

CANADIAN MINING JOURNAL

VOL. XL.

June 18, 1919.

No. 24

ENDURANCE BRAND BALLS

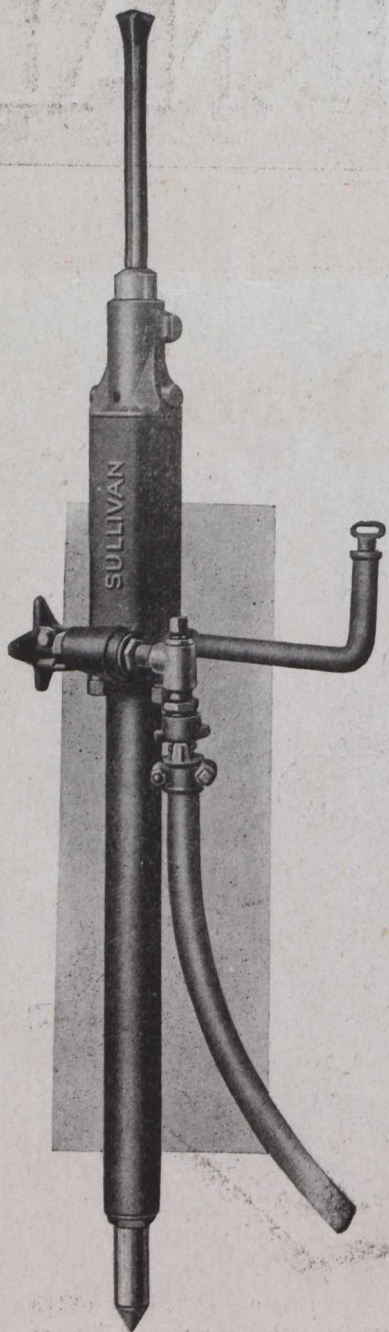


We have found a steel and also discovered a treatment for these balls which gives extraordinary performances in action by resisting abrasion and withstanding shocks. All sizes.

PRICES ON APPLICATION

CANADA FOUNDRIES & FORGINGS, Limited
Canadian Billings & Spencer Plant, WELLAND, ONT.

Sullivan Light Stopers



Sullivan "DT-44"
Light Stoper

Looking for a light, fast, easily handled stoper ?

Here's the new Sullivan "DT-44" bantam weight drill, 66 pounds as the runner shoulders it to climb the stope—the lightest stoper in use.

EASE IN POINTING HOLES?

This tool is only 47 inches over all with feed piston drawn in. You can run it in the narrowest stope you've got.

"SIMPLE" IS RIGHT!

This drill looks simple and is simple—no valve, a single throttle for air cylinder and feed, automatic lubrication, self cleaning chuck, hand rotation, enclosed side rods—all parts accessible by loosening five nuts.

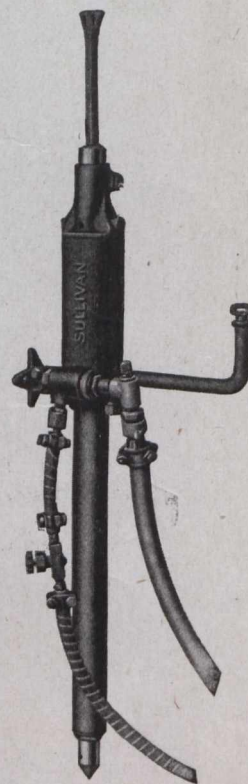
STAY ON THE JOB?

The light stoper is built to Sullivan Hammer Drill Standards: alloy steel throughout, machined from drop-forged billets and bars; heat treated by special processes to resist wear and breakage.

CUTTING SPEED?

Ask our customers why they buy "DT-44's" (names on request). Types—"Dry" (solid steel), and "Water" (hollow steel), with direct or reverse feed cylinders.

Bulletin 670 M.



Sullivan Light Water
Stoper "DT-44"

SULLIVAN MACHINERY COMPANY

122 So. Michigan Ave., Chicago

::

37 Colborne St., Toronto



*The Best
By Test*

Hollow and Solid Swedish Drill Steel

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

Swedish Steel & Importing Co., Limited

Montreal

Toronto

New York

Chicago

Denver

San Francisco

Deloro Smelting & Refining Co.

LIMITED

SMELTERS AND REFINERS OF

Silver Bullion

Cobalt Oxide and Metal

Nickel Oxide and Metal

Refined White Arsenic

“STELLITE” High Speed Tool Metal

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

MacKinnon Steel Co.

Limited

SHERBROOKE, QUE.

Montreal Office, 404 New Birks Building

STRUCTURAL STEEL

— and —

STEEL PLATE WORK

of every description

Air Receivers

Aftercoolers

Ore Buckets

Cars

Skips, Etc.

SEND US YOUR ENQUIRIES

THE BEST BY TEST

SISCO

Drill and Tool Steel

FOR SALE BY

**Northern Canada Supply
Co. Limited**

COBALT, HAILEBURY, SOUTH
PORCUPINE, TIMMINS



THERE IT IS!

and we absolutely guarantee that
it is impossible to manufacture
A BETTER BABBIT METAL than

IMPERIAL GENUINE

FOR MINING MACHINERY BEARINGS
and for HIGH SPEED HEAVY ENGINES
and EXTRAORDINARY HARD WORK.

In actual test we have found that under a load of 300 to 1,200 pounds
to the square inch the rise in temperature was scarcely perceptible.

The tenacity of the tin and copper mixture combined with ductility
renders it best for high speed work and where special service is demanded

ORDER A BOX FROM OUR NEAREST FACTORY

THE CANADA METAL CO. Limited

TORONTO

Branch Factories: HAMILTON MONTREAL WINNIPEG VANCOUVER

EVERITT & CO.

40 CHAPEL STREET, LIVERPOOL, ENGLAND

Tel. Address: "PERSISTENT"

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

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

COBALT, TUNGSTEN, MOLYBDENUM, NICKEL, ALUMINIUM, FERRO - SILICON, FERRO - CHROME, ETC
ASBESTOS—CRUDE, FIBRES, SHINGLE STOCK.

NICKEL



THE MOND NICKEL COMPANY, LTD

39 Victoria Street, London, S.W.

Also Makers of

Copper Sulphate,
Nickel Sulphate, and
Nickel Ammonium Sulphate

A NEW LINE

By an ESTABLISHED MANUFACTURING COMPANY

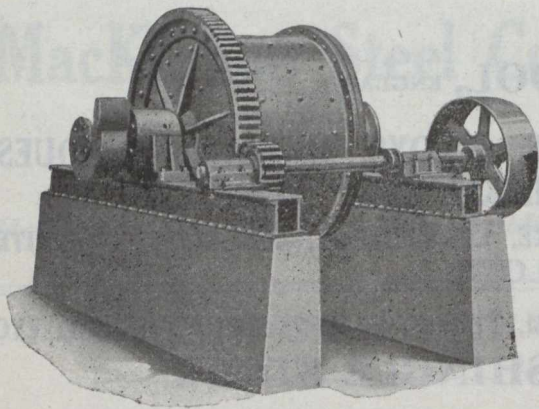
We are at the present time installing machinery in our new plant at Leaside, Ontario for the manufacture of all sizes and kinds of

STEEL WIRE ROPE

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

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

Canada Wire & Cable Company, Limited
TORONTO, ONT.



BALL MILLS, TUBE MILLS

MANGANESE CASTINGS

BALL AND TUBE MILL LINERS

MILD STEEL CASTINGS---

any weight

*WE ARE SPECIALISTS IN
MINING EQUIPMENT*

The Wabi Iron Works

New Liskeard, Ont.

American Zinc Lead and Smelting Co.

Purchasers of

**ZINC and
LEAD ORES**

Address

1012 Pierce Building, St. Louis, Mo.

Exploration Department

For the purchase of

MINES

Gold - Silver - Lead - Zinc - Copper

Address

55 Congress Street, Boston, Mass.

Dominion Coal Company

Glace Bay

Limited

Nova Scotia

19 Collieries

Output—5,000,000 tons annually

“Dominion” Coal

Screened, run of mine and slack

“Springhill” Coal

Screened, run of mine and slack

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

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

For Prices and Terms Apply to:

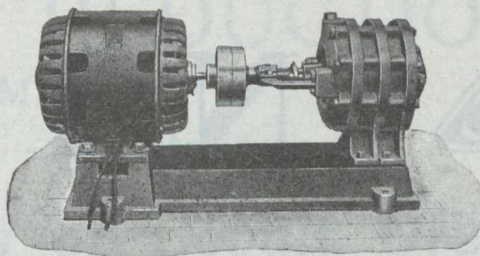
Alexander Dick, General Sales Agent,

112 St. James Street, Montreal

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

and to the following Agents:

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



STEAM
and
POWER

P
U
M
P
S

The Smart-Turner Machine Co., Limited

HAMILTON,

CANADA.

The Consolidated Mining and Smelting Company

OF CANADA, LIMITED

Smelting and Refining : TRAIL, BRITISH COLUMBIA

Buyers of

GOLD, SILVER, COPPER, LEAD and ZINC ORES

Producers and Sellers of

Copper - Lead - Spelter

Tadanac Brand

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

THEY WANT ANOTHER

“May 28, '19

“Ship by express

**“1 Holman 3 in. Ball Tappet
Rock Drill.**

“This is a duplicate of the drill which you supplied us with last September, and which has given the best of satisfaction.”

HOLMAN ROCK DRILLS

either Piston or Hammer Type
always give satisfaction

The Drill You will Finally Buy

Mussens Limited

MONTREAL
WINNIPEG
VANCOUVER

TORONTO:
Confederation Life
Building

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



NICKEL

Shot—High and Low carbon

Ingots—Two sizes, 25 lbs., 50 lbs.

ELECTROLYTIC NICKEL—99.80%

Prime Metals for the Manufacture of Nickel Steel, German Silver, Anodes and all remelting purposes
Our Nickel is produced as Rods, Sheets, Strip Stock, Wire and Tubes.

**MONEL
METAL**

(Reg. U.S. Pat. Off.)

We are **SOLE PRODUCERS** of this natural, stronger-than-steel, non-corrodible alloy.

Manufactured forms are Rods, Flats, Castings, Tubes, Sheets, Strip Stock and Wire.

Send Enquiries Direct to

THE INTERNATIONAL NICKEL COMPANY

43 Exchange Place,

NEW YORK

METALLIC NICKEL

SHOT—High and Low Carbon

INGOTS—Two sizes, 25 lbs. and 50 lbs.

Prime Metals for the Manufacture of
Nickel Steel, German Silver, Anodes,
and all Remelting purposes.

Send Enquiries to

THE INTERNATIONAL NICKEL COMPANY OF CANADA, LIMITED

Harbor Commission Building,

TORONTO

THE CONIAGAS REDUCTION

COMPANY, LIMITED

St. Catharines - - Ontario

Smelters and Refiners of Cobalt Ores

Manufacturers of

Copper Sulphate

Bar Silver—Electrically Refined

Arsenic—White and Metallic

Cobalt Oxide and Metal

Nickel, Oxide and Metal

Telegraphic Address:

“Coniagas.”

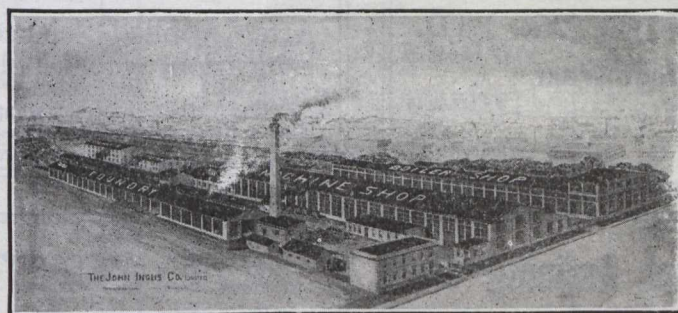
Codes: Bedford McNeill,

A. B. C. 5th Edition

Bell Telephone, 603 St. Catharines

ENGINES, BOILERS and TANKS

WRITE US
FOR PRICES
AND
SPECIFICATIONS



HEAVY
PLATE WORK
and
SPECIAL
MACHINERY

PLANT OF THE JOHN INGLIS CO. LIMITED

THE JOHN INGLIS COMPANY, LIMITED

14 Strachan Avenue, TORONTO, Canada

Representatives in Eastern Canada :
Ottawa Representative :

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



CUT GEARS

All Types - - - - Any Size
Large Capacity.

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

FORGINGS

SEND PRINTS FOR PRICES.

CANADA
FOUNDRIES & FORGINGS, LIMITED
WELLAND, ONT.

BURNS & ROBERTS

MANUFACTURERS OF STEEL PLATE WORK
Tanks, Air Receivers, Penstocks, Etc.
Dealers in Railway and Power Plant Machinery
BANK OF HAMILTON BDC, TORONTO LIMITED

R. W. BRIGSTOCKE

MINING ENGINEER

Box 643
HAILEYBURY, - ONTARIO

PLATINUM BOUGHT AND SOLD

GOLDSMITH BROS.
SMELTING & REFINING CO. LTD.

24 Adelaide Street West
TORONTO

NEW YORK CHICAGO SEATTLE

Balbach Smelting and Refining Co.

Newark, N. J.

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

Electrolytic Copper Refinery

INQUIRIES SOLICITED

YOUR Fine Ores, Concentrates and Fluedust

Can be Cheaply and Successfully
Sintered by the

DWIGHT & LLOYD SYSTEM

(Fully Protected by Patents.)

SIMPLE, EFFICIENT, CONTINUOUS
LOW COST OF INSTALLATION

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

Dwight & Lloyd Sintering Co., Inc.

(Successor to Dwight & Lloyd Metallurgical Co.)

29 Broadway, New York.

Cable Address: SINTERER, NEW YORK.

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

American Ore Reclamation Co.
71 BROADWAY, N.Y.

The University of Toronto and University College

with which are federated

VICTORIA TRINITY ST. MICHAELS
KNOX and WYCLIFFE COLLEGES

FACULTIES OF

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

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

C. L. CONSTANT CO.,

42 New Street - New York

SHIPPERS' AGENTS

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

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

NOT CONNECTED WITH ANY SMELTER

Canadian Representative:
G. C. BATEMAN - Traders Bank Building, Toronto

: 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

**SMITH & TRAVERS
COMPANY**

LIMITED

Contract Diamond Drilling.
Foundational Work a Specialty.
Direction of Exploratory Work.
Detailed Geological Mapping.
Sampling and Valuation of
Mines.

Mines Explored for an Interest.

SUDBURY - ONT.

JAMES McEVOYMining Engineer
and Geologist

(Specialty Coal Mining)

210 POPLAR PLAINS ROAD, TORONTO, ONTARIO

Phone Hillcrest 1461

TYRRELL, J. B.

Mining Engineer,

534 Confederation Life Building,

TORONTO,

CANADA.

GEO. R. ROGERS

MINING ENGINEER

905 TRADERS BANK BUILDING
TORONTOExaminations, Sampling and Reporting
on Mines and Prospects

Telephone M. 2625

Phone M. 1889

Cable address "Heys"

Established 1878.

HEYS, THOS. & SON,

Technical Chemists and Assayers,

Rooms M and N, Toronto Arcade

Yonge Street,

Toronto, Ont.

Sampling Ore Deposits a Specialty.

Alfred R. Whitman

Mining Geologist

43 Exchange Place, New York

A. A. HASSANMining Geologist
and

Consulting Engineer

WESTBROOK HOTEL,

FORT WORTH, TEXAS.

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**THE DORR COMPANY**Metallurgical and
Industrial EngineersDENVER NEW YORK LONDON E.C.
1009 17th St. 101 Park Ave. 16 South St.**JOHN A. DRESSER**

MINING GEOLOGIST

701 Eastern Townships Bank Bldg.

MONTREAL - Canada

Canadian Laboratories, Ltd.

ASSAYERS AND CHEMISTS

410 Crown Office Building

"WE ANALYSE ANYTHING" TORONTO

SPECIAL RATES
SEND FOR PRICES

PHONE MAIN 8088

FERRIER, W. F.Consulting Mining Engineer
and Geologist

204 LUMSDEN BLDG., TORONTO, ONT.

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

We solicit enquiries.

Sudbury, Ont. - Box 958.

LEDOUX & CO.

ASSAYERS AND SAMPLERS

Office and Laboratory,
99 John St., New York.Weigh and Sample Shipments at
Buyers' Works, representing the
Interests of Sellers in all Transactions.

We are not Dealers or Refiners.

ROBERT H. STEWART

Mining & Metallurgical Engineer

VANCOUVER BLOCK
VANCOUVER, B.C.Cable Address: Codes: Broomhalls
"Linsey" 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

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

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

AGENCY:—
ROSSLAND, B. C.

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

PENNSYLVANIA SMELTING CO.
Purchasers of
SILVER & LEAD ORES

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

**Reduce Your Haulage Costs With
A PORTER**



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

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

**Milling and Mining
Machinery**

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

Alex. Fleck, Ltd. - Ottawa



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

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.



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



Ontario's Mining Lands

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

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

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

Ontario in 1917 produced 46 per cent. of the total mineral output of Canada. Returns made to the Ontario Bureau of Mines show the output of the mines and metallurgical works of the Province for the year 1917 to be worth \$72,093,832, of which the metallic production was \$56,831,857.

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

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

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

G. H. FERGUSON,

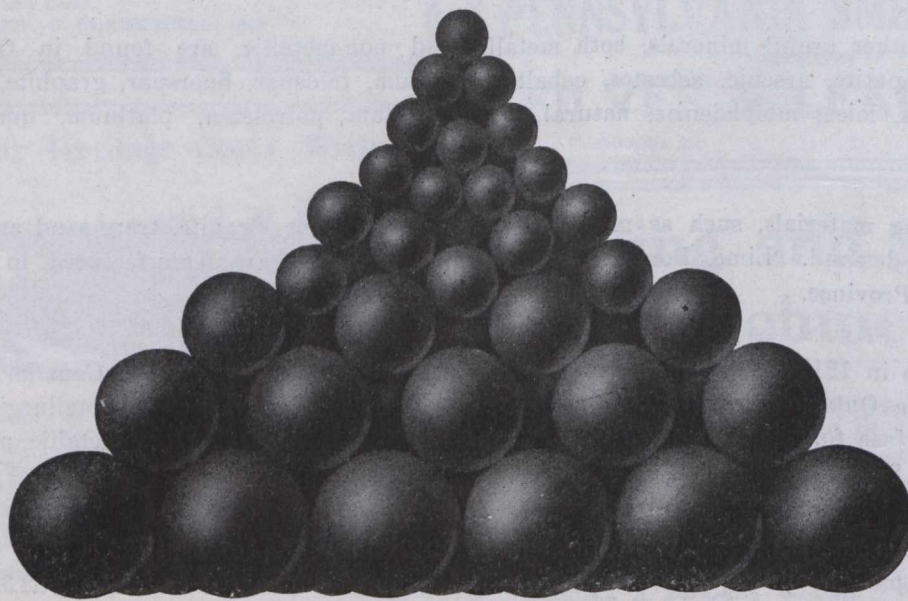
MINISTER OF LANDS, FORESTS AND MINES,

Toronto, Canada.

"HISCO" BALLS

A Canadian Product

Forged Chrome and Manganese Steel Balls
manufactured from our own Canadian
ore by Canadian skilled workmen
in our own plants. From mine
to market our own product.



If quality counts with you specify "HISCO" Balls.
Sizes 3, 4, 5 and 6 inch carried in stock.

Write us for quotations on your requirements

HULL IRON & STEEL FOUNDRIES, LTD.

Makers of Mining Equipment

HULL,

CAN.

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.

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

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

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

Subscription to any address in Canada, United States and British Empire, \$5.00 yearly. Other Countries Postage Extra. Single copies, 15 cents.

VOL. XL.

GARDEN CITY PRESS
Ste. Anne de Bellevue, Que.

No. 24

TABLE OF CONTENTS

Editorial:

The Oil Concession Correspondence	431
Further Decrease Anticipated in British Coal Production as Effect of Shorter Working Day	431
Proposed Explosives Testing Station at Ottawa	432
The Baltimore Mine Explosion at Wilkesbarre, Pa.	433
"A Typical Case"	433
Reprint of Report on the Submarine Coal Field of Nova Scotia, by Dr. H. S. Poole, in 1877	434-436
Drilling for Oil in New Brunswick	434
The Mining Industries in British Guiana, by J. Barkley Percival, Paramaribo	435

Special Correspondence:

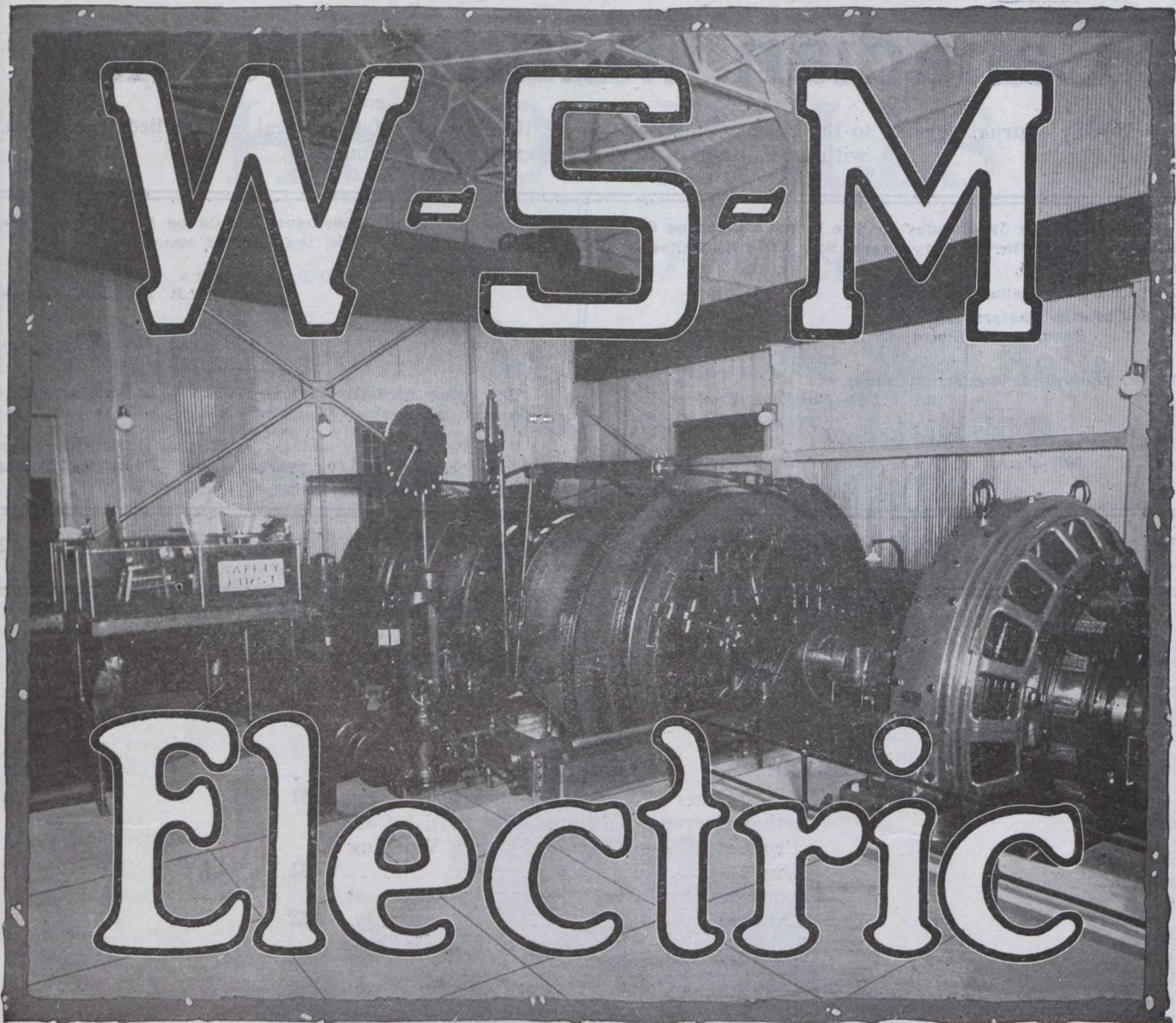
British Columbia;

Dolly Varden Mine. Request for Disallowance Recalled	440
Explosives Branch, Dept. of Mines	441
General Mining Notes from British Columbia	441-442

Northern Ontario;

Nipissing Production	442
Opening of Haileybury Mining School	443
General Mining Notes	443-444-446

Economy of Cool Intake Air for Air Compressors.	444
The Coal Miners Strike in the Crownsnest Field	445
Magnesium Sulphate Deposits at Basque, B.C.	446
Anox Coke Ovens for Recovery of Coal Tar Products	447



Wellman-Seaver-Morgan Electric Hoist installed at the Granite Mountain Shaft of the North Butte Mining Company, Butte, Montana.

Mine Hoists

The Largest Electric Hoist in the United States

—one which will hoist seven tons of ore 4000 feet at a speed of 3000 feet per minute—is illustrated above. This is an example of the problems daily solved by the W-S-M Engineers. No hoisting problem is too great—none too modest. There is a W-S-M solution for every condition. Each receives individual consideration to insure proper strength, speed and safety. Have you a hoist problem?

The Wellman-Seaver-Morgan Co., - Cleveland, Ohio

The Canadian Fairbanks-Morse Co., Limited

CANADIAN SELLING AGENTS

St. John,

Montreal,
Ottawa,

Toronto,
Hamilton,

Windsor,
Winnipeg,

Saskatoon,
Calgary,

Vancouver, 
Victoria

Quebec,

EDITORIAL

THE OIL CONCESSION CORRESPONDENCE.

On April 25th a complete return of the correspondence, telegrams and other documents in connection with the application of the Shell Transport and Trading Company for the grant of certain oil lands was made by the Department of the Interior. Several articles have appeared in this journal during the past winter concerning the proposed concessions. We did not at the time have copies of the correspondence, and we are reproducing parts of it in our next issue for those of our readers who are interested in the matter. It will be noted that the original proposal was definitely turned down by the Department of the Interior in January, 1918. There were subsequent proposals, however, and the memorandum of the interview granted by Hon. Arthur Meighen to Sir Reginald MacLeod and Mr. H. N. Benjamin on July 13th, 1918, is especially interesting. The proposal of these gentlemen was finally turned down in March, 1919.

We have little doubt that most of our readers will commend the decision of the Department of the Interior with reference to these applications. Those who wish to develop oil fields in Western Canada, whether they be big companies or little fellows, should be governed by the mining regulations. There should be no special favors for the corporations that have great financial resources. They can enter the field on the same basis as the pioneers in the Western oil fields, and their financial ability to do things on a large scale should not frighten them out of the field, unless they fear that their exploration ability is not on a par with that of the men who are already in the field.

It will be a good thing for the Northwest if exploration work, such as proposed by the Shell Transport and Trading Company is carried on in the near future. We would be pleased to see this company go into the field and carry on the search for oil in a big way; but under the same conditions as others who have been searching for oil in Western Canada while this company has been seeking concessions.

We are willing to admit that any company would be pleased to have such concessions and we are not surprised that one company should ask for them. Their failure to secure concessions is not blameworthy. The government's failure to refuse them would have been.

Compliance might have brought about development more quickly than we will now have it, and the lost

time is something that we regret; but we are very well satisfied that the people of Canada will prefer the loss of time to the loss of their oil rights, and that they would prefer to have a number of smaller companies exploring under the mining regulations rather than one big company operating under special privileges and controlled abroad. The Shell Company can now come into the country on the same terms as the other fellows, having satisfied itself that special concessions are not obtainable. We will be ready to welcome it when it does so.

FURTHER DECREASE IN BRITISH COAL PRODUCTION ANTICIPATED FROM EFFECT OF SHORTER WORKING DAY—INCREASED COST OF COAL TO CONSUMERS.

Sir Auckland Geddes has announced in the British House of Commons that following the commencement of the shorter statutory working day which comes into operation in July, the production of coal in Britain may be expected to decline still further, accompanied by an increase in cost to the consumer of over a dollar per ton. Sir Auckland Geddes stated that as far as possible to judge "the estimated output for the twelve months from July, 1919, after the reduced hours come into force, is between 214,000,000 and 217,000,000 tons a year, compared with 287,000,000 tons in 1913. The consumption of coal for inland purposes and bunkers, which was 210,000,000 tons in 1913, had fallen to 196,000,000 tons in 1918. Exports in 1913 were 77,000,000 tons, and in 1918 were 34,000,000 tons.

In order to preserve approximately the same quantity for inland consumption and bunkers from July, 1919, all present restrictions on consumption must be fully maintained, and, in addition, exports must be reduced from 34,000,000 tons to 23,000,000. After guaranteeing profits to the owners at the rate of four-pence a ton, the estimated deficiency on the working of the industry would amount to £44,600,000. This meant an increase to the consumer of about four shillings and sixpence a ton.

The members of the coal commission were supplied to-day with a memorandum and schedules relating to the coal output. The figures had been prepared by Sir Evan Jones, the coal controller. For the first twenty weeks of 1919 the output was at the rate of 242,000,000 tons a year, compared with 287,000,000 tons in 1913. The average number of men employed during the twenty weeks was 1,111,000, ex-

actly the same number as the average for 1913. The percentage of absentees due to sickness, injury and voluntary absence increased from 10.7 in 1913 to an average of 12.5 in the first twenty weeks in 1919, and to 13 per cent. in the four weeks ended May 24 last."

In a previous statement to the House Sir Auckland forecasted some reduction of the coal supply for industrial and domestic use in Britain, or a stricter limitation on coal exports, as the output of coal per person employed continued to show a decrease without any shortening of the hours of work.

The "Iron & Coal Trades Review" states that the output per person employed in and about mines has since the commencement of the war shown a persistent reduction. In 1915 production per man was 270 tons per annum; in 1918 it was 260 tons, in 1917, 247 tons, and in 1918, 232 tons. During this same period the wages of the miners have increased by close upon 120 per cent.

The production of coal in the United Kingdom in 1913 was 287,411,869 tons, and the ordinary home consumption of coal was something like 250,000,000 tons. If, as Sir Auckland Geddes anticipates, the British coal production should fall so low as 214,000,000 tons per year, it means that Britain will not even supply her own needs, and that instead of being an exporter of coal, she must become an importer. The train of consequences of such a reversal would be so calamitous that one does not care to dwell upon them. One must trust the essential good sense of the British people to see that the axe is not laid to the root of that industry which pre-eminently has enabled Britain to be a great industrial and maritime nation.

It may be noted that the output of 1913 was secured by the labour of 1,110,884 persons, which is slightly less than the number now reported as employed at coal mines in Britain. More men on the payroll, reduced production, lessened working hours, decreased efficiency during working hours, wages more than doubled—Britain is about to pay dearly for the preferential treatment demanded by and accorded to coal-miners.

PROPOSED EXPLOSIVES TESTING STATION AT OTTAWA.

Our British Columbia correspondent writes that Mr. J. G. S. Hudson, of the resurrected Explosives Branch of the Department of Mines at Ottawa, is now conferring with the provincial authorities in British Columbia on the desirability of a uniform set of regulations for Canada dealing with the manufacture, sale, transportation and use of explosives, more particularly in connection with mining and quarrying operations.

We also understand that the long-deferred appropriation for the erection of an Explosives Testing Station at Ottawa, under the direction of the Mines

Branch, is now to be expended. The undertaking of this work was—like many other necessary undertakings—deferred because of the greater and more immediate necessities of the War, but we venture to assert that the great expansion of mining and quarrying during the war period, and the more self-sustaining character of the explosives industry in Canada occasioned by the restriction of the sources of supply of the raw materials used in the manufacture of explosives, has demonstrated most clearly the necessity for an explosives testing plant in Canada.

The action of the Government will be welcomed both by the manufacturers of explosives and by all mine owners who have a proper sense of the responsibility that rests upon the user of explosives, a responsibility that touches not only the safety of the workman, but the quality of the product of the mine and the pocket of the owner.

In this connection we would draw the attention of our readers to a paper read before the last meeting of the Canadian Mining Institute by Mr. H. Y. Russel, the Manager of the Technical Division of the Canadian Explosives, Ltd., in which the author remarks: "Until such time as the Dominion Government establishes a Department of Explosives with a testing station, the best a user of explosives can do towards deciding as to the safety or otherwise of an explosive is to take into consideration the standing of the company manufacturing the article.

"In England there is a list of 'Authorized Explosives,' that is, explosives which are authorized by the Home Office for use in work outside of coal mines; but in Canada this procedure has not yet been followed, and the permission of the mine officials to test an explosive in any working rests mainly upon the standing and reputation of the firm of manufacturers and the persuasiveness of the company's representative."

Those provinces of Canada which are most interested in the testing of explosives are the provinces containing coal mines, where any regulations limiting the use of explosives under dangerous underground conditions have been difficult to make because no government test or regulation existed which would specify exactly what constituted a "permissible" explosive for use in coal mines. It has been necessary to use British and United States standards for this purpose, which is distinctly awkward when the explosives used are manufactured in Canada. The officials in charge of the United States Bureau of Mines have always been most courteous in allowing the use of their testing station to Canadian applicants, and the literature distributed by the Bureau concerning the composition and the use of explosives has been of great value, but we believe our readers will agree that the mining industry in Canada is large enough and sufficiently important to justify us in having our own explosives testing station, and a department of the Mines Branch especially charged

to acquire and disseminate information as to the composition and use of explosives, and their use under specified conditions in mine workings.

We believe that a significantly large number of the coal-mine explosions that have occurred in Canada originated in blasting operations, and the recent disaster at Wilkesbarre is an example of the result of laxity in the handling of explosives underground.

THE BALTIMORE EXPLOSION AT WILKESBARRE, PA.

The "Engineering & Mining Journal," commenting on the explosion of black powder in the Baltimore Tunnel of the Delaware & Hudson Coal Company, which occurred on June 5th, regrets that "obvious carelessness in handling large quantities of men and explosives in close proximity still exists."

We are a little puzzled, however, by a reference to the impossibility of avoiding the handling of relatively large quantities of explosives in coal mining which concludes by stating that "the inert character of black blasting powder—its comparative immunity to ignition from shock—undoubtedly causes a certain amount of carelessness in handling." No explosives should be used in a coal mine that are susceptible to ignition from shock. Mine explosives should be of a character incapable of explosion without detonation by a fulminate of mercury or other form of approved detonator, and comparatively innocuous in the presence of ordinary flame. Black powder, which may be fired by a spark, is an anachronism in a coal-mine.

We remember seeing, after the Waterford Explosion in July, 1917, a can, with the lid open, full of "Excelite," over which the full blast of the explosion had passed. Beyond the grey dust deposited by the blast upon the paper cartridge-cover, the explosive was uninjured.

On another occasion a small powder-storage house was blown to pieces by an explosion of detonators, and full cartridges of explosive were scattered over the surrounding country, uninjured and intact. Most "permitted" explosives are quite safe to handle and inert except when used with a detonator, but black powder—or gunpowder—is proverbially and notoriously dangerous, and its persistent use in coal-mines is a deliberate sacrifice of safety to custom and supposed cheapness. It is curious to note that the prejudice in favour of the use of black powder is chiefly found among the miners themselves, and is based, of course, on the fact that black powder, because of its slow disruptive character, is a "good coal-getter." Where black powder is used in coal-mines, open lights are usually found, and they form an ideal combination for the promotion of inquests, especially if there should be present, as is not unusual in coal-mines, a little gas and some coal-dust.

"A TYPICAL CASE."

The following editorial from the "Daily Times" of Victoria, B.C., sums up the unsoundness of the "One Big Union" idea admirably:

"A worker in the shipyards recently purchased a home on which certain payments are due. If he is able to remain on his job a few months longer he will have no difficulty in meeting his obligations. If he must go on strike and lose his revenue he will be in danger of losing his home, especially if the strike be prolonged.

He is a good trades unionist. His relations with his employers are satisfactory, his conditions of employment having been prescribed in an agreement accepted by the employing company and representatives of his union on the basis of collective bargaining. He cannot see why he should have to quit work, break an agreement ratified in his name, lose his home and inflict privation upon his family on account of a dispute in Winnipeg. He cannot recall that workers in Winnipeg imposed these disabilities upon themselves on account of labor troubles in Victoria.

Furthermore, he cannot see how a strike in the Victoria shipyards can help matters in Winnipeg. It cannot influence the Government of Manitoba in the slightest to relax its determination to refuse to take any legislative action until the sympathetic strike in Winnipeg is first called off. The proposition may be all right for the strike officials, for their pay still goes on, but it is poor business for him because in a strike his pay must stop. And this is a typical case."

The Winnipeg strike leaders would not, however, admit the propriety of a shipyard worker owning his own home. That would make him a capitalist, and, if we understand aright the beliefs of those who preach the righteousness of the dominance of the proletariat, the ownership of a house would have the effect of changing the moral nature of such a worker.

The doctrine that all men are separated into two classes, namely, the capitalist and the laborer, is a poisonous and depressing one, and its adoption is only conceivable by those who have no hope in the world. It is more wicked than feudalism, without its chivalry, and the idea is not distinguishable from the Hindu conception of caste. Its acceptance as a principle of political administration would mean that no man could ever hope to escape from the social status of his parents, and it would rivet upon the worker chains as strong as steel and as burdensome as lead.

The division of our Canadian people into two camps, inherently and everlastingly at enmity—which is the doctrine preached at Winnipeg—is so foreign to our national ideals, so exactly the opposite of the self-reliant and ambitious characteristics of Canadian men and women, that we need not fear its spread, except and unless we allow the growth of urban conditions of congestion and poverty that rob men of hope and ambition, and provide nurseries for the spirit of revolt that sleeps, or wakes, in every man, according to his circumstances.

REPRINT OF REPORT ON THE SUBMARINE COAL FIELD OF NOVA SCOTIA BY DR. HENRY S. POOLE IN 1877.

We reproduce in full in this issue of the Journal that portion of the late Dr. H. S. Poole's report as Inspector of Mines for the Province of Nova Scotia for the year 1877, which relates to the coal content and future workability of the undersea coalfields which fringe the shores of Nova Scotia and Cape Breton Island. The report referred to was the last made by Dr. Poole in his capacity as Inspector of Mines and may be regarded as his testament concerning the submarine coal tracts. The Journal has a large and valued circle of readers in Nova Scotia, where the questions connected with the extraction of the undersea coal are attracting much interest. Copies of the Report of the Nova Scotia Department of Mines for so distant a date as 1877 are not easily obtained, and Dr. Poole's statements are so pertinent to existing conditions and show such prescience and sound judgment that in the interest of our Nova Scotian readers we have decided to make this report available for reference.

When Dr. Poole assumed a distance of three miles from shore to be the boundary of profitable working he was in advance of mining opinion in Nova Scotia, but later developments have demonstrated that the extraction of coal may be confidently anticipated at distances from shore much exceeding three miles. The furthest distance from shore at which we know of coal being extracted is at the Whitehaven Colliery, where, in workings off the shores of Cumberland, coal is being successfully won at a distance closely approaching five miles.

We hope, in future issues of the Journal, to publish a series of articles dealing with various phases of undersea mining.

DRILLING FOR OIL IN NEW BRUNSWICK.

Moncton, N.B., June 14.—The New Brunswick Gas and Oil Fields, Ltd., in the Stoney Creek field at Well No. 18, about eight and a half miles from Moncton, in their deepening process have struck the most prolific and deepest oil sands yet found in this field, at a depth of 2,622 feet. The oil came with such a gush that it flowed intermittently to the top of the derrick, a height of seventy feet above the ground. This is the first gusher struck in this field."

It is understood by the Journal that the interests of the New Brunswick Gas and Oil Fields have been acquired by the Anglo-Persian Oil Company, and that a systematic search for oil is now being undertaken. Four drills are now operating, and a genuine attempt is to be made to prove or disprove the oil-bearing nature of this New Brunswick territory.

For a good many years the town of Moncton has been supplied with natural gas, which is used locally for both lighting and heating purposes.

Mr. Matthew Lodge, who is the moving spirit in the development of the natural resources of coal, oil and gas in the vicinity of Moncton is optimistic over the possibilities of this region, and the Journal hopes to give shortly some authentic information regarding the recent developments.

The Journal understands further that the new interests associated with these New Brunswick properties intend to develop the large deposits of oil-shales in Albert and Westmorland Counties. Recent bores

have proved these shales to a greater depth than previously demonstrated.

Mr. Lodge is an "entrepreneur" of the best type, who has spent a good deal of time combatting the doings of a very undesirable type of fakir that seems to have found New Brunswick a favorable operating centre, and it is largely owing to his persistent and well-founded belief in the value of the oil bearing occurrences of New Brunswick that reputable people like the Anglo-Persian Company have become interested therein.

The high cost of coal, and its probable still higher cost, combined with its comparative scarcity throughout the whole north-eastern portion of North America, has entirely altered the relative values of coal and oil as fuels. In this connection there is also to be considered the technical advances made in the use of oil and carbonaceous shales or lean coals as fuels. — F. W. G.

ANOTHER DIVIDEND.

A dividend of 5 per cent. was recently declared by the Belmont Surf Inlet Mines, Ltd., payable July 1st.

VANCOUVER DELEGATES TO THE NELSON CONVENTION.

At a meeting of the Vancouver Board of Trade, held Tuesday, June 10th, it was decided to send three delegates to the Nelson Convention.

The Vancouver Chamber of Mines is sending two delegates whose names have not been decided upon at this writing, but who will be two representative men prominent in the industry.



JOHN L. AGNEW,
Vice-President International Nickel Co., of Canada.

The Mining Industries in British Guiana

By J. BARKLEY PERCIVAL.

During the war gold, diamonds and other precious metals and stones in the colony were officially non-existent. Now that hostilities have come to an end, and the enemy, it is to be hoped, rendered incapable of further mischief for many years to come, there is no reason for silence concerning the existence and possibilities of the rich minerals which exist in the hinterland of the colony.

The principal mining industries at present are, of course, gold, diamonds and bauxite; the latter of very recent growth, and although by now fairly extensive, yet likely in the future to assume proportions of the very first importance.

It is not definitely known when gold was first discovered in British Guiana, but the first gold expedition went up the Berbice River as long ago as 1720. More than a hundred years elapsed before any well organized attempt at mining for gold was made by a company which discovered gold-bearing quartz at Wariri on the right bank of the Cuyuni. The project had, however, to be abandoned on account of the district being in dispute between British Guiana and Venezuela. In the eighties there was a revival and by 1886 the industry was so well established in the Essequibo, Mazaruni and Cuyuni districts that the first set of mining regulations was passed in that year. Gold production continued steadily to increase, reaching its zenith in 1893-4 when 138,528 ounces was produced. At that time the gold industry was in the heyday of its prosperity, and there has been no return to the good old days since that time, the yearly production averaged about 54,000 ounces. Gold bearing quartz is to be found throughout the colony; and all the fields where mining have been carried out have proved of value, rich finds being made in each. Perhaps the most valuable field for its size was at Omai, on the left bank of the Essequibo River, from which place over 50,000 ounces alone of the precious metal, valued at one million, seven hundred and fifty thousand dollars have been obtained from an area about sixty acres. This production was arrived at by working such instruments as sluices and "long toms" which here and there took the place of a dredge or a small stamp mill. Various factors contributed to putting companies engaged in crushing operations out of business; the Peters mine, which was worked from 1905 to 1910 being the last and, having during that period secured 39,017 ounces of gold. There are also now only two companies engaged in dredging, the Guiana Gold Company on the Kenawaeuk or Conawaruk, and the Minnehaha Company on the creek of that name. From 1906 until 1916 the former company had recovered 64,200 ounces, while the latter from 1909 to 1916 had made a total output of 14,059 ounces. Since 1884, at which time gold mining started in earnest, until the end of 1917, no less than two million ounces has been won from the goldfields of British Guiana and that, it must be noted, mainly from alluvial washing only. The war naturally caused a slump in gold fields activity, owing largely to the increased cost of supplies, and partly to the fact that laborers who used in the past to leave their homes for the interior found remunerative employment on the works of construction in progress on the coastlands. The in-

dustry also suffered from another and much more serious factor in that it is the only commodity in the world which has decreased instead of increased in value as a result of the war. The cost of securing the metal has increased considerably, and while the value of gold is nominally the same, its purchasing power has been reduced by nearly half. In spite of these crushing conditions the two companies operating in the colony have been plodding steadily along, and it is to be hoped that the concessions recently made by the Government in reducing the royalty on alluvial gold from 70 to 50 cents, and making mining and dredging companies pay a five cent tax on profits in lieu of royalty, will relieve the industry of part of its handicap and encourage a future expansion of the industry.

Diamond mining has not shared the misfortunes of gold during the war; on the contrary the output is distinctly on the up-hill grade. In 1913 there were 9,078 carats exported to the value of eighty-two thousand, three hundred and fifteen dollars. A slight increase in the next year was followed by a slump in 1915, but in 1916 there was a revival and in 1917 no less than 16,985 carats, equivalent to one hundred and eighty-five thousand, seven hundred and eighty-seven dollars, were sent out of the colony. The country being so intersected by rivers, the general means of transport is by water, and the facilities are good. There is steamer communication from Georgetown, the capital of the colony to all the centres of the districts from where boats and crews can easily be obtained to cover the remainder of the journey at a reasonable cost. The journey to the diamond fields is infinitely more strenuous and hazardous than to the gold fields for instance, but with the construction of the projected roads in the interior in the region of the diamondiferous area, many of the dangers of transportation will be avoided.

By locating themselves on the banks of the Demerara river at a navigable part, bauxite deposits which are now being worked have shown themselves to be more considerate, and there are other districts in the colony in which bauxite is known or believed to occur in positions in which the deposits may be commercially worked—in the north-west district, and on parts of the Essequibo, Berbice, and Corantyn Rivers. The possibility of the occurrence of extensive deposits of bauxite of good quality, has led the British Government to order a special geological survey to be made for the purpose of ascertaining the extent of the deposits in different parts of the colony. Provided that rapid and stable communication is established with the interior, and the Government avoids obstructive regulations, sufficient is already known of the wealth of the colony's minerals to invite capital for the development of one of the richest countries in the Empire.

Northern Ontario.—A new vein has been uncovered at the old Foster property, which has been operated under lease for the past eight weeks. The vein was found on surface as a result of stripping, and shows a vein about two inches wide in which silver occurs. Further work will be necessary before determining whether or not the find is important.

Submarine Coal Workings

Extract from The Report of H. S. Poole, Inspector of
Mines, Province of Nova Scotia, Year 1877.

There is a popular fallacy that our coal resources are inexhaustible; it is even sometimes asserted that our coal measures cover 18,000 square miles. When it is remembered that that number represents the full area of the Province, a statement that our workable coal fields above high water mark, do not embrace one-sixtieth of that area, will not seem so surprising, or that the figures enumerating the available contents are easy of expression. Few probably are aware how restricted is the Pictou field; so far as proved, its total output, could not do more than supply the trade of Great Britain for four years. If then, the land fields are limited, the greater is the necessity for looking after the sea areas, which sooner or later will tax engineering skill to the uttermost.

The coast sections of Cape Breton and the Gulf shore early demonstrated the probability that the existing coal measures are but remnants of immense fields that now lie submerged under the Atlantic and Gulf of St. Lawrence. Outliers of the latter yet remain at George's Bay, Newfoundland, at Chimney Corner, Broad Cove, and Port Hood on the Cape Breton Coast, at Tracadie, Cariboo and other spots on the south shore of the Straits of Northumberland. Through this field faults have brought to the surface lower carboniferous rocks at the Magdalen Islands, at Margaree Island, Smith's Island off Port Hood, and Pictou Islands. Prince Edward Island remaining as a vast tract of undenuded overlying Triassic rocks, may, as the vale of Cheshire similarly related to the coal measures, yet be pierced by coal shafts. Of the Southward and Eastern Extension of the carboniferous rocks along the foreshore of the Atlantic coast, outliers are left in Rhode Island, at Chester Bay and Lennox Passage, besides the available coal field of Cape Breton County, which remains as a considerable portion of the outcrop of what may be called the Atlantic field.

How much of these submarine fields may in time be won can at the best be only a small portion of the whole, for the major part must lie buried until time changes the relative positions of land and sea. What proportion of the submerged field will be worked can only be roughly conjectured, for so many unknown quantities enter into the calculation. The thickness and quality of the seams, the faults and troubles to be met with in the workings, the cover to be left for security, the proportion of saleable coal obtained, the increased cost, the engineering difficulties to be surmounted as depth and distance from the operating centres increase, the relative value of labor to that of the fuel produced, these and other considerations have to be better known before an approach to accuracy in any estimate can be made. But basing a calculation on our present knowledge and our prospective ability to meet the anticipated difficulties within a reasonable limit of distance and depth, some idea of the future value of our submarine coal fields may be deduced, and the necessity demonstrated for even now so conducting all in-shore mining, that ultimate deep-sea mining may be safely prosecuted.

Assuming for the present a contour line three miles from shore to be the boundary of profitable working,

and four thousand feet the available depth, and that no seam under three feet will be worked, then taking into consideration the minimum cover of solid measures required by our present law, the reduction to be made on account of known anticlinals, and the average thickness of the seams along their shore crops, the submarine coal field of Cape Breton, from Mira Bay to Cape Dauphin will yield 1,866,000,000 tons. This estimate assumes that after allowing one-fourteenth for unavoidable loss and waste in working, 1,400 tons may be obtained from each foot acre as was assumed in the enquiry by the Royal Commission to ascertain the quantity of coal remaining unwrought in Great Britain. It is made up by calculating separately the area of each seam in each locality, and the figures given are the sum total of all, without allowances for other circumstances than those enumerated. It does not, however, presume to be more than a mere guess at the best, but for want of fuller information is sufficient to show the approximate future value of this field. For all that is yet known, the strata may rise seaward, and distant workings be cut off, although this is not so probable, as that workings may be limited by heavy faults. But here the regularity of the measures along the shore indicates no serious dislocations. The uniform slope of the sea-bottom also negatives a probability of the foreshore being bounded by heavy faults, but rather suggests that the area above water has been reduced by long continued denudation. The seams may thin out or deteriorate, but then again some that are thin and inferior along the crop may thicken and improve in quality to the deep. The proved seams on the land have only to be followed to show how much a seam may change its character and thickness within a mile or two.

As mining must, to a large extent ever remain a matter of accumulated experience, the subjoined information respecting past, present and prospective submarine workings on the English coast is given as of great practical value for us, and as suggestive for our guidance.

Sir George Elliott, who, from a trapper boy, rose by his own ability to be a member of parliament, and one of the most wealthy commoners and extensive coal owners of England, stated before the Royal Commission, already referred to, that in estimating the quantity of available coal under the sea along the coast of the County of Durham, a distance of only $3\frac{1}{2}$ miles from the shore was taken, but that "he thought it is possible that a much wider extent will ultimately be worked by sinking shafts at a distance from the shore in the sea, especially taking into consideration that this portion of the coal field includes six seams of excellent coal, with an aggregate thickness of 30 feet. This would allow of a further distance, of say seven miles being worked. The Durham submarine field within the 10 mile limit, would then yield 2,200,000,000 tons. Sir George further stated that he actually had worked $2\frac{1}{2}$ miles from shaft, and that he believed at great depths it would be possible to work 5 miles from shaft with shafts 10 miles apart. Respecting barriers be-

tween separate winnings, he thought it was not of so much importance under a great depth of cover as that it should not be allowed to take away the coal up to within a certain distance of the bed of the sea. "I feel," he said, "that there should be some mode of dealing with the subject, so that parties should not be permitted to work coal under the seas, rivers and estuaries in such a manner as to ruin and destroy a whole district."

Mr. W. Y. Craig, a mining engineer of high repute, when examined "inter alia" on the system of working under the estuary of the Dee gave the following evidence:—"We commenced at first working in the hard five-quarter seam upon the long wall system, and we opened off, leaving about 20 yards of pillar above the air heading; but we were obliged to abandon it. The dip of the measures is one in five, and we found that we could not get stuff to pack the roads without bringing it a considerable distance from the gob. The expense connected with keeping up the gob roads and the packings, caused us to abandon the long wall system, and then we commenced the ten yard drift, or what is commonly called Lancashire system. From each pair of up-brows we drove headings ten yards apart, and after extending those headings from 60 yards to 80 yards on each side of the up-brows, we took back the pillars, two on each side simultaneously. By that means we were able to do without timber, and we found this system of working best suited of any which he had attempted. The roof was very stubborn, and when in long wall working it did fall, it generally fell into the face, causing a considerable loss of coal and expense in reopening. The stone drift that intersected this, and the other seam of the series under the Dee, began at a depth of 135 yards, and the least cover on these workings was 100 yards. In the next seam working on the same system, all the coal was taken below where the cover was more than 80 yards. Another seam, the Durbog, was wrought on what is called the narrow wicket system. The bords are driven 5 yards wide, and a 5 yard pillar is left. The cut-throughs are about 20 yards apart. This system of working is adopted in order to bring on the creep, so to avoid a sudden fall and fracture of the surface. After it comes on, the district is abandoned for some time to allow it to settle and then the main roads are re-opened. None of the Pillars are taken out, and about 44 per cent. of the coal is entirely lost in pillars. It was not considered safe to work nearer than within 50 yards of the surface.

In working this seam the intention was to come to long wall work when there was 100 yards of cover, and between that and 60 yards of cover to pursue the narrow wicket system, leaving 44 per cent., and not to go beyond 60 yards with any description of work whatever. In the modified long wall which was tried in the lower range, roads in the coal were kept simultaneously going, and 40 to 60 yards of face were taken away, five yards being left on each side of the road, and 20 yard pillars between each two stalls, which are worked off on coming back.

In one or two falls there was a rapid discharge of water, but it took off again. In the bed of the river, at the thinnest part, there are about 14 yards of silt, in another part it is about 40 yards. And in the bed of silt there is a strong bed of clay which is quite impervious, and had it not been for that, Mr. Craig said, he would not have recommended going so near as 60 yards.

In answer to the question:—You heard the evidence as to the desirability of leaving pillars of coal, so that in the event of the sea water coming into any of these workings, the whole coal field might not be sacrificed; do you concur in that opinion?

Mr. Craig replied:—"I think that in working under water, at such shallow depths, there is a degree of uncertainty as to what may be the effect, and in winning out new districts, it would be desirable to have it divided, and to leave barriers."

Mr. T. E. Forster, in his estimate of the quantity of coal remaining unwrought in Northumberland and Cumberland, says:— It is assumed that for a distance of eight miles on the Cumberland coast two workable seams of coal will be found under the sea, making in the aggregate 11 feet of coal over an area of 16 square miles, then taking the extent to be worked seaward 2 miles, and allowing 40 per cent to be left, the available coal will amount to 101,376,000 tons. On the Northumberland coast his estimate takes the extent to be work seaward 2 miles, and along the coast from the Tyne Northward 20 miles, and in this case allowing 25 per cent. to be left, the yield will be 403,200,000 tons.

Mr. G. B. Forster stated that he adopted the bord and Pillar system of working at Whitehaven; that the face was 2 miles in a line at right angles to the shore and 3 miles from the pit, and about 900 feet below the ocean in that particular spot, though the seam is worked at all depths from 60 to 70 yards downwards; the seam being 10 feet in thickness. The bords are driven 6 yards wide and the pillars are left 20 yards thick. The first working takes out in the whole 36 per cent., and about 16 per cent. more is taken out when the pillars are merely cut through by 5 yards cross cuts, which is done down to a depth of 180 yards. Below that depth all the coal is taken out. At a neighboring colliery at Workington the sea broke in when the whole of the coal was being taken at a slight depth—not more than 60 yards at the most. It is supposed a gravel bed communicated with the pit to the rise, and that it was not a fair break down of the strata. At Whitehaven the sea bottom is principally rock. Mr. Forster had worked large quantities of the Hutton seam on the Tyne, under the High Main water which was tubbed off, the High Main being exhausted and full of water with a vertical pressure from 70 to 100 fathoms. He was of opinion that it was desirable to have the mines under the sea worked in compartments; certain collieries on the Northumberland coast were with that view kept distinct, and it was proposed to keep a barrier of 40 to 50 yards between each sea face.

Mr. T. L. Cottingham, when describing his system of working under the estuary of the Dee, said the shafts were sunk on the shore of the river and tunnels were driven under it to intersect and work the various seams of coal dipping under it. The coal was worked on the bord and pillar system, the pillars being on an average 20 yards wide and the bords 9 feet wide. The length of the pillars varied from 40 to 50 yards; they were cut through at intervals of 30 yards and subsequently worked back. The depth of the shafts was 166 feet from the surface, and the coal was reached under the river at that depth and worked to the rise, to within about 30 yards of the surface, and practically all was worked out. The bed of the estuary was composed of sand and a stiff red clay, in some places 15 to 16 yards thick, which it was supposed would sink or sub-

side, but would not break through; at any rate they never had the river water in upon them. Mr. J. J. Atkinson thought that $2\frac{1}{2}$ to 3 miles is about the extent which it is desirable to attempt under the sea.

In the estimate of the available coal under the Firth of Forth, Mr. Geddes places it at 1,800,000,000 tons, and off the Ayrshire coast at 158,000,000 tons. Besides these submarine fields there is also a tract off the South Wales coast, which will, it is anticipated produce a large quantity of coal. Considering then the great stake England has in submarine workings, we cannot do otherwise than regard the experience and expressed opinions of mining engineers and others so largely interested themselves in the future welfare of coal mining under the sea as of the utmost utility and value for us now, when precautionary measures may be easily adopted and their provisions recognized and strictly complied with.

Desirous of benefitting by the large experience of Mr. Richard Brown, late of Sydney Mines, he was written to on this subject April 27th, 1877. In reply he stated:—"In my opinion, wherever the overlying measures are perfectly sound and impervious to water, it will be quite safe to drive passage-ways in the seam under a cover of 100 feet, and to take out 50 per cent. of the coal under a cover of 300 feet beneath the sea. When the measures consist chiefly of shale free from slips there will be no danger, but where sandstones, which are generally traversed by open joints and cracks, predominate there will be great risk of sea water finding its way into the workings, as an instance of the latter I may mention the Jacobs pit at Sydney, where, when the south levels reached within about 3 chains of the shore, there was such an influx of salt water through cracks in the sandstone roof, that we were obliged to shut off all the South side workings by strong timber dams, although the thickness of cover was 240 feet at the sea level. Again in sinking the new shafts at Lloyd's Cove a heavy feeder of salt water was met at a depth of 257 feet below the surface. Hitherto no workings have been carried on under the sea at Sydney with a less cover than 450 feet. At the Saltern pit, Whitehaven, (where I spent many a weary day years ago), the uppermost of the three seams worked was 62 fathoms below the sea at the shore, under which it dipped at the rate of 1 in 9. Near the shore 36 per cent. of the coal was taken out, but as the cover increased to the dip, the pillars were split, and 28 per cent. more taken out, in all 64 per cent. Now, with a cover of 600 feet all the pillars are removed.

When the first Act relating to Mines and Minerals in this Province was framed, knowledge of the lav of the coal seams of Cape Breton was not so general as it has since become through the labors of Brown, Lesley, Lyman and others. It was then deemed sufficient to leave the definition of any desired area to the individual discretion of the applicant, and merely restrict him as to its length and contents. Consequently many areas have been taken out in irregular shapes and with but little regard for local advantages. In fact, some are perhaps more inconvenient and unsuited for economical working than others would have been, had each field been laid off in squares without at all considering the line of outcrop of the measures. For land areas the system adopted answers well enough perhaps; but now that the general course of the coal beds is approximately known, and the future value of those under the sea recognized it is most apparent that the system is not best suited for the submarine. Instead of allowing distinct individuals to take out

leases of areas, one beyond the other, it would undoubtedly have been better and more conducive to the interests of the country to have restricted each lessee to a certain frontage on the adjoining coast, taking into consideration the outcrop of the seams rather than a given superficial extent.

Private individuals holding such mineral rights as those reserved by the crown, would take care as far as possible, that known facilities for access and advantageous working of the whole fields should determine the boundaries rather than haphazard selection. As the law now reads, the whole of an area can be forfeited for non-working, but not so a part that could not possibly be worked by other than a neighboring lessee; and this matter is worthy of further consideration.

It is very certain that to work sea areas to the best advantage, operators should be in the possession of the land adjoining, or that a sufficient barrier be left unworked about their pits. In either case that the approaches should not be from workings in common along the shore line, lest water breaking into one panel should get round land-wards, and destroy a whole district. Mr. Forster was of the opinion that impervious barriers should be left on the land side or sea barriers would be of no use. In this respect our present law is not very explicit, though its general bearing is in accordance with the experience cited.

In England, where the owners of small lots of land are often the owners of the subjacent minerals, thousands of acres of coal are computed by the Royal Commissioners to have been irretrievably lost on account of the awkward position of the lots, the irregularity of the holdings and the refusal of such owners to sell or lease at reasonable rates to those who, working adjacent areas, were at one time in a position to mine them profitably, but who, prevented by extortionate demands from entering on such lands, abandoned their pits. Thus the coal contained was forever lost to the country, in that the separate lots are too small to warrant the sinking of special pits for its extraction. A waste from such a source in this country was in part met by the Crown reservation in grants of land of coal and other minerals, but warning by such experience may be had, and care taken that areas are leased of such shapes as may be most thoroughly and economically worked, if only the law will permit some discretion in the leasing to be exercised.

To avoid the difficulties which experience in England showed would militate against extensive sea workings, were no safeguards to be now interposed between selfish present interests and the future welfare of the coal industry, section 42 was inserted in the Mines Regulation Chapter of the Fourth series of the Revised Statutes. Mining was already being conducted under the foreshore of Cape Breton without sufficient regard for the special requirements of the position, when the Legislature sanctioned the section in question. The section proposed to check further damage being done, and to so control incipient operations as to secure approaches to distant sections of the fields. Not that it is likely in our day that the coal lying at extreme depths and in remote districts will be required, or that colliery establishments will be in a position to work outlying sections profitably, but for the benefit of those who will come after us and who otherwise might justly reflect on our short-sighted policy and indifference to the country's future welfare. The coal required by the clause to be left in barriers may be regarded as not necessarily lost for ever, it is only reserved until

all the available coal seaward has been won, when, if it be thought expedient, specified sections of the districts now reserved may then be removed. By the Act sections of coal are not destroyed or lost, but only reserved, while were no check put upon operations, instead of small barriers of coal being locked up as it were, whole districts undoubtedly would be endangered or irretrievably lost by a short-sighted system of "developing" property. Considering the extent of Cape Breton's submarine fields, and the shallow depths of many of the seams under water, with extensive croppings of valuable beds even into the sea itself, the extra inducements to pare as close to any prescribed limit as possible with a consequent increased risk in case of infringement, make it not improbable that a greater thickness of cover than is at present stipulated for may be advisable to ensure safety. The limit assigned in the act was suggested by the practice pursued on the English coast at Whitehaven, where the overlying measures appear, by published sections, to be similar in character to those of Cape Breton. The experience under the estuary of the Dee is of less service, since on our coasts there are no such thick and impervious beds of silt to choke a crowning in should one occur. That a limit of 60 yards of solid measure is excessive few will question, for the risk is so disproportionate to the gain; and as a mistake realized can never be repaired, it is better to err on the side of safety. Further experience in pillar working in existing collieries may even dictate a wider margin as advisable for security.

To enable lessees of submarine areas to gain access to their property, the statute gives them a right to drive tunnels through the measures of adjoining areas. The wording of the clause is so general, that various constructions have been put upon its meaning, no strict interpretation having yet been given. The intention of the act is obviously to prevent jealousy or conflicting interest putting obstacles in the way of working areas lying under the sea. It is no less evident that the Legislature did not intend to go beyond this, and grant facilities to the one, to the inconveniences and detriment of the other. In granting the right to tunnel through the land of an adjacent area, the statute says "doing as little damage as possible," clearly meaning thereby that if there be one means of approach, that will incommode less than another, although it may be the more expensive, that means, in preference to the cheaper, shall be adopted.

Suppose a case, where it is proposed to tunnel through an area half a mile or more seaward: To drive in the coal would be cheaper and more expeditious than to go through an equally serviceable under or overlying stratum; or again, a slope in a seam might be proposed when a vertical shaft with a tunnel across the measures, would effect the desired purpose. In the case of steep lying seams, the advantage of access in the coal, might, in some cases, far outweigh the loss that would be occasioned the proprietor of the land area, from which barriers were reserved, and therefore it might not be advisable to define the right to merely driving through coal or other workable beds, and in no case in the beds themselves. But in the first case supposed, the isolation of the approaches in the coal seam would greatly interfere with the working of the inshore area, in fact it is not difficult to foresee such a condition of affairs that would not merely interfere, but actually prevent the working of the inshore area from one set of pits, by cutting the area

in two, and making the operations on either side distinct. It may fairly be presumed that the statute is not intended to incommode the prior lessee, nor to cause waste of coal already won, as an interpretation sanctioning such a practice, would necessitate. The question might also be fairly asked, whether overlying drifts within the limit of 180 feet connecting with distant abandoned or drowned out excavations, would not require workings in a subjacent seam to be protected by the thickness of barrier required for security.

When the new Chapter was added to the Statutes which relate to the working of mines, the 40th Section respecting submarine workings was incorporated as bearing on a present necessity. At the same time it was felt that possibly on more mature consideration some modification might be found advisable. The preceding remarks have been made, and authorities quoted on this subject that if possible it may receive due consideration and be fully weighed while there is time to protect the coal interests of the future from further damage, and that the public may see that the matter is not one of mere opinion on one system of working in preference to another, but is of national importance; further, it should be remembered that any restrictions now imposed can at the worst only act as a drag on the development of the coal industry, while the results of neglect or indifference, sanctioning a penny-wise system, can never be remedied.

It was, however, felt when the sub-section 40 (3) was framed and submitted without protest on the part of our mining engineers that it probably would require amendment when the coal at great depths was to be won; though it was most essential to protect the frontage and to effectually shut off deep and extensive workings seaward from such as were shallow and liable to eruptions of water. The authorities quoted believe, and the practice at Whitehaven now safely carried on indicate that there is a depth at which all fear of irruption from above may be disregarded. At Whitehaven 60 fathoms is the limit. Mr. Brown and others are quite confident that at 500 feet all the coal can be removed with impunity.

Denudation has been mentioned as the probable cause of the small present size of our coal fields, the continuing action of the sea has therefore to be considered as an element of future insecurity. According to records at different spots along the coast, the rate of denudation appears to be irregular, and the present contour of bays and headlands would lead one to the same conclusion. At several places on the Cape Breton coast the roads have had of late to be moved inland, and the old tracks are even now half or wholly obliterated by the destruction of the cliffs; eight inches to a foot a year is probably the rate at exposed places. At the Joggins, an old plan shows that the rate has been about six inches a year. A large margin in barriers has consequently to be allowed to meet this element.

PERSONAL

Mr. A. A. Hassan has been examining several prospective oil fields in Texas for the last six weeks, has decided to open an office in Fort Worth, Texas, which is the logical oil centre, for practice in geology and making examinations and reports upon prospective oil fields and to transact oil business in general. His present address is at the Westbrook Hotel, Fort Worth, Texas.

Special Correspondence

BRITISH COLUMBIA.

Dolly Varden Mining Co. Request for Disallowance Recalled.

The position of the Dolly Varden Mining Company is still occupying attention in mining circles in British Columbia. It will be recalled that notification was received by the British Columbia Government from Ottawa to the effect that a petition had been submitted there asking for the disallowance of the Provincial legislation under which the Taylor Engineering Company is taking over the proposed operating the Dolly Varden Company's property at Alice Arm. This was done, it is understood from authoritative quarters, at the instigation of George Wingfield, Reno, Nevada, in whose name there stands a mortgage against the mine amounting to \$150,000. It is understood that as soon as it was realized that the property was required by the recent statutes to pass to the control and ownership of the Taylor Engineering Company in default of settlement in cash of its claims against the Mining Corporation, Mr. Wingfield took the course indicated with a view to obtaining adequate protection for his mortgage. Apparently having been satisfied in the meantime that his investment under the new conditions was in no way jeopardized, Mr. Wingfield has caused the petition for disallowance to be recalled. It therefore would appear that there is no likelihood of the Provincial Government's legislation being questioned from Ottawa and the Taylor Engineering Company is free to proceed with its plans for the opening up and the placing upon a producing basis of the Alice Arm property.

The new mine staff, which has left for the North, is headed by Major D. E. Young, who has resigned from the Provincial Commission to accept the general managership of the Taylor Mining Company, Limited. Major Angus W. Davis, late of the staff of the Consolidated Mining & Smelting Co., at Trail, has been appointed superintendent of the mines. He will be assisted for a time by R. B. McGinnis, of San Francisco, formerly manager and engineer for the Dolly Varden Mining Company. The position of chief accountant and storekeeper, will be filled by H. S. Brownin, formerly office manager for the Canadian Collieries, Limited.

There is a short section of the grade of the railway from Alice Arm to the mine which has yet to be connected up by steel. For this purpose a cargo of rails is being taken north, and the work involved will be undertaken immediately. The Dolly Varden Company, before ceasing operations at the mine, is reported to have blocked out 20,000 tons of high grade ore. This, it is expected, will be shipped as soon as transportation facilities are provided.

The Taylor Mining Company, Limited, which has been organized for the special purpose of operating the properties in question, has an authorized capital of \$1,500,000, of which \$1,200,000 is paid up. Assisting Mr. A. J. T. Taylor, the president, are R. P. Butchart, of Victoria, president of the B. C. Cement Company; Mr. H. C. Chiene, C. A., of Buttar and Chiene, who is also trustee for the creditors of the Taylor Engineering Company; Charles M. Rowson, general manager of the Imperial Oil Company, Vancouver, who is also

acting as trustee for the debenture holders of the Taylor Mining Company, and Mr. John F. Tener, general manager of the Pacific Lime Company.

Major Angus W. Davis, the new superintendent of the mines, is a leading western mining authority. Before the war he was in charge of the Richmond Eureka Mine at Sandon, the Snowshoe Mine and the No. 7 Mine in the Boundary District and the Sullivan Mine in East Kootenay, all of which are properties of the Canadian Consolidated Mining and Smelting Company. He went overseas as a competent officer with the First Canadian Division, and because of his technical knowledge, was selected to organize and command the Third Canadian Tunnelling Corps, which post he held until mining operations at the front, in a large way, ceased with the successful mining of Messines Ridge. Subsequently he was in command of the Tenth C. E. Battalion.

Major D. Drummond Young, D.S.O., formerly Adjutant of the 72nd Battalion, C.E.F., who will be in charge of the general business and financial affairs of the company, has had considerable business and executive experience in England and in Canada, and his services were also requisitioned by the general staff in France.

A CORRECTION.

In our issue of the May 21st (page 367), it was incorrectly stated that Mr. Victor Dolmage, of the Geological Survey, Ottawa, had prepared a Report on the Cariboo Gold Fields, from the summary of which we quoted extracts. We now understand the Report was written by Mr. B. R. McKay, and are glad to make this correction.



PROF. WM. NICOL,
Professor of Mining, Queen's University, Kingston.

EXPLOSIVES BRANCH, DEPT. OF MINES.

Proposed Explosives Testing Station at Ottawa.

Joseph G. S. Hudson, of the Explosives Branch, Department of Mines, Ottawa, is making a tour of Canada on business of considerable importance to the mining industry. At present he is in British Columbia and has interviewed the Hon. Wm. Sloan, Minister of Mines, and other officials in the Provincial Department of Mines. He announces that it is the intention of the Federal Government to erect at Ottawa a powder-testing plant modelled after that at Woolwich, England, and the equipment of the U. S. Bureau of Mines at Pittsburgh. At the present time there is no provision in Canada for the official testing of explosives used in the mines of the country. The provincial governments have been authorizing the use of those explosives passed by United States government authorities or recognized and approved by the British government. Whatever course has been pursued, however, has been on the initiative only of the province and the policy therefore has by no means been uniform. Moreover, if necessity arose for the testing, say of powder or a certain grade of powder, and the coal dust of the mines in which it was proposed to be used, it was necessary to send samples either to Woolwich, or to Pittsburgh. With a plant at Ottawa as is proposed, not only will a uniform list of authorized explosives be adopted in Canada, but it will be possible for all such testing and experiments to be carried out within the Dominion. It is understood also, that manufacturers of explosives will be required to submit their output to test in the official laboratory and will be required to lay out their plants to conform to standard practice, so that plans of new establishments will have to be submitted to the proper quarters for approval. Another innovation suggested, is that regulations regarding the sale of explosives shall be uniform throughout the Dominion. This will be a marked improvement over the present somewhat haphazard method. Mr. Hudson's mission, therefore, is to lay these various proposals before the heads of the Mines Departments in the different provinces, explain them in detail, obtain suggestions, and generally to come to a clear understanding of the objects aimed at, so that when federal legislation is finally drafted it will meet conditions in all parts of the Dominion and be unanimously approved.

Dispute re Alice Arm Molybdenum Claims.

The case of Stewart vs. Molybdenum Mining and Reduction Company is being tried before the Supreme Court of British Columbia, involving a well known Alice Arm property. It appears that the defendant company started in to develop two claims on Alice Arm carrying molybdenum and about \$100,000 was spent in the erection of mill, aerial tramway and other equipment. Subsequently a question arose as to the soundness of the title to the property. The plaintiffs claim that they were entitled to be paid some \$35,000 under a bond which had been given to Stewart, McGraw & Haines by one Riel. After getting this bond, it is alleged, the claims were allowed to lapse through failure to do the assessment work required by statute, and it is asserted that the property was re-located by Riel and conveyed by him to the defendant company in consideration of the company allotting to him a large block of the stock, the conveyance to be free of all encumbrances. Later a dispute arose between Riel and the Company and Riel is now assisting the plaintiffs to upset the title of the Company to the claims.

Use of Diamond Drills Increasing in B. C.

Diamond drilling is being used to a larger extent in British Columbia in mining development than heretofore. The Provincial Government is carrying on operations of this character on the Snowstorm group of copper claims in Highland Valley near Merritt, B. C. The work was started last January and five borings have been completed. The sixth is now down over 600 feet. While no first hand information is available as to the results up to date, it is understood that the showings generally are good and that the outlook is considered promising. Drilling also has started on the property of the Aspen Grove Amalgamated Mines, Limited, which is under bond to Joseph Errington, and associates. This property includes about 75 mineral claims and the plan is to drill at least ten thousand feet for the purpose of proving the ore body. The surface showings indicate an extensive zone with good values in copper.

Haematite Deposits, Iron Mountain, B.C.

Three groups of haematite iron deposit have been located on Iron Mountain, B.C., and work has been in progress on two of them for several weeks. The Iron Dollar group is said to show extensive bodies of high grade haematite ore while the Titanic Group, situated on Sheep Creek, shows a body of brown haematite, the size of which has not been determined. A shaft is being sunk and thus far the workings are all in iron, the analysis of which shows metallic value as high as 63 per cent. One feature of the analyses is the comparative absence of sulphur, etc. The ores of the Titanic Group carry 4.35 per cent. lime, 3.41 per cent. carbonic acid, 1.50 per cent. silica, and insoluble silicate, .22 per cent. alumina and 27 per cent. oxide, with the 63 per cent. metal and only a trace of phosphorus, magnesia, and sulphur.

Improved Outlook in Portland Canal District.

News from the Portland Canal District continues to indicate much mining activity. The Premier Mine on Salmon River is reported to be developing a very attractive body of ore. This property has been examined recently by H. B. Price of New York; W. W. Warren, of Butte, and W. H. Young, of San Francisco. The Bush Company has commenced work on its property, which is located near the Premier. H. Howson, a mining authority, has made an examination of the Yellowstone group, which was recently bonded by Charles F. Caldwell, operator of the Utica Mine, Kaslo. The snow is reported to be disappearing from the higher ranges and prospectors in numbers are leaving the town of Stewart for the hills. Stewart, which since the 1910 boom broke, has gone from bad to worse, is becoming a very busy little community. Several new business enterprises have started and mining men, prospectors and business men are going in with every boat.

The Skeena Mining & Milling Company, Ltd., has secured a working bond on the Victory and Coronado Groups, Hudsons Bay Mountain, Northern B. C. These are the silver-lead zinc properties, very promising in character as far as development has gone. A 50-ton a day concentrator is to be installed and other equipment provided for the operation of the claims. The total expenditure involved being about \$30,000.

Development Promised at Summit Camp, Tulameen District.

One of the most important mining deals reported from the Tulameen District in months occurred recently when Arthur E. Hepburn, of Vancouver, took a bond on seven mineral claims in Summit Camp. The claims included in the option are the Sutter No. 7, Nickle Plate, Huckleberry, Huckleberry Fraction, Sunlight, Sunbeam and Jumbo. It is understood that Mr. Hepburn is acting for English capitalists who propose to do considerable development work this summer. These properties it may be explained, are in silver-lead ore, one vein of which is said to range in silver values from 60 to 80 oz. with a percentage of lead sufficient to produce assay results as high as \$300 per ton. Another lead shows about 12 in. of clean high grade ore in which some exceptionally fine values have been found.

Eureka Mine, Nelson.

The Eureka Mine at Nelson is turning out well under development, the ore body on the 250 ft. level being 17 ft. wide. The Granite-Poorman mill has been fitted up with a concentrator for the treatment of the ore and a flotation plant added. The ore is copper, carrying appreciable gold and silver values.

Progress at Sheep Creek.

Development of mining on Sheep Creek, near Salmo, B. C., has attracted much attention recently. The properties on this work is in progress look more promising as they are opened up. At the Nugget Mine excellent progress is being made with the long tunnel designed to crosscut and develop, at depth, the veins on the Nugget property. This tunnel has now been extended 350 feet, and is being continued at the rate of 200 ft. per month. In the course of a few months it will have attained its objective when the ore bodies will be opened up by raises and stopes prepared for mining. The Mother Lowe Mill then be placed in commission again and run to full capacity. Much is looked for in a mining way from Sheep Creek which is considered one of the best of British Columbia's gold fields.

VANCOUVER SYMPATHETIC STRIKE.

The strike of the steamer hands on the Pacific Coast Steamers is affecting the large mines up the Coast. Although the supply at the present time is sufficient, should the strike continue much longer it will be a serious matter unless some provisions are made for operating steamers to and from the different plants.

At the present time the Citizens' Protective League is being formed and plans are being perfected to obviate any serious conditions which may arise. Meantime all plants are getting along as best they can under the conditions.

IMPERIAL MINERAL RESOURCES BUREAU.

The Governors of the Imperial Mineral Resources Bureau have appointed Major W. M. Henderson-Scott, 1st Queen's Westminster Rifles, to be secretary of the bureau in place of Mr. Arnold D. McNair, C.B.E., who has resigned the appointment of organizing secretary.

Major Henderson-Scott is a gold medallist of the Royal School of Mines and an Associate of the Institute of Mining and Metallurgy. He has practised mining extensively in North and South America and has served continuously in France since 1914.

NORTHERN ONTARIO.

Nipissing Production.

During the month of May, the Nipissing mine produced \$347,751, or an average of approximately \$11,218 every 24 hours. This shows an increase of \$127,824 over the April figures, and is the highest monthly production this year, and may reasonably be attributed to the exceedingly favorable developments on vein 109 and 99 noted during recent weeks in these columns.

In his regular monthly report to the president and directors, Hugh Park, manager, says:—

“During the month of May the company mined ore of an estimated net value of \$347,751, and shipped bullion from Nipissing and custom ores of an estimated net value of \$102,578.

“All stoping operations and general underground exploration and development continued to be satisfactory throughout the month. At 96 tunnel, development work on veins 99 and 109 continued to show good results, though not as continuous as in April. Vein 99 now shows 60 feet of ore, averaging two inches in width and assaying in excess of 5,000 ounces to the ton. In addition some 30 feet produced irregular amounts of high grade ore, the country rock, however, being of sufficient grade to be treated at the low grade mill. Vein 109 has been drifted on for 230 feet, and about 130 feet will assay in excess of 5,000 ounces to the ton over a width of two inches. The balance contains mill rock and some high grade ore.

“Owing to excessive surface water, some difficulty was encountered in starting new development operations at a level 90 feet below the tunnel. These difficulties have been overcome and cross-cutting has been started. Vein 109 is expected to be cut at a distance of 75 feet, and vein 99 will require somewhat more.

“At shaft 73, developments on vein 544 at the 550-ft. level were more or less satisfactory. Several raises were put up, and while developments indicated continuity of the vein, the silver contents were just too low to be profitable. A level higher up is necessary, and a station is being cut 50 feet higher up and the vein will be developed at that level.

“Stoping operations at 73 shaft continued to be satisfactory. No new veins were encountered in any of the cross-cuts. No favorable developments were met with at shafts 63, 64 and 128, Shaft 27 is being dewatered for examination. This shaft has been idle for the past 11 years.

“The low grade mill treated 6,645 tons of mill rock and 184 tons of high grade ore. The refinery shipped 101,053 fine ounces of bullion.

“The following is an estimate of production for the month of May:

Low grade mill	\$177,126
Washing plant	170,625
Total	\$347,751”

Miller Lake-O'Brien Mine.

The Miller Lake-O'Brien Mine, of the M. J. O'Brien, Limited, at Gowganda, is to be extensively explored, in addition to the usual amount of development work, according to reports coming from Gowganda.

Swastika.

High gold assays have been obtained from samples taken from a large sulphide dike, which runs east and west for several miles, crossing the boundary between the townships of Otto and Eby, a short distance south-west from Swastika. As a result, quite a large number of mining claims are being staked in that vicinity.

The first samples taken, show a gold content of upwards of \$400 to the ton, with several ounces of silver per ton, as well as a trace of platinum. Steps are being taken to do further sampling in an endeavor to check up the former assays.

Lucky Baldwin Mine.

Operations at the 200-ft. level of the Lucky Baldwin mine, at Kenogami Station, continue to be encouraging. Cross-cutting is being done in a large dike of porphyry, in which bands of highly mineralized matter occurs. It is stated that certain sections of the dike carries gold in commercial quantities. A force of about twenty men are employed, and the motive power is supplied by a small steam driven mining plant. Some visible gold has been encountered.

Opening of Haileybury Mining School.

The formal opening of the Haileybury Mining School is to take place June 19th. The Hon. Dr. Cody, Minister of Education, will be among the distinguished visitors.

It is interesting to note at this time, that Federal support for technical education aggregating ten million dollars within the next ten years, the money to be paid to the provinces, is provided for in a resolution of which notice has been given by Hon. J. A. Calder, Minister of Immigration and Colonization.

The Haileybury Mining School may reasonably be expected to share in the benefits of such assistance, and it is anticipated that it may make possible the plan which has been proposed to give short courses to returned men in milling, assaying and metallurgy.

Reeves-Dobie Mine—New Oil-flotation Plant.

The 100-ton oil flotation plant, being installed on the Reeves-Dobie Mine, at Gowganda, is nearing completion, and should be ready for operation very shortly, according to official information.

The property was formerly equipped with a forty-ton stamp mill, to which it is expected additional grinding equipment will be necessary in order to operate the flotation plant at full capacity. It is stated that not much difficulty is expected in being able to keep the plant running at full capacity on medium grade ore.

It has been definitely announced that the Nipissing Mining Company has dropped its option on the Ophir-Cobalt mine. The option had been held for some three months, during which time a considerable amount of exploration work was done with varying results. At two points, during the course of drifting operations, short shoots of ore were encountered, and apparently the result of work did not appear to justify the purchase of the control of the property.

Whether or not the Ophir Company will itself continue to operate the property, or interest other prospective purchasers has not been learned.

Dome Mines.

The directors of the Dome Mines, during their recent visit to the property, expressed themselves as being very well pleased with the progress so far made and as being decidedly hopeful of a prosperous future. The mill is operating at a moderate rate, and it will probably be some little time before full capacity is reached. However, between 300 and 400 men are now employed, and with efficiency increasing, it is expected almost normal conditions will prevail by the end of the current year.

Development work being conducted on the Dome Extension, which is under option to the Dome Mines, is favorable, and the general impression is that the option will be exercised before next March.

Kirkland Lake Proprietary Merger.

The merging of the interests of the Tough-Oakes Gold Mines, the Burnside, and the Alladin-Cobalt, including the Chambers Ferland mine at Cobalt, and the Sudbury Syndicate, is stated to be making satisfactory headway. The new company is to be known as the Kirkland Lake Proprietary. The Sylvanite is not mentioned in a statement just made, which may be summarized, as follows:

(1)—The Kirkland Lake Proprietary Company, whose issued capital is 125,000 pounds, will receive 250,000 shares in the new issue. That is to say, when the merger is completed, shareholders will receive a bonus of one share in addition to each share now held.

(2)—Shareholders in the Tough-Oakes Gold Mines will receive one Kirkland Lake Proprietary share for each two shares held in the Tough-Oakes Company.

(3)—Shareholders in the Burnside Gold Mines will receive one share in the Proprietary Company for each two shares held in the Burnside Company.

(4) Shareholders in the Sudbury Syndicate will receive $1\frac{1}{4}$ shares of the Kirkland Lake Proprietary for each one share held in the Sudbury Syndicate.

(5)—Shareholders of the Aladdin-Cobalt will receive two Kirkland Lake Proprietary shares for each seven shares held in the Aladdin-Cobalt.

The Kirkland Lake Proprietary is to be capitalized at 800,000 pounds, as against a present combined capital of the various companies of about 2,000,000. There will be about 100,000 cash in the treasury.

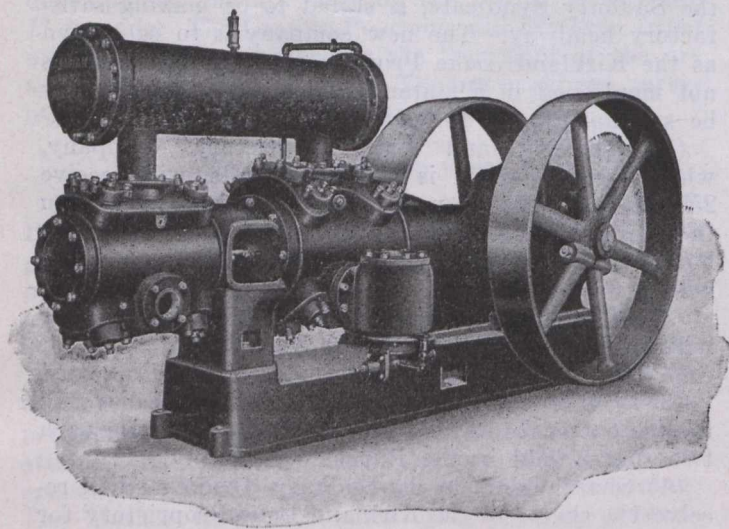
Shareholders Not Alarmed.

The labor situation in the mining fields of Northern Ontario has become more or less disquieting, following the actual declaration of a strike in the Kirkland Lake camp. At Cobalt the result of the strike vote taken last Sunday has not been made known at the time of writing. In the meantime, operations are proceeding in a normal way, and there is a tendency to view the matter as one that will be but temporary, and that the value of the mines, should actual curtailment be necessary for a time, would not deteriorate, and thus leaves no reason for panic among shareholders. The great pity, of course, is the more loyal the subject, the greater may be the hardship imposed. For instance, returned men in many instances declare that they are only beginning to "get on their feet," while many of those who did nothing for the country during the war have large bank rolls and will not suffer.

ECONOMY OF COOL INTAKE AIR FOR AIR COMPRESSORS.

Temperature plays an important part in all compressed air engineering; the intercooler exists mainly to cool the air between low and high pressure cylinders of the air compressor so that dangerous temperatures are not reached in the high pressure cylinder. In large shipyards reheaters are sometimes used to heat the air before being used in pneumatic tools; this has the double advantage of reducing trouble from "reezing," and increasing the volume of air supplied.

A simple way of increasing the over-all efficiency, and one that is not taken advantage of as much as it might be, is to place to the air compressor intake in as cool a place as possible. The cooler the intake air, the larger is the final volume of air delivered to the tool; this is realized by some, but by putting this



Canadian-Kand Air Compressor.

fact in cold figures the startling fact is brought out that every five degrees drop in the temperature of the intake air represents again in power of one per cent. For this reason the intake pipe for an air compressor should be placed so that the air is taken from outside the engine room; this is not only cooler than the air inside the engine room, but considerably cleaner. It might be thought unnecessary to insist on this point, but there are many compressor installations which show that this is not the case.

The intake pipe for an air compressor should also be made of ample diameter, at least half the diameter of the low pressure cylinder; and the longer the pipe, the larger should be the diameter. A rule given in "Compressed Air Data" is to increase the pipe diameter by one inch for every ten feet of length. The air should be taken in some distance from the grounds, say eight or ten feet above ground level.

DOMES.

Toronto, June 6.

Mr. J. S. Bache, the president of the Dome Mines, and his fellow directors on that board, will leave tonight for South Porcupine, where they will examine both the Dome and Dome Extension properties preparatory to the annual meetings of these companies, which occur next week. The annual meeting of the first men-

tioned company is set for next Tuesday and that of the latter for the day following. Mr. Alex. Fasken, the secretary of the company, goes North along with the other officials. This is Mr. Bache's first visit to Cobalt and Porcupine.

NORTHERN ONTARIO.

The substantial reduction in the tariff as applicable to mining machinery, the greater portion of which is imported into Canada, will come as a pleasant surprise to mining interests, and will probably be all the more appreciated. Although the plea has been made on various occasions during recent years, that the precious-metal mining industry should be shielded from excessive taxation, yet very little was done in response to the plea, and the fear that the mines must survive as best they could in so far as the government was concerned, appears to have become fairly general. Now, however, a step has been taken for the benefit of the mines, or at least, such is the proposal of Finance Minister Sir Thomas White.

The Budget speech, as viewed by many representative business men of the North, has met with much approval in that it will draw most heavily upon the purse strings of the richest people in the country.

In discussing the matter with one of the men in this district who will be materially affected by the new Income Tax, the writer was informed that the government had made a step in the right direction. "It is only fair," he said, "that those fortunate enough to have won a position involving enormous income should bear the brunt of taxation." He also intimated that it was his honest opinion that this method of collecting government revenue was here to stay. "Men who are energetic, and win good fortune by denying themselves many of the pleasures of life by remaining almost constantly at work attending to the affairs of their business are certainly entitled to greater income than the men who will neglect their work and join the pleasure bent. This is a point that the government should not forget," he said. "Yet, despite this, all men who try their best do not succeed, and it is only fair that the large incomes should be severely taxed. In doing this, the government should not apply the measure to the point of confiscation for the reason that such would discourage thrift, and rob the country of the benefits won through the energy of the men of the soundest abilities."

THE CONFUSION OF INDUSTRIAL AND POLITICAL ISSUES.

The European commission of the National Industrial Conference Board (New York), which has just returned from Europe says that "solution of the world-wide unrest problem rests largely upon the separation of political and industrial issues." But is it not the aim of labor leaders to make political issues of all industrial difficulties? It is the separation of industrial issues from politics which is considered by present day labor leaders to be the weakness of the labor cause, and they show a tendency to use the massed political power of labor to adjust the most trivial industrial issues, which is indeed the whole idea behind the sympathetic strike.

THE COAL MINERS STRIKE IN CROWSNEST FIELD.

The following copy of correspondence which has passed between those concerned in the present coal miners' strike in the Crowsnest Pass Coal Field, British Columbia, and which strike now is in effect throughout District 18, fully explains the existing condition as between the men and the company:

From Gladstone Local Union, Fernie, B.C. to the Pit Bosses:

Fellow workers:—We wish to draw your attention to the fact that we are at this time engaged in a struggle to maintain the just rights of a certain portion of our membership. We think it is hardly necessary to point out to you the fairness of our demands, as you must readily realize that with the cost of living forced up to the limit, whereby it is impossible for the worker to support himself and family, it is absolutely essential that there be no reduction in wages at this time, but rather a general increase all around is needed to offset the ever-increasing cost of the necessities of life.

It has come to our notice that the coal company intend to use your services to replace those of some of our members who are out to secure a living wage.

Fellow workers, we appeal to you not to permit yourselves to be used for such a despicable purpose. We would ask you to fall in line with the fire bosses, who to a man refused to fill any job of a man who is out on strike. We realize the position they have placed themselves in by such action, and we certainly admire their courage. The members of Gladstone local union have already pledged themselves not to resume work until all fire bosses are reinstated without prejudice or discrimination on the part of the management, and are ready to take the same stand with regard to yourselves (pit bosses.) We ask you to think the matter over carefully. Is it worth while to earn yourselves the animosity and ill-feelings of all right thinking men, to pander to the wishes of those who, however much they pretend to have your interest at heart, would if it suited their purpose, take the same stand in regard to yourselves that they are taking with the ten and eleven-hour men at the present time?

(Signed) "Gladstone Local Union, per Secretary."

Reply of Pit Bosses.

In reply to the foregoing the pit bosses directed a letter to the members of the miners' union, the essential part of which reads:—"Most mine officials are holding their positions, not only through the company's choice, but by government qualification, and in the ordinary course of affairs are responsible to both parties for the safe and efficient management of their respective departments. At the present time, owing to the conditions created by a general suspension of work they are simply trying to limit the unavoidable damaging of property, upon whose welfare the city of Fernie depends for its very existence.

Should we imitate the example of the firebosses formerly employed at Coal Creek mines, who, taking a different view of the obligations inherent to their position, ceased work immediately the general strike order went into effect, we would render ourselves guilty of a very grave breach of trust and an action that all right-thinking men could not fail to consider as highly reprehensible

We might further state that at no time has the management required of the officials to do any kind

of work other than that strictly covered by the Strike Clause included in the agreement still in force.

Management's Statement.

The management of the Crowsnest Pass Coal Company, Limited, have under date of May 31st, issued the following public statement:

A circular has been issued by the Gladstone Local Union to the officials of the company, urging them to stop work and assist them in getting "Justice" for certain of their fellow employees. The agreement effective in the mines of District 18 when the strike was declared, entered into between the United Mine Workers and the operators of the district, and in force under the jurisdiction and direction of the federal government through the commissioner, Mr. W. H. Armstrong, director of coal mine operations, contains clauses with respect to the management of the mines, the employment of officials and the care of the mines during strikes. These clauses read as follows:—

Management of Mines.—The right to hire and discharge, the management of the mines, and the direction of the working forces are vested exclusively in the company, and the United Mine Workers shall not abridge this right; however, the company agrees not to discharge employees or refuse work of applicants on account of, or because of their affiliation with the United Mine Workers of America.

Employees Not Under Jurisdiction.—All employees connected with the management of the mine are not to be under the jurisdiction of the United Mine Workers of America, or the members thereof, and shall include the following:—

Mine.—Manager or superintendent overman or assistant overman, pit bosses, firebosses, stable boss, master mechanic, electricians, weighmen, head carpenter, head blacksmith, tippie or breaker foreman loader boss, night watchman, coke oven foreman, outside foreman and all other foremen, timekeepers, inspectors and head lampmen.

In case of either local or general suspension of mining either at the expiration of this agreement or otherwise the engineers, firemen and pumpmen shall not suspend work, but shall when mining is suspended fully protect all the companies property under their care and operate fans and pumps and lower and hoist such men and supplies as may be required to keep up steam at the companies plant, but it is understood and agreed that the company shall not ask them to hoist any coal for sale on the market.

These clauses have appeared in every agreement between the United Mine Workers and the operators of District 18 since the first agreement negotiated between them and represent the opinion of both parties that the preservation of the mines in working condition, ready for resumption of work was simply economic horse-sense and desirable as much from the point of view of the one side as the other, no matter what the dispute at the moment might be. Hitherto these clauses have been loyally lived up to and the settlement of grievances has been followed by practically immediate re-employment of all workmen.

Agreement Violated.

The circular just issued by the miners officials, however, indicates a new policy on the part of those at present in control of Gladstone Local Union. In fairness to itself the company wishes to give publicity to the fact that, in expecting its officials to remain at work for the protection of the mines, it is doing what

it has always done, and what the United Mine Workers of America have agreed it has the right to do; that those officials who have remained at work have similarly done as they have always done, and as the U. M. W. of A., have undertaken they shall have perfect freedom and right to do, and that, in taking their present attitude, Gladstone Local of the U. M. W. of A. deliberately and knowingly violates its own signed undertaking in the expectation that the added pressure resulting from a knowledge on the part of the company that its mines are suffering damages, will force settlement of their demands."

The Gold Miners Optimistic.

Leading mining men in the gold camps claim to be able to see the end of the present economic strain, and appear to believe that conditions will get back to nearly normal by the end of the current year. The labor unrest is viewed as but a temporary retarding factor, and that in due course it will be realized that the industry is bigger and better than is at present understood. It is believed that the number of men employed in Porcupine is now a little in excess of the number at the Cobalt mines.

McIntyre-Porcupine.

The development of rich ore on the McIntyre-Porcupine, now being reported in certain portions of the press, has reference to the favorable development reported some little time ago in these columns. It will be recalled that the Journal pointed out the fact that about one million dollars in new ore had been developed at and above the 800-ft. level of the McIntyre as a result of recent development work.

Strike at Kirkland Lake.

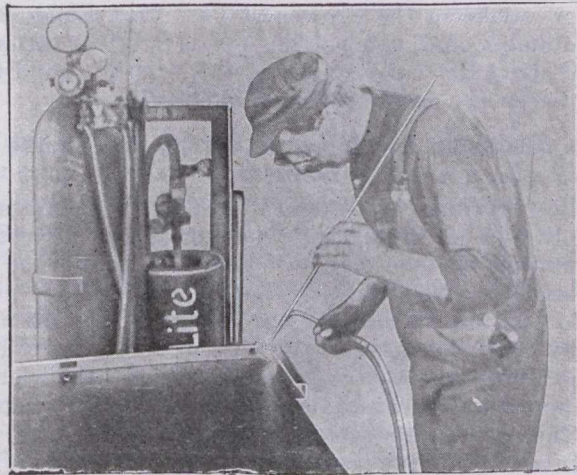
The mine workers of the Kirkland Lake camp ceased work, Thursday morning, June 12, following the presentation of certain demands which the mining companies refused to grant. Upwards of 500 men are involved in the walk-out.

The Miners' Union had demanded, as previously stated in these columns, a minimum wage of \$4.50 daily to underground workers, a 44-hour week and recognition of the Union. At the time of writing, the mines in the Kirkland Lake field are closed down, it being the apparent intention of the companies to await further developments, before taking definite steps to cope with the situation and make arrangements to ultimately resume work.

MAGNESIUM SULPHATE DEPOSITS AT BASQUE, B.C.

The "Canadian Chemical Journal" contains an account by George C. Crux of a chain of lakes near Basque, B.C., from which very pure magnesium sulphate may be easily obtained in quantities not hitherto available. The lakes, as described, seem to form a series of natural evaporators. It is intimated that the salts enter the lakes from below in solution, and the crystallized salt is deposited in a circular ring around the lake in the summer. From March until June or July it is stated the deposited ring of salts is under water. In the vicinity of one lake alone, it is estimated that 6,000 tons of high grade technical magnesium sulphate is immediately available, and in one place drilling has shown pure Epsom salts to a depth of forty feet.

OxyAcetylene Welding and Cutting



**SOMETIMES THE ONLY WAY—
GENERALLY THE BEST WAY—
ALWAYS A POSSIBLE WAY.**

Wherever two pieces of metal are to be joined, the Prest-O-Lite Process of Oxy-Acetylene Welding provides a simple, low-cost method. It opens the way to metal manufacturing, construction and repair operations which cannot be performed by any other process.

In practically every metal manufacturing industry oxy-acetylene welding is providing better, neater-appearing and more lasting joints than have been hitherto obtainable by rivetting, threading or other methods, and at the same time is lowering production costs. Operations on metal parts, large and small, are handled easily, quickly and economically by this process. Welded joints can be built up to give added strength if desired. The metal is left in satisfactory condition for subsequent machining. For repair work it more than pays its way—preventing costly delays and replacements—handling the jobs "right on the spot" with efficiency and dispatch.

**Prest-O-Lite
PROCESS**

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

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

This Welding Outfit is portable and handy for use inside or outside the shop. The Prest-O-Lite system of exchanging your empty cylinders for full ones insures perpetual service.

Write for valuable illustrated literature and data on work others are doing by the Prest-O-Lite Welding Process. It may point out ways to solve your problems.

Address Department C -- 108

**Prest-O-Lite Company
of Canada, Limited**
Prest-O-Lite Building
Cor. Elm St. and Centre Ave.
Toronto

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



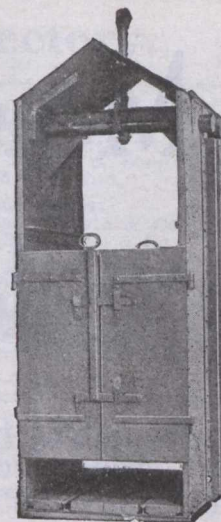
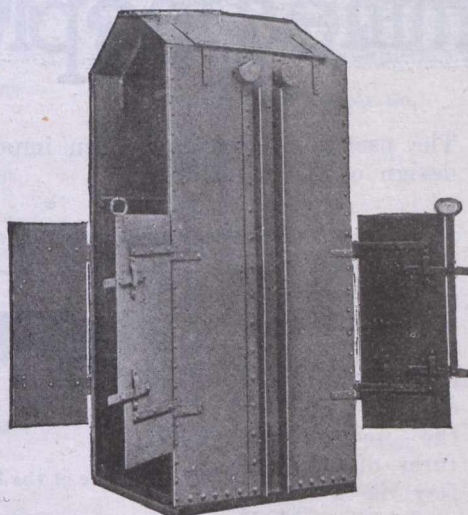
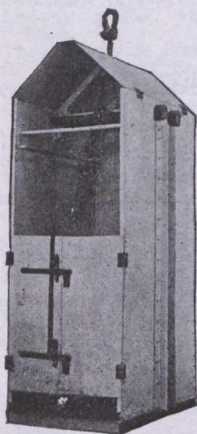
World's Largest Makers of Dissolved Acetylene

SAFETY MINE CAGES

MADE TO FIT YOUR SHAFT

We build these Cages to suit you and your workmen. They are Safe, Strong, and Reliable.

- ¶ The top doors permit the carrying of long timbers, or the escape of the men in case of accident.
- ¶ The hand rails are properly placed to safeguard the passengers in the quick ascent or descent.



- ¶ We supply these cages with either one or two sets of doors for inlet or exit, to suit your shaft.
- ¶ Rails are also laid in the floor, if required, for convenience in handling the cars.

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

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

NORTHERN ONTARIO—GENERAL.

The installation of a small mining plant on the Collins property, at Leroy Lake, in the Gowganda district, is about completed, and will be ready for operation very shortly. A shaft was formerly put down about 130 feet, with encouraging results, and it is proposed to resume work at the point where formerly left off.

A vein said to be several feet in width has been opened up on the La Bine group of claims in the Sese-kinka district, in the township of Maisonsville. At a point where one of the formerly discovered narrow high grade veins joins the large vein, a good deal of mineralization occurs, showing telurides of gold, as well as free gold. The resemblance of the Sesekniks area bears much in common with the Boston Creek district.

A second vein has been encountered as a result of diamond drilling on the Independence Mine, at Boston Creek. About three feet of vein matter has been penetrated in the new vein. As yet the mineral content has not been determined.

With the completion of cross-cutting operations at the Dome Lake, for the purpose of opening up the ore body recently indicated by diamond drilling, it is expected very little difficulty will be experienced in keeping the Dome Lake mill running at full capacity.

It had been planned to arrange for the early resumption of work at the La Belle-Kirkland Mine, but, owing to the rather uncertain trend in the labor situation, the commencement of operations may be temporarily deferred.

ANYOX COKE OVENS TO RECOVER COAL TAR PRODUCTS.

Dr. M. E. Nichols, President of the Granby Consolidated Mining and Smelting Company recently finished a trip of inspection to the Pacific Coast.

It has been known for some time past that coke ovens were being erected at Anyox and the fact that they are now completed and ready for operation is of great interest to the industrial world and adds another important branch of the mining industry to British Columbia.

While in Vancouver, on his return from the company's Anyox plant, Dr. Nichols made the following announcement, that the heating up of the coke ovens at Anyox, which will be the first on the Pacific Coast to be operated for the recovery of toluol, benzol and the other valuable by-products of coal tar, has been started.

The armistice has taken away the necessity for the production of explosives, for which purpose the ovens were originally planned, but they will prove a valuable source of coal by-products for commercial uses. The tar will be shipped to Vancouver where the distillates will be recovered in a local works.

Dr. Nichols stated that the expensive installation of the recovery ovens was not altogether necessary, as the old beehive ovens would have suited their purpose just as well, but the war has shown that by-products would warrant the additional outlay. Formerly Germany has been by far the greatest manufacturer of dyes and other products of coal tar. These new coke ovens will now form a part of the national plans to capture this trade.

More than ever the Mill determines the profit

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

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

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

Massco equipment has been making interesting changes in cost sheets.



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

* * * * *

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



One of the latest Wilfley Tables

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

* * * * *

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

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



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

* * * * *

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

Massco service backs them all

Write for further particulars

The Mine & Smelter Supply Co.

Denver

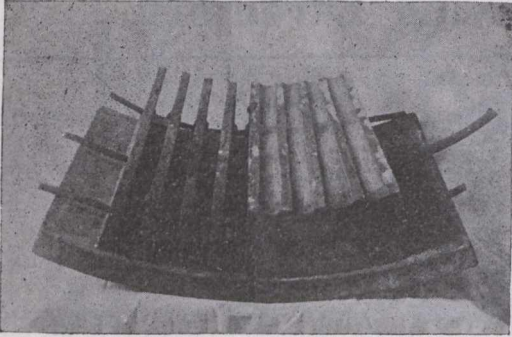
Salt Lake City

El Paso

New York Sales Office: 42 Broadway

The Canadian Miners' Buying Directory.

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



Cut showing bars before and after being filled with Cement

A RECORD for a Tube Mill Lining:

5000 Running hours, showing only one-eighth of an inch wear is the result of a test made with a mill Lined with "KILBOURNS" Patent Lining. Or in other words when once installed the lining is good for 80,000 running hours.

Send us your inquiries, we do the rest.

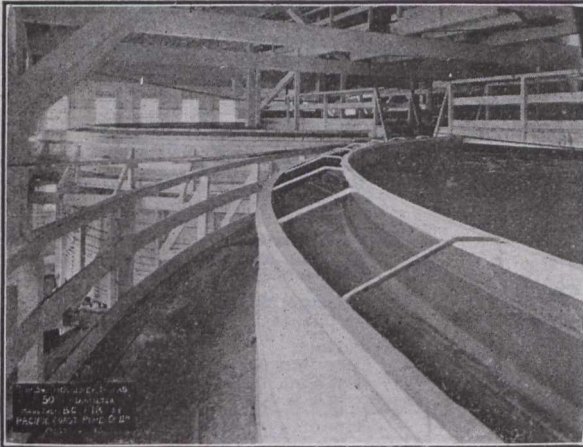
Sole agents and manufacturers,

BURNETT & CRAMPTON

Engineers and Ironfounders.

RIGAUD

QUE.



Wood Mining Tanks

Of All Descriptions

Wood Stave Pipe

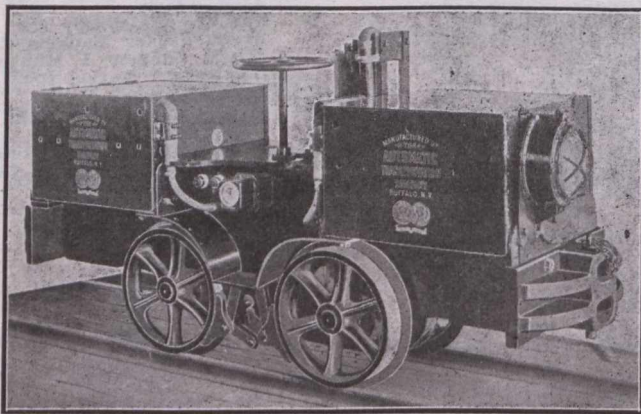
ILLUSTRATION SHOWS DORR THICKENER TANKS 50 FEET DIAMETER. MADE FROM B.C. FIR. INSTALLED BY US.

Pacific Coast Pipe Co., Limited

1551 Granville Street, Vancouver, B.C.

Reduce Your Haulage Costs

and Conserve Your Man Power



A Storage Battery Locomotive installed in your mine will allow of a larger percentage of ore output, reduce your labor and haulage costs to a minimum.

No trolley wires, track bonds or electric cables required—12" to 36" gauge—goes anywhere the mine cars go.

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

SIMPLICITY - EFFICIENCY - LOW COST

Write us for complete information

AUTOMATIC TRANSPORTATION COMPANY

POWLEY and TOWNSLEY, 1004 Excelsior Life Building, TORONTO

SPECIALISTS IN INDUSTRIAL TRANSPORTATION

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

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

ALPHABETICAL INDEX TO ADVERTISERS

A		F		McEvoy, Jas. 11	
Allan Whyte & Co.	6	Fleck, Alex	6	Mine & Smelter Supply Co.	28
American Zinc Lead & Smelting Co.	6	Ferrier, W. F.	6	Mond Nickel Co.	5
B		Fasken, Robertson, Chadwick & Sedgewick	34	Mussens, Ltd.	
Balbach Smelting & Refining Co.	10	Fraser & Chalmers of Canada, Ltd. 34		N	
Blackwell, G. C., Sons & Company	12	G		Northern Canada Supply Co., Ltd.	4
Beatty, M. & Sons	12	Gartshore John J.	12	Northern Electric Co., Ltd.	
Berger C. L. & Sons	12	General Engineering Co.	12	Nova Scotia Steel & Coal Co.	
Brigstocke, R. W.	10	Gilman, R. T. Co.		Nova Scotia Government	
British Columbia, Prov. of	10	Goldsmith Bros., Smelting & Refining Co., Ltd.	10	O	
Burns & Roberts	10	Greening, B. Wire Co.		Ontario, Province of	13
Burnett & Crampton	30	Goodyear Tire & Rubber Co. of Canada, Ltd.		P	
C		H		Q	
Campbell & Deyell, Ltd.	11	Hadfields, Ltd.		Quebec, Province of	
Canadian Allis-Chalmers, Ltd.		Hall, G. C. & Co.		R	
Can. Chicago Bridge & Iron Works		Hamilton Gear & Machine Co.	10	Pacific Coast Pipe Co., Ltd.	30
Canadian Explosives, Ltd.		Hardinge Conical Mill Co.		Peacock Bros., Ltd.	
Canadian-Fairbanks-Morse Co., Ltd.	16	Hassan A. A.	11	Pennsylvania Smelting Co.	12
Canadian H. K. Porter, Ltd.	12	Hendrick Mfg. Co.	12	Powley & Townsley	30
Canadian Milk Products		Hersey, Milton Co., Ltd.	11	Prest-O-Lite Co. of Canada, Ltd.	26
Canadian National Railways		Heys Thomas & Son	11	S	
Canadian Ingersoll-Rand Co., Ltd.		Hull Iron & Steel Foundries, Ltd.	14	Salisbury Electric Co., Ltd.	
Canadian Laboratories, Ltd.	11	Hoyt Metal Co.		Smart-Turner Machine Co.	7
Canada Foundries & Forgings, Ltd.	1 & 10	I		Smith & Travers Company	11
Canada Wire and Cable Co.	6	Imperial Bank of Canada		Standard Underground Cable Co., of Canada, Ltd.	
Canadian Rock Drill Co.		International Business Machines		Stewart, Robert H.	11
Canadian Steel Foundries		International Nickel Co.	8	Sudbury Diamond Drilling Co., Ltd.	11
Canada Carbide Company		Inglis, J. & Co.	9	Sullivan Machinery Co.	2
Canada Metal Co.	5	J		Swedish Steel & Importing Co.	3
Canadian Brakeshoe Coy.	7	Johnston, Matthey & Co.	11	T	
Capper Pass & Son, Ltd.	12	Jones & Glassco		Toronto Testing Laboratory, Ltd.	11
Consolidated Mining and Smelting Co.	7	L		Toronto Iron Works	
Coniagas Reduction Co., Ltd.	9	Laurie & Lamb	34	Tyrrell, J. B.	11
Constant, C. L. & Co.	10	Ledoux & Co.	11	U	
D		Lindsey, G. C. S.	11	University of Toronto	10
Deister Concentrator Co.		Longyear, E. J. Company		W	
Denver Rock Drill Mfg. Co.		Lymans, Ltd.		Wabi Iron Works	6
Department of Mines Canada		M		Whitman, Alfred R.	11
Dewar Mfg. Co.	10	McDonald, M. P.	11		
Dewar Mfg. Co.	10	MacGovern & Co., Inc.			
Diamond Drill Carbon Co.	32	MacKinnon Steel Co., Ltd.	4		
Diamond Drill Contracting Co.	12	Marsh Engineering Works Ltd.	27		
Dominion Coal Co., Ltd.	7				
Dorr Co.	11				
Dresser, Jno. A.	11				
Dunlop Tire & Rubber Co., Ltd.					
Dwight & Lloyd Sintering Co., Inc.	10				
Dom. Engineering & Inspection Co., Ltd.	12				
E					
Electric Steel & Metals Co., Ltd.					
Engineering & Machine Works of Canada					
Everett & Co.	5				

Good Cores

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

Write or wire at our expense for particulars.


THE DIAMOND DRILL CARBON CO.

Direct Importers of

GARBONS BALLAS BORTZ

61 PARK ROW

New York - N.Y.



NOW READY

Canadian Mining Manual

1918

Edited by Reginald E. Hore

Bound in Cloth.
360 Pages

Price \$5, post paid.

Bound in Leather, \$7
290 Illustrations

30 COLORED PLATES

**Information concerning all Minerals
and Metals Produced in Canada.**

**Information concerning all Mining
Companies Operating in Canada.**

The Illustrations include: 30 Colored Plates showing Canadian Ores; Maps of Mineral Areas; Photographs of Mining Plant and Equipment; Photographs of Men connected with the Industry.

Send Orders to—

MINES PUBLISHING CO.

Garden City Press,

Ste. Anne de Bellevue, QUEBEC

or to—

TORONTO OFFICE, 1402 C.P.R. Bldg., TORONTO

BELLISS & MORCOM

Air Compressors

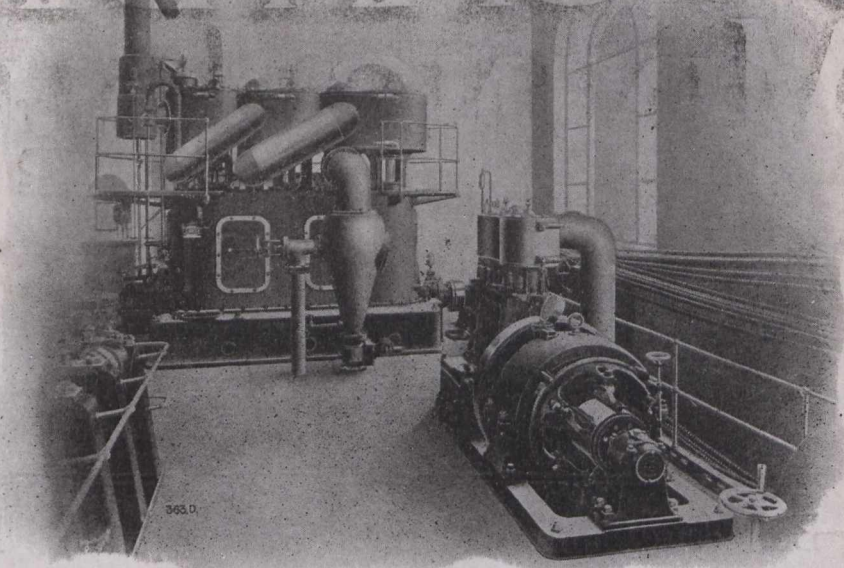
Diesel Engines

Steam Turbines

Condensers

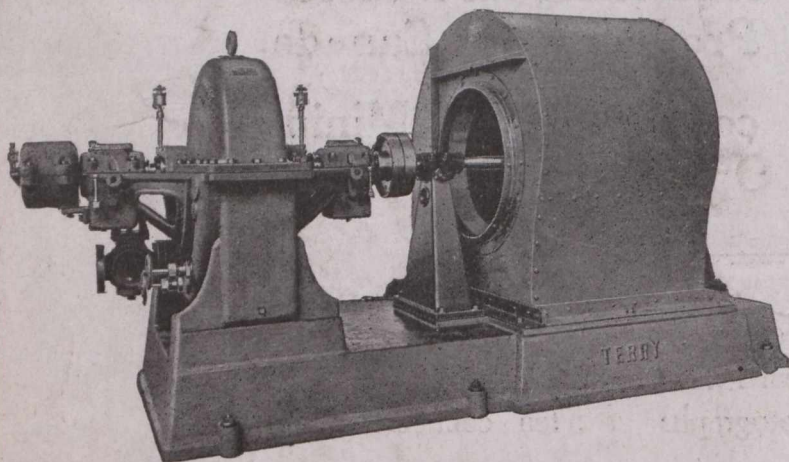
Steam Engines

**LAURIE
& LAMB**



TRIPLE AND COMPOUND ENGINES.

211 BOARD OF TRADE BUILDING, MONTREAL



TERRY FORCED DRAFT UNIT
Used extensively because of
its flexibility, reliability
and low cost of up-keep.

From 0 to Full Speed
In Less than 60 Seconds

is made possible by the sturdy design of the Terry turbine and the fact that the case is only subject to exhaust pressures and temperatures. When occasion arises to suddenly throw into operation standby apparatus you will be insured of instant and reliable operation of your auxiliaries if they are driven by

THE TERRY TURBINE

Because of the unique construction of the Terry Wheel, water carried over from the steam line does not injure the turbine buckets, nor does it impair proper operation.

The simplicity, accessibility and reliability of this turbine is such as to warrant your immediate investigation. Write for Bulletin 24 for the many reasons why you should

Specify Terry for Driving Your Auxiliaries

FRASER & CHALMERS OF CANADA

GUARANTEE BUILDING

LIMITED

MONTREAL, QUE.