Morse Co., Ltd.

TTrucks:

Canadian Fairbanks-Morse Co., Ltd.

Tubs:

Hadfields, Limited

Tube Mills:

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

Tube Mill Balls:

Canada Foundries & Forgings, Ltd.
Fraser & Chalmers of Canada, Ltd.

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.
Mussens, Limited
R. T. Gilman & Co.
The Wabi Iron Works

Wire:

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

Wire Rope:

R. T. Gilman & Co.

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:

Consolidated Mining & Smelting Co.

Zinc Spelter:

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

GRAPHITE MINING LAND AND PLANT

About 400 acres in St. Rémi d'Amherst, Co. Labelle, Province of Quebec, Canada, with complete Plant of 17 Buildings, machinery and Mining Camp Accessories.

For further information, please apply to:

VINET & DUFRESNE,
99 St. James St., MONTREAL,
Canada

WANTED

ENGINEER to design mining machinery, including electric hoists, for large Canadian manufacturer.

State education, experience, and salary expected.

Reply Box 2,

Canadian Mining Journal
Ste. Anne de Bellevue, P.Q.

EQUIPMENT COMPANY LIMITED

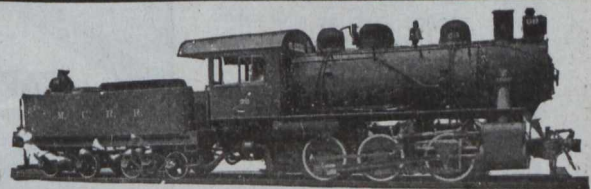
General Machinery Dealers

New and Secondhand Machinery
Stocked in Vancouver

GENERAL OFFICES: 609 Bank of Ottawa Building
VANCOUVER

Warehouse and Factory: Granville Island

PORTER LOCOMOTIVES



LIGHT AND HEAVY
STEAM AND COMPRESSED AIR LOCOMOTIVES
CONTRACTORS' DINKEYS

PREMIER HAULERS FOR FIFTY YEARS

Literature on request

H.K. PORTER CO., PITTSBURGH, PA.

ALPHABETICAL INDEX TO ADVERTISERS

A		E		M	
Allen Whyte & Co.		Electric Steel & Metals Co.		McDonald, M. P.	11
American Zinc Lead & Smelting Co.		Engineering & Machine Works of Canada	7	MacGovern, & Co., Inc.	
B		Everitt & Co.		MacKinnon Steel Co., Ltd.	
Balbach Smelting & Refining Co. 10		F		Marsh Engineering Works	24
Blackwell, G. C., Sons & Company 12		Fleck, Alex.		McEvoy, Jas.	11
Beatty, M. & Sons		Ferrier, W. F.	11	Mine & Smelter Supply Co.	28
Berger C. L. & Sons	12	Fasken, Robertson, Chadwick & Sedgewick	10	Mond Nickel Co.	
Brigstocke, R. W.	11	Fraser & Chalmers of Canada, Ltd.		Mussens, Ltd.	
British Columbia, Province of	8	G		N	
Burns, L. P., Ltd.	12	Gartshore, John J.	12	Northern Canada Supply Co.	
Burnett & Crampton		General Engineering Co.	12	Northern Electric Co., Ltd.	32
C		Gilman, R. T.	8	Nova Scotia Steel & Coal Co.	6
Canadian Allis-Chalmers, Ltd.	6	Goldie & McCullough		Nova Scotia Government.	30
Can. Chicago Bridge & Iron Works	8	Goldsmith Bros., Smelting & Refin- ing Co., Ltd.	10	O	
Canadian Explosives, Ltd.	36	Greening, B. Wire Co.	1	Ontario, Province of	13
Canadian Fairbanks-Morse Co., Ltd.		Goodyear Tire & Rubber Co. of Can- ada, Ltd.	22-23	P	
Canadian H. K. Porter	37	H		Pacific Coast Pipe Co., Ltd.	
Canadian Milk Products.		Hadfields, Ltd.	40	Peacock Bros., Ltd.	40
Canadian National Railways	8	Hall, G. C. & Co.		Pennsylvania Smelting Co.	10
Canadian Laboratories, Ltd.	12	Hamilton Gear & Machine Co.	10	Powley & Townsley	7
Canadian Link-Belt Co.		Hardinge Conical Mill	16	Prest-O-Lite Co. of Canada, Ltd.	
Canadian Ingersoll-Rand Co., Ltd.	3	Hassan A. A.	11	Q	
Canada Foundries & Forgings, Ltd.	10	Hendrick Mfg. Co.	12	Quebec, Province of	30
Canada Wire & Cable Co.		Hersey, Milton Co., Ltd.	11	R	
Canadian Rock Drill Co.	39	Heys Thomas & Son	11	Ridout & Maybee	12
Canadian Steel Foundries		Hull Iron & Steel Foundries, Ltd.	14	Rogers John C.	11
Canada Carbide Company.		Hore, Reginald E.	11	Rogers, Geo. R.	11
Canada Metal Co.		Hoyt Metal Co.	40	Reddaway, F. & Co.	
Canadian Brakeshoe Co	7	I		S	
Canadian Sirocco Co.		Imperial Bank of Canada	8	Smart-Turner Machine Co.	
Capper Pass & Son, Ltd.	12	Imperial Oil Co.		Smith & Travers Company	10
Consolidated Mining & Smelting Co.		International Business Machines		Standard Underground Cable Co. of Canada, Ltd.	
Coniagas Reduction Co.	34	International High Speed Steel Co.		Stewart, Robert H.	11
Constant, C. L. & Co.	7	International Nickel Co. of Canada, Limited	5	Sudbury Diamond Drilling Co., Ltd.	10
D		International Nickel Co.		Sullivan Machinery Co.	2
Deister Concentrator Co.	4	Inglis, J. & Co.	34	Swedish Steel & Importing Co.	
Denver Rock Drill Mfg. Co.	39	J		T	
Deloro Smelting & Refining Co.	4	Johnston, Matthey & Co.	10	Toronto Iron Works	
Department of Mines, Canada	26	Jones & Glassco		Tyrrell, J. B.	11
Dewar Mfg. Co.	8	L		U	
Diamond Drill Carbon Co.	38	Laurie & Lamb		University of Toronto	7
Diamond Drill Contracting Co.	12	Ledoux & Co.	10	W	
Dominion Coal Co., Ltd		Lindsey, G. C. S.	11	Wabi Iron Works	
Dorr Co.	11	Longyear, E. J. Company.	6	Whitman, Alfred R.	11
Dresser, Jno. A.	11	Lymans, Ltd.	8		
Dunlop Tire & Rubber Co., Ltd.					
Dwight & Lloyd Sintering Co. Inc.	12				
Dominion Engineering & Inspection Co.	10				

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
GARBONS & BORTZ
BALLAS

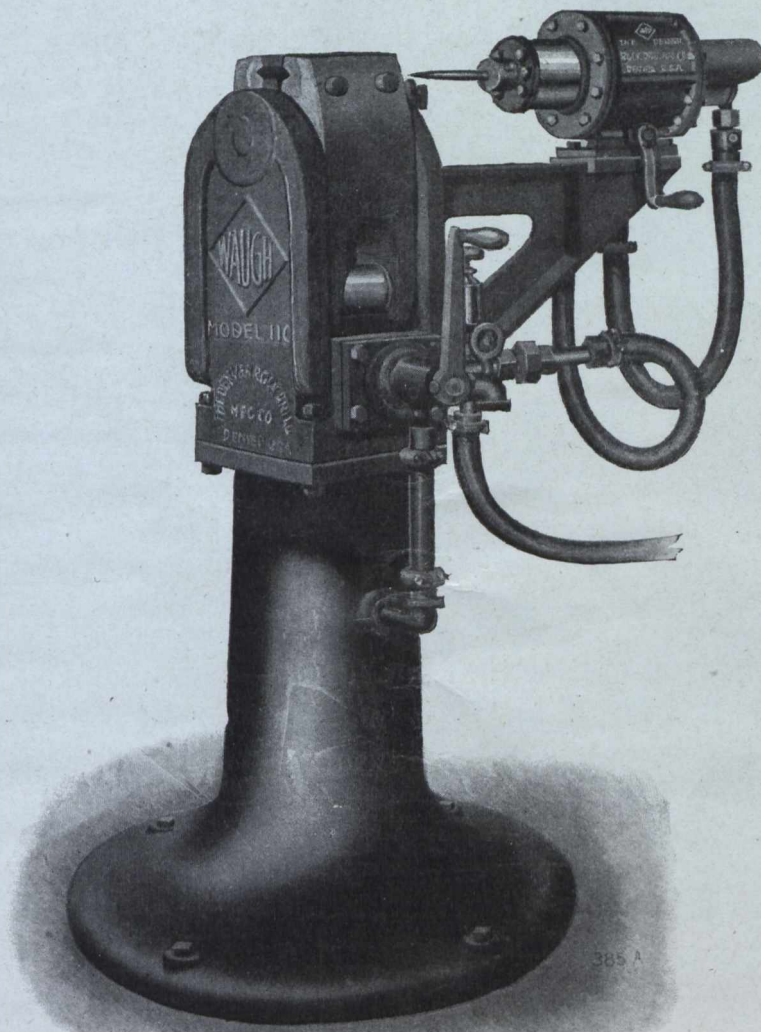
**61 PARK ROW
New York - N.Y.**



Saving 57 Seconds Every Minute

That's what this model 110 Waugh Drill Steel Punching Machine does, punching holes in hollow steel, when it is substituted for hand work.

It means more time for the blacksmith, more steel for the mine, less trouble, less expense, and better, straighter holes—always.



Bigger mines, demanding better blacksmithing, equip their shops with this machine.

Eventually you will equip yours with it.

Write for our bulletin, No. 10-V-H. It will interest you.

Canadian Rock Drill Company, Limited

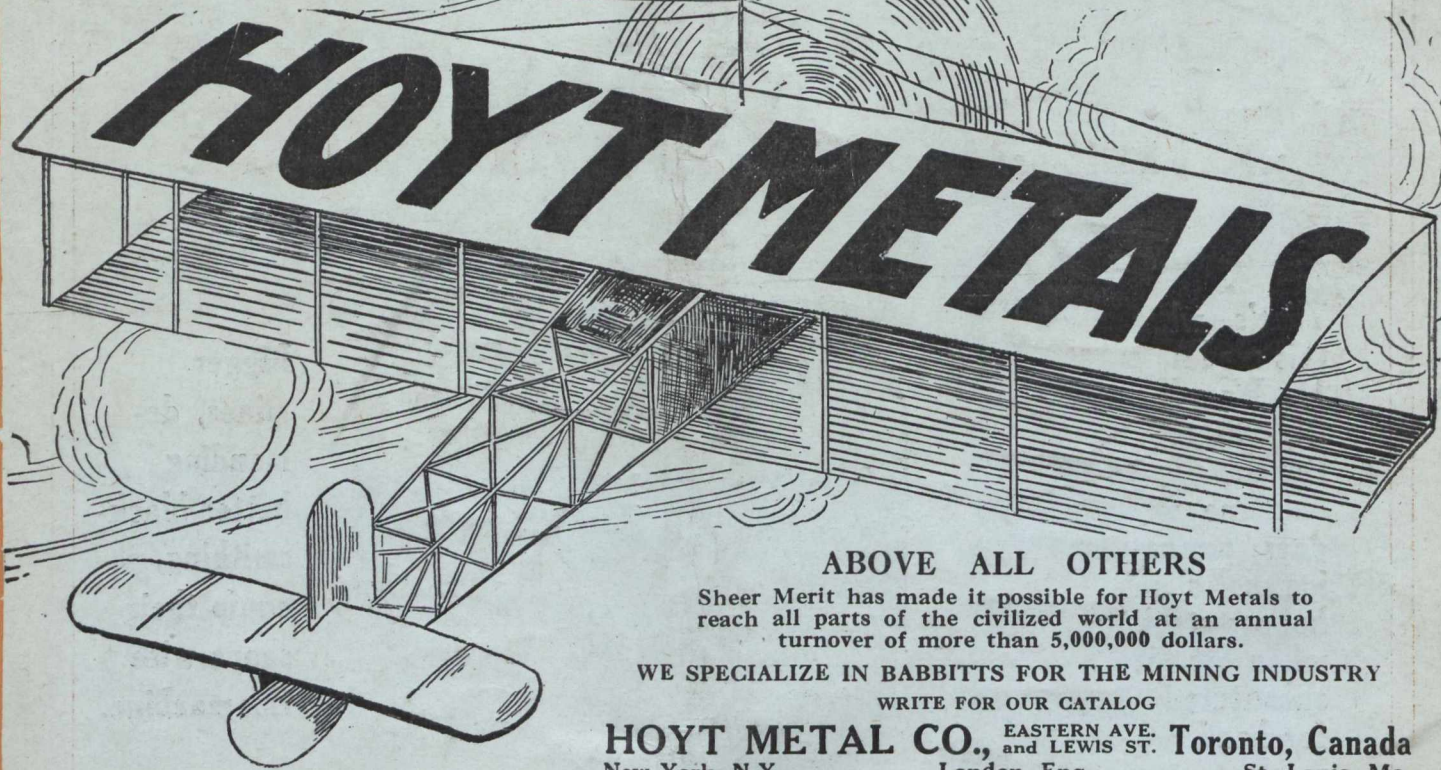
Toronto, Ont.
Cobalt, Ont.

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

Sole Agents in Canada for

The Denver Rock Drill Manufacturing Co.

Denver, Colorado, U.S.A.



ABOVE ALL OTHERS

Sheer Merit has made it possible for Hoyt Metals to reach all parts of the civilized world at an annual turnover of more than 5,000,000 dollars.

WE SPECIALIZE IN BABBITS FOR THE MINING INDUSTRY

WRITE FOR OUR CATALOG

HOYT METAL CO., EASTERN AVE. Toronto, Canada
New York, N.Y. and LEWIS ST. London, Eng. St. Louis, Mo.

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



HADFIELDS LTD. SHEFFIELD

“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