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SPECIAL REPORT
ON THE
**CONSUMPTION OF PREPARED
NON-METALLIC MINERALS
IN CANADA**

AN INVESTIGATION
to determine the extent of the
market in Canada for finely-
ground non-metallic minerals

Published by authority of the Hon. Thos. A. Low, M.P.,
Minister of Trade and Commerce



OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1923

LIST OF PUBLICATIONS

PREPARED IN THE
MINING, METALLURGICAL AND CHEMICAL BRANCH
DOMINION BUREAU OF STATISTICS

(1) **Mineral Production (Mining and Metallurgy).**

General Reports—

- (a) **Annual Report on the Mineral Production of Canada.**
- (b) **Preliminary Reports (semi-annual) on the Mineral Production of Canada.**

Coal—

- (a) **Annual Report on Coal Statistics for Canada.**
- (b) **Monthly Report on Coal Statistics for Canada.**

In addition to the foregoing reports on mineral production a series of annual bulletins is in preparation each of which will contain statistics relative to a particular metal or non-metallic mineral or to a special section of the mineral industry, and the series when complete will cover every phase of mineral production in Canada.

(2) **Statistics of Manufactures, based chiefly on minerals.**

Summary reports on the sections of manufactures covered by the Mining, Metallurgical and Chemical Branch are issued as follows:—

Annual—

1. **Iron and its Products:** Blast Furnaces and Steel Mills—Foundries and Machine Shops—Iron and Steel Fabrication—Boilers and Engines—Agricultural Implements—Machinery—Motors and Cycles—Car and Car Repairs—Heating and Ventilating Appliances—Wire and Wire Goods—Sheet Metal Goods—Hardware and Tools.
2. **Manufactures of Non-Ferrous Metals:** Aluminium Ware—Brass and Copper Products—Lead, Tin and Zinc Products—Manufactures of the Precious Metals—Electrical Apparatus and Supplies—Miscellaneous Non-Ferrous Metal Goods.
3. **Manufactures of Non-Metallic Minerals:** Abrasive Products—Asbestos Products—Coke and its Products—Gas, Illuminating and Fuel—Glass and its Products—Graphite Products—Petroleum and its Products—Stone and Concrete Products—Miscellaneous Non-Metallic Mineral Products.
4. **Chemicals and Allied Products:** Coal Tar and its Products—Acids, Alkalies, Salts and Compressed Gases—Explosives, Ammunition, Fireworks and Matches—Fertilizers—Medicinal and Pharmaceutical Preparations—Paints, Pigments and Varnishes—Soaps, Washing Compounds and Toilet Preparations—Inks, Dyes and Colours—Wood Distillates and Extracts—Miscellaneous Chemical Industries.

Monthly;

(1) **Production of Iron and Steel in Canada.**

In addition to the foregoing printed summary reports, a series of bulletins is being prepared, each of which deals with a particular phase of manufactures.

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P R E F A C E

The present report on the consumption of certain non-metallic minerals in Canada has been prepared with a view to exploring the possibility of establishing plants in Canada to produce the finely-ground non-metallic commodities used in Canadian industries. The consumption of these commodities in Canada is considerable in the aggregate and comprises many different varieties. Heretofore, though extensive deposits of the crude material are known to exist in Canada and though these deposits are in certain cases being worked, the bulk of the supply has been derived from importations. It has been suggested that it is feasible to substitute Canadian products for certain of these importations and it is the purpose of the present report to present the data required for computing the probable extent of the substitute market which might thus be developed.

The investigation has been carried out under the direction of Mr. S. J. Cook, B.A., A.I.C. F.C.I.C., Chief of the Mining, Metallurgical and Chemical Branch, by Mr. A. C. Young, B.Sc., of the permanent staff.

September 14, 1923.

R. H. COATS,
Dominion Statistician.

DOMINION BUREAU OF STATISTICS

R. H. COATS, B.A., F.S.S., F.R.S.C., Dominion Statistician

S. J. COOK, B.A., A.I.C., F.C.I.C., Chief of the Mining, Metallurgical and Chemical Branch

SPECIAL REPORT ON THE CONSUMPTION OF PREPARED NON-METALLIC MINERALS IN CANADA

Introduction.—A survey of the conditions bearing on the economic practicability of grinding Canadian non-metallic minerals offers many problems of interest to Canadian producers of the raw materials and to manufacturers in many industries. With the exception of sulphur in the native state, whiting, and some special grades of clay, Canada possesses important deposits of almost all the non-metallies most commonly used in industries. While there is a large market in the United States for many crude materials, and at the present time nearly all Canada's feldspar is ground there, the fact remains that although Canadian industries use a large and varied list of ground non-metallies, most of the supply has so far had to be imported since no one commodity offers a sufficiently extensive field to permit of the establishment in Canada of the necessary grinding facilities. Some of the difficulties to be overcome are (1) the restricted home market, (2) unfavourable foreign tariffs, and anti-dumping laws against Canadian prepared materials, (3) high freight rates and classification placed on prepared non-metallies as compared with the rate on the crude material, (4) the necessity of building and equipping a plant such that many different commodities may be ground and prepared without contamination, (5) the natural antipathy of many workmen to changing from an imported product which they have long been accustomed to use. On the other hand many difficulties may be successfully met by substituting new and cheap materials for many of those now imported, and with the amount of research being done such a probability is always to be considered. Further, the consumption of these prepared non-metallies is bound to increase as industries develop.

The minerals now being consumed in Canada in the ground or prepared form are actinolite, barytes, calcite, whiting, dolomite, corundum, feldspar, fluor spar, gypsum, lime, magnesite and magnesia, mica, iron oxides, quartz, or silica, including siliceous flint, tripolite and talc. Of these, gypsum and magnesite are produced in considerable tonnages, are calcined and otherwise prepared in Canada and supplied in the ground form and larger sizes to consumers both in Canada and abroad. Talc is ground at Madoc, Ont., and produced in several marketable grades. The Canadian talc industry is now well developed and the products are shipped to consumers throughout Ontario and Quebec as well as the United States. Lime is mainly used as crude quicklime in the building trades, pulp manufacturing, sugar and glass making industries and a limited amount is used as lime flour. With the exception of gypsum, magnesite and magnesia, lime and talc, which are already developed, the above-mentioned minerals are the only ones which lend themselves readily to preparation for market by fine grinding or milling and of these actinolite, quartz, feldspar and mica are now being prepared to a limited extent in Canada.

The Canadian grinding and calcining companies and their locations are as follows:—

NOVA SCOTIA

Windsor Plaster Co., Limited, Windsor, N.S.—Calcining gypsum.

NEW BRUNSWICK

Hillsborough Plaster Quarrying & Mg. Co., Hillsborough, N.B.—Calcining gypsum.

Albert Manufacturing Co., Hillsborough, N.B.—Calcining gypsum.

QUEBEC

- Silico Limited, 103 St. Francois-Xavier St., Montreal.—Grinding potsdam sandstone.
 Slate Products Co. of Canada, 128 Bleury St., Montreal.—Crushing slate.
 Mineral Products Co., Hull, Que.—Producing ground mica.
 North American Magnesite Producers Ltd., 127 Board of Trade Bldg., Montreal, Que.—Calcining and clinkering magnesite.
 Scottish Canadian Magnesite Co., Ltd., Box 50, Grenville, Que.—Calcining and clinkering Magnesite.
 International Magnesite Co., Ltd., 608 Bk. of Nova Scotia Bldg., Montreal.—Calcining and clinkering magnesite.

ONTARIO

- Frontenac Floor and Wall Tile Co., Kingston.—Producing ground feldspar.
 Feldspar Milling Co., Toronto.—Producing ground feldspar and ground quartz.
 Feldspar Glass Co., Oshawa.—Idle.
 Ontario Gypsum Co., Ltd., Paris.—Calcining and grinding gypsum
 Asbestos Pulp Co., Ltd., Madoc,—Grinding tale.
 G. H. Gillespie Co., Ltd., Madoc,—Grinding tale.
 Bolender Bros., Haliburton,—Crushing and grinding marble and dolomite.

MANITOBA

- Manitoba Gypsum Co., Ltd., P.O. Box 3057, Winnipeg,—Calcining gypsum.

BRITISH COLUMBIA

- Eagle Tale and Mining Company, 627 Yates St., Victoria,—Grinding tale.

In addition to the above which are the only companies in Canada producing finely-ground materials, there are several producing broken feldspar and calcite and ground dolomite for stucco, poultry grit, stone dust and chips and limestone as a fertilizer as follows:—

- White Grit Company, Portage du Fort, Que.—Producing ground and broken dolomite.
 W. G. Treadwell, Hartington, Ontario.—Producing crushed limestone, and feldspar for stucco dash.
 Hendersons Farmers Line Co., Beachville, Ont.—Grinding limestone for fertilizing material.

Scope of Inquiry.—The returns to the Bureau under the Industrial Census clause of the Statistics Act formed the principal source of the information compiled in the present survey. It was necessary to supplement these data by further correspondence and for this purpose circular inquiries were used, followed by special letters where necessary and finally by personal visits to plants.

The results have been compiled to show as closely as possible the quantity of domestic and foreign materials consumed, and the names of the firms in each industry reporting consumption. It is believed the data given are fairly complete for each industry described.

A little difficulty arose in the confusion of names; for example, kaolin was occasionally not recognized as china clay, but on the whole excellent replies were received, many points of which have been embodied in the notes under each industry. The text of the circular letters used has been repeated here to show the nature of the inquiry.

LETTER.

DEAR SIR,—This Bureau is corresponding with all important consumers of non-metallics in Canada with regard to the survey outlined in the enclosed memorandum and we would appreciate information from you along the lines indicated.

To make the survey complete, it will be necessary for us to know whether Canadian products could be used instead of those now imported from foreign countries. In addition, such general information as average quantities used per annum, grades, prices, sources of supply and the conditions of supply and demand obtaining at the present time, would be of value.

The data already furnished by you under the Census of Industry have been examined in this connection but for this special study, more detailed information is required. Please find a return envelope enclosed for your reply which we shall be glad to receive at an early date.

Yours truly,

S. J. COOK,
Chief M.M. & C. Branch.

Memorandum with letter.

SPECIAL SURVEY RE. THE CONSUMPTION IN CANADA OF NON-METALLIC MINERAL PRODUCTS (EXCEPT FUELS)

The Bureau has undertaken to make a survey, covering the whole of Canada but more particularly the industrial area of Ontario and Quebec, of the present and possible markets for Canadian non-metallic minerals including actinolite, arsenic, asbestos, barytes, calcite, whiting, chromite, corundum, dolomite, feldspar, fluorspar, graphite, gypsum, kaolin, lime, magnesite, magnesium sulphate, manganese, mica, natro-alunite, iron oxides, phosphate, pyrites, silica or quartz, sodium sulphate, talc and tripolite.

It is well known that many non-metallic minerals produced in Canada are exported in the crude state and are later brought back into Canada, finely ground, or otherwise prepared for use in the manufacturing industries. Considerable quantities of similar mineral products of foreign origin are also imported. Detailed information regarding the consumption of these commodities is not presently available and in view of these facts, the necessity for such an investigation as that now under taken needs no further argument.

The co-operation of every concern using or importing any of the products listed is requested and it is hoped that the information gained will lead to the establishment of new industries whereby the supplies of these materials will be made more readily available and Canadian users will be rendered less dependent on foreign markets.

The results of the survey will be published at the earliest possible date, and copies of the report will be sent to those interested.

Imports.—One of the most useful guides to the consumption of non-metallics in Canada is furnished by the imports statistics, which are compiled in great detail every month in the External Trade Branch of the Bureau from Customs records. These data are published promptly in the Monthly and Annual Reports of the Trade of Canada, issued by the Bureau, so it has only been necessary to compile for this report an abstract to show the principal commodities imported which come within the scope of this report. Data have been included for the twelve months ended March 31, 1923, and for the first five months of the current fiscal year with comparative data for the corresponding period in the immediately preceding fiscal year.

Imports into Canada for Consumption of Non-Metallic Minerals

	Year Ending March 31, 1923		Five months April-August, 1922		Five months April-August, 1923	
	Quantity	Value	Quantity	Value	Quantity	Value
STONE AND ITS PRODUCTS						
ABRASIVES						
Artificial abrasives in bulk, crushed or ground, for the manufacture of abrasive wheels and polishing composition.....	-	195,298	-	84,045	-	110,170
Emery in bulk, crushed or ground.....	-	42,434	-	14,992	-	24,055
Emery wheels and carborundum wheels, n.o.p.....	-	173,146	-	63,510	-	65,647
Emery or carborundum, manufactures of, n.o.p., including stones.....	-	51,000	-	18,179	-	26,306
Grindstones, not mounted, and not less than 36 inches in diameter.....	-	314,820	-	91,630	-	210,865
Grindstones, n.o.p.....	-	18,172	-	6,413	-	4,505
Pumice and pumice stone, lava and calcareous tufa, not further manufactured than ground.....	-	29,387	-	9,365	-	12,460
Sand paper, glass, flint and emery paper or emery cloth.....	-	271,826	-	103,960	-	132,618
BUILDING AND PAVING STONE						
Building stone, other than marble or granite, sawn on more than two sides, but not sawn on more than four sides.....	13,583 cwt.	14,867	4,021 cwt.	3,090	10,423 cwt.	8,724
Building stone other than marble or granite, planed, turned, cut or further manufactured than sawn on four sides.....	13,513 cwt.	14,867	4,138 cwt.	9,048	688 cwt.	3,511
Flagstone, granite, rough sandstone and all building stone not hammered, sawn or chiselled.....	-	168,783	-	61,357	-	74,169
Flagstone and building stone, other than marble or granite, sawn on not more than two sides.....	-	191,283	-	92,193	-	85,405
Granite, sawn only.....	-	7,781	-	2,919	-	2,737
Granite, manufactures of n.o.p.....	-	73,082	-	29,642	-	80,073
Paving blocks.....	-	100	-	139	-	42
LIME, PLASTER AND CEMENT						
Gypsum, crude (sulphate of lime).....	2,992 tons	24,901	1,171 tons	8,450	1,485 tons	14,593
Lime.....	67,986 cwt.	25,405	16,128 cwt.	10,439	35,434 cwt.	21,808
Plaster of Paris or gypsum, ground, not calcined.....	2,933 cwt.	6,126	1,605 cwt.	3,285	404 cwt.	784
Plaster of Paris or gypsum, calcined, and prepared wall plaster.....	71,709 cwt.	48,230	30,077 cwt.	20,084	41,647 cwt.	29,023
Cement, portland and hydraulic or water lime.....	112,610 cwt.	90,849	94,022 cwt.	64,267	17,511 cwt.	26,973
Cement, n.o.p., and manufactures of, n.o.p.....	-	13,206	-	4,102	-	78,428
MARBLE						
Marble, rough, not hammered or chiselled.....	-	58,718	-	23,574	-	22,741
Marble, sawn or sand rubbed, not polished.....	-	13,492	-	71,067	-	82,871
Marble, manufactures of, n.o.p.....	-	110,455	-	64,589	-	43,298
SLATE						
Roofing slate.....	7,028 sq.	70,298	2,483 sq.	23,103	2,602 sq.	30,170
Slate pencils.....	-	12,713	-	4,807	-	3,901
School writing slates.....	-	112,555	-	45,195	-	45,785
Slate mantles and manufactures of slate, n.o.p.....	-	75,507	-	26,153	-	34,362
OTHER STONE PRODUCTS						
Barrstones in blocks, rough or unmanufactured, not bound up or prepared for binding into mill-stones.....	408 only	7,015	400 only	910	375 only	592
Chalk, China or Cornwall stone, cliff stone and mica schist ground or unground.....	-	19,651	-	6,790	-	9,539
Chalk, prepared.....	-	108,185	-	45,347	-	46,370
Curling stones and handles therefor.....	666 pr.	852	2 pr.	40	6	125
Feldspar.....	33,587 cwt.	35,692	14,366 cwt.	14,017	12,455 cwt.	13,297
Flint and ground flint stones.....	131,700 cwt.	94,364	43,557 cwt.	37,102	55,071 cwt.	32,882
Floorspar.....	142,218 cwt.	97,386	36,316 cwt.	32,592	101,799 cwt.	64,436
Ganister.....	6,597 cwt.	1,836	612 cwt.	253	96,090 cwt.	19,605
Lithographic stones, not engraved.....	-	5,185	-	2,213	-	1,844
Magnesite.....	1,185 cwt.	4,279	815 cwt.	1,433	4,366 cwt.	6,719
Phosphate rock.....	230,100 cwt.	57,623	221,523 cwt.	53,320	2,368 cwt.	73,402
Sand, silica, for glass and carborundum manufacture, and for use in steel foundries.....	2,328,751 cwt.	240,063	834,820 cwt.	86,384	1,578,409 cwt.	148,394
Sand and gravel, n.o.p.....	351,114 tons	178,442	197,480 tons	84,364	205,123 tons	125,779
Silex or crystallized quartz, ground or unground.....	19,288 cwt.	23,451	9,447 cwt.	11,332	29,657 cwt.	35,537
Stone refuse, not sawn, hammered or chiselled, nor fit for flagstone, building stone or paving.....	310,651 tons	194,043	123,626 tons	76,941	212,227 tons	127,523
Whiting, gilders' whiting and Paris white.....	291,570 cwt.	198,461	104,841 cwt.	71,728	93,861 cwt.	62,179
Manufactures of stone, n.o.p.....	-	44,289	-	21,182	-	28,801
Total Stone and its Products.....	-	4,060,806	-	1,535,961	-	2,208,387

Imports into Canada for Consumption of Non-Metallic Minerals—Concluded

	Year Ending March 31, 1923		Five months April-August, 1922		Five months April-August, 1923	
	Quantity	Value	Quantity	Value	Quantity	Value
OTHER NON-METALLIC MINERAL PRODUCTS						
Barytes.....	52,150 cwt.	57,897	22,237 cwt.	24,979	17,492 cwt.	19,009
Blast furnace slag.....	-	2,987	-	1,177	-	5,607
Earths, crude only.....	-	1,993	-	1,396	-	237
Foundry facings of all kinds.....	-	24,889	-	9,350	-	14,653
Fuller's earth in bulk only.....	-	25,870	-	8,880	-	9,117
Insulators, electric.....	-	647,277	-	291,972	-	301,586
Magnesia pipe covering.....	-	104,586	-	36,541	-	46,958
Sulphur and brimstone, crude, or in roll or flour.....	246,020,164 lbs.	1,673,662	110,300,936 lbs.	750,456	-	795,371
Mineral and bituminous substances, n.o.p.....	-	670,819	-	256,867	-	436,788
Recapitulation—Non-Metallic Minerals and their Products (Except Chemicals).....	-	139,919,912	-	39,392,194	-	70,718,297

Customs Tariffs.—As mentioned above, one of the greatest difficulties in the establishment of plants for the grinding and preparing of non-metallies in Canada is the restricted home market for these commodities. This obstacle might be overcome if the nearby large consumers in the United States could be freely supplied. The United States tariffs in force against such products in the refined form have been investigated and the following table has been drawn up showing the difference in the duties levied on crude and ground materials. On silica or quartz, \$4 per ton is placed on the crude material and on the ground or prepared mineral, \$3.50 per ton is added making a total of \$7.50 duty per ton. This makes it almost prohibitive for Canadian producers to reach the markets of the United States. The same situation prevails as to feldspar except that while the crude material may be entered duty-free, as much as 30 per cent ad valorem is added on the ground mineral. In 34 items covering the different grades or classes of 18 non-metallies, only eight may be shipped into the United States duty-free and then only as the crude material. These are: actinolite, chromite, corundum, feldspar, gypsum, phosphate and tripoli.

United States Tariff

Item No.		Duty
1619	Actinolite—crude, apparently classified as "minerals, crude, not specially provided for"	Free
214	Actinolite—ground, apparently classified as "earthy or mineral substances, wholly or partly manufactured, not specially provided for"	30% ad val.
1515	Asbestos—crudes and fibres.....	Free
1401	Asbestos—yarn.....	30% ad val.
69	Barytes—barytes ore, crude.....	\$4 per ton
69	Barytes—barytes ore, ground.....	\$7.50 per ton
	Calcite—not mentioned by this name in the tariff. Chalk, crude, is free (Item 1545) and chalk, ground, is dutiable at 25% ad valorem (Item 20).	
1547	Chromite—chromite or chrome ore.....	Free
1570	Corundum—corundum ore.....	Free
1415	Corundum—ground.....	1 cent per lb.
	Dolomite—not mentioned by this name in the tariff.	
1619	Feldspar—crude, apparently classified as "minerals, crude, not specially provided for"	Free
214	Feldspar—ground, apparently dutiable as "earthy or mineral substances, wholly or partly manufactured, not specially provided for"	30% ad val.
207	Fluorspar.....	\$5.60 per ton
1643	Gypsum—crude.....	Free
205	Gypsum—ground.....	\$1.40 per ton
204	Magnesite—crude.....	5/16c. per lb.
204	Magnesite—caustic calcined.....	5/8c. per lb.
204	Magnesite—dead burned and grain.....	23/40c. per lb.
50	Magnesium sulphate—(Epsom salts).....	4c. per lb.
208	Mica—unmanufactured, valued at not above 15 cents per pound.....	25% ad val.
208	Mica—unmanufactured, valued above 15 cents per pound.....	30% ad val.
208	Mica—cut or trimmed, and mica splittings.....	20% ad val.
208	Mica—ground.....	1/8c. per lb.
75	Iron oxides—ochres, crude.....	3/8c. per lb.
75	Iron oxides—ochres, washed or ground.....	20% ad val.
75	Iron oxides—"iron-oxide pigments not specially provided for"	Free
1640	Phosphate—"phosphates, crude"	Free
1677	Pyrites—"sulphur ore, such as pyrites or sulphure of iron in its natural state, and spent oxide of iron, containing more than 25% of sulphur"	Free

United States Tariff—Concluded

Item No.		Dutw
209	Talc—crude	½c. per lb.
209	Talc—ground, washed, powdered, or pulverized (except toilet preparations).....	25% ad. val.
207	Silica—crude, not specially provided for.....	\$4 per ton
207	Silica—for use as pigment, not specially provided for.....	\$7.50 per ton
1875	Tripoli—crude or manufactured, not specially provided for.....	Free

Industrial Reviews.—The survey was carried out over a large number of industries representing, as far as was known, all the possible consumers of non-metallic minerals in the ground or otherwise prepared, state. It is necessary that this limitation in the scope of the inquiry should be kept in mind, as, otherwise, some statements in the report may appear misleading if not entirely erroneous. The purpose of the investigation, it may be repeated, was to determine the extent of the developed market in Canada for ground non-metallic minerals so that the necessary information might be made available to determine the commercial feasibility of establishing further plants in Canada for the production of Canadian non-metallic minerals in a sufficiently finely pulverized form to meet the requirements of established industries.

A general summary table has been prepared showing for only a selected list of industries the amounts of named non-metallic minerals used in powdered form. This table embodies the principal items of interest shown in the report.

Following the table, and under each industrial group-heading, more detailed accounts have been prepared and the consumption of these non-metallics in each province and by each industry has been recorded.

After the industrial reviews, there are several sections, each dealing with a particular commodity, indicating the extent of the Canadian consumption, the nature of the product demanded and such other specific information as was obtained in the course of the investigation.

Consumption of a Selected List of Prepared Non-Metallics by Principal Canadian Industries

(In Tons of 2,000 pounds)

Industry	Acti- no- lite	Bary- tes	Calcite	Whit- ing	Chro- mite	Co- run- dum	Felds- par	Fluor- spar	Lime	Mica	Quartz Silex Flint	Silica Sand	Tri- po- lite
Heavy Chemicals	-	60.0	-	-	-	-	-	-	5963.0	-	30,880.0	-	-
Explosives, Fireworks and Matches	-	-	100.0	134.0	-	-	-	-	-	-	650.0	-	0.1
Medicinal and Pharma- ceutical Preparations.....	-	-	-	11.5	-	-	-	-	3.1	-	-	-	-
Paints, Pigments and Var- nishes	-	2,054.0	-	5,310.0	-	-	3.5	-	4.0	-	423.0	-	-
Soaps and Washing Com- pounds	-	-	-	-	-	-	560.0	2.0	-	-	3,370.0	-	-
Inks, Dyes and Colours ..	-	50.6	-	0.5	-	-	-	-	-	-	15.0	-	-
Polishes and Dressings.....	-	-	-	105.0	-	-	-	-	-	-	331.3	-	77.5
Enamelling, Porcelain and Potteries	-	45	-	65.0	-	-	2,520.0	175.0	-	-	1,221.5	300.0	-
Pulp and Paper	-	-	-	350.0	-	-	-	-	73,165.0	-	10.0	-	-
Rubber Goods	-	480.4	-	2,231.0	-	-	-	-	125.4	21.8	40.0	-	4.0
Tanneries	-	45.0	-	-	-	-	-	-	4,000.0	-	-	-	-
Artificial Abrasives and Abrasive Wheels.....	-	-	-	-	-	160.0	100.0	-	-	-	275.0	18,275.0	-
Roofing and Mineral Walls	20	-	1.0	-	-	-	21.2	-	-	359.0	-	1,796.0	-
Oil cloth and Linoleum ..	-	32.4	-	2,086.0	-	-	-	-	-	-	-	-	-
Wall Paper	-	-	-	-	-	-	-	-	-	200.0	-	-	-
Glass Manufacturing.....	-	-	-	-	-	-	53.0	50.0	3,408.0	-	-	56,730.0	-
Miscellaneous.....	-	25.0	-	247.0	40.0	-	425.0	-	300.0	61.0	243.0	1,303.0	-
Total.....	20	2,792.4	101.0	10,540.0	40.0	160.0	3,682.7	227.0	86,968.5	641.8	37,458.8	78,404.0	81.6

* This 30,880 tons was crude unprepared Quartz.

Consumption by Industries

Abrasives

(a) **Artificial Abrasives.**—Four companies in Canada produced artificial abrasives as a principal product during 1922, including carborundum, exolon and aloxite. Of the minerals covered, only silica sand to the extent of 18,275 tons and about 160 tons of corundum were reported as used. The companies were the Canadian Carborundum Co., at Niagara Falls, Ont., and Shawinigan Falls, Que.; Exolon Company, Thorold, Ont.; Norton Company, Chippawa, Ont., and Abrasives Co. of Canada, Hamilton, Ont.

(b) **Abrasive Wheels.**—This industry is centered in Western Ontario, there being two plants in Brantford, two in Hamilton, one each in London, Mimico, Toronto and Prescott. There is also a plant in Winnipeg, Manitoba. The products are grinding wheels and hones of different composition. The materials used are quartz, flint, feldspar, clay, silica sand, garnets and whiting. The largest item reported as used was emery, which not being produced in Canada was not included in the questionnaire. There were also used some 200 tons of crude quartz which was crushed and graded by the manufacturers, 75 tons of garnets, some 75 to 100 tons of feldspar and a few tons of flint and whiting.

Asbestos Products

Although a large proportion of the world's supply of asbestos is produced in the crude fibre form and is graded in the mills of the eastern townships of Quebec province, a considerable portion of the asbestos used in Canadian industries is imported in the prepared form as asbestos shingles, brake bands, paper, packing, cloth and yarn. A few industries such as paint, rubber, roofing, electrical goods, and pulp and paper use the raw material, but with the exception of roofing which uses considerable quantities of asbestos sand, the amounts reported were small.

The firms producing asbestos goods or materials in which asbestos was the chief constituent numbered ten in all, of which five were located in Ontario, one each being in Toronto and Peterboro, and three in Hamilton; of the remaining four, two were in Montreal and one each in Vancouver and Halifax.

The following table shows the consumption by this industry of only those raw materials mentioned in the special questionnaire:—

Province	Asbestos Corrugated Paper	Crude Asbestos, Fibre, Paper, Asbestine	Cloth, Yarns and Packing
Ontario (6 plants).....	Sq. Ft. 21,250	Pounds 121,176	Pounds 120,609
Nova Scotia, Quebec and British Columbia.....	150,000	1,212,500	6,000
Total for Canada.....	171,250	1,333,676	126,609

Explosives, Fireworks and Matches

Ground quartz, calcite (chalk), whiting and phosphate rock were the principal ground non-metallic minerals reported as used by the manufacturers of explosives, fireworks and matches but these minerals represented a very small proportion of the total materials used.

The calcite or chalk was used in plants operating in Montreal and Vancouver and was described as a "pulverized extra fine lime stone" and was supplied to the manufacturers for \$14.00 per net ton at Vancouver and \$10.00 at Montreal. At the latter plant some 70 tons was consumed in the year and 30 tons at the former.

Quartz and glass in the ground form were used to the extent of some 650 tons, in the manufacture of a sand paper attached to match boxes.

The whiting used was as usual imported from abroad as an extra fine grade known as "American Paris whiting, bolted," which was manufactured from imported English chalk, having been levigated and water-floated. The amount consumed by all plants totalled 214 tons of which Ontario works used 134 tons; Quebec 70 tons; and about 10 tons in British Columbia. The price at United States points was around \$1.10 per cwt.

Phosphate rock was consumed in British Columbia at a price of \$8.75 per net ton f.o.b. Idaho points, whence it was shipped in bags.

Kaolin or china clay and graphite were used in small quantities; both these commodities were imported, the former from the United States as "Blue Ridge pulverized clay" at \$12.00 per net ton United States points and the latter as "powdered air floated graphite" at 4½ cents a pound f.o.b. at shipping point.

Fertilizers

While many non-metallic minerals or chemical derivatives of them are used by the fertilizer industry, the bulk of the materials used do not require to be finely ground. Basic slag is an exception, but as the survey was not expanded to take in chemical products, phosphate rock was the only commodity mentioned in the replies received in answer to the special inquiry. Nearly 5,000 tons of phosphate rock, all imported from the United States was consumed in the industry. In passing, it may be noted that approximately 18,000 tons of superphosphate was also imported. The Bureau's report on "Chemicals and Allied Products" contains more information on this industry; as a market for finely ground non-metallic minerals the fertilizer industry does not seem a good prospect but in the preparation of the chemical products used there should be something of interest.

Heavy Chemicals

Of the many concerns engaged in the production of industrial chemicals including sulphuric, nitric and hydrochloric acids, caustic soda, soda ash, salt cake, calcium carbide, etc. only nineteen plants reported any important consumption of the materials under review.

The largest item in the quantity was limestone of which 175,124 tons was used, all of which was produced from domestic quarries. The burned lime produced in addition to a few hundred tons purchased from lime producers was used in the processes and totalled 108,078 tons, the larger part of which was used in Ontario plants. Phosphate rock, pyrites and sulphur in order were the next greatest on the list in point of quantity; of these only the pyrites was of domestic origin. While smaller quantities of ground barytes and whiting, ground quartz and tripolite were reported as consumed by manufacturers of acids, these materials were used in the production of side lines such as greases and polishing compounds. The barytes quartz and tripolite were all imported, in a finely-ground condition of about 140 mesh; they are not presently produced in Canada in such commercial grades as to meet the requirements of the trade. The colour of the material has often a distinct bearing on the products made, and for some polishing compounds, the rose-coloured ground tripolite is chiefly used although the cream-coloured is also imported in small amount. Some 60 tons was used, at an average price of \$18.00 per ton f.o.b. Toronto. In the case of quartz, only 120 tons of the ground material was reported as consumed by the firms in this section. It also was imported, as powdered white silica (140 mesh) at \$9.00 per ton f.o.b. Toronto. The quartz tripolite and whiting have been included in the section on polishes and dressings.

Over thirty thousand tons of crude quartz was also used by two firms, one in Ontario consuming about 26,000 tons, and the other located in Quebec province using 4,000 tons.

The following materials mentioned in the Survey inquiry were reported as used by the companies reporting:—

	Tons
Asbestos powder.....	5
Asbestos sheets.....	5
Barytes.....	60
Crude quartz.....	30,880
Lime (CaO).....	5,903
Limestone.....	175,124
Magnesium sulphate.....	4
Phosphate rock.....	26,800
Pyrites.....	15,091
Sodium sulphate.....	23
Sulphur.....	14,002
White arsenic.....	55

The names and locations of the concerns from which these statements were received follow:—

ONTARIO

Commercial Acetylene Supply Company, Toronto,
Canadian Ammonia Company, Toronto,
Hanson and Van Winkle, Toronto,
Grasselli Chemical Co., Hamilton,
Union Carbide Company, Welland,
American Cyanamid Co., Niagara Falls,

Chemical Products Co., Ltd., Trenton,
Canadian Salt Company, Windsor,
Brunner Mond, Limited, Amherstburg,
Yocum Faust, Ltd., London,
Nichols Chemical Co., Sulphide,

QUEBEC

L'Air Liquide Society, Montreal, P.Q.
John Cowan Chemical Co., Montreal, P.Q.
Laporte Irwin Co., Montreal, P.Q.

Nichols Chemical Co., Capellton, P.Q.
Canadian Carbide Co., Shawinigan Falls, P.Q.
Electric Reduction Co., Buckingham, P.Q..

BRITISH COLUMBIA

Nichols Chemical Company, Barnet, B.C.

Inks, Dyes and Colours

Of the 25 plants which produced writing inks, dyes and colours in Canada, only four situated in Toronto reported any consumption of the non-metallic minerals under review. These companies either produced their own dry colours or used the ground materials in the preparation of particular grades of ink or ink powders and pellets.

The consumption reported, amounted to 101,200 pounds of barytes, 40,000 pounds of iron oxide or red mortar colour, 30,000 pounds of silica, 4,000 pounds of graphite, 2,000 pounds of gypsum and 1,000 pounds of whiting all ground to pass 120 mesh.

Medicinal and Pharmaceutical Preparations

While it was not expected that the preparation of medicines, etc., would consume large quantities of any prepared non-metallics, a selected list of the larger firms were asked for reports. Of these firms, 33 reported consumption of some non-metallics listed. Seventeen plants were situated in western Ontario, nine being in Toronto; there were nine firms in Montreal, four in Winnipeg, and one each in Vancouver, St. John, N.B., and Halifax, N.S. The principal non-metallics used are shown in the following table. About 40 to 50 per cent by weight of the commodities used and shown below were imported.

	Pounds
Arsenic.....	2,120
Kaolin.....	12,604
Magnesium sulphate.....	133,618
Sodium sulphate.....	31,470
Talc.....	298,317
Whiting.....	23,100
Lime.....	6,350
Gypsum.....	2,000
Magnesite.....	1,400
Iron oxides.....	600
Silica and tripolite.....	200
Graphite.....	100

Of the above talc is the only important item and of the total shown 89,340 pounds of specially prepared talc was imported from France and Italy. Some sixty-tons of magnesium sulphate was used, and while the Canadian native salts are of an exceptionally high grade and suitable for all industrial preparations, it seems impossible for the operators of the western deposits to replace the imported varieties because of the high cost of transportation. Foreign magnesium sulphate is laid down in western Ontario points at about \$4.60 per hundredweight.

Oilcloth and Linoleum

This industry is carried on entirely in Montreal, and is represented by only two firms at the present time. The consumption of non-metallics reported was largely of foreign origin. The most important item was whiting, of which 4,172,744 pounds was consumed; other items were 64,874 lbs. of barytes, 356,400 pounds of iron oxide and 720,000 pounds of Georgia limestone. All these materials were used in a very finely pulverized state and this field, upon further development, might offer a market for ground Canadian materials. For instance, some grades of ground calcite might be used in place of the Georgia limestone. While no substitute has yet been found, it was stated that it would be of advantage to have a raw material which would absorb less oil than the foreign brands of whiting.

The Paint Industry

The manufacture of paints and varnishes necessitates the use of large quantities of prepared non-metallics and during the past four years this industry has shown continuous progress in every province. It has been developed most extensively in Ontario where 14 plants were in operation last year, eight of which were located in Toronto and the balance in western Ontario. In Quebec, 11 plants operated in Montreal. British Columbia was represented by 7 plants, Manitoba by 2 and there was 1 plant in Nova Scotia. The three cities of Montreal, Toronto and Vancouver because of their location as centers of distribution and by reason of their convenience to other consuming industries control the greater part of the paint industry in Canada. The principal companies were:—

ONTARIO

Lowe Brothers, Toronto.
Imperial Varnish & Colour Co., Toronto.
Penfound Varnish Co., Toronto.
A. Muirhead & Co., Toronto.
Benjamin Moore and Co., Toronto.
Flint Varnish & Colour Works, Toronto.
Brandram-Henderson, Toronto.

Glidden Co., Ltd., Toronto.
Ottawa Paint Works, Ltd., Ottawa.
Northern Varnish Co., Owen Sound.
Jae. Langmuir & Co., Oakville.
Dominion Paint Works, Walkerville.
Berry Bros., Walkerville.
Standard Paint & Varnish Co., Windsor.

QUEBEC

Sherwin-Williams Co., Montreal.
Holland Varnish Co., Montreal.
R. C. Jamieson & Co., Montreal.
Dougal Varnish Co., Montreal.
A. Ramsay & Son Co., Montreal.
Mc-Arthur-Irwin, Ltd., Montreal.

Brandram-Henderson Co., Montreal.
Mount Royal Color & Varnish Co., Montreal.
J. W. Jamieson Co., Montreal.
National Varnish Co., of Canada, Montreal.
Martin-Senour, Montreal.

NOVA SCOTIA

Brandram-Henderson, Halifax.

BRITISH COLUMBIA

Henry Darling & Son, Vancouver.
British American Paint Co., Vancouver.
Crown Paint Co., Vancouver.
Pacific-White Lead Co., Vancouver.

Martin-Senour, Vancouver.
Williams & Harle, Victoria.
Stanland Company, Victoria.

MANITOBA

International Laboratories, Ltd., St. Boniface.

G. F. Stevens Co., Ltd., Winnipeg.

Of the non-metallics listed, whiting was used in the largest quantity, and as in other industries was entirely imported from abroad. English cliff stone or the American variety, was used, but in either case in a very finely pulverized condition. So far it has not been found possible to substitute Canadian calcite for imported whiting in the manufacture of putty and flat wall paints, owing it is said to its crystalline structure. The imported product is amorphous. Some 1,500 tons of barytes in various colours was imported from United States, England and Germany; about 360 tons was supplied by domestic producers. Canadian barytes if of a good white colour prepared to the right degree of fineness, may in time supply the entire Canadian demand. Some users require that 98% pass 300 mesh. This also applies to silica and asbestine, which have so far been mostly imported.

Consumption of Non-Metallic Minerals as Reported by Firms Manufacturing Paints

	Ontario		Quebec		British Columbia	
	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign
Asbestine—						
No. of Companies.....	5	4	5	2	1	3
Pounds.....	693,894	343,718	795,739	326,340	9,423	93,000
Barytes—						
No. of Companies.....	1	10	1	8	-	6
Pounds.....	10,380	1,060,777	600,082	2,118,044	-	135,297
China clay—						
No. of Companies.....	1	5	2	6	-	1
Pounds.....	249	27,212	6,562	346,591	-	35,989
Feldspar—						
No. of Companies.....	-	-	1	-	-	-
Pounds.....	-	-	7,000	-	-	-
Graphite—						
No. of Companies.....	4	4	2	2	-	3
Pounds.....	5,483	252,192	44,880	6,023	-	11,564
Gypsum—						
No. of Companies.....	1	1	1	1	-	-
Pounds.....	800	40,763	40,000	100,000	-	-
Iron oxide—						
No. of Companies.....	1	7	8	4	1	5
Pounds.....	30,600	163,204	1,053,423	150,288	50,000	157,702
Lime (CaO)—						
No. of Companies.....	1	2	1	-	-	-
Pounds.....	1,000	3,200	3,500	-	-	-
Manganese—						
No. of Companies.....	-	4	1	1	-	1
Pounds.....	-	4,058	2,000	2,000	-	1,700
Quartz-silica—						
No. of Companies.....	-	10	-	7	-	5
Pounds.....	-	292,273	-	511,921	-	32,600
Whiting—						
No. of Companies.....	-	12	-	12	-	7
Pounds.....	-	2,747,505	-	6,199,283	-	602,563

	Manitoba		Nova Scotia		Canada		Total
	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign	
Asbestine—							
No. of Companies.....	1	-	-	-	12	9	21
Pounds.....	176,025	-	-	-	1,075,131	763,053	2,439,189
Barytes—							
No. of Companies.....	-	2	1	-	3	28	29
Pounds.....	-	64,007	110,000	-	729,462	3,379,025	4,106,487
China clay—							
No. of Companies.....	-	1	-	-	3	13	16
Pounds.....	-	8,185	-	-	6,811	417,977	424,788
Feldspar—							
No. of Companies.....	-	-	-	-	1	-	1
Pounds.....	-	-	-	-	7,000	-	7,000
Graphite—							
No. of Companies.....	1	-	1	-	8	9	17
Pounds.....	12,591	-	7,600	-	70,554	269,779	340,333
Gypsum—							
No. of Companies.....	-	-	-	-	2	2	4
Pounds.....	-	-	-	-	40,800	140,763	181,563
Iron oxide—							
No. of Companies.....	1	1	-	-	11	17	28
Pounds.....	120,535	21,250	-	-	1,854,567	498,444	2,353,011
Lime (CaO)—							
No. of Companies.....	-	-	-	-	2	2	4
Pounds.....	-	-	-	-	4,500	3,200	7,700
Manganese—							
No. of Companies.....	-	-	-	-	2	6	8
Pounds.....	-	-	-	-	2,000	7,758	9,758
Quartz-silica—							
No. of Companies.....	-	2	-	-	-	24	24
Pounds.....	-	10,391	-	-	-	846,185	846,185
Whiting—							
No. of Companies.....	-	2	-	1	-	34	34
Pounds.....	-	937,368	-	135,072	-	10,621,791	10,621,791

Polishes and Dressings

The firms listed below are those whose main products are polishes or dressings. In Ontario firms in other industries make small quantities as side lines, statistics of which have been covered in reports of those industries. Of these firms 7 in Ontario 5 in Quebec, and one in British Columbia reported having used non-metallics. The names and addresses are as follows:—

ONTARIO

Nonguch Manufacturing Company, Toronto, Ont.
Electro Solient Company, Toronto, Ont.
Edward Hawes, Toronto, Ont.
Hanson and Van Winkle, Toronto.

F. F. Dalley & Co., Hamilton, Ont.
Permanent Ink Co., Hamilton, Ont.
Canadian Polishes, Ltd., Hamilton, Ont.

QUEBEC

dele Sam Dressing Co., Montreal, P.Q.
Itana, Limited, Montreal, P.Q.
merican Metal Polish Co., Montreal, P.Q.

Canadian Furniture Gloss Co., Montreal, P.Q.
Boston Blacking & Polish Co., Montreal, P.Q.

BRITISH COLUMBIA

Tilikum Manufacturing Co., Vancouver, B.C.

The most important item used was ground quartz or silex. This was said to be used largely in metal polishes and dressings for suede shoes. The consumption was over 100 tons all of which was imported. Whiting was used to the extent of some 30 tons.

Consumption of Non-Metallic Minerals as Reported by Firms Manufacturing Polishes and Dressings

Ontario—7 firms: Quebec—5 firms: British Columbia—1 firm: Canada—13 firms

	Ontario		Quebec		British Columbia		Canada		Total
	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign	
Graphite—									
No. of firms.....	2	-	-	2	-	1	1	1	5
Pounds.....	90,695	-	-	78,900	-	1,000	90,695	79,900	170,595
Plumbago—									
No. of firms.....	-	-	1	-	-	-	1	-	1
Pounds.....	-	-	52,000	-	-	-	52,000	-	52,000
Kaolin, white clay—									
Nos. of firms.....	1	-	1	-	-	-	1	1	2
Pounds.....	120,607	-	6,400	-	-	-	120,607	6,400	127,007
Iron oxide—									
No. of firms.....	1	-	-	-	-	-	1	-	1
Pounds.....	6,000	-	-	-	-	-	6,000	-	6,000
Industrial earth and Tri- poli—									
No. of firms.....	-	3	-	1	-	-	-	4	4
Pounds.....	-	154,000	-	1,000	-	-	-	155,000	155,000
Pumice—									
No. of firms.....	1	-	-	-	-	-	-	-	1
Pounds.....	13,055	-	-	-	-	-	-	-	13,055
Silica or silex—									
No. of firms.....	-	2	-	2	-	-	-	4	4
Pounds.....	-	340,000	-	132,600	-	-	-	472,600	472,600
Whiting—									
No. of firms.....	-	1	-	1	-	-	-	2	2
Pounds.....	-	150,000	-	60,000	-	-	-	210,000	210,000

Pottery, Stoneware, Porcelain and Enamelware

This industry included pottery works, porcelain-manufacturing plants, the enamelling of iron and steel articles and the manufacture of electrical insulating materials. The industry has grown considerably during the past five years and with the ordinary development of the country should continue to expand in size and importance. Canada produces nearly all of primary raw materials required which consist of feldspar, quartz, barytes and fluorspar. There is yet some discussion regarding the use of Canadian clays.

The firms operating in Canada and from which statements were received numbered 21 and were located as follows: Ontario 12, Quebec 6, New Brunswick, Nova Scotia and Alberta, 1 each. The names were:—

ONTARIO

- | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. (a) Canadian Porcelain Company, Hamilton.
(b) Dominion Insulator & Manufacturing, Niagara Falls.
(c) Ontario Potteries Limited, Oshawa.
(d) Canadian General Electric Company, Toronto.
(e) Smith and Stone Co., Electric Insulators, Georgetown | 2. (a) Standard Sanitary Manufacturing Co., Toronto.
(b) Port Hope Sanitary Manufacturing Co., Port Hope.
(c) Sheet Metal Products, Toronto.
(d) Stamped and Enamelware, Ltd., Hespeler.
3. (a) Moffatt Stove Works, Limited, Weston.
(b) McClarey Stove Co., London. |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Of the above companies the first five produced insulators and glazed ware, the next four firms enamelled iron and steel articles, while the remaining two were in the stove production industry.

QUEBEC

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| 1. (a) Canadian Potteries Limited, St. John.
(b) Dominion Sanitary Pottery Company, St. John.
(c) Canadian Stoneware Works, Iberville. | 2. (a) Thos. Davidson Mfg. Company, Montreal.
(b) Gurney Foundry Company, St. Laurent.
(c) Vilas Company, Cowansville. |
|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|

The first three produced pottery, while the remaining companies were engaged in enamelling metal goods.

NEW BRUNSWICK

Foley Pottery Limited, St. John.

NOVA SCOTIA

Amherst Foundry Company Limited, Amherst.

ALBERTA

Medalta Stoneware Company, Medicine Hat.

In the production of pottery which is on the increase in Canada it has been pointed out that nothing is more serious than the use of a material which is not uniform in grade and composition from shipment to shipment. This applies to practically all the material entering into the formula but especially to feldspar and ball clay. In pottery manufacturing the process of making one piece is so long that before the pieces made in one day are completed there are thousands in process, and as it is usually in the last firing that defects appear, serious losses may occur before a weakness is apparent. Feldspar used for the purpose must be ground to 100 mesh, be free from all metallic and other impurities and should fire to a fine white color. In the pottery section of the industry the whole consumption of feldspar would be possibly 500 to 700 tons per annum. Enamelling of iron and steel materials would use not quite so much and the insulator and other electrical goods would probably use about two thousand tons if all were preparing their raw materials in Canada. At the present time some companies making the insulating ware, import prepared materials, but with development will be in the market for feldspar and quartz. On the whole there seemed no apparent reason why Canadian raw materials could not be used. An important feature noted was that the furnacemen and others engaged in the plants have been accustomed to use American spars and enamels and it is thought it might be necessary to carry on considerable educational propaganda before the use of Canadian products could be made general.

Another feature of this industry has been the recent expansion of the high tension insulator and small porcelain manufacturing. There are four companies now in Ontario, of which three consume approximately 2,000 tons of ground feldspar with smaller quantities of quartz. A fourth company now imports its clay, feldspar and flint already mixed, but will possibly be in the market for 800 to 1,000 tons of ground feldspar and quartz when more completely developed. The enamelling of stoves is also carried on by two companies, one of which imports enamels in the form of flint which is a partly-calced mixture of silica feldspar borax and fluorspar.

**Consumption of Prepared Non-Metallic Minerals as Reported by Companies Operating
in the Enamelware, Porcelain, Pottery and Stoneware Industry**

Items	Ontario		Quebec		Alberta New Brunswick Nova Scotia		Canada		Total
	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign	
Asbestos sheets—									
No. of Companies.....	3	-	-	-	-	-	3	-	3
Pounds.....	50,000	-	-	-	-	-	50,000	-	50,000
Ball clay—									
No. of Companies.....	-	4	-	1	-	-	-	5	5
Pounds.....	-	1,960,000	-	1,110,000	-	-	-	3,070,000	3,070,000
Barytes—									
No. of Companies.....	-	1	-	-	-	-	-	1	1
Pounds.....	-	9,000	-	-	-	-	-	9,000	9,000
China clay—									
No. of Companies.....	-	1	-	2	-	1	-	5	5
Pounds.....	-	1,000,000	-	30,000	-	1,200,000	-	2,230,000	2,230,000
Feldspar—									
No. of Companies.....	7	3	1	3	2	1	8	8	16
Pounds.....	3,440,000	570,000	200,000	705,000	112,000	10,000	3,752,000	1,298,000	5,040,000
Fluorspar—									
No. of Companies.....	-	4	-	3	-	1	-	8	8
Pounds.....	-	274,000	-	50,000	-	25,000	-	350,000	350,000
Gypsum—									
No. of Companies.....	-	-	-	-	-	1	-	1	1
Pounds.....	-	-	-	-	-	75,000	-	75,000	75,000
Silica sand—									
No. of Companies.....	-	5	-	-	-	-	-	5	5
Pounds.....	-	240,000	-	-	-	-	-	240,000	240,000
Talc.....									
No. of Companies.....	2	-	-	-	-	-	2	-	2
Pounds.....	300,000	-	-	-	-	-	300,000	-	300,000
Quartz, Flint—									
No. of Companies.....	3	4	1	3	-	2	4	9	13
Pounds.....	440,000	1,040,000	160,000	784,000	-	19,000	600,000	1,843,000	2,443,000
Whiting—									
No. of Companies.....	-	1	-	-	-	1	-	2	2
Pounds.....	-	120,000	-	-	-	10,000	-	130,000	130,000

Pulp and Paper

The developments of the pulp and paper industry principally in the provinces of Quebec and Ontario and to a less extent in New Brunswick, Nova Scotia and British Columbia has created a considerable market for non-metallic minerals. The largest single item reported as consumed was limestone amounting to over 89,000 tons, most of which was supplied by local quarries. More than 87,000 tons of imported sulphur costing over two million dollars was also used. The following table shows the consumption in the pulp and paper mills of Canada of the principal non-metallic minerals used.

**Consumption of Non-Metallic Minerals and Allied Products, as Reported in the Pulp
and Paper Industry in Canada**

	Tons
IN PULP MILLS—	
Sulphur.....	87,556
Limestone.....	89,706
Lime.....	73,165
Soda Ash.....	1,050
Bleach.....	15,401
Liquid Chlorine.....	2,408
Sulphate of Soda.....	6,811
Salt Cake.....	40,478
All other miscellaneous materials.....	316,635
IN PAPER MILLS—	
Soda Ash.....	1,120
Clay.....	11,996
Slime.....	4,478
Whiting.....	350
Iron oxides.....	276
Magnesia.....	1,800
Quartz.....	10
Talc.....	1,041

Prepared Roofing and Mineral Wall Board

There were in Ontario seven firms producing roofing of various kinds, three in Quebec, three in New Brunswick and one in British Columbia. Of these fourteen concerns, only eight used surfacings such as silica, sand, talc, ground mica, slate, asbestos sand, feldspar, marble dust, actinolite and magnesite, and were located as follows:—

QUEBEC

Barrett Company, Montreal.

Ruberoid Roofing Co., Montreal.

ONTARIO

Roofers Supply Co., Toronto.
Bird and Son, Hamilton.
Brantford Roofing Co., Brantford.

Canadian Roofing Co., Windsor.
Bishopric Manufacturing Co., Ottawa.

BRITISH COLUMBIA

Sidney Rubber Roofing Co., Sidney.

Consumption of Prepared Non-Metallic Minerals as Reported in the Roofing and Mineral Wall Board Industry

Material	Ontario	Quebec	British Columbia	Canada
Actinolite—				
No. of Companies.....	1	-	-	1
Pounds.....	100,000	-	-	100,000
Asbestos—				
No. of Companies.....	1	-	-	1
Pounds.....	181,000	-	-	181,000
Asbestos sand—				
Number of Companies.....	1	-	-	1
Pounds.....	118,200	-	-	118,200
Asphalt—				
Number of Companies.....	2	1	1	4
Pounds.....	12,912,456	6,190,000	2,192,000	21,294,456
China clay—				
Number of Companies.....	-	1	-	1
Pounds.....	-	200,000	-	200,000
Dolomite ground—				
Number of Companies.....	1	-	-	1
Pounds.....	2,509,806	-	-	2,509,806
Feldspar ground—				
Number of Companies.....	1	-	-	1
Pounds.....	42,344	-	-	42,344
Magnesite ground—				
Number of Companies.....	1	-	-	1
Pounds.....	637,772	-	-	637,772
Marble dust—				
Number of Companies.....	1	-	-	1
Pounds.....	2,100	-	-	2,100
Mica ground—				
Number of Companies.....	1	2	-	3
Pounds.....	230,000	488,000	-	718,000
Silica sand—				
Number of Companies.....	3	1	-	4
Pounds.....	1,792,550	1,800,000	-	3,592,550
Slate granules—				
Number of Companies.....	2	2	1	5
Pounds.....	9,298,000	12,270,000	64,000	21,568,000
Talc—				
Number of Companies.....	3	2	-	5
Pounds.....	1,810,705	884,000	-	2,700,705

The most important item in the above list which Canadian producers would have difficulty in supplying is silica sand, which is mainly imported from Illinois or Michigan. The grade of sand supplied from these states is of a very high silica content and is free from dust or other impurity. It is laid down in western Ontario points at from \$5.55 to \$5.65 per short ton. Users of this article do not see any objection to silica sand produced by grinding but have met such difficulties as unevenness of grade and also dust. With such operators who depend on standardized raw materials, home producers must be in a position to supply quantities of a standard grade all the year round. With the exception of china clay and the bulk of the silica sand all

the other commodities are now being supplied by Canadian mills. Mineral floors, stucco and plaster board manufacturing is expanding in Canada, and with the progress of building, will use increasing amounts of non-metallics in the ground or broken state, including asbestos sand, dolomite sand, feldspar, and marble dust. At the present time magnesite is being imported from India in a small way; it is said the Canadian variety is unsuitable on account of the high content of lime. Efforts are being made to eliminate the lime from Canadian magnesites which may be successful.

Rubber and Rubber Goods

The rubber industry which is centered principally in Montreal, Toronto and a few western Ontario points, consumes a large and varied list of minerals and chemicals. Much experimenting is being carried on with a view to finding new and cheaper substitutes for commodities now imported and with the progress of time this industry will prove a market with an ever-growing importance.

Of the twenty-five rubber companies producing tires and rubber goods, and rubber footwear, eight companies in Ontario and five in Quebec province reported some consumption of the materials under review. These companies were as follows:—

ONTARIO

The Goodyear Tire and Rubber Co., Toronto.
The Dunlop Tire and Rubber Co., Toronto.
The K. and S. Tire and Rubber Co., Toronto.
The Oak Tire and Rubber Co., Toronto.

The Gutta Percha Rubber Co., Toronto.
Stirling Rubber Co., Guelph.
F. E. Partridge Rubber Co., Guelph.
Kaufman Rubber Co., Kitchener.

QUEBEC

Canadian Consolidated Rubber Co., Montreal.
Columbus Rubber Co., Montreal.
Rubber Regenerating Co., Montreal.

Miner Rubber Co., Granby.
Panther Rubber Co., Sherbrooke.

Consumption of Prepared Non-Metallic Minerals in Pounds as Reported by Companies Operating in the Rubber Industry

Ontario—8 Companies: Quebec—4 Companies: Total—12 Companies

Items	Ontario		Quebec		Canada			Average Price Toronto
	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign	Total	
Asbestos powder—								
No. of Companies.....	3	-	-	-	3	-	3	-
Pounds.....	75,974	-	-	-	75,974	-	75,974	2-1c. per lb.
Asbestos fibre—								
No. of Companies.....	1	-	-	-	1	-	1	-
Pounds.....	1,600	-	-	-	1,600	-	1,600	4-9c. per lb.
Barytes—								
No. of Companies.....	-	6	1	2	1	4	9	-
Pounds.....	-	757,229	1,526	202,200	1,526	959,429	960,955	1-5 to 2-0c. lb.
China clay—								
No. of Companies.....	-	1	-	2	-	3	3	-
Pounds.....	-	60,000	-	306,278	-	366,278	366,278	2-2c. per lb.
Fossil flour—								
No. of Companies.....	-	1	-	-	-	1	1	-
Pounds.....	-	6,000	-	-	-	6,000	6,000	5-2c. per lb.
Graphite—								
No. of Companies.....	1	2	-	-	1	2	3	-
Pounds.....	2,000	68,610	-	-	2,000	68,610	70,610	5-2c. per lb.
Gypsum—								
No. of Companies.....	1	-	-	-	1	-	1	-
Pounds.....	2,000	-	-	-	2,000	-	2,000	-
Iron oxide—								
No. of Companies.....	1	6	1	3	2	9	9	-
Pounds.....	55,000	141,306	20,000	93,364	75,000	234,670	309,670	3-8 to 14-5 per lb.
Lime (hydrated)—								
No. of Companies.....	6	1	3	-	9	1	10	-
Pounds.....	126,300	50,400	74,200	-	200,500	50,400	250,900	1-1c. per lb.
Mica ground—								
No. of Companies.....	5	2	-	-	5	2	7	-
Pounds.....	39,440	4,300	-	-	39,440	4,300	43,740	3-8 to 9-4c. per lb.
Magnesium carbonate—								
No. of Companies.....	-	1	-	1	-	2	2	-
Pounds.....	-	12,000	-	10,000	-	22,000	22,000	10-5c. per lb.

Consumption of Prepared Non-Metallic Minerals in Pounds as Reported by Companies Operating in the Rubber Industry—Concluded

Ontario—8 Companies: Quebec—4 Companies: Total—12 Companies

Items	Ontario		Quebec		Canada			Average Price Toronto
	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign	Total	
Magnesia powder—								
No. of Companies.....	1	1	-	1	1	2	3	-
Pounds.....	1,800	15,000	-	40,000	1,800	55,000	56,800	4-8c. per lb.
Pumice—								
No. of Companies.....	-	1	-	-	-	1	1	-
Pounds.....	-	2,000	-	-	-	2,000	2,000	6-3c. per lb.
Quartz, silica—								
No. of Companies.....	-	1	-	-	-	1	1	-
Pounds.....	-	80,000	-	-	-	80,000	80,000	-
Sodium sulphate—								
No. of Companies.....	1	1	-	-	1	1	2	-
Pounds.....	12,567	7,854	-	-	12,567	7,854	20,421	-
Talc—								
No. of Companies.....	5	1	-	3	8	1	9	-
Pounds.....	646,360	55,000	-	137,196	783,556	55,000	838,556	1-3c. per lb.
Whiting—								
No. of Companies.....	-	8	-	2	-	10	10	-
Pounds.....	-	2,261,914	-	2,200,000	-	4,461,914	4,461,914	1-2c. per lb.

Of the quantities shown in the above table those for barytes, china clay, iron oxide, and lime are greater than 100 tons and whiting, reaches a total of over 2,200 tons. Barytes which totals 320 tons was reported as obtained from the Southern States where the supply is large; the excess supply is usually exported at a low price. Both these materials are used as fillers or for weighting. Feldspar, dolomite and natro-alunite are considered by some rubber companies as being useful as fillers; they must be supplied in a very finely powdered condition (350 mesh). Canadian samples of both dolomite and calcite are now being tested, and if properly prepared, and are found both satisfactory and cheap will in part take the place of both whiting and silica. The same might be said of fluorspar and dead-burned gypsum. The practice in the rubber industry varies considerably depending in part on the class of goods turned out. A few companies stated that it would be impossible to use either ground Canadian calcites or dolomites on account of the crystalline structure. The market to-day if successful substitution was obtained would probably be in the neighborhood of 1,000 to 1,200 tons of materials to be used as fillers.

Soaps and Toilet Preparations

The manufacture of soaps, including washing compounds, in Canada is centered in Quebec and Ontario. Those reporting any appreciable consumption or use of the non-metallics covered in the survey numbered 13 in the province of Ontario, 14 in the province of Quebec, 2 in Manitoba, and one each in New Brunswick and British Columbia.

The names and addresses of the companies were as follows :—

ONTARIO

David Morton & Son, Hamilton.
Guelph Soap Company, Guelph.
Eze Manufacturing Co., Toronto.
Lever Bros., Toronto.
Palmolive Co. of Canada, Toronto.
Cudahey Packing Co., Toronto.
Diamond Cleaner Co., Toronto.

London Soap Co., London.
Misner Manufacturing Co., Goderich.
Canadian Booster Co., Windsor.
Seeley Manufacturing Co., Windsor.
Pompeian Co., Walkerville.
Andrew Jergens, Perth.

QUEBEC

Darling and Brady, Montreal.
Palmer, Ltd., Montreal.
G. A. Lewis Company, Montreal.
J. T. Robertson Co., Montreal.
F. A. Marceau, Montreal.
Albert Bellefontaine, Montreal.
La Savonnière du Lion, Montreal.

California Perfume Co., Montreal.
Colgate and Co., Montreal.
The Menon Co., Montreal.
Fyon and Fyon, Ltd., Montreal.
Robillard and Co., Montreal.
Conway Manufacturing Co., Montreal.

The most important item contained in the list under review was silica or ground quartz of which over 3,000 tons was used, all of which was imported from the United States. About 500 or 600 tons of feldspar was also used and this supply was also imported from the United States. These commodities entered into the manufacture of such cleansing materials as Bon Ami and Old Dutch Cleanser. In the manufacture of soaps these materials were not largely consumed in Canada; smaller quantities of iron oxide, talc, sodium sulphate, ground flint and chloride of lime, etc. were also reported. The table follows :—

Consumption of Prepared Non-Metallic Minerals as Reported by Companies Operating in the Soap Industry

Ontario—13 companies; Manitoba—1 company; British Columbia—1 company; total for Canada—29 companies

	Ontario		Quebec		Western Provinces		Canada		
	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign	Total
Feldspar—									
No. of Companies.....	-	-	-	1	-	-	-	1	1
Pounds.....	-	-	-	1,120,000	-	-	-	1,120,000	1,120,000
Fluorspar—									
No. of Companies.....	1	-	-	-	-	-	-	1	1
Pounds.....	4,000	-	-	-	-	-	-	4,000	4,000
Iron oxide—									
No. of Companies.....	-	-	-	-	1	1	1	1	2
Pounds.....	-	-	-	-	50,000	15,000	50,000	15,000	65,000
Silica—									
No. of Companies.....	-	2	-	1	-	1	-	4	4
Pounds.....	-	5,650,000	-	40,000	-	50,000	-	6,740,000	6,740,000
Talc—									
No. of Companies.....	6	1	7	-	1	1	14	2	16
Pounds.....	86,500	10,000	100,200	-	25,000	60,000	211,700	70,000	281,700

In addition to the above items which were the only ones of the list reported as used, this industry consumes smaller amounts of china clay, gypsum, sulphate of ammonia, chloride of lime, borax, soda ash, ammonium chloride and pumice. The last mentioned is used in somewhat greater amount, 125 tons having been reported by one company producing a cleanser.

This material which is a volcanic ash is not produced in Canada. Small quantities of sodium sulphate were also used. The quartz or flint as it is sometimes referred to by manufacturers must be supplied in a high degree of fineness. The price laid down in Toronto is around \$12.50 per ton. Many small consumers would use the Canadian article if of pure silica and if the source of supply could be depended upon. The grinding of quartz would appear to offer inducements to home producers.

Tanneries

As a probable field for consumption of ground non-metallies the tanning and leather industry does not offer many inducements. One hundred and thirty-nine principal tanneries operated throughout Canada were circularized. Of these five were located in Nova Scotia, two in New Brunswick, seventy-five in Quebec, forty-eight in Ontario, two in Manitoba, five in Alberta and two in British Columbia.

Replies received from the larger companies indicated that, with the exception of burnt lime, which in nearly all cases was supplied by local producers, the consumption of the commodities covered was not great. About 4,000 tons of lime (or calcium oxide) was reported as used, by the whole industry and about 45 tons of ground barytes was consumed by two Ontario firms.

During 1921 the materials used included various chemicals and minerals such as sodium bichromate, sulphate of soda, chromic oxide, red arsenic, talc, hyposulphite of soda, sodium sulphide and magnesium sulphate.

Wall Paper

In Canada four firms manufactured wall papers, two of which were located in Montreal and two in Toronto. In 1922, there was consumed some 3,000 tons of china clay all of which was imported, and about 190 or 200 tons of ground white mica. This industry was the only one reporting the use of white mica and although the raw product is found in Canada, no grinding or preparation of the same has been done. Baryte was formerly used as a filler to the extent of about 35 tons but no consumption of this mineral was reported during 1922.

Consumption by Commodities

Actinolite

Actinolite is ground in Canada to the extent of about 75 to 100 tons per year and is used as an ingredient in preparing roofing materials. Some 50 tons was reported as used by one firm in Canada but the major portion of the production was exported to the United States. No uses other than for roofing were reported. A small quantity of actinolite might be used in the rubber industry to replace asbestine of which 75 to 100 thousand pounds are used annually.

Arsenic

Is produced in the form of oxide by two smelting companies treating cobalt arsenide ores and is also recovered from British Columbia gold ores treated in United States smelters. This product is used in a large way in many industries in Canada among which the manufacturers of insecticides and glass are the most important, while smaller amounts are used in the preparation of medicinal and pharmaceutical products and explosives.

In 1922 there was produced in Canada 2,058 tons as the white oxide and it was estimated that 518 tons of arsenic was recovered from ores exported. The consumption as reported was:—

	Pounds
Insecticide preparation.....	768,000
Glass manufacturing.....	275,553
Acids, etc.....	110,000
Medicines, etc.....	2,130
Explosives.....	50
Total.....	1,155,733

Barytes

Although this mineral is produced in Canada a large part of the quantity used for the paint and rubber industries is imported from United States, Germany, Spain and Great Britain. The production of barytes in Canada during 1922 amounted to 289 tons and was produced by the Brandram-Henderson Paint Company from their Lake Ainslie property in Nova Scotia. This quantity was ground and used by that company in their own works. The average consumption by industries has been reported as follows.

	Tons
Heavy chemicals.....	60.0
Paints and pigments.....	2,054.0
Inks, dyes and colours.....	50.6
Enamelling.....	45.0
Rubber goods.....	480.4
Tanneries.....	45.0
Oilcloth and linoleum.....	32.4
Miscellaneous.....	25.0
Total.....	2,747.4

The quantity used for paints in which must be included the amounts shown under Inks, Dyes and Colours and under Miscellaneous amounted to 2,129.6 tons all of which was used in the manufacture of colours. All but about 300 tons was imported from foreign countries. This material is known as the commercial grade which must be very pure and finely ground. The price in Toronto ranged from \$1.28 to \$1.75 and \$2.00 per hundred weight. The standard of fineness desirable was given as 98% to pass 300 mesh.

In the rubber industry, imported white barytes, water floated and ground to 300 mesh, is laid down in Montreal at about \$25 to \$60 per ton depending on the colour. Some Canadian varieties supplied to this trade have been found undesirable through being off-colour. It is used as a filler and varies in specifications according to its application. For instance, for filling

inner tubes some companies desire that 99% should pass 300 mesh and that the specific gravity be not less than 4.20; very small quantities of this material which runs as high as \$68 per ton in price, are used.

A small quantity of domestic barytes is supplied to the tanning industry, where it is used in finishing certain varieties of leather. This variety does not need lixiviation and the consumption amounts to about 45 tons per year.

Calcite

Calcium carbonate is variously described as limestone, dolomite (which in addition to calcium also contains magnesium), calcite, and whiting. Limestone and various grades of dolomite are widely used as building materials, for the production of burned lime, as flux in smelting and in the pulp and paper industry, while whiting, the amorphous calcium carbonate, is of importance in the paint, rubber, linoleum and paper-coating trades.

In order that definite data might be secured concerning the variety calcite, it was mentioned as such in the questionnaire, and special attention given to it. Calcite is a pure white mineral, having a crystalline structure and a chemical composition of practically pure calcium carbonate. There are large deposits of this mineral in Canada, the economic value of which may be come great if new uses are discovered for it. While it is not at the present time widely used, many experiments are being carried on and it may possibly be found satisfactory as a filler in the rubber industry where it might find a market of about 2,000 tons per annum depending on the success with which it might be substituted for other fillers now being used. It would be of value, if the present day processes in the paint and linoleum industries permitted, in reducing the quantities of oil absorbed by the whittings now in use. Up to the present the crystalline structure of calcite has militated against its application in manufacture of paper, putty, paints, rubber and linoleum.

Calcite was formerly used in the manufacture of polishes and dressings to a small extent but in this survey it was reported used by the explosives manufacturers only, where under the name of calcite or chalk it was used to the extent of 100 tons. Calcium carbonate enters in some form or other in nearly every branch of industry listed in the summary table, but as indicated its uses depend in a large way on its physical structure as well as cheapness in price.

Chromite

In 1922, some 1,087 tons of chrome having a value of \$19,566 was mined and shipped from the eastern townships in Quebec. The entire Canadian production was exported in the crude form to be later imported where necessary in Canadian industries. The quantity consumed in Canada was not large but some was used in the manufacture of high temperature cements, and in the foundry trade where it was mixed with a bounding clay and used as a patching cement. It is a constituent of chromite bricks and is also used in the basic process of steel manufacturing. One firm reported a probable consumption of around 40 to 50 tons per annum in the manufacture of cements, while the foundries would probably consume about the same amount. The steel works reported a consumption of 350 tons so that the total quantity used would be about 450 tons.

Corundum

This mineral has been largely used as abrasive and was extensively mined and milled at Craigmont, Ontario, but of late years of production has fallen off due to the introduction of such artificial abrasives as carborundum and aloxite, which are derived from the electrical reduction of imported bauxite ores, silica and carbon.

Corundum is still consumed in a small way and enters into the composition of a certain grade of abrasive wheels. It was reported as consumed by only one company which uses some 160 tons per annum. Corundum is also used in small quantities as an abrasive in the production of manufactured forms of glassware and for burnishing metal articles.

Feldspar

This mineral in a finely ground condition is used in the enamelware, pottery and porcelain, washing compounds, abrasives, glass, roofing and paint industries and also in a coarser form as a constituent of artificial walls and floors. The Canadian production which is around 28,000 tons of feldspar per year is mainly exported in the crude form to United States for grinding. During 1922 seven of the twenty-five or more available feldspar grinding plants in the United States received and ground over 22,000 tons of Canadian spar. According to an article published in the bulletin of the American Ceramic Society,¹ the largest consumers in the United States during 1920 were compelled to take active steps to secure a more satisfactory supply of the ground material. The outstanding features of the industry in that country were given as follows :—

(1) Many grinding companies do not own or control all or even a major part of their sources of crude material, but buy in job lots from many sources.

(2) There is a great need of more adequate engineering and chemical control over mines and mills.

(3) Out of date, inefficient methods and equipment for mining and grinding are in common use.

(4) Little or no co-operation exists between feldspar producers, but on the contrary many feldspar companies are exceedingly secretive. This tends towards (a) preservation of obsolete methods; (b) want of knowledge of the essential features of production, market requirements, and the relation between total milling and consuming capacities of the country; (c) inefficient and often mistaken trade practices; (d) unprofitable and even ruinous competition in dull periods.

(5) The small size of many feldspar deposits precludes maintenance of an efficient organization at each individual mine.

(6) Many of the best deposits of feldspar situated close to railroads are becoming depleted, which results in gradual lowering of grades, and increase in cost for better grades.

(7) There is a lack of exact knowledge of the ceramic properties and behavior of feldspar by some consumers, which results in (a) purchase of feldspar on the basis of price alone, thus encouraging low production costs at the expense of quality, and (b) inefficient and expensive cross-hauling of both crude and ground feldspar.

(8) The grinding capacity of the country greatly exceeds the consuming capacity. There are more than 25 mills with a total capacity in excess of 300,000 tons per year, for a normal consumption of not more than 150,000 tons per year.

(9) There is a lack of uniform tests, specifications and standards of quality and fineness for different uses; and lack of standard definitions of grades.

Since the consumption of the Canadian spar in the finely ground condition is not much over 3,000 tons per annum, no difficulty has been experienced in securing raw materials of a quality suitable for any section of the industry. The bulk of the Canadian supply is now supplied by Canadian mills. With the large deposits of good grades of crude spar now available, it does not appear that Canadian industries will ever find any difficulty in securing a standard product.

At the present time in Canada there are three plants available for the fine-grinding of feldspar, situated at Kingston, Oshawa and Toronto, of which the two establishments in Kingston and Toronto carried on operations during 1922, and produced about 2,192 tons of the ground material.

The quantities reported as used in the following Canadian industries were as follows :—

	Tons
Enamelware, porcelain and pottery	2,520
Soaps, washing compounds	560
Abrasive wheels	100
Glass manufacturing	53
Roofing	21.2
Paints, pigments	3.5
Floors and walls	425

3,682.7

¹ (Conditions in Feldspar Industry—Raymond B. Ladoo, Vol. 1—No. 1—Page 7.

Fluorspar

The principal uses for fluorspar in Canada are for the purpose of preparing the lead fluo-silicate which is used in the electrolytic refining of lead; and also as a flux in the iron and steel industry. The production of the mineral in 1922 was about 4,500 tons of which some 2,700 tons was exported. In the same year imports totalled 4,980 tons so that the annual consumption of all grades would be in the neighbourhood of 6,500 or 7,000 tons. Of this quantity only 200 tons was reported as used in the ground form. The consumption of the ground material in the year 1913 according to a survey made by the Mines' Branch was about 762 tons and was used by the following industries: Enamelware, porcelain and pottery, 412 tons; glass manufacturing—350 tons; as against 175 tons for the enamelware, porcelain and pottery and 50 tons in the glass industry in 1922. The decrease was therefore apparently something over 500 tons in quantity, possibly due to a change in processes rather than to a falling off in production.

Graphite

Graphite is another mineral of which consumption in Canada has fallen off during recent years, the largest decrease occurring in the polishes and dressings industry. In 1913 some eleven firms consumed about 288 tons as against 106 tons now used by only six firms. This amount has not varied greatly during the past three years.

The production in Canada in 1922 was 597 tons valued at \$31,353 and was produced by the Black Donald Graphite Company, Ltd., and the Quebec Graphite Co., Ltd. The imports amounted to \$87,163 worth of all grades including manufactured crucibles, ground and un-ground varieties. Graphite was used in the polishes and dressings, the paint, foundry and machine shops industries, and in rubber manufacturing. The average consumption reported by the industries named was as follows:—

	Tons
Polishes and dressings.....	111.2
Paints and pigments.....	170
*Foundries and machine shops.....	300
Inks, dyes and colours.....	2
Explosives.....	1
Total.....	584

Lime

In 1922 some 7,698,008 bushels of quick lime and 44,623 tons of hydrated lime were sold or used in Canada by the owners of operating kilns. The production by provinces is shown in the following table:—

Province	No. of Operators	Quick Lime Bushels	Hydrated Lime Tons
New Brunswick.....	5	560,834	—
Quebec.....	16	2,108,513	5,278
Ontario.....	31	3,939,954	36,408
Manitoba.....	4	525,184	—
Alberta.....	3	129,827	28
British Columbia.....	3	433,716	2,909

Lime is used in many industries in Canada, the most important of which is the pulp and paper industry. This group consumes as much as all the others with the exception of possibly building and construction. No figures are available for the last-mentioned industry. Lime in a very finely ground condition such as lime-flour is used in the rubber industry to the extent

* Estimated.

of 125 tons; a few tons are also consumed in the manufacture of paints. It is however, generally used in the crude form as produced from the kilns. In the summary table, the amounts of lime used by the industries covered in the report are shown; in addition further data relating to other industries for the year 1922 were available and have been embodied in the following table:—

Industry	Province	No. of Plants	Quantities Consumed
			Tons— 2,000 lb.
Sugar.....	Ontario.....		9,371
	Quebec.....		135
	New Brunswick.....		327
	Nova Scotia.....		78
	Total for Canada.....		9,911
Glass.....	Ontario.....	3	1,778
	Quebec.....	1	1,552
	Total for Canada.....		3,330
Sand-Lime-Brick.....	Ontario.....		7,420
	Manitoba.....		380
	Total for Canada.....		7,800
Heavy Chemicals.....	Ontario.....	3	5,928
	Quebec.....	2	35
	Total for Canada.....		5,963
Pulp and Paper.....	British Columbia.....		4,587
	Ontario.....		6,798
	Quebec.....		49,149
	New Brunswick.....		12,631
	Total for Canada.....		73,165
Paint.....	Ontario.....	3	2
	Quebec.....	1	2
	Total for Canada.....		4
Rubber.....	Ontario.....	7	88
	Quebec.....	3	37
	Total for Canada.....		125
Tanneries.....	Canada (estimated).....		4,000
Silver Smelters.....	Ontario.....	2	16
Gold Mining and Milling.....	Ontario.....	9	3,400
Cobalt Silver Mining and Milling.....	Ontario.....	2	364
	Grand Total for Canada (Except building and construction).....		198,078

Mica

Two important varieties of mica occurring in Canada are white mica or muscovite and the red or brown variety known as phlogopite. The former has not been mined to a great extent but phlogopite has been produced for many years from deposits in the Gatineau-Lievre area of the Ottawa valley in Quebec Province, and in Frontenac county in Ontario. The brown or black mica is largely used for insulating purposes, in the rubber industry, and in prepared roofing. Ground white mica is used in the manufacture of wall paper and also for a special insulating material. The demand for these commodities by Canadian industries has so far been small. The most important trade as a mica market in Canada is the manufacturing of roofing materials in which some 284 tons was consumed in the industrial centres of Ontario and Quebec. In this industry, mica is taking the place of silica sand where it is applied to the surfaces of newly manufactured rolls of roofing material to prevent the sticking together of the plastic materials and also to add elasticity or the function of bending without causing cracking of the sheets. Ground mica was also used in some special grades of lubricants and also as a constituent in the manu-

facture of rubber tires. The amounts consumed per annum were reported as 30 tons for the former and 21.8 tons for the latter. The electrical supply manufacturing industry absorbs about 31 tons of all grades of mica but the bulk of this or 26 tons is made up of sheets, which are used as insulators. Sheet mica is also used in the doors of coal stoves.

The consumption of mica as reported by the different industries in Canada was as follows:—

	Tons
Roofing materials.....	359.0
Wall paper.....	200.0
Electrical goods.....	31.0
Lubricants.....	30.0
Rubber.....	22.0
Total for Canada.....	642.0

Quartz and Silica

Ground quartz or silica is used to a considerably greater extent than barytes, feldspar or fluorspar and is consumed by many industries, notably among which are, washing compounds, enamel and porcelain ware, paints, and polishes. The ground material is usually imported from the United States under various names such as ground flint, ground silice, silica, and quartz. In composition these materials are silica or SiO_2 and for purposes of compilation have all been included together.

The largest amount of the ground material consumed was reported in the manufacture of a cleanser or washing compound where some 3,250 tons of ground silica was reported as used yearly; also about 75 tons of ground flint in the same period, all of which was imported. In this case flint and silica were in reality the same material in composition, and as a matter of fact very little true flints such as those produced in Europe are now used in Canada. The prices paid for ground silicas for these purposes was around \$12.50 per ton. The soap and cleanser firms alone in Toronto and Montreal are now consuming over 3,300 tons and a fair estimate of the consumption per annum for the next two or three years would be 4,000 to 5,000 tons for this industry.

The grade of ground quartz used in enamellware and porcelain is not of such a high standard in fineness as that demanded by the cleanser manufacturers. There is now consumed some 1,151 tons by this section, and this figure does not include any estimate for the ground quartz or flint now imported in the ball clay used for high tension insulators, nor estimates for two firms from which no replies were received. The plants carrying on enamelling and porcelain making, using ground quartz are located in Montreal or vicinity, and in Toronto, Hamilton, Port Hope and Georgetown. Of the 1,142 tons of ground quartzs used in Quebec and Ontario some 842 tons was imported and 300 tons supplied by domestic producers; the grade desired is 100 to 120 mesh.

Ground quartz or silica is also used in the paint industry in Canada to the extent of 423 tons, as follows: Quebec, 256 tons; Ontario, 141 tons; British Columbia, 16 tons, and Manitoba 10 tons. Practically all of the 256 tons shown for Quebec province is sold in the city of Montreal, while of the Ontario consumption over 60 tons are used in paint works in the city of Toronto. This material is imported almost entirely from the United States since few producers in Canada have endeavoured to supply the paint industry. The grade required is an exceedingly fine mesh and is used as an inert filler or extender.

Quartz in powdered form is also used in the production of acids, alkalies and salts, in polishes as the base for suede shoe dressing, and also in metal polishes. It is used in limited amounts in the rubber and ink industries and in coarser grades such as ground quartz and glass for the abrasive strips on match boxes. In addition ground and powdered quartz is used to a very limited extent as an abrasive in polishing buttons, metal goods, cabinet and furniture manufacturing, but the amount is small and does not exceed five tons. The quantities used were as follows:—

Consumption of Ground Quartz and Silica by Industries in Canada, as Reported

(Tons—2000 lbs)

	British Columbia	Manitoba	Ontario	Quebec	Nova Scotia	Canada
Soaps and Cleansers.....	-	25	3,325	20	-	3,370
Enamel, Porcelain and Pottery.....	-	-	740	472	9½	1,221½
Matches.....	-	-	-	650	-	650
Paints.....	16	9½	141	256	-	422½
*Abrasive wheels.....	-	-	200	-	-	200
High Temp. Cements.....	-	-	240	-	-	240
Polishes and Dressings.....	-	-	170	66	-	236
Inks.....	-	-	15	-	-	15
Rubber.....	-	-	40	-	-	40
(b) Adhesives.....	-	-	3	-	-	3
Buttons.....	-	-	3	-	-	3
Total.....	16	34½	4,879	1,464	9½	6,463

*Crude quartz ground by company.
(b) Reported as silica.

Silica sand is produced in the province of Quebec by one firm which was active during 1922 in the grinding and washing of potsdam sandstone. The product which is a fine grade of pure silica sand compares favorably with the imported silica sands from Illinois and Michigan. These sands are very widely used in iron and steel furnaces and by foundries. It is also imported from United States, and Belgium for the manufacture of glass and for the production of artificial abrasives, and is an important constituent of many roofing materials. Silica sand is also used in the bases of saggers in the porcelain industry to keep the porcelain article from fusing to the containing sagger. In nearly all these industries the silica sand used is imported from the United States and the average price per ton in central Ontario points is around \$5.65. As the United States sands are dug in their natural state from banks it is difficult for the producers of the compact sandstones of Canada to compete, since it is necessary to crush, wash and otherwise prepare the domestic varieties. The silica sand as used in the foundries must be of such a nature that it will shape well into moulds and at the same time remain in a porous condition so that the gases from hot metals may escape. In brass foundries a grade of beach sand is more desirable since the resulting casting is smoother.

The silica sand used in mineral wallboard is marketed in a grade of about 100 mesh. The most essential characteristic necessary is a fine white colour, free from impurities, all of which could readily be satisfied by grinding crude lump quartz, provided the purity and colour were right and that it could be economically delivered at a low enough price to compete with natural silica sands. Excluding the silica sands used in the iron and steel and brass industry for moulds, and that imported for glass manufacturing, and artificial abrasives, there remains only the roofing and mineral walls as a field for this material, which at the present time would not exceed 2,000 tons per annum, but which will increase with the development of the industry.

Tripolite

Tripolite is a highly silicious sedimentary rock, composed of the shells of diatoms. It is also known as infusorial earth, diatomaceous earth, infusorial silica, fossil flour, rottenstone, electro-silicon and kieselguhr. It is widely used as a polishing powder and as a filter. During 1922 Canada produced some 219 tons, which was shipped to United States from a deposit in Nova Scotia.

In the industries covered by this survey there was reported a consumption of 77½ tons in the polishing and dressing industry.

Other small quantities were reported by the rubber industry, by manufacturers of medicines and those trades preparing highly polished products: e.g. glassware, metal and brass goods, wood working, etc. The total consumption in Canada as reported was 81.6 tons.

Whiting

The commodity, an amorphous form of calcium carbonate is imported as ground English cliffstone, ordinary white, Paris, satin or gilders white, ground or in lump form. The English whiting on account of its whiteness, exceedingly fine state and low price is largely used and the fact that in physical structure it is amorphous gives it an important place in the manufacture of paints, rubber and linoleum. In addition a considerable quantity is used for the coating of paper. Whiting has a wide application in Canadian industries, and over ten thousand tons are consumed yearly for which no domestic mineral has so far been successfully substituted.

The consumption reported by industries was as follows :—

	Tons
Pulp and paper.....	350.0
Explosives, fireworks, etc.....	134.0
Medicinal and pharmaceuticals.....	11.5
Paints.....	5,310.0
Inks, dyes and colours.....	0.5
Polishes and dressings.....	105.0
Enamelware, porcelain, pottery.....	65.0
Rubber.....	2,231.0
Buttons, manufacturing.....	6.5
Electrical goods.....	200.0
Brass manufacturing.....	40.35
Oilcloth and linoleum.....	2,086.0
Miscellaneous.....	33.0
Total.....	10,572.85

**Whiting Prices-Open Water Season
1923**

Prices in cents per 100 lbs. laid down on quay at Montreal in lots of not less than 60 tons at a time.

	Lump Whiting			Ground, Bolted or Powdered Whiting			Lump Chalk
	Ordinary	Gilders	Paris White	Ordinary	Gilders	Paris White	
CASKS—							
504 lbs. nett.....	95.30	97.70	101.40	102.50	104.90	108.60	92.00
336 lbs. nett.....	95.30	97.70	101.40	102.50	104.90	108.60	94.30
280 lbs. nett.....	97.60	100.10	103.70	108.20	110.40	114.20	
SACKS—							
224 lbs. nett (single).....	67.10	69.50	73.20	75.10	77.40	81.10	
224 lbs. nett (double).....	73.50	76.10	79.70	82.50	84.80	88.60	
168 lbs. nett (single).....				70.40	78.60	82.40	

To arrive at prices on Quay Halifax, N.S. Add 1.50c. per 100 lbs.
St. John, N.B. Add .50c. per 100 lbs.

For quantities of less than 60 tons the extra charge will be as follows :—

Parcels of 50 to 59 tons.....	.00-60c. per 100 lbs.
Parcels of 40 to 49 tons.....	.01-10c. per 100 lbs.
Parcels of 30 to 39 tons.....	.02-20c. per 100 lbs.
Parcels of 20 to 29 tons.....	.03-30c. per 100 lbs.
Parcels of 10 to 19 tons.....	.04-40c. per 100 lbs.

The above prices are strictly nett and do not include duty, if any.

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