

MARCH 15, 1916

Single Copies 15 Cents



# CANADIAN MINING JOURNAL

VOL. XXXVII

TORONTO

No. 6

## CONCENTRATION OF **MOLYBDENITE**

Having given several years' study to this problem and having had experience in the design of equipment for producing saleable molybdenite concentrates from molybdenite as mined, I am in a position to design plants for this purpose, supply all necessary machinery and superintend their operation after construction. I am also prepared to install equipment for manufacture of ferro-molybdenum and other alloys from concentrates.

**FRANCIS M. TURNER, JR.**

Chemical and Metallurgical Engineer

Care of

Chemical Catalog Company, Inc.

437 FIFTH AVE.

**NEW YORK, U.S.A.**

# CANADA

## DEPARTMENT OF MINES

HON. P. E. BLONDIN, Minister.

R. G. McCONNELL, Deputy Minister.

### MINES BRANCH

#### Recent Publications

- The Nickel Industry: with special reference to the Sudbury region, Ont. Report on, by Professor A. P. Coleman, Ph.D.
- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.
- Building and Ornamental Stones of Canada (Quebec). Vol. III. Report on, by W. A. Parks, Ph.D.
- The Bituminous Sands of Northern Alberta. Report on, by S. C. Ellis, M.E.
- 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 Report of the Mineral Production of Canada During the Calendar Year 1913, by John McLeish, B.A.
- The Petroleum and Natural Gas Resources of Canada: Vols. I. and II., by F. G. Clapp, M.A., and others.
- The Salt Industry of Canada. Report on, by L. H. Cole, B.Sc.
- Electro-plating with Cobalt. Report on, by H. T. Kalmus, Ph.D.
- Electro-thermic Smelting of Iron Ores in Sweden. Report on, by A. Stansfield, D.Sc.
- Non-metallic Minerals Used in Canadian Manufacturing Industries. Report on, by H. Frechette, M.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

- Memoir 34. The Devonian of Southwestern Ontario, by Clinton R. Stauffer.
- Memoir 50. Upper White River District, Yukon, by D. D. Cairnes.
- Memoir 56. Geology of Franklin Mining Camp, British Columbia, by C. W. Drysdale.
- Memoir 57. Corundum, its Occurrence, Distribution, Exploitation and Uses, by A. E. Barlow.
- Memoir 60. Arisaig-Antigonish District, Nova Scotia, by M. Y. Williams.
- Memoir 64. Preliminary Report on the Clay and Shale Deposits of the Province of Quebec, by J. Keele.
- Memoir 65. Clay and Shale Deposits of the Western Provinces (Part 4), by H. Ries.
- Memoir 66. Clay and Shale Deposits of the Western Provinces (Part 5), by J. Keele.
- Memoir 68. A Geological Reconnaissance Between Golden and Kamloops, B.C., along the Canadian Pacific Railway, by R. A. Daly.
- Memoir 69. Coal Fields of British Columbia, by D. B. Dowling.
- Memoir 73. The Pleistocene and Recent Deposits of the Island of Montreal, by J. Stansfield.
- Memoir 74. A List of Canadian Mineral Occurrences, by Robert A. A. Johnston.
- Memoir 76. Geology of the Cranbrook Map-area, British Columbia, by S. J. Schofield.
- Memoir 77. Geology and Ore Deposits of Rossland, British Columbia, by C. W. Drysdale.
- Memoir 78. Wabana Iron Ore of Newfoundland, by A. O. Hayes.
- Memoir 79. Ore Deposits of the Beaverdell Map-area, by L. Reinecke.
- Memoir 81. The Oil and Gas Fields of Ontario and Quebec, by W. Malcolm.
- Memoir 82. Rainy River District of Ontario. Surficial Geology and Soils, by W. A. Johnston.

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

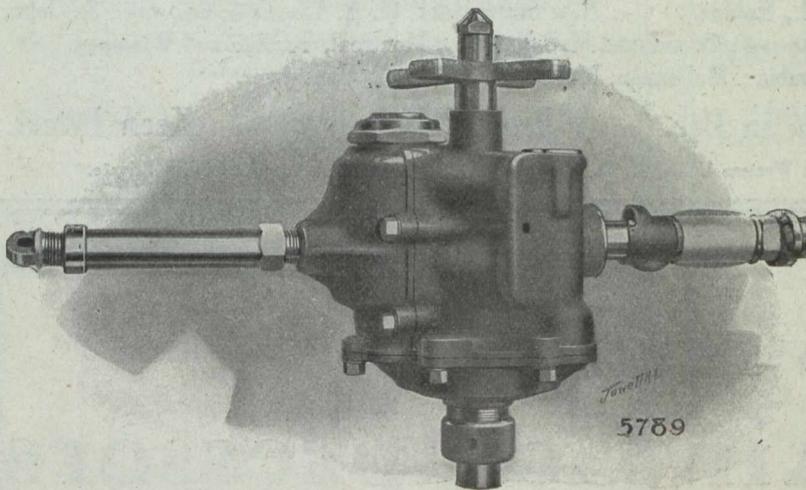
Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

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. Letters and samples that are of a Departmental nature, addressed to the Director, may be Mailed O.H.M.S. free of postage.

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

# A CONVENIENT TOOL FOR A GREAT MANY REPAIR JOBS

A PORTABLE pneumatic Metal Drill will save many times its cost on repair and construction work about the mine.



A "LITTLE DAVID" Drill is a most satisfactory tool for this work because of its simplicity and its great pulling power.

It's an easy tool to keep in good order as it has very few parts and these are well made.

Let us send you a catalog showing "LITTLE DAVID" construction and range of sizes.

---

## CANADIAN INGERSOLL RAND COMPANY, LIMITED

Commercial Union Building, MONTREAL, CAN.

Vancouver, Nelson, Winnipeg, Timmins, Cobalt, Toronto, Sydney. Works: Sherbrooke, Que.

CONTRACTORS TO ADMIRALTY WAR OFFICE AND COLONIAL GOVERNMENTS

# Allan, Whyte & Co.

CLYDE PATENT WIRE ROPE WORKS,  
Rutherglen, Glasgow, Scotland

## WIRE ROPES

For Mining; Engineering and Shipping: For Hoisting and Haulage in Collieries and Mines: For Cableways and Aerial Ropeways: For Dredgers and Steam Shovels: Specially Flexible Ropes for Winches and Fast Hoists, Coal Towers and Cranes.

### OF THE HIGHEST QUALITY

made from special grades of Wire drawn to our specifications and carefully tested before being used. They are at work in all parts of Canada from Vancouver to Halifax and are everywhere recognized as the best on the market. Complete stocks held in all parts. Orders executed and quotations furnished by:

Nova Scotia: Wm. Stairs, Son & Morrow, Ltd., Halifax.

New Brunswick: W. H. Thorne & Co., Ltd., St. John.

Quebec, Ontario, Manitoba and Saskatchewan: Drummond McCall & Co., Montreal, Toronto and Winnipeg.

Alberta and British Columbia: McLennan, McFeely & Co., Ltd., Vancouver.

Highest Quality.

Satisfaction in Use.

Prompt Delivery.

Keen Prices.

CABLES: "Ropery, Rutherglen."

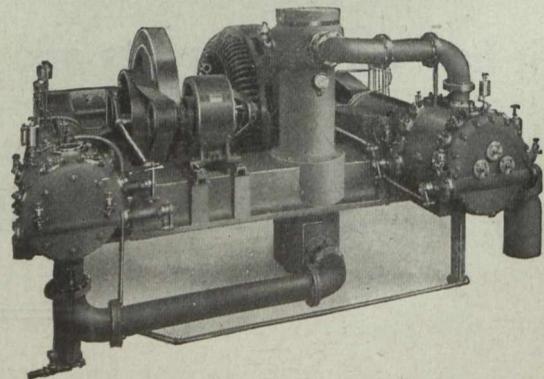
CODES: Western Union, A. B. C. (4th and 5th Editions), A. 1., Liebers and Private.

## Quick Delivery of Sullivan Air Compressors

If you need a new air compressor **Now**, as soon as you can get it, don't forget that Sullivan Compressors are available for prompt shipment in a large range of sizes and patterns, both steam and power driven.

We are particularly well prepared to help you if you need **LARGE COMPRESSORS** of 1000-foot capacity and up, in standard, high duty types.

Phone, wire or write the nearest Sullivan office.  
Catalogues, price and delivery on application.



Sullivan "WN2" cross-compound, direct-connected, motor-driven air compressor. Capacities—1,200 to 3,300 cu.ft. Bulletin 658M.

## Sullivan Machinery Company

122 South Michigan Avenue, Chicago, Ill.

Boston

London

Montreal

Cobalt, Ont.

Juneau

Nelson, B.C.

Vancouver, B. C.

Spokane

Sydney, N. S. W.

**“NOTICE TO ALL MINING COMPANIES”**

We are in a position to supply you with your requirements in all lines of Machinery and Supplies.

**Sullivan Diamond Drills, Compressors, Rock and Hammer Drills, Hoists, Boilers, Ore Cars, Buckets, Drill Steel, Drill Sharpeners, Shafting, Transmission and Conveying Material.**

**Hoisting Cable, Screens, Iron Pipe and Fittings, Valves, Building Supplies, Camp and Kitchen Supplies, General Line Light and Heavy Hardware.**

We will be pleased to have your specifications and to quote you on your requirements.

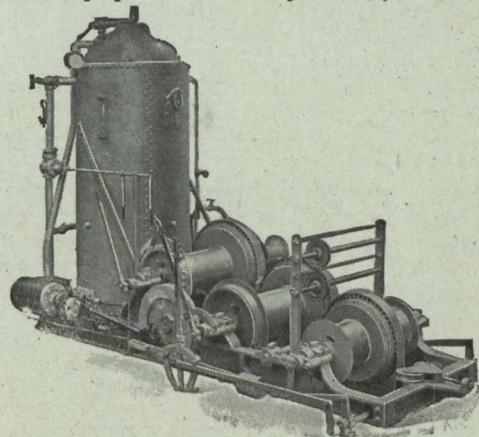
**“IT WILL PAY YOU TO GET OUR PRICES.”**

Our Large Stock Guarantees You the Most Prompt Delivery on All Orders.

**NORTHERN CANADA SUPPLY CO. LIMITED**  
 COBALT    PORCUPINE    TIMMINS

**“BEATTY”**

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



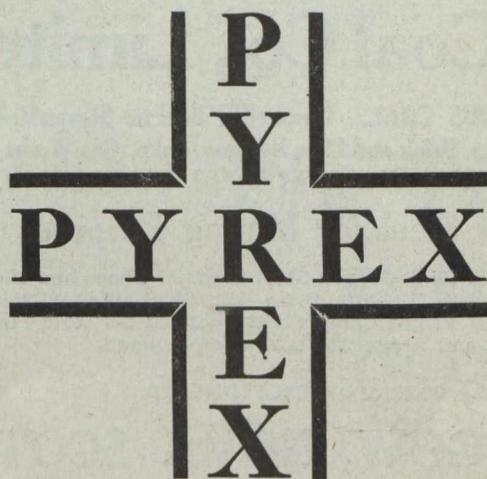
Standard Two-Drum Hoist with Swinger.

Engines for every kind of hoisting duty. “BEATTY PLANT” on your work means uninterrupted service and complete satisfaction.

SEND FOR CATALOGUE TO-DAY

**M. BEATTY & SONS, Limited**  
 Welland, - Ontario

TORONTO BRANCH, 4th FLOOR, 154 SIMCOE STREET  
 AGENTS: — H. E. Plant, 1790 St. James St., Montreal, Que.  
 E. Leonard & Sons, St. John, N.B.  
 Rob't. Hamilton & Co., Vancouver, B.C.  
 Kelly-Powell, Ltd., McArthur Bldg., Winnipeg, Man.



**CHEMICAL GLASSWARE**

Send for Price List.  
 Better write to-day.

SALES AGENTS

**LYMANS, Limited**  
 MONTREAL

**WE CAN SUPPLY PROMPTLY.**

your every requirement in the way of bare copper, copper clad, brass and bronze wires.

These products are rolled and drawn in our own mills and are of high quality and accurate gauge throughout.

WRITE OUR NEAREST OFFICE FOR PRICES  
**STANDARD UNDERGROUND CABLE CO. OF CANADA, LIMITED**  
 Hamilton, Ont.

Winnipeg, Man.    Montreal, Que.    Seattle, Wash.

Manufacturers of Electric Wires and Cables of all kinds, also Cable Accessories.

**UNIVERSITY OF TORONTO FACULTY OF APPLIED SCIENCE AND ENGINEERING**

Courses in—

- |                          |                                    |
|--------------------------|------------------------------------|
| 1—CIVIL ENGINEERING      | 5—ANALYTICAL and APPLIED CHEMISTRY |
| 2—MINING ENGINEERING     | 6—CHEMICAL ENGINEERING             |
| 3—MECHANICAL ENGINEERING | 7—ELECTRICAL ENGINEERING           |
| 4—ARCHITECTURE           | 8—METALLURGICAL ENGINEERING        |

Leading to ACADEMIC and PROFESSIONAL Degrees

For Calendar and other information apply to the Secretary,  
**A. T. LAING**

# ROBERTS AND SCHAEFER CO.

ENGINEERS AND CONTRACTORS  
CHICAGO, U. S. A.

"There is Satisfaction in Using the Best"

DESIGNER AND BUILDERS OF

COMPLETE COAL MINING PLANTS,  
MARCUS PATENT COAL TIPPLES,  
STEWART COAL WASHING PLANTS,  
STANDARD COUNTERBALANCED BUCKET  
LOCOMOTIVE COALING PLANTS,  
RANDS GRAVITY SAND PLANTS,  
COAL DOCK BRIDGES.



W. R. ROBERTS, PRESIDENT  
EDWARD E. BARRET, VICE-PRES.  
JOHN J. ROBERTS, TREASURER  
FRANK E. MUELLER, CHIEF ENGINEER.  
CLYDE P. ROSS, CONT. ENGINEER.  
WILLIS E. HOLLOWAY, CONT. ENGINEER.  
C. C. BRACKETT, GEN'L SUPT. CONSTR.



## 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**

### The Buffalo Mines, Limited

COBALT :: ONTARIO

Producers of Refined Silver

Cobalt Residues

Mercury for Mining Purposes

HEAD OFFICE :: 14 WALL ST., NEW YORK

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.

# Imperial Bank of Canada

Established 1875

HEAD OFFICE: TORONTO

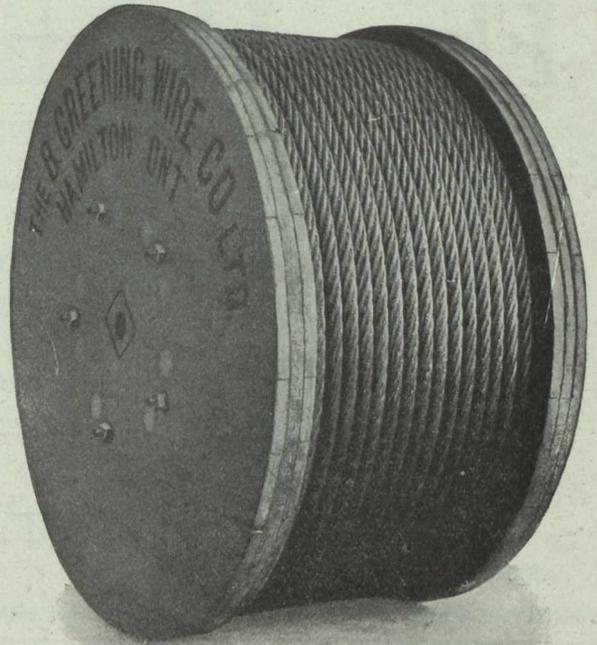
Capital Paid Up       \$7,000,000  
Reserve Fund           7,000,000

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 to all parts of the  
World. Travellers' Letters of Credit, Drafts,  
Cheques, etc., negotiated.

## HAULAGE AND HOISTING ROPES



DERRICK AND DREDGE ROPES  
ROPES FOR HOUSE MOVING

SAW CARRIAGE ROPES  
SMOKE STACK STAYS

Standard or Lang's Lay

WIRE ROPE FITTINGS

WIRE ROPE GREASE

The B. GREENING WIRE COMPANY, Limited  
HAMILTON, ONT.                      MONTREAL, QUE.

**Pig Tin, Pig Lead  
Ingot Copper  
Bertha Spelter**

**Antimony, Aluminum**

— Prompt Delivery —

**Canada Metal Co.**

--- LIMITED ---

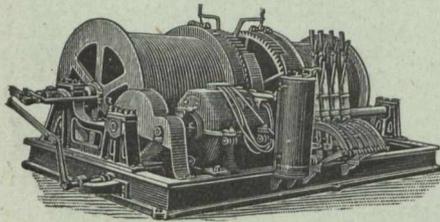
FRASER AVENUE, - TORONTO

# Flory Hoisting Engines

STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

The Flory Cableway System is superior to any on the market.



ASK FOR OUR CATALOGUES

Slate Mining and Working Machinery.

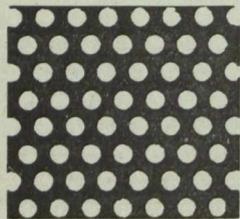
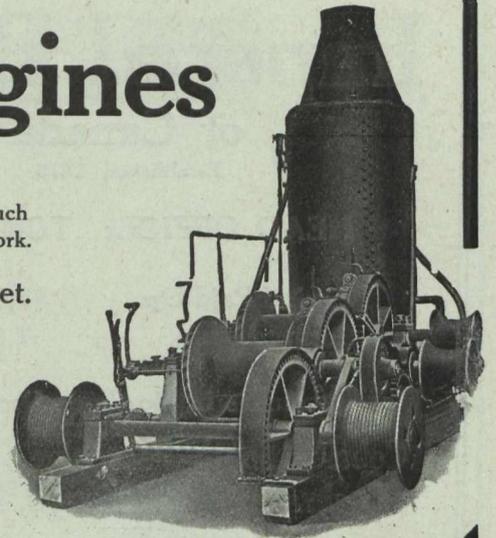
SALES AGENTS:

J. MATHESON & CO.  
New Glasgow, Nova Scotia

MUSSENS LIMITED  
Montreal, Que.

S. Flory Mfg. Co.

Office and Works: BANGOR, Pa., U.S.A.



## PERFORATED METALS

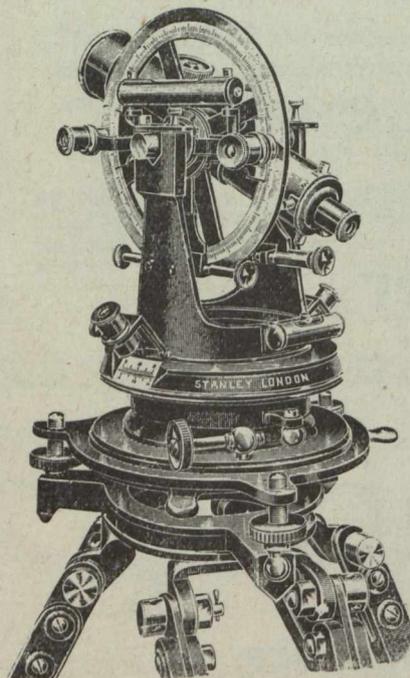
For Every and All Purposes in all Metals

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.

Trade **STANLEY** Mark



Stanley's Tunnelling Transit Theodolite. Has a hollow axis so as to allow sights to be taken through the centre and head of the stand down a vertical shaft.

**W. F. Stanley & Co., Limited**  
Export Dept.: Great Turnstile, High Holborn, W.C.

The Largest Manufacturers of Surveying and Drawing Instruments in the world.

Please send for our K 65 Catalogue, (post and duty free) and compare our prices with those of other first-class makers.

## A New Book By a Mining Engineer

Published April, 1914

# Compressed Air

## Production—Transmission—Use

By THEODORE SIMONS, E.M., C.E.

Professor of Mining Engineering, Montana State School of Mines  
Member American Institute of Mining Engineers.

173 pages, 6x9, fully illustrated. \$1.50 (6/3) net, postpaid.

The author's aim has been to give such insight into the natural laws and physical principles underlying the production, transmission and use of compressed air, as shall enable the reader to comprehend the operation of various appliances and judge of their merit.

He does not attempt to give extensive descriptions of existing types of compressors, but only examples which illustrate the principles, and which enable the student and investigator to solve the theoretical problems arising in the use of compressed air.

— For Sale By —

Canadian Mining Journal, - Toronto, Canada

# BRITISH COLUMBIA

## The Mineral Province of Western Canada

Has produced Minerals valued as follows: Placer Gold, \$73,269,603; Lode Gold, \$81,595,516; Silver \$37,709,282; Lead, \$31,468,462; Copper, \$86,939,370; Other Metals (Zinc, Iron, etc.), \$2,198,949; Coal and Coke, \$149,814,462; Building Stone, Brick, Cement, etc., \$23,827,101; making its Mineral Production to the end of 1914 show an

### Aggregate Value of \$486,822,745

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 1894, inclusive, \$88,904,199; for five years, 1894-1899, \$46,906,258; for five years, 1899-1904, \$90,391,394; for five years 1904-1909, \$121,618,733; for five years, 1909-1914, \$139,002,161.

### Production During last ten years, \$260,620,894

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**

## YOUR Fine Ores, Concentrates and Fluedust

Can be Cheaply and Successfully  
Sintered by the

### DWIGHT & LLOYD SYSTEM

(Fully Protected by Patents.)

SIMPLE, EFFICIENT, CONTINUOUS  
LOW COST OF INSTALLATION

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

### Dwight & Lloyd Sintering Co., Inc.

(Successor to Dwight & Lloyd Metallurgical Co.)

29 Broadway, New York.

Cable Address: SINTERER, NEW YORK

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

American Ore Reclamation Co.

71 BROADWAY, N.Y.

Now Ready

## Canadian Mining Manual

1915

A handbook of information  
on the minerals and mines  
of Canada

Price \$2.00.

432 Pages

Cloth Bound

ADDRESS

263-265 Adelaide St. West., Toronto

# The Minerals of Nova Scotia

The extensive area of mineral lands in Nova Scotia offers strong inducement for investment.

The principal minerals are:—Coal, iron, copper, gold, lead, silver, manganese, gypsum, barytes, tungsten, antimony, graphite, arsenic, mineral pigments, diatomaceous earth.

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

The Province contains numerous districts in which occur various varieties of iron ore practically at tide water and in touch with vast bodies of fresh water.

The Gold Fields of the Province cover an area of approximately 3,500 square miles. The gold is free milling and is from 870 to 970 fine.

Deposits of particularly high grade manganese ore occur at a number of different localities.

Tungsten-bearing ores of good quality have lately been discovered at several places and one mine has recently been opened up.

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

Fuel is abundant, owing to the presence of 960 square miles of bituminous coal and 7,000,000 acres of woodland.

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 upon application to**

**HON. E. H. ARMSTRONG,**  
**Commissioner of Public Works and Mines,**  
**HALIFAX, N. S.**



## PROVINCE OF QUEBEC

**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

**THE HONOURABLE THE MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC**

*When Answering Advertisements please mention THE CANADIAN MINING JOURNAL.*

## Dominion Coal Company

Limited

Glance Bay

Nova Scotia

19 Collieries

Output—5,000,000 tons annually

### “Dominion” Coal

Screened, run of mine and slack

### “Springhill” Coal

Screened, run of mine and slack

Collieries at 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 the 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.  
Harvey & Co., St. John's, Nfld.

## School of Mining

AND

COLLEGE OF APPLIED SCIENCE

QUEEN'S UNIVERSITY

KINGSTON

ONTARIO

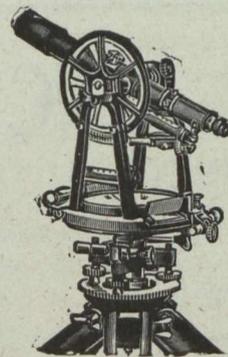
1. Four Year's Course for a Degree (B.Sc.) in
  - (a) Mining Engineering.
  - (b) Analytical and Applied Chemistry.
  - (c) Mineralogy and Geology.
  - (d) Chemical and Metallurgical Engineering.
  - (e) Civil Engineering.
  - (f) Mechanical Engineering.
  - (g) Electrical Engineering.

For Calendar of the School and further information apply to The Secretary, School of Mining, Kingston, Ontario.

## Milling and Mining Machinery

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

**Alex. Fleck, Ltd. - Ottawa**



**Berger**  
TRANSITS AND LEVELS

Tell us the kind of Engineering Work you are to be engaged on, and we can surely ship to you promptly from stock, any size or style of transit or level suitable to be used on your contemplated project. Own a BERGER, and have no regrets, though they cost more at first.

Let us send you Descriptive Bulletins

**C. L. Berger & Sons**

25 Williams Street Boston, Mass.. U.S.A.

## NICKEL

**Shot** - High and low carbon.

**Ingots** -

Two sizes:

25#, 50#.

## ELECTROLYTIC NICKEL 99.80%

Our metal is prime for the manufacture of Nickel Steel, German Silver, Anodes and for all remelting purposes, and is produced as rods, sheets, strip stock, wire and tubes.

Send inquiries direct to us



**The International Nickel Co.**

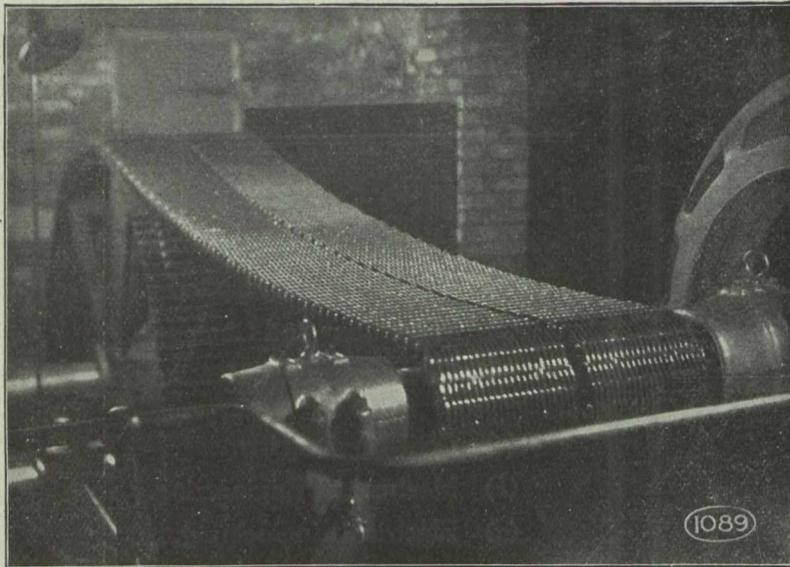
48 Exchange Place

New York

## MONEL 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. Ask for descriptive booklet.

# RENOLD PATENT SILENT CHAIN



250 H.P. Renold Silent Chain driving a hoist

## What a Cobalt User Thinks

Cobalt, Ont., May 18, 1914.  
Messrs. Jones & Glassco,  
Montreal.

Dear Sirs:—

Replying to your favor of the 6th re your Renold Silent Chain, we have found this Chain Drive to be eminently satisfactory in every respect.

We have a 12-inch rubber belt on a 50 H.P. motor running beside a 60 H.P. motor driving Stamp Batteries with your Chain Drive.

A comparison of these two drives shows a saving of approximately \$20.00 since September, 1911, in repair parts, while the time spent on the Chain Drive has been less than on the belt.

We also have the convenience on the short space required by your drive as compared with the longer drive required for the same H. P. in Belting, which is essential in many instances and particularly in ours.

We now have three of these large drives and with none of them have we had any trouble, and all the chains are in as good condition to-day as when purchased.

Yours truly,

The above comes from a prominent Cobalt Mining Co (name on application) and is signed by the Manager.

## JONES & GLASSCO, (Reg'd) Engineers

Branch Office, TORONTO

Sole Canadian Agents

49 Place D'Youville, MONTREAL

## AMERICAN ZINC LEAD & SMELTING CO.

PURCHASERS OF

## ZINC ORE

PRODUCERS OF

## HIGH GRADE SPELTER

Including "MASCOT" and "CANEY" Brands

## SULPHURIC ACID

Send Ore Inquiries to  
1012 PIERCE BUILDING  
ST. LOUIS, MO.

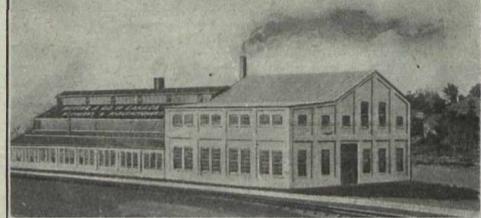
Send Spelter and Acid Inquiries to  
2646 EQUITABLE BLDG.  
NEW YORK, N.Y.

## Boving Hydraulic & Engineering Company, Limited

LINDSAY,

ONTARIO

### OUR LINDSAY WORKS



We Manufacture

Water Wheels, Hydraulic Governors  
Centrifugal Pumps, Mill Machinery  
Fly-Wheels [ up to 28 feet dia.]

Prompt Shipment

Prices, etc., on request

# THE CANADIAN MINING JOURNAL

VOL. XXXVII.

TORONTO, March 15, 1916.

No. 6

## The Canadian Mining Journal

With which is incorporated the

"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada.

Published fortnightly by the

**MINES PUBLISHING CO., LIMITED**

Head Office . . . . . 263-5 Adelaide Street, West, Toronto

Branch Office . . . . . 600 Read Bldg., Montreal

Editor

REGINALD E. HORE

**SUBSCRIPTIONS** — Payable in advance, \$2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, \$3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

### CIRCULATION

"Entered as second-class matter April 23rd, 1908, at the post office at Buffalo, N.Y., under the Act of Congress of March 3rd 1879."

### CONTENTS

Editorials . . . . .	131
Annual Meeting Canadian Mining Institute . . . . .	133
The Metallurgy of Cobalt Silver Ores, by Ralph W. Bridges . . . . .	134
The Export of Nickel Matte . . . . .	136
Debate on the Proposed War Tax . . . . .	137
Mineral Production of Canada in 1915, by John McLeish . . . . .	141
Mr. D. H. McDougall . . . . .	147
Personal and General . . . . .	147
Special Correspondence . . . . .	148
Markets . . . . .	154

## A LIMIT SHOULD BE FIXED AND ANNOUNCED

Since the publication of our last issue we have received assurance that the mining industry will not be taxed so severely as indicated in the Budget speech of Sir Wm. Thomas White. An endeavor will be made to take into consideration factors peculiar to the mining industry and to each mining company. The amount to be collected from the companies is much less than the Budget speech indicated. We have been assured that great care will be taken to avoid crippling the companies and that short-lived mines will receive special consideration.

Sir Thomas proposes to administer the Act through the Finance Department. He has reserved great powers in connection with the administration and hopes to take into consideration the affairs of each company or group of companies and to arrive at an assessment that will be just for all. A less capable man than Sir Thomas would scarcely have undertaken such a task and we would have little confidence in almost anyone who attempted it. The Minister of Finance, however, has been so successful in carrying out things that he undertakes, that we have reason to confidently expect he will succeed in doing what he proposes.

We cannot, however, get over the impression that Sir Thomas is making a lot of unnecessary work for himself and his department. To arrive at the actual value of a mine at any time during its life is a difficult matter, difficult for those most familiar with the industry and doubly difficult for those whose experience in assessment work does not include experience in mine valuation. The determination of the value of a mine for taxation purposes is not a matter that should be undertaken with the idea that it can be accomplished without much thought and labor.

Many of the difficulties will be lessened by the fact that the companies are not endeavoring to escape taxation. They can be counted upon to co-operate with the Finance Department when official assurance is given that they will not be taxed unreasonably. Unfortunately the Finance Department takes the position that it must consider each case on its merits before the companies will know, even approximately, what they may be called upon to pay.

We do not expect that any mining company will be called upon to pay in war taxes more than ten per cent. of its profits as ordinarily calculated. An announcement to this effect could be made by the Government without interfering with the general plan proposed. It would fix a reasonable maximum which the companies could work on until they find out what Sir Thomas means by "capital" and "value of the assets."

The thanks of Canadian mining men are due to Mr. T. A. Rickard, editor of Mining and Scientific Press, for an admirable paper on Flotation Processes.

There is an excellent demand for magnesite for furnace linings. In Quebec several properties are being operated, and it is to be hoped that the industry will become well established while the demand is so good.

At the Canadian Mining Institute annual meeting, Professor Adam Shortt gave a very interesting address on "Gold and War Finance." His arguments were good, and he defended them well; but his deductions did not meet with general approval. One of his deductions was that the appreciation of the American dollar on the New York Exchange was a sign of financial weakness in the United States. Another deduction was that at present it is not important for Canada to increase production of gold.

The story of the discovery of phosphate of lime at Banff by Dr. Frank D. Adams and Mr. W. J. Dick was told at the Mining Institute meeting by Dr. Adams. It is a very interesting story and clearly illustrates the application of structural geology in the search for mineral deposits. Equally interesting was the story of Mr. W. F. Ferrier, who has been quietly prospecting for phosphate deposits in the Rocky Mountains during the past few years. Mr. Ferrier, until the meeting, had not obtained permission to make his work public. After Dr. Adams had told of the work done and prophesied that phosphate beds would be found in the vicinity of Banff, Mr. Ferrier rose and told how he had already prospected the district and found such beds; but had until then been unable to say anything about it. The two stories created a dramatic situation which appealed greatly to the meeting.

During 1915 there were, according to Mr. T. F. Sutherland, Chief Inspector of Mines, 22 fatal accidents at the mines, metallurgical works, quarries, clay and gravel pits regulated by the Mining Act of Ontario. Four farmers were killed by falls of sand and gravel in small pits over which the Department has no jurisdiction. There were none in the pits governed by the Act.

In addition to statistics and discussion of mining accidents Mr. Sutherland gives a description of new safety methods or equipment which the inspectors have noticed throughout the year; the water stopper and safety crosshead at the Hollinger mine; the Stokes stretcher, the electric return bell signal system, and the regulations and requirements regarding rope and hoist inspection of the Canadian Copper Company, a description of which was furnished by Mr. J. C. Nicholls, the company's superintendent of mines. Considerable information is also furnished regarding the regulations for hoisting operations in the pro-

posed Rules and Regulations for Metal Mines in the United States, published in Bulletin 75, of the U. S. Bureau of Mines.

Ontario now has several large shafts handling big tonnages. The Dome and Hollinger have each a six-compartment shaft; the Beaver has one shaft about 1,300 feet deep; Creighton has two shafts, one with four, and the other with five compartments, both over 1,000 feet deep. The Frood Extension shaft is 1,000 feet and the Victoria No. 1 shaft 2,300 feet deep.

It is difficult for the public to understand why mining men protest so strongly against the proposed taxes. In his presidential address, Mr. A. A. Cole made some pertinent remarks in this connection, to which we subscribe. Mr. Cole said: "The war has shown us the woeful lack of co-operation between many of our industries, in other words, the lack of application of scientific methods to our national activities. Germany's successes, both industrial and military, have been due to the fact that she has recognized the value of science and of engineering and has freely utilized these aids in the promotion of her objects. The Canadian Mining Institute is composed for the most part of scientifically trained men holding positions of various importance in the mining industry. The influence of these men on the country at large should be such that the general principles on which the industry is carried on should be fairly generally understood.

"But what are the facts of the case? Talk to the man on the street and you will be amazed in nine cases out of ten to find that he does not realize the basic difference between a mining and an industrial enterprise. He will tell you that the reason that a mining proposition should return twice the income of an industrial concern is because it is more risky whereas the mine may have all its capitalization blocked out ahead and be as safe as the Bank of England; and his own industrial concern may be in a most precarious condition. He has, in fact, never thought of that extra profit as a sinking fund or return of capital. Let us look to ourselves for much of the explanation of this general ignorance regarding the mining industry on the part of the man on the street."

There are many strange statements made in the House of Commons. We have heard few more misleading than W. F. Maclean's remarks concerning a new process for refining nickel. He says: "I believe that it is a fact that out of 100 pounds of our nickel ore we shall get 50 pounds of nickel, which is equivalent pound for pound of the nickel that is used in making nickel steel." Mr. Maclean deserves credit for his apparently sincere endeavor to have nickel refining done in Canada. We are, however, naturally surprised at some of his statements. They are amusing to most of us, but they are likely to do harm. Some of the members of the House may believe that he is serious, and that he is quoting facts.

## ANNUAL MEETING CANADIAN MINING INSTITUTE

The annual meeting of the Canadian Mining Institute held at the Chateau Laurier, Ottawa, March 1st, 2nd and 3rd, was a distinct success. The chief topic of discussion was naturally the proposed tax on mining companies. As the membership includes many of the directors of Cobalt and Porcupine mining companies, the effect that the proposed legislation would have on the gold and silver mining industry received special attention.

Mr. Arthur A. Cole, Cobalt, was elected president for the coming year, in succession to Mr. G. G. S. Lindsey, who is now in China.

The other new officers elected were: Vice-President, Charles Fergie, Montreal; T. W. Gibson, Toronto, D. B. Dowling, Ottawa, and Thomas Cantley, New Glasgow; Councillors, J. A. Dresser, Montreal; Norman R. Fisher, Haileybury; Thos. Graham, Victoria; Gomer P. Jones, Hedley, B.C.; A. D. Miles, Copper Cliff; R. H. Morris, Pochontas, Alta.; M. E. Purell, Rosslund; W. E. Segsworth, Toronto; Clifford Smith, Toronto, and Lewis Stockett, Calgary.

An amendment to the by-laws providing for voting by letter ballot in future amendments to by-laws was carried. A proposal to make application for a Royal Charter was defeated.

In the discussion of Sir Thomas White's proposed tax it was shown clearly that the mining industry would have to pay much more than its proper share. In one case the tax would, on account of the retroactive clause, be so severe that it would take more ore than now remains in the mine to pay the three years' taxes. One mining company would have to pay about \$1,250,000 or one-sixteenth of the total amount required. Similar absurdities which the proposal would effect in other cases were pointed out. It was decided that an attempt should be made to point out to the Minister the unfairness of his proposals and the harmful effects which the carrying out of them would have. President-elect A. A. Cole was asked to name a committee to interview Sir Thomas. The committee chosen by Mr. Cole interviewed the Minister and were given assurance that the tax would not be as severe as indicated in the budget speech, as he intended to take into consideration factors peculiar to the mining industry.

Several very interesting papers were presented during the sessions. The program included the following:

"The Coal Situation in Canada," by W. J. Dick, Ottawa.

"The Carbonization and Briquetting of Saskatchewan Lignites," by S. M. Darling, Estevan, Sask.

"The Coal Resources of Canada, with Special Reference to the Metallurgical Industries," by Dr. J. Bon-sall Porter, Montreal.

"The Discovery of Phosphate of Lime in the Rocky Mountains," by Dr. F. D. Adams, Montreal, and W. J. Dick, Ottawa.

"Some Effects of the War on Canadian Mining and Metallurgical Industries," by Dr. Alfred Stansfield, Montreal.

"Zinc Occurrences at Notre Dame des Anges," by Dr. J. Austen Bancroft, Montreal.

"The Magnesite Industry in Canada," by Howells Frechette, Ottawa.

"The Concentration of an Ontario Magnetite and the Sintering Thereof for the Manufacture of Charcoal Pig Iron," by G. C. MacKenzie, Ottawa.

"Canadian Supplies of Iron and Steel in Relation to Munitions of War," by Thos. Cantley, New Glasgow, N.S.

"Copper Mining in Alaska," illustrated by colored lantern slides, by H. W. DuBois, Philadelphia, Pa.

"Canadian Gold and War Finance," by Dr. Adam Shortt, Ottawa.

"Gold Production and the War," by J. Murray Clark, Toronto.

"The Flotation Process," by T. A. Rickard.

"Recent Improvements in Concentration at the Washoe Reduction Works, Anaconda, Montana," by E. P. Mathewson, Anaconda, Mont.

"The Flotation of Bornite," by H. W. Dubois, Philadelphia, Pa.

"The Concentration of Canadian Molybdenite," by Henry E. Wood, Denver, Col.

"Some Conditions Affecting Education in Mining and Metallurgy," by Prof. J. C. Gwillim, Kingston.

"Mining Education," by L. D. Burling, Ottawa.

"Methods of Construction of Deep Mine Shafts in Water Bearing Material," by John W. Doty, New York.

"Rock Crushing Tests at McGill University," by Prof. J. W. Bell, Montreal.

"Mineral Deposits of the Buckingham District," by Morley E. Wilson, Ottawa.

"Petrolia, Past and Present," by John Stansfield, Montreal.

By the courtesy of Dr. J. Bonar, Deputy Master, members and others attending the meeting were enabled to visit the Royal Mint. Permission was also granted by Dr. Eugene Haanel, Director of the Mines Branch of the Department of Mines, for members to inspect the ore dressing and other laboratories of the Mines Department. Many members visited these institutions, as well as the Museum of the Geological Survey and the National Gallery under the guidance of members of the local committee.

The dinner, always one of the best features of the Institute's meetings, was held on Thursday evening. On Wednesday evening Mr. DuBois showed a splendid series of colored views illustrating the conditions under which mining is carried on in Alaska. Prof. Shortt followed with a dissertation on gold mining and war finance which aroused a lively discussion that lasted until midnight.

### IN DELORO.

South Porcupine, March 5.—The Dominion Rand Mines Limited have been granted a charter and will take over and develop the Rand Syndicate properties in Deloro Township, about four miles south of Porcupine, in a week or so, as soon as the affairs of the syndicate and preliminary details are formally gone through with. Heavy machinery will be taken in on the snow before the break-up. A handful of men have been sinking on this property all winter and have encountered some splendid milling ore of good values. It is the intention of the company to push underground work ahead and get enough ore blocked out to ascertain the size and class of mill that will be necessary to treat the ore. We will have some further information about this property in a few days.—Porcupine Herald.

### HEDLEY GOLD.

A quarterly dividend of 3 per cent. and an additional dividend of 2 per cent. payable March 31, 1916, has been declared by the Hedley Gold Mining Co.

# THE METALLURGY OF COBALT SILVER ORES

## III. LEACHING OF CHLORIDIZED SPEISS WITH CYANIDE

By Ralph W. Bridges

When the preliminary chloridizing roasting experiments, covered in Article II, Tables 1 and 2 (see Feb. 1 issue of Canadian Mining Journal) were completed and the loss of silver was seen to be quite low, the chloridized speiss resulting from this series of roasting experiments was used in making leaching tests with cyanide and hypo solutions to determine how much of the silver was in a soluble form and what per cent. could be recovered as bullion. This treatise deals only with the cyanide leaching.

In these experiments an Abbe mill was used. In it was placed a charge of 2,000 grams of chloridized speiss and 20 litres of cyanide solution. A ratio of 10 parts of cyanide solution to 1 part of chloridized speiss was maintained throughout the experiments.

The Abbe mill was rotated for a period of 10 hours. The solution was decanted and the tailings discharged onto a filter, washed, dried and weighed. The results of two sets of leaching tests are shown in Table No. 1.

The silver cyanide solution resulting from the leaching was used for a number of precipitation tests. Zinc dust and shavings and aluminum dust and shavings were used with satisfactory results. However, as the company had a large amount of surplus electrical power, it was decided to use the electrical current for precipitating the silver, should the cyanide process be adopted.

A number of tests were made in the laboratory to determine if all the silver could be precipitated, and the time and current required. Examples of these tests are as follows:—

(1) Took one assay ton of solution, silver content .06764 gr., diluted to 200 c.c. and electroplated with laboratory apparatus; Platinum anode, silver cathode; amperes 1, volts 14; time 4 hours.

Silver precipitated: .06748 gr. Left in solution: .00016 gr. Precipitation of silver: 99.76 per cent.

(2) Test of rapid precipitation by use of solenoid. Took one assay ton of solution, silver content: .06764 gr. Platinum electrodes; Amperes 3; Volts 40. Silver precipitated as follows:—

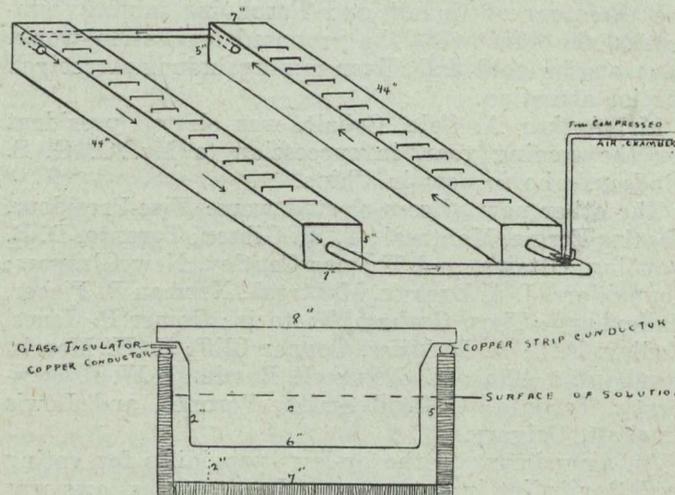
Time	Cathode Wt.	Plated	Total
Start	26.2908		
5 min.	26.3329	.0421	.0421
12 min.	26.3563	.0234	.0655
17 min.	26.3615	.0052	.0707
20 min.	26.3635	.0020	.0727
25 min.	26.3650	.0015	.0742

The solution was free from silver in 25 minutes. The metal on cathode was dissolved with nitric acid and the silver was precipitated with hydrochloric acid. The cobalt and nickel were replated and weighed .0058 gr., making the total silver deposited .0742—  
.0058=.0684.

The above examples were taken from a large number of tests showing that the silver could be rapidly and completely precipitated from solution.

In order to give the electrolytic precipitation a thorough test an apparatus consisting of two troughs 44 in. by 7 in. by 5 in. and holding 45 to 50 litres of solution was constructed. These troughs were connected at each end by means of a 2 in. pipe, so that the solution could be circulated, which was accomplished by introducing an air blast into the connecting pipes. Pre-

liminary work with electrodes showed that lead anodes and tin-plate cathodes gave satisfactory results. Tin-



Precipitating Apparatus

plate seemed to have no reaction with the solution and was easily cleaned. The 12 tin-plate cathodes used in the following experiments weighed 583 gr. before and after using. There were 6 tin-plate cathodes and 7 lead anodes in each trough. These electrodes were all the same size and the surface in contact with the solution was 2 in. by 6 in. or 24 square in. per electrode and 1 square ft. in each trough.

A few preliminary tests were made with this apparatus to determine how fast the silver could be precipitated.

The result of a 26 hour run, showing the amount of silver still in solution at different times is shown below:—

Time.	Assay.
Start	68.08 oz. per ton.
4 hrs.	32.87 " " "
8 hrs.	25.48 " " "
14 hrs.	8.00 " " "
17 hrs.	1.78 " " "
20 hrs.	0.72 " " "
23 hrs.	0.65 " " "
26 hrs.	0.41 " " "

Starting with green speiss a complete quantitative experiment was made to determine how much of the silver contained therein could be recovered as bullion. 10,000 gr. of green speiss was chloridized and leached with cyanide solution. The solution was treated in the precipitating apparatus, described above, and the precipitate was collected, dried, fused with borax, sand and soda which gave a bullion about 900 fine. Complete figures are given in Table No. 2. All weights in this table are grams and the assays of silver are given in per cent. instead of ounces per ton.

At the finish of the experiment a clean-up of the troughs produced 456 grams of dried precipitate and sediment. This was fused with borax, sand and soda and gave 390 grams of silver bullion, which assayed 900.2 fine, making the total fine silver produced 351.8 gr. or 93.91 per cent. of the silver in the original green speiss.

TABLE NO. 1

SHOWING WEIGHTS AND ASSAYS, BEFORE AND AFTER LEACHING, AND CONSUMPTION OF CYANIDE.

No.	WEIGHT		Time	Assay Ag.		Ag. Content		Silver Extr'd	% Ag. Extr'd	Assay Co. Ni. Con.		Metallic Co. Ni.		Co. Ni. Ext.	% Co. Ni. Ext.	% CYANIDE			
	Before	After		Before	After	Before	Aft.			Before	After	Before	Aft.			Before	After	Consumed	Ratio
1	2000	1660	10 h	709	13	709	11	698	98.45	3164	35.13	633	583	50	7.90	2.52	1.45	1.07	2.45
2	2000	1695	10 h	898	36.6	898	31	867	96.98	2889	32.43	578	550	28	4.84	2.52	1.30	1.22	2.25
3	2000	1675	10 h	927	34.	927	28	899	96.98	2798	31.74	560	532	28	5.00	2.52	0.76	1.76	3.13
4	2000	1712	10 h	908.4	28.4	908	24	884	97.35	2834	30.79	567	527	40	7.05	2.54	0.83	1.71	3.09
	Av.	1685			28.0				97.44						6.20			1.44	2.73
	Loss in Wgt. 15.75%																		
1	2000	1605	10 h	1100	19.4	1100	16	1084	98.54	25.82	29.99	516	481	35	6.78	3.20	0.94	2.26	3.33
2	2000	1596	11 h	776	19.4	776	15	761	98.07	26.22	30.77	524	491	33	6.29	3.20	0.91	2.29	4.81
3	2000	1632	11 h	812	17.4	812	14	798	98.27	27.26	30.64	545	500	45	8.25	3.00	0.84	2.16	4.33
4	2000	1582	10 h	773	11.4	773	9	764	98.83	26.93	30.85	539	488	51	9.46	3.20	0.80	2.40	5.02
	Av.	1604			16.8				98.40						7.70			2.28	4.37
	Loss in Wgt. 19.80%																		

TABLE NO. 2

CHLORIDIZING ROAST

Weight	Ag.	ASSAY			METALLIC CONTENT					
		Co.	Ni.	As.	Fe.	Silver	Cobalt	Nickel	Arsenic	Iron
BEFORE ROAST										
10000	3.746%	24.40	14.39	31.45	17.90	374.6	2440	1439	3145	1790
AFTER ROAST										
13025	2.80%	17.77	10.87	16.65	13.10	364.7	2315	1416	2169	1706
CLINKER, FLUE DUST, ETC.										
1146	0.565%					6.5				
						Total	371.2	2315	1416	2169
						Loss	3.4	125	23	976
100 gr.	Sample of Chloridized Speiss out.									
100 "	2.80					2.8				

CYANIDE LEACHING

BEFORE LEACH										
12925	2.80%	17.77	10.87	16.65	13.10	361.9	2297	1405	2152	1693
AFTER LEACH										
10744	0.0603%	19.71	12.21	19.70	15.05	6.5	2118	1312	2117	1617
		Weight of Metals in Solution				355.4	179	93	35	76
		Per cent. of Metals in Solution				98.20	7.79	6.62	1.62	4.46

Strength of Cyanide Solution before . . . 2.30 After . . . . . 0.25 Consumed . . . . . 2.05.  
 Rates of Avoirdupois ounces Key. consumed to Troy ounces Silver precipitated 4.08.

Weight of Solution	Silver Assay		Silver Content		Amperes	Volts	Time	Ampere Hours	Silver	
	Before	After	Before	After					Precipit.	Fine Sil.
45477	0.241%	0.00003%	109.6	0.013	3	56	39 hrs.	117	By differ	From
44500	0.247%	0.00024%	109.9	0.094	3	56	44 hrs.	132	355.0	dri.ppt.fus
50021	0.271%	0.00048%	135.5	0.244	3	56	56 hrs.	141	0.4	with Bor. etc.
			355.0	0.351				390	354.6	351.8

SILVER DISTRIBUTION.

Fine Silver obtained as Bullion	351.8	93.91%
Clinker, Flue Dust, etc.	6.5	1.74%
Roasting Loss	3.4	0.91%
Tailings	6.5	1.74%
100 gr. sample	2.8	0.74
Refining bullion and unaccounted for	3.6	0.96%
	374.6	100.00%

## THE EXPORT OF NICKEL MATTE

Ottawa, March 1.—The budget debate concluded early this morning without a vote after seven speeches had been added to the record. The main topic of discussion, as it proved, was not the budget but the export of Canadian nickel and the question as to whether or not any of it found its way to Germany. Several speakers during the course of the debate have urged that it did and the last night they found a champion on the Government side in the person of Mr. W. F. Maclean, of South York, who urged Government control of Canada's nickel deposits and asserted his distrust of the International Nickel Company of the United States, which now refines the great bulk of Canadian nickel.

Hon. Arthur Meighen, solicitor-general, defended the Government's record in connection with nickel export. He stated that after an examination of the books of the International Nickel Company by a Government official it could be stated that not a pound of nickel found its way into German hands and that the price had not been increased to the British Government except by the few cents necessary to cover increased expenses of ocean transportation.

Mr. Meighen said that an arrangement had been made by the Government with the International Nickel Company regarding the exportation of nickel at the close of 1914 and that the papers relating to it had been laid on the table of the house in February, 1915. That arrangement had met with the approval of the British Government which had sent a special note expressing appreciation of the action taken by the Canadian administration in the interest of the Empire.

Mr. Meighen said that he was unable to give the details of the arrangement which had been made because if he did so he would be disregarding the expressed wish of the British Government and making public confidential information. He read the correspondence with regard to the arrangement between Sir Robert Borden and Sir George Perley. Sir George Perley stated that Sir Francis Hopwood, chairman of the British committee for preventing supplies from reaching the enemy, had pronounced the arrangement perfectly satisfactory. The solicitor-general stated that Mr. Graham Bell, financial controller of the Department of Railways, had had access to the books of the International Company with the friendly consent of the corporation. He had authorized the solicitor-general to state that "not a pound of Canadian nickel had reached Germany since the war began."

Mr. Turriff feared that if the company was selling to Germany it might conceal the fact from a Canadian Government official. Mr. Meighen, however, assured him that the system of inspection would prevent such concealment. He then took up Mr. Turriff's assertion that the Krupps were "big owners" of the International Nickel Company. In the first place Mr. Nesbitt, the Liberal member for North Oxford, had asserted that he knew that no one in Germany had anything to do with the company. He had further said that the company would welcome an inspection of its books to prove that such was the case. Mr. Meighen read a letter from Mr. Bostwick, assistant to the president of the nickel company, to the effect that the Krupps had absolutely no influence in the affairs of the company and that, moreover, only 158 shares of common and 263 shares of preferred stock of the company out of 469,

441 shares in all were held by persons in Germany and Austria.

Mr. Meighen then took up the statement of Mr. Turriff that the International Nickel Company was selling nickel before the war at 25 cents a pound and was now charging the British Government 50 cents a pound. The solicitor-general said that before the war the company was selling nickel to the British Government in large quantities at £160 a ton, or at the rate of exchange then prevailing, at about 34.8 cents a pound. At present it was selling, with the approval of the British Minister of Munitions, at £175 a ton or about 37.2 cents a pound delivered in the United Kingdom. The increase in the price, 2.34 cents a pound, would cover the increase in the cost of freight but would make no provision for any increase in the cost of mining and refining.

Mr. Meighen favored an export duty on nickel matte to encourage the establishment of refineries in Canada if this could be done without exciting the antipathy of our neighbors. But to place such a duty on at this time would be to prevent the supply of nickel for the munitions of war which were being manufactured for the allies in the United States.

### CROW'S NEST PASS COAL CO.

The directors of the Crow's Nest Pass Coal Co. met in New York City on February 18 and declared a quarterly dividend of 1½ per cent. (at the rate of 6 per cent. per annum), payable on March 3. For some years, up to 1907, the company paid dividends of ten per cent. per annum; then the dividend distribution dwindled to one per cent., which was paid in 1911, although the company's statement of accounts showed a deficit. Since then there has not been any cash disbursement to shareholders. In 1908 a stock dividend of 66 2-3 per cent. was paid to shareholders.

In 1915 the company worked eight mines at its Coal Creek colliery, near Fernie, and four at its Michel colliery. Coke ovens were operated at both Fernie and Michel. Its gross output of coal was 797,010 long tons, against 778,403 tons in 1914, an increase of 18,706 tons. The quantity of coke made was 239,178 tons, as compared with 199,866 tons in 1914, an increase of 39,312 tons.

The following statement, for which the president of the company was quoted as authority, was published in the Journal on February 15: "During the last three years the Crow's Nest Pass Coal Co. has paid off all its bills and accounts payable, amounting in 1912 to a total of \$1,081,690. The liability on these accounts was reduced to \$811,605 in 1913, to \$498,241 in 1914, and the balance was entirely cleared off in 1915." A further statement quoted was: "Since January 1, 1915, the company has paid off all its indebtedness and it now has a substantial balance at its credit in the bank. All the bonds against its subsidiary companies have been paid, so that there are now no bonds outstanding against any of the companies, nor is there any preferred stock. As far as we can judge, the prospects for the coming year are quite as good as, if not better than, the year just closed."

### TECK-HUGHES.

The mill at the Teck-Hughes is nearly ready for operation, and mining operations will be resumed shortly. It is hoped that electric power will be available for operation of the mill; but arrangements have not yet been completed.

## DEBATE ON THE PROPOSED WAR TAX

The House of Commons in Committee of Ways and Means on Thursday, March 2, 1916, discussed the proposed war taxation. The following extracts from the official report of the debate are of interest to mining men:

Sir Thomas White (Minister of Finance): The resolutions which were brought down in the Budget appear in the Votes and Proceedings of February 15. In the course of the debate on the Budget, I stated that I would acquaint the House with certain provisions which appear in the Bill to be founded upon the resolutions dealing with some important matters which were discussed in the course of the debate. I propose at this sitting of the committee, to deal briefly with these points and with the amendments which I have to offer; and then I will ask the Committee to rise and report progress. The resolutions can then be printed, and to-morrow or some later day, with the full text of the resolutions and amendments before it I will ask the committee to proceed with their consideration.

In the resolutions it was provided that the special taxation measure should apply to the accounting periods ending after August 4, 1914, of persons, firms, partnerships and companies. The intention of the proposals was, that no business should pay upon more than three accounting periods, or upon less than three accounting periods, of one year each.

The proposal to make the taxation apply to the past has been discussed at some length, and, so far as the revenue of the Dominion is concerned, I think it makes no difference—as only three periods can be taxed, and as three periods must be taxed—whether or not the proposals are limited to accounting periods which fall in after August 4, provided that the accounting periods are dealt with. This, however, is subject to two considerations. In the first place, large profits were derived during 1915 by many firms and companies engaged in the munitions business and in many other businesses in which, owing to the war, there was an abnormal rise in the price of the commodities dealt with. Secondly, there is this consideration: that it is not desirable, as this measure is a temporary one, to extend its provisions too far into the future. In view of the discussion which has taken place, and having given the matter full consideration, the Government is of the view that the measure might with fairness be made to apply to businesses in respect of accounting periods which end after December 31, 1914, instead of after August 4, 1914. The months of August, September, October and November, after the outbreak of the war, were very trying months; and, therefore, I have to propose, in the amendments which I shall lay upon the table, that the taxation measure shall apply to businesses in respect of accounting periods which end after December 31, 1914.

Mr. Murphy: How far does the explanation that the hon. gentleman has just given apply to the accounting period which, under the resolution, is to be determined by the minister himself?

Sir Thomas White: As my hon. friend will observe, the discretion of the minister to determine the accounting period applies only to cases where the accounting period exceeds a year, or where there is no accounting period. I do not think that occasion will arise frequently for the exercise of that discretion. It is only to safeguard the measure, so that companies cannot

evade the tax by saying: we have no accounting period. As a corollary to what I have stated, namely, that the new proposals will apply to accounting periods ending after December 31, 1914, the operative part of the Bill will come to an end on December 31, 1917, instead of August 3, 1917, in order that the measure may apply to three accounting periods of a year, and to not more than three accounting periods a year.

Mr. Graham: You will get more money, too.

Sir Thomas White: I am glad to hear my hon. friend say that. I am trying to meet the difficulty that has been mentioned; I am rather disposed to think that my hon. friend is right in suggesting that we shall get more money.

The Bill itself contained provisions, even under the resolutions as drafted, whereby any business subject to the tax would not be obliged, in the year 1916, to pay in respect of two accounting periods. There were provisions in the Bill that, where a business was liable in respect of two accounting periods, representing a period of two years, the business might pay for the first accounting period in 1916, for the second accounting period in 1917, and for the third accounting period in 1918. My object was to avoid inconvenience and hardship to those who might be subject to the taxation in being obliged to pay in 1916 in respect of two full accounting periods.

Turning from the so-called retroactive provisions of the measure to certain other matters which were discussed, and particularly to the question of the capitalization of companies, I have the following observations to make: It is not necessary for me to say to the committee that in an intricate measure of this kind, a measure so far-reaching in its character, it has not been an easy matter to deal with the important question of reserves. The committee, comprising as it does so many lawyers and business men, of course understands that there are reserves and reserves. One company has carried on its business properly. Starting years ago with a small capital, it has written off year by year a proper amount for depreciation. Every year it has put part of its profit back into business, usually into the plant or stock in trade. In a word, it has built up its business along conservative lines. Some of the greatest enterprises in the world have been built up precisely in that way, and in my opinion that is the proper way to build up large industries; that is to say, to grow by certain and sure steps from small beginnings to a larger, and finally to a great business. In cases such as that, where the reserves are true reserves, no question could possibly arise. Such reserves are just as much capital as the paid-up capital of the company, even if it is fully paid up in cash.

Mr. Nesbitt: Does that apply to incorporated companies as well as to partnerships?

Sir Thomas White: Undoubtedly. The question does not arise in the case of firms, because there we are taking the value of their assets.

Mr. Sinclair: What would the minister say as to the value of stock quotations on the exchange? We will say that a stock which has a nominal value of 100 is quoted in the market at 400. Would the minister say that that was a fair way of finding the market price?

Sir Thomas White: I am coming to that, but I will say now, and I think my hon. friend, as a lawyer, will agree with me, that stock market value is evidence, but not conclusive evidence of value. It is some evidence to be taken into consideration. But many factors enter into stock market values—earning power as well

as the tangible assets back of the stock, and while I would be disposed to say to my hon. friend that some regard should be had to stock market quotations, still I would not consider that a sound basis on which to reach the value of any stock listed upon exchange. My hon. friend also knows that stocks fluctuate very much according to financial conditions. When money is cheap, when there is a boom, stocks of course rise in value. On the other hand when panics occur, or money becomes dear, stocks fall in value; so I think it would be very unsafe to take the stock market quotations as the value at which stock should be fixed for the purpose of ascertaining the true capitalization of over-capitalized companies.

Now I come to what I have to propose. I told the House that this taxation measure would apply to businesses, including corporations, in respect to accounting periods ending after December 31, 1914. To meet the case of so-called watered stock corporations, or over-capitalized companies, I propose by way of addition or amendment to the resolutions a definition of amount paid up on capital stock, which I think will fairly meet the situation. I say again, perhaps quite unnecessarily, that it is not an easy situation to deal with, because we have behind us the entire legislation of the past, and corporate action in virtue of that legislation, and decisions thereunder.

What I propose is as follows: That the amount paid on the capital stock of a company shall be the amount paid up in cash. That is to say, if paid up in cash, no question arises. Where stock was issued before the first day of January, 1915, for any consideration other than cash, the fair value of such stock, on such date, shall be deemed to be the amount paid up on such stock; and where stock has been issued since the first day of January for any consideration other than cash, the fair value of the stock at the date of its issue shall be deemed to be the amount paid up on such stock. In estimating the value of stock issued for any consideration other than cash, regard should be had to the value of the assets, real and personal, movable and immovable, and to the liabilities of the company at the date as of which such value is to be determined.

In no case shall the value of the stock be fixed at an amount exceeding the par value of such stock. In other words, what we propose is that where stock has been issued for cash, the amount paid upon the stock shall be the amount of cash so paid upon the stock, but not of course exceeding par. Where the amount paid exceeds par, that would appear in the reserves of the company, so that no injustice is done in making the limitation par. Where the stock of a company has been issued, for consideration other than cash, prior to January 1, 1915, we propose to say that the amount paid up on the stock for the purposes of this Act is the fair value of that stock as at January 1, 1915. Why? Because, as I have said before, this is a tax upon profits upon capital, if we can determine the capital of the company as of a date approximating the beginning of the period in respect to which the company is taxed, then we are fairly imposing the tax in respect to the capital of the company at that time. In other words, we are dealing with the over-capitalized company on precisely the same basis as we are dealing with the properly capitalized company.

Mr. W. F. Maclean: And the hon. gentleman de-waters some of the stock?

Sir Thomas White: We de-water some of the stock for the purposes of this Act. I did not know that my

hon. friend knew what watered stock was. That is the proposal which the Government has to make in respect to companies whose stock has been issued for consideration other than cash. I realize that it will not be possible to ascertain the precise cash value, but for every practical purpose of the Act, this puts the over-capitalized company upon exactly the same basis as the company which has been properly capitalized.

Sir Wilfrid Laurier: How will you determine what is water and what is gold?

Sir Thomas White: No doubt my hon. friend uses the word "gold" in the sense of tangible assets?

Sir Wilfrid Laurier: Yes.

Sir Thomas White: Let me give my right hon. friend an illustration such as this: You may have an industrial company whose stock was watered to a very considerable extent, say, some time ago, or, recently—it really makes no difference for the purposes of my argument. That company has certain earnings to-day. Its stock has been issued for a consideration other than cash. If we could determine the value of the assets of that company as of January 1, 1915, and determine the liabilities of that company as of January 1, 1915, we would have a reasonably fair idea of the value of the stock: in other words, of the true capital of the company. My right hon. friend will, no doubt, say that it will be a difficult thing to do, and I quite agree with him, but in connection with assessment, I may say that I had charge of the business assessments in the city of Toronto for ten years, and while a number of questions arise which are difficult of determination, they are not impossible of determination along fair or just lines for purposes of a taxation measure. Personally, I see no difficulty in administering the Act under this provision, and administering it in such a way, as I stated a few days ago to the House, as to allow of no undue advantage to the over-capitalized company.

Mr. Pugsley: It is proposed to take the actual, fair, cash value irrespective of any prospective profits?

Sir Thomas White: What I say is the value of the assets, movable and immovable, real and personal, irrespective of future expected earning power.

Mr. Pugsley: The cash market value?

Sir Thomas White: The cash value? What I say is the value of the assets of the company, real and personal, movable and immovable, adopting the same language as we do in connection with persons and firms subject to taxation, less the liabilities of the company.

Mr. Pugsley: When you say the "fair value," do you allow for prospective profits?

Sir Thomas White: No. I have not used the words "fair value" in respect to the future profits on the stock, but I say that regard should be had to the value of the assets, real and personal, movable and immovable, subject to the liabilities of the company at the date at which such value is to be determined. When the matter is in committee I would value very greatly the opinion of my hon. friend, or any suggestion that he might put forward, but when we say that it is to be the value of the stock as of about the time this Bill begins to operate, and when we say, in reaching that value, that regard shall be had to the value of the assets, real and personal, movable and immovable, and the liabilities of the company, we put the over-capitalized company precisely on the same basis as the fairly capitalized company and the individual who is being taxed by this Bill. That is what we propose to do and that is the intention of this amendment to the resolution.

Mr. W. F. Maclean: Would the minister say who is to apply the law in this case?

Sir Thomas White: We propose to administer this Act through the Finance Department. Just as the customs administration is under the Minister of Customs, just as the administration of the inland revenue is under the Minister of Inland Revenue, so the administration of this Act will be under the Department of Finance, and we shall have to make the assessment and collect the taxation. There will be an appeal to the Board of Referees and a further appeal to the court in order to safeguard the rights of the taxpayer.

Mr. Graham: There are two kinds of securities, namely: bonds and preferred stock, which usually provide the capital in cash. Common stock represents an intangible asset such as goodwill or something of that kind. As I understand it, my hon. friend proposes to treat preferred stock and common stock just as capital stock.

Sir Thomas White: "Capital stock" for the purposes of this Act, is capital stock, whether preferred or common, but bonds, the liability of the company, cannot be regarded as capital stock.

There are carrying on business in Canada some companies who are controlled by companies outside of Canada, and, instead of those companies paying their true net profits, or a substantial part of them by way of dividends to the holding or parent company, they have an arrangement whereby they sell the parent company their product at less than its fair market value and in that way the parent company takes its benefits or advantage from the stockholders in such company. That also is a matter of some difficulty, as hon. gentlemen will realize, but I think I have covered that by an amendment which I shall ask the committee to consider carefully, and which is as follows:

Where an incorporated company conducts its business, whether under agreement or otherwise, in such manner as either directly or indirectly to benefit its shareholders or any of them or any persons directly or indirectly interested in such company by selling its product or the goods and commodities in which it deals at less than the fair price which might be obtained therefor the minister may determine the amount which shall be deemed to be the profits of such company for any accounting period and in determining such amount the minister shall have regard to the fair price which but for any agreement, arrangement or understanding might be or could have been obtained for such product, goods and commodities.

Mr. W. F. Maclean: Would the amendment reach the nickel company—a nickel company? I do not want to specify. Is the minister trying to deal with a company of that kind?

Sir Thomas White: I think that might fairly be gathered from the clause I read. There has been a misunderstanding with regard to the effect of the measure on mining companies, and there is no doubt that mining companies present difficulties that are not presented by other companies. It would in my view be quite unjust to leave mining companies untaxed in a measure such as this. You have in the case of mining companies frequently a capital of five, ten or twenty million dollars earning large profits, and it would seem unfair to other corporations for mining corporations to escape untaxed. Now, it is only fair to the mining corporations, because I have had representations from some of them, to say that they do not in the least degree desire to escape taxation at this time.

They put forward their view as to the method of application of this Act to mining companies. But, as I have said, there has been misapprehension as to the effect of the proposals upon mining conditions. In the case of a mine, profits, so-called, include not only what might be regarded as true net profits, but a very substantial portion of the capital of the mine. Therefore, when we assess mining companies, we must bear in mind that, in order to ascertain what their net profits are, a substantial part of the apparent profits of the mine represent capital, and that within a few years, depending upon the character of the mine, whether metalliferous or otherwise, the capital will be exhausted. Under the laws of the Province of Ontario, and possibly under those of some other provinces, a mining corporation is permitted to do what another corporation is not permitted to do—namely, to pay out as profits to its shareholders a part of the capital. Now, under the resolutions as they stand, it is perfectly clear that in determining the net profits, regard must be had to the amount by which the mine is yearly exhausted. I may say, there is legislation in the United States assessing the income of mining companies, and it is provided that allowance shall be made, not exceeding a certain percentage—I have forgotten the exact figure—to represent the capital that is being returned to the shareholders in the so-called profit distribution. Now, although it would be implied by the resolutions as they stand, that this allowance should be made for the depletion of capital, yet, in order to make it perfectly clear, **I propose to provide that the minister, in determining the profits derived from a mine, may make an allowance for the exhaustion of the mine.**

Sir Wilfrid Laurier: My right hon. friend said that in the case of mining companies the minister would be allowed to make a deduction upon the amount the companies are assessed. Will provision be made in the Bill authorizing the minister to make that deduction, and will any limitation be set?

Sir Thomas White: I gave that matter very careful consideration, and finally came to the conclusion that it would be unwise to import any limitation, and I will tell my right hon. friend why. In the legislation of the United States respecting mining companies, there is a limitation beyond which an allowance cannot be made. An allowance may be made for exhaustion of a mine, but the allowance must not exceed 5 per cent., I think it is, of the output of the mine. I regard it inexpedient to fix a limitation for this reason. Mines are of different character. You may have a coal mine that will last for generations, and silver and gold mines which will last for varying periods. You cannot lay down any hard and fast rule in regard to all mines. It would seem to me that the facts in connection with each particular mine should be taken into consideration at the time the assessment is made; such facts, for instance, as the district in which the mine is, the condition of the mine, etc., and then try and reach a just conclusion as to how much should be allowed as capital. My right hon. friend might properly observe that that leaves a great deal to discretion, and I agree that it does. I think it advisable in all legislation, whether taxation or otherwise, that the law should be clear in so far as it is possible to make it clear, and that as little room as possible should be left for the exercise of discretion; but in all legislation, and especially in taxation legislation, a certain amount of discretion is necessary in the administration of the Act. I do not mean a discretion which

would favor one and do an injustice to another; but a certain amount of discretion must be exercised by the officials who carry out the Act. They may say: In this particular mine or industry we estimate that an allowance of such and such per cent. should be made for exhaustion of capital. It might be better to deal with this matter—and I have given this some consideration—by regulations of the Governor in Council, and I shall be very glad to consider any such suggestions when we are in committee again, and in the meantime my hon. friends may think the matter over with a view to offering suggestions that they think would improve the Bill.

#### INTERNATIONAL NICKEL CO.

Under date of March 1st, the Boston News Bureau says: One of the most absurd yarns published since beginning of the European war is the one from Canada that International Nickel Co. is controlled by German-Americans and is shipping nickel to Germany. For this reason J. G. Turriff, a western liberal member of parliament, wishes to stop the exportation of nickel from Canada.

In this connection it is interesting to note that E. C. Converse, Ambrose Monell, W. E. Corey, D. Coulson, W. T. Graham, Robert M. Thompson, J. R. De Lamar, and a few other good "Germans" control the International Nickel Co.

Corey, Monell and Converse are among the controlling interests of Midvale Steel Co., which is filling big orders for Great Britain and France. They are also identified with big interests who are supplying copper and steel to the allies. The companies with which they are identified are among the largest consumers of nickel. The question is where would the American manufacturer procure nickel for British war orders if supplies from Canada were shut off?

The statement that large quantities of nickel are being exported to Germany is given no credence. It is true, however, that over the past several weeks a big borrowing demand for International Nickel stock has developed.

Officials of International Nickel Co. deny flatfootedly the statements regarding the company made on floor of House of Commons at Ottawa by a western member.

The denial by International Nickel officials is explicit.

There is no foreign control of the company. Less than 500 shares of Nickel stock are owned in Germany and Austria.

Inasmuch as the allies have declared nickel contraband of war, it is impossible for the metal to reach Germany and Austria.

Price to the British government is a shade less than the company received before the war.

In view of announced intention of International Nickel Co. to construct a refinery in Canada with capacity sufficient to meet needs in nickel of the Dominion and Great Britain, and acceptances of that plan by the Canadian government as satisfactory, the attack in parliament made by a western member of the opposition is not regarded here as important. It appears to be strictly a political speech. At request of the Nickel Co., the Canadian government sends a representative to New York each month, to check up the company's books and this monthly scrutiny has borne out the company's assertions that none of the company's products is reaching the enemy. Canadian government has expressed itself as satisfied with the reports.

#### SOUTHERN YUKON.

A letter to the Whitehorse Star from Robinson Station, 22 miles south of Whitehorse, Southern Yukon, tells of considerable activity there in mining circles. James Powell has bonded for \$20,000 six antimony claims from Cochrane and Becker; also two antimony claims from Becker and Patterson (the consideration in the latter deal being \$16,000), these two claims being situated on what is known as Chieftain hill. From Adam Birnie, Powell purchased the View mineral claim outright for \$5,000. On these various properties work was to be begun about March 1 with 18 to 25 men employed.

The Daily Alaskan, published at Skagway, on February 12, printed information relative to a resumption of work at the Pueblo mine, in Whitehorse copper camp, as follows: Snow, ice, dirt, and supplies have been moving at the Pueblo mine since the return recently of General Manager W. D. Greenough. Roads have been shoveled, tracks cleared, roofs cleaned, frozen pipes dug up, supplies brought in—the preliminary work of opening the mine. Work at the compressor reached the stage on February 7 where water could be turned into the boilers. As soon as the boilers get up steam the work of unwatering the mine will be commenced. The cabins are being overhauled and furnished.

On February 8 the whistle of the railway locomotive was heard at the Pueblo for the first time for fifteen months. Supt. V. I. Hahn, who had directed the work of clearing and repairing the railway track, accompanied the train crew on the first trip. He reported several hard-packed, badly-drifted places along the track. For four days as many workmen as could be mustered in Whitehorse were kept busy shoveling away tons of drifted snow and chopping through at least 1,800 ft. of ice which extended like a glacier, sometimes four or five feet thick, along the track. The process was exceedingly slow, and not until noon of February 8th did the first locomotive get all the way to the Pueblo. Since then several carloads of freight have been hauled out to the mine.

From another source it is learned that the holdings of the Atlas Mining Company have been taken over by the Yukon Copper Company, a Canadian company organized by Dr. Alfred Thompson, M.P., for Yukon Territory, Mr. Wilbur D. Greenough, and associates. Dr. Thompson is president and Mr. Greenough vice-president and general manager of the company; the latter will have immediate charge of operations at the Pueblo mine. Shipment of ore is to be resumed as soon as the mine is again in shape for producing, and it is expected a large quantity will be shipped during the ensuing season.

A report has been received from the Chisana (Alaska) field, across the International Boundary line from the Canadian Yukon, to the effect that between \$100,000 and \$150,000 worth of gold was obtained there last season. About 50 men remained in Chisana district for the winter; 10 were at Chisana City, 10 at the mouth of Bonanza, and the remainder were scattered along various creeks in the district. More winter mining has been done in the 1915-1916 winter than ever before, and considerable drifting was undertaken.

#### KEORA.

A contract has been let for the sinking of a 200-ft. shaft on the Keora property in Whitney Township.

# MINERAL PRODUCTION OF CANADA IN 1915

## A PRELIMINARY REPORT

By John McLeish, Mines Branch, Ottawa.

As a result of the demand created by the war, the metal mining industry has, in 1915, shown the highest production ever recorded and notwithstanding the greatly decreased production of materials of construction, such as cement, clay and stone quarry products, a very large increase is still shown in the total mineral output, over that of the previous year.

The production in 1915 was as follows:—

### Metallic.

Product.	Quantity.	Value.
Antimony, lb. . . . .	961,040	\$192,208
Cobalt, metallic, lb. . . . .	211,610	
Cobalt, oxide, lb. . . . .	379,219	502,388
Copper, valued at 17.275c. per lb. . . . .	55,325	
Nickel, metallic, lb. . . . .	200,032	42,193
Nickel, oxide, lb. . . . .	102,612,486	17,726,307
Gold, oz. . . . .	916,076	18,936,971
Iron pig from Canadian ore, tons . . . . .	158,598	1,740,808
Iron ore sold for export, tons . . . . .	93,444	187,682
Lead, valued at 5.60c. per pound, lb. . . . .	45,377,065	2,541,116
Molybdenite, lb. . . . .	28,600	28,460
Nickel, valued at 30c. per pound, lb. . . . .	68,077,828	20,423,348
Silver, valued at 49.604c. per pound, oz. . . . .	28,401,735	14,088,397
Zinc ore, tons . . . . .	15,553	636,204
<b>Total . . . . .</b>		<b>\$77,046,082</b>

### Non-Metallic.

Product.	Quantity.	Value.
Actinolite, tons . . . . .	220	\$2,420
Arsenic, white, tons . . . . .	2,291	141,830
Asbestos, tons . . . . .	113,115	3,491,450
Asbestic, tons . . . . .	25,700	21,819
Chromite (a), tons . . . . .	11,486	162,618
Coal, tons . . . . .	13,209,371	31,957,757
Corundum, tons . . . . .	262	33,138
Feldspar, tons . . . . .	15,455	59,124
Graphite, tons . . . . .	2,610	121,023
Grindstones, tons . . . . .	2,580	35,768
Gypsum, tons . . . . .	470,335	849,928
Magnesite, tons . . . . .	14,779	126,535
Manganese (b), tons . . . . .	47	5,460
Mica . . . . .		81,021
<b>Mineral Pigments—</b>		
Barytes, tons . . . . .	550	6,875
Ochres, tons . . . . .	6,248	48,353
Mineral water . . . . .		118,796
Natural gas, M. cu. ft. . . . .	18,319,710	3,300,825
<b>Product.</b>	<b>Quantity.</b>	<b>Value.</b>
Petroleum, value at \$1.395 per barrel, bbls . . . . .	215,464	300,572
Phosphate, tons . . . . .	217	2,502
Pyrites, tons . . . . .	296,910	1,028,678
Quartz, tons . . . . .	127,108	205,153
Salt, tons . . . . .	119,900	600,226

Talc, tons . . . . .	11,885	40,554
Tripolite, tons . . . . .	317	12,119
<b>Total . . . . .</b>		<b>\$42,755,594</b>

### Structural Materials and Clay Products—

Cement, Portland, bbls. . . . .	5,681,032	\$6,977,024
<b>Clay products—</b>		
Brick, common, pressed, paving . . . . .		2,341,483
Sewer pipe . . . . .		795,646
Fireclay, drain tile, pottery, etc. . . . .		781,071
Kaolin, tons . . . . .	1,300	13,000
Lime, bushels . . . . .	4,932,767	1,015,878
Sand and gravel . . . . .		2,098,683
Sand-lime brick, No. . . . .	23,211,802	182,651
Slate, sq. . . . .	397	2,039
<b>Stone—</b>		
Granite . . . . .		1,634,084
Limestone . . . . .		2,504,731
Marble and Sandstone . . . . .		365,784
<b>Total structural materials and clay products . . . . .</b>		<b>\$18,712,074</b>
All other non-metallic . . . . .		42,755,594
<b>Total value, metallic . . . . .</b>		<b>77,046,082</b>
<b>Grand total, 1915 . . . . .</b>		<b>\$138,513,750</b>

(a) Additional returns make the Chromite production 14,291 tons, value \$208,718; (b) Exports are reported as 255 tons, valued at \$6,855.

The total value\* of the metal and mineral production in 1915, as shown in the preliminary report presented herein, was \$138,513,750, compared with \$128,863,075 in 1914, and \$145,634,812 in 1913, the latter being the highest production recorded. The increase in 1915 over 1914 was thus \$9,650,675, or 7.49 per cent., but the output is still less than that in 1913 by \$7,121,062.

Without attempting to discuss at length the effect of the war upon the Canadian mining industry, it may be remarked that the demand for the metals, copper, lead, nickel and zinc, led to great activity in the operation of the already developed deposits of these metals, and also, later in the year, to the opening up of old and the exploitation of new deposits. The capacities of steel furnaces were taxed to the utmost to meet the demand for shell steel.

The fact that under war conditions it was desirable that our metals should become available for commercial or national use, entirely within the country and that we should be less dependent, even upon a friendly neutral, for their recovery in smelters and refineries has stimulated the development of our smelting and refining operations.

Amongst non-metallic minerals the recovery of benzol and toluol in by-product coke oven operations was a direct result of the war, as was also the activity in the mining and shipment of magnesite and of chrome ores.

\*In presenting a total valuation of the mineral production as is here given, it should be explained that the production of the metals copper, gold, lead, nickel and silver is given as far as possible on the basis of the quantities of metals recovered in smelters, and the total quantities in each case are valued at the average market price of the refined metal in a recognized market. There is thus included in some cases the values that have accrued in the smelting or refining of metals outside of Canada.

The limitation placed by the Government upon the export of certain minerals and metals may have caused inconvenience and interruption to certain industries but these were usually adjusted by the issue of special licenses for export where it could be shown that such export was not for enemy destination but was in the interest of Great Britain and her allies.

The mining and metallurgical industries include a great variety of products so that in dealing with the industry as a whole the total value presents the only means of comparison, nevertheless quantities of production and prices are at all times the items of essential importance.

A comparison of the production of the more important mineral products in 1915 with that of 1914, is shown in the accompanying table.

**Increase or Decrease in Principal Products, 1915.**

Principal Products.	Quantity.	Pct.	Value.	Pct.
Copper, lb. ....	*26,876,526	35.49	*\$7,424,701	72.07
Gold, oz. ....	*142,898	18.48	*2,953,964	18.48
Pig iron, tons ....	*130,555	16.67	*1,589,963	15.90
Lead, lb. ....	*9,039,300	24.88	*914,548	56.19
Nickel, lb. ....	*22,559,886	49.56	*6,767,967	49.56
Silver, oz. ....	†48,086	0.17	+1,505,234	9.65
<hr/>				
Total metallic .....			*\$17,659,463	29.73
Asbestos & Asbestic, tons	*21,242	18.07	*603,463	20.74
Coal, tons .....	†428,158	3.14	+1,514,044	4.52
Gypsum, tons .....	†46,545	9.90	+306,279	26.49
Natural gas, M. ft. ....	†3,372,794	15.09	†183,902	5.28
Petroleum, brls. ....	*659	0.31	†42,552	12.40
Pyrites, tons. ....	*68,596	30.04	*284,170	38.16
Salt, tons .....	*12,862	12.02	*106,578	21.59
Cement, brls. ....	†1,491,448	20.79	†2,210,900	24.06
Clay products .....			+2,940,757	32.01
Lime, bush. ....	†2,095,815	28.92	†344,750	33.94
Sand and Gravel .....			+406,628	16.23
Stone .....			†964,457	17.63
<hr/>				
Total non-metallic .....			†\$8,008,788	11.53
Grand total .....			*9,650,675	7.49

\*Increase. †Decrease.

It will be observed that there has been an increased production in all metals with the exception of silver. The total value of the metallic production in 1915 was \$77,046,082, as compared with \$59,386,619 in 1914, and \$66,361,351 in 1913, the increase over 1914 being nearly 30 per cent., and that over 1913 the highest previous year, about 16 per cent. The production of nickel, copper and zinc are the highest that have been re-

paratively recent years except possibly in antimony and zinc, and some of the rarer metals.

Compared with 1914 the average price of copper shows an increase of 27 per cent., lead an increase of 27 per cent., spelter an increase of 154 per cent., antimony (ordinaries) an increase of 246 per cent., silver a decrease of 9.4 per cent., and tin an increase of 12.2 per cent.

The total value of the non-metallic production in 1915 including clay and quarry products, etc., was \$61,467,668 as against \$69,476,456 in 1914; \$79,273,461 in 1913. Compared with 1914 the decrease was \$8,008,788, or 11.5 per cent., while compared with 1913 the falling off was \$17,805,793 or 22.5 per cent.

It will be seen that the largest decreases in 1915 occurred in materials of construction such as cement, clay products, lime, sand and gravel, and stone and quarry products, the falling off varying from 16 to nearly 34 per cent. There was, however, also a smaller production of coal, natural gas and gypsum. On the other hand there were increases in the shipments of asbestos, chromite, graphite, magnesite, pyrites and salt.

The record of mineral production by provinces shows the relative importance of the provinces in the same order as in the previous year with the exception that Quebec and Alberta change places, the former having the larger production in 1915. An increase in production is shown in the provinces of Nova Scotia, Quebec, Ontario, and British Columbia, and a decrease in New Brunswick, Manitoba, Saskatchewan, Alberta and the Yukon district. Ontario again has the largest output with a value of \$61,800,170, or 44.6 per cent. of the total, and showing an increase over 1914 of \$8,765,501, or 16.5 per cent. British Columbia occupies second place with a value of \$28,932,658, or 20.9 per cent. of the total and showing an increase of \$4,768,619, or 19.7 per cent. over 1914; Nova Scotia is third with a production valued at \$18,126,672, or 13.1 per cent. of the total and showing an increase of \$542,033, or 3.1 per cent. over 1914. Quebec comes fourth with a value of \$12,159,436, or 8.8 per cent. of the total, and an increase over 1914 of \$322,507, or 2.7 per cent. Alberta occupies fifth place with a production of \$9,915,282, or 7.2 per cent. of the total and showing a decrease of \$2,768,952, or 21.8 per cent. compared with 1914. The Yukon district mineral production, includ-

**Metal Prices.**

	1910.	1911.	1912.	1913.	1914.	1915.
	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.
Antimony (ordinaries), per lb. ....	7.386	7.540	7.760	7.520	8.763	30.280
Copper, New York, per lb. ....	12.738	12.376	16.341	15.269	13.602	17.275
Lead, New York, per lb. ....	4.446	4.420	4.471	4.370	3.862	4.673
Lead, London, per lb. ....	2.807	3.035	3.895	4.072	4.146	4.979
*Lead, Montreal, per lb. ....	3.246	3.480	4.467	4.659	4.479	5.600
Nickel, New York, per lb. ....	40.000	40.000	40.000	40.000	40.000	45.000
Silver, New York, per oz. ....	53.486	53.304	60.835	59.791	54.811	49.684
Spelter, New York, per lb. ....	5.520	5.758	6.943	5.648	5.213	13.230
Tin, per lb. ....	34.123	42.281	46.096	44.252	34.301	38.500

\*Prices quoted by James Robertson Co.

corded in these metals. The quantity of nickel was 50 per cent. greater than in 1914, copper over 35 per cent. greater, lead nearly 25 per cent. greater, gold over 18 per cent. and pig iron nearly 17 per cent. The falling off in silver was only 48,000 oz. or less than two-tenths of one per cent. Owing to the high prices of copper and lead the total values of these metals show increases of 72 per cent. and 56 per cent. respectively.

Although the prices of nearly all metals have been high they have in most cases been exceeded in com-

ing copper and coal as well as gold, is sixth, with a value of \$4,915,863, or 3.6 per cent. of the total and a falling off from 1914 of \$502,322, or 9.3 per cent. Manitoba's production was \$1,351,604, a falling off of \$1,061,885, or 44 per cent. New Brunswick's production was \$916,329, a decrease of \$98,241, or 9.7 per cent., and the production of Saskatchewan was the smallest, being \$395,728 or less than that of 1914 by \$316,585, or 44.4 per cent.

Mineral Production by Provinces, 1914 and 1915.

	1914		1915		Value of production.	Pet.
	Value of production.	Per cent. of total.	Value of production.	Per cent. of total.		
Nova Scotia . . . . .	\$17,584,639	13.68	\$18,126,672	13.09	*\$542,032	3.08
New Brunswick . . . . .	1,014,570	0.79	916,329	0.66	†98,241	9.68
Quebec . . . . .	11,836,929	9.21	12,159,436	8.78	*322,507	2.72
Ontario . . . . .	53,034,677	41.01	61,800,178	44.62	*8,765,501	16.53
Manitoba . . . . .	2,413,489	1.88	1,351,604	0.97	†1,061,885	44.00
Saskatchewan . . . . .	712,313	0.55	395,728	0.28	†316,585	44.44
Alberta . . . . .	12,684,234	9.87	9,915,282	7.16	†2,768,952	21.83
British Columbia . . . . .	24,164,039	18.80	28,932,658	20.89	*4,768,619	19.73
Yukon . . . . .	5,418,185	4.21	4,915,863	3.55	†502,322	9.27
<b>Dominion . . . . .</b>	<b>\$128,863,075</b>	<b>100.00</b>	<b>\$138,513,750</b>	<b>100.00</b>	<b>*\$9,650,675</b>	<b>7.49</b>

\*Increase. †Decrease.

Gold.

The total production of gold in placer and mill bullion and in smelter products in 1915 is estimated at 916,076 fine ounces valued at 18,936,971, as compared with 773,178 fine ounces valued at \$15,983,007 in 1914, an increase of \$2,953,964 or 18.5 per cent. Although the production has more than doubled since 1907 it has not yet reached the high mark attained during Klondike's best years. The 1915 output was exceeded during each of the four years from 1899 to 1902.

Of the total production in 1915 about \$5,550,987 was derived from placer and alluvial mining, \$9,195,307 in bullion and refined gold and \$4,230,677 contained in matte, blister copper, residues and ores exported.

The production in Nova Scotia was about \$137,178, or over twice the output of the previous year. The pyrites ores of Quebec carry small quantities of gold and silver though the producers are not paid therefor. No placer recovery was reported from this province.

Ontario has now become the largest gold-producing province in Canada, the production in 1915 from fifteen properties being reported as \$8,386,956, or 44 per cent of the total production in Canada, as against a production in 1914 of \$5,545,509, an increase of \$2,841,447, or 51 per cent. The Hollinger and Acme mines contributed about one-half of the output in 1915 and the Dome nearly one-fifth of the total.

No production of gold has been reported in either Manitoba or Saskatchewan although some development work has been done. From Alberta record has been obtained of the recovery of about \$4,000 of alluvial gold.

The production in British Columbia was \$5,628,982 including \$755,000 estimated by the provincial mineralogist as being the output of placer workings, and \$4,873,982 recovered from milling and smelting ores. In 1914 the production was \$5,224,393, including \$565,000 from placer workings and \$4,659,393 from milling and smelting ores.

The Yukon production in 1915, including a small recovery from copper ores, was \$4,755,721, a decrease of \$369,653 from the 1914 production. The amount of gold on which royalty was paid during the year 1915 according to the records of the Mining Lands and Yukon Branch, Interior Department, was 287,254.15 oz., as against 309,691.17 oz. in 1914, and 352,900.04 oz. in 1913. For purposes of the royalty this gold is valued at \$15 per oz., although the actual value is probably nearer \$16.50. The receipts at the Dominion of Canada Assay Office, Vancouver, were 87,284.35 oz., valued at \$1,421,292.37, or an average of \$16.28 per oz.

The exports of gold bearing dust, nuggets, gold in ore, etc., in 1915, are reported by the Customs Department as \$16,528,143.

Silver.

The production of silver was 28,401,735 oz., valued at \$14,088,397 as against 28,449,821 oz. in 1914, valued at \$15,593,630. Silver is the principal metal that did not show an increased production in 1915. The falling off in quantity was very small, however, amounting to only 48,086 oz. Owing to the lower price of silver the decrease in total value was \$1,505,234 or over 9.6 per cent.

Of the total production in 1915, 24,653,057 oz., or about 86.8 per cent. is credited to Ontario.

The production from the ores of Cobalt and other silver camps was 23,568,147 oz., including 19,893,639 oz. in bullion recovered in smelters and cyanide plants in Canada and 3,674,508 oz. estimated as recovered from ores exported to United States smelters. The quantity credited to gold ores was 84,910 oz. The total production in 1914 was estimated at 25,139,214, compared with which the 1915 recovery shows a decrease of 1,571,067 oz.

Of the silver in bullion 10,623,307 oz. were produced in smelters in Southern Ontario, and 9,270,332 oz. in the mills at Cobalt, the total in bullion being over 84 per cent. of the production of the district.

The production in British Columbia, representing refined silver, silver contained in smelter products, and estimated recoveries from ores exported, was in 1915, about 3,628,727 oz. as compared with 3,159,897 oz. in 1914, an increase of 468,830 oz., or over 14 per cent.

In Quebec province there is a small silver content in the pyrites ores shipped, while in the Yukon 58,382 oz. are estimated as being contained in the placer gold produced and recovered from copper ores.

The exports of silver bullion and silver in ore, etc., as reported by the Customs Department, were: 27,672,481 oz. valued at \$13,812,038.

The price of silver in New York varied between a minimum of 46¼ cents in September and a maximum of 56 cents in December, averaging for the year 49.684 cents, a decrease of 5.127 cents from the average price in 1914.

Copper.

The copper output in 1915 was the highest recorded. The production in smelters together with the estimated recoveries or amounts paid for in ores exported amounted to 102,612,486 pounds, which at the average New York value of refined copper would be worth \$17,726,307. The highest previous production was in 1912 when an output of 77,832,127 pounds was reached. Compared with the production in 1914 which was 75,735,960 pounds valued at \$10,301,606 an increase is shown of 26,876,526 pounds or 35 per cent., and in total value of \$7,424,701, or 72 per cent.

Of the total 1915 production 42,050,347 pounds were contained in blister copper, 44,230,052 in copper and

copper nickel matte and 16,332,087 recovered from ores exported.

The production in Quebec from pyrites ores was 6,082,003 pounds as against 4,201,497 pounds in 1914.

The Ontario production is derived chiefly from the nickel-copper ores of the Sudbury district and of the Alexo mine, although there is a small amount of copper contained in the silver ores shipped from Cobalt, some of which is paid for. There was also a small shipment from the old Massey mine which was re-opened during the year.

The production in 1915 is reported as 39,303,279 pounds as against 28,948,211 pounds in 1914, an increase of 10,355,068 pounds, or 35.7 per cent. Further details respecting production will be found in the remarks on nickel.

British Columbia also shows a largely increased production in 1915, the total being 56,692,988 pounds, as against 41,219 pounds in 1914, an increase of 15,473,786 pounds, or 37.5 per cent. The 1915 production in this province included 47,064,234 pounds recovered in blister and matte, etc., and 9,628,754 recovered from ores shipped to smelters outside of Canada. The coast mines including the Britannia, Texada Island and Anyox mines, etc., are credited with 33,980,508 pounds

The total value of the imports of copper in 1915 are recorded as \$3,467,586 as against \$4,256,901 in 1914. The imports in 1915 included 16,818,116 pounds of copper in pigs, ingots and manufactures, valued at \$3,104,382; other manufactures valued at \$263,922, and copper sulphate 1,854,850 pounds, valued at \$99,282.

The imports in 1914 included 26,280,815 pounds crude and manufactured copper valued at \$3,983,322; copper sulphate 1,143,039 pounds valued at \$53,802 and other manufactures of copper valued at \$219,777.

### Nickel.

Refined metallic nickel is now being recovered in Canadian refineries but only in small quantities and as a by-product in the smelting and refining of the silver-cobalt-nickel ores of the Cobalt district, nickel oxide having been recovered in these smelters for several years. The nickel-copper ores of the Sudbury district supplemented by a small tonnage of similar ores from the Alexo mine in Timiskaming, north of Cobalt are the main sources of nickel production which in 1915 increased nearly 50 per cent. as compared with 1914 and is greater than the production in 1913, the largest previous record, by over 37 per cent.

	1911. Tons.*	1912. Tons.*	1913. Tons.*	1914. Tons.*	1915. Tons.*
<b>Production of Nickel in Canada.</b>					
Ore mined . . . . .	612,511	737,584	784,697	1,000,364	1,364,048
Ore smelted . . . . .	610,834	725,065	823,403	947,053	1,272,283
Bessemer matte produced.	32,607	41,925	47,150	46,396	67,703
Copper content of matte...	8,966	11,116	12,938	14,448	19,608
Nickel content of matte...	17,049	22,421	24,838	22,759	34,039
Spot value of matte . . . . .	\$4,945,592	\$6,303,102	\$7,076,945	\$7,189,031	\$10,352,344
	1911. Lbs.	1912. Lbs.	1913. Lbs.	1914. Lbs.	1915. Lbs.
<b>Exports of Nickel from Canada.</b>					
Nickel contained in matte, etc.—					
Exported to Great Britain	5,023,393	5,072,867	5,164,512	10,291,979	13,748,000
do to United States . . . . .	27,596,578	39,148,993	44,224,119	36,015,642	52,662,400
do to other countries . . . . .	.....	.....	70,386	220,706	.....
	32,619,971	44,221,860	49,459,017	46,538,327	66,410,400
	1911.	1912.	1913.	1914.	1915.†
<b>Imports of Nickel into U. S.</b>					
Gross tons or ore and matte	23,993	33,101	37,623	29,564	41,053
Nickel contents, lb. . . . .	29,545,967	42,168,769	47,194,101	35,006,700	50,099,707
<b>Exports of Nickel from U. S.</b>					
To France, lb. . . . .	5,463,358	5,083,947	3,631,858	3,457,157	2,749,554
To Netherlands, lb. . . . .	9,101,150	7,387,447	6,622,811	855,168	52,770
To United Kingdom, lb. . . . .	7,196,259	8,191,364	8,221,640	10,836,369	13,570,574
To other countries, lb. . . . .	3,338,819	5,152,258	10,096,779	12,446,458	8,130,687
Total, lb. . . . .	25,099,586	25,815,016	29,173,088	27,595,152	24,503,585

\*In tons of 2,000 lb. †Eleven months only.

and the Trail Creek and Boundary mines with 22,712,480 pounds.

The Yukon production is reported as 534,216 pounds as against 1,367,050 pounds in 1914.

The New York price of electrolytic copper rose from a minimum of 13 cents per pound in January to 20 cents in June, falling again to 16 cents in August, then rising steadily to the end of the year, reaching a maximum of 22 cents at the end of December. The average monthly price for the year was 17.275 cents, as compared with an average of 13.602 cents in 1914, an increase of 3.673 cents, or 27 per cent. This is the highest average monthly price since 1907, when 20.004 cents per pound was reached.

Exports of copper according to Customs records were: Copper fine in ore, etc., and copper in pigs, 102,729,579 pounds valued at \$12,460,356, there were also exports of old and scrap copper amounting to 4,161,600 pounds, valued at \$616,553.

The nickel-copper ore, derived from 12 separate mines, is reduced in smelters and converters to a Bessemer matte containing from 77 to 82 per cent. of the combined metals and shipped in that form to Great Britain and the United States for refining, the product of the Canadian Copper Company going to New Jersey and that of the Mond Nickel Company to Wales. A portion of the matte produced by the Canadian Copper Company is used without the intermediate refining of either metal for the direct production of Monel metal, an alloy of nickel and copper.

The total production of matte in 1915 was 67,703 tons, containing 39,216,165 pounds of copper and 68,077,823 pounds of nickel and valued by the producers at \$10,352,344. The tonnage of ore smelted (part being previously roasted) was 1,272,283. The production in 1914 was 46,396 tons of matte containing 28,895,825 pounds of copper and 45,517,937 pounds of nickel and valued at \$7,189,031.

The reported recovery of nickel from the ores of the Cobalt district was 55,325 pounds of metals and 200,032 pounds of nickel oxide. The recovery in 1914 was 392,512 pounds of nickel oxide.

The exports of nickel are reported by the Customs Department as 66,410,400 pounds valued at 7,394,446 or an average of 11.13 cents per pound. Since about 80 per cent. of the Canadian nickel production is exported to the United States, it may be of interest to add to the Canadian statistics a record of the imports (eleven months only in 1915) of nickel into and the exports from the United States.

The exports of nickel from the United States during the eleven months ending November were 24,503,585 pounds valued at 9,299,234, or an average of 37.95 cents per pound. More than 50 per cent. of these exports went to the United Kingdom. The value of the United States exports in 1914 ranged from 31 to 39 cents per pound and averaged about 34 cents.

It will be noted that a larger quantity of nickel finds its way to the United Kingdom through United States refineries than is exported directly from Canada.

The price of refined nickel in New York remained fairly constant during the first seven months of the year, quotations published by the Engineering and Mining Journal being 40 to 45 cents per pound for ordinary forms with 5 cents per pound more asked for electrolytic nickel. During the last five months of the year prices ranged between 45 and 50 cents for ordinary forms.

#### Lead.

Although there was an increase of nearly 25 per cent. in the production of lead the 1915 output has been exceeded in six of the past 15 years. The production of lead in 1914 was 45,377,065 pounds, which, valued at 5.60 cents per pound, the average price of pig lead in Montreal for the year, would be worth \$2,541,116. The production in 1915 was 36,337,765 pounds, valued at \$1,627,568, or an average of 4.479 cents per pound. The 1915 production consists chiefly of pig and manufactured lead produced at Trail, B.C., but includes also an estimate of the lead probably recoverable from ores shipped to smelters outside of Canada. The entire output of the Surprise mine in the Slocan District, B.C., was shipped to the United States, refined in bond, and sold in London.

The exports of lead in ore, etc., in 1915 are recorded by the Customs Department as 1,845,100 pounds, valued at \$40,273, and of pig lead 2,066,929 pounds, valued at \$79,067. Exports in 1914 were 246,100 pounds of lead in ore and 510,573 pounds of pig lead.

The total value of the imports of lead and lead products in 1915 was \$2,479,261 as against \$1,042,538 in 1914. The 1915 imports included 42,616,200 pounds valued at \$2,010,006, manufactured lead 3,102,838 pounds valued at \$184,581, other manufactures valued at \$102,439, litharge 1,579,800 pounds valued at \$89,232 and lead pigments 1,709,035 pounds valued at \$93,003. The imports of litharge and pigments would contain approximately 1,565 tons of metallic lead and the total import of lead would therefore exceed 24,425 tons as shown by this record. The imports in 1914 were equivalent to about 10,869 tons.

The average monthly price of lead in Montreal varied between a minimum of 4.27 cents in January and a maximum of 6.61 cents in December, averaging for the year 5.60 cents. This is the producer's price for lead in car lots as per quotations kindly furnished by Messrs. Thos. Robertson & Co.

The average monthly price of lead in New York was 4.628 cents and in London £22.917 per gross ton, equivalent to 4.979 cents per pound.

#### Zinc.

Complete returns of zinc shipments have not yet been received but the tonnage is estimated at 15,553 tons containing 12,400,000 pounds of zinc. Shipments include several hundred tons from Notre Dame des Anges, Quebec, but the greater part is from some fifteen properties in British Columbia. Zinc shipments in 1914 were reported as 10,893 tons containing 9,101,460 pounds of zinc.

The Consolidated Mining & Smelting Co. at Trail, B.C., after successful experimental development has installed at Trail a zinc recovery plant, having an initial daily capacity of 35 tons of refined zinc, and has entered into a contract with the Shell Committee for a considerable tonnage of zinc to be delivered during 1916. A small quantity of zinc was recovered during 1915 in connection with the experimental work.

The Electric Zinc Co. has constructed a plant at Welland, Ontario, for the recovery of refined zinc from zinc oxide. It is intended, eventually, to treat the zinc ores from Notre Dame des Anges, Quebec, at this plant.

At Silverton, B.C., a demonstration plant, using the French process for the recovery of zinc, was operated during 1915 and satisfactory results are claimed.

In August the Dominion Government made an announcement with respect to a proposed bounty on zinc as follows:

"Bounties on a sliding scale not exceeding two cents per pound will be granted upon production in Canada from Canadian ores of zinc containing not more than 2 per cent. impurities, when the standard price of zinc in London, England, falls below £33 per ton of 2,000 pounds, provided that bounties shall not be payable on zinc produced before the expiration of the war or after the 31st day of July, 1917, or on zinc contracted for by the Shell Committee at a price of 8 cents or over per pound. Total amount of bounty to be paid not to exceed \$400,000."

The price of spelter in New York varied between a minimum of 5¾ cents per pound in January and a maximum of 25 to 27 cents in June, the price at the close of the year being from 15¼ to 16¾ cents and the average for the year 13.230 cents per pound.

The price of high grade spelter rose from 10 cents at the beginning of the year to over 40 cents in midsummer and was maintained fairly strongly through the balance of the year at from 35 to 40 cents.

#### Other Metals.

**Antimony.**—After several years of no production the demand and high prices in 1915 caused a renewal of activity in mining antimony ores at West Gore, Nova Scotia, and Lake George, New Brunswick. About 1,288 tons of concentrates were shipped to England from the former locality. The antimony smelter at Lake George was operated toward the end of the year with a small production of refined antimony, and there was also some recovery of refined antimony at the lead refinery at Trail, B.C. Antimony ores are also reported to have been shipped from Carpenter Creek, Slocan, from Bridge River District, Lillooet, B.C., and from the Yukon, but no record has been obtained. The total production reported is estimated at about 961,040 pounds of antimony refined and in concentrates.

The recorded exports of antimony ore in 1915 were 1,149 tons valued at \$8,990, while the imports includ-

ed antimony or regulus of, etc., 1,962,194 pounds valued at \$344,918, and antimony salts 67,956 pounds valued at \$10,320.

The price of antimony, ordinary grades, in New York, ranged between a minimum of 13 cents in January to a maximum of 42 cents in December, averaging about 30 cents for the year. The price of "Cooksons" in December was 55 cents per pound and the year's average 40 cents.

**Cobalt.**—Metallic cobalt is now being recovered as well as cobalt oxide, at the smelters at Deloro and Thorold. The silver-cobalt-nickel ores of the Cobalt district are reduced in these smelters, silver being the principal product with arsenous oxide, metallic cobalt and nickel, cobalt oxide and nickel oxide as by-products. Returns received show a production in 1915 of 211,610 pounds of metallic cobalt and 379,219 pounds of cobalt oxide, equivalent to a total of 477,063 pounds of metal. In 1914 the production was reported as 899,027 pounds of cobalt oxide and 242,572 pounds of cobalt contained in residues sold outside of Canada or equivalent to a total of 871,891 pounds of cobalt. The price of cobalt is seldom quoted in the Mining Journals. However, a price of \$2.00 per pound 97 per cent. cobalt metal was recorded by the Engineering and Mining Journal in September and November.

**Molybdenum.**—A production has been reported of about 28,600 pounds of molybdenite valued at \$28,460, including cobbled molybdenite and molybdenite contained in ore shipped to concentration plants. There were also about 50 tons of low grade ore sent to the Mines Branch Ore Testing laboratories for experimental concentration. The export of molybdenite was prohibited to other than British destinations except under license, and from September 23rd the British Government requisitioned all molybdenite arriving in the United Kingdom at a price of 105 shillings per unit of MoS<sub>2</sub>. C.I.F. Liverpool, and appointed Messrs. H. A. Watson & Co., Liverpool, as buyers.

**Platinum.**—Efforts are being continued to recover platinum from the gravels on the Tulameen river in the Similkameen district of British Columbia, and there is also occasional recovery of small quantities from the gold gravels of Quesnel division, Cariboo district. A recovery of about 20 ounces is reported in 1915. There was no recovery of platinum from the Sudbury nickel-copper mattes.

Customs records show an export of platinum of 236 ounces valued at \$11,052, but this may possibly include old metal.

The price of refined platinum in New York, which was about \$41 per ounce in January, fell to \$38 in June and July, but increased to an average of \$85.50 in December. The year's average was about \$47.

#### Iron Ore.

Iron ore shipments in 1915 amounted to 398,112 short tons, valued at 774,427 as compared with 1914 shipments of 244,854 short tons, valued at \$542,041. The 1915 shipments included hematite 205,989 tons, roasted siderite 132,906 tons, and cobbled magnetite and concentrates 59,217 tons. The 1914 shipments included hematite 89,454 tons, roasted siderite 109,838 tons, and cobbled magnetite and concentrates 45,562 tons.

In the Great Lakes area the same ore prices prevailed as in 1914 and 1910, which were the lowest recorded in many years.

Mine operators report 93,444 tons of ore exported to the United States and 304,668 tons shipped to Canadian furnaces.

According to the records of the Customs Department

exports of iron ore amounted to 79,770 tons, valued at \$206,823, and imports of iron ore to 1,499,722 tons, valued at \$2,320,066.

Shipments of iron ore from Wabana Mines, Newfoundland, in 1915, by the two Canadian companies operating there were 868,451 short tons, of which 802,128 tons were shipped to Cape Breton and 66,323 tons to England. In 1914 the shipments were 639,430 short tons, of which 422,920 tons went to Cape Breton and 216,510 to the United States and Europe.

#### Pig Iron.

The total production of pig iron in Canadian blast furnaces in 1915 was 913,719 short tons, valued at approximately \$11,592,819, as compared with a production of 783,164 short tons in 1914 valued at approximately \$10,002,856. A large proportion of this production is used directly in the manufacture of steel and the values are in part estimated. The 1915 output shows an increase of 130,555 tons or 16.67 per cent. over that of 1914 and compares favorably with the average of recent years.

Of the total production in 1915, 13,692 tons were made with charcoal and 900,027 tons with coke.

Included in the ore charged to blast furnaces there was 293,305 short tons from Canadian mines and 1,463,681 tons of imported ore. Of the imported ore approximately 840,587 tons come from Newfoundland.

The blast furnace plants, operated for varying periods of time, included those of the Dominion Iron and Steel Co. at Sydney, N.S., the Nova Scotia Steel and Coal Co. at North Sydney, N.S., the Standard Iron Co. at Deseronto, Ont., the Steel Company of Canada at Hamilton, Ont., the Canadian Furnace Co. at Port Colborne, Ont., and the Algoma Steel Co. at Sault Ste. Marie, Ont.

There was also in 1915 a production in electric furnaces of 10,794 tons of ferro-alloys (chiefly ferro-silicon with a very small tonnage of ferro-phosphorus), valued at \$753,406, as compared with a production in 1914 of 7,524 tons, valued at \$478,355. About two-thirds of the ferro-silicon production in 1915 was of 50 per cent. grade, and the balance was of 75 and 85 per cent. grade.

The exports during 1915 of pig iron were 17,307 short tons, valued at \$231,551, or an average per ton of \$13.38, and of ferro-silicon and ferro-compounds 9,238 tons valued at \$537,081, an average of \$50.81 per ton, or a total of 26,545 tons valued at \$768,632 as compared with a total in 1914 of 19,063 tons valued at \$486,366. The imports were 47,482 tons of pig iron valued at \$624,200, or an average of \$13.15 per ton, and 13,758 tons of speigeleisen, ferro-manganese and ferro-silicon valued at \$807,312, or a total of 61,240 tons valued at \$1,431,512.

Electro Metals, Ltd., producing ferro-silicon, have considerably enlarged the capacity of their plant at Welland, Ontario, to meet the increased demand for their product occasioned by the war. In addition to sales for Canadian consumption a large and important tonnage has been furnished to Great Britain, Russia and the United States.

#### Steel Ingots and Castings.

The production of steel ingots and castings in 1915 including 5,626 tons from electric furnaces, was 1,020,335 short tons, as compared with a production in 1914 of 828,641 tons. The 1914 production included open-hearth ingots 608,383 tons; bessemer ingots 203,184 tons; direct open-hearth castings 15,315 tons; and other steel castings 1,759 tons, these figures being a revision of those previously published.

(To be continued.)

## D. H. McDOUGALL

The appointment of Mr. D. H. McDougall to be the general manager of the Dominion Steel Corporation has met with very general approval, and has caused much gratification to Nova Scotians, and to residents of Cape Breton in particular. The Halifax Chronicle writes editorially:—

The following account of Mr. McDougall's career given by the "Sydney Record" is fairly accurate, and is therefore quoted in full:

"Mr. D. H. McDougall, the newly-appointed general manager of the Dominion Steel Corporation, has, in various capacities, been associated with the fortunes of the Dominion Coal Company and the Dominion Iron and Steel Company since the very beginnings of the vast enterprise of which he is now the operating head. Mr. McDougall was born in Glace Bay, and saw the first stages of the Coal Company's growth, when in 1893, the various independent coal companies were amalgamated to form the Dominion Coal Company; and in the course of his association with Glace Bay, has seen coal mining develop from the primitive horse-gin at the Sterling mine, to the magnificent hoisting arrangements of the present day.

"Beginning as a boy and working up through various stages of experience and promotion, the new general manager entered the survey staff of the Coal Company, afterwards joining the engineering staff of the Steel Company. He spent several years in the employ of the New York Central as an assistant engineer, coming back to the Steel Company to become field engineer. Mr. McDougall was then appointed as superintendent of mines and quarries in charge of the Steel Company's ore and limestone mines, and the general provision of raw materials. In the beginning of 1910 Mr. McDougall was appointed as assistant general manager of the Dominion Coal Company, Mr. M. J. Butler being at that time general manager of the Dominion Steel Corporation. On Mr. Butler's retirement from this position, Mr. McDougall was appointed general manager of the Coal Company, having throughout also retained his position as superintendent of mines and quarries of the Steel Company.

"Mr. McDougall's position now involves direction of the coal mines at Glace Bay, and at Springhill, of the Steel Company's operations in Sydney, of the ore mines at Wabana, the limestone quarries at Marble Mountain and Georges River, C.B., at Port-au-Port, Newfoundland; of extensive lumbering operations and saw mills around Springhill and in New Brunswick; of two railways, namely the Sydney & Louisburg Railway and the Cumberland Railroad. In addition the corporation controls and operates extensive loading and discharging plants at Sydney, Louisburg, Parrsboro', Halifax, St. John, Quebec and Montreal. The workmen of the Steel Corporation number approximately 16,000 persons, and the operations of this great enterprise cover the whole of Eastern Canada and Newfoundland.

"Mr. McDougall has achieved his present position by dint of unremitting labor, by tactfulness and courtesy under the most trying circumstances, and by a very characteristic modesty. It is a source of peculiar gratification to Cape Breton people that the direction of what is probably the largest single industrial enterprise in Canada, excepting the Canadian Pacific Railway, should have been placed in the hands of a local man, still young in years, deservedly popular with his subordinates, and with a past record that warrants expectations of a successful future both for Mr. McDougall and the enterprise that he now directs in its entirety."

Mr. McDougall is president of the Mining Society of Nova Scotia, a vice-president of the Canadian Mining Institute, a member of the Institution of Mining Engineers (England), and a member of the Canadian Society of Civil Engineers.

## PERSONAL AND GENERAL

Hon. Lorne A. Campbell, Minister of Mines for British Columbia, who was re-elected by a by-election held on February 26 to represent Rossland constituency in the Provincial Legislature, paid a visit to Ottawa early in March on official business.

Mr. James Cronin has returned to his mining property in the Babine region, Omineca mining division, after a short visit to his home in Spokane, Washington. Mr. Cronin has long been known in British Columbia as a successful mine manager, for it was he who directed the development of the St. Eugene mine, in East Kootenay, from the time it was staked until it became the biggest lead mine in Canada.

Mr. Oscar Lachmund, of Greenwood, Boundary district, B.C., went to New York City at the end of February to attend the annual meeting of the British Columbia Copper Co. of which he is general manager.

Mr. Oscar V. White, manager of the Slocan Star silver-lead-zinc mine and concentrating plant in Slocan district, British Columbia, has been on a visit to the Coeur d'Alene district of Idaho, where he investigated milling practice at several of the local silver-lead-zinc mines in successful operation there.

Mr. D. J. Williams, who was manager for the Montana Consolidated Development Syndicate during the three-year period it was operating under lease the Rocher Debole copper mine, in Omineca mining division, British Columbia, is remaining in charge of the mine now that the Rocher Debole Copper Company has resumed possession and is operating it.

The management of the Standard Silver-Lead Mining Company, with mine and concentrating plant near Silverton, Slocan Lake, British Columbia, last month declared the usual monthly dividend of \$50,000, payable in March.

Mr. S. A. Wookey of the Hollinger staff has been appointed manager of the Schumacher mine, succeeding Mr. Jos. Houston, who is now assistant manager at the Dome mine.

Mr. E. Flynn has been appointed instructor in mining at the Haileybury High School.

Mr. H. J. Stuart has examined the McCrea claims in Pacaud township, Timiskaming district, for the Crown Reserve Mining Co.

Mr. H. P. DePencier, third vice-president of Dome Mines, Ltd., has been at the Dome mine recently, in the absence of General Manager Kaeding.

Mr. C. D. Kaeding has returned to Porcupine.

Mr. Chas. J. Murphy, who for some years has been chief engineer of the Crow's Nest Pass Coal Co., has returned from the West and opened an office in St. Catharines for consulting work. Mr. Murphy is a graduate of the University of Toronto. He was for some time on the staff of the Canadian Copper Co. at Copper Cliff.

Dr. Henry K. Benson, professor of industrial chemistry at the University of Washington, in Seattle, has been appointed director of the newly established Bureau of Industrial Research, the first such institution on the Pacific Coast.

Mr. J. H. Stovel, recently manager of the Bruce Mines for the Mond Nickel Co., has been appointed a provincial mine inspector for the Sudbury district.

## SPECIAL CORRESPONDENCE

### COBALT, GOWGANDA AND ELK LAKE

As the weather grows milder a tendency to take up old silver prospects becomes more pronounced. So much snow has fallen in the bush this year that it is discouraging to attempt to do work until some of it has disappeared, but the eagerness with which development work will be taken up directly it is possible to see the ground, cannot be doubted.

**Ophir.**—In South East Coleman the Ophir has stopped diamond drilling as there is now a proposal to merge this company with the John Black claims. These claims lie together, and the whole block would make 60 acres. Four or five years ago shafts were sunk below 300 feet on both the Ophir and the John Black. A little ore was found but not sufficient to make mining profitable. The Ophir owns 20 acres and the John Black 40. The John Black shaft is only 140 feet from the Ophir line, so that any merger would make the general development of these properties very economical.

**The Peterson Lake Mining Company** is sinking a small shaft on the Reliance claim in Coleman Township. This claim was staked at the same time as the Har Graves and is better known as the White Silver Mining Company property. Although it lies in the centre of the Cobalt camp, little or no work has ever been done on it before. There is a small vein in an open cut on the surface and a very little high grade ore was found.

**The Right of Way Mining Company** has shipped another car of ore. It is estimated to have contained 48 tons, and the concentrates will run little less than 1,000 oz. to the ton. The ore was shipped from the shaft at the south end of Cobalt Lake to the Northern Customs concentrator and treated there. Work is now in progress not only at the other end of the lake but also in the old workings of the mine.

**Nipissing.**—More than double the amount of bullion was shipped in February by the Nipissing as compared with January. Production was only slightly higher. It is always to be remembered that production is of Nipissing ore only, while bullion shipments consist not only of Nipissing ore but all customs ore purchased by the Nipissing Mining Company and refined in the high grade mill. The figures for the first two months of the year are as follows:

	Net Production.	Bullion shipped.
January . . . . .	169,802 oz.	148,730 oz.

The high grade mill treated 124 tons and shipped 535,514 oz. The low grade mill treated 6,953 tons.

The results of development at the third level of the Meyer on vein 490 are still negative. Going back to the old workings of vein 64, a branch vein on the third level is producing much more ore than was anticipated. The vein is two inches wide and assays 2,200 oz. Most of the ore produced during the month came from stopes at shaft 80 and from development.

**Glen Lake.**—Very interesting developments are awaited in the drift on the Glen Lake Cobalt Mines. This company has a lease on the old Foster. An ore shoot has recently been struck at the 50-foot level and it is expected that the vein cut is an extension of one of the Lawson veins. The ore shoot is only 15 feet

long, but it is two inches wide and very rich. The vein is all in the conglomerate and is being drifted upon in the hope of picking up other ore shoots. From the old Foster shaft a long crosscut has been pushed under Glen Lake to within 40 or 50 feet of the Bailey line. Another crosscut will soon be started running parallel to the Bailey line with the hope of picking up extensions of the Bailey veins.

**Shipments.**—There is a much more marked disposition to ship ore than in the preceding month. Both in bullion and concentrates this is the case, so that the month of March should show a production much higher than the first two months of the year.

**In Gowganda,** despite the very poor transportation facilities, there is quite a lot of activity in old prospects. At Calcite Lake, five or six miles east of Gowganda, two companies are working again with small forces. At Wigwam Lake the Barbara Mines is operating with a small plant. On the Gowganda ridge the Reeves-Dobie is stopping out some rich ore. On the Elk Lake Branch of the T. & N. O. Railway a Montreal syndicate has applied for a charter to operate claims in the Kenabeek district. This company is to be known as the Royal Mining Company. A small gang of men are at work.

### PORCUPINE, KIRKLAND LAKE AND BOSTON CREEK

**Dome.**—In the new central shaft at the Dome, mill ore has been struck and the rock being broken in the further development of this shaft is going to the mill. The location of this shaft was expressly chosen so that it should not be in ore. There was no ore in it until below the 600-ft. level, when the difference of the character of rock was noticed and assays were taken. It was then found that the rock contained good values and should not be thrown on the waste pile. The ball mill in the Dome mill is still proving most satisfactory. When the other two eight-ft. mills arrive they will at once be installed and it is probable that some of the original 40 stamps will be taken out to make room for them. The production from the Dome during February amounted to \$169,500. This may have been due to that fact that during the cold weather the broken ore in the big ore chutes froze up and difficulty was experienced in breaking them away. The remodeled Dome mill with a maximum capacity of 45,000 tons a month should be completed by the end of May. Two tube mills are now on the ground.

**Deloro.**—The three claims belonging to the Ankerite Gold Mining Company in Deloro have been optioned to Mr. Clifford E. Smith of Toronto. The claims are better known as the Dobie-Armstrong claims and are controlled by a syndicate in which Sam Dobie, Frank Armstrong and others are prominent. In 1911-12 some work was undertaken on these claims and some spectacular ore was mined from a drift on the 50-ft. level. These claims lie between the old Standard Mine, which is now being worked by the Porcupine Premier and the Maidens-MacDonald, which the La Rose have under option.

**Vipond.**—The new ore body at the Vipond is still looking very promising and it has been drifted upon for upwards of 100 ft. and maintains both width and grade. It has also been picked up at the 500-ft. level.

**Lucky Cross.**—The Trethewey Mining Company has started to work dewatering the Lucky Cross Mine at Swastika. The old plant was complete and in good ore and pumping has already commenced. When the workings are dry the old drifts at both levels will be carefully sampled. There is a mill on the property, but it will have to be remodeled before a satisfactory extraction can be obtained.

**At Boston Creek** the Crown Reserve has met with some success in the development of the McCrea claims. In a test pit down 10 ft. a shot in the vein on the hanging wall opened up some very pretty ore showing plenty of free gold. The claims upon which the find was made are in Pacaud Township within a few feet of the Boston Township line.

In the same township the plant at the Miller Independence Mines is now running and very much more rapid progress will now be made by this company, in their development work.

**In Munro Township** the Croesus Gold Mines has cut its vein at the 300-ft. level and commenced to drift. The vein was also cut at the 250-ft. level, and there is now considerable work done at the 200-ft. level. The only other property upon which much work is being done in Munro Township is the Munro Consolidated.

**Hollinger.**—For the first period of the new year, Hollinger profits showed a falling off of \$45,083. This is partly accounted for by the fact that in the 13th period of 1915, certain additions were made for accounting purposes which should have been distributed over the whole of the year. Tonnage is gradually being raised to the desired 2,000 tons a day. The grade of the ore mined was \$1.07 less. Milling costs were exactly the same, but mining costs were cut down by 82 cents a ton. Gross profits were \$174,996. Tonnage treated, 30,817; grade, \$9.30; total costs, \$3,129; surplus, \$1,533,206. The most significant feature of the report was the fact that about three-quarters of the ore came from development and only one-quarter from the stopes. Expenditure for plant amounted to 14,526, of which \$13,278 was for the mill extension.

The new central shaft at the Hollinger is now broken through to below the 800-ft. level. To the 425-ft. level it has been broken to the full dimensions of the six compartments and concreted. It is the first shaft in Ontario that has been treated in so permanent a manner. It is believed that the small amount of repairs necessary will more than offset the initial expenditure, in comparison with ordinary timbering. The long cross-cut to the Vipond boundary has now been pushed forward 300 ft. There is a distance of 2,300 ft. yet to traverse before the shaft which is being sunk on the Vipond is reached.

The Hollinger staff is now in its new office. The main office is to be on the ground floor and the engineering office on the second. There will be accommodation for members of the staff on the upper floor.

### BRITISH COLUMBIA

Weather conditions improved during the latter half of February, so that the transportation of ore was again practicable in mountainous parts of mining districts where there had been a temporary suspension of ore shipping consequent on the heavy snowfall of two or three previous weeks.

For four consecutive weeks the **Standard** silver-lead mine, near Silverton, was not among those from which ore was received at the Trail smelting works. While the reason for this has not been made public, it is prob-

able that the sinking at the Standard shipping dock on Slocan lake during stormy weather early in February of a scow laden with ore and concentrate has been the cause, for there is available in the mine an ample supply of ore to admit of shipments being regularly maintained whenever shipping facilities are in working order.

Deep snow at Rossland seems to have made a difference in the output in both January and February, the total quantity of ore shipped during the first eight weeks of 1916 having been nearly 10,000 tons less than in the corresponding period of 1915, but there, too, there is plenty of ore opened in the larger mines, so that a bigger output will be made whenever required for the smeltery.

### Ore Receipts at Trail.

The quantity of ore received at the smelting works of the Consolidated Mining and Smelting Co., Trail, during four weeks ended February 24, was 33,436 tons, as compared with 32,075 tons for the corresponding period to January 27, inclusive. Of the February total, 28,604 tons was from the company's own mines and 4,832 tons was of custom ores. The company's mines and their production were as follows: In East Kootenay, Sullivan, 4,680 tons; Ainsworth, No. 1, 1,244 tons; Rossland, Centre Star group, 13,139 tons, and Le Roi, 9,541 tons, together 22,680 tons. With the exception of the Centre Star, the output of which was 934 tons less than in January, all the company's mines above mentioned made a larger output in February. It is again noticeable, as in January, that more than two-thirds of the ore received at Trail during February was from Rossland mines. Details of total receipts for the last four week period are as under:

	Tons.	Tons.
East Kootenay—		
Lead Queen .....	30	
Monarch .....	17	
Sullivan.....	4,680	
		4,727
Ainsworth—		
Bluebell.....	616	
Cork-Province.....	6	
Florence.....	77	
Martin.....	30	
No. 1 .....	1,244	
		1,973
Slocan—		
Enterprise.....	29	
Galena Farm .....	40	
Noonday.....	32	
Rambler-Cariboo.....	166	
Reco.....	39	
Ruth.....	101	
Slocan Star .....	186	
Yakima.....	22	
		615
Nelson—		
Emerald.....		104
Rossland—		
Centre Star Group .....	13,139	
Le Roi .....	9,541	
Le Roi No. 2, Ltd. (Josie) .....	1,130	
Velvet.....	33	
		23,843
Revelstoke—		
Lanark.....		32
Kamloops—		
Iron Mask .....		142
Lake Louise (Alberta)—		
Yellow Jacket .....		52

## State of Washington, U.S.A.—

Bonanza, Bossburgh .....	206
United Copper, Chewelah .....	929
Ben Hur, Republic .....	440
Knob Hill, Republic .....	211
Tom Thumb, Republic .....	162
	1,948

Total for four weeks in Feb 33,436

For the corresponding period of 1915, the total was 35,938 tons, in the following proportions: East Kootenay, 3,231 tons; Ainsworth, 43 tons; Slocan, 261 tons; Nelson, 512 tons; Rossland, 29,948 tons; Boundary, 46 tons; State of Washington, 1,897 tons.

## Yale District

The following notes relative to mining in Nicola, Vernon, Kamloops, Ashcroft, and Yale mining divisions, all within the boundaries of the extensive Yale district, have been taken from the Provincial Mineralogist's "Preliminary Review" of mining in the Province in 1915, issued early in February:

**Nicola**—The only production from metalliferous mines in Nicola division consisted of two sample shipments from the Copper King group, on Ten-mile or Guichon creek, and a shipment of high-grade ore from the **Copper Star** mineral claim, situated at the extreme north end of the Aspen Grove camp. Aside from the work at these two localities, there has been but very little activity in metalliferous mining in the Nicola division.

No work was done on the gypsum deposits near Merritt.

The coal mining industry in the Nicola-Coldwater coal fields was not as prosperous as during 1914. The reasons for this are attributed by the colliery managers chiefly to the substitution of fuel oil on locomotives, as the bulk of the demand for the coal in this field was, in the past, for firing locomotives. The depressed conditions have been taken advantage of by the managements of the Middlesboro' Collieries and the Inland Coal and Coke Company to open new mines in virgin ground, in order to be in readiness to supply coal for any market offering.

**Vernon**.—Placer gold valued at about \$3,000 was recovered on Siwash creek previous to July last, when operations ceased because of a lack of sufficient water to pipe with. These operations were conducted by the Union Hydraulic Mining Company, with headquarters in Spokane, Washington.

At the **Monashee** mine, about 50 miles east of Vernon, development work was being actively carried on until about July last, when work was suspended and the manager left for his headquarters in Minneapolis.

At the **St. Paul** mine work was carried on for a portion of the season; the ore mined, about 150 tons, was treated in a 2-stamp mill on the property.

**Kamloops**.—The **Iron Mask** was the only mine producing in the Kamloops district during 1915. Development work on quite an extensive scale was done on the 750-ft. level of this mine, and a long tunnel started on that level towards the Erin mine, about 1,500 ft. distant, which it is proposed to connect with the Iron Mask, and open a new shaft between the two properties, by raising from the tunnel level to the surface. This shaft will, when completed, become the main outlet for ore from both mines. Almost 2,000 tons of ore and concentrates were shipped.

**Ashcroft**.—In the Highland Valley portion of the Ashcroft mining division there has been greater ac-

tivity than in any other section. Several properties have been bonded by outside syndicates, and shipments of about 100 tons of high-grade copper ore have been made from the Storm group by Stuart Henderson, of Victoria, also about 50 tons from the Glossie group by Carlson, Vosburg, Gerle, and Dunlevy, who had bonded the property from J. W. Burr, the original owner, but failed to meet the payments.

**Yale**.—In the Yale mining division the most noteworthy occurrence during 1915 was the discovery of high-grade copper ore outcroppings near Jones Lake, in the range of mountains between the Fraser river and Chilliwack lake. The claims staked are said to be about 18 miles distant from Hope in an air line.

Because of the extreme low water in the Fraser river, several placer miners have been taking advantage of the opportunity to clean up ground near the middle of the river which, during normal seasons, is unapproachable because of the depth of water and the rapidity of the current.

## Lillooet District.

The Provincial Mineralogist's brief summary of Lillooet district follows:—

During the season of 1915 the Lillooet district obtained its first railway connection with the seaboard, when the Pacific Great Eastern Railway, in the early part of the season, completed its tracks to the town of Lillooet and later continued its service as far as Clinton.

Formerly, the lack of transportation facilities deterred even the development of the mineral prospects which had been located adjacent to the railway, and the mineral output of the district was restricted to a limited amount of gold, either placer or produced by small stamp mills crushing quartz.

The advent of the railway will, it is expected, stimulate the prospecting for and development of lode mines in this district, in which, for geological reasons, there is a probability that they exist.

It is as yet too soon to expect any great results from this cause, and at present the only part of the district in which any serious attempt at lode mining is being made is on Cadwallader creek, where, in 1914, the **Coronation** milled some 120 tons of quartz, carrying about \$40 to the ton in gold.

While this property did not make any output in 1915, a small force of men has been at work developing, with, it is reported, satisfactory results.

Development was also carried on at the **Pioneer** by Fergusson et al., where considerably increased orebodies have been proven, equally high in grade to those formerly known. A stamp-mill and cyanide plant are now being erected, and a force of men is at work in the mine under the superintendence of Charles Copp.

The **Wayside** has been under development all the season by Paxton and associates. A lot of some 20 tons of ore was treated in a test stamp mill and yielded about \$16.50 to the ton.

The comparatively large amount of development work done in the past few years has not shown the camp to be of greater extent than given in the 1910 report of this department, but it has shown up a number of veins heretofore unknown and has proved some known veins to extend farther than expected.

The placer-gold output of the district is expected to be somewhat higher than for some years back, chiefly due to the exceptionally low water exposing bars in the rivers, thus permitting individual placer-miners and Indians to work them.

**GENERAL NOTES.**

Shipment of ore from the Yankee Girl mine, in Ymir camp, Nelson mining division, is to be resumed shortly. An aerial tramway, about one mile in length, has been constructed from the mine to the Ymir railway station, so that hauling the ore by horse wagon, as in past years, will no longer be necessary.

A few men are working on the Red Buck mineral claim, on Kennedy mountain, about ten miles up Similkameen river from Princeton. This property is reported to have been bonded by Mr. F. S. Norcross of Copper mountain, mine superintendent for the British Columbia Copper Co., and a carload of ore was recently shipped from it to that company's smeltery at Greenwood.

The Montana Consolidated Development Co.'s lease of part of the Rocher Debole copper mine, in Omineca division, Skeena county, having expired, the Rocher Debole Copper Co. is again operating the mine, from which about 17,000 tons of ore, averaging 8 per cent. copper, was shipped to the Granby Co.'s smelting works at Anyox, Observatory inlet, during 1915.

The Silver Standard mine, near Hazelton, Skeena district, has again been sending ore down to the railway. Early in February there was about 120 tons loaded on railway cars ready for shipment to a smeltery.

**NOVA SCOTIA**

**Dominion Coal Outputs.**—The production of the Dominion Coal Company's collieries for the first two months of the year compares as follows with 1915:

	Glance Bay Collieries—	
	1915.	1916.
January . . . . .	225,970	373,000
February . . . . .	282,373	362,000
	<hr/>	<hr/>
	538,343	735,000
	Springhill Collieries—	
January . . . . .	31,210	34,000
February . . . . .	29,479	33,000
	<hr/>	<hr/>
	60,689	67,000
	<hr/>	<hr/>
	599,032	802,000

Increase in 1916, 203,000 tons.

The increase in output as compared with 1915 is quite striking, but in making this comparison it must be borne in mind that the first few months of 1915 were months of the leanest description so far as the coal industry was concerned. The collieries at that time were not working in some cases more than two to three days a week, and the Dominion Coal Company's production was from 150,000 to 175,000 tons per month below the capacity of the collieries.

The outputs for February, although larger than in previous years, were very considerably—say 60,000 tons—below the capacity of the mines, and the production barely filled the actual commitments.

Production during the remainder of the year will not show the same ratio of increase over 1915, in fact the production of coal during 1916 will in all probability fall behind the figures of 1915, because of the large production during the last half of 1915, and the continual shrinkage of the number of miners that is being caused by enlistments.

Much confusion is caused in comparisons of production in Nova Scotia by the different periods used in computation. For example, the fiscal year of the Nova

Scotia Department of Mines ends September 30th, the fiscal year of the Dominion Coal Company ends March 31st, and these varying dates are confused with the calendar year. The fiscal year 1915, in the Mines Report of the Province, happened to include with strange exactness the very worst months of the industrial depression, namely the twelve months October 1st, 1914, to September 30th, 1915. Compared with the year ending September 30th, 1914, therefore, a large reduction in tonnage is shown in the Provincial Mines Report. Conversely, the Mines Report for the year ending Sept. 1916 will show an increase over the fiscal year 1915 because the period will include the months commencing October 1st, 1915, when the demand for coal showed such a sudden increase in strength. The members of the Provincial Parliament amused themselves recently by debating the reasons for the difference in production in the fiscal years 1914 and 1915, and it was evident that the effect of the incidence of the fiscal year and its exact coincidence with the period of trade depression was unappreciated by those who took part in the debate.

**NEWFOUNDLAND**

The first metal electrically smelted in Newfoundland was produced on Thursday evening last. An initial test of the smelter was made and a high-grade copper was produced. The plant worked splendidly and the "run" was made on material brought from Little Bay Copper Mine.

The capacity of the plant was found to exceed expectations of the expert, Mr. Paul Simpson. The plant will smelt about one thousand pounds of ore per hour. In a few days operations will be formally opened by Governor and Lady Davidson. The plant then will be taken over by the Hydro Electric Smelting Co., Ltd., the capital of which has been locally subscribed. To Mr. W. A. McKay, who organized and promoted the whole scheme, much credit is due. The company owns outright Little Bay Mines, where an abundance of ore exists on the surface, many thousands of tons being left there by the old company, which operated when the price of copper was exceedingly low. At the present time copper is worth £135 a ton in England, a price hitherto unknown.

The object of placing the preliminary furnace in St. John's was to avail of the electric power which the Reid Newfoundland Co. could easily dispose of without any embarrassment, and particularly to demonstrate to parties holding promising copper properties the possibility of their being able to market their ore. The establishment of the plant will no doubt be the means of opening up many small mines in the country as the operating of this smelter will mean a constant and available market. The inauguration of this industry will be of great importance, and will certainly mean much for men of small means holding mining claims. The company has about five hundred tons of ore in stock at the smelter to commence operations, and until navigation opens further supplies will be obtained from Batts Hill Mine, Conception Harbor, Harbor Main District, and will be shipped by rail. For the present the output of copper will be utilized by the Newfoundland Shell Company, whose plant is in the neighborhood of the smelter, and who are now about ready to begin operations.

Already as a result of the success of copper smelting, we learn from a reliable source that two more smelters will be erected in Notre Dame Bay at a very early date.

Newfoundland is fortunate in possessing an abundance of water powers which can be availed of very cheaply, and are sure to be of great economic and commercial value in the expansion and development of the mining industry.

**Coal.**—The coal famine which was threatening St. John's from early winter was relieved by the arrival of the S. S. Alconda from Sydney last week with a cargo of seven thousand tons. Several other smaller steamers and sailing vessels arrived recently, and the S. S. Florizel of the Red Cross Line has arrived with one cargo of three thousand tons, and is due again from Sydney in a few days with another cargo. Sufficient stock is now in store as will relieve the situation for many months to come. What made matters most serious this winter was the arrival in St. John's in January and February of at least twelve foreign-going steamers all short of coal, as a result of very stormy weather and long passages across the Atlantic. As these ships were engaged in carrying supplies to and from England and her Allies we were bound to give them sufficient supplies of coal to reach their destinations. Fortunately but certainly at great sacrifices every ship got a supply and went her way. There was one exception in the case of the "Ontaneda," flying the Norwegian flag. It appears this ship was blacklisted by the British Admiralty for some misdeed, and as a consequence she lay at anchor in the harbor of St. John's for nearly two months without getting coal. Finally last week matters were adjusted and her bunkers supplied, and she was allowed to sail, her owners no doubt giving assurance to walk the straight road.

What probably will result in the exploitation and development of the mineral resources of Newfoundland on a larger and more substantial basis than anything heretofore attempted is to be expected from the report of Mr. Davies, Government Assayer and Chemist. It is understood that His Excellency Governor Davidson who takes a very great interest in all matters pertaining to the development and well being of the country, has been fortunate in bringing before the Imperial authorities the vast and varied mineral resources of the colony, and the matter has been so favorably received that Mr. Davies has been directed to make a most complete and minute report, hence it is not unreasonable to suppose that henceforth the development of the mineral resources of the colony will receive more encouragement from British capitalists than in the past. For many years Newfoundland made every effort to get Englishmen to invest in the minerals of this country, but to no avail. Apparently England was content to buy her iron, lead, copper and other minerals from Germany, Sweden and other countries and leave her own colonies neglected. It is a fact that the great iron mines of Belle Island, of their kind the greatest in the world, went a-begging through the English money markets for a purchaser some years ago, but there was no one to buy, yet at the same time England was importing thousands of tons of iron ore from nations which to-day are arrayed against her with all the fierceness and ferocity of savagery. When the iron mines on Belle Island were purchased by Canadian and American capital and the ore shipped abroad not a cargo could be sold in England. It is a matter of history that the Krupp works of Germany were amongst the largest purchasers of Belle Island ore previous to the war, and it is well known that they had in their possession most correct information in the way of plans and other data in connection not only with the iron deposits of Belle Island, but all other mines and minerals

in the colony. The very guns of the German navy and those trained on the English soldiers and their Allies at the front are in part the product of the iron mines of Belle Island.

It is pleasing to know that all the machinery for the Newfoundland shell factory is now installed, and next week work in connection with the making of shells will begin in earnest. Apart from the constant employment it will give to many hands, it goes to prove that Newfoundland is not alone content in sending soldiers, sailors, airships and money to help the Mother Country in her day of trouble, but with all local capital she intends also to do her share as best she can to speed up the making of munitions of war. A big order for shells has been obtained from the authorities at Ottawa and, according as the shells are turned out, they will be shipped direct to England.

Work on the iron mines at Belle Island during the past winter has been more vigorously pursued than at any time since the opening of these mines. The largest number of miners ever employed have been working day and night uninterruptedly for months past and immense piles of ore are being stacked near the piers awaiting early shipments. It is thought by the end of March some cargoes will be shipped, at least as early as navigation will permit.

Work at our copper mines has maintained a constant and steady increase all through the winter, and many cargoes will be ready to ship abroad as soon as conditions are favorable. It is thought that as a consequence of the increased price for copper, and the result that will accrue from the electric smelter now in operation a great stimulus will be imparted to copper mining in this country. With the return of spring many copper properties which have remained idle for years will again be worked.

#### PREMIER LANGMUIR MINES.

In an article that appeared in this Journal of December 1st last, under the heading "Silver at Porcupine," it was stated that Premier Langmuir mines, the owners of the well-known deposit of barite in Langmuir Township, were shipping barite to the United States. We find, however, that no shipments have yet been made. Native silver and argentite were found to be present to such an extent in the barite, that it would be unwise to ship without first separating the silver. It is, we understand, the intention of the company the coming season, to install a concentrator to make the necessary separation, and it would not be surprising if it were now found that the silver were of even greater importance than the barite, especially since it has been found that native silver and argentite are present in the tunnel run on the vein, in which, at the time that the work was performed, no silver was reported. This company will rank as one of the pioneers in the development of Northern Ontario, there being, as far as we know, no other similar deposits in Northern Ontario.

A newspaper despatch from Atlin, B.C., published about the middle of February, stated that the cold weather had abated and miners on all the Atlin creeks were commencing work again, while it was expected the placer-mining plants would soon again be in operation.

#### SWASTIKA.

The Swastika Mine has been temporarily closed down.

# MINERAL PRODUCTION OF BRITISH COLUMBIA, 1914-15

The following table shows the quantities and value of the several minerals produced in the year 1914, and the estimated production in 1915:

	Production, 1914.		Estimated Production, 1915.			
	Quantity.	Value.	Quantity.	Value.	Increase.	Decrease.
Gold, placer .....		\$ 565,000		\$ 745,000	\$ 180,000	
Gold, lode, oz.....	247,170	5,109,004	244,378	5,051,293		\$ 57,711
Total gold .....		\$ 5,674,004		\$ 5,796,293	\$ 122,289	
Silver, oz. ....	3,602,180	1,876,736	3,434,393	1,621,393		\$ 255,703
Lead, lbs. ....	50,625,048	1,771,877	45,990,372	1,917,799	145,922	
Copper, lbs. ....	45,009,699	6,121,319	57,905,488	10,006,068	3,884,749	
Zinc, lbs. ....	7,866,467	346,125	13,817,808	1,554,503	1,208,378	
Total value of metalliferous .....		\$15,790,061		\$20,895,696	\$ 5,105,635	
Coal, tons (2,240 lbs.).....	1,810,967	6,338,385	1,546,664	5,413,324		\$ 925,061
Coke, tons (2,240 lbs.).....	234,577	1,407,462	248,424	1,490,544	83,082	
Building materials, etc.....		2,852,917		1,500,000		1,352,917
Total value of production. ....		\$26,388,825		\$29,299,564	\$2,910,739	

## PROFITS OF BRITISH COLUMBIA MINING COMPANIES.

The following statement shows the dividends declared by metalliferous-mining companies during the calendar years 1913, 1914, and 1915:

Name of Company.	1913.	1914.	1915.
British Columbia Copper Co., Greenwood.....	\$ 88,756		
Consolidated Mining and Smelting Company, Trail.....	348,264	\$464,376	\$493,425
Granby Con. Mining, Smelting and Power Co., Grand Forks.....	899,911	449,955	449,955
Hedley Gold Mining Co., Hedley.....	360,000	300,000	300,000
Le Roi No. 2, Ltd., Rossland.....	43,830		58,440
Rambler-Cariboo Mines, Ltd., Three Forks.....			35,000
Standard Silver-Lead Mining Co., Silvertown.....	650,000	475,000	250,000
Totals. ....	\$2,390,761	\$1,689,331	\$1,586,820

## MINE-VENTILATION STOPPINGS.

The United States Bureau of Mines, Department of the Interior, in co-operation with the State of Illinois, has just issued Bulletin 99, "Mine-Ventilation Stoppings, with Especial Reference to Coal Mines in Illinois," by R. Y. Williams.

The author draws the following conclusions from his investigations:

"One of the most obvious conclusions from the inspection of several hundred stoppings is that the efficiency of a mine stopping to prevent the leakage of air depends more on the care with which the joints are made than on the material that is used in construction. Some concrete stoppings were found to leak large quantities of air because they were not set into the rib, and new tongue-and-groove stoppings were tight when carefully constructed. The amortised first cost is a small item compared with the maintenance and efficiency charges, and the cost of cutting a latch in the rib is only a small part of the initial expense. The preparation of grooves in the ribs should therefore always precede the erection of stoppings.

"A general protest is being made against high velocities in the ventilating currents in coal mines. The practical facts on which this protest is based are as follows:

"The amount of power required to move a given volume of air increases directly as the cube of the velocity. If leaky stoppings make it necessary for the fan to deliver four times as much air as would be required if the stoppings were tight, the cost of the power to move the larger volume of air would be sixty-four times that for the smaller volume.

"As the temperature and the relative humidity of the upcast at any mine are approximately constant throughout the year, the quantity of moisture extracted from the dust will vary directly with the quantity of air in circulation. If, therefore, the fan furnishes four times as much air as would be required if the stoppings were efficient, the amount of water extracted from the mines during cold weather would be increased nearly fourfold. The drying out of coal mines in the winter causes a dangerous condition to exist in the event of a blown-out or windy shot or the ignition of a pocket of gas.

## SILVER PRICES.

February—	New York, cents.	London, pence.
22. ....	Holiday	27
23. ....	57	27 <sup>1</sup> / <sub>8</sub>
24. ....	57	27 <sup>1</sup> / <sub>8</sub>
25. ....	57	..
28. ....	56 <sup>5</sup> / <sub>8</sub>	..
29. ....	56 <sup>5</sup> / <sub>8</sub>	26 <sup>1</sup> / <sub>8</sub>
March—		
1. ....	56 <sup>5</sup> / <sub>8</sub>	26 <sup>1</sup> / <sub>8</sub>
2. ....	56 <sup>5</sup> / <sub>8</sub>	27 <sup>1</sup> / <sub>8</sub>
3. ....	56 <sup>3</sup> / <sub>4</sub>	27
4. ....	56 <sup>3</sup> / <sub>4</sub>	27
5. ....	56 <sup>5</sup> / <sub>8</sub>	26 <sup>1</sup> / <sub>8</sub>
7. ....	56 <sup>3</sup> / <sub>4</sub>	27
8. ....	56 <sup>3</sup> / <sub>4</sub>	27
9. ....	56 <sup>3</sup> / <sub>4</sub>	27
10. ....	56 <sup>3</sup> / <sub>4</sub>	..

# MARKETS

## NEW YORK MARKETS.

March 10, 1916.—Connellsville Coke—  
 Furnace, spot, \$3.75 per ton.  
 Contract, \$3.00 to \$3.25 per ton.  
 Foundry, prompt, \$3.75 to \$4 per ton.  
 Contract, \$3.50 to \$3.75 per ton.  
 March 10, 1916.—Straits tin, f.o.b. nominal, 56 cents.  
 Copper—  
 Prime Lake, nom., 27 to 27.50 cents.  
 Electrolytic, nom., 27 to 27.50 cents.  
 Casting, nom., 25.50 to 25.75 cents.  
 Lead, Trust price, 6.60 cents.  
 Lead, outside, 6.87½ to 7.12½ cents.  
 Spelter, 17.17½ to 17.42½ cents.

### Antimony—

English brands, nominal.  
 Chinese and Japanese, 44 to 45 cents.  
 American, 44 to 45 cents.

### Aluminum—nominal.

No. 1 Virgin 98-99 per cent., 58 to 60 cents.  
 Pure 98-99 per cent. remelt, 56 to 58 cents.  
 No. 12 alloy remelt, 47 to 49 cents.  
 Nickel, 45 to 50 cents.  
 Cadmium, nominal, \$1.25 to \$1.50.  
 Quicksilver, nominal, \$250.00.  
 Platinum—nominal, \$88.00.  
 Cobalt (metallic), \$1.25.  
 Silver (official), 56¾c.

**Metal Products.**—Owing to the withdrawal of all price lists by the leading manufacturers of brass and copper products, quotations appearing below are based on the outside market and are likely to change at any moment. All prices are nominal as follows:—

Sheet copper, base, 34.  
 Copper wire, base, 28.75 to 29.25.  
 High sheet brass, base, 38 to 40.  
 Seamless brass tubing, 42 to 44.  
 Seamless copper tubing, 43 to 45.  
 Brazed tubing, 46.50 to 48.50.  
 Brass wire, 38 to 40.  
 Brass rods, 38 to 40.  
 Sheet zinc, f.o.b. smelter, 25.

## TORONTO MARKETS.

March 14—(Quotations from Canada Metal Co., Toronto)—  
 Spelter, 25 cents per lb.  
 Lead, 10 cents per lb.  
 Tin, 55 cents per lb.  
 Antimony, 45 cents per lb.  
 Copper casting, 31 cents per lb.  
 Electrolytic, 31 cents per lb.  
 Ingot brass, yellow, 13c.; red, 15 cents per lb.  
 March 14.—(Quotations from Elias Rogers Co., Toronto)—  
 Coal, anthracite, \$8 per ton.  
 Coal, bituminous, \$5.75 per ton.

## STOCK QUOTATIONS.

(Courtesy of J. P. Bickell & Co., Standard Bank Bldg., Toronto.)

### New York Curb.

March 11, 1916.

	High.	Low.	Close.
Alaska Gold . . . . .	22½	17½	22
Allis-Chalmers . . . . .	31¼	28¾	30
American Smelters . . . . .	103½	97¾	101¾
American Zinc . . . . .	89	79¼	87
Anaconda . . . . .	87¾	85%	86½
Bethlehem Steel . . . . .	495	467	488½
Butte & Superior . . . . .	105¼	94¾	96
Canadian Pacific . . . . .	166¾	164¼	164½

Chile Copper . . . . .	23¾	22½	22¾
Chino . . . . .	57¾	55½	55½
Colorado Fuel . . . . .	44¾	41	44¼
Crucible Steel . . . . .	86	73¾	84½
Erie . . . . .	37¾	36	36¾
Goodrich . . . . .	73½	70¼	72¾
Great Northern Ore . . . . .	44¾	41¾	43¾
Inspiration . . . . .	47	44¾	46¼
Kennecott . . . . .	57¾	54¾	56
Lackawana Steel . . . . .	78¾	75¼	77
Miami . . . . .	36¾	35¼	36¼
National Lead . . . . .	69¾	66¾	67½
U. S. Steel . . . . .	84¾	81¾	83¾
Utah Copper . . . . .	86½	83	83½

## STANDARD MINING EXCHANGE.

March 11, 1916.

### Cobalt Stocks.

	Ask.	Bid.
Bailey . . . . .	.06	.05½
Beaver Consolidated . . . . .	.37½	.36
Buffalo . . . . .	.95	..
Chambers-Ferland . . . . .	.23½	.21
Coniagas . . . . .	4.12½	..
Crown Reserve . . . . .	.43	.42
Foster . . . . .	.11½	.11
Gifford . . . . .	.06½	.06
Gould . . . . .	.01	¼
Great Northern . . . . .	.04¾	.04½
Hargraves . . . . .	.06¼	.05½
Hudson Bay . . . . .	..	26.00
La Rose . . . . .	.64	.62
McKinley-Darragh . . . . .	.40	..
Nipissing . . . . .	6.50	6.25
Ophir . . . . .	.05	.04
Peterson Lake . . . . .	.26	25¾
Right of Way . . . . .	.05	.04¾
Seneca Superior . . . . .	.65	.52
Silver Leaf . . . . .	.02¾	.02¼
Shamrock Con. . . . .	.17	.15½
Timiskaming . . . . .	.53½	.53
Trethewey . . . . .	.17	.12
Wetlaufer . . . . .	.10	.08
York Ontario . . . . .	.02	.01

### Porcupine Stocks.

	Ask.	Bid.
Apex . . . . .	.06	.05¾
Dome Con. M. . . . .	..	.15
Dome Extension . . . . .	.37	.36¾
Dome Lake . . . . .	..	24½
Dome Mines . . . . .	..	24.75
Foley O'Brien . . . . .	.55	.50
Gold Reef . . . . .	.02	.01½
Homestake . . . . .	.55	.45
Hollinger . . . . .	27.00	26.80
Jupiter . . . . .	.21¾	.21½
McIntyre . . . . .	.92½	.92
McIntyre Extension . . . . .	..	.27
Moneta . . . . .	.12	.10
Pearl Lake . . . . .	¾	¼
Porcupine Crown . . . . .	.77	.73
Porcupine Gold ex-r. . . . .	..	½
Porcupine Imperial . . . . .	.03¼	.03
Porcupine Tisdale . . . . .	.02	.01½
Vipond . . . . .	.60	.59
Preston East Dome . . . . .	.04¼	.04
Schumacher . . . . .	.46	..
Teck-Hughes . . . . .	.20	.19½
West Dome . . . . .	.15	.14½
West Dome Con. . . . .	.22½	.22

# PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

## ENGINEERS, METALLURGISTS AND GEOLOGISTS

### COHEN, SAMUEL W., E. M.

Consulting Engineer,  
Room 601, Dom. Express Bldg. Montreal  
General Manager,  
Crown Reserve Mining Co. Ltd.  
Cobalt, Can.

### JOHN V. N. DORR

Consulting and Metallurgical  
Engineer  
17 Battery Place New York City  
and  
Cooper Building  
Denver, Colorado

### FERRIER, W. F.

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

### FORBES, D. L. H.

Mining & Metallurgical Engineer  
Chuquicamata, Chile  
Chief Construction Engineer for  
Chile Copper Co.

### GUESS & HAULTAIN

Mining & Metallurgical Engineers  
123 Bay Street  
TORONTO CANADA

### HARDMAN, J. E.

Consulting Mining Engineer  
MONTREAL, CANADA.

### HASSAN, A. A.,

Mining Geologist and Consulting  
Engineer.  
SUITE 203-204 RIGGS BLDG.,  
WASHINGTON, D.C.

### HITCHCOCK C. H.

Mining Engineer  
Mines examined with a view to purchase  
COPPER CLIFF, ONT.

A. M. Can. Soc. C. E.

M. Am. I. M. E.

### CHAS. J. MURPHY

Consulting Engineer  
Reports, Surveys, Plans, Estimates, Specifi-  
cations and supervision.  
Formerly Chief Engr. 1911-16 The Crow's  
Nest Pass Coal Co.; C.N.P. El. Light and  
Power Co.; The Morrissey, Fernie &  
Michel Railway.  
22 NOVA SCOTIA BANK BLDG. ST. CATHARINES, ONT.

### SPEARMAN CHAS., B.Sc., M.A.

Mining Geologist and Engineer  
Structural geology problems relating to  
ore deposits, examinations, reports,  
petrographical examinations, radio-ac-  
tive tests, etc. Box 413, Haileybury, Ont.

### SMITH, SYDNEY.

Mining Engineer,  
HAILEYBURY, ONT.

### SUMMERHAYES, MAURICE W.

Mining Engineer,  
Manager  
Porcupine-Crown Mines, Limited  
Timmins - Ont.

### TYRRELL, J. B.

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

Telephone Main  
3813

Cable Address: "Chadwick" Toronto  
Western Union Code

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

Beatty, Blackstock, Fasken  
Cowan & Chadwick  
Barristers, Solicitors, Notaries  
Offices: Bank of Toronto,  
Cor. Wellington & Church Sts.  
58 Wellington St. East  
Toronto

## ASSAYERS, CHEMISTS AND ORE TESTERS.

### 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

Phone M. 1889 Cable address "Heys"  
Established 1873.

### HEYS, THOS. & SON,

Technical Chemists and Assayers,  
Rooms M and N, Toronto Arcade  
Yonge Street, Toronto, Ont.  
Sampling Ore Deposits a Specialty.

### 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.

### 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

### CAMPBELL & DEYELL, Limited

Ore Samplers, Assayers  
and Chemists

Cobalt, Ont.  
South Porcupine, Ont.

C. G. CAMPBELL,  
General Manager.

## LAWYERS

Phone Main 2311

Cable Address  
"Segsworth" Toronto

### R. F. SEGSWORTH

Barrister, Solicitor, Notary, Etc.

JARVIS BUILDING  
103 Bay Street - TORONTO

**MINE SUPERINTENDENT WANTED**

For Pyrites Mine in Ontario

Must have good record for producing ore at low cost and be capable of handling 60 to 80 men.

Address Box L, Can. Mining Journal

"The Canadian Mining Manual for 1915, edited by Reginald E. Hore, editor of The Canadian Mining Journal, has just been published by the Mines Publishing Company. The publication is an extremely useful handbook of information concerning the minerals and mines of Canada, and numerous illustrations throughout add not a little to its value."—Toronto World.

The Price is \$2.00

**Smith & Travers Diamond Drill**

Company, Limited

Box 169, SUDBURY, ONT.

All classes of Diamond Drilling done.

Engineer's Reports on All Work, Furnished.

**SMITH & DURKEE Diamond Drilling Co. LIMITED**

Contractors for all classes of diamond drill work.

We make a specialty of saving a large percentage of core in soft ground.

Plans showing location of holes and surveys of holes can be supplied.

SUDBURY - ONT.

For Information Concerning

**Mining Companies Operating in Canada**

Consult The

**Canadian Mining Manual**

**PORCUPINE GOLD CAMP**

Latest information obtained by subscribing to the

PORCUPINE HERALD

South Porcupine, Ontario

Canada \$1.50, United States \$2.00 a year.

**Canadian Mining Manual**

1915

Now Ready

PRICE \$2.00

263-265 Adelaide St. West., TORONTO.

**ORILLIA MOLYBDENUM CO.**

LIMITED

Molybdenite Ores of all kinds Treated

Schedule of Charges Given on Request

ORILLIA

ONTARIO

**DARLINGS STEAM APPLIANCES**



DARLING BROTHERS LIMITED  
Engineers and Manufacturers  
MONTREAL, CANADA

Branches: Toronto and Winnipeg

Agents: Halifax, St. John, Calgary, Vancouver

**The Canadian Mining Journal**

WITH WHICH IS INCORPORATED "THE CANADIAN MINING REVIEW"  
A JOURNAL DEVOTED TO MINING AND METALLURGY  
SUBSCRIPTION IN CANADA, \$2.00  
TO OTHER COUNTRIES, \$3.00

PUBLISHED ON THE FIRST AND FIFTEENTH OF EACH MONTH  
TWO, FIVE-FOUR ISSUES IN A YEAR

The Canadian Mining Journal,  
Toronto, Ontario, Canada.

Send me the Canadian Mining Journal for one year and until countermanded, beginning with the month of.....for which I agree to pay the sum of.....Dollars per year.

Name .....

Address .....

**THE CANADIAN MINING JOURNAL**

VOL. 1 No. 1



# Canadian Explosives, Limited

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



## ECONOMY

In the use of EXPLOSIVES is of  
**SUPREME IMPORTANCE**

Under existing conditions Ammonia Dynamites cost considerably less than Nitro-Glycerine Dynamites or Forcite, and are equally satisfactory under many conditions.

Why not try them.

### DISTRICT OFFICES:

NOVA SCOTIA:	-	-	-	-	-	-	Halifax
QUEBEC:	-	-	-	-	-	-	Montreal
ONTARIO:	Toronto,	Cobalt,	South Porcupine,	Port Arthur,	-	-	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.

**BUYERS AND SELLERS OF METALS**

**The Consolidated Mining and Smelting Company of Canada, Limited**

Offices, Smelting and Refining Department  
**TRAIL, BRITISH COLUMBIA**

**SMELTERS AND REFINERS**

Purchasers of all classes of Ores.  
Producers of Fine Gold and Silver, Base Bullion; Copper Matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal.

**Oldest Experts in**

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

**GEO. G. BLACKWELL, SONS & CO., Limited**  
Metallurgists, Mine Owners, Merchants, Manufacturers

**THE ALBANY, LIVERPOOL, ENGLAND**

Talc  
Mica  
Barytes  
Graphite  
Blende  
Corundum  
Fluorspar  
Feldspar

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

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

**ESTABLISHED BY GEO. C. BLACKWELL. 1869**

**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

Cobalt Metal  
Cobalt Anodes  
Cobalt Oxide  
Nickel Oxide  
Cobalt Salts  
Nickel Metal  
Pure White Arsenic

**Deloro Mining and Reduction Co., Limited**  
WORKS AT DELORO, ONT.  
Branch Office : Room 1112 C.P.R. Bldg., TORONTO

**C. L. CONSTANT CO.,**  
42 New Street - New York  
**SHIPPERS' AGENTS**  
FOR  
Selling, Sampling and Assaying Ores, 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 Coniagas Reduction Company, Limited.**  
St. Catharines - Ontario  
Smelters and Refiners of Cobalt Ores  
Manufacturers of  
Bar Silver, White Arsenic, Cobalt Oxide and Nickel Oxide

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

When Answering Advertisements please mention THE CANADIAN MINING JOURNAL.

# The Canadian Miner's Buying Directory.

- Air Hoists—**  
Canadian Ingersoll-Rand Co., Ltd.
- Amalgamators—**  
Fraser & Chalmers of Canada, Limited.  
Northern Canada Supply Co.
- 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
- Ball Mills—**  
Fraser & Chalmers of Canada, Limited.
- Belting—Leather, Rubber and Cotton—**  
Northern Canada Supply Co.  
Jones & Glassco
- Blasting Batteries and Supplies—**  
Can. Ingersoll-Rand Co., Ltd.  
Curtis & Harvey (Canada) Ltd.  
Northern Canada Supply Co.  
Canadian Explosives, Limited
- Blowers—**  
Fraser & Chalmers of Canada, Limited.  
Northern Canada Supply Co.
- Boilers—**  
Fraser & Chalmers of Canada, Limited.  
Northern Canada Supply Co.  
Can. Ingersoll-Rand Co., Ltd
- Buckets—**  
Hendrick Mfg. Co  
M. Beatty & Sons, Ltd.  
Northern Canada Supply Co.
- Cable — Aerial and Underground—**  
Fraser & Chalmers of Canada, Ltd.  
Northern Canada Supply Co.
- Cableways—**  
Fraser & Chalmers of Canada, Limited.  
M. Beatty & Sons, Ltd.
- Cages—**  
Fraser & Chalmers of Canada, Limited.  
Jeffrey Mfg. Co.  
Northern Canada Supply Co.
- Cables—Wire—**  
Standard Underground Cable Co. of Canada, Ltd.
- Cars—**  
Jeffrey Mfg. Co.  
Northern Canada Supply Co.
- Cement Machinery—**  
Northern Canada Supply Co.
- Chains—**  
Jeffrey Mfg. Co.  
Jones & Glassco  
Northern Canada Supply Co.  
B. Greening Wire Co., Ltd.
- Chemists**  
Canadian Laboratories.  
Campbell & Deyell.  
Thos Heys & Sons.  
Milton Hersey Co.  
Ledoux & Co.
- Coal—**  
Dominion Coal Co.  
Nova Scotia Steel & Coal Co.
- Coal Cutters—**  
Jeffrey Mfg. Co.  
Sullivan Machinery Co.  
Can. Ingersoll-Rand Co., Ltd.
- Coal Mining Explosives—**  
Curtis & Harvey (Can.), Ltd.  
Canadian Explosives, Limited
- Coal Mining Machinery—**  
Can. Ingersoll-Rand Co., Ltd.  
Fraser & Chalmers of Canada, Limited.  
Jeffrey Mfg. Co.  
Roberts & Schaefer Co.
- Coal Punchers—**  
Sullivan Machinery Co.  
Can. Ingersoll-Rand Co., Ltd.
- Coal Washeries—**  
Jeffrey Mfg. Co.
- Compressors—Air—**  
Smart-Turner Machine Co.  
Fraser & Chalmers of Canada, Limited.  
Sullivan Machinery Co.  
Can. Ingersoll-Rand Co., Ltd.  
Northern Canada Supply Co.
- Concentrators and Jigs—**  
Fraser & Chalmers of Canada, Limited.
- Concrete Mixers—**  
Northern Canada Supply Co.
- Condensers—**  
Fraser & Chalmers of Canada, Limited.  
Smart-Turner Machine Co.  
Northern Canada Supply Co.
- Converters—**  
Fraser & Chalmers of Canada, Limited.  
Jeffrey Mfg. Co.  
Northern Canada Supply Co.
- Conveyor—Trough—Belt—**  
Hendrick Mfg. Co.
- Cranes—**  
Smart-Turner Machine Co.  
M. Beatty & Sons, Ltd.
- Crane Ropes—**  
Allan, Whyte & Co.  
B. Greening Wire Co., Ltd.
- Crushers—**  
Fraser & Chalmers of Canada, Limited.  
Lymans, Ltd
- Cyanide Plants—**  
Fraser & Chalmers of Canada, Limited.  
Roessler & Hasslacher.
- Derricks—**  
Smart-Turner Machine Co.  
S. Flory Mfg. Co.  
M. Beatty & Sons, Ltd.
- Diamond Drill Contractors—**  
Diamond Drill Contracting Co.  
Smith and Travers.
- Dredging Machinery—**  
M. Beatty & Sons.
- Dredging Ropes—**  
Allan, Whyte & Co.  
Fraser & Chalmers of Canada, Limited.
- Drills, Air and Hammer—**  
Can. Ingersoll-Rand Co., Ltd  
Jeffrey Mfg Co.  
Sullivan Machinery Co.  
Northern Canada Supply Co.
- Drills—Core—**  
Can. Ingersoll-Rand Co., Ltd  
Standard Diamond Drill Co.
- Drills—Diamond—**  
Sullivan Machinery Co.  
Northern Canada Supply Co.
- Drill Steel Sharpeners—**  
Can. Ingersoll-Rand Co., Ltd  
Northern Canada Supply Co.
- Dump Cars**  
Sullivan Machinery Co.
- Drills—Electric—**  
Can. Ingersoll-Rand Co., Ltd.
- Dynamite—**  
Curtis & Harvey (Canada), Ltd.  
Canadian Explosives.  
Northern Canada Supply Co.
- Ejectors—**  
Can. Ingersoll-Rand Co., Ltd  
Northern Canada Supply Co.
- Elevators—**  
Jeffrey Mfg. Co.  
M. Beatty & Sons.  
Sullivan Machinery Co.  
Northern Canada Supply Co.
- Engineering Instruments—**  
C. L. Berger & Sons.
- Engineers and Contractors—**  
Fraser & Chalmers of Canada, Limited.
- Engines—Automatic—**  
Smart-Turner Machine Co.
- Engines—Gas and Gasoline**  
Fraser & Chalmers of Canada, Limited.  
Alex. Fleck.  
Sullivan Machinery Co.  
Smart-Turner Machine Co.
- Engines—Haulage—**  
Fraser & Chalmers of Canada, Limited.  
Can. Ingersoll-Rand Co., Ltd
- Engines—Marine—**  
Smart-Turner Machine Co.
- Engines—Steam—**  
Fraser & Chalmers of Canada, Limited.  
Smart-Turner Machine Co.  
S. Flory Mfg. Co.  
M. Beatty & Sons.
- Fans—Ventilating—**  
Fraser & Chalmers of Canada, Limited.  
Sullivan Machinery Co.
- Feeders—Ore—**  
Fraser & Chalmers of Canada, Limited.
- Flights—**  
Hendrick Mfg. Co.
- Forges—**  
Northern Canada Supply Co., Ltd.
- Forging—**  
M. Beatty & Sons.  
Smart-Turner Machine Co.
- Furnaces—Assay—**  
Lymans, Ltd.
- Fuse—**  
Curtis & Harvey (Canada), Ltd.  
Canadian Explosives.  
Northern Canada Supply Co.
- Gears—**  
Smart-Turner Machine Co.  
Northern Canada Supply Co.
- Hangers—Cable—**  
Standard Underground Cable Co. of Canada, Ltd.
- Hand Hoists—**  
Fraser & Chalmers of Canada, Limited
- High Speed Steel Twist Drills—**  
Northern Canada Supply Co.
- Hoists—Air, Electric and Steam—**  
Can. Ingersoll-Rand Co., Ltd  
S. Flory Mfg. Co.  
Jones & Glassco.  
M. Beatty & Sons  
Fraser & Chalmers of Canada, Limited  
Northern Canada Supply Co.
- Hoisting Engines—**  
Sullivan Machinery Co.  
Fraser & Chalmers of Canada, Limited  
Can. Ingersoll-Rand Co.  
M. Beatty & Sons.
- Hose—**  
Northern Canada Supply Co.
- Jacks—**  
Can. Ingersoll-Rand Co., Ltd  
Northern Canada Supply Co.
- Lamps—Safety—**  
Canadian Explosives.
- Link Belt—**  
Northern Canada Supply Co.  
Jones & Glassco.
- Metal Merchants—**  
Henry Bath & Son.  
Geo. G. Blackwell, Sons & Co.  
Consolidated Mining and Smelting Co. of Canada.  
Canada Metal Co.  
C. L. Constant Co.
- 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.
- 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.
- Perforated Metals—**  
B. Greening Wire Co., Ltd.  
Fraser & Chalmers of Canada, Limited  
Northern Canada Supply Co.  
Hendrick Mfg. Co.
- Pick Machines—**  
Sullivan Machinery Co.
- Pipes—**  
Consolidated M. & S. Co.  
Northern Canada Supply Co.  
Smart-Turner Machine Co.
- Pipe Fittings—**  
Northern Canada Supply Co.
- Pneumatic Tools—**  
Can. Ingersoll-Rand Co., Ltd  
Jones & Glassco.
- Prospecting Mills and Machinery—**  
Standard Diamond Drill Co.  
Fraser & Chalmers of Canada, Limited

Canadian Miner's Buying Directory.—(Continued from page 16.)

<b>Pulleys, Shafting and Hangings—</b> Fraser & Chalmers of Canada, Limited Northern Canada Supply Co.	<b>Pumps—Vacuum—</b> Smart-Turner Machine Co.	<b>Screens—</b> B. Greening Wire Co., Ltd. Jeffrey Mfg. Co. Northern Canada Supply Co. Fraser & Chalmers of Canada, Limited	<b>Steel—Tool—</b> N. S. Steel & Coal Co.
<b>Pumps—Boiler Feed—</b> Smart-Turner Machine Co. Northern Canada Supply Co. Canadian Ingersoll-Rand Co. Ltd. Fraser & Chalmers of Canada, Limited	<b>Quarrying Machinery—</b> Sullivan Machinery Co. Can. Ingersoll-Rand Co., Ltd.	<b>Screens—Cross Patent Flanged Lip—</b> Hendrick Mfg Co.	<b>Surveying Instruments—</b> W. F. Stanley. C. L. Berger.
<b>Pumps—Centrifugal—</b> Smart-Turner Machine Co. M. Beatty & Sons. Can. Ingersoll-Rand Co., Ltd. Fraser & Chalmers of Canada, Limited	<b>Roasting Plants—</b> Fraser & Chalmers of Canada, Limited	<b>Separators—</b> Smart-Turner Machine Co.	<b>Tanks—Cyanide, Etc.—</b> Fraser & Chalmers of Canada, Limited Hendrick Mfg. Co.
<b>Pumps—Electric—</b> Smart-Turner Machine Co. Canadian Ingersoll Rand Co., Ltd. Fraser & Chalmers of Canada, Limited	<b>Rolls—Crushing—</b> Fraser & Chalmers of Canada, Limited	<b>Sheets—Genuine Manganese Bronze—</b> Hendrick Mfg. Co.	<b>Transits—</b> C. L. Berger & Sons.
<b>Pumps—Pneumatic—</b> Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd	<b>Roofing—</b> Northern Canada Supply Co.	<b>Shovels—Steam—</b> M. Beatty & Sons.	<b>Tube Mills—</b> Fraser & Chalmers of Canada, Limited
<b>Pumps—Steam—</b> Can. Ingersoll-Rand Co., Ltd Northern Canada Supply Co. Smart-Turner Machine Co.	<b>Rope—Manilla and Jute—</b> Jones & Glassco. Northern Canada Supply Co. Allan, Whyte & Co.	<b>Smelting Machinery—</b> Fraser & Chalmers of Canada, Limited	<b>Turbines—</b> Fraser & Chalmers of Canada, Limited
<b>Pumps—Turbine—</b> Smart-Turner Machine Co. Canadian Ingersoll-Rand Co., Ltd. Fraser & Chalmers of Canada, Limited	<b>Rope—Wire—</b> B. Greening Wire Co., Ltd. Allan, Whyte & Co. Northern Canada Supply Co. Fraser & Chalmers of Canada, Limited	<b>Stacks—Smoke Stacks—</b> Hendrick Mfg. Co.	<b>Winding Engines—</b> Canadian Ingersoll-Rand Co., Ltd.
	<b>Samplers—</b> C. L. Constant Co. Ledoux & Co. Milton Hersey Co. Thos. Heys & Son.	<b>Stamp Mills—</b> Fraser & Chalmers of Canada, Limited	<b>Wire Cloth—</b> Northern Canada Supply Co. B. Greening Wire Co., Ltd.
		<b>Steel Barrels—</b> Smart-Turner Machine Co.	<b>Wire (Bare and Insulated)—</b> Standard Underground Cable Co., of Canada, Ltd.
		<b>Steel Drills—</b> Sullivan Machinery Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd	
		<b>Steel Drums—</b> Smart-Turner Machine Co.	

ALPHABETICAL INDEX TO ADVERTISERS

<b>A</b>	<b>F</b>	<b>M</b>
Allan, Whyte & Co. . . . . 2	Ferrier, W. F. . . . . 11	Murphy, Chas. J. . . . . 11
American Zinc Lead & Smelting Co. . . . . 10	Fleck, Alex. . . . . 9	<b>N</b>
<b>B</b>	Flory, S., Mfg. Co. . . . . 6	Nova Scotia Steel & Coal Co. . . . . 4
Bath, Henry & Son. . . . . 14	Forbes, D. L. H. . . . . 11	Nova Scotia, Province of. . . . . 8
Balbach Smelting & Refining Co. . . . . 14	Fraser & Chalmers of Can., Ltd. 4	Northern Canada Supply Co., Ltd. 3
Beatty, Blackstock, Fasken, Cowan & Chadwick . . . . . 11	<b>G</b>	<b>O</b>
Beatty, M. & Sons, Ltd. . . . . 3	B. Greening Wire Co., Ltd. . . . . 5	Orillia Molybdenum Co. . . . . 12
Berger, C. L. & Sons. . . . . 9	Guess & Haultain . . . . . 11	Ontario, Province of . . . . .
Blackwell, Geo. G., Sons & Co. . . . . 14	<b>H</b>	.....Inside Back Cover
British Columbia, Province of. . . . . 7	Hardman, Jno. E. . . . . 11	<b>Q</b>
Buffalo Mines, Ltd. . . . . 4	Hassan, A. A. . . . . 11	Quebec, Province of . . . . . 8
Boving Hydraulic & Engineering Co. . . . . 10	Hendrick Mfg. Co. . . . . 6	<b>R</b>
<b>O</b>	Hersey, Milton Co., Ltd. . . . . 11	Roberts & Schaefer Co. . . . . 4
Campbell & Dayell, Ltd. . . . . 11	Heys, Thomas & Son . . . . . 11	<b>S</b>
Canadian Copper Co. . . . . 9	Hitchcock, C. H., . . . . . 11	School of Mining. . . . . 9
Canadian Explosives, Ltd. . . . . 13	<b>I</b>	Segsworth, R. F. . . . . 11
Can. Ingersoll-Rand Co., Ltd. . . . . 1	Imperial Bank of Canada. . . . . 5	Smart-Turner Machine Co. . . . . 7
Canada Metal Co. . . . . 5	International Nickel Co. . . . . 9	Smith & Durkee, Diamond Drill Co. . . . . 12
Cohen, S. W. . . . . 11	<b>J</b>	Smith & Travers Diamond Drill Co. . . . . 12
Consolidated Mining & Smelting Co. . . . . 14	Johnson, Matthey & Co. . . . . 11	Smith Sydney . . . . . 11
Coniagas Reduction Co. Ltd. . . . . 14	Jones & Glassco . . . . . 10	Spearman, Chas. . . . . 11
Constant, C. L. & Co. . . . . 14	<b>L</b>	Sullivan Machinery Co. . . . . 2
Curtis's & Harvey . . . . .	Ledoux & Co. . . . . 11	Summerhayes, Maurice W. . . . . 11
.....Outside Back Cover	Lymans, Ltd. . . . . 3	Stanley, W. F. & Co., Ltd. . . . . 6
<b>D</b>		Standard Underground Cable Co. of Canada . . . . . 3
Darling Bros., Ltd. . . . . 12		<b>T</b>
Dept. of Mines, Canada. . . . .		Toronto University . . . . . 3
.....Inside Front Cover		Tyrrell, J. B. . . . . 11
Deloro Mining & Reduction Co. . . . . 14		
Diamond Drill Contracting Co. . . . . 4		
Dominion Coal Co., Ltd. . . . . 9		
Dorr, Jno. V. N. . . . . 11		
Dwight & Lloyd Sintering Co., Inc. 7		

When Answering Advertisements please mention THE CANADIAN MINING JOURNAL

# Ontario's Mining Lands

---

There are many millions of acres in Eastern, Northern, and Northwestern Ontario where the geological formations are favorable for the occurrence of minerals, the pre-Cambrian series being pre-eminently the metal-bearing rocks of America.

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.

Many other varieties of useful minerals are found in Ontario:—cobalt, arsenic, iron pyrites, mica, graphite, corundum, talc, gypsum, salt, petroleum, and natural gas.

Building materials, such as brick, lime, stone, cement, sand and gravel, are abundant.

The output of the mines and metallurgical works of Ontario for the year 1913 was valued at \$53,232,311. Ontario has the largest mineral production of any of the Provinces.

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 three claims a year in every mining division.

For maps, reports of the Bureau of Mines, and mining laws, apply to

**HON. G. H. FERGUSON,**

Minister of Lands, Forests and Mines,

**Toronto, Canada.**

# Printing and Publishing

We wish to draw the attention of mining, metallurgical, and development corporations to our excellent facilities for compiling, arranging, illustrating, printing and distributing Annual Statements, Special Reports, Descriptive Pamphlets, etc.

We guarantee our work in all respects. In letter-press, half-tone engravings and reproductions in colour, we are prepared to give entire satisfaction.

We shall be glad to furnish estimates to enquirers.

ADDRESS

**Industrial and Technical Press Ltd.,** 263-5 ADELAIDE ST. WEST,  
TORONTO

OR

**Canadian Mining Journal,** 263-5 ADELAIDE ST. WEST,  
Toronto

---

---

## MINING EXPLOSIVES

STRAIGHT DYNAMITE  
SPECIAL LOW FREEZING DYNAMITE  
SEMI-GELATINIZED DYNAMITE  
SPECIAL SAFETY COAL MINING EXPLOSIVES

### CURTIS'S & HARVEY

(CANADA) LIMITED

400 St. James Street

Montreal