

Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

Coloured covers/
Couverture de couleur

Coloured pages/
Pages de couleur

Covers damaged/
Couverture endommagée

Pages damaged/
Pages endommagées

Covers restored and/or laminated/
Couverture restaurée et/ou pelliculée

Pages restored and/or laminated/
Pages restaurées et/ou pelliculées

Cover title missing/
Le titre de couverture manque

Pages discoloured, stained or foxed/
Pages décolorées, tachetées ou piquées

Coloured maps/
Cartes géographiques en couleur

Pages detached/
Pages détachées

Coloured ink (i.e. other than blue or black)/
Encre de couleur (i.e. autre que bleue ou noire)

Showthrough/
Transparence

Coloured plates and/or illustrations/
Planches et/ou illustrations en couleur

Quality of print varies/
Qualité inégale de l'impression

Bound with other material/
Relié avec d'autres documents

Continuous pagination/
Pagination continue

Tight binding may cause shadows or distortion along interior margin/
La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure

Includes index(es)/
Comprend un (des) index

Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/
Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.

Title on header taken from:/
Le titre de l'en-tête provient:

Title page of issue/
Page de titre de la livraison

Caption of issue/
Titre de départ de la livraison

Masthead/
Générique (périodiques) de la livraison

Additional comments:/
Commentaires supplémentaires:

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	14X	18X	22X	26X	30X
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
12X	16X	20X	24X	28X	32X

THE CANADIAN MINING REVIEW

Established 1882

Vol. VIII.—No. 6.

1889.—OTTAWA, JUNE—1889.

Vol. VIII.—No. 6.

1889 CATALOGUE OF 200 PAGES, 1889

This Catalogue is one of unusual interest and value.—*R.R. Gazette*.
Should be in the hands of every engineer and Contractor.—*Eng. and Min. Journal*.
Supplies a long felt want.—*Manufacturers Record*.
This is a thoroughly good publication.—*Engineering News*.
A valuable addition to the literature on the subject.—*Eng and B'g Record*.
The matter is readily available.—*Tradesman*.
A Complete Work.—*Colliery Engineer*.
Handy for reference.—*Min. and Sc. Press*.
The Useful Information will be specially valuable.—*Eng. and B'g Record*.
In reality a hand book.—*Am. Manufacturer*.

RAND DRILL CO.,
23 PARK PLACE, NEW YORK.

Hamilton Powder

COMPANY,

Manufacture Mining, Blasting, Military
and Sporting

Gunpowder,

DYNAMITE, DAULIN, and the new

ECLIPSE MINING POWDER

DOMINION AGENTS FOR

**Safety Fuse, Electric Blasting
Apparatus, &c.**

OFFICE

103 ST. FRANCOIS XAVIER STREET
MONTREAL.

BRANCH OFFICES & MAGAZINES
at all chief distributing points
in Canada.

**CANADA ATLANTIC
RAILWAY.**

THE SHORTEST PASSENGER ROUTE
BETWEEN

Ottawa and Montreal,

AND ALL POINTS EAST & SOUTH.

The only road in Canada running trains lighted
with electricity and heated by steam from the
engine. Luxurious Buffet Pullman Palace Cars
on all trains between Ottawa and Montreal. Only
line running through Sleeping Cars between

Ottawa, Boston and New York

And all New England and New York points.

Baggage checked to all points and passed by Customs
in transit.

During season of navigation close connections
are made with Richelieu and Ontario Navigation
Company's Steamers at Coteau Landing, shooting
the St. Lawrence Rapids.

For Tickets, Time Tables and information apply
to nearest agent, or to

S. EBBS, City Passenger Agent,
24 Sparks St., OTTAWA.

GEO. H. PHILLIPS, Gen. Agent,
VALLEYFIELD.

A. E. CAIRNS, General Agent,
136 St. James St., MONTREAL.

Or at 260 Washington St., Boston, and
317 Broadway, New York.

PERCY R. TODD,
General Passenger Agent.

E. J. CHAMBERLAN,
General Manager,
General Offices, Ottawa.

**THE CANADIAN RUBBER CO.
OF MONTREAL.**

A. ALLAN, Pres. J. O. GRAVEL, Secy.-Treas. F. SCHOLES, M'g. Dir.

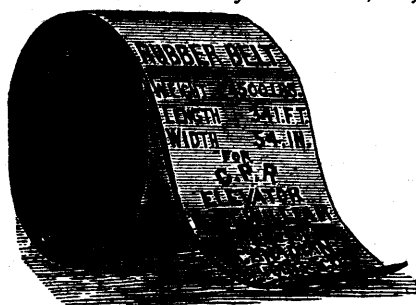
Manufacturers of

**SUPERIOR QUALITY
RUBBER GOODS.**

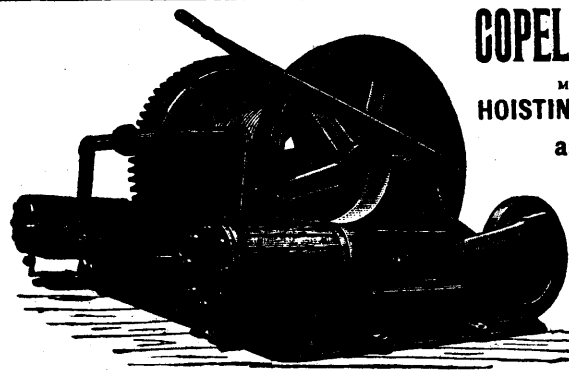
Our Rubber Belting is Un-
equalled in America.

Rubber Packings of all kinds.
Rubber Engine, Hydrant, Suction,
Steam, Brewers' and Fire Hose.
Moulded Goods of every description.

J. H. WALKER, Manager.



Western Branch cor., Front and Yonge Sts.,
TORONTO.



COPELAND & BACON

MANUFACTURERS OF
HOISTING ENGINES,
and MINING PLANTS.

85 Liberty St.

NEW YORK.

Send for Catalogue.

MILLER BROS. & MITCHELL

MANUFACTURERS OF

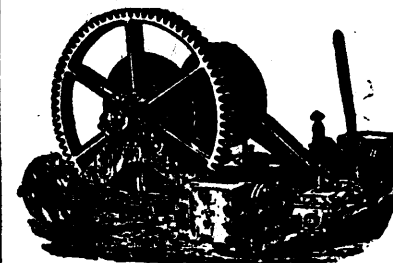
Steam Rock Drills

AND

HOISTING ENGINES,

Mining & Contractors' Plant
&c., &c.

110 TO 120 KING STREET, MONTREAL, QUE.



THE
**BELL TELEPHONE CO.
OF CANADA.**

ANDREW ROBERTSON, . . . PRESIDENT
C. F. SISE, . . . VICE-PRESIDENT
C. P. SCLATER, . . . SECRETARY-TREASURER

HEAD OFFICE, - MONTREAL.

H. C. BAKER, Manager Ontario Department,
HAMILTON.

This Company will sell its instruments at prices
ranging from \$10 to \$25 per set. These instru-
ments are under the protection of the Company's
patents, and purchasers are therefore entirely free
from risk of litigation.

This Company will arrange to connect places
not having telegraphic facilities with the nearest
telegraph office, or it will build private lines for
firms or individuals, connecting their places of
business or residences. It is also prepared to
manufacture all kinds of electrical apparatus.

Full particulars can be obtained at the Com-
pany's offices as above, or at St. John, N.B., Hal-
ifax, N.S., Winnipeg, Man., Victoria, B.C.

**REMINGTON
STANDARD
TYPEWRITER**

Miss Orr, Championship
of the world and Gold Medal
at Toronto, 13th August,
1888.

GEORGE BENGOUGH,
GENERAL AGENT,
36 King Street, TORONTO.



AEX. FLECK, JUN.,

Manufacturer of every Description of

Mill Machinery

**Water Wheels, Steam Engines,
Boilers, Derricks, Steam
Pumps and Mining
Machinery.**

Brass and Iron Casting of every
Description.

**VULCAN IRON WORKS, WELLINGTON ST.
OTTAWA.**

**DYNAMO ELECTRIC
MACHINES and LAMPS**



ELECTRIC LIGHTING APPARATUS
57, ADELAIDE ST. W.
TORONTO
ONT.

ARC and INCANDESCENT

FOR MINING PURPOSES

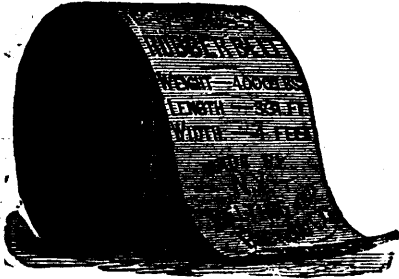
New York Belting & Packing Co.

15 PARK ROW, NEW YORK

JOHN H. CHEEVER, Treasurer.

J. D. CHEEVER, Dep'y Treasurer.

Oldest and largest Manufacturers in the United States of

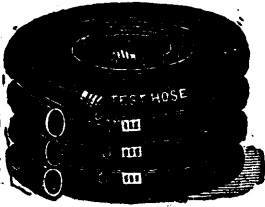


RUBBER BELTING.

CIRCULAR WOVEN SEAMLESS, ANTI-SEPTIC RUBBER LINED

"CABLE" HOSE AND TEST HOSE

For the use of Steam Engines, Force Pumps, Rolling Mills, Iron Works, Factories, etc. Woven in a superior manner to insure wear, compactness and durability.



"TEST HOSE."



Emery Vulcanite Wheel.

SOLID VULCANITE
EMERY WHEELS

(Large Wheels made on iron centers)

Cuts Cooler and Freer than any other wheel in the market.

W. D. ALLEN & CO.,
151 Lake St., Chicago.
European Branch: Pickhuben, , Hamburg Freihafengebeit ,Germany.

H. D. EDWARDS & CO.,
Detroit.

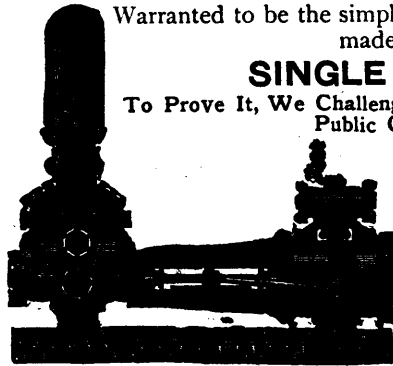
The M. T. DAVIDSON

IMPROVED MINING PUMP.

Warranted to be the simplest and most efficient Steam Pump made, whether it be

SINGLE OR DUPLEX.

To Prove It, We Challenge All Makers of Steam Pumps to a Public Competitive Test.



COMPOUND PUMPING ENGINES,

Obtaining a higher duty than any direct-acting pump made.

MANUFACTURED BY THE

Davidson Steam Pump COMPANY,

New York Office, - - -

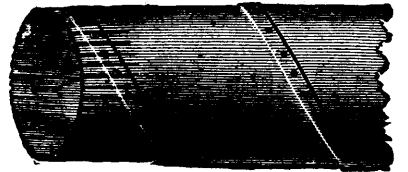
77 Liberty Street.

ROOT'S

SPIRAL RIVETED PIPE

FOR

Hydraulic Mining,
Water Works
Ranch and Railroad
Water Supplies.



From 2 to 24 inches in diameter and 1 to 25 in length. Manufactured with fittings to suit, capable of withstanding any desired pressure.

ABENDROTH & ROOT MFG. CO.

28 Cliff Street, New York.

Chicago Branch, - - SMITH & KNAPP, 62 South Canal Street

LIDGERWOOD MANUF'G CO.

96 LIBERTY ST, NEW YORK,

Largest Manufacturers in the United States of Hoisting Machinery of Every Description for Mines, Tunnel Work, Contractors, and General Hoisting Purposes.

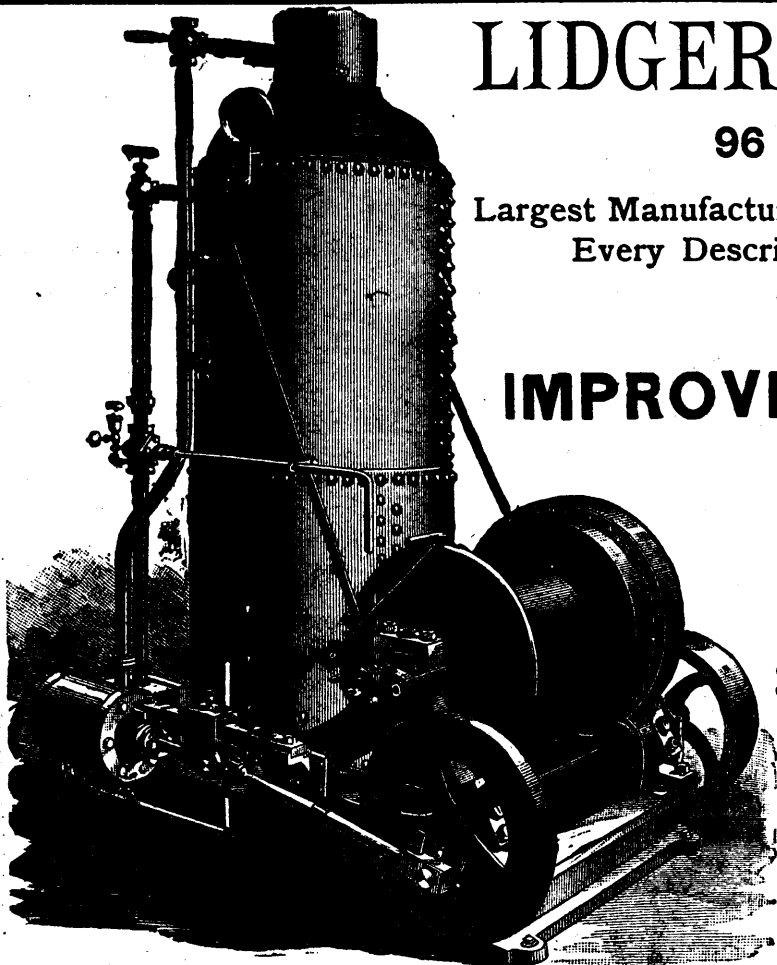
IMPROVED HOISTING ENGINES

FOR MINING PURPOSES A SPECIALTY.

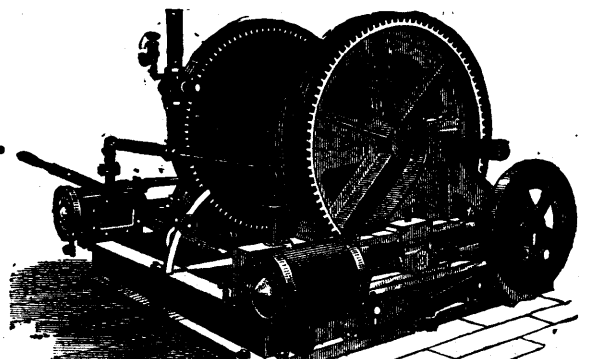
Over 5,000 Engines in Use!

300 Styles
and Sizes.

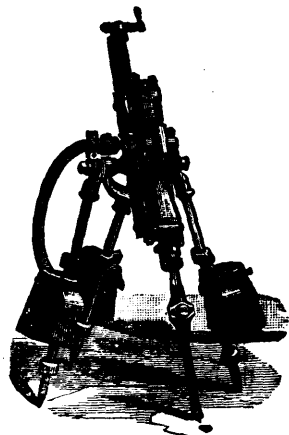
Send for
CATALOGUE.



FRICITION DRUM PORTABLE HOISTING ENGINE.

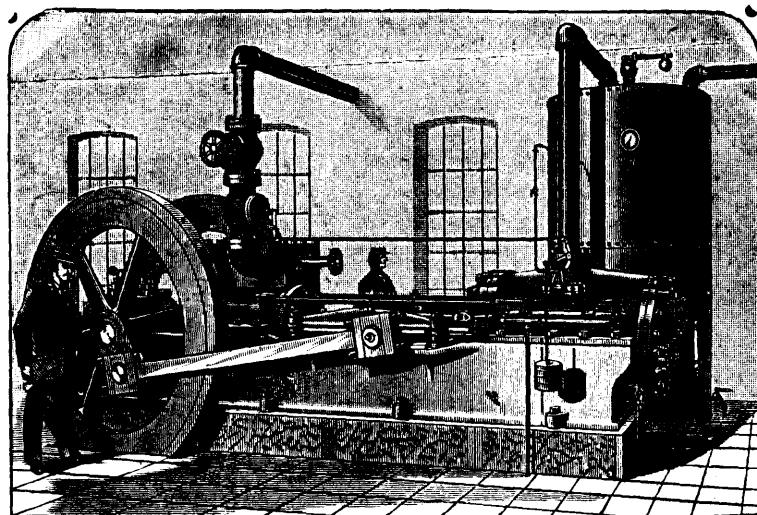


Double Cylinder Reversible Mine Engine.

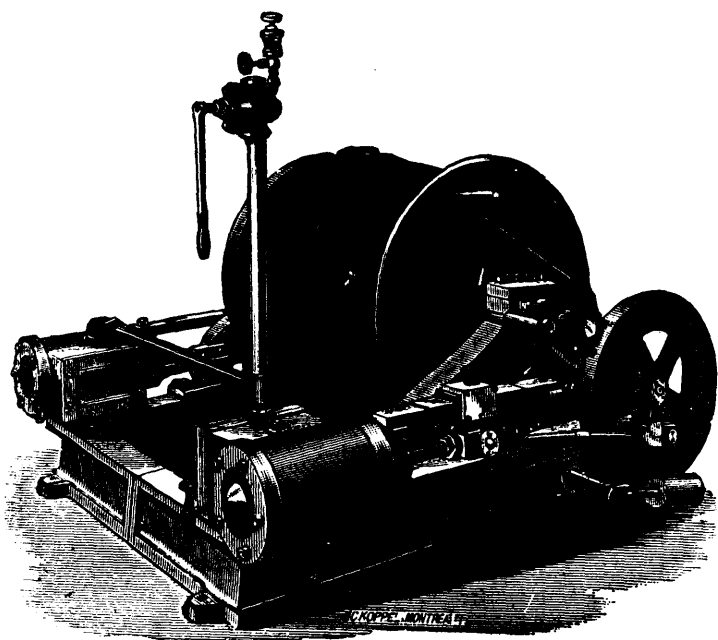


INGERSOLL
ROCK DRILL COMP'Y
OF CANADA
MANUFACTURERS OF

Rock Drills,
Air Compressors,
Steam & Horse Power Hoists,
BOILERS,
—AND—
GENERAL MINING
—AND—
Quarrying Machinery
—AND—
Contractors' Plant.



— ALSO —



Drill Steel, Wire Rope,
Derrick Castings,
Steam & Air Hose & Couplings,
Iron Piping, Fittings,
—AND—
ALL KINDS OF SUPPLIES
—FOR—
Miners & Contractors' Work.

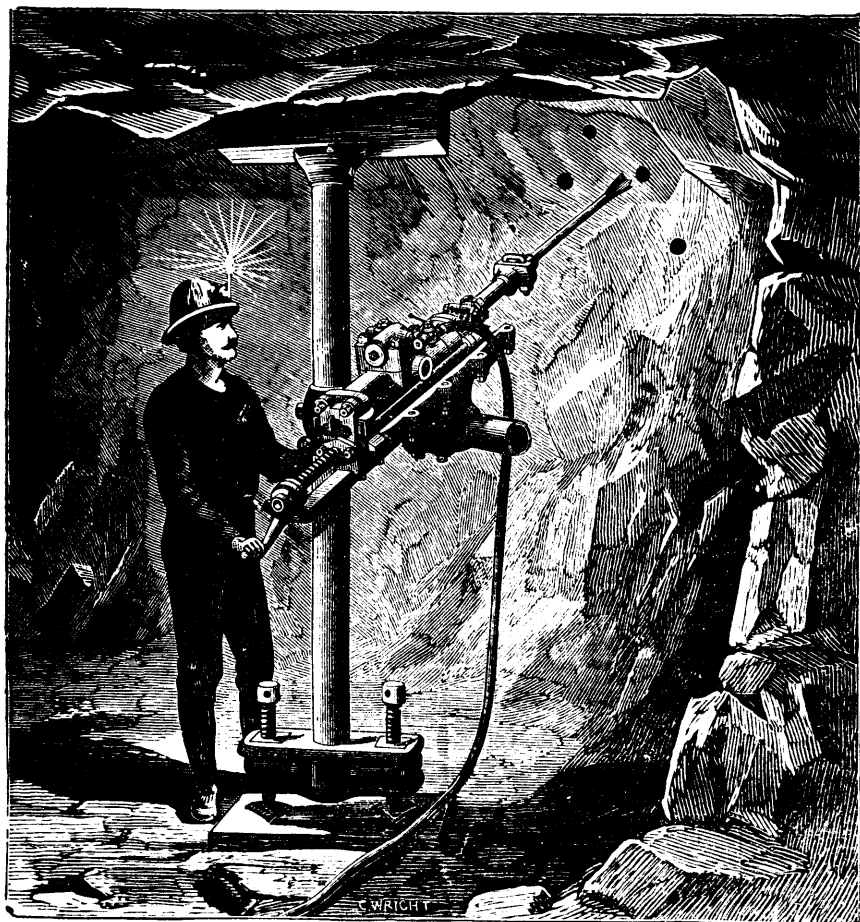
For Estimates, Catalogues and information address

Ingersoll Rock Drill Co. of Canada

204 st. James street, or P.O. Box 1942, Montreal.

F. G. BECKETT ENGINE CO.

HAMILTON, ONT.



Having had many years practical experience in the manufacture of

MINING MACHINERY

IS NOW PREPARED TO CONTRACT FOR

Stamp Mill Machinery,
Concentration Mills,
Revolving, Roasting and
Drying Furnaces.
Rock Breakers,
Cornish Rolls for crushing,
Amalgamating Pans and Settlers,
Concentrators and
Revolving Screens,
Smelting Furnaces, Retorts,

HOISTING ENGINES,

EITHER GEARED OR DIRECT ACTION.

Cornish Pumping Machinery,

Iron Ore Cars, Safety Cages, &c.,

Rock Drills and Air Compressors.

STEAM ENGINES AND BOILERS.

Marine Engines and Steam Yachts.

Francis D. Taylor

MINING ENGINEER,
BROCKVILLE, - ONTARIO

SPECIALTY. — The Mining of Iron Ores, Coals, and the Manufacture of Iron and Steel.
Mr. T. has had for many years the management of large mining enterprises in England and the U. S. A.

CAMERON STEAM PUMP
SIMPLE, RELIABLE, COMPACT, DURABLE
NO OUTSIDE VALVE GEAR.
ADAPTED FOR ALL PURPOSES.
THE A. S. CAMERON STEAM PUMP WORKS
FOOT OF EAST 23^d STREET, NEW YORK.

**THE DOMINION
Leather Board Co.**

MONTREAL,
—MANUFACTURERS OF—
Leather Board & Stiffeners
ALSO OF
**ASBESTOS MILL BOARD,
STEAM PACKING, and
FRICTION PULLEY BOARD.**

Samples and prices furnished upon application.
Please mention this paper.



**ONTARIO
Mining Regulations.**

The following summary of the principal provisions of the General Mining Act of the Province of Ontario is published for the information of those interested in mining matters in the Algoma District, and that part of the Nipissing District north of the Mattawan River, Lake Nipissing and French River.

Any person or persons may explore for mines or minerals on any Crown Lands surveyed or unsurveyed, not marked or staked out or occupied.

The price of all lands sold as mining locations or as lots in surveyed townships is two dollars per acre cash, the pine timber being reserved to the Crown. Patentees or those claiming under them may cut and use such trees as may be necessary for building, fencing or fuel, or for any other purpose essential to the working of mines.

Mining locations in unsurveyed territory shall be rectangular in shape, and the bearings of the outlines thereof shall be due north and south, and due east and west astronomically, and such locations shall be one of the following dimensions, viz: eighty chains in length by forty chains in width, containing 320 acres, or forty chains square, containing 160 acres, or forty chains in length by twenty chains in width, containing 80 acres.

All such locations must be surveyed by a Provincial Land Surveyor, and be connected with some known point or boundary at the cost of the applicant, who must file with application surveyor's plan, field notes and description of location applied for.

In all patents for mining locations a reservation of five per cent. of the acreage is made for roads.

Lands patented under the Mining Act are free from all royalties or duties in respect to any ores or minerals thereon, and no reservation or exception of any mineral is made in the patents.

Lands situated south of the Mattawan River, Lake Nipissing and French River are sold under the Mining Act at one dollar per acre cash.

Affidavits showing no adverse occupation, improvement or claim should accompany applications to purchase.

A. S. HARDY,
Commissioner,
Department of Crown Lands, Toronto.

PHOSPHATE LANDS.

South half Lot 10, 9th Range, Buckingham, or the Mines thereon, will be sold out and out cheap for cash. One mile from the River, five from Buckingham Village. Good roads; three good "Shows" and several smaller ones.

Apply to
S. J. JONES, Buckingham.
OR ON THE PREMISES.

**TAYLOR McVEITY,
Barrister, Solicitor, &c.,**

Supreme Court and Departmental Agent,
SCOTTISH ONTARIO CHAMBERS, OTTAWA.

WM. HAMILTON MERRITT, F.G.S.

Associate Royal School of Mines, &c.,
Mining Engineer and Metallurgist,
Will report on Mines and Mineral Properties.
ADDRESS:
15 TORONTO ST., TORONTO, ONT.

J. T. DONALD, M.A.,

Analytical Chemist and Assayer,
124 St. JAMES St. - MONTREAL.
Analyses and Assays of every description. Manufacturing processes practically tested. Laboratory instruction in Chemistry, Assaying and Mineralogy. Terms on application.

The Canada Co.

Will issue Licences to Prospect or to work Minerals on any of their Mining Lands and Mineral Reservations,
Covering nearly a

Quarter of a Million Acres

In Eastern Ontario, and principally within the belts containing Iron, Phosphate, Gold, Galena Plumbago, Mica, Marbles, Building Stone, and other valuable Minerals.

For list of lands and terms apply to the Company's Mining Inspectors,

H. T. STRICKLAND,
Peterborough, Ont.,

For lands in the County of Hastings and westward, and to

ANDREW BELL, P.L.S.,
Almonte, Ont.,

For lands East of the County of Hastings.

TO MINERS AND OTHERS.

Bannerman & Powers,

VULCAN BOILER WORKS,

428 and 340 Wellington St., Ottawa.

MANUFACTURERS OF

IRON AND STEEL BOILERS

OF EVERY DESCRIPTION.

Tanks, Girders, Iron Roofing, Bank Vaults, Smoke Stacks

—AND ALL KINDS OF—

SHEET IRON WORK.

Repairs Neatly and Promptly Executed

FENWICK & SCLATER,

Manufacturers of Asbestos, Fire Hose, Files and Cotton Waste, Miners of Asbestos and Soapstone,

ASBESTOS

Cotton, Leather and Rubber Belting,
42, 44 & 46 Foundling Street, Montreal.

H. R. IVES & CO.,
Hardware Manufacturers and Founders,
QUEEN ST., MONTREAL.

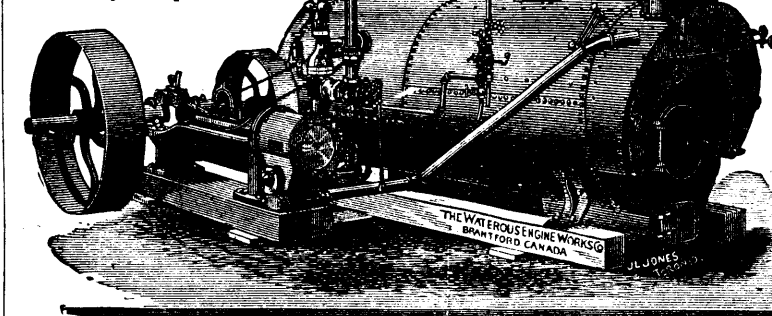
STOVES. TRADE MARK "Buffalo" — IRON BEDSTEADS FOR MINERS' USE.	PORTABLE FORGES. — BLACKSMITH'S DRILLS.	MONTREAL SMELTING CO'S BABBIT METAL.	CASTINGS Of every description to order. — SOIL PIPE.
---	---	---	---

PORTABLE ENGINES AND SAW-MILLS

Of all capacities—from 3000 feet of lumber and up per day.

Saw-Mills. Shingle-Mills. Lath-Mills. Chopping-Mills.
ENGINES OF ALL SIZES.
BOILERS of all capacities, IRON OR STEEL, ALL STYLES.

Send for Circulars, stating what you require.



Waterous Engine Works Co. Brantford, Canada.
St. Paul, Minn., U.S.A.

JOHN E. HARDMAN, S.B.

MINING ENGINEER,

OLDHAM, NOVA SCOTIA.

Can be consulted on all matters pertaining to the profession.

The development and management of Gold Properties a specialty.

WILSON & GREEN,

Commission Merchants,

PHOSPHATE SHIPPERS.

AGENTS HIGH ROCK MINE.

30 St. François Xavier St., - MONTREAL.

EDMUND SPARGO,

Consulting and Mining Engineer, 3 Cable Street, Liverpool.

Owners of or Investors in Metalliferous Mines, Slate, Granite, and other Stone Quarries, Brick, Terra Cotta, Fire and other Clays and Mineral Estates in general, requiring reliable and sound advice either in the Purchase or Disposal thereof, should consult E.S., who has executed important professional Commissions in Germany, Austria, Hungary, France, Belgium, Spain, Portugal, Sweden, Norway, and in the various Mining Districts throughout Great Britain and Ireland. Telegraphic Address: "Spargo," Liverpool. Bankers, National Provincial Bank of England, Liverpool.

THOMAS HEYS,

Analytical and Consulting Chemist and Assayer.

References are kindly permitted by the following: Messrs. Gooderham & Worts, Toronto, Limited; Messrs. P. R. Lamb & Co.; John Livingston, Esq., Dominion Bolt Co.

Assay and Analytical Laboratory } TORONTO.
16 King St. West, opposite the Rossin House, }

J. LAINSON WILLS,

F. C. S., ETC.

Late Manager Canadian Phosphate Co. (Lim.),

Will shortly be disengaged, and offers his services to examine and report upon Mines and Mining properties. Advice given on Chemical and Metallurgical processes.

SPECIALTIES: PHOSPHATE AND GOLD.

TELEGRAPHIC OR POSTAL ADDRESS:

WILLS, BUCKINGHAM, P.Q.

Irwin, Hopper & Co.

MINERS AND SHIPPERS OF MINERALS,

30 St. François Xavier Street,
MONTREAL, CAN.

Asbestos, crude and manufactured. Phosphate, Mica, Plumbago, Soapstone, &c.

DOMINION ASSAY OFFICE,

Gold and Silver Ores and Bullion
ASSAYED, REFINED AND PURCHASED.

Mining Properties bought, sold and examined. Fifteen years experience in Australia, New Zealand and California.

44 VICTORIA STREET, - - TORONTO.
H. ANN, PROP.

JAMES HOPE & CO.

BOOKSELLERS,

Stationers, Bookbinders and Printers,
OTTAWA.

SPEIGHT & VANNOSTRAND,

*Dominion and Provincial Land Surveyors,
Draughtsmen, Valuators, &c.*

OFFICE: ROOM "J," FIRST FLOOR, TORONTO ARCADE,
YONGE ST., TORONTO.

Surveys, Plans, Descriptions of Properties, etc., promptly executed.
Timber Limits and Mining Claims Located.

MILLAR & CO.

General Merchants & Shipping Agents

ATLANTIC CHAMBERS,

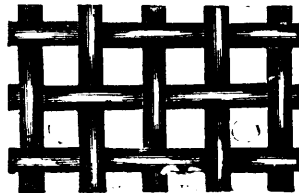
209 COMMISSIONER ST., - MONTREAL

Cable address, "Hoyer, Montreal." P.O. Box 1095.

AGENT FOR The Canadian Phosphate Co., Ltd., of London, Eng.,
The Montreal Union Abattoir Co., of Montreal, Can.
English Correspondents Messrs. Couper, Millan & Co., London, England.



For Mining Hoisting Derricks, etc.



Strong Wire Cloth and Screens

For Mining, etc., manufactured by

B. Greening & Co.

HAMILTON, ONT.

NATIONAL COLONIZATION

Lottery!

UNDER THE PATRONAGE OF

THE REV. FATHER LABELLE.

Established in 1884 under the Act of Quebec, 31 Vict.,
Chap. 36, for the benefit of the Diocesan Societies
of Colonization of the Province of Quebec.

CLASS D.

DRAWINGS ON THIRD WEDNESDAY IN EVERY
MONTH AT 2 P.M.

Prizes value \$50,000

Capital Prize: 1 Real Estate worth \$5,000.

LIST OF PRIZES.

1 Real Estate worth	\$5,000	\$5,000
1 Real Estate worth	2,000	2,000
1 Real Estate worth	1,000	1,000
4 Real Estates	500	2,000
10 Real Estates	300	3,000
30 Furniture Sets	200	6,000
60 Furniture Sets	100	6,000
200 Gold Watches	50	10,000
1000 Silver Watches	10	10,000
1000 Toilet Sets	5	5,000

2307 Prizes worth \$50,000

Tickets, \$1.00!

Offers are made to all winners to pay their prizes cash,
less a commission of 10 p. c. Winners' names not published
unless specially authorized.

S. E. LEFEBVRE, Secretary.

Office: 19 St. James St., Montreal, Can.

W. Blakemore, F.G.S., M.E.,
Member of I. & S.I.

A. Montgomery Evans, M.E.
of Canada & U.S.

**BLAKEMORE & EVANS,
MINING & CIVIL ENGINEERS**

Exchange Buildings, Cardiff, S.W.

LONDON OFFICE:

Robert H. Jones, 82 Queen St., Cheapside, London, E.C.

Reports, Estimates, and Valuations made on Iron and Steel Works,
Blast Furnaces, and all classes of Mining Properties.

CANADIAN BUSINESS PROMPTLY ATTENDED TO.

To Prevent Boiler Explosions

And other accidents to steam boilers, and to secure
economy in working, insure with

**THE BOILER INSPECTION
AND INSURANCE COMPANY OF CANADA.**

Sir Alex. Campbell, K.C.M.G., | John L. Blaikie, Esq.
President. Vice-Pres.

HEAD OFFICE: TORONTO

G. C. ROBB, Chief Engineer.

A. FRASER, Sec'y-Treas.

ORFORD COPPER CO.,

COPPER SMELTERS.

Works at Constable's Hook, N.J., opposite new Brighton,
Staten Island. Copper Ore, Mattes, or Bullion
purchased. Advances made on consignments for re-
fining and sale. Specialty made of Silver-Bearing
Ores and Mattes.

SELL

INGOT AND CAKE COPPER.

President, **ROBERT M. THOMPSON,**

Treasurer, G. A. LAND.

Office, 37 to 39 Wall Street, New York.

Robin & Sadler,

MANUFACTURERS OF

LEATHER BELTING.

TRY OUR

Waterproof Belting,

Just the thing for Mining Machinery.

MONTREAL, TORONTO,
2518, 2520, 2522 Notre Dame St. 129 Bay Street.

Diamonds, Jewelry, Watches & Silverware

AT ROSENTHAL'S

Goldsmith's Hall, 87 Sparks St.

OTTAWA.

T. D. LEDYARD,

DEALER IN MINERAL LANDS

4 ONTARIO CHAMBERS, TORONTO.

Will buy undeveloped iron ore and other mineral properties.
WANTED. — Deposits of Magnetic Iron Ore, Red Hematite,
Brown Hematite, Galena, Iron and Copper Pyrites, Mica, Soap-
stone, Marble, Gypsum, Baryta. Samples can be sent by Sample
Post for 1 cent for 4 oz. or up to 24 oz. in weight.
Information regarding mines cheerfully given. Correspondence
solicited. Crown Land Business attended to.

CHEMICAL APPARATUS!
OF EVERY DESCRIPTION.



Glass, Porcelain, Stoneware, Platinum Crucibles of every sort, Analytical Scales and Weights, Fine Chemicals and Reagents, including Volumetric Solutions. Every requisite for Analysis or Experiment. For Sale by

LYMAN, SONS & CO.,
384 St. Paul St., Montreal.

Illustrated Catalogue mailed on receipt of 10c. or Business Card.

Boiler For Sale.

AN EIGHTY H.P. TUBULAR STEEL BOILER made by W. C. White, Montreal, 15 ft. x 5 ft. 4 in.—eighty 3½ in. tubes; smoke stack 45 ft. long; guyards and guys. Very little used. Equal to new. Price on cars, \$600. Address

P. O. Box 6,
MONTREAL.

IMPROVE YOUR HEALTH

And INCREASE your MUSCULAR DEVELOPMENT
By taking REGULARLY

JOHNSTON'S



FLUID BEEF.

The most strength-giving food for
YOUNG or OLD or for the SICK or HEALTHY.

Victor Electric Fuses.

Superior to all others for Exploding any make of Dynamite, High Explosives, or Gelatine Powder. Each Fuse is tested and warranted extra strong and waterproof. Low grades of Dynamite Powder will do ten per cent. more execution if detonated with Victor Electric Fuses.

VICTOR BLASTING MACHINES.

Latest improvements, made in three sizes, easy to operate, strong and durable. No expensive repairs, low in price, will fire any make of Electric Fuses.

MANUFACTURED ONLY BY

JAMES MACBETH & CO.,

128 Maiden Lane, N.Y., U.S.A.

Send for Catalogue.

FOR SALE.

A COAL MINE IN CAPE BRETON,

Area, 970 acres, underlaid by 6 or 7 beds of the best Coal in Nova Scotia. The property is estimated to contain from 50 to 60 million tons of Coal. No Coal Mine can be more easily or cheaply operated. The angle of dip is 6 degrees, and the rock stratification is remarkably even and without fault or break.

Apply to

ALEXANDER CAMPBELL,
Annapolis Royal, N.S.

JOHN D. FROSSARD, B.S., M.E.

MINING ENGINEER & GEOLOGIST,

30 St. Francois Xavier St., - - Montreal.

Specialty—Phosphate Lands.

LEDOUX & COMPANY,

10 CEDAR ST., NEW YORK,

Engineers, Metallurgists & Assayers.

Public Ore Sampling & Storage Works

All the principal buyers of furnace materials in the world purchase and pay cash against our certificates of assay, through New York banks.

By special permission of the Secretary of the Treasury of the United States, cars of ore or copper matte passing through in bond can be opened and sampled at our works.

Consignments received and sold to highest bidder. Send for circular giving full particulars.

Mines examined and sampled. Assays and Analyses of all kinds.

A Remarkable Hoisting Record—On March 26th the J shaft of the Chicago, Wilmington, and Vermilion Coal Company, at Braidwood, Illinois, hoisted 1,655 tons of coal in 9½ hours. This, while the best hoisting record yet made, is said to be not the maximum, and it is expected to run this up to 2,000 tons in the near future. The J shaft is 92 feet from the surface to the coal, and it was sunk in 17 shifts in 1885. There are 200 rooms in it and about 700 miners are employed. The shaft is equipped with Cherry's self-dumping cages, and Ramsay's box-car trimmer. The cages are raised and lowered by a double hoisting-engine with 14-inch cylinders, 18-inch stroke, geared to a drum 6 feet in diameter. The following is a detailed statement of the work done: Average weight of pit cars, 1,408 lbs. Tons per hour 174.22. Tons per minute, 2.90. Pit cars per minute, 4.12. Miles run by cages 106.62. This shows that to hoist 1,655 tons nearly 2,350 mine-cars were hoisted.

A New Use For Graphite.—A new use of Graphite consists in its application to wire rope. Wire rope is expensive, and is rapidly coming into a much larger consumption. It is largely used in distant fields and mines, where break-ages cost double and treble the usual expense of repair, so that a wire rope preservative is literally a boon. This is found in Graphite. The Graphite must be pure and only the flake is useful. This graphite is then prepared by the same firm in a grease which makes the application of the Graphite to the wire rope easy. Have a tinsmith make a tin tube, trumpet shaped, the small end just large enough to fit the circle of the rope, the other end large enough to carry two or three pounds of the Graphite grease. The rope travelling through this tube will coat it nicely—one coating in two weeks is enough, and this practice alone will double the length of life of the rope. The graphite prevents the wire from rusting—it saves the rope from abrasion when striking hard substances; it also prevents the wires forming the rope from abrasion one against the other as the Graphite finds its way into and fills the minutest spaces and is held there by the fatty substances in the mixture. The facts above are furnished from his own experience by one of the leading mining engineers of the country.

ALEX. RANKIN,

20 Toronto Street, Toronto Ont.

Agent for sale of Mines and Mineral Lands.

CORRESPONDENCE SOLICITED.

Agents in England and New York.

E. H. SARGENT & CO.,

IMPORTERS AND DEALERS IN

ASSAYER'S MATERIALS,

Chemicals and Laboratory Supplies.

125 State Street,

CHICAGO.

HARRIS & CAMPBELL

Latest Designs in Drawingroom, Diningroom and Bedroom

FURNITURE

With improved Steam Machinery our facilities for manufacturing Cabinet Goods are complete. Our upholstery Department is well stocked with latest imported patterns.

Corner **QUEEN & O'CONNOR Sts.**
OTTAWA.

THIS YEAR'S

MYRTLE

CUT AND PLUG

Smoking Tobacco

FINER THAN EVER.

SEE

T & B

In Bronze on Each Plug and Package.

THE DOMINION

SAFETY BOILER CO.

MANUFACTURERS OF

The "Field-Stirling" Patent High Pressure Boiler,

The Safest and Cheapest Steam-Generator now in Use.

This Boiler is unusually durable, being made of the best steel and wrought iron exclusively. No cast-iron is employed. It is simple in construction, has a rapid, well-defined circulation, and a large cool mud-drum, where all impurities are collected to be blown off. All parts of the Boiler are readily accessible for the closest inspection. It has great excess of strength and is not liable to be strained by unequal expansion. The water space is divided into sections so arranged that NO EXPLOSION IS POSSIBLE.

Some of Our Leading Customers:

The J. A. Converse Mfg. Co. (A. W. Morris & Bro.), Montreal; The Canada Sugar Refining Co., Montreal; The Pillow and Heisey Mfg., Montreal; The Berthier Beet Root Sugar Co., Berthier, Que.; The Imperial Insurance Co., Montreal; The Massey Manufacturing Co., Toronto; The Acadia Coal Co. (Ltd.), Stellarton, N.S.; Canada Paper Co., Windsor Mills, Que.; Royal Electric Co. (Central Station), Montreal; Dodge Wood Split Pulley Co., Toronto, and a repeat order from A. W. Morris & Bro., after five months' experience; Ingersoll Rock Drill Co. of Canada.

We guarantee Dry Steam and Great Economy of Fuel. Correspondence Solicited.

J. FRASER TORRANCE, M.E.,

P.O. Box 1707, Montreal.

Manager.

If you want

BAGS

FOR PACKING

ASBESTOS, PHOSPHATES, ORES, &c.,
Send to us for Samples and Prices.

Every quality and size in stock.

Specially strong sewing for heavy materials.

Lowest prices compatible with good work.

We now supply most of the Mining Companies, and those who have not bought from us would find it to their advantage to do so.

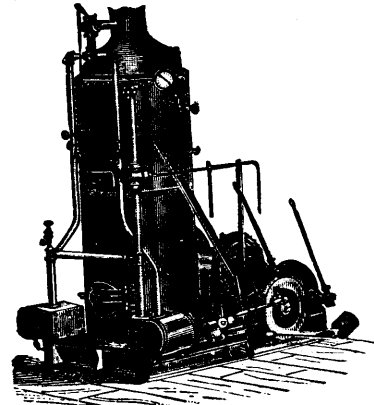
THE CANADA JUTE COMPANY (LTD.)

17, 19 & 21 ST. MARTIN STREET,

Established 1882.

MONTREAL.

M. BEATTY & SONS,
WELLAND, ONT.



HOISTING
ENGINES

ENGINES

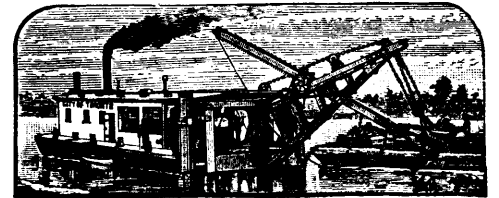
FOR
Mines

AND
Inclines

Horse-Power Hoisters,

Stone Derrick Irons,

Centrifugal Pumps.



DREDGES,

DERRICKS,

STEAM SHOVELS,

And other Contractors' Plant.

AMALGAMATING MACHINERY.

Stamp Mills for Wet or Dry Crushing. Huntington Centrifugal Quartz Mill. Drying Cylinders. Amalgamating Pans, Settlers, Agitators and Concentrators. Retorts, Bullion and Ingot Moulds, Conveyors, Elevators, Bruckners and Howell's Improved White's Roasting Furnaces, Etc.

CONCENTRATING MACHINERY.

Blake, Dodge and Comet Crushers, Cornish Crushing and Finishing Rolls, Hartz Plunger and Collom Jigs. Frue Vanner & Embrey Concentrators, Evans', Calumet, Collom's and Rittenger's Silice Tables, Trommels, Wire Cloth and Punched Plates. Ore Sample Grinders and Heberle Mills.

FRASER & CHALMERS, MINING * MACHINERY.

Improved Corliss and Slide-Valve Steam Engines,
Boilers--Horizontal, Vertical and Sectional,

IMPROVED STEAM STAMPS.

Hoisting Engines, Safety Cages,
Safety Hooks,
Ore Cars, Water and Ore Buckets,
Air Compressors, Rock Drills, Etc.
General Mill and Mining
Supplies, Etc.



Pumping Engines and Cornish
Pumping Machinery,
Improved Water Jacket
Blast Furnaces for Calena and
Copper Ores.
Slag Cars and Pots,
Roots & Baker Pressure Blowers,
Suspended Tramways.

Sectional Machinery for Mule-Back Transportation.

General Offices and Works: **FULTON & UNION STS., CHICAGO, ILL.**

BRANCH OFFICES: NEW YORK, Room 43, No. 2 Wall St. DENVER, COLO., 1316 Eighteenth St. SALT LAKE CITY, UTAH, 7 West Second South St. LONDON, ENGLAND, 23 Bucklersbury, E. C. CHIHUAHUA CITY, MEXICO, No. 11 Calle de Juarez. LIMA, PERU, South America. JOHANNESBURG, TRANSVAAL, South Africa.

The Canadian Mining Review

CONDUCTED BY . . . B. T. A. BELL

OFFICES:

UNION CHAMBERS, 14 Metcalfe St.

OTTAWA.

Vol. VIII. JUNE, 1889. No. 6.

Notice to Correspondents.

Being desirous of publishing our next issue on the 15th inst., our Correspondents will greatly oblige by furnishing their usual Contributions *not later* than the 12th July.

Scientific Agriculture.

The publishers beg to announce that the Review's Annual Exhibition Supplement will be entirely devoted this year, to the subject of scientific agriculture, particular emphasis being laid upon the value and importance of Canadian phosphates and phosphatic manures as a means of enriching the soil. Arrangements have been made for a series of articles of special interest to the Canadian farmer, among them the following:

Agricultural Fertilizers—By Dr. FRANCIS WYATT, New York.

The Soil—By ANDREW H. WARD, Agricultural Editor of the *Boston Herald*.

The Application of Finely-Ground Phosphate of Lime—By Prof. A. F. GUERARD.

The Occurrence of Phosphates in Nature—By Dr. G. M. DAWSON, Assistant Director Geological Survey of Canada.

Nitrates v. Phosphates—By W. H. IRWIN, London, Eng.

The Importance of Phosphates and Phosphatic Manures to the Canadian Farmer—Excerpted from the various Official Reports of the Hon. JOHN CARLING, Minister of Agriculture.

It has been decided to furnish every farmer in the provinces of Ontario and Quebec with a copy of this issue.

Readers of the Review desirous of obtaining extra copies for distribution among their friends will please send in their orders now, in order that due provision may be made before going to print.

Advertisers desirous of reaching the mining and agriculture classes will find this issue a valuable medium, admirably adapted to their purpose; contracts are being made now, and the spaces are rapidly filling up.

Mineral Wealth of British Columbia.

The Report of Dr. George M. Dawson, F.G.S., Assistant Director of the Geological Survey of Canada, on the mineral wealth of British Columbia, is so complete in its general bearings, viz., history, geography and geology of that country, that all who may have the privilege of reading it cannot fail to be interested and instructed; and particularly those who are now, or have been engaged in mining pursuits; and to such, the fact that so much mineral has been, and is being wrought, must be astounding.

There can be no manner of doubt as to the future of this new country ranking with the foremost countries of the world in a commercial point of view, and at a very early date; particularly so, as the facilities for transportation by land and sea are now complete, and thereby linked with the whole world.

In a concise form, reference will be made to the enormous wealth in gold, coal, and other minerals that have already been taken out in past years, when transportation in that country was confined to the old principles of portaging and land carriage, to say nothing of the crude mining appliances used by miners in those early days.

Comparing this imperfect and defective machinery with that of to-day, which science and practice have perfected, and which enables the miner and mill man to overcome difficulties that in those early days would have been insurmountable.

These improvements, coupled with the rapid developments of this country, should induce us to accept this field as one demanding our immediate attention, time and money.

The Report is the result of very careful investigation and compilation, and shows an utter absence of the desire to "boom." It savors of modesty and truthfulness throughout, and is written, as it states, with a twofold object, viz: Firstly, "As an exponent of the mineral wealth, and to provide an answer of a general kind to enquiries so frequently made; and secondly, "designed to place in the hands of the prospector or miner a constant synopsis of facts."

The Province of British Columbia has an area of 390,344 square miles, includes a length of 800 miles of the Corderilla mountain belt, a region of mountains very much disturbed geologically, and which has, between the Pacific Ocean and the elevated margin of the great plains, a breadth averaging about 400 miles. The mountain range extends north east and south-west, and represents the northern continuation of the most important metalliferous area of the United States.

The "Corderilla belt" in British Columbia has four great mountain systems, which run nearly parallel to each other and the coast, and known as "The Rockies," "The Gold," "The Coast," and "The Vancouver" ranges.

1st. The Rocky Mountain range is the furthest inland, and has an average breadth in the southern part of about 60 miles, but this is decreased near the Peace River to 40 miles or less.

Near the 49th parallel several summits occur in this range which exceed 10,000 feet in height, but above the sources of the North Saskatchewan and Athabaska the range appears to culminate, the mountains "Prown" and "Murchison" occur with separate heights of 16,000 feet and 13,500 feet respectively.

More or less snow fields occur in many places, and true glaciers are found at the heads of the

Bow, North Saskatchewan and Athabaska rivers.

The mountains are well timbered wherever sufficient soil exists for the support of the trees, and owing to the greater rain fall on the western slopes of the range, the forests are there very dense.

The geological formation of this range is somewhat varied. Crystalline slates and granites are scarcely known in any part of this range between the 49th and 60th parallels. The rocks belonging to the Cambrian and carboniferous formations being about 28,000 feet in thickness are found in the Bow River region carrying deposits of copper and galena. There is also found basins of rocks of the Cretaceous age, and in these beds anthracite and bituminous coals are found.

On the south-west side of this range is a straight wide valley, traceable for 700 miles from the 49th parallel to the head waters of the Peace River. It is watered by the sources of the Kootanie, Columbia, Fraser, Parsnip and Finlay rivers.

Placer gold has been found and worked at a number of points along this valley, and important discoveries of various ores are now being made near Upper Columbia and the Upper Kootanie rivers.

2nd. The next mountain system is to the south-west of the "Rocky" Mountain, and referred to as the "Gold" range. The Purcell, Selkirk and Columbian ranges constitute its southern part, while to the north lie the Cariboo, Omenica and Cassiar mountains. The highest mountain is Mount Donald, measuring 10,645 feet in height, and lies on the line of the Canadian Pacific Railway. Granites and slates of old ages, together with great masses of palæozoic rocks, prevail in this range, and it may be regarded as the most important metalliferous belt of the province. Discoveries have already been made of gold and silver ores; also of argentiferous galena.

Between this range and the coast range lies the interior plateau of British Columbia, having an average width of 100 miles, and lies at an elevation of 3,500 feet. It is traversed in various directions by a system of trough-like valleys of erosion, generally occupied by streams and rivers.

The tertiary rocks of this plateau hold in many places beds of lignite. These plateaus also present some important granitic areas. As a metalliferous region it is destined to take high rank. Placer gold deposits have been worked, and platinum is abundant in the Similkameen region.

The Cascade range of Oregon and Washington is largely composed of eruptive volcanic material, to which its characteristic features are due (viz., Cascade), though these materials rest upon a basis of older rocks.

Near the mouth of the Fraser River its place is taken by a new mountain system geographic,

ally and geologically distinct, in the composition of which volcanic ejectamenta play no prominent part.

3rd. The "Coast" range has an average width of 100 miles, and consists of numerous constituent ridges. The altitudes of the higher summits are from 6,000 to 7,000 feet. Glaciers are of frequent occurrence and of large size. The mountains are rugged and well timbered. Geologically this range owes the greater part of its elevation to a period later than the Cretaceous, of which formation patches are found in them at great heights. The rocks consist of grey granites and gneises and other crystalline schists, as well as palaeozoic. In the latter rocks gold placers occur locally, whilst copper and iron ores are frequently found, and rich silver ores have been discovered.

4th. The "Vancouver" range is to a considerable extent formed of crystalline rocks like those of the coast ranges, principally composed of the Palaeozoic and Triassic age, and is flanked in places (both in Vancouver and on Queen Charlotte Islands) by Cretaceous rocks, which are important because of their coal bearing character. The areas underlaid by these rocks are generally comparatively low and hilly rather than mountainous, while a large tract of level land based upon the Tertiary formation occurs in the north-east part of Queen Charlotte Island. Gold placers have been worked in several places in Vancouver, but few ever attained much importance. Iron, copper, lead ores and gold bearing quartz have been discovered, but up to the present time the coal deposits have proved to be vastly its most important feature.

British Columbia first rose from the position of a fur country to the rank of a colony on the discovery of gold upon the Lower Fraser in 1858. Its subsequent history for a number of years is substantially that of the sudden rise and subsequent slow decline in importance of placer gold mining. Coal mining has, however, concurrently advanced slowly but steadily till it has attained its present pre-eminent position. With respect to vein mining proper we have as yet to chronicle merely the first steps; but in the southern part of the province the completion of the Canadian Pacific Railway has at length forwarded the necessary impetus in this direction. Everything which has been ascertained of the geological character of the province as a whole tends to the belief that so soon as similar means of travel and transport shall be extended to what are still the more inaccessible districts, these also will be discovered to be equally rich in minerals, particularly in the precious metals gold and silver. In the southern district, for which information is most complete, praiseworthy efforts are now in progress at a number of widely separated localities, toward the exploitation of ores, which in many cases have already been proved to be of an exceptionally valuable character. Hence it is, that every reason is entertained for witnessing the inauguration of an

era of mining activity of the most important kind.

While it is affirmed that gold is very generally distributed over the entire area of the Province of British Columbia, so much so that scarcely a stream of any importance in which at least colour of gold may not be found, the principal discoveries of important mining districts have been found along the systems of mountains and high plateaux which comprise the Purcell, Selkirk, Columbia and Cariboo ranges and their north-western continuations lying to the south-west of the Rocky Mountain range. Of all the gold producing districts, that of Cariboo has proved the richest and steadiest producer. The estimate of the yield of gold from the year 1858-1888 being \$54,108,804. The whole of this amount, with the exception of a small quantity of bullion (obtained from a quartz mine) is entirely due to placer mining.

The condition of workable auriferous lodes yet remain to be studied in detail and discovered as the development of mining of this kind progresses.

With regard to the silver ores of British Columbia, there is every reason to believe that before many years elapse the province will take its place as one of the great silver producing regions of the world.

Argentiferous galenas appear to be the most abundant ores, and the knowledge of these already obtained is sufficient to enable the silver belt to be traced from point to point from the international boundary north-westward to the 60th parallel of latitude (forming the northern boundary of the province) and beyond it to Forty Mile Creek, where the Yukon leaves the North-West Territory to enter Alaska. The belt thus defined is about 1200 miles long, and wherever it has been explored and prospected highly argentiferous galena ores have been found. Most of the discoveries so far made are those in the southern part of the belt, within easy distance of the Canadian Pacific Railway, and from analyses made these ores are in some cases exceedingly rich, running from 100 to 1700 ounces of silver to the ton, besides carrying gold, copper and lead in good percentages. In these same districts cinnabar and copper ores have been found.

To those of our readers unacquainted with this country it will be surprising to learn that there are four large collieries in full operation, employing 2000 miners. The output for these collieries since 1853-1888 is about 4½ million tons, the markets being California, San Diego, Oregon, Alaska, Hawaiian Islands, China, Japan, besides Her Majesty's naval and other mail and trading steamers.

The analyses given of these coals are very surprising, being equal and in many cases superior to the North of England and Welsh coals. It is claimed that the evaporation power is 13.41 lbs. water per lb. of fuel. In practical work 9 lbs. is about the highest service attained, but 13.41 lbs. can be got by experiment.

The anthracite coals analyse very well, but do not (as claimed) compare with the Pennsylvania anthracites, but are, at the same time, a good marketable coal.

Carbonate iron ores are found in this coal formation. These, with the mixtures of the magnetites and hematites should produce a good pig-iron and start the manufacture of finished iron and steels.

The building stones found at the different places, such as the pink and grey granites, sandstones in variety, together with marbles of all hues, are pronounced of good quality and well suited for construction purposes.

In conclusion, it is to be hoped that wise and proper means will be adopted to preserve the high standard of merit that this new field possesses, in order that confidence when established may be maintained, and that the prospector, the miner and capitalist may work harmoniously together, having for their motto "Unity is strength."

LETTERS TO THE EDITOR.

Coke, or Charcoal?

The Editor

THE CANADIAN MINING REVIEW:

SIR,—The text of a bulletin, in which the progress of smelting at the Sudbury Copper Mines has been connected with the announcement of a proposed coke iron furnace at Trenton, Ont., and all to show the necessity for the free importation of coke, has been going the rounds of the press. It is most desirable to afford every facility for the reduction of ores, and if the importation of coke is essential to attaining economic results for the enterprises springing into life in the Lake Superior District, few would attempt to gainsay the calculations of experts who have doubtless considered the fuel question which heads this paper, "Coke, or Charcoal?" It is not therefore intended to offer any objection to the proposal to import coke, if such is intended. But it happens that the mineral interests of the Dominion affect a wider constituency than the United States, and to all our trans-atlantic friends who buy copper stocks or who may contemplate investment in Canadian mines the proposal to import a foreign manufactured fuel, rendered costly by long inland transportation before it reaches lake navigation, will at once give rise to the question, are there no forests in Canada? Whatever the opinion entertained by American experts on the merits of coke fuel, it is a matter of duty to communicate the information that within sight of Sudbury, and within a very few miles from any iron or copper mine in the Province of Ontario, are immense forests of the best hardwood fuel, and that charcoal kilns can be erected and the fuel manufactured of the best quality at a varying cost of \$6 to \$7.50 per ton of 2000 lbs. for hardwood coal, and \$2.90 to \$4.50 for softwood coal.

The historic fuel for copper is charcoal. Overman says that certain Norway and Sweden brands of copper are remarkable for their purity, testifying to the careful metallurgy attained by the people of these countries with

charcoal fuel in the manufacture of copper as in iron. The copper reduction processes of Germany as described by Ure are made with charcoal. The highest quality the smelter can turn out is demanded by the electrician, and it would seem that his requirements may be best attained by the use of charcoal. "The higher temperature at which reduction proceeds carries more impurities into the metal," is the theory of Belani for the relative inferiority of coke to charcoal. And this higher temperature is due to the greater pressure of blast necessary for the combustion of coke, and is attended with a greater consumption of fuel. The surface presented by charcoal in the fissures and intercellular spaces in its structure is $5\frac{1}{2}$ times that of coke, and the rapidity of its ignition is as $1\frac{1}{2}$ to 1. A test conducted at Kingston, though not conclusive, supports the view that good hardwood charcoal in a horizontal fire will decompose jets of superheated steam effectively, and work quite as well as anthracite in the manufacture of water-gas. An attempt to generate the gas from steam passed through coke was a failure.

It is difficult to see why copper should be smelted with coke at Sudbury, Ontario, in the presence of abundant supplies of wood, when the silver smelting furnaces of Colorado are reported to be using "seven and a half millions of bushels of charcoal annually, which is made in meliers and kilns from Pinon pine, balsam and spruce wood, much of it dead timber from burned tracts." If the reason is that there are no charcoal-burners there will be no difficulty in importing them from Sweden. The Government of that country maintains a "School for Charcoal-Burners," in which the theory and management of meliers is taught, and so successfully that it is claimed that Swedish charcoal made "under dust" is superior to that obtained from American kilns, and the product equal in quantity.

Prof. Kerpely, a Hungarian expert of continental repute, in a report on the iron industry of his country in 1884, gives some information on a state of affairs there to a great extent on all fours with the fuel question in this country. He says: "The demand for raw material (for forges and mills) can only be met by increased imports or by building new blast furnaces. The Government is putting up two furnaces at Vajdahunyad. Until now 45 charcoal furnaces were running; in the future there will be 48. I cannot pass over the fact that some leading men who assume to be experts in iron-making, and unfortunately are acknowledged by many as such, have insisted recently that works using charcoal as fuel are doomed. According to these gentlemen, the majority of our blast furnaces, and those of our mills and forges using charcoal, should be demolished, and our iron industry be simply turned over to our competitors of neighboring countries. But these gentlemen know only too well that there are in Hungary more than 5,700,000 acres of forest, the greater part of which is only of use to iron manufacture. Even its use for building timber is profitable only when accompanied by using the waste for the manufacture of charcoal; foresters insist upon clearing the ground of this waste, and therefore both combined not only lead to a low cost for the charcoal, but even yield a small profit. It is certain that one half of the timber in our forests is beech, which can only be used as cordwood. The fact that the greater part of these forests is remote from the iron manufacturing districts is not nowadays an obstacle to the transportation of the charcoal, because a large part of the forests is within reach of our railroads, and because the adminis-

tration of the latter, in their own interests and in that of our iron industry, have put the rates so low that a number of works can now draw a large supply of charcoal from remote districts. Thus, forest areas which have been unproductive for decades can be worked to a profit, and a living is assured to thousands, besides increasing the taxable value of property. The importance of this movement from an economical point of view needs no further discussion. The manufacture of charcoal pig-iron does not therefore deserve adverse criticism, but should have the support of the trade and of patriotic men, particularly because the iron thus produced is far superior in quality to that smelted with coke or coal, and secures to us foreign markets. Even if decades from now, we were the only producers of charcoal pig-iron, after the latter has become scarcer and scarcer, and the demand has grown for certain purposes, that would not alone be a disadvantage, but would be a positive advantage, and with this prospect before us we should not diminish our production of charcoal pig-iron or ever abandon it."

In the place of Hungarian beech we have the Canadian maple, covering millions of acres of no value except for the manufacture of iron, or other smelting purposes. Made into charcoal, the process of coaling offers to the owners for every acre chopped and hauled to the meliers or kilns from \$30 to \$60, according to the amount of wood obtained. The importation of coke for copper or iron smelting offers to Ohio colliers and coke-burners and to American railroad and vessel owners a yearly increasing tribute from the industry of this country. And yet the profits which these proposed coke furnaces would forego may be found printed in every trade journal. "The Plymouth, Mass., rivet manufacturers use largely Swedish iron, which comes in the form of iron rods. They pay a duty of \$12 a ton of 2000 lbs. for 5 gauge upward, and below No. 5 a duty of 45 per cent. *ad valorem*. The rods cost from \$65 to \$70 per ton of 2240 lbs. The Swedish or Norway iron wire costs about twice as much as American wire." Here are the latest prices of No. 1 charcoal and coke iron per ton in the United States:—

CHICAGO.	
Lake Superior Charcoal	\$18 50
Tennessee do	19 00
No. 1 Coke	16 00
Southern No. 1 Coke.....	15 75
CINCINNATI.	
Hanging Rock Charcoal	\$21 00
Tennessee and Alabama Charcoal	18 00
Hanging Rock cold blast "	25 00
Southern Coke	14 50
Ohio Soft Coal.....	16 00
CLEVELAND.	
No. 1 Lake Superior Charcoal	\$20 50
No. 1 Am. Scotch.....	18 00
LOUISVILLE.	
Southern Car Wheel.....	\$22 75
Hanging Rock No. 1 Charcoal.....	21 00
No. 1 Southern Coke	14 75

Much might be said for processes which largely reduce the cost of charcoal fuel, such as Dr. Pierce's system of wood distillation, which is successfully operated in the United States. But as this would involve the presentation of technical details at some length, the subject is reserved for a future issue. The question, shall our metallurgical industries be operated with foreign coke or home-made char-

coal is one worthy of attention on every hand. It is simply the question whether our forests shall be of any value in the development of those industrial enterprises which it is the hope of the people may shortly arise to take away our reproach that we are a country of producers of raw material, and with the best iron ore and the best fuel in the world, know not how to make iron.

J. BAWDEN.

KINGSTON, 15th June, 1889.

A Visit to Port Arthur and the Silver Mountain Mining District.

To the Editor:

THE CANADIAN MINING REVIEW:

SIR,—Your correspondent having taken a trip with some friends to the Silver Mines, south west of Port Arthur, I have much pleasure in giving your readers a short account of our trip.

We left Toronto at 11 o'clock, p.m., per the C. P. R., on Thursday, the 25th April, arriving at Port Arthur, a distance of 857 miles, on Saturday, the 27th, enjoying a very pleasant journey. The scenery on the north shore of Lake Superior is very grand. Resting a few days at the Northern Hotel, one of the finest summer resorts in Canada, we started for the mines by train to Murillo Station on the C. P. R., thence by stage some twenty-eight miles to Silver Mountain, remaining over night at the Half-way House. In the district the following named mines are being worked:—The Beaver, Badger, Palisades, Queen, Silver Wolverine, Silver Fox, Elgin, Porcupine, Silver Creek, Big Bear, Silver Victoria and others, some of them turning out ore to the value of \$01,000.00 and upwards to the ton of 2,000 lbs.

The West End mine of Silver Mountain which has been actively developed, during the past year is rapidly becoming one of the largest and most valuable silver mines in the country. The mine is being opened in four places by shafts, drifts and cross cuts. The main shaft No. 1, now down about 290 feet, has been in continuous ore from the surface, and the levels which are run both east and west on the vein from this shaft, at a depth of 100 feet are all in ore, a part of which is very high grade. In shaft No. 2 a large body of high grade ore was struck a few feet from the surface, and at a depth of 60 feet drifts are being run east and west on the vein, the extent of this ore body is not yet known, it had been opened 70 feet in length, at date of our visit, and as work progressed was getting larger and richer, the bottom top and sides of the levels showed masses of native and sulphide silver assaying from 3,000 oz. to 20,000 oz. per ton. The other workings are not so extensive as the two last mentioned, but show a large strong fissure vein and considerable good ore which is continuous and will doubtless improve with depth. The mine is supplied with steam hoisting and pumping machinery, and the buildings; some twenty or more, are substantial and convenient.

The property consists of 240 acres of land $\frac{3}{4}$ of a mile on the vein, and is admirably situated for working purposes, has good water, and an abundance of timber for fuel and mining purposes. The Port Arthur, Duluth and Western R. R. which is to be built this season will pass this property. At this mine samples of ore are being produced equal to anything that ever came out of Silver Islet, pink ore, and in fact the same class of ore in every particular. The West End from its formation is destined to be a great

mine. The east end of Silver Mountain (Shuniah Weachu) is also turning out a large body of very rich ore. Crown Point, just north of Silver Mountain is also showing good results, rich ore being shipped to the United States from this mine.

Adjacent to Silver Mountain and Crown Point Mine is one of the most promising locations in the whole district known as R. 64 and has eight lodes crossing it, one being a continuation of the Silver Mountain lode and another that of Crown Point. This location is about to be opened up and, it is believed, will be found one of the richest mines in the district.

West of Silver Mountain is being found rich ore and some considerable work has been done. After a very enjoyable visit and being hospitably entertained by Captain H. K. Nichols and Mr. Woodruff, we started on our return for Port Arthur, and sailed from there by the Athabaska, one of the Canadian Pacific Railway Company's splendid steel steamships which traverse with safety and rapidity these magnificent inland seas of Canada. Arriving at Sault Ste. Marie about 11 o'clock at night, I and the other passengers were attracted by the brilliancy of the electric light on the Canadian side. The town is lighted with the Heisler system of incandescent lights and these at a distance of over a mile from where the vessels lay were most brilliant, the buildings being quite easily discernible. Upon enquiry we found that 100 lights cost the town \$4.00 per night. This town is growing very rapidly owing to the fact that a new canal is being built on the Canadian side, as well as the C. P. Ry. having a branch road terminating there. We arrived in due time at Owen Sound, thence taking the train for Toronto.

Much surprise is expressed at the want of enterprise of the Canadian people, who allow the English and American capitalists to come in and capture the untold millions which lie slumbering in the silver mountains of the Thunder Bay mining district. Thoroughly enjoying the trip it is our intention to again visit the district, and we would recommend all our Canadian friends who can possibly do so, not to let the present summer pass without a visit to the mines, if only for the health giving properties of such a trip and to see for themselves the magnificent mines of silver, and the wealth that they will yield in the near future. Some of the finest (well timbered) farm lands in Canada are to be found in the valley of the White Fish River. This beautiful valley is about forty miles long and about seven to ten miles in width, a few miles west of Porth Arthur.

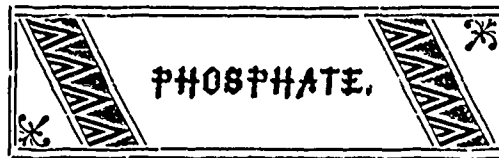
Yours truly,

GEO. A. SHAW,

Lt.-Col. H. M. M's. Vice-Consul.

Toronto, 29th May, 1889.

Soapstone and its Uses.—A writer in a London journal calls attention to the unappreciated uses and preservative qualities of Soapstone, a material, he says, which possesses what may be regarded as extraordinary qualities in withstanding atmospheric influences those especially which have so much to do with the corrosion of iron and steel, and from experiments made it is said that no other material is capable of taking hold of the fibre of iron and steel so readily and firmly as this. In China, Soapstone is largely used for preserving structures built of sand-stone and other stones liable to crumble from the effect of the atmosphere.



Shipments.

The following have been the Shipments of Canadian Phosphate to British and European ports since our last issue:—

Date.	Vessel.	Destination.	Shipper.	Tons.
May 15.	S.S. Colina.	Glasgow.	Wilson & Green.	22
" 20	" Oxenholme	Liverpool.	" "	305
" 20	" Fremona.	London.	Millar & Co.	375
" 22	" Alcides.	Glasgow.	Lomer, Rohr & Co.	400
" 22	" Montreal.	Liverpool.	" "	370
" 23	" Castellano.	" "	" "	87
" 27	" Henri IV.	Havre.	" "	150
" 27	" Lake Ontario.	Liverpool.	" "	300
June 1.	" Kurwaider.	Hamburg.	Wilson & Green.	251
" 1.	" Cancopus.	Liverpool.	" "	300
" 1.	" "	" "	Lomer, Rohr & Co.	180
" 5.	" Michigan.	London.	" "	180
" 5.	" Circé.	Glasgow.	" "	180
" 5.	" Lake Superior.	Liverpool.	" "	150
" 5.	" Oregon.	" "	" "	100
" 5.	" Saturnia.	" "	" "	150
" 5.	" Zambesi.	" "	" "	100
	Total			4393

RECAPITULATION.

Lomer, Rohr & Co.	2990
Millar & Co.	375
Wilson & Green.	938
Total	4303 Tons.

Liverpool	2525
Glasgow	822
London	555
Havre	150
Hamburg	251
Total	4303 Tons.

Ocean Freights.

Liverpool freights have been very plentiful, varying from 5 shillings to 7/6, and on one or two occasions even less. On the other hand London freights are extremely scarce, and shippers have to pay the regular liners from 10 shillings to 11/3 and even at these figures no vessels are obtainable, hence the bulk of phosphate is being shipped to Liverpool. There is an accumulation of over 4,000 tons of phosphate rock here in the harbour of Montreal waiting for tonnage.

British Fertilizer Market.

Messrs. Couper, Millar & Company, London, send us the following report:

"The position remains much the same as stated in our last circular, though since the Easter holidays business has been quieter. Nitrate of Soda is very depressed owing to heavy imports, while Phosphates, more particularly those of high test, continue in request even at the advanced prices demanded by sellers.

Mineral Phosphates—Canadian will come forward in larger volume than ever before, and the higher tests are finding a ready market, 80 per cent. we quote at 1/0 1/2, 75 per cent. 11d., and 70 per cent. 10d. per unit, all with one-fifth of 1d. rise. South Carolina enquired for at 9 1/2d. for U. K., and at a proportionate advance for continent. The higher tests of Somme are very scarce but business is being done in the lower grades. Belgian 40 to 45 per cent., and 45 to 50 per cent. is available, but the higher qualities seem to be all bought up. Cambridge Coprolites selling in small lots at 45/6 f.o.r. Bedfords sold forward.

Bone Ash, Bones and Meal—No sales reported afk at, and no demand for bones, though Ash is enquired for and will probably be dearer in harmony with mineral phosphates. Indian bone meal dull at £4 17s. 6d. to £5.

Nitrate of Soda down to £8 5s. per ton and very dull.

Sulphate of Ammonia keeps its position well, to-day's quotation being \$11 17s. 6d. to £12.

Ammonical materials are not affected by nitrate as much as might be expected, the supply of nitrogen from organic matter being so limited.

Dried blood from R. plate sold at Liverpool at 10s. 6d. Fish guano and ground hoofs and horns we are sellers of for prompt and forward.

Muriate of Potash is quoted at £7 4s. on 80 per cent.; Kainit at 23s. 6d. in bulk, 26s. 6d. in bags, and Kieserit at 17s. 3., all f.o.b. Hamburg, subject to open river navigation. Net Cash. Strassfurt weight and sampling.

We have received from Messrs. H. & E. Albert, London, a 4 lb. sample of the Thomas Gilchrist Slag, now largely in use among English agriculturists. A large proportion of the phosphoric acid in this fertilizer is soluble in Citrate of Ammonia, which is considered as valuable as the phosphoric acid soluble in water, in the ordinary superphosphates of lime. The senders inform us that Prof. Johnson of the Connecticut Agricultural Experimental station found in a sample:—19.57% soluble in Ammonium Citrate, 0.30% insoluble. This Fertilizer is sold at 30/6 to 35/ per ton in bags f.o.b., Antwerp or Rotterdam according to quantity, or 35/ per ton Newcastle-on-Tyne according to quantity. An extended reference to this Slag was made in our article "Iron & Phosphates," published in Vol. V., No. 4, June, 1887.

Du Lievre District.

The late showery weather has been much felt in the opencast workings of the phosphate mines on the river, but the shipping of the ore has been regular and satisfactory.

A loaded scow of the High Rock Company was lately sunk off the viage landing at Buckingham in deep water; a contract for raising it at \$450 was taken, and a clam dredge has been successfully employed for removing the ore; diving apparatus will now be necessary.

Proprietors of phosphate lots have continued to be in a state of expectation in consequence of the many enquiries for bonds and promises of sale, but few transactions have been terminated. A cash sale of the Angus McMillan Lots at the Little Rapids, Portland, East, was effected on the 19th inst., and this property will, we understand, be put upon the London market immediately. The price paid, we understand, was \$15,000.

The Glasgow Canadian Phosphate Company's property is being negotiated in England by Mr. A. D. Cameron, of Buckingham. The price put upon it by the liquidators is \$25,000.

Mr. George Attwood, the well known English mining expert, was upon the river on the 12th and 13th instants, and visited several phosphate properties in Portland West, accompanied by Mr. Lainson-Wills. We are gratified to see men of Mr. Attwood's experience and ability giving their attention to the development of our local mineral wealth.

Mr. Lainson-Wills retired from the management of the Canadian Phosphate Company on the 18th inst., but continues his residence in Buckingham for the development of an important phosphate enterprise.

In view of the remarks of the *Star* and other English financial papers, further comment upon the failure to float the Emerald, Central Lake and Lievre River Phosphate Company is

unnecessary. This is but another striking instance of a fairly good investment being swamped by excessive promotion money, and a strong disposition to overestimate the production and value of the properties for sale.

"It is," concludes the *Star*, "no wish or intention of ours to run amuck at all Canadian phosphate properties. Many of these properties are valuable, and may be purchased at reasonable prices, such as will allow good returns to investors. It is because promoters and others are attempting to fast upon the public worthless properties, or, as in the case of the Emerald, properties which, though good in themselves, are swamped with capital, that we think it necessary, in the interests of the industry itself, to speak the truth about them."

We are informed that it is the intention of the owners to put these properties again on the market, with a Prospectus greatly modified in tone, and with the objectionable features characteristic of its predecessor eliminated.

A small force continues to make satisfactory progress with development work at the Little Rapids mines. A number of eminent experts have recently made a close inspection of the workings, and have returned greatly pleased with the appearance of the pits, and all that has been done of late to improve the plant and property. The Rapids were also visited lately by a number of American capitalists who spent a few days at the mines.

Mr. O. M. Harris, who returned from the mines of the Canadian Phosphate Co. on Saturday, reports that things look very well there. He says: "We have struck a very rich deposit of phosphate in No. 1 pit about 100 yards from the Star-Hill Cobbing-House which promises to be very productive after we have got down to a greater depth. Our other pits are all looking fairly well and had it not been for the quantity of rain we have been having all this month our output would have been considerably increased.

Mr. E. W. Ingall, M.E., writes: Mr. James White and party have resumed their Geological and Topographical work in this district. At time of writing the party was heading toward the Templeton region.

Kingston District.

The Foxton mine was opened the first week in May, and with an average of eighteen men has produced 200 tons of 80 per cent. ore. The cost of the same delivered at Kingston not exceeding \$6 per ton. The mine is in a very good condition and has fully carried out the expectations of the owners. The new boiler has just been bricked in, and steam drills and hoists have also been purchased, and we look for a larger output in the near future. The ore is of a fine green quality, fully equal in all respects, to anything produced on the Lievre River.

The Memphremagog Mining Co.—Mr. Chas. C. Smith and Capt. Warne, president and manager of the Memphremagog Mining company, spent last week in New York, and succeeded in making arrangements for shipping 500 tons of ore to be smelted at Elizabethport, N.J. The ore is being mined at the rate of ten to twenty tons per day, and is composed of copper, sulphur, iron, antimony, zinc, and galena. The surface of the vein exposed is 40 feet deep by 1,000 feet long. From the indications the supply of ore is very large.

MINING NOTES.

We shall be greatly obliged to mine owners and superintendents for such authentic reports of their operations as may concern shareholders and the public.

Nova Scotia.

NOTICE.

At the Annual Meeting of the Gold Miners' Association of Nova Scotia, held at Halifax, on 6th March, a resolution was passed adopting the "Canadian Mining Review" as the official organ of this Association. Our readers may therefore rely upon the accuracy of all information published in these columns bearing on the gold mining industry of the Province.

Miscellaneous.

The North Sydney Coal Company, Limited, was registered on the 28th ult., with a capital of £2,800, in £1 shares, to acquire and work coal mines in Nova Scotia. Messrs. W. M. Simpson and F. Roberts are appointed managers both in Canada and Europe, and will be entitled to debit the company with a commission of 5 per cent. on the gross amount of sales and purchases made by them on the company's behalf.

At an adjourned meeting of the Joggins Coal Mining Association held recently, a letter was read from R. G. Leckie, of the Cumberland Coal and Iron Company, of Springhill, stating that he would withdraw the 5 per cent. commission stipulated in his offer, and would allow it to stand at \$200,000 net. After a general discussion, it was decided to adjourn the meeting until the 5th of June, and get in the meantime an expression of opinion from the stockholders on which the meeting might act. The mines, at present, are under lease to the Phoenix Coal Company, and the members of that corporation, many of whom are also shareholders of the Joggins Association, are adverse to the sale, for they are now making money out of the mines, and expect to do still better in the future, as the railroad facilities for shipping will be improved. Should the mines be sold, the Joggins Association will have to pay the present debt and the Phoenix Company for their improvements.

Sherbrooke District.

Matters at Goldenville are very quiet, the only work doing being that of J. H. M. Donald on the old "Mayflower" belt. A force of five or six men are employed all told, and from 200 to 300 tons a month are crushed. The yield is from three dollars to five dollars per ton. Last month gave 29 oz. from 200 tons.

Cochran's Hill.

The work doing here by the English people who have had control of the property for some months past, is very little, some forty feet of shaft and about as much cross-cutting representing development work. It is to be regretted that a more vigorous policy has not been instituted.

Stormont District.

The Palgrave Co. on Hurricane Island are working steadily, and the president of the Co. reports at least one year's reserves ahead. Last month's work produced one hundred and forty-eight ounces from two hundred and eighty tons. Several men were put at surface prospecting the last month but no pay lode has yet been cut.

Messrs. Frazer and Hamilton who were prospecting on Dunn Cove have quit work there, results being discouraging, and now have put their men away to the eastward of the workings of the old Mulgrave vein.

Central Rawdon.

The Northup Lode in this district continues to yield large monthly returns, the product for May being 350 ozs. The lode is believed to be a fissure, as it runs obliquely to the course of the country rock, having a north and south course with an easterly dip. The shaft is down only 130 feet. The mine is situated in the midst of a fine agricultural country.

Waverley.

The Lake View Mining Co. (which is the new name of the old American Hill property) have nearly completed the work of putting in an Ingersoll-Sergeant straight-line air compressor. It will work four 23" drills. The work of straightening and retimbering the old shaft on No. 6 lode is about completed, the bottom of the shaft having been reached the first week in June. The shaft now measures about 350 feet in depth. Work on the cross-cuts from the bottom of this shaft will commence this month. These cross-cuts (running north and south) are designed to cut the 120 feet of the Taylor belt, and to prospect the eight or ten other lodes known to traverse the belt.

The cross-cut tunnel into Laidlaw's Hill in East Waverley is still driving, but with only two men. The breast of tunnel is now in over 300 feet, but so far no lodes of value have been cut. The object of the tunnel is to cut the rich "Barrel" lode worked some twenty years ago on the surface, some 200 feet or more below the old workings. This work is being done ostensibly by English capital.

An attempt is being made to open up the old De Wolfe property in West Waverley, now owned by Mr. Palgrave of London, G.B. Some of the old machinery has been patched up and will be used to pump out the Tudor and Union lodes which have been flooded and abandoned for twenty years. The machinery, both of mine and mill, is of heavy English pattern and entirely unsuited to the economical working of any mine, much less a low grade gold deposit. It is to be regretted that any attempt to utilize such machinery should be made.

Quebec.

The Asbestos industry continues to rapidly increase in importance, and at all the mines operations are going ahead briskly. It is thought, from present indications, that the output of this mineral from the various districts will be largely in excess of former years. The demand for the product continues strong, and many manufacturers, being unable to obtain their supply of *Firsts*, have to be content with *Second* and *Third* qualities.

At the Bell's Company mines the new machinery is working smoothly and gives entire satisfaction to the management. It is confidently anticipated that the year's output will not be far short of 2,000 tons, the greater proportion of which will be No. 1 quality.

The Johnston Company continue to produce large quantities of *Firsts*, and your correspondent estimates that the profits of this concern will figure close upon \$50,000 on this season's operations.

The excellent property owned and operated by the King Bros. looks as well, if not better, than ever. The ore prepared for the market by this firm is exceptionally well cleaned and cobbled, and being of very fine quality, is eagerly sought after by manufacturers. Openings are being made on two new mines on Lot 28 in the 5th Range of Thetford and on Lots 24 and 25 in the 1st Range of Ireland. These give promise of good returns to the owners.

The Wertheims have 125 men working on 15 pits, producing large quantities, which is being shipped to their factory at Frankfort, Germany. The work is done by contract, the mineral being cleaned, cobbled and bagged at something like \$25 per ton, and as the market value of the stuff averages \$75 per ton, it is easy to calculate the profits yielded by this concern. We understand that Mr. Wertheim is now in negotiation with Dr. Reed, from whom the present productive property was acquired, for the purchase of three other lots, 27, 28 and 29 in Range A, Coleraine. Messrs. Copeland and Bacon, New York, are equipping these mines with a full complement of working machinery. This will be in full running order within the next ten days, and it is estimated will make a saving in the cost of production of something like ten dollars to the ton.

An important discovery is reported to have been made on Lot 31, Range A, Coleraine, about a quarter of a mile from the Johnston mine. This property is owned by Messrs. Lake & Mitchell, Sherbrooke, and R. H. Martin, of the Chalmers-Spence Company, of New York. The veins are of good size and excellent quality, and being located in the immediate vicinity of the Quebec Central Railway, the property offers every facility for economical and profitable working.

A good vein has been opened on the property of R. H. Lambly, near the line of Garthly.

M. C. Lionais has, we are informed, been unsuccessful in his Suit against the Frchette D'Auville Company. This company's mines are being worked profitably. By the way, Mr. Lionais seems to be in no hurry with his Suit against the REVIEW.

At the adjourned meeting of creditors of the Scottish Canadian Asbestos Company, before Mr. Justice Billy, Mr. R. C. Smith, representing the American shareholders, moved to dissolve the meeting and set aside all the proceeds in liquidation, on the ground that the company being incorporated under the Imperial Joint Stock Company's Act, the Canadian winding up act did not apply to it. He also moved for a delay to examine into the affairs of the company in Scotland. Mr. W. White, of Sherbrooke, opposed the application on behalf of the Scotch preference shareholders and pressed for the immediate appointment of a liquidator.

The nature of the judgment given by Mr. Justice Billy in this case at Arthabaskaville was simply the appointment of liquidators (Messrs. Hanson Bros., Montreal). There was a motion made on behalf of Mr. Harry Allan, of New York, one of the ordinary shareholders of the company to quash all the liquidation proceedings on the ground that the winding up act in Canada does not apply to companies incorporated under Imperial charter, and that Dominion legislation intended to extend the operations of the winding-up act to Imperial com-

panies is *ultra vires*. The motion to quash was rejected; but, we understand that Mr. Allan is about to make application for leave to appeal to the Court of Queen's Bench on this single ground.

We understand that Messrs. Lomer Rohr & Co. have shipped from Montreal 80 tons of Feldspar per S.S. Zambesi, to Liverpool. This we presume is another shipment from the Villeneuve mica mines for the manufacture of pottery and china ware.

Six thousand and three shares of the Lake Huron Silver and Copper Mining company, standing in the name of the late Francis Hincks, forfeited for non payment of a call of 5 cents per share, will be sold at the company's office at Montreal on the 15th July.

Ontario.

Canada has not been able to make much of its mineral oil deposits, owing to the presence of sulphur in the oil, which caused a disagreeable smell, and fouled the lamps when burning. A means has now, says the *Financial News*, been discovered of removing the sulphur so that the Dominion will no longer require to import great quantities of oil every year from the States, and may even begin to export on its own account.

We have received some excellent samples of galena from the Caldwell mine near Lanark. An assay by Mr. J. T. Donald, Montreal, gives silver 4 ozs. 1 dwt. 16 drams per ton, 2,000 lbs. Mr. Caldwell has a hoisting engine and a couple of pumps, and everything in shape to sink the shaft, but owing to the recent heavy rains the work has been greatly retarded.

Regarding the remarkable gas well at Kingsville, a gentleman who recently visited it, says that the company, in their boring, struck a sulphur spring at the depth of 400 feet. Continuing about 1,100 feet from the surface they struck gas, and concluded to go deeper. A few feet lower down another pocket was found, and so strong was the pressure that the drill was forced up out of the shaft by it. "When I saw the well they had cased it in with a four-inch iron pipe, which was laid along the earth about fifty feet from the top of the well, and turned up at the end like an ordinary gas-pipe. I was there when it was first lit, and the noise made by the rush of the gas was like a railway express, or the roar of Niagara at a distance. The gas, which has a strong smell of sulphur, shot up for about two feet out of the end of the pipe in a solid mass. Then it became flame that reached to the tops of the trees in the neighbourhood. It was a most wonderful sight. The pressure is estimated at 500 pounds to the inch, or close upon 11,000,000 feet per day. Experts say it is one of the five largest wells ever discovered. The projectors are boring a second well, and a company will be organized at once to take the matter in hand. Since this well was struck, capitalists have visited it with a view to investment. A site has been secured, and a company with \$200,000 capital will build a glass factory, employing 100 hands."

Sudbury District.

Correspondence to the *Toronto Mail* states:—The smelting works of the Canadian Copper Company, which have been working without interruption since last December, are treating about 125 tons of ore daily. A second blast furnace of the Herrshoff patent is now being set up, and will be in running order about the

first of August. The company has just effected an arrangement with the Dominion Government whereby such mining and smelting machinery as is not manufactured in Canada may be admitted free of duty, and three carloads of machinery arrived here yesterday under this arrangement. Other orders, which will be filled in a short time, will enable the company to erect eight furnaces, with a total smelting capacity of 1,000 tons of ore daily.

The duty on coke has hitherto checked the smelting enterprise here, but it is understood that the Government have agreed to place all coke required for smelting purposes on the free list by Order-in-Council. It is also understood that proposals have been made to the Dominion and Ontario Governments for the extension of the Central Ontario railway from Coe Hill to Sudbury, on the condition of a grant of \$3,200 per mile from each Government, and that if a satisfactory understanding is arrived at the work of construction will begin at once. The principal stockholders of the Central Ontario Company are also stockholders in the Canadian Copper Company, and they represent that at the present time they can command any reasonable amount of capital for their enterprises. Messrs. Ritchie and Cornell, while in Toronto, authorized the statement that in connection with the extension of the railway northward they will erect a furnace in Hastings county for the manufacture of coke iron, with a capacity of 250 tons daily. They propose to utilize the new Edison patent for desulphurizing magnetic ores, which is claimed to be at once a cheap and a perfect process.

The annual meeting of the Vermillion Mining Co. was held at Sudbury on the 5th inst., when the following officers were elected: B. E. Charlton, Esq., of Hamilton, Pres.; A. G. Duncan, Esq., of Marksville, vice-president; John Oliver, Esq., of Chicago, sec'y-treas.; Board of Directors: Messrs. V. W. Foster, W. D. Hitchcock, E. H. Reid, H. A. Christie and W. S. Miller, all of Chicago, Ill. A carload of ore was shipped from the mine three weeks ago, which assayed 14 per cent. of copper, 11½ ounces of silver and 2½ ounces of platinum to the ton, which is an excellent showing for that quantity of ore. It was sold to a company with reduction works in Chicago.

The Copper Cliff company at Sudbury have just sold 600 tons of nickel, and two more smelters are to be introduced. The Stoby mine is being opened, and operations are being pushed in the township of Dennison by the Dominion Mining company.

Port Arthur District.

The President of the Board of Trade, Port Arthur, in his last Annual Report makes the following appropriate reference to the present methods of purchasing mining lands in that district:

"Mining appears always in Canada to be considered an illegitimate business. Men may speculate in telegraph stocks, which really neither increase nor decrease in value; they may gamble in bank stocks, which seldom vary in dividends they pay; they may boom real estate to such an extent that a city of 150,000 or 175,000 inhabitants has land enough laid out in 'additions' to hold a million people, and which cannot possibly have any other than a speculative value for a generation; they may take a Chicago wheat corner or pork corner, in which they invariably pay for their experience; they may do

a hundred other things of the same character, but these they consider safe or paying investments or speculations as the case may be. But ask them to buy mining lands at two dollars per acre, and invest the most modest sum, not in mining, but in seeing what their lands contain, and what is their answer? If they have courage enough to buy the land they will neither sell at a reasonable price nor show their faith by working. What is the result? To day every working mine in this district is being opened by either English or American companies, and 75 per cent. of the recent sales of Government lands are made to either American or English investors. Is it much wonder that Americans say that we do not appreciate the richness and value of the great mineral district tributary to our town."

Prospecting and taking up iron lands appears to be the chief object of mining men during the past month, the Red Hematite from Nipigon attracting especial attention.

Badger Mine.—They are still shipping high grade ore from here and the Mill is now operating on the rest. The specimens from this mine presented to the Board of Trade are the richest ever seen in the district.

Silver Mountain.—The East End "Shuniah Weachu" is daily barreling some high grade ore for shipment to England.

The West End mine continues the same encouraging development. All the shafts and tunnels are showing up very fine ore. The management are preparing to build a good wagon road from the mine to Whitefish Lake, about 2½ miles.

There is nothing special to report concerning the other working mines which are swinging along as steadily as ever, awaiting railway facilities for which the bonus by-laws are now before the people with every assurance of being carried by a large majority.

A couple of silver lead properties east of Port Arthur are to be developed by some American capitalists. The Ogema is a specially promising property. A road is now being cut to it and a tunnel some 75 feet in length to strike the vein at a depth of 60 feet down will be driven under the direction of Captain Parsons.

Three of the staff of the Geological survey are now doing the district west of Port Arthur in a thorough manner.

Nickel and asbestos have recently been found near Port Arthur and a most successful explorer is now out searching for tin. He is certain he has met with a substance very similar to the tin ore recently shown him.

Government money and fine weather have rendered the roads to the mines excellent travelling.

Bush fires are raging around Whitefish and Arrow Lakes. Bad for the timber but good for explorers.

British Columbia.

Application for incorporation is made by the following companies: The Willow River Gold Mining Co. (Lt.) capital \$25,000; the Alpha Mining and Mining Co. (Ltd.), capital \$120,060, to acquire and work lands at Anderson Lake;

the Donald Gold Mining Company (Ltd.), capital \$10,000, to work mining lands in Kootenay district; the Salt Spring Island Mining Company (Ltd.), capital \$10,000, to acquire and work mining lands on Salt Spring Island Spring Island.

Canadian Mines on the English Market.

	Price Per Share
General Mining, Limited £219,752 fully-paid shares of £3	4 1/4
Low Point, Barraross and Langan, \$309,100 fully-paid shares of \$100	—
Ditto, \$200,000 vendors fully-paid shares of \$100	—
North-Western Coal and Navigation, Limited, £160,500 6 per cent. debentures; coupons June 30 and Dec. 31; principal 1904	—
Ditto £149,000 fully-paid ordinary shares of £10	—
Ditto £900 fully-paid deferred shares of £100	—
Sydney and Louisburg Coal and Railway, Limited, £500,000 cumulative 10 per cent. first preference shares of £10, £6 paid	7 9
Ditto, £14,560 fully-paid non cumulative 6 per cent. second pref. of £10	1 5
Ditto, £250,000 fully-paid ordinary shares of £10	—
Vancouver Coal Mining and Land, Limited, £66,850 fully-paid shares of £10	—
Ditto, £118,150 shares of £10, £9 paid	6 1/2
Excelsior Copper, Limited, fully-paid shares of £1	7 1/2
Ditto, shares of £1, 17s. 6d. paid	—
Shuniah Weachu, Limited, £39,838 fully-paid shares of £1	—
Silver Wolverine, Ltd., £33,465 fully-paid shares of £1	—
Anglo-Canadian Asbestos, Limited, £39,132 fully-paid shares of £2	—
Anglo-Canadian Phosphate, Limited, £46,340 fully-paid pref. shares of £10	—
Ditto, £15,000 fully-paid deferred shares of £10	—
British Columbia Smelting, Ltd., £25,000 preference shares of £1, 10s. pd.	—
Ditto £40,000 fully paid ordinary shares of £1	—
Canadian Asbestos and Antimony Company, Limited, £100,000 fully called shares of £5	—
Canadian Phosphate, Ltd., £100,000 fully paid shares of £1	—
Bell's Asbestos, Limited, £100,000 fully paid shares of £5	17 1/2
White's Asbestos, Limited, £20,000 fully paid shares of £1	17 1/2
Ditto shares £1 paid	—
Jackson Rae Phosphate Co., Limited, \$25,000 fully paid shares of £1	—

General Mining.—Accounts to December 31 submitted in April, but an interim meeting is held in November. Dividend for 1884, 5 per cent., for 1885 and 1886, 3 1/2 each year, and for 1887, £4 1/2 9d. per cent. Reserve fund, £29,850.

Low Point.—The vendors' shares, up to the end of 1883, do not rank for dividend until 7 per cent. per annum dividends have been paid on ordinary. Accounts to Dec. 31. For 1887, 5 per cent. was paid on the ordinary shares other than those held by the General Mining Assoc., that Company foregoing their dividend rights.

North-Western Coal.—The deferred shares receive on dividend until 15 per cent. per annum (cumulative) has been paid on the ordinary. Accounts to June 30. Dividend for 1887-8, 5 per cent.

Sydney and Louisburg Coal.—Accounts to Dec. 31 submitted about May. Out of the profits of 1884 one half-year's dividend on the first preference shares was paid. No dividend since. Debt to Dec. 31, 1887, £1,574.

Vancouver Coal.—Accounts to June 30 and December 31 submitted in November and May. In the half-year to June, 1888, there was a net profit of nearly £11,000. Debentures, £57,000. Reconstruction has been decided on.

Excelsior Copper.—Registered September 16, 1888. Authorized capital, £50,000; purchase consideration, £400,000, in cash or shares. Fully-paid share, issued to the vendor; partly paid to the public.

Shuniah Weachu.—Accounts to Nov. 20 submitted in February. No dividend yet.

Silver Wolverine.—Registered October 19, 1888, with a capital of £100,000, of which £80,000 was the first issue. Most of the shares were issued to the vendor.

Anglo-Canadian Asbestos.—The Company was registered in November, 1885. Accounts to October 31 submitted in March. No dividend yet. Debentures, £3,450. Reports are not obtainable, but this information is official.

Anglo-Canadian Phosphate.—The preference shares rank first for 7 per cent., and after a like rate has been paid on the deferred shares, both classes rank equally.

British Columbia Smelting.—The company was registered May 9, 1888. The ordinary shares were issued to the vendor, and they do not rank for dividend until the preference shares have received dividends amounting to 100 per cent.

Canadian Phosphate.—Accounts to November 30 submitted in February. Eleven months to Nov. 30, 1888, resulted in a profit of £2,576, which was carried forward.

White's Asbestos.—Registered April 9th, 1887, the authorized capital is £100,000; first issue, £60,000, of which £20,000, fully paid, was issued to the vendor.

Coal Mining in the North-West.

The Lethbridge Colliery—the property of the North Western Coal and Navigation Company, Limited—producing that coal known throughout Manitoba and the North-West Territories as "Galt coal" has been in operation since 1832; though its development properly speaking, only dates from the autumn of 1885, upon the completion of a narrow gauge railway—owned and operated by the same company—from the C. P. Railway at Danmore, near Medicine Hat, to Lethbridge, a distance of 109½ miles. This company owes its existence to the exertions of Sir Alexander T. Galt, G.C.M.G., who with other gentlemen in 1881 secured coal leases in Alberta, on both the Bow and Belly Rivers. The year following, these leases were thoroughly examined, and from the reports received it was decided to open a mine on the east bank of Belly River, being the site of the present town of Lethbridge.

Early in 1883 the Northwestern Coal and Navigation Company, limited, with a capital of £50,000 sterling was formed for this purpose, and during that and the following year about 3,000 tons were shipped by way of the Belly and South Saskatchewan Rivers to Medicine Hat, and then tested on the locomotives of the C. P. Railway.

These tests proved the value of this coal as a steam producer, but owing to the very short and uncertain season of river navigation it became necessary to abandon this mode of transfer and build the Narrow Gauge Railway above referred to. To do this, the company increased their capital to £150,000 sterling, and bonded the road to the extent of £160,000 sterling, which was formerly opened by the Marquis of Lansdowne, then Governor-General of Canada, on the 24th September, 1885.

Prior to any of the mining operations above mentioned, coal was extracted on the west bank of Belly river opposite the present Lethbridge Colliery, by the late Nicholas Sheran, who probably was the first coal operator in Northwestern Canada.

Mr. Sheran early in the seventies located at the St. Mary's River, about 6 miles south of Lethbridge.

This point being near the St. Mary's crossing of the Benton-Macleod trail, the freighters on their return trip to Benton used to load their "string teams" with coal and sell it on their arrival in Benton.

In 1879 Mr. Sheran moved down the Belly River and located on the west side of the river, as already stated, where the lower trail crossed leading from Macleod to Benton. Here he occupied himself in conducting a ferry during high water, also in mining coal which he sold at \$5 per ton to the freighters who afterwards retailed it in Benton at \$20.

Returning to the operations of the Northwestern Coal and Navigation Company, the output of their colliery since 1885, has yearly increased, even far beyond the expectations of the promoters of the scheme.

The principal consumer of their coal is and has been the C. P. Railway, and en passant, it may be said that the success and advancement of the North-West, is, in a great measure, dependent upon the success of this Corporation, and be it said to their credit, even in the absence of competition, they are without doubt most liberal, far surpassing in the writers opinion any of the transcontinental roads to the south of the 49th° parallel.

Owing to the very large and increasing demand for coal in the smelting and reducing

ASBESTOS.

THEO. HAMEL,

44 Mountain Hill, Quebec,

SOLE ASBESTOS MANUFACTURER IN CANADA

Write for prices and catalogue. Use Asbestos and save your money. Applied on boilers and Steam pipes it will prevent them from rusting and will economize 33% on fuel.

works in Montana—the State adjoining Alberta on the south—the N. W. C. & N. Co. have for some time past, been moving in the direction of placing their coal on this market.

In the summer of 1888, several car loads were shipped by way of the C.P.R., St. P.M. & M., N.P.R.R. to various smelters in Montana for the purpose of being tested. The result being favourable, negotiations are now in progress for the construction of a railway from Lethbridge to Helena, Montana.

The completion of this road will probably increase the present output about 500 per cent., in which event Lethbridge will be quite a busy centre of trade, where a few years ago, prior to the construction of the Canadian Pacific Railway nothing but desolation reigned.

The Empress Mill, Renfrew District, N. S.*

By J. E. Hardman, M. E. Oldham.

Probably in no other country where gold mining has been carried on for nearly thirty years has so little advance in methods of milling been made as right here in Nova Scotia.

It is doubtless owing to this fact that so much general interest has been shown in the ten stamp mill recently erected for Mr. C. H. North, at Renfrew.

The mill which I am about to describe in detail, is essentially and in all important points, the mill which has been in use in the Black Hills of Dakota for some years.

Mr. D. S. Turnbull, the superintendent of the Empress Mine, and under whose supervision the mill was built, has had an extensive experience at the Homestake and other Dakota mines.

On the 1st of February, 1889, there were 685 stamps running in the Black Hills. Of this number, 580 were essentially of the one type or pattern, known as the "Homestake," 25 in the "Cassel" mill were of older pattern, and 80 in the "Caledonia" mill were of a distinctly different type. The largest number of stamps in any one mill in the Hills is 120: the largest number owned by any one company is 200, by the Homestake; but as the larger part of the shares in each of the five large companies now operating is held by the same individuals, the same policy prevails throughout nearly all of the mills.

Of the 685 heads, 320 are located at Lead City, 240 at Terraville and 125 at Central City.

These mills were all built in 1878, 1879 and 1880 (with the exception of the last 20 head in the Caledonia, which were added this year), so that this particular type is no experiment, since it has been in use from eight to ten years. During this time minor changes have, of course, been made, but the pattern as a whole has not been changed.

I have drawn your attention to these figures and facts, as perhaps, a necessary introduction to the subject of this paper.

THE BUILDING AND ORE BINS.

The Empress Mill covers a ground space of forty feet square; of this, a portion covering sixteen by forty feet is devoted to ore bins and rock breaker, the remaining twenty-six by forty feet includes the mill proper. The building was designed for twenty stamps, but only ten have yet been erected; I am told the other ten will be added this year.

The posts of that portion devoted to ore bins are forty feet in height; the other portion is built with a shed roof, and the general arrangement of the building can be seen from the accompanying photograph.

There is nothing especially novel in the framing of the building itself, but perhaps one feature

may be of interest to the members, viz.: the battery blocks were built in place before any portion of the building was erected, and the battery sills are the sills of the ore bins; this method ties together the battery frames and ore bins, and by the other parts of the frame of the bins, ties to the building. The method has the great feature of economy, but also has the objection that if the ore bins are not full, the frame of the building is more or less in vibration; with the bins full, the bracing is rigid and the method very satisfactory.

The battery blocks are built of selected white hemlock plank, six inches and twelve inches wide, spiked together, and so placed as to break joints. The planks are of two lengths, ten and fourteen feet, respectively, the fourteen feet plank forming the block proper, and the ten feet plank forming the connection between the longer planks, thus practically making one solid block of plank on end, thirty inches wide by twenty-seven feet long, and ten feet in depth below mud-sills. The accompanying sketch will illustrate the idea.

These blocks are fastened with binders in the usual way, bolted together with transverse rods, the upper binder being on a level with the top of the mortar block, and the lower one three feet below. The mortars are fastened to these blocks in the usual manner, each mortar having eight one and a half inch bolts, five and one-half feet in length.

Parallel to the mortar blocks, and thirty feet in length, are four mud-sills, two on each side, spaced four feet from centre to centre; the top surface being on a level with the ten foot timber in the mortar block. These sills are sixteen inches thick and eighteen inches wide. On right lines of these mud-sills are placed six cross or battery sills, each twelve inches by fourteen inches, spaced five feet seven inches apart, centre to centre. Where these battery-sills cross the mud sills and the battery-blocks, a cut two inches deep is taken out, thus locking the sills and bringing the cross-sills solidly on the mortar-blocks. Upon these battery-sills are erected the battery-posts, twelve inches by fourteen inches, which carry the cam shaft and guide timbers. Upon these sills also are mortised the posts, sixteen inches square, of the ore-bins, and the diagonal braces of the bins are also tied to these sills. These posts run up and connect with the frame of the building, and the horizontal beams of the bins are also mortised into these posts. On these beams comes the weight of the ore, also the strain due to the rock-breaker and to the tram car.

It will thus be seen how almost every part of the inside and outside framing is braced to and dependent on the battery sills, which are securely locked to the battery-blocks and mud-sills. The economy alluded to on page 3 is now apparent. No heavy foundation other than the one for the batteries is necessary.

The ore-bins are triangular in section, with the vertical side towards the battery; they reach to the cam floor and end in a chute which conveys to the self feeder. The two sides of the right angle are sixteen feet in length, and the capacity of the bins is about two hundred tons.

To the upright posts of these bins on the vertical side, the battery frames are braced by means of two short horizontal struts, and tie bolts, one above the cams, near the top of the battery post, and the other forming the beam for the cam floor. These struts are mortised into both battery posts and ore-bin posts. This method of bracing leaves the entire front of the battery clear, and gives the maximum amount of light on the plates.

The line-shaft of the mill lies directly on the battery-sills back of the mortars, and beneath the feeding floor. To this arrangement many exceptions may be taken, necessitating as it does, short and nearly vertical belts to the cam-shaft pulleys, and the consequent use of tighteners, to say nothing of the constant drip from floor above, and the attendant darkness, but the purpose of this paper is not to criticise, only to describe.

THE BATTERIES.

The drawings accompanying this paper are of the Homestake mortars, the Empress mortars being precisely like these drawings with one unimportant exception, namely, that the discharge opening has been lowered relatively four inches as shown by the red ink line in fig 3. That is to say, Mr. Turnbull being somewhat influenced by the prevailing notions in the province regarding high discharge batteries, yielded so far to the current prejudice as to put four inches more in the bottom of his mortar, thus decreasing the height of discharge that amount. I am informed by him, that, after two months experience with the same, his next batteries will not be modified, but will be made exact copies of these drawings.

The drawings are self explanatory and need no letter press.

The features of importance are:—

(1). The inside dimensions of lower part of mortar: that is the sides and ends are drawn in towards the die, leaving a space of only one inch on the ends, and two inches on the back from the face of shoe or die. This conduces to rapid crushing by tending to throw the pulp directly under the shoe.

(2). The so-called "Graham" chuck-block which is removable, and can be replaced with one smaller. The first one used is seven inches high but when the die has worn down two inches, the seven inch chuck-block is removed and replaced by one five inches wide, which lasts for another two inches wear, when the die is usually thrown out and a new one put in. This chuck-block makes a high discharge mortar, and facilitates amalgamation in the battery. With the Homestake having the discharge eight and three-quarter inches above bottom of mortar and adding seven and one-quarter inches of chuck-block makes a mortar sixteen inches deep. In the Empress four inches of this have been removed and the mortar is between eleven and twelve inches deep.

While speaking of this chuck-block I may say that Mr. Turnbull has substituted a piece of six inch channel iron for the wood of Mr. Graham, with excellent results.

As shown in the drawing, there is only one inside copper plate fastened right on the chuck-block, this plate is three-sixteenths of an inch thick.

It is claimed that 55 per cent. of the free gold is caught by this plate. The Empress mill has no plate on the back or feed side.

As will be seen from fig 1, the feed opening does not extend the whole length of mortar, but is only twenty-four inches long.

The Empress mortar weighs 6500 pounds. The stems are of wrought iron three and one-quarter inches diameter, turned full length; they are twelve feet six inches long and weigh 356 pounds each.

The tappets are the two gibbed, double-faced pattern, twelve inches long, nine inches diameter at face, and six inches diameter in the middle; each weighs 132 pounds. The head or boss is nineteen inches long, eight and one-half inches diameter, and weighs 235 pounds. It has no rings shrunk on, but is all cast-iron.

The new shoe is eight and one-half inches diameter, and eight inches high, and weighs 135 pounds.

The total weight of each stamp is therefore 858 pounds; this statement will perhaps surprise some members present who have been told that the stamps weighed 925 pounds, but I desire to say that these figures were given me by actual weighings of the different parts, and may be taken as correct. Moreover, they correspond with the weights given by the Homestake Co., viz.: stem 340 pounds, tappet 140, head 240, shoe 130, total 850 pounds.

The cams are double armed and each arm is 17 inches long from centre of hub. The weight is 236 pounds. The short arm has a beautiful curve, and the stem is raised without the slightest perceptible jar to the tappet.

The cam shaft is fourteen feet long and five inches diameter, it runs in babbitted iron boxes, and weighs 930 pounds.

The Die is eight and one half inches diameter and weighs 93 pounds.

The cams are lubricated with molasses, forming a smooth surface which does not so readily catch grit, and which revolves the stem in about three drops. The order in which the stamps drop is 1, 3, 5, 2, 4.

The guides in the Empress Mill present a new feature which I consider admirable, and worthy of adoption by us all. Instead of the usual two pieces of hardwood scored with five grooves across the grain, each stamp has its own guide block. These blocks are two pieces of hardwood about sixteen inches long, (with the grain), and eleven inches wide and three to four inches thick. The groove is cut in these blocks *with the grain*, each half block being made from a template which serves for the whole mill, and is bored for two seven-eighths inch bolts; which fasten the two halves solidly to the guide timbers. Thus each stamp has its own guide, which can be replaced by merely removing two bolts, without disturbing the guides of the other four stamps in the battery.

The Empress Mill uses twenty mesh twilled wire screens, and this is undoubtedly one reason for an increased capacity. The screens measure forty-eight inches by thirteen inches. But the difference between wire cloth screens and slotted screens is not by itself sufficient to account for the increased capacity of the mill, the other features are fully as important factors.

The outside plates are those taken from the old mill, and at present each battery has one four feet square plate, followed by a plate narrowing down to twenty-four inches at the bottom, and about three feet in length. This arrangement of plates is but temporary, Mr. Turnbull contemplating some marked changes.

The quartz coming from the mine is trammed directly into the top of the mill, and dumped about four feet to the breaker floor. No grizzlies are used. The quartz is fed by hand to an old pattern Blake crusher, which is entirely unfit for the work. It is proposed to substitute a small-size Gates crusher. The ore falls from the rock breaker into the ore bins, and thence runs down a chute to the automatic feeders. These machines are the "F. B. Hammond" patent feeder, and detailed information concerning them is not accessible. They are exceedingly simple in construction and appear to me to be by all odds, the most efficient feeder I have seen. I understand that the Truro Foundry Co. have the sole right to manufacture the same, but of this I am not positive.

THE MOTIVE POWER.

The power to drive this mill is furnished by a brook, which appears to have a flow of about

2,000 cubic feet per minute. The old mill was driven by an 18 foot overshot wheel, but Mr. Turnbull, by cutting a ditch along the hill-side some 300 feet or more long, has increased the head to 54 feet. The water wheel is a turbine on a horizontal shaft, called the "Perfection," and made by Paxton, Tate & Co., of Port Perry, Ont. It is 27 inches in diameter, and is enclosed in an iron scroll case. The wheel is located back of the mill, on a separate foundation, and has a head direct of 20 feet, with a draught tube 14 feet in length.

The gate was only one-quarter open at the time of my inspection, and the power was ample, but, owing to the fluctuation of speed caused by the old-fashioned breaker, a governor would seem to be necessary. I understand that it is the intention to put a governor on the wheel this summer.

A pulley on the wheel shaft transmits the power directly to the line-shaft of the mill, by means of a six-ply rubber belt.

The water for the batteries is taken from the iron penstock above the wheel by a four-inch pipe, and distributed to the stamps by half-inch pipe nipples leading to each stamp. No arrangements have yet been made for heating either water or building in winter.

At the time of my visit, the 27th of May, the stamps were dropping sixty times per minute, and had seven and one-half inches' drop. Mr. Turnbull informed me that he was crushing one and one-quarter tons per stamp per shift of ten hours, at that speed. It is his intention to run at 80 to 85 drops per minute, when the new Gates crusher is in, and the supply of ore from the mine warrants it.

I have no hesitation in expressing my opinion in regard to the mill and its capacity. It seems to me to be the mill which all Nova Scotia gold miners can study and copy to advantage. It is the best built mill I have seen in the Province, both as respects iron work and wood work. I believe it can easily crush 25 tons of our Nova Scotia quartz in 24 hours. As to its capacity for saving gold, it has yet to be tested. But the runs already made have caused Mr. Turnbull to state that he is getting four dollars per ton *more* than he got out of the same quartz with the old mill.

It is still an incomplete mill in the fact that it has no provision for concentrating and saving the sulphurets in the ore. I am told that Renfrew concentrates assay only twenty dollars per ton, if that is the case, it is perhaps better economy not to attempt to save them. But a new type of the Hooper concentrator is to be supplied to this mill this month, and definite information can then be obtained.

This subject of concentrates and concentrating is one I am deeply interested in, and I hope at no remote date to have the pleasure of reading a paper on that subject before this Association.

In conclusion I would advise every member who has a mill to build, to first visit Renfrew before he makes any plans, or lets any contracts.

*Read before the Gold Miner's Association, June 3, 1889.

Pennsylvania Miners' Wages.—From official returns received by the chief of the Bureau of Statistics of Pennsylvania, the wages of 20,000 miners employed at 130 collieries have been ascertained. The wages of the best paid miners amount over \$700 a year, and the lowest to \$200. The average in the anthracite and bituminous regions will be about \$500. A considerably lower figure is said to be earned in the bituminous.

MANUFACTURING NOTES.

New Works of the Dodge Wood Split Pulley Co., at West Toronto Junction.

We take much pleasure in giving special mention and a partial description of the above enterprising company's new works which have lately been erected at West Toronto Junction. The site selected is on the north side of the C. P. R. track, covering an area of some 4½ acres, which gives every facility for the shipping and receiving of stock, having special sidings for that purpose. The works, consisting of main building, 250x54, three stories, with annex 80x60, large store house, machine and blacksmith shops, &c., all of solid brick, having been erected especially for the manufacture of the Wood Split Pulley, and are completely equipped in the most modern and substantial manner.

Entering the annex we find the engine room, a model of completeness in itself, and are at once attracted by a beautiful and practical illustration of the transmission of power by manilla ropes, a system now very popular in the United States and Great Britain, and being largely adopted in this country through the efforts of this company who make that their speciality. The power is taken from the 13ft. grooved fly wheel of a handsome 100 H. P. compound engine, and conveyed to the 250 feet of main line shafting by means of 11 wraps of ½ rope running on to a 63 grooved pulley, which with the lighter pulley on travelling carriage and necessary idler and winder, constitute the main drive which runs the shaft at 300 revolutions per minute and drives all the machinery in the factory. In addition to the main drive there is a second transmission from engine shaft upright to counter shaft, from which is driven the mammoth Sturtevant fan. This fan, with the heater attachment, supplies all the hot air necessary for the heating and ventilation of the whole factory and dry kilns. It discharges 82,000 cubic feet of air per minute at 250 revolutions per minute, and requires 18 H. P. to drive it. The boiler is a "Field Stirling" water tube safety boiler, having a working pressure of 165 lbs. and 125 H. P. capacity. In this building we also find the dry house, which holds 60 M. feet of lumber, all on trucks of 4 M. feet each, and arranged so that as soon as a truck is passed out for use, a fresh one is pushed in from the other end, thereby keeping the kiln constantly full. The loaded truck of dried lumber is carried on an auxiliary car into west end of main building and deposited close to the large endless bed surface Planer and planed, then passed to the cutting up saws. We have now passed from annex into main building and are shown the direction in which the lumber travels after leaving the Planer. We find that all arm and bushing stock courses down one side of the large ground floor while the rim stock goes down the other side. In this way the work is systematically classified, each man and machine having his special portion of the pulley work to do. The pulley as it now appears, has reached the last end of first floor, and is taken on elevator to next floor, where it commences to travel westwards, passing through the different stages it arrives at west end of second floor, when we

find it a "Dodge Wood Split Pulley," ready for the paint shop. It is now taken in on Elevator (at that end for the purpose) to paint shop on 3rd floor, where it is thoroughly filled with a patent specially prepared filler, painted and varnished, and afterwards wrapped with special wood wrappers, size marked on end and is ready for shipment.

The machine shop is completely equipped for all iron work necessary in the making of iron centre grooved pulleys for rope transmissions, turning, shafting, bolt and nut cutting, tapping, smithing, etc.

The dust arrester and shaving service, which works most effectually, depositing into the vault in boiler room, is also worked with a Sturtevant Fan.

The works throughout have been constructed with a view to being considered "Standard" by the Fire Insurance companies, all elevators and stairways being bricked in from ground to roof, and all doors iron covered. Each flat is provided with two fire plugs and 100 feet of 2 in. hose, also 3 bbls. and 20 pails kept constantly filled with salt water.

business, will be allowed thirty days trial and to return at the company's expense if then not found satisfactory."

The entire construction and fitting up of this model establishment has been under the direct supervision of Mr. Samuel May, the President and Manager, to whom too much praise cannot be given for his untiring zeal in placing his company in a position to supply the power users of Canada with an article which has long been so universally popular on the other side of the line.

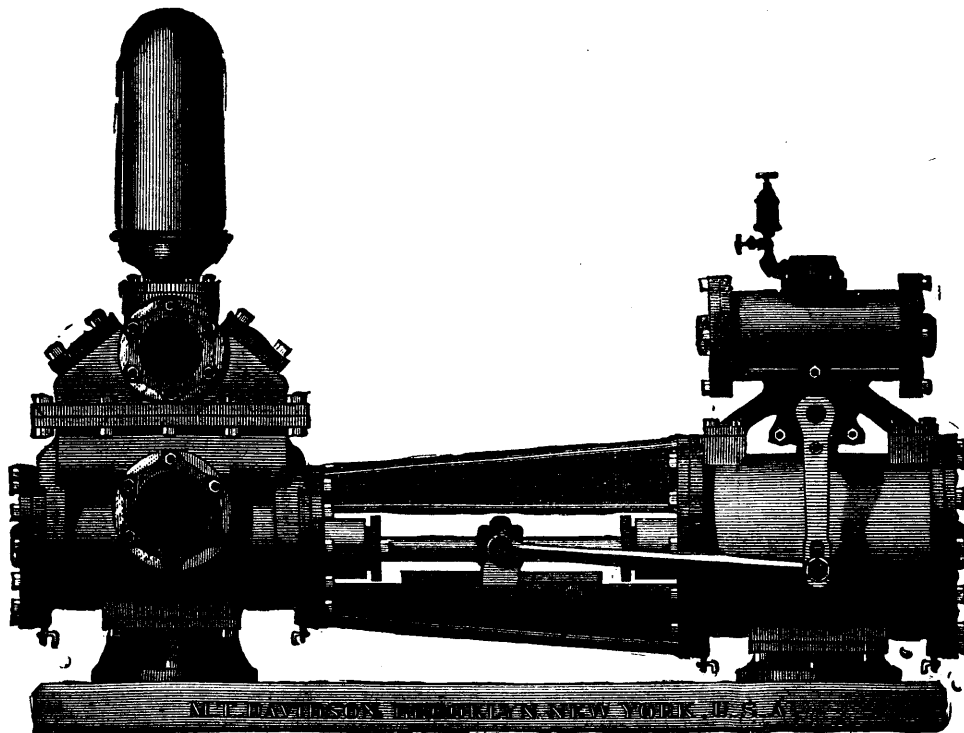
Correspondence and orders should be directed to the office of the Dodge Wood Split Pulley Co., 89 and 111 Adelaide St., West, Toronto.

The Improved Davidson Mining Pump.

The Davidson Steam Pump for mining purposes has become a prime favorite. Simplicity, durability and efficiency are its prominent features, and recommend it for use wherever a thoroughly reliable pump is needed. Only the

repairs. The manufacturers claim that the valve will not get out of order, become deranged or wear out within the life of the pump. The valve is oscillated by an oblique cam, connected with the valve by a steel pin which passes through the valve into the exhaust port, in which the cam is placed.

The moving of the valve does not depend entirely upon the steam admitted to the end of the valve piston, for should that not be quick enough to operate on it with the pump under a high rate of speed, the cam is so constructed that it will carry the valve mechanically, and thus prevent the piston from striking the cylinder heads in any case. This is one of the most important features of the pump, the valve being as much under the control of the piston rod as the valve of the ordinary steam engine, worked by an eccentric, instead of being controlled by an auxiliary valve. Those of our readers requiring power pumps for mining purposes will do well to write for further particulars regarding the Davidson Improved Mining Pump. Address the makers; Davidson Steam Pump Co., 77 Liberty Street, N.Y., U.S.A.



THE IMPROVED DAVIDSON MINING PUMP.

The company holds eleven Canadian Patents, and the factory has a capacity of about two hundred pulleys per day without working overtime.

The article itself many of our readers have no doubt had an opportunity to try and benefit by the practical use of the Dodge Independence Wood Split Pulley, now a passport in almost every factory and mill in the country. To those who have not used them we say get the company's special guarantee, which reads as follows:

"Every Pulley made shall be in every respect as represented. The maple face pulley in every case to transmit from 25 to 60 per cent more power with the same belt than any other iron pulley made with the like tension of belt. The compression fastening guaranteed to be perfect, the compression of wood and iron guaranteed to hold stronger than set screws in any case and to be the most perfect fastening ever invented. To summarize: Satisfaction entire guaranteed. Any Pulley found defective and not as represented may be returned at the expense of the company. Any party skeptical as to the merits of the Dodge Wood Split Pulley, and who means

best quality of material is used in its construction and the workmanship is admirable. In general appearance, as may be seen by engraving on this page, this pump is solid and substantial, simple and pleasing in design. Unlike other direct acting pumps, it has only one valve in the steam chest. This, which may properly be called a compound slide-valve with cylindrical face, performs two duties, that of the ordinary slide-valve and of the auxiliary valve combined. Its duty as a slide-valve is, of course, to reciprocate across the steam ports, to admit steam alternately to the two ends of the steam cylinder, and as an auxiliary valve, it is oscillated so as to open and close the steam ports that lead to the ends of the steam chest. The steam chest is cylindrical and bored out to make a face for the slide-valve and to receive the pistons that assist in operating the valve. The pistons are connected together, sufficient space being allowed between them for the valve and steam ports, and they are also connected to the slide-valve, all working in the same plane, and being of the same diameter, thus insuring evenness of wear and readiness of access for adjustment and

Important to Iron Founders.

A new and important invention whereby Iron Founders can, without alteration of plant or, in fact, any departure from their present methods of moulding and pouring of the heated metal, secure a casting with a wrought iron or semi steel exterior. Besides not only a clean casting is secured, but one of a bright surface is given. The inventor, Mr. F. D. Taylor, M. E. of Brockville, Ont., after many years' experience, has, it is said, succeeded in accomplishing the above objects. It is known that in past years great strides have been made in improving and reducing the costs of both wrought iron and steel. But whilst these improvements have been going on little or no improvements of any note have been made in the foundry beyond that of running the iron into the ordinary sand and chill moulds. Mr. Taylor has invented a cheap lining which can be fitted into any mould and which, so soon as the molten iron comes in contact with it (during the process of pouring) reduces the carbon in the iron to its minimum, thereby producing a casting of increased strength and superior finish.

COAL MINING IN NOVA SCOTIA.

[Continued from May issue.]

By E. Gilpin, Jr., A.M., F.G.S., F.R.S.C., etc., Deputy Commissioner and Inspector of Mines for Nova Scotia.

At the head of the balance is placed a drum, having a powerful brake, and two ropes leading leading to the ballast tub and platform. The former being at the top of the balance, and the platform standing in a gap in the level railway or in a siding from it, a continuous track is obtained by the rails referred to on the platform. An empty tub being pushed on the platform it is evident that the road becomes self-acting, for the tub, at the top of the balance, on being loaded with ballast, will by its weight draw up the empty tub and platform. The platform can be arrested by means of the brake opposite the mouth of any of the bords which are driven similarly to those already referred to. There being a section of track in the bord, the empty tub is landed and replaced by one filled with coal. This additional weight causes the platform to descend and draw up the ballast box which is ready for another tub.

The pillar above the level is left 50 feet thick, and the bords start from the balance and run level for about 150 yards to the next balance. They are 15 to 18 feet wide, and 12 to 15 feet

high, with pillars 35 feet thick, and cross cuts for air every 60 feet. The top bord is frequently driven through into the next balance, and the rest squared up, leaving a thin barrier of coal; but to gain time the next balance can be driven through the pillars of the bords of the first balance. The boxes are handled by the miners, and two boys can transfer the coal from a dozen bords to the level, without any assistance from horses, etc.

When the seam pitches at an angle heavier than 25° there are two modifications of this system that can be adopted. By one of them the track in the balance is done away with, and the coal tubs of each bord are emptied into the

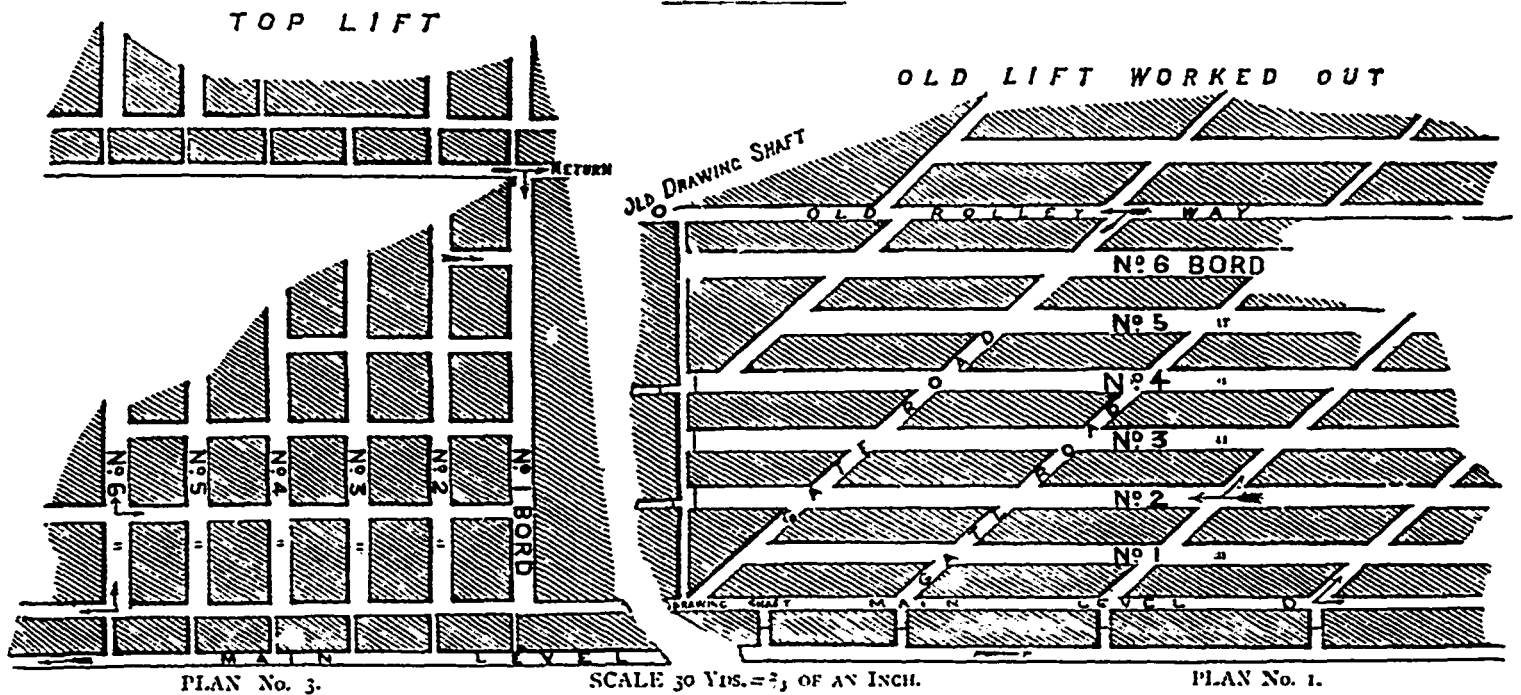
balance itself. In this case the coal will run either in the pavement or in a shoot made of iron sheets. At the point where the balance meets the level, the shoot is carried at a lessened angle so that it will project into the level at a height sufficient to allow the pit tubs to pass under its mouth. They are filled by lifting a door at the mouth of the shoot opened by the driver with the assistance of a lever. In the other modification the bords are driven directly to the rise from the level and a shoot laid in each one. The coal is loaded from the shoots on the level in the manner just described. This system has not been generally approved of from the difficulty of airing so many uphill places, and the

cost of getting timber to the faces, etc. On the other hand, the cost of material is less, there being no rails or tubs required in the bords, and the pillars are formed parallel to the dip of the seam.

In the Pictou and Cumberland districts, of late years, the seams, whenever local conditions permitted, have been opened by slopes. The slopes are usually driven in pairs, with one or more back slopes for ventilation. A crop pillar of two or three hundred feet being left, the first levels are turned away at a distance of six or seven hundred feet from the crop, and operations carried on as from a shaft. The slopes are driven wide enough to admit of a double track of

MAIN SEAM WORKINGS

PICTOU CO.



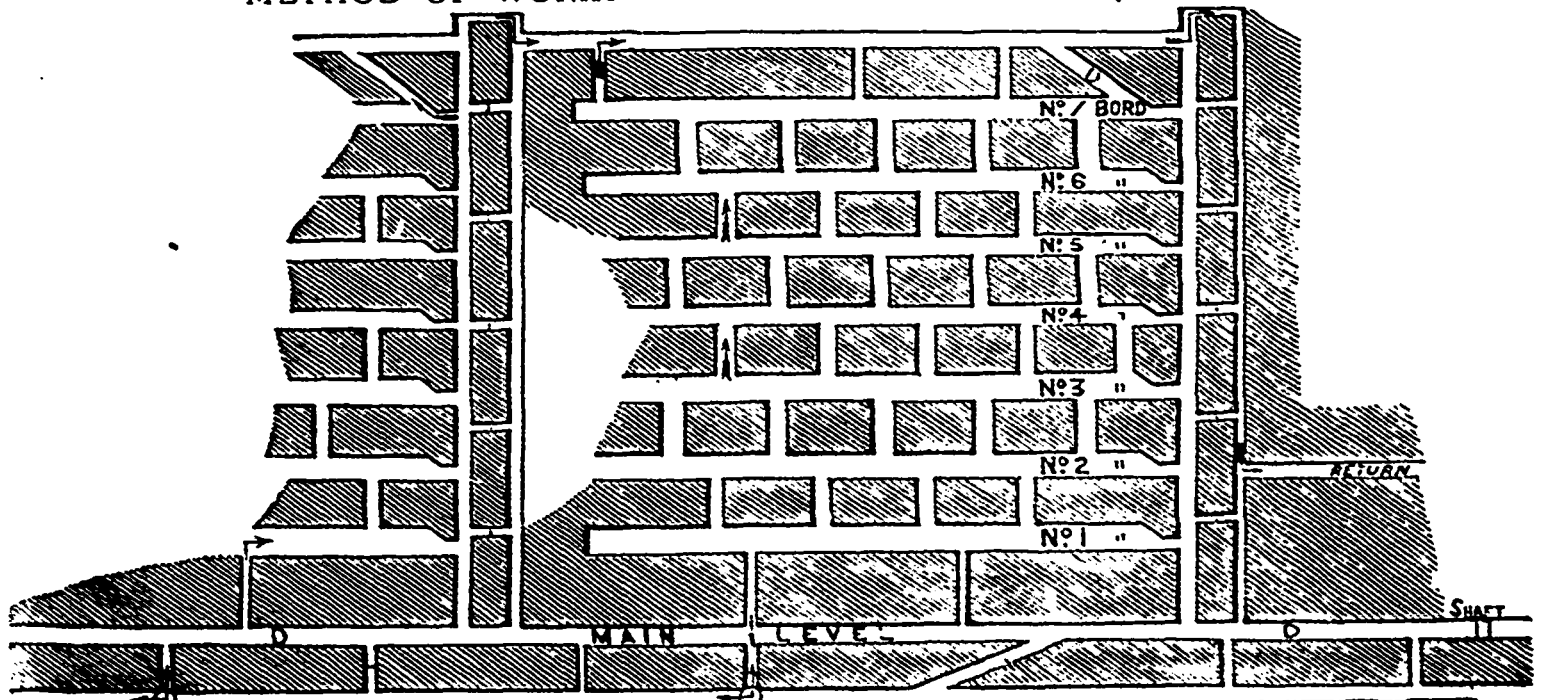
PLAN No. 3.

SCALE 30 Yds. = 1/2 OF AN INCH.

PLAN No. 1.

This sketch shows the old method of working pitching seams referred to in My issue of this paper.

METHOD OF WORKING PITCHING SEAMS.—NOVA SCOTIA.



SCALE 30 Yds. = 1/2 OF AN INCH.

PLAN No. 2.

the gauge of the pit tubs, usually from 1 foot 6 ins. to 2 ft. 6 ins., and provided with the usual switches. The signalling is done by wire signal cord striking a gong or giving a blow by means of a hammer on an iron plate. This method answers with a well stretched wire neatly hung and smartly handled, but electric signals would prove more satisfactory. The writer understands that the experience of H. S. Poole, Esq., agent, with electric signalling at the Acadia Colliery is so far satisfactory. Telephonic communication between the pit workings and the bank head has been tried, but at present is in operation only at the Vale Colliery. There is an arrangement made at some mines, whereby the ascending train of loaded tubs by striking a lever a few yards before the bankhead is reached rings a bell in the engine room and cautions the engine tender. To prevent the empty tubs from running down the slope should they escape the bankman's hands, a weighted lever is placed at the head of the slope, between the rails of the track for the empty tubs. When at rest, the unweighted end rises above the rails so as to engage with any descending tubs, while it offers no obstacle to the passage of ascending tubs, which are heavier than the weighted end.

In the flatter lying seams of Cape Breton, the methods of winning and working the coal do not differ materially from those common in England. Usually the levels are driven in pairs from the shaft bottom. Gate or horse roads are turned away from them, and the bords opened out of the horse roads at such angles as may best suit the requirement of the mine. As the bords advance the gate road is frequently turned up the first bord until it reaches a point near the working faces, when it resumes its normal course, so as to shorten haulage.

At the Gowrie Colliery bords are driven eleven yards wide and the pillars left seven yards thick. When the bord is first started a road is laid on each side, and the dirt, etc., are stowed in the centre. Afterwards a cut is made through the stowage, and the double road maintained only at the face. By this system under a moderate cover, the maximum of coal is got at the first operation, and the drawing of the pillars when the rooms have gone their distance, should give a good pillar coal with little danger of creep.

Pillarage.—The shape and size of pillars varies with the depth of the seam, and the nature of the roof. The earliest workings along the crops of the seams left small square pillars, which have frequently crushed and caused trouble by the admission of surface waters.

At Springhill between the 1,300 and 1,900 feet levels, the main "level pillar" is 100 feet thick, then succeed 12 feet bords, with 35 feet pillars, with the middle pillar of the balance 50 feet thick. There are seven bords on each balance, and the block of coal between the 1,300 and the 1,900 feet level is 550 feet wide. The loss of coal in working the bords and heads is about 18 per cent, and when taking out the pillars the loss is 15 to 20 per cent. in the high coal (9-14 feet), and in the low coal (4 feet thick) about 5 per cent. At the Albion Colliery, when working nine to fifteen feet of the upper part of the main seam at a depth of 90 feet, the bord pillars were left 35 feet wide and from 75 to 100 feet long, the level pillars being a little thicker.

In Cape Breton, at the Sydney (main seam) workings, in the earlier mining, the bords were 6 or 7 yards wide, and the pillars 10 by 14.5 yards. In the Queen Pit workings, 360 feet deep, the bords were 5½ yards wide. In the present workings, 600 to 800 feet deep, the size

of the bords has not been altered, but the pillars have been made a little larger.

These examples will serve to show the practice generally adopted. In a few collieries the extraction of pillars is systematically carried on, and usually closely follows the completion of a panel of bord and pillar workings. No regular rule has been laid down for the initiation and conduct of the operation. In some mines, as soon as the workings of any lift are finished, the pillars are drawn back; in others the pillars of each balance or shoot are drawn to suit the trade. The experience so far gained is in favor of former practice. Frequently, the extraction is so arranged, that the upper pillars are worked in advance of the lower ones, under a belief that by this means the roof is most readily let down and settled. In other cases the line of the full dip is taken as the range of the working faces.

The top and bottom pillars, forming the high and low sides of the levels of the various lifts, are allowed to remain untouched, in order to provide for drainage, etc., or the bottom pillar, immediately above the main level, is left to be taken out in the extraction of pillars in the next lift, whenever there is other provision made for air, etc. The pillars are either attacked from the lower end next the goaf, and carried back the full width, or a head is driven into the pillar and widened out sideways, first toward the goaf and then backward. The aim is to allow the roof to fall as quickly and completely as possible, to prevent weight from being thrown down-hill on the levels or any lower workings, and the timbering is proportioned so as to afford protection only for the removal of the succeeding pillar. But it will be understood that in steep seams, with questionable roof, having a thickness of from 10 to 15 feet, no hard and fast rule can be carried out.

In the flat lying seams of Cape Breton, little pillar work has been done except at the Caledonia Colliery, where the pillars lying under a pressure of 100 to 200 feet, and of good dimensions, have been successfully drawn.

In many cases, however, the pillarage has been viewed rather from the standpoint of a support to the roof than as a future supply of coal. The great question is that of water, and no doubt in many of the Cape Breton collieries worked at shallow depths, the increased pump costs would, at the present price of coal, outweigh any gain from the cheapness with which it can be mined in comparison with bord coal.

At present the most advanced mining practice in the province, is in favor of moderate sized pillars, to be drawn at the earliest possible moment. Even adopting this principle, except in a case of a few mines, the conditions of trade are unfavorable to extended and systematic pillar workings at considerable depths, for the shipments are interrupted during the depth of winter. When pillars are not taken out, the percentage of coal removed may vary between 25 and 35 per cent., when they are drawn, as high as 90 per cent. of the seam has been gained.

In Cape Breton the coal lying, as already mentioned, at easy angles is attacked through shafts, except at the Victoria and Reserve collieries. At the Victoria mine, at Low Point, the seam lies a heavy angle. Here two slopes spread out on the half pitch of the seam, and have, intermediate between them, one driven on the full pitch of the seam. This is used for ventilation and pumping, and will ultimately serve for the tail ropes of a system of haulage, which will pick up the tubs in the level and haul them direct to bank. The empty tubs running down the slopes by their own weight, will be taken

along the levels by the tail ropes. This arrangement will do away with the live horses. The balance system has been adopted here.

At the Reserve mine the seam was opened by a slope, but the mining wisdom of this procedure is doubtful, the seam lying at so low an angle that the empty tubs are landed with difficulty at the bottom of the slope. In order to provide more pit room, at a point in the slope, about ten chains from its mouth, a steeper slope, having an inclination of one in three and a half, has been driven to intersect the Emery seam lying 95 feet below the one at present worked. The following table shows the depth of the main shafts of the principal collieries:—

Sydney,	681 feet.	Round diameter 13 ft.
International,	87 "	14.5 by 16.5 ft.
Glace Bay,	224 "	10.5 by 11 ft.
Caledonia,	205 "	11 by 11 ft.
Gowrie,	260 "	11.5 feet diameter.

At the Sydney mines of the General Mining Association is found the largest shaft plant working in the Province. The main pump and back shafts were sunk under unusual difficulties from heavy feeders of water. The shafts are situated at the Northern point of Sydney Harbor, a few yards from the sea shore, and were intended to command the coal in an area of four square miles extending under the sea. At a depth of 200 feet heavy feeders of salt water reaching 1800 gallons per minute were met, and after severe exertions they were stopped by cast iron tubing.

The following memorandum of tubing used in the new shafts will be of interest:—

	Depth tubbed,	Segments,	Weight lbs.
Winding shaft,	275 ft. 6 in.	1269	658,724
Pumping "	284 ft. "	1168	569,639
Staple "	283 ft. 3 in.	736	323,975

1,552,338

Underground, two large engines stand near the shaft bottom, and draw the coal along a rise engine plane with dip slants. The rope on the main level is an endless one. The train of full tubs starting from the landing near the face of the plane run by gravity to the pit bottom, and the train of empties is, drawn out by the tail rope. By means of spare ropes lying in the dip slants, this system can be extended in any direction, and has been found to work satisfactorily for a number of years. Under this arrangement, horses are used only to collect and distribute the tubs from the landings and working falls, and their employment for the long live haulage, which is over a mile on one side of the pit, is avoided.

At the International mine the coal to the rise of the shaft (80 feet deep) having become exhausted, a slope was driven from a point a few yards to one side of the shaft, on the full dip of the seam, for a distance of about 2,500 feet, and at an inclination of 5½°. The engine stands at bank and is signalled from the foot of the slope. The track is of the ordinary character, and a double rope being used, the employment of an automatic switch allows the train of empty tubs to pass the full ones, irrespective of the landing they are being drawn from.

At the Caledonia mine a portable engine and boiler have been placed underground at the head of the slope driven to the full dip. The smoke is led into the return. The system of raising steam underground is open to objections. Precautions are taken to remove the soot, and to lessen its liability to combustion, but any fire underground is a standing menace to a mine.

The writer is pleased to learn that preparations are being made to generate the steam, for the underground haulage at the surface, as such an

arrangement must add to the safety of the pit.
 At the Gowrie mine the haulage from the dip slant is conducted on a system resembling that referred to as adopted at the International.
 The tables of machinery will give full particulars as to size of engines above and below ground, their loads, steam supply, etc.

VENTILATION.

The furnace was employed for ventilating the Nova Scotia mines, until a change was made in 1871, by the introduction of a Guibal Fan at the Albion mines. This fan was ten feet wide, and thirty feet in diameter, and yielded 75,000 cubic

feet per minute at 47 revolutions, being driven by a direct acting engine having a 24 in. stroke, and 24 in cylinder. The length of air ways was about 15,000 feet. Afterwards fans were introduced at the Sydney, Intercolonial, Low Point, and Springhill collieries. At the latter the seams being inclined and close together, it was found practicable to use "blow down" fans placed directly over the downcast and driven by a belt, so as to air the mine in sections having comparatively short airways. The volumes of air in cubic feet passed per minute by these fans vary from 15,000 to 89,000. The highest record being that of the Intercolonial colliery, which during the year 1887 maintained an average

monthly circulation of about 85,000 cubic feet.

In Cape Breton at the Reserve, International, Caledonia, and Gowrie mines, furnaces are still used, but the rapid extension of the workings of these collieries during the past few years, renders a more efficient ventilating power imperative. At one mine only, the Gowrie, is there any opportunity given for the furnace to do proper duty. Here it is placed near the bottom of the drawing shaft, being connected with it by an ascending drift, which enters the shaft above the door heads.

Its dimensions are, length of bars 7 feet, height of bars above floor 2 ft. 6 in., width of bars 7 ft. 8 in., length of heated column 307 feet, height of crown of arch above bars, 5 feet.

The total length of air course is about 170,000 feet, least sectional area, 56 ft., average sectional area, 64 ft. There are two air courses, 8,000 and 9,000 feet long. This furnace passes on an average, 44,000 cubic feet of air per minute, with a consumption of about 1½ tons of coal during the twenty-four hours. The capacity of the furnace could be increased to about 50,000 feet if required.

At the other mines, wooden chimnies fifty to eighty feet high have been placed on the shallow crop pits, which were first used for ventilating, but as the efficiency of the furnace increases in a ratio much smaller than the increase in length of the upcast, these additions give little assistance. The furnaces are of the usual pattern, being of brick, with arched roof, and having the grate about 2 feet from the floor, about 6 feet wide, and 9 feet long. The volumes of air passed vary from 20,000 to 43,000 per minute, the consumption of coal varying from one to two and a quarter tons a day.

The furnace under favoring conditions of large grate area, roomy air ways, and a long heated column, forms an efficient ventilator, but the last named condition in our mines is but partially presented at the Gowrie colliery. At present, they are operated under conditions which should lead to the prompt replacement of the furnace system by mechanical ventilators.

The cost of the latter, if one of the smaller and semi-portable patterns be adopted, is but little larger, and it yields a much greater efficiency on the basis of coal consumption. Its work can be constantly supervised, its maximum capacity readily reached, and in case of accident if it be properly placed, it is readily available for renewing the ventilation of the patterns adopted here. The Guibal has most satisfactorily stood the test of steady and long continued

(To be Continued.)



MONEY ORDERS.

MONEY ORDERS may be obtained at any Money Order Office in Canada, payable in the Dominion; also in the United States, the United Kingdom, France, Germany, Italy, Belgium, Switzerland, Sweden, Norway, Denmark, the Netherlands, India, the Australian Colonies, and other countries and British Colonies generally.

On Money Orders payable within Canada the commission is as follows:

If not exceeding \$4.....	2c.
Over \$4, not exceeding \$10.....	5c.
" 10, " " 20.....	10c.
" 20, " " 40.....	20c.
" 40, " " 60.....	30c.
" 60, " " 80.....	40c.
" 80, " " 100.....	50c.

On Money Orders payable abroad the commission is:

If not exceeding \$10.....	10c.
Over \$10, not exceeding \$20.....	20c.
" 20, " " 30.....	30c.
" 30, " " 40.....	40c.
" 40, " " 50.....	50c.

For further information see OFFICIAL POSTAL GUIDE.

Post Office Department, Ottawa.
 15th Sept., 1888.



SEALED TENDERS addressed to the undersigned, and endorsed "Tender for supplying Coal for the Public Buildings, Ottawa," will be received at this office until THURSDAY, 11th JULY next.

Specifications can be seen and forms of tender obtained on and after Friday, the 21st June, at this office, where all necessary information can be had on application, also at the office of James Nelson, Architect, Montreal, and at the Dominion Public Works Office, Post Office, Quebec.

Each tender must be accompanied by an accepted bank cheque for the sum of \$30, made payable to the order of the Honourable the Minister of Public Works, which will be forfeited if the party declines to enter into a contract when called upon to do so, or if he fails to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,
 A. G. BEIL,
 Secretary.

Department of Public Works,
 Ottawa, 11th June, 1889.

SPECIAL MIXTURE USED **WRITE FOR PRICES** **FOR SHOES & DIES**

JAMES S. NOAD,
MINING AGENT
 AND PROMOTER OF AND DEALER IN
 Mines and Mining Properties,
MONTREAL, CANADA.

MINES AND MINING PROPERTIES.
 The undersigned, representing a London Syndicate, is prepared to negotiate for desirable Mines and Mining Properties, for the purpose of forming them into Joint Stock Companies, or providing cash capital for their proper development.
 Address or call on
JAMES S. NOAD,
 Montreal.

JAMES S. NOAD,
MINING AGENT
 AND PROMOTER OF AND DEALER IN
 Mines and Mining Properties,
MONTREAL, CANADA.

ASBESTOS CRUDE AND MANUFACTURED FOR ALL PURPOSES.
ASBESTOS Cloths, Pacings, Furnace Cements, Paper, Stove Linings, &c.
SPECIALTIES: FIREFELT, a flexible Asbestos Sheet, made in tubular sections and rolls, best and most durable non-conductor made.
 SUPERATOR, a strong fire & waterproof fabric for sheathing & roofing buildings, fire proofing boiler rooms, &c.
THE CHALMERS-SPENCE CO.,
 419 TO 425 EIGHTH ST., NEW YORK. **ASBESTOS,**

POSITION WANTED.

A practical Certificated Colliery Manager is open for engagement. Twenty years experience in every system of Coal Mining in some of the largest collieries in the North of England and in Nova Scotia. Large experience in sinking and timbering shafts.

Address:

COLLIERY MANAGER,
Canadian Mining Review,
Ottawa, Ont.

FOR SALE.

Asbestos Mines.

On Lots 27, 28 and 29, in Range A, of Colrairie, Megantic County, P. Q.

300 ACRES,

One Mile from Quebec Central Railway.

Free from Reserves or Royalties.

James Reed,

Reedsdale, Megantic, P. Q.

RUSSELL & CO.

PROVINCIAL AND DOMINION

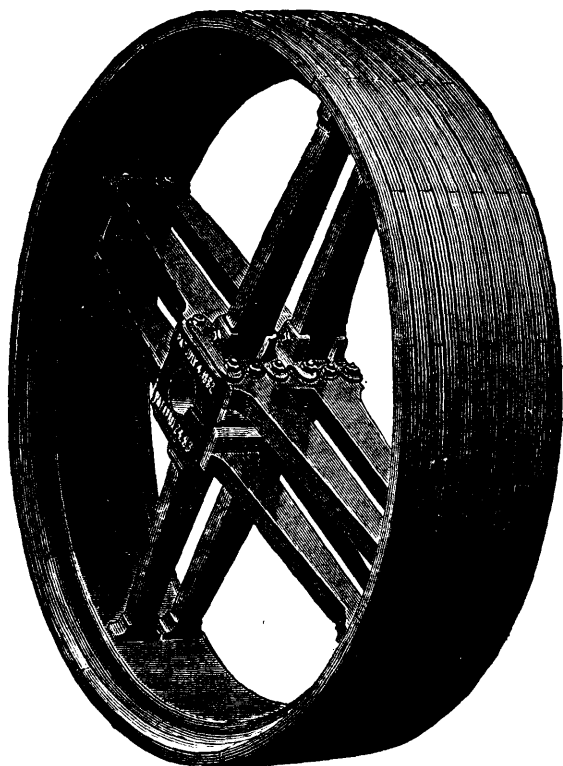
LAND SURVEYORS,

CIVIL AND MINING ENGINEERS,
PORT ARTHUR, ONTARIO.

Mining Properties Surveyed, Reported on and Dealt in.

Latest and Most Complete Plans of Thunder Bay Mining District Always on Hand.

A. L. RUSSELL, A. H. MACDOUGLL, W. W. RUSSELL
P. L. S., D. L. S. P. L. S., D. L. S. M.E.A.M.C.A.N.S.O.C.C.E



DODGE PATENT

Wood Separable Split Pulleys

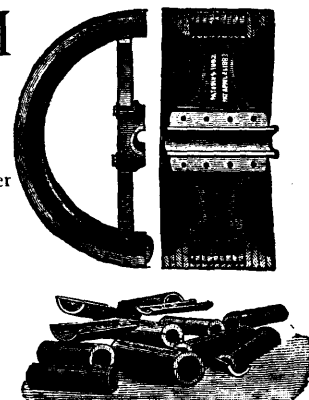
Best Belt Surface, Lightest, Strongest, Best Balanced and Most Convenient Pulley in the World.

WITH OUR PATENT BUSHING SYSTEM

In Comparing Prices of Pulleys please note carefully the following:

1. Our list is lower than most others.
2. Every Pulley is a Split Pulley.
3. Every Pulley is guaranteed to transmit from 25 to 60 per cent. more power than an iron one with same tension of belt.
4. Our Pulleys are 70 per cent. lighter than iron pulleys.
5. The fastening does not mar the shaft.
6. They are perfect in Balance.
7. They can be used on many different sizes of shafting.
8. They are the most thoroughly made wooden pulleys in the world.
9. And the handsomest pulley on the shaft.
10. No chances to take. Every pulley as represented or no sale.

Order a Sample Pulley, after which you will have no other.



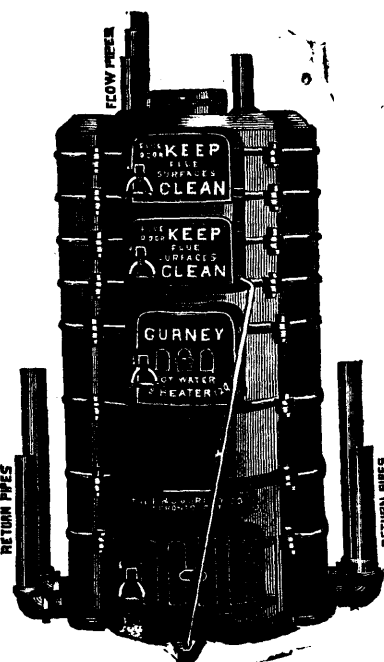
EVERY PULLEY IS A SPLIT PULLEY
Made in any size from 9 inches to 16 ft. diameter with original bores of 3 and 3½ inches, bushings to be used for intermediate sizes; larger ones bored to order.

WE ALSO MANUFACTURE
WOODEN GROOVED PULLEYS FOR THE TRANSMISSION OF POWER BY MANILLA ROPE,

Under the Dodge Patent System from 5 to 500 h. p. State power to be transmitted, speed of shafts, relative position of shafts, distance between shafts, and we can furnish a clear estimate.

EVERY PULLEY WILL FIT.
22 or more sizes of Shafting.
200 of our Pulleys and an assortment of bushings represent as many as 4,000 iron pulleys, a great advantage to dealers carrying stock.

APPLY FOR PARTICULARS TO **The Dodge Wood Split Pulley Co., 81 & 111 Adelaide Street West, Toronto.**



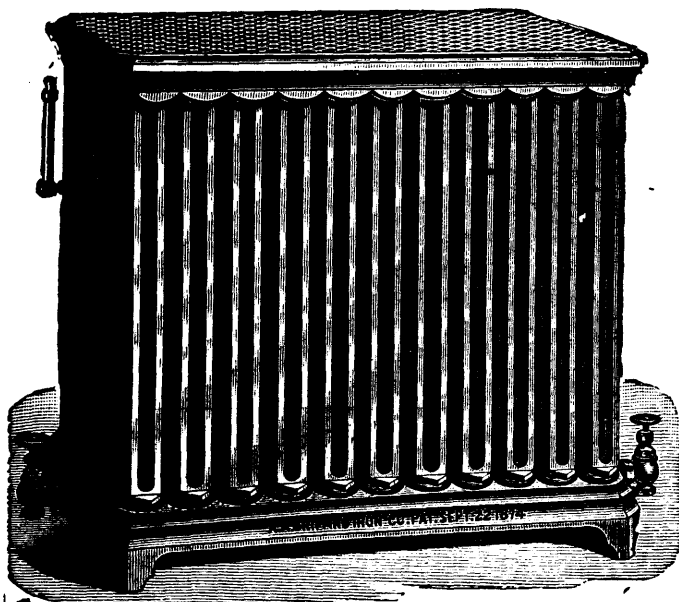
USE
GURNEY'S
IMPROVED CELEBRATED
Hot Water Heaters!

Guaranteed more Economical than any other Heater now made, and containing every known Improvement in Hot Water Heating.

STEAM FITTINGS, CAST IRON PIPE, REGISTER, GRATES, ETC.

HOT AIR FURNACES
FOR COAL OR WOOD.

E. & C. GURNEY & CO.,
MONTREAL.



Bundy Radiators for Quick Circulation and Economy of Space.

**VALUABLE
PLUMBAGO**

AND OTHER

**Mineral Lands
FOR SALE,**

IN THE TOWNSHIP OF BUCK-
INGHAM, COUNTY OF
OTTAWA.

1st.—Lot 28, in the 6th range, containing 100 acres, in addition to the salina of the lake.

2nd.—North half of lot 23, in the 5th range, containing 100 acres.

3rd.—Nine acres of lot No. 28, in the 5th range, with water privileges thereto appertaining, being site of mill dam, etc., etc.

The property formerly belonged to the Montreal Plumbago Mining Company, and was worked successfully for several years, until the company's mill was destroyed by fire, but the mill dam remains almost uninjured, and there are on the property several houses, sheds, etc., built for various purposes when mining operations were carried out.

The Plumbago Deposits

upon the property are regarded as amongst the richest and most extensive in the Dominion. As to the quality of the Plumbago, it has been extensively used in the manufacture of crucibles, lubricating leads, stove polish, etc., etc., and given unbounded satisfaction. This is established by the experience of consumers, and by a certificate from the celebrated Battersea Crucible Works, London, England, a copy of which is open for inspection.

MICA

has also been discovered in quantity

The lands are in the Phosphate region, and recent prospecting has disclosed a rich and extensive deposit of this mineral. There are unrivalled facilities for transporting the ore to and from the mines by the Ottawa River and C. P. Railway. Distance from mines to Railway Station 6 miles. Good road.

All that is required to make these valuable mines handsomely remunerative is a little capital and enterprise.

The Title is Indisputable.

For information apply to

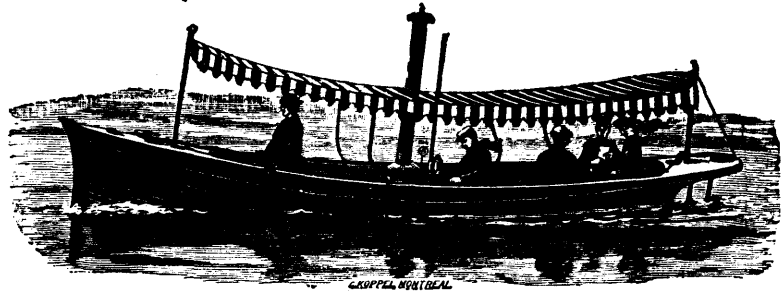
WM. H. DICKSON,
160 Waller St., Ottawa.

H. E. DICKSON,
Russell House, Ottawa.

OR TO THE OFFICE OF

THE CANADIAN MINING REVIEW,
OTTAWA.

**SHIPMAN ENGINES, ACME MODEL.
COAL OIL FOR FUEL.**



To parties requiring a safe, reliable, durable and economical Steam Launch, from 20x4 to 35x7 with ample power to give satisfactory speed, we can supply the best on the market and at prices which will defy competition for a like quality of goods. We have a full staff of competent boat and engine builders and guarantee every article to be strictly first class. Hundreds of our engines from 1 to 12 h. p. Marine or Stationary have been in use for years and are acknowledged superior to all others. No smoke, dirt or sparks, no manual or mechanical labor necessary. You have the privacy of your launch for your family. As the water and oil supply is automatic very little attention is required. But a few minutes is necessary to get up 100 lbs. of steam; when you return to the boat house by turning a hand wheel all fire is extinguished. Orders for coming season should be placed at once, as the demand is much in excess of previous years. Write for 1889 circulars giving prices, testimonials, etc. No attention paid to postal cards.

JOHN GILLIES & CO., Carleton Place, Ont.

**JOHN A. ROEBLING'S SONS CO.
WIRE ROPE**

—FOR—

Mines, Elevators, Inclines, &c.

GALVANIZED GUY ROPE. BRIDGE CABLES.
HAWSER ROPES.

WIRE of all kinds. Insulated WIRES

John A. Roebling's Sons Co.

117 & 119 LIBERTY St., NEW YORK.

H. L. SHIPPY Sec'y.

**PHOSPHATES,
PHOSPHATIC MANURES,
AGRICULTURAL FERTILIZERS**

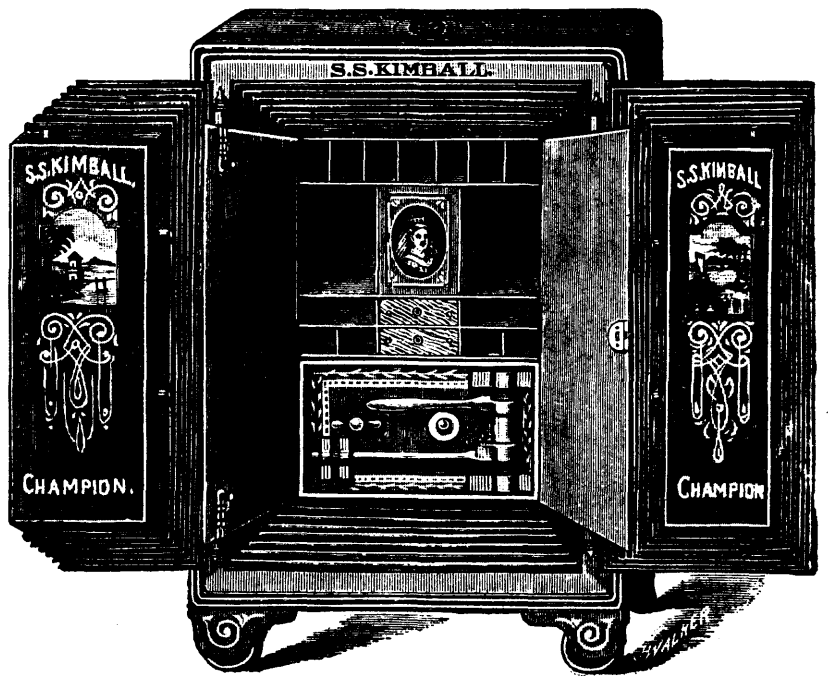
Readers of the REVIEW desiring extra copies of SCIENTIFIC AGRICULTURE should SEND IN THEIR ORDERS NOW. A few SPACES are still open and contracts may be made at reasonable rates. Address Manager, THE CANADIAN MINING REVIEW, OTTAWA.

Champion Fire and Burglarproof Safes.

These Safes have the best record of any in the Dominion. Price 30 per cent. cheaper than any other first-class Safe.

SEND FOR CATALOGUE AND PRICE-LIST.

S. S. KIMBALL,
577 Craig St., Montreal.





DEPARTMENT
OF
Inland Revenue.

AN ACT RESPECTING AGRICULTURAL FERTILIZERS.

The public is hereby notified that the provisions of the Act respecting AGRICULTURAL FERTILIZERS came into force on the 1st of January, 1886 and that all Fertilizers sold thereafter require to be sold subject to the conditions and restrictions therein contained—the main features of which are as follows:

The expression "fertilizer" means and includes all fertilizers which are sold at more than TEN DOLLARS per ton, and which contains ammonia, or its equivalent of nitrogen, or phosphoric acid.

Every manufacturer or importer of fertilizers for sale, shall, in the course of the month of January in each year, and before offering the same fertilizer for sale, transmit to the Minister of Inland Revenue, carriage paid, a sealed glass jar, containing at least two pounds of the fertilizer manufactured or imported by him, with the certificate of analysis of the same, together with an affidavit setting forth that each jar contains a fair average sample of the fertilizer manufactured or imported by him; and such sample shall be preserved by the

Minister of Inland Revenue for the purpose of comparison with any sample of fertilizer which is obtained in the course of the twelve months then next ensuing from such manufacturer or importer, or collected under the provisions of the Adulteration Act, or is transmitted to the chief analyst for analysis.

If the fertilizer is put up in packages, every such package intended for sale or distribution within Canada shall have the manufacturer's certificate of analysis placed upon or securely attached to each package by the manufacturer; if the fertilizer is in bags it shall be distinctly stamped or printed upon each bag; if it is in barrels, it shall be either branded, stamped or printed upon the head of each barrel or distinctly printed upon good paper and securely pasted upon the head of each barrel, or upon a tag securely attached to the head of each barrel; if it is in bulk, the manufacturer's certificate shall be produced and a copy given to each purchaser.

No fertilizer shall be sold or offered or exposed for sale unless a certificate of analysis and sample of the same shall have been transmitted to the Minister of Inland Revenue and the provisions of the foregoing sub-section have been complied with.

Every person who sells or offers or exposes for sale any fertilizer, in respect of which the provisions of this Act have not been complied with—or who permits a certificate of analysis to be attached to any package, bag or barrel of such fertilizer, or to be produced to the inspectors to accompany the bill of inspection of such inspector, stating that the fertilizer contains a larger percentage of the constituents mentioned in sub-section No. 11 of the Act than is contained therein—or who sells, offers or exposes for sale any fertilizer purporting to have been inspected, and which does not contain the percentage of constituents mentioned in the next preceding section—or who sells or offers or exposes for sale any fertilizer which does not contain the per-

centage of constituents mentioned in the manufacturer's certificate accompanying the same, shall be liable in each case to a penalty not exceeding fifty dollars for the first offence, and for each subsequent offence to a penalty not exceeding one hundred dollars. Provided always that deficiency of one per centum of the ammonia, or its equivalent of nitrogen, or of the phosphoric acid, claimed to be contained, shall not be considered as evidence of fraudulent intent.

The Act passed in the forty-seventh year of Her Majesty's reign, chaptered thirty-seven and entitled, "An Act to prevent fraud in the manufacture and sale of agricultural fertilizers," is by this Act repealed, except in regard to any offence committed against it or any prosecution or other act commenced and not concluded or completed, and any payment of money due in respect of any provision thereof.

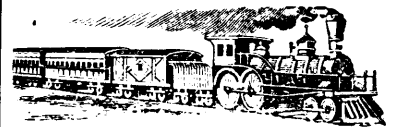
A copy of the Act may be obtained upon application to the Department of Inland Revenue, as well as a copy of a Bulletin which it is proposed to issue in April, 1888, concerning the fertilizers

E. MIALL,
Commissioner.

January, 1889.

PROPERTIES FOR SALE.

Parties having developed or undeveloped mineral lands for sale will find the REVIEW an admirable medium for bringing them before the notice of CAPITALISTS and INVESTORS in GREAT BRITAIN and the UNITED STATES.



THE
Intercolonial Railway
OF CANADA.

The Royal Mail Passenger & Freight
Route between Canada and
Great Britain,

—AND—

Direct route between the West and all points on the Lower St. Lawrence and Baie des Chaleux; also New Brunswick, Nova Scotia, Prince Edward Island, Cape Breton and Newfoundland.

New and Elegant Buffet Sleeping and Day Cars run on through Express Trains.

Passengers for Great Britain or the Continent by leaving Toronto by 8:00 A.M. train Thursday will join Outward Mail Steamer at Halifax Saturday.

Superior Elevator, Warehouse and Dock accommodation at Halifax for shipment of grain and general merchandise.

Years of experience have proved the Intercolonial, in connection with steamship lines to and from London, Liverpool and Glasgow to Halifax, to be the quickest freight route between Canada and Great Britain.

Information as to Passenger and Freight rates can be had on application to

E. KING,
27 Sparks Street,
OTTAWA.

G. W. ROBINSON,
Eastern Passenger Freight Agent,
137½ St. James St., MONTREAL.

D. POTTINGER,
Chief Superintendent.

Railway Offices, Moncton, N.B.
Nov. 20th, 1888.

The Polson Iron Works Co'y

TORONTO, ONT.

Manufacturers of the Celebrated "Brown Automatic Engine"

GENERAL DEALERS IN

MINING MACHINERY.

SPECIAL AGENTS FOR

Knowles' Steam Pumps,

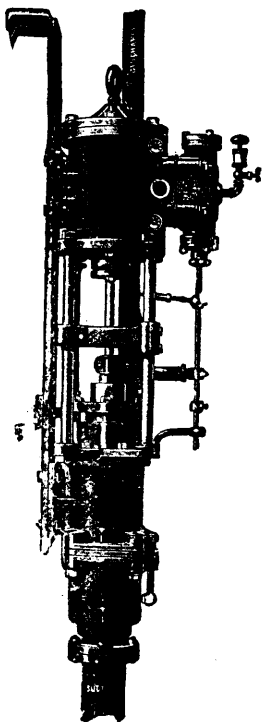
B. T. Sturtevant's Blowers and Fans,

Burleigh Rock Drills.

Hoisting Engines and Boilers, Quartz Mills, Diamond Prospecting Drills, Rock Breakers.

Office and Works, Esplanade E.; Warehouse, 38 Yonge St.,

TORONTO.





Mining Regulations

TO GOVERN THE DISPOSAL OF

Mineral Lands other than Coal Lands, 1886.

THESE REGULATIONS shall be applicable to all Dominion Lands containing gold, silver, cinnabar, lead, tin, copper, petroleum, iron or other mineral deposits of economic value, with the exception of coal.

Any person may explore vacant Dominion Lands not appropriated or reserved by Government for other purposes, and may search therein, either by surface or subterranean prospecting for mineral deposits, with a view to obtaining under the Regulations a mining location for the same but no mining location or mining claim shall be granted until the discovery of the vein, lode or deposit of mineral or metal within the limits of the location or claim.

QUARTZ MINING

A location for mining, except for iron on veins, lodes or ledges of quartz or other rock in place shall not exceed forty acres in area. Its length shall not be more than three times its breadth and its surface boundary shall be four straight lines, the opposite sides of which shall be parallel, except where prior locations would prevent, in which case it may be of such a shape as may be approved of by the Superintendent of Mining.

Any person having discovered a mineral deposit may obtain a mining location therefor, in the manner set forth in the Regulations which provides for the character of the survey and the marks necessary to designate the location on the ground.

When the location has been marked conformably to the requirements of the Regulations, the claimant shall within sixty days thereafter, file with the local agent in the Dominion Land Office for the district in which the location is situated, a declaration or oath setting forth the circumstances of his discovery, and describing, as nearly as may be, the locality and dimensions of the claim marked out by him as aforesaid; and shall, along with such declaration, pay to the said agent an entry fee of FIVE DOLLARS. The agent's receipt for such fee will be the claimant's authority to enter into possession of the location applied for.

At any time before the expiration of FIVE years from the date of his obtaining the agent's receipt it shall be open to the claimant to purchase the location on filing with the local agent proof that he has expended not less than FIVE HUNDRED DOLLARS in actual mining operations on the same; but the claimant is required, before the expiration of each of the five years, to prove that he has performed not less than ONE HUNDRED DOLLARS' worth of labor during the year in the actual development of his claim, and at the same time obtain a renewal of his location receipt, for which he is required to pay a fee of FIVE DOLLARS.

The price to be paid for a mining location shall be at the rate of FIVE DOLLARS PER ACRE, cash, and the sum of FIFTY DOLLARS extra for the survey of the same.

No more than one mining location shall be granted to any individual claimant upon the same lode or vein.

IRON.

The Minister of the Interior may grant a location for the mining of iron, not exceeding 160 acres in area which shall be bounded by north and south and east and west lines astronomically, and its breadth shall equal its length. Provided that should any person making an application purporting to be for the purpose of

mining iron thus obtain, whether in good faith or fraudulently, possession of a valuable mineral deposit other than iron, his right in such deposit shall be restricted to the area prescribed by the Regulations for other minerals, and the rest of the location shall revert to the Crown for such disposition as the Minister may direct.

The regulations also provide for the manner in which land may be acquired for milling purposes, reduction works or other works incidental to mining operations.

Locations taken up prior to this date may, until the 1st of August, 1886, be re-marked and re-entered in conformity with the Regulations without payment of new fees in cases where no existing interests would thereby be prejudicially affected.

PLACER MINING.

The Regulations laid down in respect to quartz mining shall be applicable to placer mining as far as they relate to entries, entry fees, assignments, marking of localities, agents' receipts, and generally where they can be applied.

The nature and size of placer mining claims are provided for in the Regulations, including bar, dry, bench, creek or hill diggings, and the RIGHTS AND DUTIES OF MINERS are fully set forth.

The Regulations apply also to

BED-ROCK FLUMES, DRAINAGE OF MINES AND DITCHES.

The GENERAL PROVISIONS of the Regulations include the interpretation of expressions used therein; how disputes shall be heard and adjudicated upon; under what circumstances miners shall be entitled to absent themselves from their locations or diggings, etc., etc.

THE SCHEDULE OF MINING REGULATIONS

Contains the forms to be observed in the drawing up of all documents such as:— "Application and affidavit of discoverer of quartz mine," "Receipt for fee paid by applicant for mining location," "Receipt for fee on extension of time for purchase of a mining location," "Patent of a mining location," "Certificate of the assignment of a mining location," "Application for grant for placer mining and affidavit of applicant," "Grant for placer mining," "Certificate of the assignment of a placer mining claim," "Grant to a bed rock flume company," "Grant for drainage," "Grant of right to divert water and construct ditches."

Since the publication, in 1884, of the Mining Regulations to govern the disposal of Dominion Mineral Lands the same have been carefully and thoroughly revised with a view to ensure ample protection to the public interests, and at the same time to encourage the prospector and miner in order that the mineral resources may be made valuable by development.

COPIES OF THE REGULATIONS MAY BE OBTAINED UPON APPLICATION TO THE DEPARTMENT OF THE INTERIOR.

A. M. BURGESS,

Deputy Minister of the Interior.

SEND FOR SAMPLES AND PRICES FOR

Asbestos Bags, Phosphate Bags, Ore Bags, &c.,

SPECIAL SIZES MADE TO ORDER.

DOUBLE SEWN.

DICK, RIDOUT & CO.,

PROPRIETORS TORONTO BAG WORKS,

Office and Warehouse: 11-13 Front St. East. Factory: 14, 16, 18, 20, 22 Bay St.

ESTABLISHED 1887.

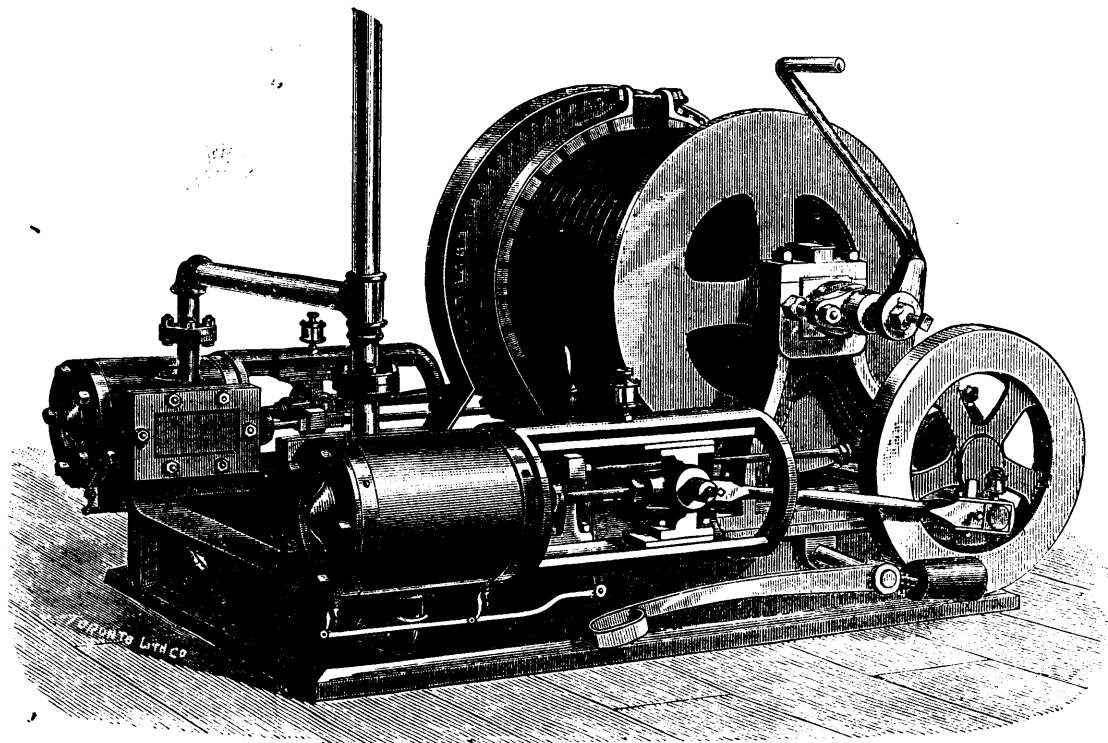
TORONTO.

JOHN DOTY ENGINE CO.

Toronto, Ont.

MANUFACTURERS OF

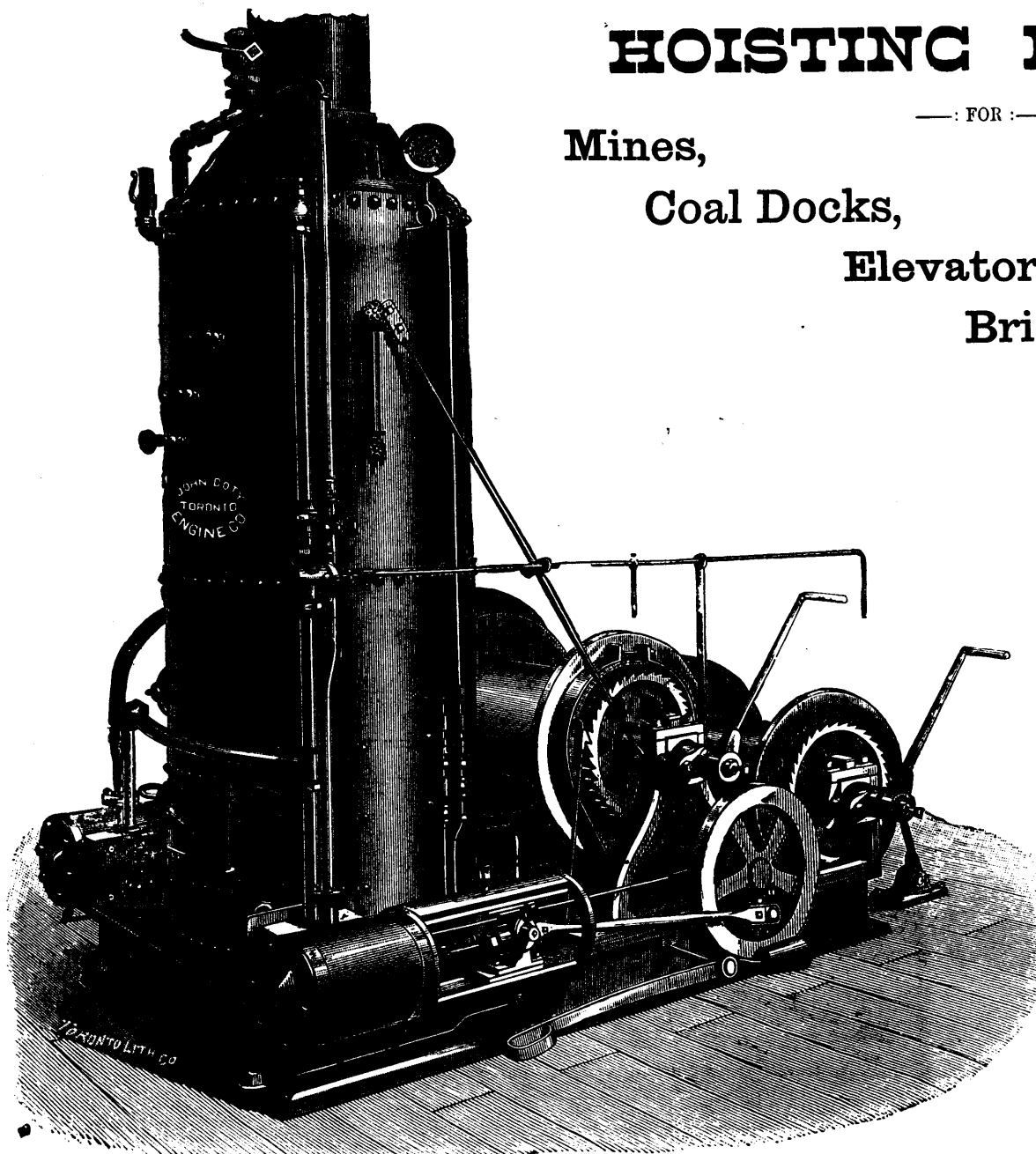
Mining & General
Machinery.



HOISTING ENGINES

— FOR —

Mines,
Coal Docks,
Elevators,
Bridge Builders,
Contractors, &c.



CORLISS ENGINES

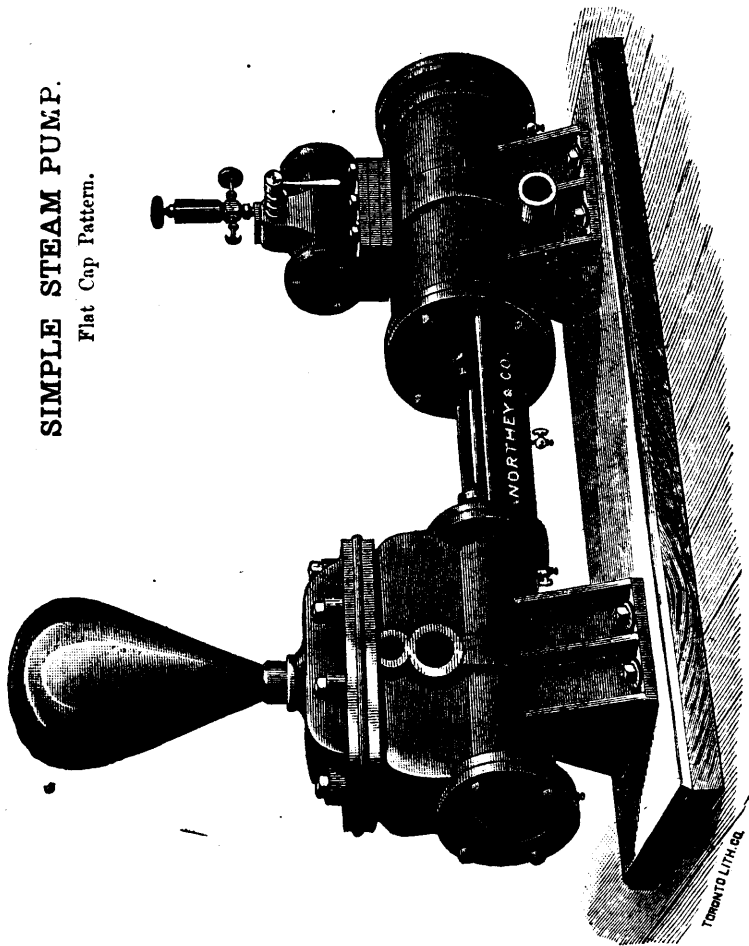
Tug & Steam Yacht Engines,
Mill Engines.

Shafting & Mill
Gearing.

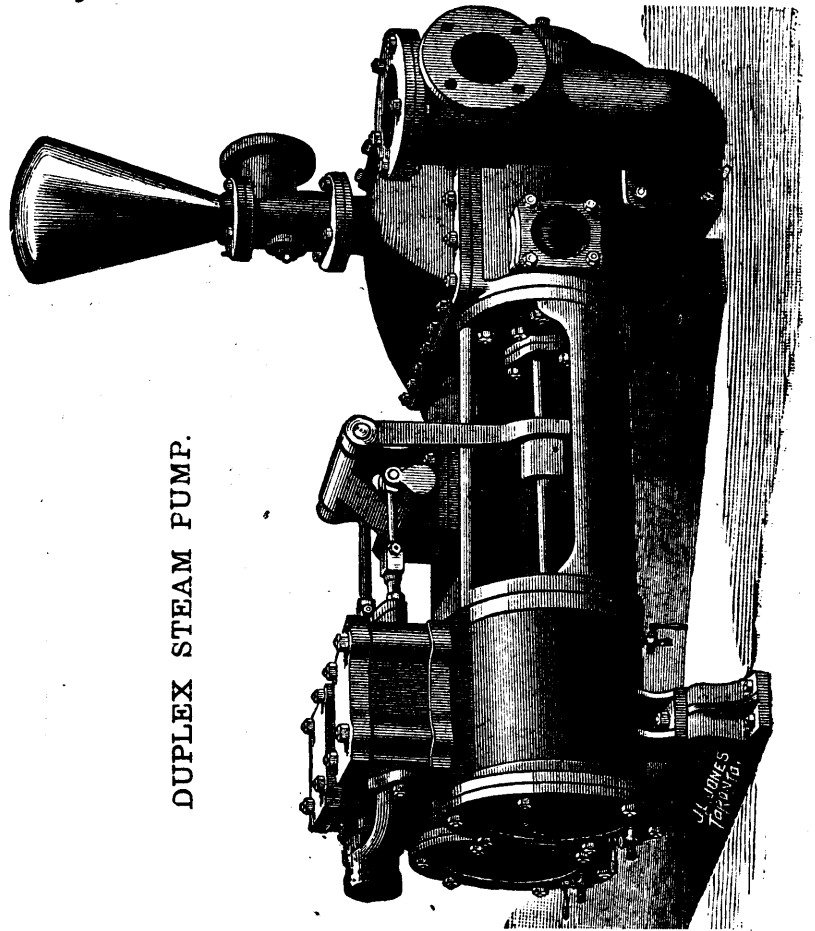
All Descriptions of Boiler
and Tank Work.

Send for Estimates and
Catalogues.

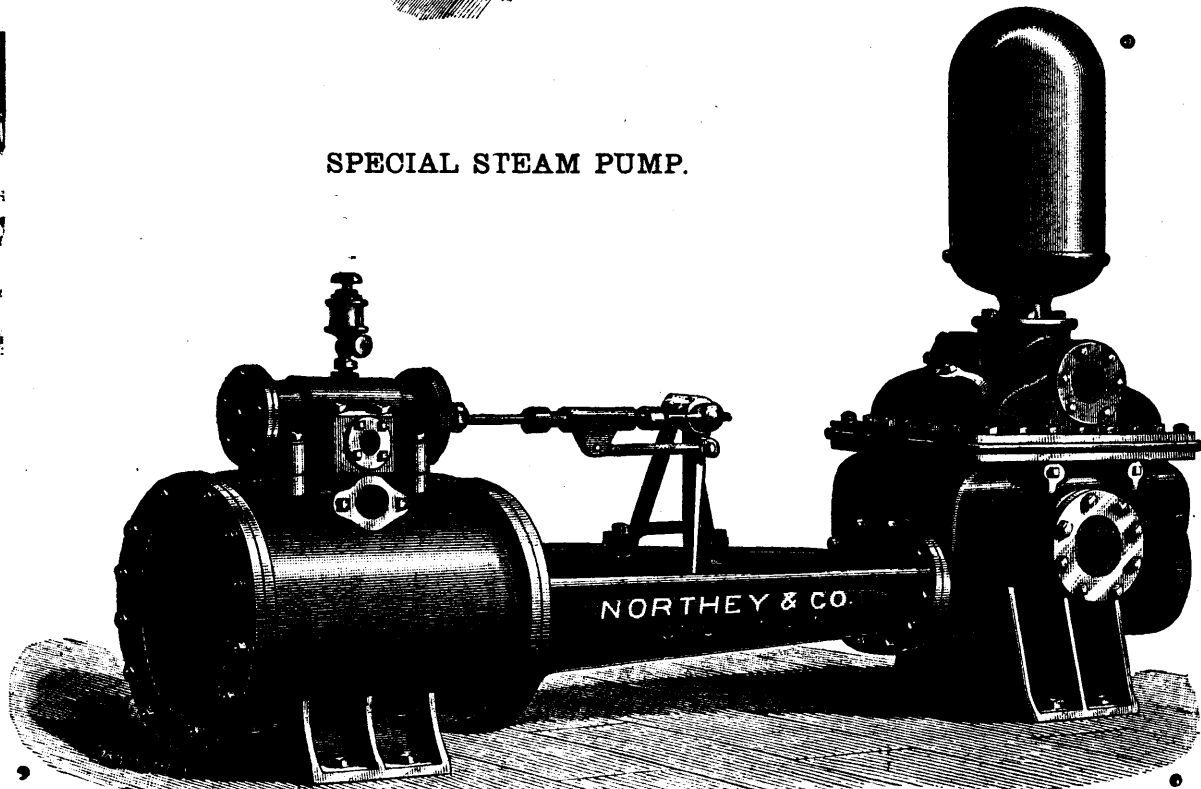
Northey & Co's Steam Pump Works, TORONTO, ONT.



SIMPLE STEAM PUMP.
Flat Cap Pattern.



DUPLEX STEAM PUMP.



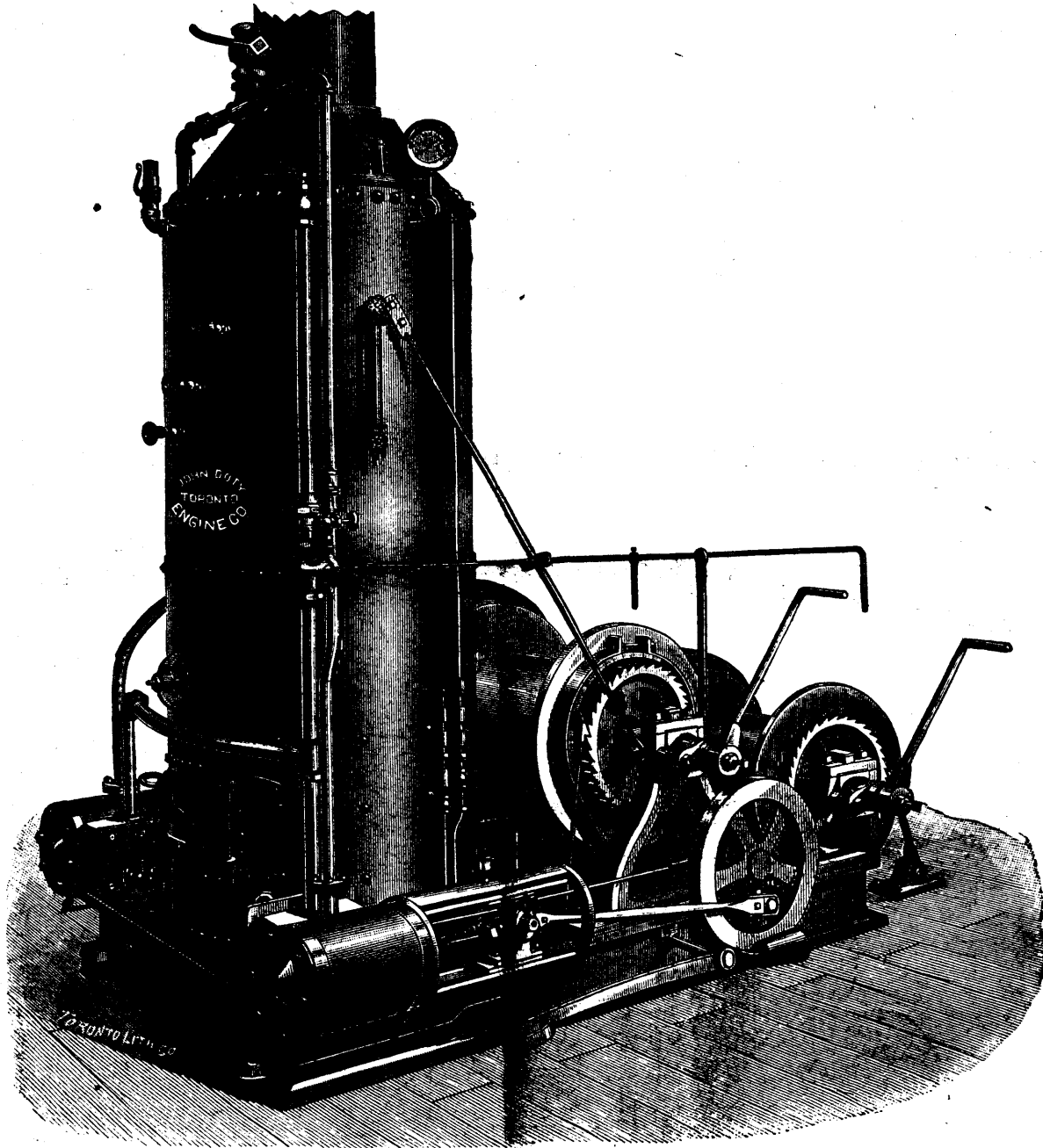
SPECIAL STEAM PUMP.

Steam Pumps of the best and latest designs for mining purposes, Boiler Feeding, Fire Protection, and General Water Supply, etc.

NORTHEY & CO.,
Mechanical  Hydraulic Engineers, Toronto, Ont.
WORKS—COR. FRONT AND PARLIAMENT STS.

THE CANADIAN MINING REVIEW.

A. R. WILLIAMS,
SOHO MACHINE WORKS,
TORONTO, ONTARIO.
MANUFACTURER AND DEALER IN
MACHINERY AND SUPPLIES.



Duplex Steam Pumps, all sizes. Every Pump Guaranteed.

VERY LOW PRICES.

Portable Engines, Hoisting Engines, Stationary Engines, Iron and Wood Working Machinery, Ventilating Fans, Saw Mill and Shingle Mill Machinery. Full lines of Machinery and Supplies. Send for Catalogue,