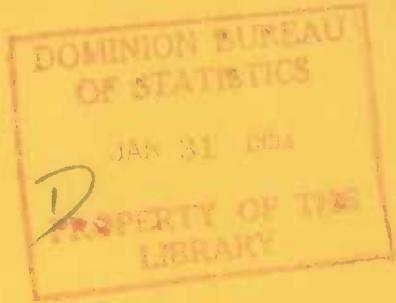


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GOVERNMENT OF CANADA



THE MISCELLANEOUS  
INDUSTRIAL OR NON-METALLIC MINERALS  
MINING INDUSTRY

1949





DOMINION BUREAU OF STATISTICS - DEPARTMENT OF TRADE AND COMMERCE

THE MISCELLANEOUS INDUSTRIAL OR NON-METALLIC  
MINERALS MINING INDUSTRY

1949

Published by Authority of the Rt. Hon. C. D. HOWE  
*Minister of Trade and Commerce*

Prepared in the Mining, Metallurgical and Chemical Section,  
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## NOTICE

It has been the practice of the Bureau of Statistics, since 1920, to issue an annual printed report on the Mineral Production of Canada. This report was comprised to a large extent of the data which had already been issued in bulletin form as statistics for each industry were completed. The final report was necessarily late in being issued, and its main use was for library purposes and for historical research. It also had the advantage of having complete statistics of the Canadian Mining Industry for a year in one volume.

Such a procedure necessitated the preparation of new manuscript, duplication of proof-reading, and extra costs in type-setting and printing. In order to avoid this extra cost, a system has been devised whereby libraries and other similar organizations may file the separate reports in a ring binder as issued, and if they so desire, may have them bound in a volume when the series for the year is complete.

The reports have been paged in such a manner that when bound they will correspond to the chapters of the annual printed report hitherto issued, but which will now be discontinued.

The following reports will constitute the complete volume on Mineral Statistics of Canada:

- A General Review of the Mining Industry
- B The Gold Mining Industry
- C The Silver-Lead-Zinc Mining Industry
- D The Nickel-Copper Mining, Smelting and Refining Industry
- E The Miscellaneous Metal Mining Industry
- F The Non-ferrous Smelting and Refining Industry
- G The Coal Mining Industry
- H The Natural Gas and Crude Petroleum Industry
- I The Asbestos Mining Industry
- J The Feldspar and Quartz Mining Industry
- K The Gypsum Industry
- L The Peat Industry
- M The Salt Industry
- N The Talc and Soapstone Industry
- O The Miscellaneous Industrial or Non-metallic Minerals Mining Industry
- P The Cement Manufacturing Industry
- Q The Clay and Clay Products Industry
- R The Lime Industry
- S The Sand and Gravel Industry
- T The Stone Industry
- U Contract Diamond Drilling in the Mining Industry
- V Appendix — Explanatory notes on the method of computing the quantities and values of the Mineral Production of Canada

## TABLE OF CONTENTS

	Page
Principal statistics.....	O-5
Arsenious oxide .....	O-7
Barite .....	O-8
Brucite.....	O-16
Corundum.....	O-9
Diatomite.....	O-9
Fluorspar.....	O-11
Garnet.....	O-12
Graphite .....	O-12
Grindstones (natural),.....	O-14
Iron oxides (natural).....	O-14
Lithium .....	O-16
Magnesite .....	O-16
Magnesium sulphate (natural) .....	O-17
Mica .....	O-18
Mineral waters (natural) .....	O-20
Phosphate rock .....	O-20
Silica brick .....	O-21
Sodium carbonate (natural).....	O-22
Sodium sulphate (natural) .....	O-22
Strontium .....	O-26
Sulphur.....	O-26
Volcanic dust .....	O-26
Directory of Firms .....	O-27



# THE MISCELLANEOUS INDUSTRIAL OR NON-METALLIC MINERALS MINING INDUSTRY

1949

Canadian operators producing certain industrial minerals, and who are usually relatively few in number, have been segregated for statistical purposes into a single group designated as the Miscellaneous Industrial or Non-metallics Mining Industry. Minerals or primary mineral products recovered (or deposits developed) by this industry during 1949 included barite, brucite, diatomite, fluorspar, garnet, graphite, grindstones, dolomitic-magnesite, mineral waters, phosphate rock, silica brick, sodium carbonate and sodium sulphate. For convenience, the sulphur content of pyrites shipped and sulphur recovered from smelter gas are recorded with the various miscellaneous minerals listed above; the value of sulphur production, however, is not included in the total for the miscellaneous non-metallic or industrial minerals as the value of this element is credited to the copper-gold-silver mining and non-ferrous smelting industries. Arsenious oxide, which was formerly listed

with the metals, was reclassified as a non-metallic. As arsenious oxide is a by-product, the value of production is included in the gold and non-ferrous smelting industries. Statistics for the mica mining industry and for the iron oxides mining industry are also given in this report although they are not included in the totals for the Miscellaneous Non-metal Mining Industry; formerly separate bulletins were issued on these industries.

During 1949 there were 37 plants in the Miscellaneous Non-metal Mining Industry and the gross value of production was \$6,236,811 compared with \$6,034,352 in 1948. Salaries and wages paid to 1,160 employees amounted to \$2,632,808. Fuel cost \$826,858 and \$184,163 was paid for 15,784,361 k.w.h. of electricity. Process supplies cost \$576,919, and the value of containers was \$107,820.

**TABLE 1. Principal Statistics Relating to The Miscellaneous Non-Metal Mining Industry,  
1948 and 1949**

	1948	1949
Number of plants.....	40	37
Number of employees:		
Administrative.....	137	144
Workmen .....	1,024	1,016
Total.....	1,161	1,160
Salaries and wages:		
Administrative.....	\$ 325,306	\$ 388,797
Workmen .....	\$ 2,172,612	\$ 2,244,011
Total.....	\$ 2,497,918	\$ 2,632,808
Selling value of products (gross).....	\$ 6,034,352	\$ 6,236,811
Cost of fuel and electricity.....	\$ 1,081,147	\$ 1,011,021
Cost of process supplies used.....	\$ 689,908	\$ 576,919
Cost of containers.....	\$ 126,355	\$ 107,820
Freight.....	\$ 80,575	\$ 79,121
Selling value of products (net).....	\$ 4,056,367	\$ 4,461,930

TABLE 2. Production of Miscellaneous Non-Metallic Minerals, 1948 and 1949

Item	Unit of measure	1948		1949	
		Quantity	Value	Quantity	Value
Barite.....	ton	95,747	\$ 1,073,380	47,138	\$ 557,662
Diatomite.....	ton	46	1,487	60	1,703
Fluorspar.....	ton	11,340	344,834	64,477	1,592,908
Garnet (schist).....	ton	2	200	—	—
Graphite.....	ton	2,539	239,931	2,147	212,496
Grindstones.....	ton	220	20,100	195	12,450
Dolomitic-magnesite.....	ton	—	1,587,709	—	1,587,709
Mineral waters.....	Imp. gal.	192,539	110,259	306,691	146,240
Phosphate.....	ton	—	—	20	291
Silica brick.....	M	3,464	393,821	3,663	453,797
Sodium carbonate.....	ton	—	—	47	513
Sodium sulphate.....	ton	153,698	2,136,276	120,259	1,614,731
<b>Total</b> .....	—	—	<b>\$ 5,907,997</b>	—	<b>6,180,500</b>
Sulphur production <sup>1</sup> .....	ton	229,463	1,836,358	261,871	2,039,384
Iron oxides.....	ton	13,181	203,391	13,625	207,887
Mica.....	ton	3,951	219,948	1,745	108,458
Arsenious oxide <sup>2</sup> .....	ton	581	82,909	263	26,332

Note. Value of containers is excluded.

1. Includes sulphur content of pyrites at its sales value and estimated figures for quantity and value of sulphur in smelter gases used for acid making. General statistics relating to production of sulphur are included with those of the copper-gold mining and non-ferrous smelting industries.

2. General statistics relating to arsenious oxide are included with the non-ferrous smelting industry.

TABLE 3. Workmen, by Months, in The Miscellaneous Non-Metal Mining Industry, 1948 and 1949

Month	1948				1949			
	Mine		Mill		Mine		Mill	
	Surface	Under-ground			Male	Female		
	Male	Under-ground	Male	Female	Male	Female	Male	Female
January.....	227	112	593	4	244	2	241	684
February.....	217	118	613	4	232	2	238	652
March.....	248	114	631	4	229	2	226	646
April.....	258	98	652	4	241	2	227	600
May.....	274	87	682	4	208	2	169	580
June.....	271	99	729	4	288	2	228	573
July.....	262	96	684	4	275	2	224	548
August.....	265	106	696	4	194	2	168	483
September.....	248	106	736	4	196	2	243	489
October.....	239	94	746	4	205	2	239	561
November.....	209	91	709	4	184	2	210	566
December.....	215	85	604	4	185	2	154	457
<b>Average</b> .....	<b>248</b>	<b>99</b>	<b>673</b>	<b>4</b>	<b>228</b>	<b>2</b>	<b>214</b>	<b>570</b>

## ARSENIOUS OXIDE

Production (shipments) of arsenious oxide from Canadian ores during 1949 was 526,645 pounds valued at \$26,332 compared with 1,161,996 pounds valued at \$82,909 in 1948. In Quebec the Consolidated Beattie Mines Ltd. and the O'Brien Gold Mines Ltd. roast their arsenical ores. Both crude and refined grades of arsenic are produced by the Beattie mine but the crude from the O'Brien mine is shipped to the Deloro smelter for refining. The production from Ontario

ores originated in the silver-cobalt ores treated at the Deloro plant. The auriferous quartz ores exported to the United States from British Columbia mines contain considerable amounts of arsenic but no data are available on the possible recovery of this arsenic and since the Canadian gold mines receive no payment for the arsenic content, it is not credited as commercial production. Because there are only two producers, the figures for refined arsenic are not shown separately.

TABLE 4. Production, Imports and Exports of Arsenic, 1948 and 1949

	1948		1949	
	Quantity (pounds)	Value \$	Quantity (pounds)	Value \$
<b>PRODUCTION</b>				
White arsenic (crude and refined).....	1,161,996	82,909	526,645	26,332
<b>IMPORTS</b>				
Arsenic acid.....	1,395,809	68,008	1,701,154	86,602
Arsenious oxide and arsenic sulphide.....	84,390	13,056	256,957	18,091
Soda, arseniate of, binarsenate.....	68,510	18,910	55,142	21,203
Arsenate of lead.....	430	150	—	—
Arsenate of lime .....	—	—	—	—
<b>EXPORTS</b>				
Arsenic <sup>1</sup> .....	4,051,300	162,103	3,880,700	157,947

1. Includes arsenic content in gold ores exported from British Columbia.

TABLE 5. Production, Imports and Exports of White Arsenic, 1942-1949

Year	Production (crude and refined)	Imports <sup>1</sup>	Exports	
			Refined	Crude
(pounds)				
1942.....	7,853,123	2,082	2,204,889	5,844,611
1943.....	3,153,538	400	2,358,400	199,358
1944.....	2,627,022	2,405	2,018,000	—
1945.....	2,045,730	—	1,519,697	—
1946.....	745,885	500	418,000	—
1947.....	787,736	248,379	130,300	—
1948.....	1,161,996	84,390	170,800	—
1949.....	526,645	256,957	12,400	—

1. Arsenious oxide and arsenic sulphide.

TABLE 6. Consumption of Refined White Arsenic, 1945-1948

Industry	1945	1946	1947	1948
	(pounds)			
Glass.....	303,246	336,501	432,449	432,711
Insecticides <sup>1</sup> .....	340,000	55,808	117,051	5,390
White metals.....	62,000	60,110	37,454	30,927
Miscellaneous chemicals.....	8,000	14,800	39,520	229,561
Total accounted for .....	713,246	467,219	626,474	698,589

1. Does not include arsenic acid ( $As_2O_5$ ) imported for use in making insecticides, as follows:  
1945—5,667,053 pounds; 1946—3,867,606 pounds; 1947—3,589,018 pounds; 1948—1,395,809 pounds.

## BARITE

Canadian production of barite in 1949 amounted to 47,138 tons valued at \$557,662 compared with 95,747 tons worth \$1,073,380 in the preceding year.

The Canadian Industrial Minerals Limited at Walton, Nova Scotia is the largest producer of barite, mostly for the export markets. In British Columbia, the Mountain Minerals Ltd. shipped crude barite from its properties southeast of Golden. In Ontario the Woodhall Mines Limited did some development work in the Nighthawk River district in the Porcupine area.

For most industrial purposes barite is used in finely ground form, 325 mesh being the general specification. The material should be of good white colour, the best grades being obtained by wet grinding, bleaching with acid, and water floating. Some off-colour material is used for less exacting purposes.

Content of BaSO<sub>4</sub> is usually required to be not less than 95 per cent. Chief uses for ground barite are as a heavy, inert filler or loader in rubber, asbestos products, paper, linoleum and oilcloth, textiles, leather and plastics. It is one of the leading pigments and extenders in paints, and has become of increasing importance as a heavy weighting medium in oil-well drilling muds to overcome gas pressures. About 5 tons of barite is used for each 1,000 feet of hole drilled. The requirements are a minimum specific gravity of 4.25 (corresponding to a BaSO<sub>4</sub> content of 93 per cent) and absence of soluble salts. Considerable barite is used in the glass industry as a batch fluxing ingredient for moulded flint glass, for which purpose it should contain not less than 96 per cent BaSO<sub>4</sub>, under 3 per cent moisture, and not more than 0.4 per cent iron oxide (Fe<sub>2</sub>O<sub>3</sub>), with a fineness range of 20 to 100 mesh.

TABLE 7. Production of Barite, 1940-1949

Year	Short tons	\$	Year	Short tons	\$
1940.....	338	4,819	1945.....	139,589	1,211,403
1941.....	6,890	74,416	1946.....	120,419	1,006,473
1942.....	19,667	188,144	1947.....	128,675	1,380,753
1943.....	24,474	279,253	1948.....	95,747	1,073,380
1944.....	118,719	1,023,696	1949.....	47,138	557,662

TABLE 8. Imports of Barite, 1940-1949

Year	Tons	\$	Year	Tons	\$
1940.....	2,622	64,922	1945.....	1,150	32,531
1941.....	3,431	81,620	1946.....	1,547	42,904
1942.....	2,536	68,196	1947.....	1,737	51,060
1943.....	1,686	43,239	1948.....	1,263	39,613
1944.....	1,824	47,913	1949.....	934	32,269

TABLE 9. Consumption of Barite, 1945-1948

	1945	1946	1947	1948
(Tons)				
(a) BY USES				
Paints.....	1,749	1,711	1,658	1,331
Rubber goods.....	478	461	556	659
Wall paper.....	22	—	—	—
Glass.....	879	266	237	380
Miscellaneous.....	200	400	313	1,075
<b>Total .....</b>	<b>3,328</b>	<b>2,838</b>	<b>2,764</b>	<b>3,445</b>
(b) BY PROVINCES				
Nova Scotia .....	33	34	24	6
Quebec.....	931	1,123	1,146	1,711
Ontario.....	1,916	1,179	1,210	1,182
Manitoba.....	210	276	227	121
Saskatchewan.....	4	4	7	4
Alberta .....	105	106	11	310
British Columbia .....	129	116	139	111
<b>Canada.....</b>	<b>3,328</b>	<b>2,838</b>	<b>2,764</b>	<b>3,445</b>

Note. Above figures do not include amounts used in oil drilling.

### CORUNDUM

No corundum has been produced in Canada since October, 1946, when treatment of the old tailings at the Craigmont property, Renfrew county, Ontario, for the recovery of corundum was completed. This operation was undertaken during the war at the request of the United States Government. During the two years of operation about 2,600 tons of concentrate were shipped from the Craigmont property to American Abrasive Company, Westfield, Massachusetts, the only handler of corundum on the continent.

The main and only zone from which production has been obtained is in a belt 100 miles long and 6 miles wide in Haliburton, Hastings, and Renfrew counties in Ontario. Several of the numerous deposits examined recently contain fair amounts of

corundum, the most promising being an extensive deposit in Monteagle township on the east side of the York River, about 10 miles northeast of Bancroft. (For a description of corundum-bearing nepheline syenite belts of south and eastern Ontario, see report No. 820 "The Corundum Mineral Industry in 1945", page 53, issued by the Bureau of Mines, Ottawa.) It is doubtful, however, if the production of corundum alone would be economic and consequently marketable by-products would be necessary. Present indications are that a large tonnage of good quality nepheline feldspar product suitable for the glass trade, as well as fine mica for fillers and for backing, can be extracted from the Monteagle deposit, in addition to high-quality fine-grained corundum.

### DIATOMITE

All of the Canadian production of diatomite since 1939 has come from deposits in the swamps and lake bottoms of northern Nova Scotia; in southern British Columbia; in the Muskoka area, Ontario; and in various parts of British Columbia. Production in 1949 came from two deposits, one at Digby Neck, Nova Scotia, operated by G. Wightman, and the other on the west bank of the Fraser River, north of Quesnel, British Columbia, operated by L. T. Fairey of Vancouver. The Tertiary fresh-water deposits near Quesnel in the Cariboo area are by far the largest known in Canada; they extend for many miles along the Fraser River, are compact, and are up to 40 feet thick. At Digby Neck, Nova Scotia, is the largest known recent fresh-water (swamp) deposit in Canada.

Diatomite is used as a fertilizer dusting agent, for filtration, and as a filler in the paint, chemical, paper, rubber and textile industries. Small amounts are used in silver polish bases, and as an admixture

in concrete. A small amount of lime-diatomite insulation bricks is made by a company in Toronto which uses diatomite from Nova Scotia. Diatomite is being used in pressure filters in industrial plants in place of sand filters for the removal of disease-producing organisms.

The ammonium nitrate fertilizers in which diatomite is used as a dusting agent are made in Canada by The Consolidated Mining and Smelting Company of Canada Limited in its plants in Trail, British Columbia, and in Calgary, Alberta; and by North American Cyanamid Limited, in its plant near Welland, Ontario. The diatomite thus used is highly porous and when added to the nitrate it absorbs moisture and coats the small grains or nitrapping which prevents caking and ensures even spreading. Specifications call for uncalcined material of 325 mesh and less than 5 per cent moisture. Much of the output of these fertilizers is exported.

TABLE 10. Production of Diatomite, 1940-1949

Year	Short tons	\$	Year	Short tons	\$
1940.....	248	7,957	1945.....	46	1,238
1941.....	344	9,935	1946.....	90	2,532
1942.....	365	9,088	1947.....	103	2,677
1943.....	98	3,331	1948.....	46	1,487
1944.....	13	437	1949.....	60	1,703

TABLE 11. Consumption of Infusorial Earth in the Sugar Refining Industry, 1939-1948

Year	Tons	Value	Year	Tons	Value
		\$			\$
1939.....	2,410	105,711	1944.....	2,188	115,053
1940.....	2,492	112,369	1945.....	1,992	102,961
1941.....	2,672	138,973	1946.....	2,196	104,794
1942.....	1,504	75,295	1947.....	2,490	141,885
1943.....	1,726	89,075	1948.....	2,865	167,259

TABLE 12. Consumption of Diatomaceous Earth in the Manufacture of Fertilizers, 1944-1948

Year	Tons	\$
1944.....	9,690	297,987
1945.....	6,444	274,968
1946.....	8,185	308,446
1947.....	7,488	295,773
1948.....	7,653	316,383

TABLE 13. Imports of Diatomaceous Earth, 1940-1949

Year	Tons	Value	Year	Tons	Value
		\$			\$
1940.....	4,121	133,876	1945.....	13,217	362,882
1941.....	6,915	229,555	1946.....	17,063	469,968
1942.....	4,294	155,802	1947.....	15,074	431,125
1943.....	5,623	184,010	1948.....	17,050	512,115
1944.....	11,664	335,939	1949.....	16,914	551,954

## FLUORSPAR

Production of fluorspar in Canada during 1949 was 64,477 tons valued at \$1,592,908 compared with 11,340 tons worth \$344,834 in 1948. The increase was due to Newfoundland joining the confederation. About 90 per cent of the output came from the fluorspar deposits at St. Lawrence, Newfoundland. The remainder was mined in the Madoc area in Ontario.

Fluorspar is used chiefly as a powerful fluxing agent in the steel industry, and is used in small

amounts in numerous other metallurgical industries. The next largest market is in the manufacture of hydro-fluoric acid, which is used mainly in making artificial cryolite and aluminum fluoride for the aluminum industry. The fluorspar imported from Newfoundland is used for this purpose at Arvida, Quebec. The ceramic industry is next, and uses fluorspar as a fluxing and opacifying ingredient in glass and enamels. Uranium hexafluoride is used for the gaseous diffusion separation of the uranium isotopes U235 and U238 in the development of atomic energy.

TABLE 14. Principal Statistics of the Fluorspar Mining Industry, 1948 and 1949

		1948	1949
Active firms .....	No.	4	5
Employees:			
Administrative.....	No.	4	32
Workmen.....	No.	60	282
Total.....	No.	64	314
Salaries and wages:			
Administration.....	\$	19,799	86,052
Workmen.....	\$	105,648	546,112
Total.....	\$	125,447	632,164
Gross value of production .....	\$	344,834	1,592,908
Cost of fuel and electricity .....	\$	24,139	139,205
Process supplies used .....	\$	7,892	48,785
Net value of production .....	\$	312,803	1,404,918

TABLE 15. Production of Fluorspar, 1940-1949

Year	Short tons	\$	Year	Short tons	\$
1940.....	4,454	59,317	1945 .....	7,369	233,708
1941 .....	5,534	97,767	1946 .....	8,042	237,491
1942.....	6,199	146,039	1947 .....	7,186	209,886
1943.....	11,210	318,424	1948.....	11,340	344,834
1944 .....	6,924	217,701	1949 .....	64,477	1,592,908

TABLE 16. Imports of Fluorspar, 1940-1949

Year	Tons	\$	Year	Tons	\$
1940.....	30,312	628,719	1945 .....	20,517	530,670
1941 .....	26,539	567,656	1946 .....	31,813	717,094
1942.....	47,784	1,046,526	1947 .....	32,001	702,419
1943.....	77,436	1,738,669	1948 .....	48,925	1,105,190
1944 .....	37,100	840,309	1949 .....	2,510	81,650

TABLE 17. Consumption of Fluorspar, 1945-1948

—	1945	1946	1947	1948
(Tons)				
(a) BY USES				
Steel.....	19,462	13,805	18,768	20,651
Glass.....	302	145	752	569
Enamelling and glazing.....	200	220	244	257
Heavy chemicals.....	3,600	3,388	3,534	32,596
Non-ferrous smelters.....	12,830	10,972	18,037	—
Ferro-alloys.....	792	1,431	—	—
White metal alloys.....	20	34	44	36
Miscellaneous.....	100	—	—	—
Total.....	<b>37,304</b>	<b>29,995</b>	<b>41,379</b>	<b>54,109</b>
(Tons)				
(b) BY PROVINCES				
Nova Scotia.....	7,390	6,612	7,566	7,908
Quebec.....	13,300	11,098	18,142	29,777
Ontario.....	16,266	12,058	15,181	16,054
Manitoba.....	170	205	225	298
Alberta.....	70	—	245	61
British Columbia.....	110	22	20	11
Total.....	<b>37,304</b>	<b>29,995</b>	<b>41,379</b>	<b>54,109</b>

**GARNET**

No shipments of garnet were made during 1949. In earlier years the Niagara Garnet Company mined a deposit near River Valley in Dana township, Ontario. The ore was crushed and concentrated at the firm's mill located at Sturgeon Falls.

Garnet is used for making abrasive-coated papers and cloth, which in turn are used mainly in the wood-working and shoe-leather industries. Garnet flour or superfine grade is used as a partial substitute for corundum flour for polishing optical lenses.

**GRAPHITE**

Production of graphite in Canada came from the Black Donald mine, Renfrew county, Ontario, the only operating property in Canada. The property has been sold to the Hydro-Electric Commission of Ontario, in connection with water power development on the Madawaska River. Completion of the project will result in flooding a part of the property, but the Black Donald mine retains the right to operate until the land is actually required for flooding purposes.

Graphite has many uses, but is employed principally in foundry facings, lubricants, crucibles, retorts and stoppers, packings, pencils and crayons, paints, and stove polish. Important quantities, mostly amorphous or artificial, are used in dry batteries, electrodes, and commutator brushes. Flake from the Black

Donald deposit is too small for crucible use and finished products consist mainly of amorphous foundry grades, but include high-grade fine flake and dust sold for use in lubricants, packings, and polishes. Prepared facings for the domestic foundry trade also are made.

In Canada, graphite is used chiefly in the foundry, dry battery, packings, lubricants, and paint trades. Foundry needs are met in part by domestic production, and in part by plumbago from Ceylon. The battery trade uses mainly Mexican amorphous, and paint requirements are filled largely by low-grade amorphous flake. American imports of Canadian graphite are used chiefly in foundry facings, lubricants, and pencils.

TABLE 18. Mine Production Shipments of Graphite, 1940-1949

Year	Short tons	\$	Year	Short tons	\$
1940.....	1,382	94,038	1945.....	1,910	187,364
1941.....	1,644	132,924	1946.....	1,975	180,405
1942.....	1,192	117,904	1947.....	2,398	207,364
1943.....	1,903	197,431	1948.....	2,539	239,931
1944.....	1,582	179,457	1949.....	2,147	212,496

TABLE 19. Imports and Exports of Graphite<sup>1</sup>, 1947-1949

Imports	1947	1948	1949
	\$	\$	\$
Plumbago, not ground.....	75,780	81,899	83,301
Crucibles, plumbago, and covers.....	135,894	116,999	128,696
Plumbago, ground, and manufactures of.....	379,425	333,679	293,267
Exports			
Graphite, crude and refined.....	156,748	191,398	166,224
Carbon and graphite electrodes.....	1,657,222	1,260,696	1,158,499

1. Includes artificial graphite.

TABLE 20. Available data on the Consumption of Graphite, 1948

Industry	Quantity
Total	Pounds
Iron & Steel Foundries.....	2,310,375
Paints.....	165,699
Electrical apparatus.....	1,401,254
Heavy chemicals.....	300,852
Prepared foundry facings.....	1,091,280
Polishes.....	47,937
Brass and bronze foundries.....	59,416
<b>Total</b> .....	<b>5,376,613</b>
BY PROVINCES	
Nova Scotia.....	20,345
New Brunswick.....	3,107
Quebec.....	1,344,380
Ontario.....	3,765,538
Manitoba.....	42,088
Saskatchewan.....	6,050
Alberta.....	15,085
British Columbia.....	180,020
<b>Total</b> .....	<b>5,376,613</b>

## GRINDSTONES, PULPSTONES AND SCYTHESTONES

Sandstone beds in Nova Scotia, New Brunswick and British Columbia contain material suitable for grindstones. The output is only from the New Brunswick coast where the stones are removed

along the shore area of the Bay of Chaleur. During 1949 the shipments of grindstones amounted to 195 tons valued at \$12,450 compared with 220 tons valued at \$20,100 in the previous year.

TABLE 21. Production of Grindstones, Pulpstones and Scythestones, 1940-1949

Year	Tons	\$	Year	Tons	\$
1940.....	341	14,543	1945.....	225	10,870
1941.....	188	11,500	1946.....	295	17,450
1942.....	216	10,000	1947.....	335	21,475
1943.....	164	6,225	1948.....	220	20,100
1944.....	225	12,000	1949.....	195	12,450

TABLE 22. Consumption of Pulpstones by the Canadian Pulp and Paper Industry, 1939-1948

Year	Number for 2 ft. wood	Value	Number for 2.5 ft. wood	Value	Number for 4 ft. wood	Value
1939.....	242	\$ 60,622	60	\$ 22,443	203	\$ 238,620
1940.....	311	96,957	110	49,899	163	257,628
1941.....	295	127,349	77	35,843	97	215,913
1942.....	237	100,466	53	23,898	94	208,986
1943.....	197	102,888	54	20,000	66	151,411
1944.....	187	89,133	57	34,865	76	193,396
1945.....	191	117,585	33	14,132	114	271,108
1946.....	233	121,705	41	16,868	139	349,866
1947.....	258	153,075	35	22,629	153	409,060
1948.....	201	146,328	38	34,339	127	372,453

## IRON OXIDES

Shipments of ochreous iron oxides in 1949 amounted to 13,625 tons valued at \$207,887, f.o.b. shipping points. About 80 per cent of the output originated in Quebec and most of the remainder was mined in British Columbia.

The ochreous iron oxide used in the manufacture of paints is largely in the calcined form. However, a small quantity of natural iron oxides associated with clay-like materials in the form of umbers and siennas is also used as pigments in paints, both in the raw and calcinated state.

Iron oxide pigments are used also as colouring agents and fillers in the manufacture of imitation

leather, shade cloth, shingle stain, paper and cardboard. Siennas and umbers are used in wood stains and wood fillers. The natural ochre is used as a pigment for linoleum and oilcloth; as a pigment in wood stains and wood fillers; and in colouring cement, stuccos, and mortar.

A portion of iron oxide mined in Quebec and nearly all of that mined in British Columbia is used for the purification of illuminating gas.

The prices as quoted by the Canadian Chemistry and Process Industries for iron oxide were: red, 6 to 11 cents per pound; yellow, 5 to 7 cents; brown, 5 to 8 cents; and black 9 to 12 cents per pound.

TABLE 23. Principal Statistics of The Natural Iron Oxides Industry, 1947-1949

	1947	1948	1949
Number of firms.....	6	7	8
Number of employees:			
Administration.....	8	7	7
Workmen.....	46	48	37
Total .....	54	55	44
Salaries and wages :			
Administration..... \$	13,816	11,157	12,301
Workmen..... \$	68,553	73,402	60,810
Total .....	\$ 82,369	\$ 84,559	\$ 73,111
Selling value of products (gross)..... \$	258,322	203,391	207,887
Cost of fuel and purchased electricity..... \$	24,802	25,574	20,692
Cost of process supplies..... \$	6,628	4,625	4,424
Freight..... \$	9,474	8,066	15,290
Selling value of products (net)..... \$	217,418	165,126	167,481

TABLE 24. Production of Natural Iron Oxides, 1940-1949

Year	Quantity	Value	Year	Quantity	Value
	Short tons	\$		Short tons	\$
1940 .....	9,979	111,874	1945.....	10,314	172,053
1941 .....	10,045	142,069	1946.....	12,695	152,268
1942 .....	9,304	151,653	1947.....	13,418	258,322
1943 .....	8,401	135,893	1948.....	13,181	203,391
1944 .....	8,599	150,250	1949.....	13,625	207,887

TABLE 25. Imports and Exports of Ochres and Colours, 1948 and 1949

	1948		1949	
	Quantity	Value	Quantity	Value
IMPORTS				
Ochres, ochrey earths, siennas and umbers.....	1,462	71,272	1,580	85,171
Oxides, fireproofs, rough stuff, fillers and colours, dry, n.o.p.....	3,891	2,468,127	3,406	2,338,537
EXPORTS				
Iron oxides .....	5,250	312,585	3,386	324,202

TABLE 26. Consumption of Iron Oxides in Specified Canadian Industries, 1945-1949

Year	Coke and Gas		Paints and Varnishes			
			Iron oxide pigments		Ochres, siennas and umbers	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons <sup>1</sup>	\$	Tons	\$	Tons	\$
1945 .....	7,357	75,441	2,799	310,434	671	71,231
1946 .....	9,385	69,899	2,564	288,190	543	75,769
1947 .....	10,105	78,244	2,865	339,151	404	57,876
1948 .....	9,157	77,035	2,222	302,562	306	47,379
1949 .....	8,189	77,824	2,049	290,014	260	48,380

1. Oxide and purifying materials.

## LITHIUM MINERALS

Amblygonite, spodumene, and lepidolite are the chief lithium minerals of commerce; their ores contain, respectively, about 8, 6 and 4 per cent of lithium oxide. Spodumene is in greatest supply, and in the baseraw material for the manufacture of many lithium salts, lithium metal, and alloys. Amblygonite has similar uses, but is scarcer and more expensive. Lepidolite, or lithia mica, is employed mainly in the natural state as a batch ingredient in glass. The occurrence of all three minerals is confined to pegmatite dykes of a definite type, which usually have a localized, regional distribution and often carry, also, important amounts of beryl and tantalite-columbite. In some cases, such dykes have been worked for the recovery of all of these minerals.

There has been no recorded production of lithium minerals in Canada since 1937, when 32 tons of amblygonite and spodumene valued at about \$1,700

was shipped, and little if any lithium ore is known to be used or required for any purpose in the Dominion. Thus, an outside market would have to be found for any production. Considerable development work has been done in recent years, however, on deposits in the Pointe du Bois area in southeastern Manitoba; increased interest was shown in the commercial possibilities of lithium deposits in other sections of that province, though activities have been confined to exploratory drilling. Some attention has been given, also, to lithium-bearing deposits in the Yellowknife-Beaulieu area in the Northwest Territories, and in LaCorne township in northwestern Quebec.

Total production in Canada during the active period 1925-1937, inclusive, is estimated at about 250 tons, and comprised lepidolite, spodumene, and amblygonite. Most of the material was exported to the United States.

## MAGNESITE AND BRUCITE

Dolomitic magnesite is quarried at Kilmar, Argenteuil county, Quebec, by Canadian Refractories Limited and is processed there into basic refractory products. These include dead-burned grain material; bricks and shapes (burned and unburned); and finely ground refractory cements.

Brucitic limestone, a rock composed of granules of the mineral brucite (magnesium hydroxide) thickly distributed throughout a matrix of calcite, is quarried

from large deposits near Wakefield, Quebec, by Aluminum Company of Canada, Limited, and is processed there for the recovery of magnesia and lime. The magnesia was used in part by the company for making magnesium metal at Arvida, Quebec, but the major part of the output is sold for the manufacture of basic refractories and for use as fertilizer. Hydrated lime, the co-product, is produced in the process of recovering the magnesia, and is sold for the various purposes for which lime is used.

TABLE 27. Production of Dolomitic Magnesite, 1940-1949

Year	Value	Year	Value
	\$		\$
1940.....	897, 016	1945.....	1, 278, 596
1941.....	831, 041	1946.....	1, 225, 593
1942.....	1, 059, 374 <sup>1</sup>	1947.....	1, 167, 584
1943.....	1, 260, 056	1948.....	1, 587, 709
1944.....	1, 139, 281	1949.....	1, 536, 200

1. 1942 and following years include the value of brucite shipped.

TABLE 28. Magnesite and Dolomite Used in the Canadian Primary Iron and Steel Industry, 1945-1949

Year	Calcined Dolomite		Dolomite, crude		Magnesite	
	Short tons	Value	Short tons	Value	Short tons	Value
	\$		\$			\$
1945.....	6, 146	111, 581	110, 478	266, 236	18, 249	755, 958
1946.....	3, 788	66, 473	87, 217	230, 384	13, 049	546, 396
1947.....	6, 748	124, 107	188, 449	357, 288	18, 261	783, 336
1948.....	9, 587	198, 040	226, 683	539, 522	18, 334	888, 755
1949.....	25, 769	533, 679	233, 372	569, 348	17, 094	843, 274

TABLE 29. Calcined Magnesite Used by the Artificial Abrasives Industry, 1945-1949

Year	Tons	Value
		\$
1945.....	840	96,780
1946.....	1,676	187,250
1947.....	1,832	195,586
1948.....	3,284	389,335
1949.....	1,416	156,290

## MAGNESIUM SULPHATE

Natural hydrous magnesium sulphate (Epsom Salts or Epsomite) occurs in deposits in lake bottoms or in solution in brine lakes in British Columbia. In Saskatchewan, it is found associated with sodium sulphate. Attempts have been made to produce refined salts, and a number of years ago there was a considerable production from several of the "lakes" in British Columbia. Experimental shipments have been made also from one of the lakes in Saskatchewan.

Canada's output of magnesium sulphate has come chiefly from a deposit in Basque, British Columbia production from which was discontinued in the autumn of 1942. The salt was refined at Ashcroft, 15 miles south of the deposit, and the grade of the product was high. The refinery, now owned by Ashcroft Salts Company, Limited, had a capacity of 10 tons of salt a day. There are a number of other occurrences in British Columbia, near Clinton, north of Kamloops, and in Kruger's Pass, south of Penticton.

In Saskatchewan, two lakes south of Wiseton contain brines high in magnesium sulphate, and

Muskiki Lake, just north of Dana, contains brine high in magnesium and sodium sulphates, which at certain times of the year crystallizes into a bedded deposit with layers of both salts.

In the chemical industries Epsom salts has many uses. It is employed for tanning and in dyeing, and for textile and medicinal use. Magnesium sulphate is used in the paper industry for weighting paper. In the sole leather industry it is used to obtain a clean shiny cut, and it also helps to retain moisture in the leather and increases its weight. Magnesium salt is used to a small extent in the dyeing industry. In some cases it is used in the treatment of leather to increase the fastness of the colour in washing. It is used extensively and in large quantities in medicine and for various purposes in the manufacture of textiles. In bleaching wool, magnesium sulphate is added to destroy the corrosive effect of sodium peroxide. It is also used for weighting textile fabric, especially silk. Mixed with gypsum and ammonium sulphate, it is used in the manufacture of non-inflammable fabrics.

TABLE 30. Production of Natural Magnesium Sulphate<sup>1</sup>, 1940-1949

Year	Tons	Value
		\$
1940.....	—	—
1941.....	265	7,343
1942.....	1,140	38,760
1943-1949.....	—	—

1. Produced entirely in British Columbia.

TABLE 31. Imports of Magnesium Sulphate, 1940-1949

Year	Tons	Value	Year	Tons	Value
		\$			\$
1940.....	2,211	86,090	1945.....	2,545	101,695
1941.....	2,729	109,022	1946.....	3,463	132,342
1942.....	1,688	68,532	1947.....	2,908	108,840
1943.....	3,379	137,372	1948.....	2,797	118,792
1944.....	2,684	108,795	1949.....	2,783	120,881

TABLE 32. Available Data on Consumption of Magnesium Sulphate, 1945-1948

Industry	1945	1946	1947	1948
(Tons)				
Leather tanneries.....	1,013	1,019	935	789
Medicinals.....	828	645	611	439
Fertilizers.....	431	57	14	15
Textiles.....	44	28	38	35
<b>Total accounted for.....</b>	<b>2,316</b>	<b>1,749</b>	<b>1,598</b>	<b>1,278</b>

## MICA

Canadian production or primary shipments of all grades of mica in 1949 totalled 3,490,556 pounds valued at \$108,458 compared with 7,902,303 pounds worth \$219,948 in the previous year. The Quebec

mines contributed 1,973,894 pounds valued at \$71,217 and the mines of Ontario shipped 938,662 pounds worth \$31,566; the British Columbia mines shipped 578,000 pounds of muscovite valued at \$5,675.

TABLE 33. Principal Statistics of the Mica Mining Industry, 1948 and 1949

		1948	1949
Number of firms or operators.....		34	34
Number of employees:			
Administrative.....		13	6
Workmen.....		96	90
Total.....		109	96
Salaries and wages:			
Administration.....	\$	18,167	12,163
Workmen.....	\$	100,815	103,504
Total.....	\$	118,982	115,667
Selling value of products (gross).....	\$	219,948	108,458
Cost of fuel and electricity.....	\$	14,622	4,490
Cost of process supplies used.....	\$	18,228	6,026
Selling value of products (net).....	\$	187,098	87,942

TABLE 34. Mica Production (Primary Sales), by Classes, 1948 and 1949

Grade	1948		1949	
	Pounds	Total value f.o.b. shipping point	Pounds	Total value f.o.b. shipping point
Rough, mine-run or rifted.....	21,918	\$ 2,693	10,091	\$ 1,214
Mica sold for mechanical splitting.....	317,005	67,635	8,019	1,762
Splittings.....	17,514	14,028	8,550	7,470
Ground or powdered.....	3,748,268	84,224	1,854,844	49,907
Scrap — Mine or shop waste and mica mined and sold for grinding.....	3,716,840	33,813	1,518,101	13,202
Ungraded.....	5,734	345	43,069	3,172
Trimmed mica.....	75,024	17,210	47,882	31,731
<b>Total mica shipments.....</b>	<b>7,902,303</b>	<b>219,948</b>	<b>3,490,556</b>	<b>108,458</b>
Varieties:				
Phlogopite mica (amber).....	7,400,503	211,418	2,869,143	92,878
Muscovite mica (white).....	501,800	8,530	621,413	15,580

TABLE 35. Production of Mica, by Provinces and by Varieties, 1949

Province	Phlogopite		Muscovite		Total	
	Pounds	\$	Pounds	\$	Pounds	\$
Quebec.....	1,973,894	71,217	—	—	1,973,894	71,217
Ontario.....	895,249	21,661	43,413	9,905	938,662	31,566
British Columbia.....	—	—	578,000	5,675	578,000	5,675
Total Canada.....	2,869,143	92,878	621,413	15,580	3,490,556	108,458

TABLE 36. Production of Mica, 1940-1949

Year	Short tons	\$	Year	Short tons	\$
1940.....	975	237,145	1945.....	3,522	233,270
1941.....	1,743	335,288	1946.....	4,360	199,039
1942.....	3,010	383,567	1947.....	4,159	200,903
1943.....	4,025	553,856	1948.....	3,951	219,948
1944.....	3,342	841,026	1949.....	1,745	108,458

TABLE 37. Imports and Exports of Mica, 1948 and 1949

	1948		1949	
	Pounds	Value	Pounds	Value
<b>IMPORTS:</b>				
Mica and manufactures of, n.o.p.....	—	407,202	—	567,469
Vermiculite, crude.....	—	128,839	—	197,055
<b>EXPORTS:</b>				
Mica, scrap and waste.....	1,998,900	16,002	678,300	3,526
Mica splittings.....	11,300	8,272	—	—
Mica manufactures.....	—	1,862	—	3,426
Mica, rough, untrimmed.....	354,300	75,205	78,000	12,983
Mica, trimmed.....	8,500	3,835	97,900	26,571
Mica, ground.....	2,121,200	45,185	460,000	17,086
<b>Total Mica Exports.....</b>	<b>—</b>	<b>150,361</b>	<b>—</b>	<b>67,018</b>

TABLE 38. Consumption of Mica, in Specified Industries, as Reported to The Annual Census Of Industry, 1947 and 1948

	1947		1948	
	Quantity (tons)	Cost at works \$	Quantity (tons)	Cost at works \$
In paints.....	—	—	291	35,716
In electrical apparatus industry.....	208	519,402	201	547,942
In rubber industry.....	191	26,950	218	31,003
In roofing.....	1,778	62,071	871	34,395
In wallpaper.....	146	20,791	115	18,707
In mica manufacturing industry.....	54	92,088	50	88,630
<b>Total Accounted for.....</b>	<b>2,377</b>	<b>721,302</b>	<b>1,746</b>	<b>756,393</b>

## NATURAL MINERAL WATERS

Production of natural mineral waters in past years originated in Ontario and Quebec. Some of the more prominent Canadian mineral waters possessing special therapeutic or hygienic properties include the following: in Quebec, the Abenakis springs on the St. François river in Yamaska county, Potton Springs in Brome county and the Columbia spring at L'Epiphanie. In Ontario, saline, sulphur and gas springs occur at Caledonia Springs and at Carlsbad Springs, near Ottawa; the waters range from alkaline to strongly saline. St. Catharines, near Niagara, is one of the oldest Canadian mineral water resorts and

sulphur waters are found at the Preston mineral springs in Waterloo county. The most famous of all Canadian springs is undoubtedly the group of hot sulphur springs at Banff, Alberta. In British Columbia, the Harrison Hot Springs in Fraser Valley and the Halcyon Hot Springs on Arrow Lake are noted for their curative properties.

There were 14 firms reporting production of natural mineral waters in the Dominion in 1949. Twelve of these firms were in Quebec and 2 in Ontario.

TABLE 39. Shipments of Natural Mineral Waters from Canadian Springs, 1940-1949

Year	Quebec		Ontario		Canada	
	Imp. gal.	\$	Imp. gal.	\$	Imp. gal.	\$
1940.....	109,025	18,466	31,638	2,426	140,663	20,892
1941.....	144,441	58,062	36,623	14,469	181,064	72,531
1942.....	129,062	60,316	28,023	14,189	157,085	74,505
1943.....	125,605	61,793	14,006	5,748	139,611	67,541
1944.....	148,965	88,113	7,185	805	156,150	88,918
1945.....	236,476	148,714	8,285	976	244,761	149,690
1946.....	211,842	121,526	6,000	878	217,842	122,404
1947.....	195,452	116,840	3,500	600	198,952	117,440
1948.....	190,136	109,789	2,400	470	192,539	110,259
1949.....	304,216	145,830	2,475	410	306,691	146,240

## PHOSPHATE

Phosphate in the form of apatite was mined in Canada on a fairly substantial scale up to 1895 but since then the production has been small and spasmodic. In 1949 about 20 tons were shipped. No output was recorded in 1947 and 1948.

There has been renewed activity at the High Rock and Big Union mines near Notre Dame de Salette in the Buckingham, Quebec area. It is expected that an economical separation process may be developed to produce a high grade material.

For many years, Electric Reduction Company, Buckingham, Quebec, has purchased most of the small output for use in the production of elemental phosphorus and various phosphorus compounds. This company, however, obtains most of its phosphate rock requirements from Florida. That state and Montana supply the great bulk of the phosphate rock which Canada imports for the manufacture of fertilizer, occasional shipments being obtained also from North Africa. Rock low in fluorine is obtained from Curacao, Netherlands West Indies, for use in stock feeds.

TABLE 40. Production of Phosphate, 1940-1949

Year	Short tons	\$	Year	Short tons	\$
1940.....	358	4,039	1945.....	299	4,356
1941.....	2,487	33,376	1946.....	57	869
1942.....	1,264	17,431	1947.....	—	—
1943.....	1,451	18,385	1948.....	—	—
1944.....	482	6,716	1949.....	20	291

TABLE 41. Imports of Phosphate Rock, 1940-1949

Year	Tons	Value	Year	Tons	Value
		\$			\$
1940.....	165,858	663,554	1945.....	317,695	1,450,580
1941.....	237,029	863,833	1946.....	373,677	2,164,841
1942.....	271,373	1,053,229	1947.....	485,391	2,857,522
1943.....	260,846	1,085,080	1948.....	482,008	2,911,168
1944.....	388,247	1,710,378	1949.....	620,808	3,879,523

TABLE 42. Consumption of Phosphate Rock, 1947 and 1948

	1947	1948
	(tons)	
<b>(a) BY USES</b>		
Fertilizers.....	398,685	372,976
Chemicals.....	25,343	28,280
Steel furnaces .....	1,295	—
Refractories.....	148	—
Miscellaneous .....	9,500	8,813
<b>Total.....</b>	<b>434,971</b>	<b>410,069</b>
<b>(b) BY PROVINCES</b>		
Quebec.....	107,484	99,066
Ontario.....	83,243	72,197
British Columbia.....	244,244	238,806
<b>Total.....</b>	<b>434,971</b>	<b>410,069</b>

## SILICA BRICK

The manufacture of silica brick for refractory use was confined to the plants of the Dominion Steel and Coal Company, Limited, Sydney, Nova Scotia, and the Algoma Steel Corporation Limited, Sault

Ste. Marie, Ontario. The brick manufactured by both these firms are processed from crushed silica rock and are utilized in furnace construction and repairs.

TABLE 43. Production of Silica Brick, 1940-1949

Year	M	\$	Year	M	\$
1940.....	3,438	182,786	1945.....	4,208	317,263
1941.....	4,111	238,433	1946.....	2,902	197,804
1942.....	4,273	263,006	1947.....	3,094	193,998
1943.....	4,165	295,505	1948.....	3,464	393,821
1944.....	3,997	312,092	1949.....	3,663	453,797

Note: Quantities are shown as 9" equivalent.

## SODIUM CARBONATE (NATURAL)

Deposits of natural sodium carbonate in the form of "Natron" (sodium carbonate with 10 molecules of water) and of brine occur in a number of small "lakes" throughout the central part of British Columbia, chiefly in the Clinton Mining Division and in the neighborhood of Kamloops. As the deposits are far from the main eastern Canadian markets, production

is restricted to the requirements of consumers within economical rail haul.

Sodium carbonate has many industrial uses, notably in the manufacture of glass and soap, in the purification of oils, in the production of aluminum, in the flotation of minerals, in the refining of metals, and in the production of caustic soda.

TABLE 44. Production of Sodium Carbonate (Natural), 1940-1949

Year	Tons	\$	Year	Tons	\$
1940.....	220	1,760	1945 .....	286	3,146
1941.....	186	1,488	1946 .....	-	-
1942.....	256	2,048	1947.....	163	1,793
1943.....	468	5,148	1948.....	-	-
1944.....	44	484	1949.....	47	513

## SODIUM SULPHATE (NATURAL)

All of the natural sodium sulphate produced in 1949 was obtained from the brine lakes of Saskatchewan. Shipments amounted to 120,259 tons valued at \$1,614,731 compared with 153,698 tons worth \$2,136,276 in the preceding year.

Sodium sulphate occurs as crystals or in the form of highly concentrated brines in many lakes and deposits throughout Western Canada. From these,

hydrated sodium sulphate, known as Glauber's salt, and anhydrous sodium sulphate, known to the trade as "salt cake", are produced in Canada.

Glauber's salt is used widely in the chemical industries and the demand is increasing. Sodium sulphate is used chiefly in the sulphate process for the manufacture of kraft pulp. It is used in the glass, dye and textile industries and to a smaller extent for medicinal purposes, and for tanning.

TABLE 45. Principal Statistics of Sodium Sulphate Mining Industry, 1948 and 1949

—	1948	1949
Active firms.....	No.	5
Producing plants.....	No.	6
Employees:		
Administrative.....	No.	29
Workmen.....	No.	337
Total.....	No.	366
Salaries and wages:		
Administrative.....	\$	59,308
Workmen.....	\$	720,572
Total.....	\$	779,880
Gross value of production.....	\$	2,142,576
Cost of fuel and electricity.....	\$	536,337
Cost of process supplies and containers.....	\$	114,357
Net value of production.....	\$	1,491,882
		1,158,385

TABLE 46. Production of Natural Sodium Sulphate<sup>1</sup>, 1940-1949

Year	Short tons	\$	Year	Short tons	\$
1940.....	94,260	829,589	1945.....	93,068	884,322
1941.....	115,608	931,554	1946.....	105,919	1,117,683
1942.....	131,258	1,079,692	1947.....	163,290	1,793,043
1943.....	107,121	1,025,151	1948.....	153,698	2,136,276
1944.....	102,421	987,842	1949.....	120,259	1,614,731

1. All produced in the province of Saskatchewan, with the following exceptions: Includes production in Alberta — 1940—10 tons, value \$50; 1941—8 tons, value \$32.

TABLE 47. Production of Manufactured Sodium Sulphate, 1940-1949

Year	Salt cake		Glauber's salt	
	Tons	\$	Tons	\$
1940.....	4,100	61,567	4,425	82,969
1941.....	5,191	83,991	3,372	64,203
1942.....	4,945	68,377	914	18,761
1943.....	4,256	57,526	—	—
1944.....	3,758	46,077	—	—
1945.....	2,850	35,226	—	—
1946.....	2,584	33,333	—	—
1947.....	3,175	51,047	—	—
1948.....	3,198	69,876	—	—
1949.....	3,738	83,996	—	—

TABLE 48. Imports of Sodium Sulphate, 1940-1949

Year	Salt cake		Glauber's salt	
	Tons	\$	Tons	\$
1940.....	8,295	94,674	543	12,450
1941.....	7,819	105,502	250	8,244
1942.....	7,070	85,479	75	4,664
1943.....	11,904	150,496	566	15,399
1944.....	20,460	195,105	777	21,960
1945.....	13,535	120,982	1,016	29,452
1946.....	20,881	244,617	1,258	33,136
1947.....	9,329	172,531	1,383	41,125
1948.....	12,394	240,228	1,472	52,212
1949.....	4,294	65,722	1,996	59,959

TABLE 49. Exports of Sodium Sulphate, 1944-1949

Year	Long tons	\$	Year	Long tons	\$
1944.....	14,464	216,645	1947.....	41,906	530,388
1945.....	15,682	270,013	1948.....	26,439	468,561
1946.....	20,041	352,407	1949.....	18,830	294,367

Note. Exports from Canada are not recorded separately in the official trade statistics of Canada, but the imports into the United States from Canada are shown as follows in the "U.S. Imports for Consumption of Merchandise" by the U.S. Department of Commerce.

TABLE 50. Available Data on Consumption of Sodium Sulphate (Salt Cake) in Canada, by Industries, 1945-1948

Industry	1945	1946	1947	1948	1949
(Net tons)					
Pulp and paper .....	67,654	81,161	95,975	107,592	
Non-ferrous smelters.....	30,000	13,500	24,000	20,000	
Heavy chemicals.....	125	67	2	74	Not available
Glass .....	621	2,660	8,383	1,234	
Medicinals .....	30	42	32	26	
Total accounted for .....	98,430	97,430	128,392	128,926	

TABLE 51. Production of Sulphur<sup>1</sup>, 1940-1949

Year	Tons	\$	Year	Tons	\$
1940.....	170,630	1,298,018	1945.....	250,114	1,881,321
1941.....	260,023	1,702,786	1946.....	234,771	1,784,666
1942.....	303,714	1,994,891	1947.....	221,781	1,822,867
1943.....	257,515	1,753,425	1948.....	229,463	1,836,358
1944.....	248,088	1,755,739	1949.....	261,871	2,039,384

1. Sulphur content of pyrites and of recovered smelter gases; also in 1940 to 1943 some elemental sulphur recovered from smelter gases.

**TABLE 52. Production of Pyrite with Sulphur Content, Including Sulphur Contained in Sulphuric Acid, etc., Made from Smelter Gases, 1947-1949**

—	Pyrite			Smelter Gas		Total Sulphur	
	Sales	Sulphur Content		Sulphur Content			
	Tons	Tons	Value	Tons	Value	Tons	Value
1947			\$		\$		\$
Quebec .....	105,271	48,688	187,112	—	—	48,688	187,112
Ontario .....	—	—	—	15,931	159,310	15,931	159,310
British Columbia.....	72,993	33,949	244,315	123,213	1,232,130	157,162	1,476,445
Canada .....	178,264	82,637	431,427	139,144	1,391,440	221,781	1,822,867
1948							
Quebec .....	145,205	69,463	263,330	—	—	69,463	263,330
Ontario .....	—	—	—	15,550	155,500	15,550	155,500
British Columbia.....	38,865	17,663	149,658	126,787	1,267,870	144,450	1,417,528
Canada .....	184,070	87,126	412,988	142,337	1,423,370	229,463	1,836,358
1949							
Quebec .....	186,071	88,804	348,777	—	—	88,804	348,807
Ontario .....	—	—	—	12,630	126,300	12,630	126,300
British Columbia.....	64,405	28,777	247,677	131,660	1,316,600	160,437	1,564,277
Canada .....	250,476	117,581	596,154	144,290	1,442,900	261,871	2,039,384

**TABLE 53. Available Data on The Consumption of Sulphur (Brimstone), 1946-1948**

Industry	1946	1947	1948	(Tons of 2,000 pounds)
Pulp and paper.....	226,296	253,423	260,830	
Heavy chemicals.....	45,346	63,265	60,882	
Rubber goods.....	1,446	2,165	2,154	
Explosives.....	1,461	1,496	1,759	
Insecticides.....	1,297	1,545	1,298	
Adhesives.....	64	93	61	
Starch .....	208	267	227	
Fruit and vegetable preparations.....	119	38	23	
Sugar refining .....	128	127	107	
Petroleum refining .....	68	127	167	
Matches.....	83	92	74	
Miscellaneous.....	195	180	361	
Total accounted for.....	276,711	322,818	327,943	

**TABLE 54. Imports of Sulphur, 1940-1949**

Year	Tons	\$	Year	Tons	\$
1940.....	215,597	3,628,348	1945.....	248,846	4,063,324
1941.....	235,271	3,920,184	1946.....	273,502	4,271,081
1942.....	290,121	4,680,672	1947.....	361,424	5,466,201
1943.....	218,527	3,524,006	1948.....	354,622	5,528,740
1944.....	235,955	3,875,649	1949.....	280,557	5,213,921

### STRONTIUM MINERALS

In Ontario, several occurrences of celestite are known in the general Ottawa region, but very little mining has been undertaken for the mineral, and production has been small and intermittent.

Between 1918 and 1920, about 250 tons of white, fibrous celestite was mined from a deposit in Bagot township, Renfrew county, and after grinding in a small mill erected on the property was sold for use in paint. The material was not very pure and contained about 18 per cent of barium sulphate. The old pit was pumped out in 1941 and a few tons of ore was scaled down from a small drift. This, together with some stockpile material from the earlier work, was shipped to Montreal for grinding and pigment use. The property has since been idle. The above comprises the only production of strontium minerals in Canada of which there is any official record.

Celestite similar in character and analysis to that from the above locality occurs at certain of the fluorspar mines of the Madoc area, Hastings county, but no attempt at commercial recovery has ever been made.

In Lansdowne township, Leeds county, platy crystals of very pure celestite analysing 99 per cent strontium sulphate occur as the filling of a narrow, 1 to 2 foot, vein in crystalline limestone. A couple of small surface pits were opened on the deposit many years ago, but there are no records of any shipments. No further attempt at development has been made. The ore should be well adapted to concentration by gravity methods, but the deposit is unlikely to be capable of yielding more than a small tonnage.

Celestite similar to the foregoing occurs also in Fitzroy township, Carleton county, in a narrow vein in crystalline limestone. The deposit was encountered

in a small prospect pit opened for galena about thirty-five years ago, but no attempt has ever been made to determine its extent. A selected sample of the purest material analysed 93 per cent strontium sulphate.

Tabular crystals of celestite analysing 76 per cent strontium sulphate and 15 per cent barium sulphate occur as the cementing material of brecciated fragments of crystalline limestone on a fault-zone in Loughborough township, Frontenac county. A small pit was opened on the deposit about 40 years ago, but no shipments were made, and no further work has been done.

In British Columbia, celestite occurs near Birch Island, North Thompson River, Kamloops Mining Division. The deposit is reported to contain a large tonnage of ore consisting of a fine-grained intergrowth of fluorspar, celestite, feldspar, quartz, mica, and pyrite. Celestite is estimated to form up to 17 per cent of the mass, and fluorspar up to 27 per cent. Milling tests have shown that a grind of minus 200-mesh is necessary to unlock the fluorspar and celestite grains, but some difficulty was met in recovering clean concentrates of either mineral. The property is controlled by B.C. fluorspar Syndicate, of Toronto, who conducted considerable exploration of the deposit, including diamond drilling, between 1942 and 1944. No further development has been reported.

There are a number of recorded minor occurrences in Canada of celestite and strontianite, these being located in Ontario, Quebec, Nova Scotia, and British Columbia. They are briefly mentioned in Mines Branch report No. 570, "Barium and Strontium in Canada", but none of them is regarded as of any economic interest.

### SULPHUR (INCLUDING PYRITE)

Deposits of native sulphur of commercial grade have not been found in Canada, but sulphur occurs in combination with copper, lead, zinc, nickel, or iron in many base metal sulphide orebodies in various parts of the country. In smelting these ores sulphur dioxide gas is produced, and to 1925 this gas was a total waste as no facilities were available for the recovery from it of sulphur or of sulphur compounds. In practice this gas can be used directly for the manufacture of liquid sulphur dioxide or for the production of elemental sulphur. Sulphur used in the making of sulphuric acid is recovered in the form of sulphur dioxide from salvaged gas by The Consolidated Mining and Smelting Company of Canada, Limited, at Trail, British Columbia, and by Canadian

Industries Limited, at Copper Cliff, Ontario. There has been no production of elemental sulphur in Canada since July 1943.

Pyrite is produced as a by product in the treatment of copper ores at Quemont, East Sullivan, Waite-Amulet and Noranda mines in Quebec and Britannia mine in British Columbia.

Shipments of pyrite are made to pulp and paper mills and chemical plants in Canada and United States. Noranda Mines Limited are operating a pilot plant for the recovery of elemental sulphur from pyrite. It is expected that the iron residue will be used to produce pig iron.

### VOLCANIC DUST

Volcanic dust (pumice or pumice dust) is a natural glass or silicate, atomized by volcanic explosions and thrown into the air in great clouds which ultimately settle, forming beds of varying thickness, often hundreds of miles from its source. In many instances the dust has been washed down from higher

levels and redeposited by the agency of waters, in which case the beds are stratified and mixed with foreign substances. It consists of aluminum silicate (80 to 90 per cent) and of oxides and silicates of iron, sodium, magnesium, calcium, etc.

During 1924 to 1933 the annual production varied from 30 to 485 tons. There has been no production in recent years. The last recorded shipments were 50 tons in 1943.

Volcanic dust deposits have been found in Alberta, Saskatchewan and British Columbia. Pumice dust is used for concrete aggregate, acoustic plaster, cleansing compounds, paint fillers, absorbents, etc.

### Directory of Firms in the Miscellaneous Non-Metal Mining Industries, 1949

Name of Operator	Head Office Address	Plant Location
<b>BARITE</b>		
<b>NOVA SCOTIA:</b> Canadian Industrial Minerals Ltd .....	Walton .....	Walton
<b>ONTARIO:</b> Woodhall Mines Ltd. <sup>1</sup> .....	347 Bay St., Toronto.....	Langmuir
<b>BRITISH COLUMBIA:</b> Mountain Minerals Ltd.....	Box 273, Lethbridge, Alberta.....	Golden M.D.
<b>BRUCITE</b>		
<b>QUEBEC:</b> Aluminum Company of Canada Ltd .....	Sun Life Bldg., Montreal.....	Wakefield
Davis, Norman B. <sup>1</sup> .....	512 Victoria Bldg., Ottawa, Ontario .....	Wakefield
<b>DIATOMITE</b>		
<b>NOVA SCOTIA:</b> Wightman, Mrs. G. W. .....	Smith's Cove .....	Digby Co.
<b>BRITISH COLUMBIA:</b> Fairey and Co. .....	661 Taylor St., Vancouver.....	Cariboo M.D., Vancouver
<b>FLUORSPAR</b>		
<b>NEWFOUNDLAND:</b> Newfoundland Fluorspar Ltd.....	Bank of Montreal Bldg., St. John's.....	St. Lawrence
St. Lawrence Corporation of Nfld., Ltd .....	120 Broadway, New York .....	St. Lawrence
<b>ONTARIO:</b> Cardiff Fluorite Mines Ltd.....	26 Queen St. E., Toronto .....	Wilberforce
Millwood Fluorspar Mines Ltd.....	Box 206, Madoc .....	Madoc Dist.
Reliance Fluorspar Mining Synd. Ltd.....	Madoc.....	Huntingdon Twp.
<b>GARNET</b>		
<b>ONTARIO:</b> Niagara Garnet Co.....	c/o Wm. A. Yarwood, 8573 Krull Parkway, Niagara Falls, New York, U.S.A.	River Valley
<b>GRAPHITE</b>		
<b>ONTARIO:</b> Frobisher Exploration Co. Ltd .....	Black Donald Mines.....	Brougham Twp.
<b>GRINDSTONES</b>		
<b>NEW BRUNSWICK:</b> Read, H. C. .....	Bathurst.....	Stonehaven
Bay of Chaleur Grindstone Co.....	Clifton.....	Clifton

1. Active but not producing.

## Directory of Firms in the Miscellaneous Non-Metal Mining Industries, 1949 — Continued

Name of Operator	Head Office Address	Plant Location
<b>IRON OXIDE</b>		
<b>QUEBEC:</b>		
Argall, Mrs. Thomas H. ....	1695 Blvd. St. Louis, Trois Rivières.....	Pointe du Lac
Begin Iron Oxide Mine <sup>1</sup> ....	Cassier 197, Trois Rivières .....	Chemin des Forges
Girardin, Chas. D. ....	Yamachiche .....	Almaville en Haut
Leveille, Oscar.....	791 Ste Catherine, St. Louis de France....	St. Louis de France
The Sherwin-Williams Co. of Canada <sup>1</sup> ....	2875 Centre St., Montreal.....	Red Mill, Champlain Co.
Vennes, Wm. ....	90-6 ième Ave., Grand'Mère.....	St. Adelphe
<b>BRITISH COLUMBIA:</b>		
British Columbia Electric Co. Ltd .....	425 Carrall St.....	Alta Lake
Burgess Bros & Lundgren.....	Ymir.....	Pend Oreille
<b>LITHIUM MINERALS</b>		
<b>QUEBEC:</b>		
Canadian Lithium Co. Ltd. <sup>1</sup> .....	100 Adelaide St. W., Toronto, Ontario....	Landrienne Twp.
LaCome Lithium Mines Ltd. <sup>1</sup> .....	320 Bay St., Toronto, Ontario .....	LaCorne Twp.
Great Lakes Carbon Corp. <sup>1</sup> .....	18 East 48th St., New York .....	LaCorne Twp.
<b>MANITOBA:</b>		
Lithium Corp. of Canada Ltd. <sup>1</sup> .....	403 Avenue Bldg., Winnipeg .....	Bernic and Cat Lakes
Sherritt Gordon Mines Ltd. <sup>1</sup> .....	25 King St. W., Toronto, Ontario.....	Herb Lake
<b>MAGNETIC DOLOMITE</b>		
<b>QUEBEC:</b>		
Canadian Refractories Ltd.....	1050 Canada Cement Bldg., Montreal.....	Kilmor and Harrington
<b>MINERAL WATERS</b>		
<b>QUEBEC:</b>		
Cie d'eau Minérale, de St. Hyacinthe.....	632 Concord Ave., St. Hyacinthe .....	St. Hyacinthe
Eau Minérale Étoile .....	Ste. Geneviève de Batiscan .....	Batiscan
Orange Crush Ltd .....	1016 Bleury St., Montreal.....	Varennes
Lemay, Lucien.....	St. François du Lac.....	Nicolet Twp.
Gauthier, Charles.....	Louiseville .....	St. Léon
Minard, Edward .....	Maskinongé.....	Maskinonge
Montclair-Richelieu Spring Water Co. Ltd....	1515 Mountain St., Montreal.....	Chambly
Pellerin, A., and Sons .....	St. Barnabé Nord.....	St. Maurice
Paille, J. J. .....	Maskinongé.....	Maskinongé
Sources Abenakis Springs Ltd .....	St. François du Lac.....	St. François du Lac
Source Coulombia .....	L'Épiphanie.....	L'Épiphanie
Source d'eau Minérale Radnor.....	St. Maurice .....	St. Maurice
Usine d'Embouteillage Maski.....	St. Justin .....	St. Justin
<b>ONTARIO:</b>		
Carlsbad Springs, The .....	Carlsbad Springs.....	Gloucester Twp.
Deneault, J. F. .....	Bourget .....	Bourget
<b>MICA</b>		
<b>QUEBEC:</b>		
Active Exploration Prospecting Syndicate ...	11 Orrin Ave., Ottawa, Ontario .....	Low Twp.
Ahearn, W.....	538 MacLaren St., Ottawa, Ontario.....	Hull Twp.
Biscope, G. W. .....	380 Cooper St., Ottawa, Ontario .....	

1. Active but not producing.

## Directory of Firms in the Miscellaneous Non-Metal Mining Industries, 1949 — Continued

Name of Operator	Head Office Address	Plant Location
<b>MICA — Concluded:</b>		
<b>QUEBEC — Concluded:</b>		
Blackburn Bros. Ltd.....	85 Sparks St., Ottawa, Ontario.....	Cantley
Courte, Constant .....	Rouge Vallée.....	Argenteuil
Chénier, H. .....	Rockland, Ont.....	Grenville
Constantineau, Léon .....	Pointe aux Chênes .....	
Charron, Télesphore.....	Wilson's.....	
Charbonneau, E. .....	Perkins.....	Papineau
Charbonneau, R. .....	Perkins.....	Papineau
Charbonneau, A. .....	Perkins.....	Papineau
Chartrand, V. .....	354 St. Catherine St. E., Montreal.....	Laurel
Cross, W.C. .....	209 Bridge St., Hull.....	
Cantley Mining Co.....	424 Princess St., Kingston, Ont.....	Cantley
Dominion Petroleum Co.....	196 Sparks St., Ottawa, Ontario.....	Templeton
Dubois, O. .....	Cantley.....	Cantley
Dubois, A. .....	St. Pierre de Wakefield.....	
Elston, J. B. .....	Grand Remous .....	
Gauthier, J. B. .....	Box 226, Buckingham.....	Denholm
Genest, Leo.....	31 Graham St., Hull .....	
Gagné, Louis.....	St. Michel de Wentworth.....	
Fontine, F. .....	Perkins.....	
Joanisse, Léo.....	33 Graham St., Hull .....	Gatineau
Laroche, E. .....	716 DeLaverendrye, Trois Rivières.....	St. Boniface
Millar, R. .....	151 Guigues St., Ottawa, Ontario .....	
Massé, Onide.....	Wilson's Corners .....	Cantley
Murphy, Philip .....	Gatineau Point .....	
Mica Co. of Canada Ltd .....	2 Lois St., Hull .....	
Poirier, A. .....	Wilson's Corners.....	Wakefield
Poirier, C. .....	Wilson's Corners.....	Wakefield
Prud'homme, R. ....	Perkins.....	
Renaud, J. .....	Perkins.....	
Sabourin, V. .....	Perkins.....	Hull Twp.
Suzorite Company Ltd.....	907 Dominion Square Bldg., Montreal.....	McCarthy
Séguin, E.R. .....	Buckingham.....	
St. Amour, O. .....	Notre Dame de la Sallette .....	
Wallingford, E. .....	Perkins.....	Templeton
<b>ONTARIO:</b>		
Bancroft Mica & Stone Co.....	Selby.....	Faraday Twp.
Cordick, H. V. .....	Perth.....	Lanark
Donnelly, J. G. .....	Stanleyville .....	N. Burgess Twp.
Green, W.E. and W.C. .....	Perth Road.....	North Burgess
Loughborough Mining Co. Ltd.....	Sydenham .....	Frontenac
Northern Mica Co. ....	447 Main St. E., North Bay.....	Mattawa Twp.
Powers, Art.....	Stanleyville .....	Burgess Twp.
Rochester, R.B. .....	Rm 201, 23 Scott St., Toronto .....	Thirty Island Lake
Sproule, W.J. .....	Sydenham .....	Frontenac
Watts, R.W. .....	21 Isabella St., Perth.....	Lanark
<b>BRITISH COLUMBIA:</b>		
Fairey & Co.....	661 Taylor St., Vancouver.....	Vancouver

## Directory of Firms in the Miscellaneous Non-Metal Mining Industries, 1949 — Concluded

Name of Operator	Head Office Address	Plant location
<b>PHOSPHATE</b>		
QUEBEC:		
Bigelow, Robert <sup>1</sup> .....	Buckingham .....	Bowman Twp.
Blackburn Bros. Ltd. <sup>1</sup> .....	85 Sparks St., Ottawa, Ontario .....	Perkins
Quebec Smelting & Refining Ltd.....	215 St. James St. W., Montreal .....	Notre Dame de la Salette
ONTARIO:		
Ontario Phosphate Industries Ltd <sup>1</sup> .....	Room 1101, 62 Richmond St. W., Toronto	Bedford Twp.
<b>SILICA BRICK</b>		
NOVA SCOTIA:		
Dominion Steel & Coal Corp. Ltd.....	Sydney .....	Sydney
ONTARIO:		
Algoma Steel Corp. Ltd.....	Sault Ste. Marie .....	Sault Ste. Marie
<b>SODIUM CARBONATE</b>		
BRITISH COLUMBIA:		
Bishop, V. C. (Mrs.) .....	c/o Boyds Garage, Clinton .....	Clinton area
<b>SODIUM SULPHATE</b>		
SASKATCHEWAN:		
Horseshoe Lake Mining Co. Ltd .....	Ormiston .....	Ormiston
Midwest Chemicals Ltd .....	Palo .....	Whiteshore Lake
Natural Sodium Products Ltd .....	Bishopric .....	Frederic Lake, Alsask
Sybouts Sodium Sulphate Co. Ltd.....	Gladmar .....	Gladmar
Saskatchewan Minerals .....	401 Westman Chambers, Regina .....	Chaplin
<b>SULPHUR (PYRITE)</b>		
QUEBEC:		
East Sullivan Mines Ltd .....	1604 Aldred Bldg., Montreal .....	Bourlamaque Twp.
Quemont Mining Corp. Ltd.....	350 Bay St., Toronto, Ontario .....	Rouyn Twp.
Noranda Mines Ltd .....	Royal Bank Bldg., Toronto, Ontario .....	Noranda
Waite-Amulet Mines Ltd.....	Noranda .....	Duprat Twp.
ONTARIO:		
International Nickel Company of Canada Ltd <sup>2</sup>	Copper Cliff .....	Copper Cliff
BRITISH COLUMBIA:		
Consolidated Mining & Smelting Company of Canada Ltd <sup>2</sup> .	Trail .....	Trail
Britannia Mining & Smelting Co. Ltd.....	Britannia Beach .....	Britannia Beach

1. Active but not producing.

2. Recover sulphur from smelter gas.



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