




CANADIAN



MINING JOURNAL

VOL. XL

TORONTO

No. 2

HULL IRON & STEEL FOUNDRIES, LIMITED
HULL, QUE.

Gentlemen,

In reply to your enquiry as to the satisfaction given by Krupp Mill Plates and No. 85 Smidth Kominuter Plates supplied by you, they are both highly satisfactory.

With reference to the Krupp Mill Plates, these plates have given us about 1,000 hours' extra wear over plates supplied by the Krupp people, the manganese plates or any other plates that we have been using during the past three or four years. We have worn out two sets of these plates completely without their distorting or breaking.

With reference to the Kominuter Plates, we have had a set of these plates in the mill for the past six months. When the mill was inspected a week or so ago we found that they were in excellent condition and give promise of a good long life.

Yours truly,

CANADA CEMENT COMPANY, LIMITED

Plant No. 1

(Signed), F. B. KILBOURN

Superintendent

Write us for further information

HULL IRON & STEEL FOUNDRIES
HULL QUE.

Let Us Do Your Core Drilling

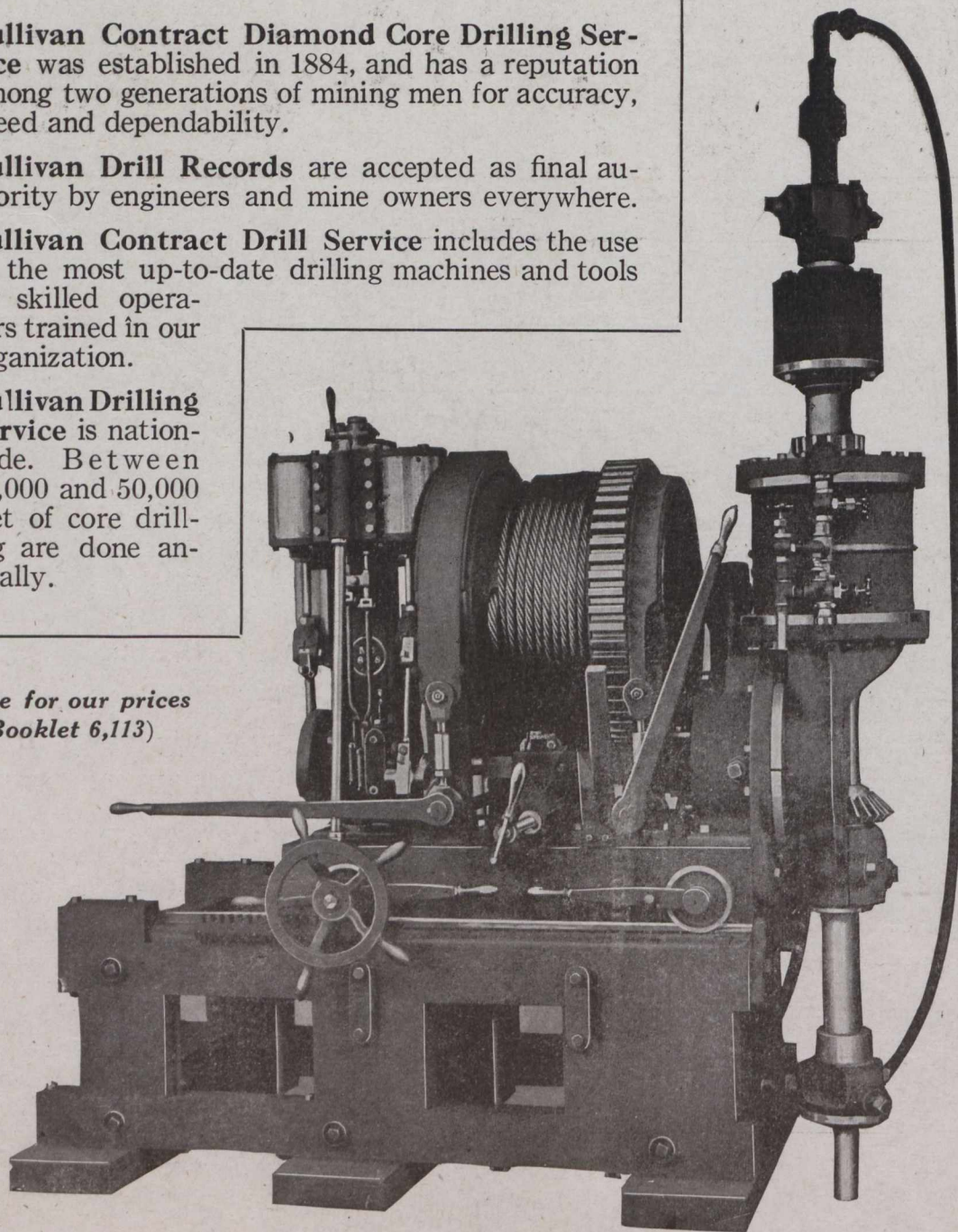
Sullivan Contract Diamond Core Drilling Service was established in 1884, and has a reputation among two generations of mining men for accuracy, speed and dependability.

Sullivan Drill Records are accepted as final authority by engineers and mine owners everywhere.

Sullivan Contract Drill Service includes the use of the most up-to-date drilling machines and tools by skilled operators trained in our organization.

Sullivan Drilling Service is nationwide. Between 30,000 and 50,000 feet of core drilling are done annually.

*Write for our prices
(Booklet 6,113)*



SULLIVAN MACHINERY COMPANY

122 S. Michigan Ave., Chicago, Ill., U.S.A.

Boston, Mass.
Denver
Duluth

El Paso
Juneau
London, Eng.

Nelson, B. C.
New York
San Francisco

Spokane
Santiago, Chile
Sydney, N. S. W.

Toronto
Vancouver, B. C.
Wallace, Ida.



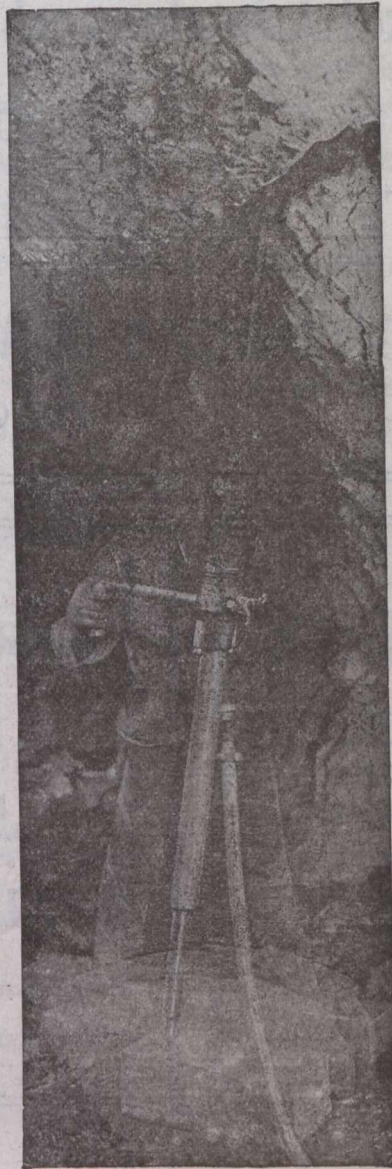
THE CIRCO PAGE

Illustrating Compressed Air Machinery, Tools and Appliances



The Stoper For YOUR Mine

Stopping is the hardest and most unpleasant of all drilling. Conditions are more exacting by far than for drifting or sinking. In selecting the stopping drill you look for a machine easily handled, with a reliable air feed under complete control, and one that will give the required footage without wearing out the drill runner and with a low repair bill.



The CC-21 illustrated here, is the result of many years experiment in stopping drills. The control is simple—only one control handle—the drill is not heavy on the runner, pressure on the air feed can be varied for the starting of holes; the machine is powerful, but does not burn the steels; the air consumption is low, and the upkeep bill unusually small.

Canadian Ingersoll Rand Company, Limited

Sydney

Sherbrooke

Montreal

Toronto

Cobalt

Winnipeg

Nelson

Vancouver

Deloro Smelting & Refining Co.

LIMITED

SMELTERS AND PRODUCERS OF

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

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 BEST BY TEST

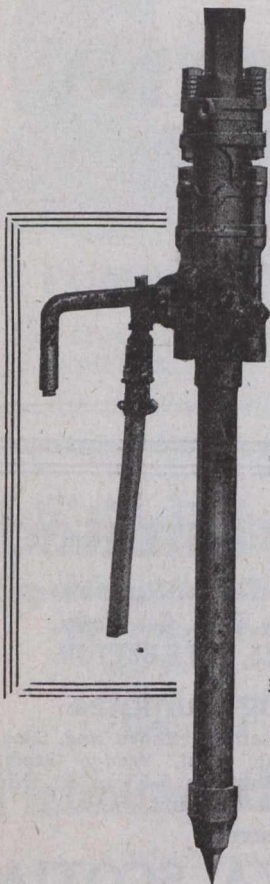
SISCO

Drill and Tool Steel

FOR SALE BY

**Northern Canada Supply
Co. Limited**

COBALT, HAILEBURY, SOUTH
PORCUPINE, TIMMINS



“TESTED”

The Last Word in Rock Drills

TESTED—the clinching quality or proven durability—means much to rock drill users. It means sure service—a long life for the Drill—and durability wherever used, with no long stops for repairs, because it is proven service.

Hundreds of Cleveland users after a long service of constant use against all conditions have sent back the verdict that for durability, labor and time saving “Cleveland” excels all.

We can prove these facts by use if you will only write for our Bulletin No. 35A.

CLEVELAND PNEUMATIC TOOL COMPANY

Of Canada, Limited

TORONTO,

ONTARIO

Used

Mining Equipment for Immediate Delivery

SUBJECT TO INSPECTION

Blake Crushers.
Fraser Chalmers Tube Mill
and Motor.
Power and Mining Tube
Mill and Motor.
Hardinge Ball Mill.
Air Compressor with Motors
Oliver Filters.
Alken Filters.

Pumps.
Tanks.
Belting.
Pulleys.
Boilers.
Steel Drills.
Sixteen-pound Rails.
Lighting Generators.

ZENITH COAL AND STEEL PRODUCTS LIMITED,
McGILL BUILDING, MONTREAL

Milling and Mining Machinery

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

Alex. Fleck, Ltd. - Ottawa

CASTINGS

that you can rely upon.

CASTINGS

made from best materials only.

CASTINGS

that will speed up production.

CASTINGS

that will mean time and money
to you.

Dominion Foundries and Steel Limited

HAMILTON, ONTARIO

E. J. LONGYEAR COMPANY

EXPLORING ENGINEERS

Diamond Drill Contractors and Manufacturers

Examination and Exploration of Mineral Lands

Shaft Sinking and Development

MINNEAPOLIS, MINNESOTA, U. S. A.

Nova Scotia Steel and Coal Co., Limited

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

Manufacturers of Hammered and Rolled Steel for Mining Purposes

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

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

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

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

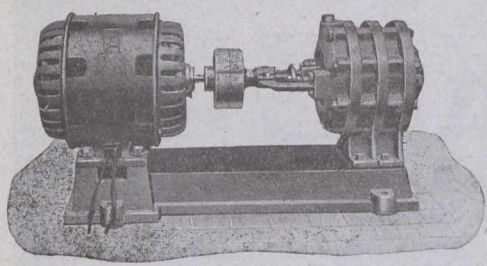


THE MOND NICKEL COMPANY, LTD.

39 Victoria Street, London, S.W.

Also Makers of

Copper Sulphate,
Nickel Sulphate, and
Nickel Ammonium Sulphate



Get our figures for your next requirements in

PUMPING MACHINERY

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




You get maximum efficiency from

HAMILTON CUT GEARS

Get our quotations

HAMILTON GEAR & MACHINE CO.
Van Horne St. - TORONTO

Goldsmith Bros.
Smelting & Refining Co., Limited
24 Adelaide St. W., Toronto,
New York Chicago Seattle

Refiners and Smelters

Platinum, Gold and Silver

PROMPT AND ACCURATE RETURNS

WOOD TANKS



for all purposes

Goold, Shapley & Muir Co. Limited
BRANTFORD, 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.

DIAMOND DRILL CONTRACTING CO.
SPOKANE, - WASHINGTON.

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

AGENCY:-
ROSSLAND, B. C.

SILICA QUARTZ

Large or small contracts wanted for shipment from our quarry at Waterfall, Ont. One man size only.
Commodity rates, Warrington Siding, C.N.R., to frontier points.

Telephones: Parkdale 3682-6715

Ontario Mining Products Co.
1265 QUEEN ST. W. - TORONTO, ONTARIO



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



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.

**ONE
METAL**

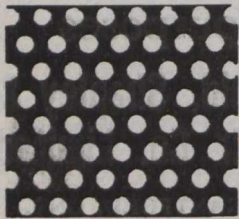
We are **SOLE PRODUCERS** of this natural, stronger-than-steel, non-corrodible alloy.

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

Send Enquiries Direct to Us

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

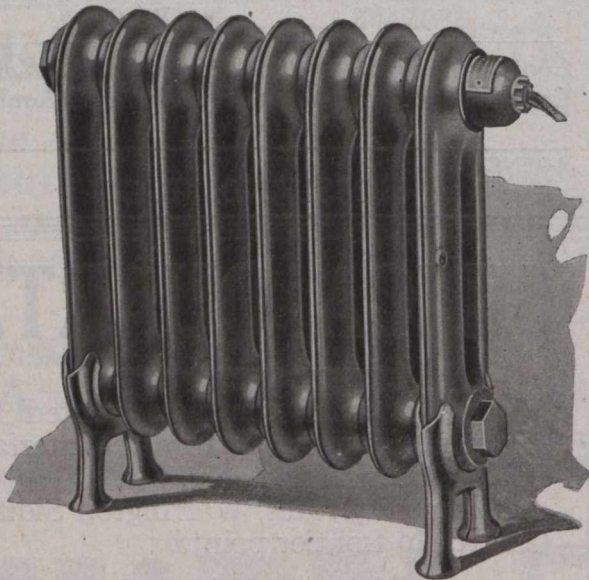
THE INTERNATIONAL NICKEL COMPANY
43 Exchange Place, - NEW YORK



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.



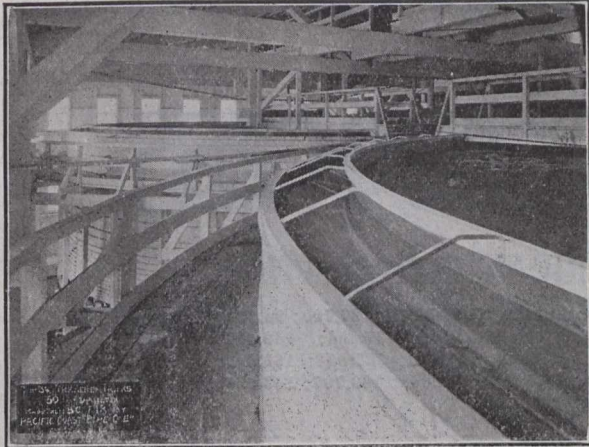
*Let Your
Electric Power
Keep You
Comfortable*

The Salisbury Electric Radiator

is a real radiator. It is built to last a lifetime.
Contains no water and requires no attention.

Write us to-day for full details of this radiator

The Salisbury Electric Company, Limited
615 Yonge Street, Toronto



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.

MacKINNON STEEL COMPANY, LIMITED

Formerly MacKinnon, Holmes & Co., Limited

SHERBROOKE - QUEBEC - CANADA

Engineers Contractors Manufacturers

STRUCTURAL STEEL AND STEEL PLATE WORK OF EVERY DESCRIPTION
TANKS BUILDINGS TOWERS CHUTES PENSTOCKS
SMOKESTACKS ORE BUCKETS CARS DRYERS AIR RECEIVERS
WATER JACKETS HOPPERS BALLOON FLUES SKIPS CYANIDE TANKS

WRITE US FOR PRICES

ESTABLISHED - 1875

IMPERIAL BANK OF CANADA

HEAD OFFICE : TORONTO

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

Branches in Northern Ontario at

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

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

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

OPPORTUNITIES

--for--

Prospectors and Mining Companies

The mineral wealth of Northern Ontario is enormous. From a few developed areas a very large output of nickel, copper, silver and gold is being made. Many promising areas are awaiting the prospector and miner.

Recently Northern Manitoba has become an important producer of copper ore, and many promising gold deposits have been located. This is an excellent field for the prospector.

One of the greatest factors in development of mineral areas is the provision of transportation facilities. Railways and the mining industry have together played a very important part in the development of several parts of Canada.

The Canadian Northern Railway, recently constructed across Northern and Western Ontario, has opened up for prospecting a large territory. Easy access to many promising areas is now available. Geological maps of some of these areas can be obtained from the Geological Survey, Ottawa.

The Canadian Northern Railway in Manitoba gives access to the Pas Mineral Area. In Alberta the Canadian Northern is serving important coal fields.

THE DEPARTMENT OF RESOURCES CANADIAN NORTHERN RAILWAY

The Department of Resources, Canadian Northern Railway Building, Toronto, will be pleased to furnish information about the districts served.

THE FLOTATION PROCESS

MINERALS SEPARATION NORTH AMERICAN CORPORATION

Is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,332; 129,819; 94,516; 96,182; 96,183; 99,743; 127,397; 129,820; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,608; 163,707; 163,936; 164,587; 165,390; 166,415; 167,474; 167,475; 167,476; 167,603; 187,263.

On December 11, 1916, the SUPREME COURT OF THE UNITED STATES unanimously adjudged our basic patent for air-froth-flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision.

On May 4, 1917, in the UNITED STATES DISTRICT COURT OF MONTANA, the opinion of Judge Bourquin was filed in the case of Minerals Separation Ltd., and others against Butte & Superior Mining Company, and was followed by a decree on September 17, 1917, wherein it was adjudicated that the three claims which had been limited by disclaimer were valid and infringed, and that the seven claims adjudged to be valid by the Supreme Court of the United States were infringed. The acts thereby adjudged to be infringement included the use of mixtures of petroleum oils and mineral-froth-forming oils in a total amount exceeding one per cent. on the ore, and also the use of Callow pneumatic cells.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

On November 11, 1918, the SUPREME COURT OF THE UNITED STATES granted the petition of Minerals Separation, Ltd., and others for a Writ of Certiorari to review the decree of the United States Circuit Court of Appeals at San Francisco which had reversed so much of the decree of Judge Bourquin in the suit against Butte & Superior Mining Company as adjudged to be infringements those acts which employed oil of any kind or character used in excess of one-half of one per cent. on the ore.

Prospective users of our flotation processes are earnestly requested not to be influenced by the views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

Minerals Separation North American Corporation

Head Office:
61 Broadway,
New York, N. Y.

Engineering Office:
220 Battery Street,
San Francisco, California.

Canadian Attorneys.

Messrs. Ridout & Maybee, Patent Solicitors, 59 Yonge Street, Toronto, Canada.

THE FLOTATION PROCESS

MINERALS SEPARATION NORTH AMERICAN CORPORATION

NOTICE

NOTICE is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

Notice is further given that no one is authorized to introduce our processes or apparatus into the United States, Canada or Mexico, without direct authority from us.

All applications should be made direct to

Minerals Separation North American Corporation

Head Office:
61 Broadway,
New York, N.Y.

Engineering Office:
220 Battery Street,
San Francisco, California.

or through

**Messrs. Ridout & Maybee, Patent Solicitors, 59 Yonge Street,
Toronto, Canada**

STEEL CASTINGS

Acid and Basic Open Hearth. Ferro Alloy.

CANADIAN STEEL FOUNDRIES, LIMITED

Transportation Building
MONTREAL

Western Representatives: Kelly Powell, Limited, 403 McArthur Building, Winnipeg.

BRITISH COLUMBIA

The Mineral Province of Western Canada

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

Aggregate Value of \$595,571,107

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

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

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

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

Mineral locations are granted to discoverers for nominal fees.

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

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

THE HON. THE MINISTER OF MINES
VICTORIA, British Columbia

To Users of the Callow Pneumatic Flotation Cell

THE recent decision in the Butte & Superior Suit with Minerals Separation has an important bearing upon the use of the Pneumatic, or Callow method of flotation.

The Appellate Court's decision at Philadelphia, in the Miami case, had already made clear the distinction between (1) froth produced by violent mechanical agitation of the Minerals Separation process, and (2) simple levitation by air bubbles, as practised in the Callow or pneumatic cell, without such agitation.

Now the Appellate Court at San Francisco has interpreted the United States Supreme Court's opinion in the Hyde case, whereby the Minerals Separation Patent was restricted to the use of a minimum, or 'critical' proportion of oil, in combination with violent mechanical agitation.

This latest decision of the Appellate Court in the Butte & Superior case, restricts the Minerals Separation basic patent to the use of a quantity of oil *not in excess of ten pounds (0.5%) per ton of ore, in combination with violent agitation*: it is a logical sequel to the Supreme Court's opinion and confirms the status of the Callow or Pneumatic method of flotation as distinct from the agitation-froth process.

Both the use (1) of oil in excess of ten pounds (0.5%) in combination with violent agitation, and (2) the use of the Callow system of aeration with any quantity of oil, appear therefore to be immune from any charge of infringement.

(Signed) J. M. CALLOW

159 Pierpoint St.

Salt Lake City, Utah

Where's your Camp?
Here's your Milk!

KLIM

No matter where your camp is located, or what facilities are available for getting in supplies, you can have naturally-flavored milk when you want it. Klim solves all milk problems. It is genuine pasteurized separated milk, reduced to dry powder form. The body-building elements and flavor of the liquid separated milk are unchanged.

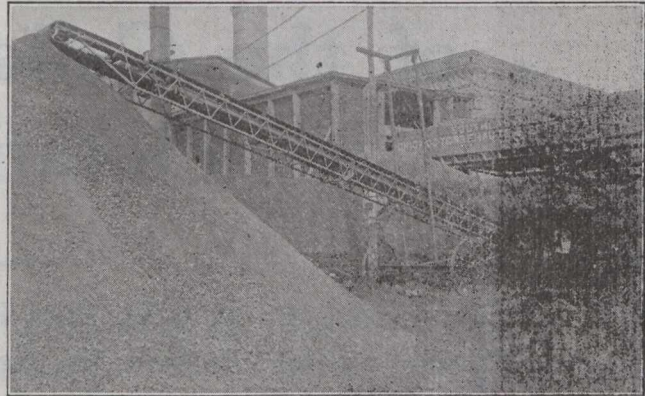
Klim bulks small, weighs little, is economical to ship. It costs less than other forms of milk, convenient, no waste, always available.

Klim is genuine—the flavor proves it.

Canadian Milk Products Limited
TORONTO -- MONTREAL

Stocked by all Wholesale and Retail Grocers
Canada Food Board License No. 14-242.

CUT UNLOADING COSTS
"B - G"
PORTABLE BELT CONVEYORS



SEND FOR CATALOGUE

MUSSENS LIMITED

MONTREAL

WINNIPEG

VANCOUVER

H. L. Usborne

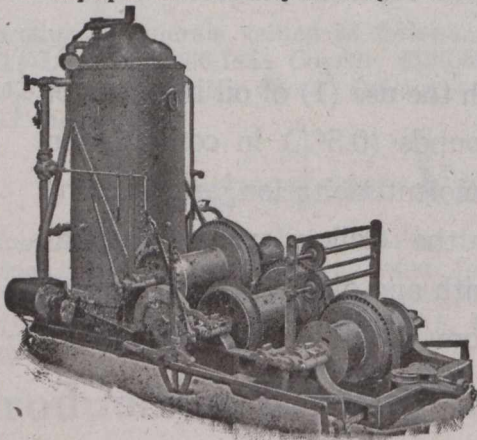
COBALT

H. Turnbull & Co.

TORONTO

"BEATTY"

Hoists, Cranes, Derricks and Material Handling
Equipment of every description.



Standard Two-Drum Hoist with Swinger
Engines for every kind of hoisting duty

"BEATTY PLANT" on your work means un-
interrupted service and complete satisfaction.

SEND FOR CATALOGUE TO-DAY

M. BEATTY & SONS, Limited
Welland, - Ontario

AGENTS:—H. E. Plant, 1790 St. James St., Montreal, Que.
E. Leonard & Sons, St. John, N.B.
Robert Hamilton & Co., Vancouver, B.C.
Kelly-Powell, Ltd., McArthur Bldg.,
Winnipeg, Man.

Dominion Coal Company

Glance 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 Glance 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.

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 Conditions maintaining therein.

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

J. J. Harpell, President and Managing Director,

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

H. W. Thompson, Western Manager,
Toronto Office, 412 C. P. R. Building,
'Phone Adelaide 3310.

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

REGINALD E. HORE, B.A., Editor,
263-5 Adelaide St. West, Toronto.

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

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

VOL. XL.

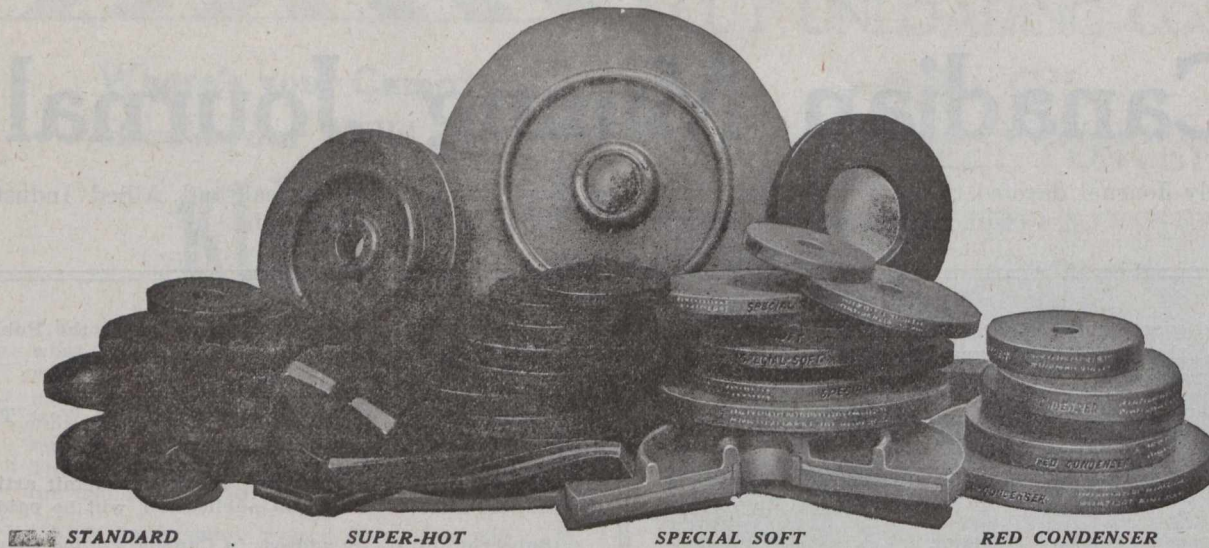
TORONTO, JANUARY 15th, 1919

No. 2

TABLE OF CONTENTS

Editorials:

Nickel Copper Mining in Canada.....	17
Are We Making the Most of Our Opportunity?.	17
Port Arthur Wants Iron and Steel Works.....	18
Imperial Mineral Resources Bureau.....	20
Coal Miners of B. C. and the War.....	21
Opportunities for Prospectors in the Country Traversed by Pacific Eastern Ry.....	22
Shell Company Would Explore Northern Alberta for Oil	23
H. H. Stevens Urges Government Ownership of Smelters	23
Rossiter W. Raymond, Obituary.....	24
A Temporary Lull in Metal Business.....	26
Consolidated M. & S. Co's Annual Report.....	27
Four Rope Hoisting System for Nanaimo Collieries	27
Metal:	
The Canadian Honorary Advisory Council of Scientific Research	28
Special Correspondence	29



Rub-Steel Valves

"THE VALVE WITH A BACKBONE"

What is it? THE RUB-STEEL VALVE is a valve made by a combination of rubber and steel.

The Construction The construction consists of a plate of high grade steel placed in the centre of the valve with a specially tough and lasting rubber composition on each side and edge, attached securely and lastingly to the metal by the Elchemo process, which chemically unites the rubber and steel.

The Purpose The steel plate gives such strength to the valve that the highest pressure cannot warp, twist or in any way get it out of shape, while the rubber surfaces afford the proper seating qualities. **"Better than Metal Because of the Rubber—Better than Rubber because of the Metal."**

What It Accomplishes It gives the valve a rigidity of form. It keeps the surface of the valve in its normal true position and insures a better seating quality. It prevents the high pressure from forcing the valve through the grating. It prevents the rubber from breaking up and the pieces causing trouble. It holds the surface of the valve in shape, so that when one side becomes worn the valve can be reversed without dressing. It is thinner and therefore gives greater efficiency to the pump. It permits the use of a softer valve for hot water, thus securing a better seat on worn or uneven "grids." It ensures an even distribution of the pressure, preventing "dishing" and the consequent cutting of the valve.

Why You Want It. **Because** its ultimate cost is less than that of ordinary type valves. **Because** it will last longer than either valves. **Because** it saves time and annoyance of replacement. **Because** its construction at once appeals to you as practical and sensible.



The Canadian Fairbanks-Morse Co., Limited

"Canada's Departmental House for Mechanical Goods"

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

EDITORIAL

\$220,000,000 IN 1918.

The total value of the mineral production in Canada during 1918 was probably not less than \$220,000,000. The total value of the production in 1917 was \$189,646,821.

The Department of Mines estimates the production of coal during 1918 at about 15,180,000 short tons, as compared with a production of 14,046,759 short tons during 1917.

The production of the more important metals during 1918 is estimated as follows, viz.: Gold, \$14,750,000 in value; silver, 20,800,000 ounces; copper, 117,000,000 pounds; nickel, 91,500,000 pounds; zinc, 36,000,000 pounds; pig iron, 1,182,000 short tons; steel ingots and castings, 1,010,000 short tons.

The production of these metals in 1917 was: Gold, \$15,272,992 in value; silver 22,221,276 ounces; copper, 109,227,332 pounds; nickel, 82,330,280 pounds; zinc, 29,568,764 pounds; lead, 32,576,281 pounds; pig iron, 1,170,480 short tons; steel ingots and castings, 1,745,734 short tons.

NICKEL-COPPER MINING IN CANADA.

About 45,000 Tons Nickel and 13,000 Tons Copper, Valued in Matte at \$36,000,000, from Sudbury District in 1918.

The year 1918 is one of unusual interest in the nickel-copper industry of Canada. The large production of nickel-copper matte was of itself a notable accomplishment, when the shortage of labor is considered. More remarkable than this, however, was the big advance towards making Canada the world's chief source of refined nickel, as well as of matte. The Port Colborne, Ontario, refinery began operations in July, 1918, and is now producing large quantities of nickel. Another refinery is in course of construction at Deserenes, Quebec.

During the first nine months of the year 1918, the smelters at Copper Cliff and Coniston treated 1,141,089 tons of ore, producing therefrom 64,926 tons of nickel-copper matte valued at \$26,925,872 containing 33,688 tons of nickel and 17,232 tons of copper. Production for the year will be about 45,000 tons nickel and 13,000 tons copper. The value of the matte produced during the year will be about \$36,000,000. As a considerable amount of this matte is now being treated at the refinery of the International Nickel Co. of Canada at Port Colborne, and added value will be given that will swell this total. During 1919 a much larger portion of the matte will be refined in Canada.

The new refinery, started in July, had produced at the end of September 358,205 lb. of nickel and 359,713 lb. of copper. This is much more nickel than had previously been produced, and is the first large production of refined copper. Until July, 1918, the refined nickel produced in Ontario was a by-product from the treatment of Cobalt silver ores, which contain silver, cobalt, nickel and arsenic. All the nickel-matte from the Sudbury district formerly went abroad, most of it to the United States and the remainder to Wales. It is hoped that from now on an ever-increasing proportion of the matte will be refined in Canada.

During the war we were handicapped by the lack of refining facilities. Fortunately it was found possible to prevent nickel from going to our enemies during the war; but we were not in a very strong position, owing to the necessity of exporting our matte in order to have it refined. We will not likely ever be in that position again.

At the mines and smelters the shortage of men has naturally necessitated that attention be specially given to maintaining output at as near capacity as possible. Nevertheless, improvements have been made during the war that will make more efficient operations in the years ahead. The Sudbury nickel-copper industry continues to grow and the operating companies can look forward to a long and prosperous life. Nickel and copper have, of course, been recently chiefly in demand for war purposes; but nickel and copper have a variety of uses that insure a big demand in peace times also. The cessation of war orders will necessitate more attention being given to markets; but we have no doubt that markets will be found.

ARE WE MAKING THE MOST OF OUR OPPORTUNITY?

Next to agriculture, mining is Canada's greatest basic industry. It is from the mines that we obtain our fuels, much of the material used in manufactures, and for building materials. Next to food, the mine products were the most necessary things used by our valiant soldiers in winning the war. Like food, mine products will be very necessary during the period of reconstruction. The Canadians who interest themselves in mining have good reason to believe that our mining industry will expand enormously if carefully handled during the coming years. They believe that rapid development of our mineral resources will help to make the Dominion prosperous. They know that Canada has natural resources

which place her in a very advantageous position now. They appreciate also that the mere having of these resources will not avail us much unless we proceed with development more rapidly than ever. Ore in the ground on undeveloped property is of comparatively little value. The benefits it can give come only with the expenditure of capital and labor. The sooner we can find the necessary money and men to develop our mineral resources the greater will be their value as a source of wealth to the country.

The Right Honourable Lloyd George, in proposing peace terms before the Trades and Labour Council of Great Britain, said: "Economical conditions at the end of the war will be in the highest degree difficult, owing to the diversion of human effort to warlike pursuits. There must follow a shortage of raw materials, which will increase the longer the war lasts, and it is inevitable that those countries which have control of raw materials will desire to help themselves and their friends first. Apart from this, whatever settlement is made, will be suitable only to the circumstances under which it is made, and as those circumstances change, changes in the settlement will be called for."

Alfred Ballin, organizer and administrator of the German shipping trust in a recent letter to Dr. Ratheman, of Berlin, remarked as follows: "You do not believe in the silly assertion that after the war these British markets for raw materials will be open to us? What a prospect! Out of the British Empire are produced countless articles on which we have hitherto relied and which will be indispensable in the future if we are to swim and not to sink."

We have the raw materials. We have the opinion of well informed men that the possession of these raw materials puts us in a peculiarly fortunate position. To derive the advantage which this position gives us it is essential that we proceed at once to use these materials. We do not conserve by neglect to use. We do not help to pay the interest on Government bonds when we leave potentially valuable ores in the ground. We should speed up development. We should recover more gold from the ground and put that gold to work; it yields no interest in the form of undeveloped ore.

Much progress has been made in developing our mineral resources in recent years. The value of our production of minerals for the year 1918 was about twenty times that of the year 1886. The value per capita last year was about ten times that of 1886. Nearly every year since 1886 there has been both an increase in value and per capita. Our production at the present is at the rate of about \$200,000,000 annually. Much of this product of the mines is manufactured in Canada into a countless variety of useful things, thereby increasing in value by many millions of dollars.

We should, however, not be content with this record. We should awaken to the fact that we are proceeding too slowly. There is much good work being done by operators and by Government departments; but we need more workers and more encouragement for them.

A FAIR DAYS WORK FOR A FAIR DAYS PAY

Steps have been taken by the management of the Consolidated Mining & Smelting Co. to secure the cooperation of its officials and men at Trail, B.C., in meeting and tiding over the period of slackness which it is foreseen must be expected if the present unsatisfactory condition of the metal market continues. Two employees from each of the nine departments of the smelting and refining works were called into conference recently by the assistant manager, Mr. S. G. Blaylock. At this conference the future was frankly discussed, and it was pointed out by the management that it would be necessary for all identified with the industry to work together in the determination to maintain the highest degree of efficiency if the conditions likely to be encountered in the immediate future were to be satisfactorily overcome. Mr. Blaylock explained to the men that the company wished to continue in operation as long as the metal situation would permit. Parts of the plant might at times be temporarily idle but, with the maintenance of efficiency, other work would be found for the men, possibly along the line of construction. All he asked for was a fair day's work for a fair day's pay, and he would leave it to the conscience of each one to decide whether such was being rendered. Questions were asked by the men's representatives relative to the prospects, and answered as fully as the information available permitted. The discussion concluded with a complete understanding between management and the men, and it is confidently believed that the two will work together amicably and enthusiastically to the end that the difficulties expected may be tidied over without recourse to any drastic measures.

PORT ARTHUR WANTS IRON AND STEEL WORKS.

The granting by the Dominion Government of 50 cents a ton bounty on all iron mined and smelted in Canada and the establishment, by authority and with the support of the Federal Administration, of a large blast furnace and steel plant at or near the city of Port Arthur, Lake Superior, are two important petitions to be laid before Premier Borden and his colleagues at an early date by the people of the district of Port Arthur.

Arguments for the granting of a bounty are enumerated as follows: That during the last decade over 90 per cent of the product of the Canadian furnaces was from im-

ported ore, of which 58 per cent came from the United States Lake Superior mines and 41.9 per cent from the Newfoundland mines.

That the proportion of domestic iron ore smelted in Canada has gradually declined until in 1917 it was only 4.23 per cent.

That the iron ores of Canada are sufficiently known to warrant the statement that there is a large tonnage that could be made available for use by some preliminary treatment, if the increased cost of such treatment were compensated for by a bounty, as the ores of the Atikokam Range require roasting, Loon Lake ores hand sorting, Magpie siderite ores calcining, and Moose Mountain and Bathurst ores concentrating.

That extensive areas of promising iron formations have been located in many parts of Canada and it is reasonable to expect that the concentrations of merchantable ore will be found in these ranges when systematically exploited, especially on the Steep Rock, Mattewan, Kaministiquia, Nipigon, Little Long Lake and Michipicoten district.

That the granting of a bounty on iron ore would stimulate the prospecting of these areas, and probably secure the active operation of several mines already developed and equipped at a heavy expenditure in Northern Ontario and provide remunerative freight traffic to several sections of the Canadian Government railways that are at present apparently unproductive.

That the increased employment of mine operators, explorers and transportation employees, together with the general development of the iron mining districts, would so materially increase the customs receipts of Canada that the proposed bounty would be a very small tax (if any) on the finances of the Dominion.

Some of the points made in support of the plea for a Dominion Blast Furnace and Steel Plant are:

That practically all the steel plants in the Dominion are in Eastern Canada and have received \$16,000,000 in bounties.

That between 1905 and 1915 Canada imported iron and steel products to the value of about \$632,000,000.

That the population of Western Canada is now over 2,000,000 and in ten years has increased 174 per cent, whereas that of Eastern Canada has increased only 17 per cent.

That there are about 19,000 miles of railway in Western Canada radiating westward from the City of Port Arthur and manufacturing plants representing over \$308,000,000.

That the United States Steel Company some years ago erected a large steel plant at Duluth at a cost of over \$25,000,000 to supply the requirements of the Western States and is about to proceed with the erection of additional mills at a cost of approximately \$15,000,000.

The policy recommended to the Dominion Government in the launching of the proposed industry is that

the cost be placed at about \$15,000,000 and that the interest for thirty years on eighty per cent of the actual capital invested be guaranteed or that the same guarantees be allowed as have been given to Canadian dry docks and shipbuilding plants to the extent of about \$13,000,000.

VANCOUVER BOARD OF TRADE ASKS FOR ORE TESTING PLANT.

A petition that an ore testing plant be established in British Columbia, and that the drilling of the placer ground of the Tulameen River be continued will be presented to the Dominion Government by the mining Bureau of the Vancouver Board of Trade. The same organization proposes asking the Provincial Government for an explanation of its failure to diamond drill iron properties of the Province in order to arrive at an estimate of the available tonnage of magnetite and hematite ores.

With respect to the ore testing plant it is asserted that British Columbia operators are handicapped because they have to send sample shipments to Ottawa for treatment, a procedure which is both costly and slow. The type of plant required would cost only about \$75,000, it is stated, and such an expenditure would be amply repaid in benefit to the mining men and the industry.

As to the Tulameen platinum operations it will be pointed out that during the past three months fourteen holes have been drilled and that the showings obtained fully warrant further prospecting. To discontinue the work now, it is argued, would be wasteful and unjustified. It has been demonstrated that this valuable mineral exists in the placer ground and the commercial possibilities of the resource should be determined before the work is abandoned.

It also was felt that no further time should be lost by the Provincial Government in taking action towards obtaining exact and authoritative information on the iron ore deposits of the Province.

P. B. Freeland, Resident Mining Engineer for the British Columbia Government, with headquarters at Grand Forks, B.C., who formerly was with the Granby Consolidated Mining & Smelting Co., was married recently at Vancouver, his bride being Miss Mary Bagley, of that city.

Mining Convention in Vancouver in March.

An International Mining Convention will be held in Vancouver (B.C.), sometime during the month of March, 1919. It had been proposed that this gathering should be called for January, but a postponement to the latter date has been agreed upon by the members of the Vancouver Chamber of Mines. The Convention has the endorsement of Hon. Wm. Sloan, Minister of Mines, and the Resident Mining Engineers of the various mining districts of the Province are expected to take an active part. The proceedings are likely to be of special importance, because of the problems which will come up for consideration.

Imperial Mineral Resources Bureau, London, Eng.

When the war came on the British Empire found that the enemy had more or less complete control of certain mineral industries of vital importance. Germany had been importing minerals and ores from various parts of the British Empire, refining them, and, in some cases, selling a part of the refined materials to the British. Early in the war it was found that while certain minerals and ores could be produced in quantity, facilities for refining them were either entirely lacking or were inadequate. It was decided that this state of things should not be allowed to continue, and great advances in metallurgy and the mineral industry generally, have been made in Britain during the war. The Scientific Products Exhibition held in King's College, Strand, August 12th to September 7th, 1918, and that of the Key Industries in Central Hall, Westminster, some weeks later, were illuminating as to the independence Britain now occupies.

Imperial Mineral Resources Bureau.

On the subject of the Empire's Mineral Resources, the Imperial War Conference, at its sittings in June and July, 1918, dealt with the following Memorandum prepared by the Minister of Reconstruction:—

1. In accordance with Resolution No. XIII of the Imperial War Conference, 1917, and following the report of a Special Committee presided over by Sir James Stevenson, steps have now been taken to establish the Imperial Mineral Resources Bureau.

2. In accordance with the recommendations for the constitution of the Governing Body contained in Sir James Stevenson's Report, the following representatives have been nominated on behalf of the Governments concerned:—

Chairman of the Governing Body (and Representative of the United Kingdom): Sir Richard Redmayne, K.C.B..

Canada: Dr. Willet G. Miller.

Commonwealth of Australia: Mr. W. S. Robinson.

New Zealand: Mr. Thomas Hutchinson Hamer.

Union of South Africa: The Right Hon. W. P. Schreiner, C.M.G.

Newfoundland: The Right Hon. Lord Morris, K.C.M.G.

India: Mr. R. D. Oldham, F.R.S.

Colonies and Protectorates: Mr. J. W. Evans, D.Sc., LL.B.

3. As regards the proposed representatives of mineral, mining, and metal industries, owing to the magnitude and complexity of the interests involved and the obvious desirability of having at the disposal of the Governing Body the best expert knowledge available, it is desired to increase the number of these representatives to six instead of the four originally recommended in Sir J. Stevenson's Report, to which the Dominion Governments have agreed. If this is accepted by the participating Governments it is proposed to nominate the following:—

Westgarth Forster Brown, Esq. (A leading consulting mining engineer, especially in regard to coal and coal mining; Mineral Adviser to His Majesty's Woods and Forests; Deputy Gravel-ler of the Forest of Dean, with experience in many Colonies.)

Professor H. C. H. Carpenter. (President of the Institute of Metals; Professor of Metallurgy in the Royal School of Mines.)

Dr. F. H. Hatch. (Ex-President of the Institution of Mining and Metallurgy; now advising the Ministry of Munitions on iron ore supplies. Has world-wide experience in metalliferous mining, and is a member of the Mineral Resources Advisory Committee of the Imperial Institute.)

Sir Lionel Phillips, Bart. (The well-known authority on South African mining; formerly President of the Chamber of Mines, now Comptroller of the Mineral Resources Development Department, Ministry of Munitions.)

Edgar Taylor, Esq. (Of Messrs. John Taylor and Sons; retiring President of the Institute of Mining and Metallurgy; an authority on gold mining.)

Wallace Thorneycroft, Esq. (President of the Institution of Mining Engineers; an authority on questions of iron mining and working.)

4. It is desirable to submit to the present Imperial War Conference proposals as to the position of the Bureau and its status in the machinery of Government.

The duties of the Bureau are thus defined in Resolution XIII, passed by the Imperial War Conference on the 23rd April, 1917:—

"The Bureau should be charged with the duties of collection of information from the appropriate departments of the Governments concerned, and other sources, regarding the mineral resources and the metal requirements of the Empire, and of advising from time to time what action, if any, may appear desirable to enable such resources to be developed and made available to meet the metal requirements of the Empire."

This definition is expanded, as follows, by Sir James Stevenson's Committee:—

"(a) To collect, co-ordinate, and disseminate information as to resources, production, treatment, consumption, and requirements of every mineral and metal of economic value.

"(b) To ascertain the scope of the existing agencies, with a view ultimately to avoid any necessary overlapping that may prevail.

"(c) To devise means whereby the existing agencies can, if necessary, be assisted and improved in the accomplishment of their respective tasks.

"(d) To supplement those agencies, if necessary, in order to obtain any information not now collected which may be required for the purposes of the Bureau.

"(e) To advise on the development of the mineral resources of the Empire or of particular parts thereof, in order that such resources may be made available for the purposes of Imperial defence or industry."

5. The constitution, as suggested by Sir James Stevenson's Committee, is as follows:

"The administration of the Bureau should be controlled by a Governing Body representing the various parts of the Empire, as well as the mineral, mining, and metal industries. This body should be responsible for the appointment of a Director, or such other official or officials as may

be considered desirable, and the necessary subordinate staff, within the limits of the funds available for administrative expenses."

The Committee further suggested that the expenses of maintenance of the Bureau (being a sum not exceeding, for the first year of existence, £10,000 per annum) should, for the time being, be voted by the Imperial Parliament, on the advice of the Minister of Reconstruction, although the view was held by some of the Committee that from the outset direct contributions to the maintenance of the Bureau should be borne by all the Governments concerned.

6. It is proposed that the Bureau should be granted Incorporation by Royal Charter, which should define the constitution and the duties of the Bureau. The Governing Body will be established on the lines laid down by Sir J. Stevenson's Committee, with such alterations as may be approved by the Imperial War Conference.

7. As to expenditure, each Government would, of course, pay the expenses of its own representative. The normal expenditure of the Bureau would be met out of funds contributed by the Imperial Government, as suggested in the Report of Sir James Stevenson's Committee, together with such contributions from the Oversea Governments as they may, by agreement, be prepared to make.

This arrangement shall continue for three years, before the end of which time the question as to the contribution to be made by the Oversea Governments shall be brought up for discussion at an Imperial Conference.

8. Power should be given in the Charter to hold and deal with moneys which would be placed at the disposal of the Bureau by way of grants in aid contributed by the Imperial and Oversea Governments. Annual reports on the work of the Bureau shall be made to each of the Governments concerned.

Resolution XVI.

The resolution made was in the following terms:—

The Imperial War Conference, having considered the memorandum by the Minister of Reconstruction on the Imperial Mineral Resources Bureau, as amended, agrees that the number of representatives of the mineral, mining, and metal industries on the Governing Body of the Bureau should be increased from four (as originally agreed) to six. The Conference further approves the proposal for a Charter of Incorporation as set out in paragraph 6 of the memorandum and the proposals in paragraphs 7 and 8 as to the allocation of expenditure.

In accordance with the recommendation of the Conference the organization of the Bureau has been proceeded with and a charter applied for. Meetings of the Board of Governors, whose names are given above, have been held periodically, and committees on organization, finance, etc., have been at work. Thus far the meetings have been held in the Ministry of Reconstruction, but it is hoped that the Bureau will soon have a home of its own, probably in the vicinity of the Strand or Kingsway. It is already evident that there is much important work waiting to be undertaken by the Bureau which can be of great service to the Empire.

Mr. A. L. Larsen, until recently draftsman for the Consolidated Mining & Smelting Co., at Trail, B. C., is leaving for San Francisco, where he has been appointed to a position with a metallurgical concern.

COAL MINERS DID THEIR SHARE OF WAR WORK.

In discussing the contributions made by the different coal mining centres of British Columbia towards winning the war the labor paper of British Columbia, in a recent issue, gives figures and mentions many individual instances which indicate that the records of all these communities has been all that could be desired.

Introducing the article in question the editor says:

"At the commencement of the war it will be remembered that the conditions in the mining industry, in common with many others, were somewhat parlous. Hundreds of long resident miners had already departed for other fields and many to other countries. In addition to these facts the call from Britain for industrial workers was readily responded to, and the commissioners enrolled men freely from the mining camps for this purpose. Many aliens have been introduced into British Columbia, and, particularly on the Island (Vancouver Island), the Asiatic miners have replaced the white by hundreds. Therefore any comparisons of number of enlistments to miners employed would be completely misleading unless these facts are also considered in connection with the very incomplete returns from the whole of the province."

Officials of District 18, U.M.W. of A., which includes Eastern British Columbia and Alberta coal fields, are mentioned as follows:

John Larson, of Lethbridge, a member of the district executive board when he enlisted, who was killed in action.

Jack Price, an active member of the local union of the district, and a candidate at one time for the office of President, who went to the front and made the supreme sacrifice for his country.

Clement Stubbs, a former president of District 18, who was granted a commission and served as a lieutenant. He was twice wounded, but has come through some of the most severe actions with his life. He is a brilliant orator, and his return is looked forward to by fellow workmen, it being anticipated that he will resume a leading place in the counsels and the activities of the labor movement of western Canada.

Then there was W. L. Phillips, another ex-president of District 18, who was killed while on service.

After mentioning specially many of the residents of the City of Fernie, who gave their lives, and printing a long list of the members of Gladstone Local Union No. 2314 who enlisted, some of whose names are numbered among casualties who never will be seen again and others of whom are expected back shortly. Tom Blairmore and "Old" Bill Archer are referred to. They went away with a Tunnelling Corps. Both were well-known and popular, besides being prominent in labor circles. "Bill" returned with rheumatism, only to be killed in one of the Blairmore Mines two days after he went back to work.

The coal miners of Michel, B.C., are credited with having sent one-third of their numbers to the war, the total being 98 men, while from South Wellington, Vancouver Island, there went over forty of the union members. No roll was kept of the number of enlistments from the Cumberland District, Canadian Collieries, Ltd., but it is estimated that at least 300 went overseas. The Nanaimo Mines contributed proportionately.

OPPORTUNITIES FOR PROSPECTORS IN THE COUNTRY TRAVERSED BY THE PACIFIC GREAT EASTERN RY.

In a report just issued by the Geological Survey Branch of the Department of Mines, Ottawa, Mr. Charles Camsell, director of the British Columbia Station, gives an interesting and instructive account of a reconnaissance of the country in British Columbia, through which the Pacific Great Eastern Ry. passes.

After pointing out that the principal mineral deposits of the province are associated with Jura-Triassic rocks he states that the most important occurrences of these rocks along the route of the railway are: The Birken Bank, extending from north of Anderson Lake to Birkenhead River; Pemberton Band, lying between Spetch and Pemberton; the Mons Band, extending from Green Lake to Cheakamus River; while smaller bands are found at Watson, Brew and Bethel. These localities, therefore, are of special interest to prospectors.

"These conditions," Mr. Camsell continues "are most favorable for the occurrence of metallic deposits of copper, lead, zinc, gold and silver, and the whole interior of the coast mountains of British Columbia, therefore, becomes an excellent field for prospecting, and not only the eastern and western borders as was formerly believed to be the case. Fortunately the magnificent system of deep fiords that cut deeply into the heart of the ranges makes it possible to prospect for these bands of stratified rocks and to easily develop any ore deposits that may be found in them. Prospectors, therefore, are urged to pay more attention to the coast mountains than they formerly did."

Referring to the deposit of limonite at Alta Lake, which is now being developed for the purpose of supplying a fluxing material for the Irondale Wn. Smelter, Mr. Camsell states that it covers an area of 60,000 sq. ft., with a length of 450 ft. and a width of 250 ft. Analysis is given of 40.98 to 48 per cent metallic iron; 0.2 per cent to 1.80 per cent sulphur; 0.1 to 1.88 per cent phosphorous; and 1.24 to 2.2 per cent silica. Other small deposits of similar ore occur in the neighbourhood, originating from the decomposition of pyrite bearing rocks.

An examination also was made by Mr. Camsell of the district adjacent to the headwaters of the Indian River, where several claims have been located east of the Britannia Mine ore zone. He considers most of the deposits of a character different from that of the Britannia. A band of stratified rocks a mile or more in width extends along the valleys of the Indian and Stamish Rivers. These rocks are surrounded by the granite batholith and intersected by numerous dykes.

On the Belle group are four outcrops of ore which are respectively four feet, seven feet, ten feet, and thirty feet in width, and from which samples are said to average 3 per cent copper. The Bulliondale group is located on an extension of the same ore zone as the Belle. The London group has a large iron-stained outcrop in granodiorite, through which the pyrite is abundantly disseminated with a little chalcopyrite and some molybdenite. The Roy group was purchased last spring by the Britannia Mining & Smelting Co. for \$25,000 cash, and Mr. Camsell found on this group copper ore of high grade covering a surface area of 2,300 square feet. Bunches of pure chalcopyrite are common. Development consists of stripping and diamond drilling.

Mr. F. M. Bancroft, of the Geological Survey, makes

a summary report on the Slocan District in which connection he refers to the Manganese Deposits near Kaslo, B.C., and points out that the primary silicate, rhodonite, occurs in Ainsworth, Yale and Kamloops mining divisions. A close search, it is suggested, should be made for ores of zinc and superficial ores of manganese in the vicinity of these deposits. The mineral occurs near Kaslo in a vein three feet to four feet wide, between graphic schist and chlorite schist and is due to hydrothermal solutions occurring along a contact fissure.

The secondary deposits of manganese near Kaslo are declared to be the most notable yet discovered in British Columbia, the grade being good and averaging 48.14 per cent manganese and 1.65 metallic iron.

With reference to the Lardeau Mining Division, Mr. Bancroft states that the surface indications in the Lardeau Valley and through the whole central mineral belt are good and merit more intelligent investigation for gold, while the mineralization compares favorably with that of Sheep Creek, Ymir, Nelson and Bridge River. There are silver-lead deposits at the head of Cascade, Poplar, Tenderfoot and Mobbs Creeks. Manganese, tin, platinum and nickel are to be regarded as minerals of possible importance in this district and it is pointed out that pyrrhotite from the Queen Victoria mine at Beasley, west of Nelson, carried 0.41 per cent nickel.

Lorne Mine, Cadwallader Creek.

One of the promising gold properties of the Cadwallader Creek District, Kamloops Mining Division, is the Lorne Mine. During the past year, owing to labor scarcity and the comparatively low value of gold, the work has been confined largely to development. From development there were milled about 380 tons of rock yielding 192 oz. gold and 37 oz. silver.

Pioneer Mine.

The Pioneer Mine is another gold property of Cadwallader Creek which has been operated steadily during the greater part of the past year. Milling was started on the 10th March last and ceased on the 21st of July following. The sinking of a shaft was continued from the latter date, and now is down 280 feet from the collar. Drifting has been carried on at the 280 foot level for 120 feet and good values are shown. Headgear, hoist house and blacksmith shop were destroyed by fire on November 17th, but milling is expected to recommence in a short time. Gold produced during the year up to the 16th November totals 1,925 ozs., and it is estimated that the output to the end of the year will aggregate 2,500 ozs.

Plant Installed at Ida May Mine.

At the Ida May Mine, also situated in the Cadwallader Creek District, a reduction plant consisting of a small jaw crusher, a Huntington Mill, with a capacity of 10 tons every 24 hours, and an amalgamating table were installed during the past year. Power is supplied by a 10 h.p. gasoline engine. In a trial run 30 oz. of gold was secured. The property now is closed down, but it is expected that it will be again operated in the spring.

Mr. F. H. Hawkins, who for several years past has held the position of Chief Assayer for the Standard-Silver Lead Mining Co. of Silverton, B.C., has gone to Anyox, B.C., to accept a situation with the Granby Consolidated Mining & Smelting Co. Mr. Thomas Brown will succeed Mr. Hawkins at the Silverton Assay Office.

Shell Company Would Explore Northern Alberta for Oil

A story comes from Ottawa, by way of Winnipeg, which has aroused considerable comment and even excitement in the Canadian west. It is to the effect that a British corporation, the Shell Transport and Trading Company, Limited, is to be given a blanket concession to enter upon and develop all the oil-bearing lands of Canada lying in the Province of Alberta and north of the Athabasca River. The company is to have a free swing for five years to investigate the geological conditions of this vast territory and develop the same. The concession is to be in the nature of a vast monopoly, except that the rights of prospectors and lease-holders already on the ground are to be respected. The company is to do the exploration and development work at its own expense. The oil thus produced is to be handled by the company, which agrees to pipe it to the head of the lakes or to Vancouver. The company is to have a return of six per cent upon its investment, and the remaining profits are to be divided on a fifty-fifty basis between the oil company and the Dominion Government.

The story is substantially set forth in a despatch from Ottawa to The Manitoba Free Press, the leading newspaper of western Canada and a staunch supporter of the Union government. The Free Press correspondent says that the initial negotiations were conducted last summer in England between the directors of the Shell Transport and Trading Company, Limited, on the one hand, and on the other hand by Sir Robert Borden, Hon. N. W. Rowell, Hon. Arthur Meighen and Hon. J. A. Calder, representing the Dominion Government. No conclusion was thus arrived at, but the proposal is not said to be under consideration by the cabinet at Ottawa, and a decision is expected at an early date.

In justification of the proposed concession, it is stated that the vast oil-bearing lands of Alberta, are not being developed as they should be, and that the only oil company in Canada of sufficient financial strength to undertake their development is the Imperial Oil Company, a subsidiary of the Standard Oil Company of the United States. It is felt that the vast deposits of oil north of the Athabasca should be kept under British control and that if not developed by the Dominion Government as a national undertaking its development should be entrusted to a British corporation. The Shell Transport and Trading Company, Limited, has a capital of fifty million dollars and has large holdings in oil and concessions for the development of the same in Rumania, Egypt, Borneo, Sarawak and the United States.

The Ottawa correspondent of The Free Press evidently considers the proposed bargain to be a good thing, and in the course of his despatch says: "Under the present system of oil exploration in the Dominion private individuals may secure a lease on 1,900 acres. They have little in the nature of expert geological recommendations to go upon. Moreover, if they do strike oil the problem of refining it and bringing it to market is still to be faced. There would appear to be only one company in the Dominion capable of meeting that problem at the present time, namely, The Imperial Oil. But there are no indications that that company desires to embark upon Canadian oil exploitation in the west. The Shell Company undertakes, if oil is

found, to establish refineries and to undertake the piping of the oil to the head of the lakes or to Vancouver. The proposal has but recently come before the cabinet. It is under consideration now and a decision one way or another may be expected at an early date."—Toronto World.

H. H. STEVENS URGES GOVERNMENT OWNERSHIP OF SMELTERS AND REFINERIES IN BRITISH COLUMBIA.

Government ownership of smelters and refineries is advocated by Mr. H. H. Stevens, member of the Canadian House of Commons for Vancouver, B.C. Discussing the possibility of the development of a large metal manufacture trade in the Pacific Northwest, Mr. Stevens said that it was a matter which he had taken up with the Dominion Government, and with experts retained by the government. "In my opinion," he said, "we must begin, in British Columbia, with copper, zinc and lead. The first two are essential to the manufacture of brass. There is not only the home market in Canada, but a huge trade to be developed in the Orient in all kinds of metal manufacture." The raw materials were to be obtained by the establishment by the Dominion Government from its own smelters and refineries on this coast. Concerning the ore supplies necessary, he stated:

"As the mineral resources and their administration are under control of the Province, the co-operation of the Provincial Government would be necessary. As a corollary to the establishment of a Dominion smelter and refinery it would be necessary for the Provincial Government to impose such restrictions on the export of ore as would tend to direct these supplies to the Dominion smelter and refinery. It goes without saying that the smelter would have to give terms equal to those of the present smelters on the coast.

"As everyone knows, all the big mines and smelters except those of Trail, B.C., are owned by the American 'Copper Ring.' And even Trail is in the hands of the 'Ring' when it comes to marketing its product.

"The effect of a smelter operated in Vancouver would be to break the monopoly of the American 'Ring' as far as the metals of this Province are concerned. The Government could carry its product until market conditions were favorable, which might not be possible with a privately owned concern.

"No doubt, too, the establishment of such a smelter would result in the development of many new mines up the coast, and the extension of those now opened up as a constant market for their ores would be provided.

"Australia, Japan, China and all the other trans-Pacific countries use large quantities of manufactured metals, purchased largely in the United States. Our own raw metals go into those manufactures and American manufacturers derive the trade and the profit.

"The question of a smelter is now before the Government, backed by all the members from British Columbia and it will likely be brought up in the House of Commons during the coming session."

The Mining Convention, which was to have been held in Vancouver, B.C., under the auspices of the Vancouver Chamber of Mines during the first week in January, 1919, has been postponed indefinitely.

Rossiter W. Raymond

Secretary Emeritus, American Institute of Mining Engineers.

Dr. Raymond, to whom the term dean of mining engineers was fitly applied, passed away at his home in Brooklyn, N.Y., on Tuesday, December 31st. While the American Institute of Mining Engineers, with its world-wide membership, will always remain a monument to his genius, he was no narrow specialist. He was not only a great mining engineer, especially in the services rendered by him to the jurisprudence of mining, but was one of the greatest authors and one of the most eloquent speakers of his or any other generation in the technical world. At the dinner given by his friends in commemoration of his seventieth birthday, in New York, in 1910, Dr. Raymond's activities were epitomized by his pastor, the Rev. Dr. Lyman Abbott, of Plymouth Church, the successor of the great Beecher, as those of "sailor, soldier, engineer, writer, author, teacher, biblical critic."

Dr. Raymond was born in 1840, and when 18 years of age he set sail for Europe as a student. He became a recognized mariner before landing

"The good old Black Ball liner 'Great Western,' on which I embarked as a passenger in 1858, and became the third mate before the long, disastrous voyage was over, and the crippled vessel, with half a rig and half a crew, and on half allowance of water, crawled down the Irish Channel to reach Liverpool, and surprise the underwriters.

"After that initial unforeseen experience, I was brought by sea and land into contact with many peoples and many literatures, in scenes of peace and scenes of war; and I can now see that I unconsciously obeyed the maxim of Browning,

'Get thy tools ready,

God will find thee work.'

So that, when my work came to me, I was, without my own prevision or predecision, prepared to understand it, to love it, and, up to the measure of my strength, to do it."

From 1861 to 1864, Dr. Raymond served in the Union army in the great civil conflict.

A well known poem by Dr. Raymond is entitled *The Grand Canyon*, "the first line of which declares the great truth that the thoughts of God are on earth expressed."

As an author and critic, outside the domain of mining, it has been said, "Dr. Raymond has written excellent stories and his commentary on the Book of Job is a fine piece of biblical criticism."

Many writers, with more facile pens than ours, will describe Dr. Raymond's accomplishments and his achievements. We cannot do better for Canadian readers than to give quotations from speeches made by him in this country. They are messages to us which apply as well to-day as when they were delivered. Furthermore they illustrate Dr. Raymond's style as a speaker and a writer and his breadth of view.

During the last twenty-five years, under direction of Dr. Raymond as secretary, the American Institute of Mining Engineers has honored Canada by holding four meetings in this country. The term American, in so far as the Institute is concerned, as Dr. Ray-

mond was fond of emphasizing, means North American, and does not apply merely to the territory south of the Great Lakes. The Institute has always had an active membership in Canada and this country has almost always been represented on its Council or Board of Directors.

In 1893, the Institute met in Montreal, with excursions in the adjacent parts of Quebec. In 1900 Quebec and Nova Scotia were visited. The British Columbia meeting of 1905 included an excursion to the Yukon. The mining men of Ontario had the pleasure of acting as hosts in 1907, the sessions being held in Toronto, with excursions to Northern Ontario.

At the meeting in 1900 the reverend Dr. James Douglas was President of the Institute. The following is from a speech at Sydney during that meeting by Dr. Raymond, with which most of us will agree as to the great benefits, other than technical, that are derived from membership in such societies as the A.I.M.E.

"I have been connected with the American Institute since 1871; it then had thirteen members, but it now has three thousand. If you come to any meeting of that Society and think that by sitting down in a hall and hearing some papers read you have struck the heart of that society you make a huge mistake. It is on the train, in the wagon, at the hotel over the evening pipe—I am afraid sometimes it is over the evening hot Scotch—that you will find the real work of that Institute going on. We learn more in our interchange of reciprocal feelings, we teach more in our talks, in our clasping of hands, in our social intercourse, than we do on the printed page It is not a question of piling up statistics as a permanent record, but it is a question of welding these people who do things into a social, harmonious and organized institution. Our institution was the first on this continent to do that on a large scale, and these societies of ours have welded together a great profession and made it a great factor for happiness and prosperity and knowledge among men. That is why I like to hold meetings anywhere."

At the Toronto meeting a reception was given by the Government in the parliament buildings to the members of the Institute and their guests. Adjournment was made to the legislative chamber, where several addresses were delivered. A part of Dr. Raymond's speech on that occasion may be quoted:

"I have spoken a good many times on Canadian soil. Some of you remember that in Vancouver, two years ago, I paid a hearty tribute to the achievements of Canadian engineers: and some may recall my address on the same subject, made in 1889, at Ottawa, in the presence of that great man—great man, I say, whatever party judges him!—Sir John Macdonald. I could only repeat to-night what I have said before, but with added emphasis. Years ago, I supposed that the conquest of this continent had been completed. I remember being very eloquent, somewhere or other, about the way in which the American mining engineer went on into the wilderness; and how Nature, which had lain for thousands of years in sleep and solitude and silence, like the Beauty in the fairy tale, woke at his coming, and rose, and smiled and gave herself to him, with all the glory of her beauty, and all the bounty of her treasure. Oh, I was very eloquent about that! I thought it had all been done; and that we had done it—we Americans; and I told the

young men of my generation that they might yet achieve great things, but not so great as the achievement of their fathers; that they might live to see wonderful epochs in human history, but there would be no future age like that, because there were no more worlds to conquer. The 'winning of the West' I thought we had completed. But lo! here was another empire in the North; and that world, too, our tall Canadian brethren are conquering. All hail to them! May they do better than we have done! But let them never forget that we and they follow a common purpose and share a common glory!

Among the numerous biographical notices of departed members of the Institute that Dr. Raymond wrote, quotations from one are especially appropriate at the present time. Many young men are now returning to Canada from the Great War, as did Dr. Raymond, and the subject of his sketch from the great strife nearly 55 years ago. Many of our young men have had their school and college courses interrupted, and will now find it hard to take up their work again. Will there not be encouragement for them in the life of one who, in the long ago, like them faced similar difficult conditions and triumphantly overcame them!

"Upon his discharge in 1865, he returned at once to his rural home and took up his life again, just where he had laid it aside. I had almost written 'laid it down'—and if I had done so, I could have defied the critic, and the proofreader, for he had as truly laid it down as if the sacrifice had been accepted and ratified by death. That the life thus freely offered was returned to him, did not impair the completeness of the sacrifice. His escape from the death he had dared was only a Voice which said, 'I have further use for thee!' So, at least, I understand it; and so, at least, did he! And I must add here, as a part of my picture of the man, that he never 'traveled' on his military record. He did not run for office on the strength of his army service, or urge it as a claim to civil distinction or preference. I think he regarded it as an episode, such as every good citizen should meet like a man—without bragging about it afterwards. I think he would as soon have paraded his honesty as his patriotism. Such things, in his view, 'go without saying.'

"So the crippled veteran of 23 went back to the Oxford Academy to prepare for college, with nothing to show in that line for the three years he had lost except when he had managed, in camp, to get out of his Latin grammar and reader, and, possibly, also a certain amount of fidelity, patience, and indomitable perseverance and courage, which had been both revealed and trained in the service of his country. And in 1867, as a man of 25 years, he modestly entered the Freshman class at Yale, along with a host of youngsters, who had not wasted any time in soldiering. Moreover, he did not cut short his college course on the ground that so much time had been lost, but went through the whole of it, shirking nothing, just as if it had been simply another campaign, and finally, in 1871, he took his degree as A.B. with his class."

"At this point, I would pause again to call attention to the exceptional character of this example. Here is a man who has become 32 years old before entering upon his professional work. The delay has been due to intervals of three years and one year,

sacrificed by the man himself, at the call of what he deemed higher duty—the first to patriotism, the second to personal honor. But the original plan of the youth has been carried out, irrespective of these interruptions, without one iota of abridgement or change; and the man stands at 32 where he might have stood at 28, or even (if he had decided to ship his classical college-course, and plunge at once into his technical course) at 24.

"Yet, does he really stand only where he would have stood four or eight years earlier, if no time had been 'lost'? Is it nothing that a man, having been a soldier, knows how to be a comrade—to meet and understand and win to hearty co-operation other men? Is it nothing that, having gained through a classical education the ability to comprehend the lessons of history and the inherited associations which actuate, even unconsciously, the men of to-day, he is able to communicate convincingly to others what he knows himself? Is it nothing that he has shown himself to be a lover of his vocation, yet capable of sacrificing even his vocation to duty and honor? Finally, is his certified professional ability less likely to win professional employment and success, when backed by that other certificate, furnished by a wide experience with men and their enterprises? These, and other like questions are answered by the subsequent career."

The American Institute of Mining Engineers was founded in 1871. At the organization meeting at Wilkes-Barre, Dr. Raymond was elected temporary secretary. He was President in the period 1872-1874. In 1884 he was elected Secretary, a position he occupied till 1911, when he became Secretary Emeritus. During this period he saw the membership grow to over 6,500, at the end of 1917, with a corresponding increase in usefulness and influence.

Many honors were bestowed on Dr. Raymond by universities and technical institutions. Of these it will suffice to mention that he was an Honorary Member of the Iron and Steel Institute of Great Britain, of the Institute of Mining and Metallurgy and of the Societe des Ingenieurs Civils de France. — W. G. M.

DECLINE IN U. S. GOLD AND SILVER OUTPUT.

Washington, January 2.

Gold production in the United States in 1918 fell to 3,313,000 fine ounces, worth \$68,493,000, the lowest in twenty years, and silver production dropped to 67,879,000 fine ounces, worth \$67,879,000 at the standard Government price of \$1 an ounce, the smallest record since 1913, according to the joint preliminary estimate of December of the Mint Baker and the Geological Survey, issued recently.

Return of normal conditions and falling of prices are expected to stimulate gold production in the United States this year, according to views of members of the Treasury's Committee appointed to suggest a remedy for the falling production of last year. Consequently it appears unlikely that the committee will recommend any unusual measures to stimulate production when it makes its report in a week or two.

Rapid mounting of the cost of mining is assigned as the cause of the decline, which is shown by comparison with the 1917 production of \$83,750,000 worth of gold and 71,740,000 ounces of silver.

Metal Producers Expect Temporary Lull In Business

Victoria, B.C.

With the announcement, made a few days ago, that British Columbia copper ore shippers to the Tacoma Smelter will have to content themselves with a settlement hereafter on a basis of 11 cents a lb., mining men are speculating as to what is ahead of the industry. Producers here must receive at least 10 cents for blister copper on a 15 cent. market, or discontinue, as there must be allowance for transportation and treatment charges. That the Government price in the United States of 26 cents a lb. is purely nominal and that it is not likely to continue for long in any event, in view of the very large excess supply which the end of the war found on hand, is thoroughly appreciated by those interested. Consequently they are asking themselves what is to be done to right conditions. It is felt that the outlook is not very bright, as far as the immediate future is concerned, at any rate, but there is general confidence that, with the end of peace negotiations and the inauguration of a period of reconstruction the demand for copper will become so brisk that the industry of the Province will find itself again with plenty of orders and continued activity assured. By the time this occurs British Columbia will be, or should be, in a position to very materially increase her output, which for 1918 will approximate 60,000,000 lb. The Canada Copper Company will be producing from the Copper Mountain property, and both the Consolidated Mining & Smelting Co., and the Granby Consolidated Mining & Smelting Company will have developed mainland and island properties to the point where they will take places among the large shippers of the copper properties of the Canadian west.

The position with respect to lead is another matter which is giving some concern, inasmuch as the price has fallen, according to information at the time of writing to 6¾ cents a lb. It will be recalled that the Consolidated Mining Company's management at the Trail Smeltery recently issued an order in which it was stated that, owing to the fact that a serious condition had arisen in the Canadian lead market, interest would be charged on money advanced to lead producers. In the course of the announcement reference was made to a large quantity of lead which is in the hands of the Imperial Munitions Board, and is "hanging over the market." This lead is in Canada, and it has been learned that the Imperial Munitions Board has arranged for its exportation, with the idea of relieving the embarrassment which its presence causes to the Canadian market. Mr. F. A. Starkey, of the Associated Boards of Trade of Eastern British Columbia, expresses himself as highly gratified with the latter development, saying: "The sum and substance of the whole thing is that we will now have a clean sheet to start off with. The action of the Board is timely. On December 9th, while in Spokane, I sent a wire to the Board pointing out that the dumping of the lead bought for munitions on the commercial market at this time would mean a glutting of the market, and that would be disastrous to the lead mining districts. But the difficulty is now settled." Mr. Starkey's wire to Sir Thomas White, Acting Premier, read: "During war shippers did not have benefit of Canadian duty, but sold Imperial Munitions Board at

practically U. S. prices. Now that the war is over shippers expect that Canada will not be made a dumping ground for Mexican and U. S. surplus and scrap metal." Whether the action taken by the Board with reference to the stock referred to will have the effect which Mr. Starkey looks for is doubted by some who point out that Canada's biggest market is not local, and that the placing of munition lead elsewhere will have the result of reducing the demand for the Canadian production at least for a time, and that, at the best, the prospect is that there are a few dull months to meet.

Zinc at 7¾ cents a lb., with a comparatively inactive market as far as the output of British Columbia is concerned, is not very promising to the industry, but the Consolidated Mining & Smelting Company, it is felt, will be able to keep its refinery in operation by virtue of the bounty provided by the Dominion Government.

The future, however, looks much brighter for gold and silver properties. Gold producing mines are preparing to increase production, and it is confidently expected that in the coming months British Columbia resources in this respect will be largely developed, and those which are past that stage will be exploited to capacity.

The platinum placers of the Tulameen River are likely to receive attention at the hands of private companies, the operations of the Dominion Government in this locality having demonstrated the possibilities. The cessation of the war having affected the demand for molybdenite, chromite and manganese, it is not probable that there will be the active prospecting for these ores that has marked the past year or more. What will be done with the properties of this character located, and to some extent developed, remains to be seen.

The whole situation, to the minds of western operators, appears very complicated. To use their own words "the whole thing at present is mixed up, unsettled and unsatisfactory. We are in for a period of slack times evidently; but it is not likely to last more than for the period of peace negotiations. With an European settlement and the actual commencement of reconstruction there is no doubt that the demand for copper, lead, zinc and other ores will be revived and the industry will jump back as far and beyond the position which it gained during the war. Meanwhile, it is hard to say what is going to happen. We believe, however, that the smelters will be able to continue operations, possibly not on as large a scale, but sufficiently to tide over the hiatus."

RESTRICTIONS ON EXPORT OF BRITISH MANUFACTURES REMOVED.

Important cable dispatches have been received by Mr. G. T. Milne and Mr. F. W. Field, the British Trade Commissioners at Montreal and Toronto, respectively, from the Imperial Department of Overseas Trade in London pointing out that since the Armistice was signed many restrictions on commerce have been withdrawn, while in the case of those which remain, licenses are being granted much more freely than previously. Particulars regarding these relaxations will be published weekly in the "Board of Trade Journal," the official organ of the Imperial Government for notices regarding trade.

Orders placed during the war period now have good prospects of being executed, and arrangements for

new business should be made without delay.

The following relaxations in particular should be noted:—

1. Permits to manufacture and Priority Certificates in connection therewith are no longer necessary.
2. Firms are at liberty to accept civil or commercial orders for immediate execution, thus freeing the engineering industry among others, for commercial work.
3. All the principal kinds of raw materials may now be used for the commercial manufacture of goods for export, but these raw materials themselves may not be exported in certain cases without licenses. Among those to which this condition applies are the following: Aluminum, antimony, brass, copper, iron, lead, nickel, spelter or zinc, steel and tin.

In general, restrictions on the export of manufactured goods have been removed, while they have been retained in the case of raw materials.

CONSOLIDATED MINING & SMELTING CO. OF CANADA.

An Active Year, but a Decrease in Profits.

An active and in some respects an expanding business, but one showing less profit than during the previous year, is revealed by the annual statement of the Consolidated Mining & Smelting Co. of Canada, which carries on large operations in British Columbia. The net profit for the year ending September 30 last was \$867,259, compared with \$1,076,828 in the previous year. This was after providing for \$81,986 in taxes, writing off \$408,557 for depreciation, and charging profit and loss account with \$219,202 in development of properties during the past year. In 1917 \$648,058 was written off for depreciation and \$380,071 charged for development.

"Taking into consideration the recent improvements in metallurgical processes," says President W. D. Matthews, "and the enhanced value of the company's mining properties on that account, your directors decided to continue payment of dividends at the rate of 10 per cent per annum, charging to profit and loss account the deficit of \$180,485. The balance at credit of profit and loss account now stands at \$2,148,122." The balance at credit of profit and loss a year ago was \$2,360,274. The season's metal product exceeded \$10,500,000 compared with \$13,000,000 in 1917.

"The continuous increase of the scale upon which the company has been operating for the purpose of meeting the copper, zinc and lead requirements of the Imperial Munitions Board," says Mr. Matthews, "and the development of new processes, especially those involved in the electrolytic treatment of complex zinc ores, have involved the expenditure of a large amount of money for new plant, but your directors hope that the result will be that the company will thereby be able to produce metals profitably at prices which may be expected to prevail under peace conditions. The cost of the new construction which was found necessary from time to time greatly exceeded the estimates by reason of the excessive and continually increasing costs of labor, materials and supplies of all kinds. Your directors, owing to these increased expenditures and to the interruption of operations during the first part of the year, have not been able to reduce the bank overdrafts as had been hoped and expected."

An issue of \$3,000,000 in 7 per cent debenture bonds

is planned. The power development of the West Kootenay Power & Light Co. will be extended and the copper refinery capacity increased from 20 tons to at least 50 tons per day. These capital expenditures will amount to at least \$1,500,000. The company's assets are now placed at \$17,099,923, compared with \$16,994,568 last year.

Reports of company officials speak of the high cost of materials, delicate labor situation, and decision of the Imperial Munitions Board to pay but little if any more for lead requirements than these could be secured for from foreigners, though costs are higher in Canada. "At the same time," says Mr. James J. Warren, the Managing Director, "it must be realized that war activities have resulted in the establishment on a firm footing in Canada of industries engaged in the production of high-grade zinc and refined copper. The fabrication of these metals is bound to follow in due course."

FOUR ROPE HOISTING SYSTEM FOR NANAIMO COLLIERIES.

Experiments have been at progress at the collieries of the Canadian Western Fuel Company, Nanaimo, B. C., for the last two months in the effort to arrive at a solution of the problem of rendering impossible, or reducing the possibility to a minimum, a repetition of such an accident as that of last September when the rope used in Protection Island Shaft broke, causing considerable loss of life.

The ingenuity of Mr. Thomas Price, master mechanic for the company, has resulted in an arrangement which seems to come very close to meeting requirements. He has devised, and demonstrated its practicability in actual operation, a working model of a four rope hoisting system.

Mr. George Wilkinson, Chief Inspector of Mines, describes the arrangement as follows:

"There are four complete hoisting ropes, an overwind rope and an underwind rope on each compartment of the drum. Four pulley wheels are used, two of them being set some distance above the other two to avoid fouling of the ropes.

"The ropes on the two upper pulleys cross. A drum of the usual dimensions is used. Having an overwind and underwind rope on each compartment, the one rope is being unwound while the other is being wound.

"As the under rope is being wound on the drum and hoisting the cage, an overwound rope is being unwound and descending with the cage in the opposite compartment. The operation is the same on the other side of the drum. The whole operation is made feasible by simply crossing the two ropes that lead to the two upper pulleys."

Mr. Wilkinson asserts that this is one of the simplest and most practical arrangements he has seen on using safety ropes. He points out that everything is under control of the engineer, the same hoisting speeds being used on all ropes. Any possibility of slipping is avoided because all ropes are fastened to the drum.

Preparations are being made by the Western Fuel Company for the installation of this double rope system at their new mine, the Wakesiah, near Nanaimo, B. C.

The Canadian Honorary Advisory Council for Scientific and Industrial Research*

By DR. A. B. MACALLUM.

"Reconstruction and Development" in Canada in the new era of international girding for supremacy in the arts of peace means to the Canadian Honorary Advisory Council for Scientific and Industrial Research much in so far as "development" is concerned, but little in regard to "re-construction." Re-construction postulates the building up again of what existed before; and up to the outbreak of War there was constructed in Canada no national organization for research work. The glowing path of Canada's opportunity for industrial development runs wide and far, but the Council's research path has to be blazed through a comparatively unexplored forest. It is almost entirely new ground to be covered.

Where Germany and, though perhaps in lesser degree, the United States had builded before the war great organizations for industrial research founded on wide-vised realization of the commercial value and necessity of applying science to industry, in Canada, as in Great Britain, state encouragement and individual enterprise had, until the war started, been content in the main with a *laissez-faire* policy. Germany had her trained technologists and research workers by the thousands in every field of industry, and, through the organized application of science to industry, was winning her trade victories in every foreign mart.

In the United States, which early took a leaf from Germany's book, the great Universities like Harvard, Yale, Chicago, Columbia and Cornell had staffs and equipments in pure and applied science, which kept pace or almost kept pace with the demand from great American industrial establishments for trained scientific investigators, chemists, electrical engineers, metallurgists, etc. to solve industrial research problems. The annual budget of the Massachusetts' Institute of Technology, for instance, exceeded before the War, and still exceeds, the total of the annual expenditures of all the Faculties of Applied Science in Canada. There are some two thousand research laboratories in connection with large industrial concerns in the United States, and each of more than fifty individual firms expend annually sums ranging from \$25,000 to \$500,000 for research.

In Canada in a score of years less than twenty students have received the advanced (Ph.D.) degree in science from the University of Toronto and fewer still from McGill. Not two per cent. of Canadian firms have research laboratories and only about ten per cent. have routine laboratories, chiefly for the testing of materials. If Canadian industries were to seek for a supply of trained technical men capable of applying the most advanced scientific knowledge to industrial processes sufficient to meet even their most ordinary needs, the number of adequately trained men available would not be sufficient to satisfy five per cent. of the demand.

That, briefly put, is the situation with regard to the needs in Canada for equipment and men for research work. That is the situation that has confronted the

Research Council since its creation in December, 1916. And that has been, and is, the crux of all problems of scientific and industrial research in Canada, handicapping the carrying out of the large research programme planned for the past year and for the coming year, jeopardizing Canada's position in the international rivalry for export trade and demanding prompt remedy if the full measure of our opportunity is to be grasped. In resources of capital and materials, in all the natural advantages for industrial supremacy we are in an enviable position as compared with our trade competitors. But in regard to the vital question of scientific organization of our industrial processes of finding new uses, hence new markets for the raw materials and the by-products of manufacture, and of keeping pace with the advances made in other countries through research, we have as yet hardly touched the fringe of opportunity.

Confronted with this situation and with a slowly awakening public and individual realization of its portent, the main task of the Council this past year has been, while carrying on the immediate needs of research work with the means at hand, to pave the way for meeting adequately the urgent needs of the future. The goal has been a supply of trained men for research work, adequate equipment and facilities for research and the enlistment of industrial organizations in co-operative effort to solve common problems, the solution of which lies in the application of science to industry.

A Central Research Institute.

The great forward step taken has been to promote the establishment of a Central Research Institute at Ottawa, combining the functions of the Bureau of Standards at Washington and of the Mellon Institute at Pittsburgh.

The proposal for such an Institute, submitted to the Government in November last, was the result of many months' careful investigation by the Council.

In view of the situation above outlined, the argument advanced in support of it is so obvious as to need no re-statement here. There has been a prompt and appreciative response to the proposal by the Government and by all the public interests concerned. There is good reason to believe that the Institute will be established without any unnecessary delay. It will involve an expenditure of \$500,000 for a four-storey building, having initial provision for fifty laboratory rooms and with plans so drawn as to provide for expansion as the needs develop. The cost of the scientific equipment is estimated at \$100,000, and the cost of maintenance, salaries, etc. at about \$100,000 per annum for the first few years.

Trade Guilds.

The establishment of the Institute is the necessary first step towards placing industrial research work in Canada upon an adequate and permanent basis and towards enabling the Dominion to keep abreast of similar progressive methods in the United States, Great Britain, Japan, France, Australia and our other trade competitors. It will, doubtless, be followed by the or-

*Written for the Toronto Globe's annual financial survey issued on Jan. 2, 1919.

ganization of trade guilds or associations for research in each branch of industry, formed to pool resources in solving common problems and to take advantage of the laboratory equipment and opportunity offered, under the Council's proposals, by the Government-maintained Institute.

Training of Scientific Workers.

A further necessary step will be the working out of the Council's plans for more adequate provision by the Universities for the training of qualified scientific workers. In the more generous investment of state funds for this purpose, starting, say, with Toronto, McGill, and L'Ecole Polytechnique, lies the hope of securing for the ensuing years of the world's strenuous and pitiless trade warfare the nation's leaders in scientific and industrial research.

Research Problems Undertaken by Council.

Apart from these crucial phases of the work and aims of the Research Council, space permits only passing reference to some of the many research problems already undertaken.

\$400,000 for demonstration plant.

As a result of the Council's initiative, Governmental action was taken in June last to secure federal co-operation with the governments of Saskatchewan and Manitoba in establishing a demonstration plant in the Souris coal areas of Southern Saskatchewan, to prove the commercial feasibility of carbonizing and briquetting the Western lignites for heating, in domestic furnaces. This year will see a plant established with an outlay of \$400,000 and an annual output of 30,000 tons of coal equal to the Pennsylvania anthracite and marketed in Regina or Moosejaw at, at least, two dollars per ton less than the imported anthracite is now costing. The success of the initial plant, about which there can be little doubt, will lead eventually to the development of the immense and little realized latent lignite resources of Saskatchewan and Alberta, relieve for Ontario and Quebec the present coal famine through limited American supply and save to Canada the five or six millions of dollars now annually going to the United States for coal for the prairie provinces.

Study of growth of trees.

A systematic study of the rate of reproduction and growth of Canadian forest trees of the commercial species has been undertaken through scientific survey of some eighty square miles of an old cut-over lumber district on the Petawawa Military Reserve. The data being secured will in the course of a few years give, for the first time, the essential definite information enabling the Dominion and Provincial Governments to inaugurate on a scientific and practical basis a scheme of re-forestation paralleling the best results obtained in the past in Europe. Our forest wealth, now in danger of exhaustion through reckless waste and disregard of adequate conservative systems, can only thus be preserved as a great and permanent national resource.

Tar fog research.

The tar fog research, initiated in 1917, has been continued with satisfactory practical results which will doubtless lead in the near future to the application to various plants in Canada of a new electrical process for the recovery of valuable by-products now lost in the destructive distillation of coal, wood, etc.

The research on sound measurements and fog signaling conducted in 1917 by Dr. Louis King of McGill has made further progress this year and forecasts a new type of sirens for use on the St. Lawrence River and Gulf.

Research work connected with the recovery of industrial alcohol from the enormous sulphite liquor waste of our Canadian pulp mills points to the installation of recovery plants and the production in Canada, at decreased costs to consumers, of the alcohol increasingly needed for industrial purposes and as a substitute for motor fuel.

There has been a score or more of other phases of industrial research initiated or continued during the year, each having a practical bearing on some branch of national production. More should and could be done, were trained men and money available. The Council's budget for the year has been under \$100,000. In Great Britain, Parliament has recognized the need and the opportunity by creating a separate Department of Scientific and Industrial Research and has voted one million dollars per annum for five years to be expended by the Research Council. In Canada we, too, are learning the obvious lesson taught by Germany and already adopted by British industry. The path has been blazed for replacing rule of thumb methods in Canada by scientific investigation.

Special Correspondence

BRITISH COLUMBIA.

Will Install Plant at Meteor Mine.

The Meteor mine near Slocan City, B.C., has been bonded by Messrs. J. C. and W. A. Buchanan, the consideration given being about \$45,000. It is a silver mine, but the ore carries also gold values. Twenty-two tons of the high grade ore was shipped to the Trail Smelter recently. It is the intention to install a compressor in order to facilitate the carrying on of development work on a large scale. Mr. W. A. Buchanan will manage the mine.

Aerial Tramway for Mountain Chief Mine.

Another gold-silver property of British Columbia to change hands recently is the Mountain Chief at Renata, which was bonded by J. W. Evans, of Revelstoke, B.C., the figure involved being understood to be \$100,000. Mr. Evans plans to carry on operations in a more extensive manner than the previous owners, one of the first pieces of work to be undertaken being an aerial tramway from the mine to Arrow Lake. With this facility for transportation he figures on materially increasing the present output of 200 tons a month.

Cassiar Crown Strikes Good Ore.

The strike of a considerable body of copper ore of good grade is reported from the north of British Columbia, Hazelton District. The property on which this promising development has taken place is owned by the Cassiar Crown Copper Company. Although work has been maintained for several years past, nothing of special note was discovered, though there was sufficient ore of good quality shown to encourage the owners. Early in the past summer the company awarded a contract to run a short tunnel on the Ruby Claim, one of the group. A short time before the contract was completed the crew began breaking into ore, which widened with every round until, with the completion of the tunnel contract, they had exposed a vein fourteen feet in width with ten feet of clean ore.

Constructing Tipple at Diamond Vale Mine.

At the Diamond Vale Mine, Merritt, B.C., a tipple is being constructed in order to permit an early resumption of operations. The mine has been idle for some time.

We Make Any Type of Mine Car To Suit You and Your Work

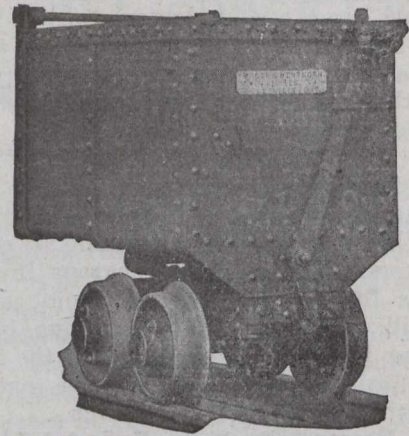
We illustrate herewith one variety of our Rotary Steel Body Cars, to dump any direction. Very simple to operate and perfectly safe. The door is positively locked, and cannot discharge the contents of the car until unlocked and in dumping position.

Our catalogue shows many other types of Cars. Have you a copy? Let us tender on your Cars, Cages, Buckets, and Hoists. We know we can please you as we have pleased so many others.

Marsh Engineering Works, Limited, Belleville, Ontario

Established 1846

Sales Agents: **Mussens Limited, Montreal, Winnipeg, Vancouver**



Powdered Fuel More Economical Than Oil?

It is reported that the use of powdered fuel by the B. C. Sugar Refinery, Vancouver, B.C., has proved satisfactory and that, as a result, the Powell River Pulp and Paper Company, and the Ocean Falls Plant of the Pacific Mills, Limited, are likely to adopt the same system. It is said that powdered fuel has been shown to be more economical than oil in this Province, and if the development suggested takes place, there will be established an important additional market for the output of the coal mines of Vancouver Island, Merritt and Princeton.

Delayed Settlements Cause Closing Down of Mine.

Supt. W. G. Norrie-Loewenthal, of the Silver Standard Mine, in announcing the temporary closing down of his mine, says:

"Our reason for closing down the mine and the mill at this time is purely one of freight rates and the value of Silver Standard ore and concentrates. The railways, chiefly on the American side, where the zinc is shipped, have been altering their rates to such an extent that the smelter people are unable to make a settlement until the rates are adjusted. The matter has been up for two or three months, the Silver Standard people hoping all the time that the rates would be satisfactorily adjusted, and operations continued at the mine. As yet nothing has been accomplished, and it may take another two or three months.

"The position of the Silver Standard is very simple. They have not yet received a dollar for all the zinc concentrates sent to the smelter on the other side, and no chance of getting any until the rates are adjusted, either for what has been shipped or for what is on hand. To continue operations under the circumstances is out of the question.

"As for the mine itself it never was in better shape. There are several shoots of very fine high grade ore recently opened up. Work at both the mine and the mill has been running very satisfactorily. There are on hand a hundred tons of zinc concentrates and 72 tons of lead concentrates."

Mr. R. H. Stewart Will Adjust Taxes.

R. H. Stewart, M.E., of Vancouver, has been appointed by the Provincial Government for the purpose of adjusting the income tax to which the mining companies operating in British Columbia are subjected. He will review the companies' balance sheets from a technical point of view and it is expected that, with his mature experience of operating, he will be able to arrive at equitable settlements in every instance.

We are Manufacturers of

STEEL TANKS

Mine Cars

Plate Work of All Kinds

BURNS & ROBERTS, LIMITED.

Bank of Hamilton Building

Toronto

"**ORTHACLASE**" **FELDSPAR**—I have the finest grade of "Orthoclase" Feldspar and lots of it. Close to railway. Open for orders in any quantities. Car lots preferred.—P. J. DWYER, Wilberforce, Ont.

Mines Shipping Ore to Trail.

The two mines shipping the largest quantities of ore to the Consolidated Mining & Smelting Co's plant at Trail, B. C., during the past year up to the end of November were the War Eagle-Centre Star-Le Roi group at Rossland and the Sullivan mine, owned by the company. The former's total was 88,934 tons, the values being mainly in gold, and the latter's 88,836 tons, of which 82,742 tons supplied the zinc plant of the smelter. Other large shippers were the Emma Mine at Eholt, also owned by the company; the Josie Mine at Rossland with 17,114 tons, No. 1 Mine at Ainsworth, the largest shipper of silver-lead ore outside of the Sullivan with 5,782 tons, the Standard Silver Lead Mining Company at Silvertown with 5,658 tons and the Bluebell at Ainsworth with 5,319 tons. There were some shippers from outside the Province among them being the Mandy Mine of Manitoba, which shipped 5,711 tons of high grade copper ore, the Electric Point in Washington which sent 4,563 tons of silver-lead ore, the San Poil at Republic which sent 2,615 tons of siliceous gold ore and the United Copper at Chewelah, which shipped 2,615 tons. Ore receipts at Trail from the various districts of British Columbia are as follows: Rossland, 107,457 tons; East Kootenay, 93,563 tons; Slooan and Ainsworth, 29,303 tons; Boundary, 19,787 tons; Nelson, 4,246 tons; and American mines, 12,962 tons.

Conditions in Rossland.

Conditions are materially improving in Rossland, one of the most important of the mining centres of British Columbia. This is due to the resumption of operations on a large scale of the mines of the Consolidated Mining & Smelting Company. These are the largest gold producers of the province, their output under normal conditions being three-fifths of the gold produced by British Columbia.



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



PROVINCE OF QUEBEC

MINES BRANCH

Department of Colonization, Mines and Fisheries

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

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

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

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

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

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

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

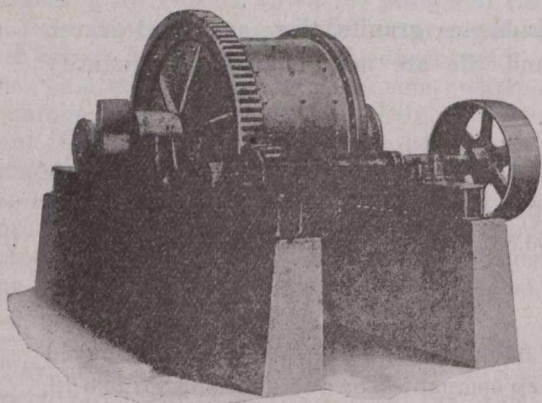
MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS

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

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

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

HONOURABLE HONORE MERCIER,
MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.



BALL MILLS, TUBE MILLS,

Ball and Tube Mill Liners,
Hard Iron Balls for Ball Mills,
Complete Mine Equipment,
Electric Hoists,
Skips, Cages, Cars,
Grey Iron and Brass Castings,

STEEL CASTINGS--any size

The Wabi Iron Works

New Liskeard, Ont. LIMIT. D

MANGANESE STEEL CASTINGS

FOR

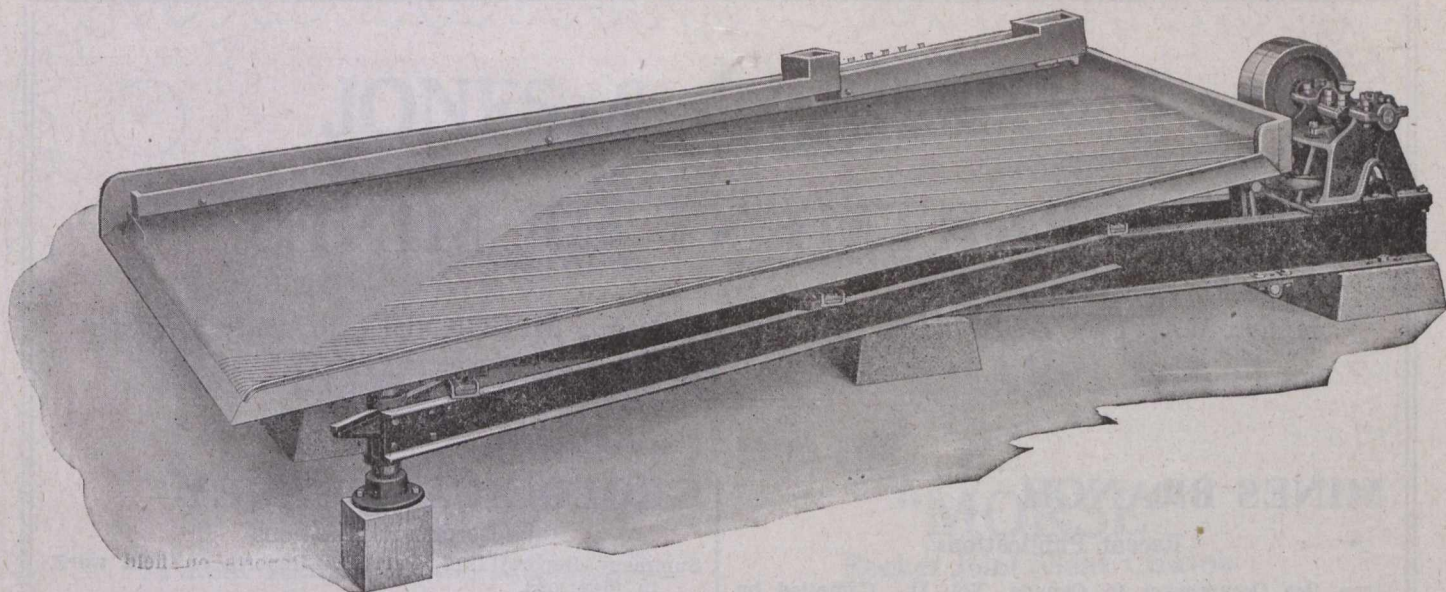
All Kinds of MINING MACHINERY,
CRUSHER JAWS, HAMMERS AND
HAMMER TIPS, LINERS FOR
CYCLONE BEATERS
BUCKET TIPS, STAMPS AND DIES,
DREDGER POINTS

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
SHERBROOKE, QUEBEC



USE
DEISTER-OVERSTROM
DIAGONAL
DECK SLIME TABLES
for the Cleaning of
FLOTATION CONCENTRATES

The success of our Diagonal Deck Tables handling flotation concentrates has been proven and is up to the standard of the well known efficiency of this table in other lines of table concentration

We have information that will be of interest to any company using flotation

SEND US YOUR NAME AND ADDRESS

—THE—
DEISTER CONCENTRATOR COMPANY

Manufacturers of DEISTER, OVERSTROM and DEISTER-OVERSTROM Tables

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

Cable Address—"RETSIED." A. B. C. 5th Edition. Bedford-McNeil.

CANADA

DEPARTMENT OF MINES

HON. MARTIN BURRELL, *Minister*

R. G. McCONNELL, *Deputy Minister*

MINES BRANCH

Recent Publications

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

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

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

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

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

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

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

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

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

Summary Report of the Mines Branch, 1916.

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

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

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

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

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

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

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

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

GEOLOGICAL SURVEY

Recent Publications

Summary Report, 1917, Part D. Reports on field work in Manitoba.

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

Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.

Memoir 98. Magnesite Deposits of Grenville District, Argen-teuil County, Quebec, by M. E. Wilson.

Memoir 99. Road material surveys in 1915, by L. Reinecke

Memoir 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.

Memoir 103. Timiskaming County, Quebec, by M. E. Wilson.

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

Map 63A. Moncton Sheet, Westmoreland and Albert Counties, New Brunswick. Topography.

Map 132A. Southwestern portion of Rainy River district, Ontario. Soils.

Map 135A. Lower Churchill river, Manitoba. Geology.

Map 145A. Timiskaming county, Quebec. Geology.

Map 154A. Southwestern Yukon.

Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.

Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.

Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.

Map 163A. Barrie sheet, Simcoe County, Ontario. Topography.

Map 165A. Windermere, Kooteney district, B.C. Topography.

Map 174A. Blairmore, Alberta. Topography.

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

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

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

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

Map 1702. Klotassin, Yukon Territory. Geology.

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

Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

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

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



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



In Stock for Immediate Delivery

- | | |
|------------------------|-----------------|
| Turbo-Generator Units | Boilers |
| Direct Connected Units | Smoke Stacks |
| Motor Generators | Tanks |
| Rotary Converters | Condensers |
| Transformers | Air Compressors |

Separate Published Stock Lists for above apparatus. Staff of Engineering Specialists with three overhauling plants to SOLVE YOUR POWER PROBLEMS.

MacGovern & Company, Inc.

285 Beaver Hall Hill - - - - Montreal

Offices : New York, Pittsburg, St. Louis.
Plants : Brooklyn, N.Y.; Lincoln, N.J., and Linden, N.J.

Buyers and sellers of new and used machinery

A CONTINENT WIDE SERVICE

Sure

To Open
To Close
To Protect
and
To Save Life

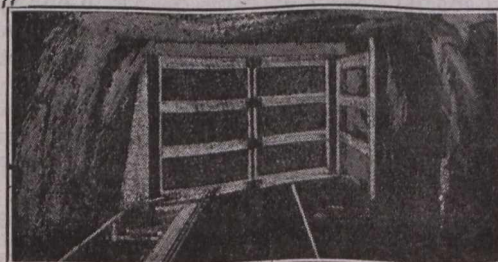
When you realize that the

Canton Automatic Mine Door

will actually do these things, you'll begin to realize that you are more than paying for the cost of it in the wages you pay your trapper boys.

Moreover, in addition to saving the wages of the boy, it gives you control of air currents, absolute and complete; and that factor alone should make it worth your while to install.

Catalog contains full description.



Canadian
Manufacturers

G. C.
Hall & Co.

CALGARY
ALTA.

: PROFESSIONAL DIRECTORY :

ENGINEERS, METALLURGISTS AND GEOLOGISTS

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.

Alfred R. Whitman
Mining Geologist
Exchange Place, New York

DOMINION ENGINEERING & INSPECTION CO.

Testing Engineers & Chemists
HEAD OFFICE & LABORATORIES
320 Lagachetiere St. W., Montreal.
BRANCH OFFICES:
- Toronto and Winnipeg
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

THE DORR COMPANY

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

FERRIER, W. F.

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

ROGERS, JOHN C.
Mining Engineer

Examination and Exploration of Mining Properties with a View to Purchase.
COPPER CLIFF - ONTARIO

ROBERT H. STEWART

Mining & Metallurgical Engineer
VANCOUVER BLOCK
VANCOUVER, B.C.

JAMES McEVOY
Mining Engineer and Geologist

(Specialty Coal Mining)
210 POPLAR PLAINS ROAD, TORONTO, ONTARIO
Phone Hillcrest 1461

MILTON HERSEY CO., LTD.

Chemists and Mining Engineers
Assays of Ores Tests of all Materials
DR. MILTON L. HERSEY, President
(Consulting Chemist to Quebec Government)
JAMES G. ROSS
Consulting Mining Engineer
HEAD OFFICE: 84 St. Antoine St., MONTREAL

TYRRELL, J. B.

Mining Engineer,
584 Confederation Life Building,
TORONTO, - - CANADA.

GEO. R. ROGERS
MINING ENGINEER

905 TRADERS BANK BUILDING
TORONTO
Examinations, Sampling and Reporting on Mines and Prospects
Telephone M. 2625

A. A. HASSAN

Mining Geologist and Consulting Engineer
SUITE 206-204 RIGGS BLDG.,
WASHINGTON, D.C.

JOHN A. DRESSER

MINING GEOLOGIST
701 Eastern Townships Bank Bldg.
MONTREAL - Canada

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.

ASSAYERS, CHEMISTS AND ORE TESTERS.

Phone Main 4427
The Toronto Testing Laboratory, Ltd
160 Bay Street, Toronto
ASSAYERS & CHEMISTS
"PROMPT AND ACCURATE SERVICE GUARANTEED."

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.

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

Canadian Laboratories, Ltd.

ASSAYERS AND CHEMISTS
24 Adelaide St. West
TORONTO
"WE ANALYSE ANYTHING"
SPECIAL RATES SEND FOR PRICES PHONE MAIN 5088

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.

CAMPBELL & DEYELL, Limited

Ore Samplers, Assayers
Head Office & Works
Cobalt, Ontario
L. M. CAMPBELL,
General Manager.
Mechanical selection of samples from shipments of any size and quality

LAWYERS

Cable Address: "Linsey" Codes: Broomhalls Western Union
G. G. S. Lindsey, K.C.
BARRISTER, SOLICITOR, Etc.
Bank of Toronto Building - - TORONTO
Special attention given to Mining Law
Phone Adelaide 1032

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

J. M. CALLOW President	GENERAL ENGINEERING COMPANY (Canadian Branch) CONSULTING ENGINEERS 363 Sparks St. Ottawa, Ont.	E. B. THORNHILL Manager
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.)		

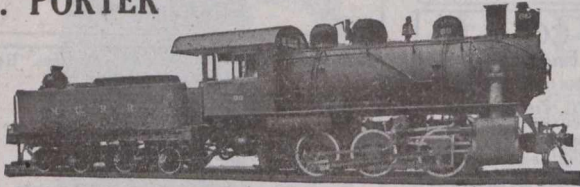
PATENTS

TRADE MARKS AND DESIGNS
PROCURED IN ALL COUNTRIES

Special attention given to Patent Litigation
Pamphlets sent free on application

RIDOUT & MAYBEE
 Cor. YONGE AND COLBORNE STS., TORONTO, ONT.

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.

NEW RAILS RELAYING

12 to 85 lbs. per yard

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

*Railway, Contractors and Mining
Equipment*

JNO. J. GARTHSHORE

58 Front St. West Toronto, Ont.

WANTED

EXPERIENCED MINERS
wanted for Copper Mine. Ap-
ply **EUSTIS MINING CO.,**
Eustis, P.Q.

PORCUPINE GOLD CAMP

Latest information obtained by
subscribing to the
PORCUPINE HERALD

South Forcupine, Ontario
Canada \$1.50, United States \$2.00 a year.

For information concerning
**MINING COMPANIES OPER-
ATING IN CANADA**
consult the
Canadian Mining Journal

The Minerals of Nova Scotia

THE MINERAL PROVINCE OF EASTERN CANADA

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

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

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

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

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

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

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

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

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

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

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

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

Commissioner of Public Works and Mines

BUYERS AND SELLERS OF METALS

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

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

Natural Gas, Oil, Shale and Coal

Close to rail and water. Held under Government lease.
Capital required for immediate development.

Address P.O. Box 15, East St. John, N.B.

The Coniagas Reduction Company, Limited.

St. Catharines, - - - Ontario

Smelters and Refiners of Cobalt Ores

Manufacturers of

Bar Silver—Electrolytically 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

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

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

Largest Buyers, Best Figures, Advances on
Shipments, Correspondence Solicited

Cables—Blackwell, Liverpool, ABC Code,
Moreing & Neal Mining and General Code,
Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL, 1869

HENRY BATH & SON, Brokers.

London, Liverpool and Swansea

ALL DESCRIPTION METALS, MATTES, Etc.

OF

Warehouses, LIVERPOOL and SWANSEA.

Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. Cable Address, BATHOTA, London

C. L. CONSTANT CO.,

42 New Street - - - New York

SHIPPERS' AGENTS

FOR

Selling, Sampling and Assaying Ore,
Metals and Furnace Products

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

NOT CONNECTED WITH ANY SMELTER

Canadian Representative:

G. C. BATEMAN

Traders Bank Building, Toronto

The University of Toronto

and University College

with which are federated

VICTORIA TRINITY ST. MICHAELS
KNOX and WYCLIFFE COLLEGES

FACULTIES OF

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

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

THIS STAMP



MEANS QUALITY

Explosives for Gold Mines

FORCITE

For hard rock mining--wet or dry
Less fumes than any other explosive 35% to 75%
 Strengths

Ammonia Dynamites

For ordinary rock where ventilation is good

These Brands made low freezing for winter use

Canadian Explosives, Limited

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

DISTRICT OFFICES:

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

Factories at

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

The Canadian Miners' Buying Directory.

- Air Hoists—**
Canadian Ingersoll-Rand Co. Ltd., Montreal, Que.
- Amalgamators—**
Northern Canada 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.
- Rabbit Metals—**
Canada Metal Co., Ltd. Hoyt Metal Co.
- Balances—Hensser—**
Mine & Smelter Supply Co.
- Ball Mills—**
Mine & Smelter Supply Co.
- Beltting—Leather, Rubber and Cotton—**
Northern Canada Supply Co. Jones & Glassco.
- Blasting Batteries and Supplies—**
Canadian Ingersoll-Rand Co. Ltd., Montreal, Que. Northern Canada Supply Co. Canadian Explosives, Ltd.
- Blowers—**
Northern Canada Supply Co.
- Boilers—**
Northern Canada Supply Co. Canadian Ingersoll-Rand Co. Ltd., Montreal, Que. Marsh Engineering Works.
- Boxes, Cable Junction—**
Standard Underground Cable Co. of Canada, Ltd.
- Buckets—**
Hendrick Mfg. Co. M. Beatty & Sons, Ltd. Marsh Engineering Works. Northern Canada Supply Co.
- Cable—Aerial and Underground—**
Northern Canada Supply Co. Standard Underground Cable Co. of Canada, Ltd.
- Cableways—**
M. Beatty & Sons, Ltd.
- Cages—**
Northern Canada Supply Co.
- Cables—Wire—**
Standard Underground Cable Co. of Canada, Ltd.
- Car Dumps—**
Sullivan Machinery Co.
- Cars—**
MacKinnon Steel Co., Ltd. Northern Canada Supply Co. Marsh Engineering Works. Mine & Smelter Supply Co.
- Car Wheels and Axles—**
Marsh Engineering Works, Ltd.
- Cement Machinery—**
Northern Canada Supply Co. Hadfields Ltd.
- Chains—**
Jones & Glassco. 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.
- Coal Pick Machines—**
Sullivan Machinery Co. Canadian Ingersoll-Rand Co. Ltd., Montreal, Que.
- Compressors—Air—**
Smart-Turner Machine Co. Canadian Ingersoll-Rand Co. Ltd., Montreal, Que. Northern Canada Supply Co.
- Concrete Mixers—**
Northern Canada Supply Co. Gould, Shapley & Muir Co., Ltd.
- Condensers—**
Smart-Turner Machine Co. Northern Canada Supply Co.
- Concentrating Tables—**
Mine & Smelter Supply Co.
- Converters—**
Northern Canada Supply Co.
- Conveyer—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—**
Lyman, Ltd. Mussels, Limited. Mine & Smelter Supply Co. Hadfields Ltd.
- Derricks—**
Smart-Turner Machine Co. M. Beatty & Sons, Ltd. Marsh Engineering Works.
- Diamond Drill Contractors—**
Diamond Drill Contracting Co. Smith & Travers. Sullivan Machinery Co.
- Dredger Pins—**
Hadfields Ltd.
- Dredging Machinery—**
M. Beatty & Sons. Hadfields Ltd.
- Dredging Ropes—**
Allan, Whyte & 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. Standard Diamond Drill Co. Sullivan Machinery Co.
- Drills—Diamond—**
Sullivan Machinery Co. Northern Canada Supply Co.
- 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—**
Canadian Ingersoll-Rand Co. Ltd., Montreal, Que. Sullivan Machinery Co.
- 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.
- Engineering Instruments—**
C. L. Berger & Sons.
- Engines—Automatic—**
Smart-Turner Machine Co.
- Engines—Gas and Gasoline—**
Alex. Fleck. Sullivan Machinery Co. Smart-Turner Machine Co. Gould, Shapley & Muir Co., Ltd.
- Engines—Haulage—**
Canadian Ingersoll-Rand Co. Ltd., Montreal, Que. Marsh Engineering Works.
- Engines—Marine—**
Smart-Turner Machine Co.
- Engines—Steam—**
Smart-Turner Machine Co. M. Beatty & Sons.
- Forges—**
Northern Canada Supply Co., Ltd.
- Forging—**
M. Beatty & Sons. Smart-Turner Machine Co. Hadfields Ltd.
- Furnaces—Assay—**
Lyman, Ltd. Mine & Smelter Supply Co.
- Fuse—**
Canadian Explosives. Northern Canada Supply Co.
- Gears—**
Smart-Turner Machine Co. Northern Canada Supply Co.
- Hammer Rock Drills—**
Mussels, 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.
- Hoisting Engines—**
Mussels, Limited. Sullivan Machinery Co. Can. Ingersoll-Rand Co., Ltd. M. Beatty & Sons. Marsh Engineering Works.
- Hose—**
Northern Canada Supply Co.
- Hydraulic Machinery—**
Hadfields Ltd.
- Ingot Copper—**
Canada Metal Co., Ltd. Hoyt Metal Co.
- Insulating Compounds—**
Standard Underground Cable Co. of Canada, Ltd.
- Jacks—**
Can. Ingersoll-Rand Co. Ltd., Montreal, Que. Can. Brakeshoe Co., Ltd. Northern Canada Supply Co.
- Laboratory Machinery—**
Mine & Smelter Supply Co.
- Locomotives (Steam, Compressed Air and Storage Steam)—**
H. K. Porter Company.
- Link Belt—**
Northern Canada Supply Co. Jones & Glassco.
- Manganese Steel—**
Hadfields 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—**
Hadfields Ltd.
- Monel Metal—**
International Nickel 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.

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

- 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.
- Piston Rock Drills—**
Mussens, Limited.
- Pneumatic Tools—**
Can. Ingersoll-Rand Co., Ltd.
Jones & Glassco.
- Prospecting Mills and Machinery—**
Standard Diamond Drill Co.
Mine & Smelter Supply Co.
- 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.
Can. Ingersoll-Rand Co., Ltd.
- Pumps—Centrifugal—**
Mussens, Limited.
Smart-Turner Machine Co.
M. Beatty & Sons.
Can. Ingersoll-Rand Co., Ltd.
Mine & Smelter Supply Co.
- Pumps—Electric—**
Smart-Turner Machine Co.
Can. Ingersoll-Rand Co., Ltd.
- Pumps—Sand and Slime—**
Mine & Smelter Supply Co.
- Pumps—Pneumatic—**
Smart-Turner Machine Co.
Can. Ingersoll-Rand Co., Ltd.
Sullivan Machinery Co.
- Pumps—Steam—**
Can. Ingersoll-Rand Co., Ltd.
Mussens, Limited.
Northern Canada Supply Co.
Smart-Turner Machine Co.
- Pumps—Turbine—**
Smart-Turner Machine Co.
Can. Ingersoll-Rand Co., Ltd.
- Pumps—Vacuum—**
Smart-Turner Machine Co.
- Quarrying Machinery—**
Sullivan Machinery Co.
Can. Ingersoll-Rand Co., Ltd.
Hadfields Ltd.
- Rails—**
Hadfields Ltd.
- 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—**
Hadfields Ltd.
- Samplers—**
C. L. Constant Co.
Ledoux & Co.
Milton Hersey Co.
Thos. Heys & Son.
Mine & Smelter Supply Co.
- 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.
- Shovels—Steam—**
M. Beatty & Sons.
- Smoke Stacks—**
Hendrick Mfg. Co.
MacKinnon Steel Co., Ltd.
Marsh Engineering Works.
- Steel Barrels—**
Smart-Turner Machine Co.
- Steel Castings—**
Can. Brakeshoe Co., 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.
- Surveying Instruments—**
C. L. Berger.
- Tables—Concentrating—**
Mine & Smelter Supply Co.
- Tanks (Wooden)—**
Gould, Shapley & Muir Co., Ltd.
Pacific Coast Pipe Co., Ltd.
- Tanks—Steel—**
Marsh Engineering Works.
MacKinnon Steel Co.
- Tanks—Cyanide, Etc.—**
Hendrick Mfg. Co.
Pacific Coast Pipe Co., Ltd.
MacKinnon Steel Co.
- Tanks (water) and Steel Towers—**
Gould, Shapley & Muir Co., Ltd.
MacKinnon Steel Co.
- Tramway Points and Crossings—**
Hadfields Ltd.
- Transits—**
C. L. Berger & Sons.
- Tubs—**
Hadfields Ltd.
- Welding Rod and Flux—**
Imperial Brass Mfg. Co.
- Welding and Cutting, Oxy-Acetylene—**
Imperial Brass Mfg. Co.
- Wheels and Axles—**
Hadfields Ltd.
- Winding Engines—Steam and Electric—**
Can. Ingersoll-Rand Co., Ltd.
Marsh Engineering Works.
- Wire Cloth—**
Northern Canada Supply Co.
B. Greening Wire Co., Ltd.
- Wire (Bare and Insulated)—**
Standard Underground Cable Co., of Canada, Ltd.
- Zinc Spelter—**
Canada Metal Co., Ltd.
Hoyt Metal Co.

ALPHABETICAL INDEX TO ADVERTISERS

<p>A</p> <p>Allan, Whyte & Co. 23</p> <p>American Zinc Lead & Smelting Co. 5</p> <p>B</p> <p>Bath, Henry & Son 27</p> <p>Balbach Smelting & Refining Co. 27</p> <p>Beatty, Blackstock, Fasken, Cowan & Chadwick 25</p> <p>Beatty, M. & Sons 12</p> <p>Berger, C. L. & Sons 5</p> <p>Blackwell, Geo. G., Sons & Co. 27</p> <p>British Columbia, Province of 10</p> <p>Burns & Roberts 18</p> <p>C</p> <p>Callow, J. M. 11</p> <p>Campbell & Deyell, Ltd. 25</p> <p>Canadian Explosives, Ltd. 28</p> <p>Canadian H. K. Porter, Ltd. 26</p> <p>Canadian Ingersoll-Rand Co., Ltd. Montreal, Que. 1</p> <p>Canadian Laboratories, Ltd. 25</p> <p>iCanada Metal Co. 24</p> <p>Canadian Milk Products, Ltd. 12</p> <p>Canadian Northern Railway 7</p> <p>Canadian Rock Drill Co., Ltd. 10</p> <p>Canadian Steel Foundries, Ltd. 27</p> <p>Capper Pass & Son, Ltd. 27</p> <p>Consolidated Mining & Smelting Co. Coniagas Reduction Co., Ltd. 27</p> <p>Constant, C. L. & Co. 27</p> <p>Cleveland Pneumatic Tool Co. of Canada, Ltd. 3</p> <p>Canadian General Electric Co. 20</p> <p>Canadian Brakeshoe Co. 20</p> <p>Canadian Fairbanks-Morse Co., Ltd. 14</p> <p>D</p> <p>Deloro Smelting & Refining Co. 2</p> <p>Denver Rock Drill Mfg. Co. 22</p> <p>Department of Mines, Canada 22</p> <p>Dewar Mfg. Co. 5</p> <p>Diamond Drill Contracting Co. 12</p> <p>Dominion Coal Co., Ltd. 25</p> <p>Dominion Engineering & Inspection Co. 25</p> <p>Dorr Co. 25</p> <p>Dominion Iron & Wrecking Co. 3</p> <p>Dominion Steel Foundry, Ltd. 25</p> <p>Dresser, Jno. A. 2</p> <p>Dwight & Lloyd Sintering Co., Inc. 21</p> <p>Deister Concentrator Co. 21</p>	<p>E</p> <p>Everitt & Co. 4</p> <p>F</p> <p>Ferrier, W. F. 25</p> <p>Fleck, Alex. 3</p> <p>G</p> <p>Gartshore, John J. 26</p> <p>General Engineering Co. 26</p> <p>Goldsmith Bros. Smelting & Refining Co., Ltd. 5</p> <p>Gould, Shapley & Muir Co., Ltd. 5</p> <p>Greening, B. Wire Co. 5</p> <p>Goodyear Tire & Rubber Co. of Canada, Ltd. 5</p> <p>H</p> <p>Hadfields, Ltd. Outside Back Cover</p> <p>Hall, G. C. & Co. 24</p> <p>Hamilton Gear & Machine Co. 5</p> <p>Harding, E. 25</p> <p>Hassan, A. A. 6</p> <p>Hendrick Mfg. Co. 25</p> <p>Hersey, Milton Co., Ltd. 25</p> <p>Heys, Thomas & Son 25</p> <p>Hull Iron & Steel Foundries, Ltd. Outside Front Cover</p> <p>Hoyt Metal Co. 23</p> <p>I</p> <p>Imperial Bank of Canada 7</p> <p>Imperial Brass Mfg. Co. 6</p> <p>International Business Machines 6</p> <p>International Nickel Co. 6</p> <p>J</p> <p>Johnson, Matthey & Co. 25</p> <p>Jones & Glassco 23</p> <p>L</p> <p>Laurie & Lamb Outside Back Cover</p> <p>Ledoux & Co. 25</p> <p>Lindsey, G. G. S. 25</p> <p>Longyear, E. J. Co. 4</p> <p>Lymans, Ltd. 4</p> <p>M</p> <p>MacGovern & Co., Inc. 24</p> <p>MacKinnon Steel Co., Ltd. 7</p> <p>Marsh Engineering Works, Ltd. 18</p> <p>McEvoy, Jas. 25</p> <p>Mine & Smelter Supply Co. 25</p>	<p>Minerals Separation North American Corporation 8-9</p> <p>Mond Nickel Co. 4</p> <p>Mussens, Limited 12</p> <p>N</p> <p>Northern Canada Supply Co., Ltd. 2</p> <p>Northern Electric Co., Ltd. 4</p> <p>Nova Scotia Steel & Coal Co. 26</p> <p>Nova Scotia Government 26</p> <p>Nordberg Mfg. Co. 26</p> <p>O</p> <p>Ontario, Province of 19</p> <p>Ontario Mining Products Co. 5</p> <p>P</p> <p>Pacific Coast Pipe Co., Ltd. 7</p> <p>Prest-O-Lite Co., Inc. 7</p> <p>Q</p> <p>Quebec, Province of 20</p> <p>R</p> <p>Ridout & Maybee 26</p> <p>Rogers, John C. 25</p> <p>Rogers, Geo. R. 25</p> <p>Reddaway, F. & Co. 25</p> <p>S</p> <p>Salisbury Electric Co., Ltd. 6</p> <p>Smart-Turner Machine Co. 5</p> <p>Smith & Travers Company 25</p> <p>Standard Underground Cable Co. of Canada, Ltd. 25</p> <p>Stewart, Robert H. 25</p> <p>Sudbury Diamond Drilling Co., Ltd. 25</p> <p>Sullivan Machinery Co. Inside Front Cover</p> <p>Scully, A. A. 25</p> <p>T</p> <p>Toronto Testing Laboratory, Ltd. 25</p> <p>Tyrrell, J. B. 25</p> <p>U</p> <p>University of Toronto 27</p> <p>W</p> <p>Wabi Iron Works, The 20</p> <p>Whitman, Alfred R. 25</p> <p>Zenith Coal & Steel Products, Ltd. 3</p>
---	---	---

No. 13084

Judicial Sale of Mining Property

PURSUANT to the Judgment and Final order for Sale made in a certain action No. 13084 by the Master in Chambers in the Supreme Court of Alberta, Judicial District of Calgary, there will be offered for sale with the approbation of the Court by Henry McCallum at the Court House at the City of Calgary in the Province of Alberta, at the hour of ten o'clock in the forenoon, on Saturday, the 25th day of January, 1919, the following lands and premises, namely:

All minerals, other than gold or silver, within, upon or under the West half of Section 9, Township 6, Range 3, West of the Fifth Meridian:

All mines and minerals, other than gold or silver, within, upon or under the West half of Section 4, Township 6, Range 3, West of the Fifth Meridian;

All minerals, other than gold or silver, within, upon or under the East half of Section 9, Township 6, Range 3, West of the Fifth Meridian;

subject to accrued taxes, and to the exceptions, reservations and conditions contained in the original grant from the Crown, and to the exceptions, reservations and conditions in the Certificates of Title covering said lands.

The sale will be subject to a reserve bid fixed by the Court.

TERMS: 15 per cent of the purchase price must be paid in cash at the time of sale to the Plaintiff's Solicitor, and the balance in Court as follows: 10 per cent in sixty days without interest, 25 per cent in six months from the date of sale with interest at seven per cent per annum, and the balance in two years from date of sale with interest at seven per cent per annum, or at the option of the purchaser the whole may be paid within sixty (60) days from the date of sale without interest.

In all other respects and terms the conditions of sale will be the standing conditions of sale approved by the Court. Further particulars will be made known at the time and place of sale, or can be obtained from the Solicitor for the Vendor, JOHN W. HUGILL, Department of Natural Resources, of The Canadian Pacific Railway Company, Calgary, Alberta.

Dated at the City of Calgary, in the Province of Alberta, this 7th day of December, 1918.

Approved:
L. F. CLARRY, M.C.

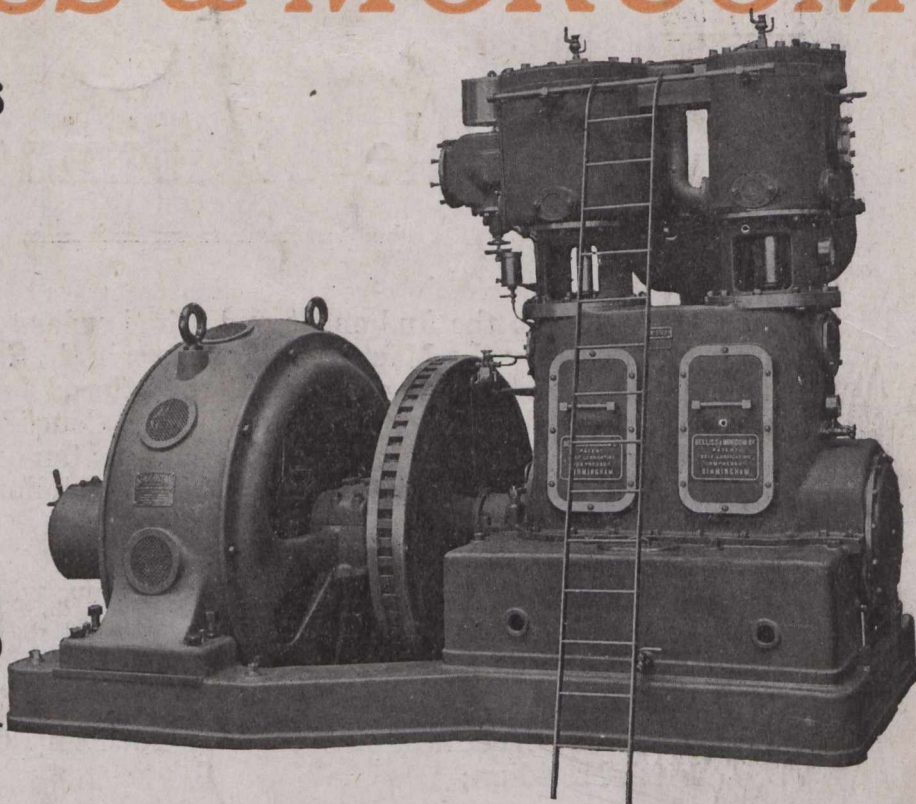
LAWRENCE J. CLARKE,
Clerk of the Court.

BELLISS & MORCOM

Air Compressors
Engines
Turbines
Pumps

**LAURIE
& LAMB**

21 Board of Trade Bldg
MONTREAL



Belliss & Morcom Motor Driven Air Compressor

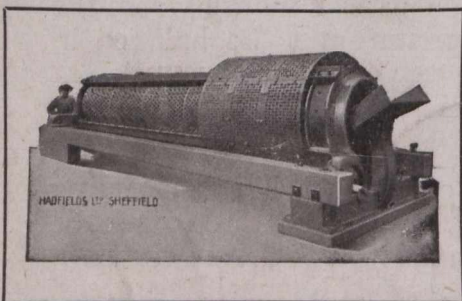
HADFIELDS L^{TD}

Workmen employed
over 15,000

Hecla and East Hecla Works,
Sheffield, England

Works area over
200 acres

Sole Agents Peacock Brothers, 285 Beaver Hall Hill, Montreal.



REVOLVING SCREEN

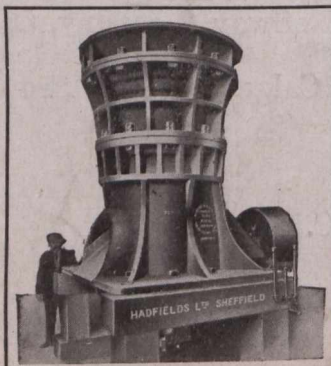
**MINING
REQUISITES**
of all kinds

Forged Steel Balls, all sizes,
for Ball Mills and Tube
Mills. Grizzley Bars, Shoes
and Dies. Steel Wheels and
Axles, etc.

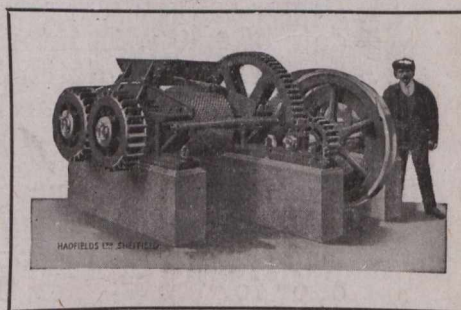
**HIGH SPEED AND OTHER
TOOL STEELS**
of the finest quality

MAKERS OF ALL KINDS OF

**Stone Breaking &
Ore Crushing
Machinery**



'HECLON' ROCK & ORE BREAKER



ROLL CRUSHER OF SOLID STEEL
CONSTRUCTION

Steel Castings & Forgings
of every description.

Sole Makers of HADFIELD'S PATENT

"ERA"

Manganese Steel

The Supreme Material for the Wearing
Parts of Stone Breaking and Ore
Crushing Machinery