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THE MISCELLANEOUS INDUSTRIAL OR NON-METALLIC MINERALS IN CANADA, 1948

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THE MISCELLANEOUS INDUSTRIAL OR NON-METALLIC MINERALS IN CANADA, 1948

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MISCELLANEOUS INDUSTRIAL OR NON-METALLIC MINERALS IN CANADA, 1948

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-metal Mining Industry. Minerals or primary mineral products produced (or deposits developed) by this industry during 1948 included barite, brucite, diatomite, fluorspar, garnet, graphite, grindstones, magnesitic-dolomite (crude and refined), mineral waters, 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. 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.

In 1948 there were 40 plants in the Miscellaneous Non-metal Mining Industry and the gross value of production was $6,034,352 compared with $5,130,972 in the preceding year. Salaries and wages paid to 1,161 employees amounted to $2,497,918. The cost of fuel, electricity, freight, process supplies and containers was recorded at $1,977,985.

Table 1 - PRINCIPAL STATISTICS RELATING TO THE MISCELLANEOUS NON-METAL MINING INDUSTRY IN CANADA, 1947 and 1948

		1947	1948
Number of plants		42	40
Number of employees - Administrative		119	137
Workmen		919	1,024
Total		1,038	1,161
Salaries and wages - Salaries	$	304,880	325,306
Wages	$	1,699,609	2,172,612
Total	$	2,004,489	2,497,918
Selling value of products (gross)	$	5,130,972	6,034,352
Cost of fuel and electricity	$	953,518	1,081,147
Cost of process supplies used	$	629,180	689,908
Cost of containers	$	34,759	126,355
Freight	$	34,087	80,575
Selling value of products (net)	$	3,479,428	4,056,367

Table 2 - PRODUCTION OF MISCELLANEOUS NON-METALLIC MINERALS IN CANADA, 1947 and 1948

Item	Unit of measure	1947 Quantity	1947 Value	1948 Quantity	1948 Value
			$		$
Barite	ton	128,675	1,380,753	95,747	1,073,380
Corundum	ton	...	...	...	...
Diatomite	ton	103	2,677	46	1,487
Fluorspar	ton	7,186	209,886	11,340	344,834
Garnet (schist)	ton	1	300	2	200
Graphite	ton	2,398	207,364	2,539	239,931
Grindstones	ton	335	21,475	220	20,100
Magnesitic dolomite	...	...	1,167,484	...	1,587,709
Mineral waters	Imp.gal.	198,952	117,440	192,539	110,259
Phosphate	ton	...	...	...	...
Silica brick	M	3,094	193,998	3,464	393,821
Sodium carbonate	ton	163	1,793	...	...
Sodium sulphate	ton	163,290	1,793,043	153,698	2,136,276
TOTAL	...	...	5,096,213	...	5,907,997
Sulphur production (*)	ton	221,781	1,822,867	229,465	1,836,358
Iron oxides	ton	13,418	258,322	13,181	205,391
Mica	ton	4,159	200,903	3,951	219,948

Note: Value of containers is excluded.

(*) 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.

Table 3 - WORKMEN, BY MONTHS, IN THE MISCELLANEOUS NON-METAL MINING INDUSTRY IN CANADA, 1947 and 1948

Month	1947					1948			
	Mine			Mill		Mine		Mill	
	Surface		Underground			Surface	Underground		
	Male	Female		Male	Female	Male		Male	Female
January	237	...	77	601	1	227	112	593	4
February	239	...	80	600	1	217	118	613	4
March	224	...	75	580	2	248	114	631	4
April	253	1	77	577	2	258	98	652	4
May	270	1	82	536	2	274	87	682	4
June	269	...	73	567	2	271	99	729	4
July	273	...	82	563	1	262	96	684	4
August	263	...	89	521	4	265	106	696	4
September	289	...	83	537	5	248	106	736	4
October	296	...	90	608	2	239	94	746	4
November	263	...	115	606	2	209	91	709	4
December	241	...	74	553	2	215	85	604	4
AVERAGE	261	1	83	571	3	248	99	673	4

Table 4 - FUEL AND ELECTRICITY USED IN THE MISCELLANEOUS NON-METAL MINING INDUSTRY IN CANADA, 1947 and 1948

Kind	Unit of measure	1947		1948	
		Quantity	Cost	Quantity	Cost
			$		$
Bituminous coal--Canadian	ton	353	3,954	1,169	13,200
Imported	ton	10,649	101,059	11,959	136,513
Anthracite--From the United States	ton	45	894	49	1,119
Lignite coal	ton	27,285	91,574	29,818	111,185
Coke	ton	25	374	7	115
Gasoline	Imp.gal.	212,279	65,693	200,769	66,992
Kerosene or coal oil	Imp.gal.	2,398	487	2,351	586
Fuel oil and diesel oil	Imp.gal.	6,753,857	519,659	6,634,989	549,000
Wood (cords of 128 cubic feet)	cord	128	758	505	2,780
Gas--Manufactured	M cu.ft.	307,223	33,179	233,852	29,454
Electricity purchased	K.W.H.	14,525,767	135,887	16,223,479	170,203
TOTAL	...	...	953,518	...	1,081,147
Electricity generated for own use.	K.W.H.	5,227,756	...	6,304,548	...

Table 5 - POWER EQUIPMENT IN THE MISCELLANEOUS NON-METAL MINING INDUSTRY, 1948

Description	Ordinarily in Use		In Reserve or Idle	
	Number of units	Total horse power rating	Number of units	Total horse power rating
Steam engines	4	116	1	30
Diesel engines	25	2,500	8	1,970
Gasoline, gas and oil engines, other than Diesel engines	18	903	1	45
Hydraulic turbines or water wheels	2	650	...	...
Electric motors (except motor-generator sets) -				
(a) Operated by purchased power	585	8,778	72	1,331
TOTAL	634	12,947	82	3,376
(b) Operated by above primary units	179	2,678	28	314
Stationary power boilers	12	688	2	40
Motor-generator sets	7	95	2	92

BARITE

Canadian production of barite in 1948 amounted to 95,747 tons valued at $1,073,380 compared with 128,675 tons worth $1,380,753 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 shipped some test lots from 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 $BaSO_4$ 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 $BaSO_4$ 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 $BaSO_4$, under 3 per cent moisture, and not more than 0.4 per cent iron oxide (Fe_2O_3), with a fineness range of 20 to 100 mesh.

Table 6 - PRODUCTION OF BARITE IN CANADA, 1940-1948

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			

Table 7 - IMPORTS OF BARITE INTO CANADA, 1940-1948

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			

Table 8 - CONSUMPTION OF BARITE IN CANADA, 1942-1947

	1942	1943	1944	1945	1946	1947
			(tons)			
(a) By Uses						
Paints	3,417	2,760	1,971	1,749	1,711	1,658
Rubber goods	557	351	288	478	461	556
Wall paper	18	15	20	22	...	...
Glass	286	290	294	879	266	237
Miscellaneous	161	123	226	200	400	313
TOTAL	4,439	3,649	2,799	3,328	2,838	2,764
(b) By Provinces						
Nova Scotia	67	38	41	33	34	24
Quebec	1,639	1,191	893	931	1,123	1,146
Ontario	2,325	1,983	1,388	1,916	1,179	1,210
Manitoba	155	162	183	210	276	227
Saskatchewan	10	11	8	4	4	7
Alberta	93	128	119	105	106	11
British Columbia	150	136	167	129	116	139
CANADA	4,439	3,649	2,799	3,328	2,838	2,764

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 1948 came from two deposits, one at Digby Neck, Nova Scotia, operated by G. Wightman, and the other on Lot 1122 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 nitraprills 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 9 - PRODUCTION OF DIATOMITE IN CANADA, 1939-1948

Year	Short tons	$	Year	Short tons	$
1939	301	10,388	1944	13	437
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

Table 10 - CONSUMPTION OF INFUSORIAL EARTH BY THE CANADIAN SUGAR REFINING INDUSTRY, 1939-1947

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			

Table 11 - 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

FLUORSPAR

Production of fluorspar in Canada during 1948 was all from the Madoc area in Ontario. The shipments of the four operators totalled 11,340 tons valued at $344,834, a substantial increase over the 7,186 tons worth $209,886 produced in 1947.

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 12 - PRINCIPAL STATISTICS OF THE FLUORSPAR MINING INDUSTRY IN CANADA, 1947 and 1948

		1947	1948
Active firms	No.	5	4
Employees - Administrative	No.	8	4
Workmen	No.	56	60
Total	No.	64	64
Salaries and wages - Salaries	$	25,946	19,799
Wages	$	86,542	105,648
Total	$	112,488	125,447
Gross value of production	$	209,886	344,854
Cost of fuel and electricity	$	16,851	24,139
Process supplies used	$	9,117	7,892
Net value of production	$	183,918	312,803

Table 13 - PRODUCTION OF FLUORSPAR IN CANADA, 1939-1948

Year	Short tons	$	Year	Short tons	$
1939	240	4,995	1944	6,924	217,701
1940	4,454	59,317	1945	7,569	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	344,854

Table 14 - IMPORTS OF FLUORSPAR INTO CANADA, 1939-1948

Year	Tons	$	Year	Tons	$
1939	16,522	258,796	1944	37,100	840,309
1940	30,312	628,719	1945	20,517	550,670
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

Table 15 - CONSUMPTION OF FLUORSPAR IN CANADA, 1942-1947

	1942	1943	1944	1945	1946	1947
			(Tons)			
(a) By Uses						
Steel	20,133	20,790	20,024	19,462	13,805	18,768
Glass	231	273	376	302	145	752
Enamelling and glazing	434	216	243	200	220	244
Heavy chemicals	3,599	2,680	3,113	3,600	3,388	3,534
Non-ferrous smelters	22,493	39,396	33,643	12,830	10,972	18,037
Ferro-alloys	853	1,407	104	792	1,431	...
White metal alloys	13	23	30	20	34	44
Miscellaneous	13	137	99	100	...	...
TOTAL	47,769	64,922	57,632	37,304	29,995	41,379
(b) By Provinces						
Nova Scotia	8,898	7,916	9,112	7,390	6,612	7,566
Quebec	21,471	38,990	32,745	13,300	11,098	18,142
Ontario	15,565	17,309	15,371	16,266	12,058	15,181
Manitoba	212	210	165	170	205	225
Alberta	138	151	118	70	...	245
British Columbia	1,485	346	121	110	22	20
TOTAL	47,769	64,922	57,632	37,304	29,995	41,379

GARNET

During 1948 the Niagara Garnet Company shipped a small quantity of pulverized garnet. The garnet ore had been mined in earlier years from the 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 16 - MINE PRODUCTION (SALES) OF GRAPHITE IN CANADA, 1939-1948

Year	Short tons	$	Year	Short tons	$
1939	1,101	61,684	1944	1,582	179,457
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

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 1948 the shipments of grindstones amounted to 220 tons valued at $20,100 as compared with 335 tons worth $21,475 in the previous year.

Table 17 - PRODUCTION OF GRINDSTONES, PULPSTONES AND SCYTHESTONES IN CANADA, 1939-1948

Year	Tons	$	Year	Tons	$
1939	304	15,278	1944	225	12,000
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

Table 18 - PRODUCTION OF NATURAL ABRASIVE STONES, 1947 and 1948

	Grindstones			
	1947		1948	
	Tons	$	Tons	$
Nova Scotia	...	...	...	...
New Brunswick	335	21,475	220	20,100
CANADA	335	21,475	220	20,100

Table 19 - CONSUMPTION OF PULPSTONES BY THE CANADIAN PULP AND PAPER INDUSTRY, 1939-1947

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

IRON OXIDES

Canadian producers of ochreous iron oxides in 1948 shipped 13,181 tons of this material valued at $203,391 f.o.b. shipping points. Except for a small tonnage in British Columbia all of these shipments originated in Quebec.

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, 2 to 11 cents per pound; yellow, 5 to 7 cents; brown, 5 to 8 cents; and black 9 to 12 cents per pound.

Table 20 - PRINCIPAL STATISTICS OF THE NATURAL IRON OXIDES INDUSTRY IN CANADA, 1946-1948

		1946	1947	1948
Number of firms		5(x)	6(x)	7(x)
Number of employees: Administration		9	8	7
Workmen		51	46	48
Total		60	54	55
Salaries and wages: Salaries	$	15,748	13,816	11,157
Wages	$	61,979	68,553	73,402
Total	$	77,727	82,369	84,559
Selling value of products (gross)	$	152,268	258,322	203,391
Cost of fuel and purchased electricity	$	16,656	24,802	25,574
Cost of process supplies	$	4,200	6,628	4,625
Freight	$	15,161	9,474	8,066
Selling value of products (net)	$	116,251	217,418	165,126

(x) One producer in British Columbia, remainder in Quebec.

Table 21 - PRODUCTION OF NATURAL IRON OXIDES IN CANADA, 1939-1948

Year	Quantity	Value	Year	Quantity	Value
	Short tons	$		Short tons	$
1939	6,015	88,418	1944	8,599	150,250
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

Table 22 - IMPORTS INTO CANADA AND EXPORTS OF OCHRES AND COLOURS, 1947 and 1948

	1947		1948	
	Quantity	Value	Quantity	Value
	Tons	$	Tons	$
Imports -				
Ochres, ochrey earths, siennas and umbers	1,236	68,426	1,462	71,272
Oxides, fireproofs, rough stuff, fillers and colours, dry, n.o.p.	4,104	2,047,954	3,891	2,468,127
Exports -				
Iron oxides	5,387	313,017	5,250	312,585

Table 23 - CONSUMPTION OF IRON OXIDES IN SPECIFIED CANADIAN INDUSTRIES, 1939-1948

Year	Coke and Gas		Paints and Varnishes			
			Iron oxide pigments		Ochres, siennas and umbers	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons (a)	$	Tons	$	Tons	$
1939		35,417	882	80,274	523	46,134
1940	5,417	42,491	1,146	112,826	575	62,636
1941	5,133	36,480	1,602	187,836	464	58,385
1942	4,600	33,790	2,334	253,383	412	52,155
1943	6,568	45,946	2,321	222,858	440	68,425
1944	9,194	71,545	2,614	242,234	648	69,092
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

(a) 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 is the base raw 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

Magnesitic dolomite 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 is 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 24 - PRODUCTION OF MAGNESITIC DOLOMITE (CALCINED) IN CANADA, 1939-1948

Year	Value	Year	Value
	$		$
1939	474,418	1944	1,139,281
1940	897,016	1945	1,278,596
1941	831,041	1946	1,225,593
1942	1,059,374(a)	1947	1,167,584
1943	1,260,056	1948	1,587,709

(a) 1942 and following years include the value of brucite shipped.

Table 25 - MAGNESITE AND DOLOMITE USED IN THE CANADIAN PRIMARY IRON AND STEEL INDUSTRY, 1939-1948

Year	Calcined Dolomite		Dolomite, Crude		Magnesite	
	Short tons	Value	Short tons	Value	Short tons	Value
		$		$		$
1939	14,858	99,838	40,592	78,904	11,401	351,680
1940	21,949	136,360	59,284	123,429	13,673	506,032
1941	21,608	160,602	71,087	159,037	18,127	682,742
1942	22,550	179,427	79,091	225,393	20,665	786,321
1943	10,310	99,740	78,746	243,793	19,427	744,716
1944	8,516	125,990	134,907	296,631	18,665	740,450
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

Table 26 - CALCINED MAGNESITE USED BY THE ARTIFICIAL ABRASIVES AND ABRASIVE PRODUCTS INDUSTRY IN CANADA, 1939-1948

Year	Tons	Value	Year	Tons	Value
		$			$
1939	121	7,735	1944	771	103,591
1940	302	19,331	1945	840	96,780
1941	809	77,508	1946	1,676	187,250
1942	398	58,648	1947	1,832	195,586
1943	150	12,164	1948	3,284	389,335

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 salt 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 27 - PRODUCTION OF NATURAL MAGNESIUM SULPHATE IN CANADA(‡), 1939-1948

Year	Tons	Value	Year	Tons	Value
		$			$
1939	550	9,900	1944	...	...
1940	...	...	1945	...	...
1941	265	7,343	1946	...	...
1942	1,140	38,760	1947	...	...
1943	...	...	1948	...	...

(‡) Produced entirely in British Columbia.

Table 28 - IMPORTS OF MAGNESIUM SULPHATE INTO CANADA, 1939-1948

Year	Tons	Value	Year	Tons	Value
		$			$
1939	1,951	56,648	1944	2,684	108,795
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

Table 29 - AVAILABLE DATA ON CONSUMPTION OF MAGNESIUM SULPHATE IN CANADA, 1942-1947

Industry	1942	1943	1944	1945	1946	1947
			(Tons)			
Leather tanneries	891	935	932	1,013	1,019	935
Medicinals	539	577	562	828	645	611
Fertilizers	790	...	54	431	57	14
Textiles	55	330	350	44	28	38
Miscellaneous	46	60	119	...	...	...
TOTAL ACCOUNTED FOR ...	2,321	1,902	2,017	2,316	1,749	1,598

M I C A

Canadian production or primary shipments of all grades of mica in 1948 totalled 7,902,303 pounds valued at $211,418, compared with 8,318,755 pounds worth $200,903 in the previous year. The Quebec mines contributed 4,275,195 pounds valued at $173,744 and the mines of Ontario shipped 3,125,308 pounds worth $37,674; the British Columbia mines shipped 501,800 pounds of muscovite valued at $8,530.

Most of the output of sheet phlogopite is handled and prepared for market by producers and dealers having trimming establishments in or near Ottawa. A few operators have made direct mine shipments of semi-rough mica to the United States for the production there of punched shapes. The making of thin splittings, now done on a very much smaller scale than formerly, is mostly farmed out in small rural communities in the Ottawa district. Scrap mica still continues to be recovered on a considerable scale from old mine dumps, and these furnish most of the scrap sold for grinding, as well as considerable amounts of screened untrimmed small mica shipped to the United States for the making of mechanical splittings.

Table 30 - PRINCIPAL STATISTICS OF THE MICA MINING INDUSTRY IN CANADA, 1947 and 1948

		1947	1948
Number of firms or operators		38	34
Number of employees: Administrative		14	13
Workmen		104	96
TOTAL		118	109
Salaries and wages: Salaries	$	26,887	18,167
Wages	$	120,464	100,815
TOTAL	$	147,351	118,982
Selling value of products (gross)	$	200,903	219,948
Cost of fuel and electricity	$	19,609	14,622
Cost of process supplies used	$	8,986	18,228
Selling value of products (net)	$	172,308	187,098

Table 31 - MICA PRODUCTION (PRIMARY SALES) IN CANADA, BY CLASSES, 1947 and 1948

Grade	1947 Pounds	1947 Total value f.o.b. shipping point	1948 Pounds	1948 Total value f.o.b. shipping point
		$		$
Rough, mine-run or rifted	246,947	30,504	21,918	2,693
Mica sold for mechanical splitting	291,549	54,357	317,005	67,635
Splittings	10	3	17,514	14,028
Ground or powdered	4,177,251	66,596	3,748,268	84,224
Scrap - Mine or shop waste and mica mined and sold for grinding	3,578,898	30,781	3,716,840	33,813
Ungraded	...	...	5,734	345
Trimmed mica	24,100	18,662	75,024	17,210
TOTAL MICA SHIPMENTS	8,318,755	200,903	7,902,303	219,948
Varieties: Phlogopite mica (amber) ...	6,510,755	176,663	7,400,503	211,418
Muscovite mica (white)	1,808,000	24,240	501,800	8,530

Table 32 - PRODUCTION (SALES) OF MICA IN CANADA, BY PROVINCES AND BY VARIETIES, 1948

Province	Phlogopite		Muscovite		TOTAL	
	Pounds	$	Pounds	$	Pounds	$
Quebec	4,275,195	173,744	...	...	4,275,195	173,744
Ontario	3,125,308	37,674	...	...	3,125,308	37,674
British Columbia	...	...	501,800	8,530	501,800	8,530
TOTAL CANADA	7,400,503	211,418	501,800	8,530	7,902,303	219,948

Table 33 - PRODUCTION (SALES) OF MICA IN CANADA, 1939-1948

Year	Short tons	$	Year	Short tons	$
1939	1,068	147,321	1944	3,342	841,026
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

Table 34 - IMPORTS AND EXPORTS OF MICA, 1947 and 1948

	1947		1948	
	Pounds	Value $	Pounds	Value $
Imports -				
Mica and manufactures of, n.o.p.	...	571,638	...	407,202
Vermiculite, crude	...	129,992	...	128,839
Exports -				
Mica, scrap and waste	2,560,600	21,724	1,998,900	16,002
Mica splittings	3,400	2,186	11,300	8,272
Mica manufactures	...	185	...	1,862
Mica, rough, untrimmed	430,200	71,002	354,300	75,205
Mica, trimmed	46,100	25,492	8,500	3,835
Mica, ground	180,000	6,940	2,121,200	45,185
TOTAL MICA EXPORTS	...	127,529	...	150,361

Table 35 - CONSUMPTION OF MICA IN CANADA, IN SPECIFIED INDUSTRIES, AS REPORTED TO THE ANNUAL CENSUS OF INDUSTRY, 1946 and 1947

	1946		1947	
	Quantity (tons)	Cost at works $	Quantity (tons)	Cost at works $
In electrical apparatus industry	178	355,160	208	519,402
In rubber industry	132	16,868	191	26,950
In roofing	1,064	39,651	1,778	62,071
In wallpaper	199	27,201	146	20,791
In mica manufacturing industry	70	109,475	54	92,088
TOTAL ACCOUNTED FOR	1,643	548,355	2,377	721,302

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 1948. Twelve of these firms were in Quebec and 2 in Ontario.

Table 36 - SHIPMENTS OF NATURAL MINERAL WATERS FROM CANADIAN SPRINGS, 1939-1948

Year	Quebec		Ontario		CANADA	
	Imp.gal.	$	Imp.gal.	$	Imp.gal.	$
1939	104,629	17,503	19,140	1,602	123,769	19,105
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

PHOSPHATE

Phosphate in the form of apatite was mined on a fairly substantial scale up to 1895 but since then the production has been small and spasmodic. There has been no recorded production in Canada since 1946.

There has been renewed activity at the old Charles mine 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. The 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 37 - PRODUCTION OF PHOSPHATE IN CANADA, 1939-1948

Year	Short tons	$	Year	Short tons	$
1939	157	1,712	1944	482	6,716
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	...	...

Table 38 - IMPORTS OF PHOSPHATE ROCK INTO CANADA, 1939-1948

Year	Tons	Value	Year	Tons	Value
		$			$
1939	124,900	477,317	1944	388,247	1,710,378
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

Table 39 - CONSUMPTION OF PHOSPHATE ROCK IN CANADA, 1946 and 1947

	1946	1947
	(tons)	
(a) By Uses		
Fertilizers	372,914	398,685
Chemicals	17,861	25,343
Steel furnaces	1,989	1,295
Refractories	153	148
Miscellaneous	7,100	9,500
TOTAL	400,017	434,971
(b) By Provinces		
Quebec	85,871	107,484
Ontario	70,933	83,243
British Columbia	243,213	244,244
TOTAL	400,017	434,971

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 40 - PRODUCTION OF SILICA BRICK IN CANADA, 1939-1948

Year	M	$	Year	M	$
1939	2,493	124,807	1944	3,997	312,092
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

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 41 - PRODUCTION OF SODIUM CARBONATE (NATURAL) IN CANADA, 1939-1948

Year	Tons	$	Year	Tons	$
1939	300	2,400	1944	44	484
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	...	...

SODIUM SULPHATE (NATURAL)

The entire production of natural sodium sulphate in 1948 came from the brine lakes of Saskatchewan. The shipments of 153,698 tons during the year were slightly less than in the previous year but the total value of $2,136,276 was greater.

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, and large amounts are used at Copper Cliff in the smelter. It is used in the glass, dye and textile industries and to a smaller extent for medicinal purposes, and for tanning.

Table 42 - PRINCIPAL STATISTICS OF SODIUM SULPHATE MINING INDUSTRY, 1947 and 1948

		1947	1948
Active firms	No.	4	5
Producing plants	No.	4	6
Employees - Administrative	No.	15	29
Workmen	No.	218	337
Total Employees	No.	233	366
Salaries	$	38,224	59,308
Wages	$	418,445	720,572
Total Salaries and Wages	$	456,669	779,880
Gross value of production	$	1,798,481	2,142,576
Cost of fuel and electricity	$	370,557	536,337
Cost of process supplies and containers	$	99,156	114,357
NET VALUE OF PRODUCTION	$	1,328,768	1,491,882

Table 43 - PRODUCTION OF NATURAL SODIUM SULPHATE(*) IN CANADA, 1939-1948

Year	Short tons	$	Year	Short tons	$
1939	71,485	628,151	1944	108,421	987,842
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

(*) All produced in the province of Saskatchewan, with the following exceptions:

Includes production in Alberta - 1939 ..... 10 tons, value $186
1940 ..... 10 tons, value $50
1941 ..... 8 tons, value $32

Table 44 - PRODUCTION IN CANADA OF MANUFACTURED SODIUM SULPHATE, 1939-1948

Year	Salt Cake		Glauber's Salt	
	Tons	$	Tons	$
1939	2,661	40,219	3,189	52,331
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	...	...

Table 45 - IMPORTS INTO CANADA OF SODIUM SULPHATE, 1939-1948

Year	Salt Cake		Glauber's Salt	
	Tons	$	Tons	$
1939	6,542	73,575	1,330	20,102
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

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.

STRONTIUM MINERALS (Concluded)

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 in Canada as a by-product in the treatment of copper-pyrite ores at Waite-Amulet and Noranda mines in Quebec and Britannia mine in British Columbia. No lump pyrite has been produced in Canada for several years, and published statistics on recent pyrite production refer to by-product iron pyrite recovered in the concentrating of copper and copper-zinc ores.

In Quebec, Noranda Mines Limited, Noranda, recovers the pyrite from the cyanide mill tailings and sells it to pulp and paper mills at Trois Rivières and at Hull, Quebec, and to chemical plants in Canada and the United States. Waite Amulet Mines, Limited has been producing a pyrite concentrate since March 1944, which it ships mainly to the United States. Noranda Mines Limited are operating a pilot plant for the recovery of elemental sulphur from pyrite. It is expected that the iron residues will be used to produce pig iron.

In British Columbia, the Britannia mine ships a portion of the iron pyrite concentrate to the acid plant of the Nichols Chemical Company at Barnet, British Columbia. Quite a large tonnage of pyrite which had been stockpiled was exported during the year.

Table 46 - PRODUCTION OF SULPHUR (‡) IN CANADA, 1939-1948

Year	Tons	$	Year	Tons	$
1939	211,278	1,668,025	1944	248,088	1,755,739
1940	170,630	1,298,018	1945	250,114	1,881,321
1941	260,023	1,702,736	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

(‡) Includes sulphur recovered from smelter gas.

Table 47 - PRODUCTION IN CANADA OF PYRITE WITH SULPHUR CONTENT, INCLUDING SULPHUR CONTAINED IN SULPHURIC ACID, ETC., MADE FROM SMELTER GASES, 1946-1948

	Pyrite			Smelter Gas		Total Sulphur	
	Sales	Sulphur Content		Sulphur Content			
	Tons	Tons	Value	Tons	Value	Tons	Value
			$		$		$
1946							
Quebec	194,291	92,716	375,328	...	...	92,716	375,328
Ontario	...	...	...	15,433	154,330	15,433	154,330
British Columbia	7,644	3,822	27,006	122,800	1,228,002	126,622	1,255,008
CANADA	201,935	96,538	402,334	138,233	1,382,332	234,771	1,784,666
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

Table 48 - AVAILABLE DATA ON THE CONSUMPTION OF SULPHUR (BRIMSTONE) IN CANADA, 1945-1947

Industry	1945	1946	1947
		(Tons of 2,000 pounds)	
Pulp and paper	203,522	226,296	253,423
Heavy chemicals	53,689	45,346	63,265
Rubber goods	1,496	1,446	2,165
Explosives	1,131	1,461	1,496
Insecticides	1,244	1,297	1,545
Adhesives	75	64	93
Starch	253	208	267
Fruit and vegetable preparations	123	119	38
Sugar refining	130	128	127
Petroleum refining	51	68	127
Matches	89	83	92
Miscellaneous	600	195	180
TOTAL ACCOUNTED FOR	262,403	276,711	322,818

Table 49 - IMPORTS OF SULPHUR INTO CANADA, 1939-1948

Year	Tons	$	Year	Tons	$
1939	152,216	2,453,836	1944	235,955	3,875,649
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

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.

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(x) Active but not producing.
(✻) Recover sulphur from smelter gas.

Name of Operator	Head Office Address	Plant Location
	BARITE	
Nova Scotia -		
Canadian Industrial Minerals Ltd.	Walton	Walton
Ontario -		
Woodhall Mines Ltd.	347 Bay St., Toronto	Langmuir
British Columbia -		
Mountain Minerals Ltd.	Box 273, Lethbridge, Alberta	Golden M.D.
	BRUCITE	
Quebec -		
Aluminum Company of Canada Ltd.	Sun Life Bldg., Montreal	Wakefield
Davis, Norman B.	512 Victoria Bldg., Ottawa, Ontario	Wakefield
	DIATOMITE	
Nova Scotia -		
Wightman, Mrs. G. W.	Smith's Cove	Digby Co.
British Columbia -		
Fairey and Co.	661 Taylor St., Vancouver	Cariboo M.D., Vancouver
	FLUORSPAR	
Ontario -		
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 Tp.
Stocklosar, Chas. A.	Box 198, Madoc	Huntingdon Tp.
	GARNET	
Ontario -		
Niagara Garnet Co.	c/o Wm. A. Yarwood, 8573 Krull Parkway, Niagara Falls, New York, U.S.A.	River Valley
	GRAPHITE	
Ontario -		
Frobisher Exploration Co. Ltd.	Black Donald Mines	Brougham Tp.

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Name of Operator	Head Office Address	Plant Location
	GRINDSTONES	
New Brunswick -		
Read, H. C.	Bathurst	Stonehaven
Bay of Chaleur Grindstone Co.	Clifton	Clifton
	IRON OXIDE	
Quebec -		
Argall, Mrs. Thomas H.	1695 Blvd. St. Louis, Trois Rivières	Pointe du Lac
Begin Iron Oxide Mine	Cassier 197, Trois Rivières	Chemin des Forges
Girardin, Chas. D.	Yamachiche	Almaville en Haut
Lafrenière, Philias	St. Louis de France	St. Louis de France
The Sherwin-Williams Co. of Canada Ltd. (x)	2875 Centre St., Montreal	Red Mill, Champlain Co.
Vennes, Wm.	90 - 6ème Ave., Grand'Mère	St. Adelphe
British Columbia -		
British Columbia Electric Co. Ltd.	425 Carrall St.	Alta Lake
	LITHIUM MINERALS	
Quebec -		
Canadian Lithium Co. Ltd. (x)	57 Queen St. W., Toronto, Ontario	Landrienne Tp.
LaCorne Lithium Mines Ltd. (x)	320 Bay St., Toronto, Ontario	LaCorne Tp.
Manitoba -		
Lithium Corp. of Canada Ltd. (x)	403 Avenue Bldg., Winnipeg	Bernic and Cat Lakes
Sherritt Gordon Mines Ltd. (x)	25 King St. W., Toronto, Ontario	Herb Lake
	MAGNESITIC DOLOMITE	
Quebec -		
Canadian Refractories Ltd.	1050 Canada Cement Bldg., Montreal	Kilmar and Harrington
	MINERAL WATERS	
Quebec		
Benedict-MacPeak Mineral Exploration	420 Lagauchetière St., Montreal	St. Agnes
Cie d'eau Minerale, de St. Hyacinthe	632 Concord Ave., St. Hyacinthe	St. Hyacinthe
Eau Minerale Etoile	Ste. Genevieve de Batiscan	Batiscan
Orange Crush Ltd.	1016 Bleury St., Montreal	Varennes
Lemay, Lucien	St. François du Lac	Nicolet Tp.
Gauthier, Charles	Louisville	St. Leon
Minard, Edward	Maskinonge	Maskinonge
Montclair-Richelieu Spring Water Co. Ltd.	Chambly Basin	Chambly
Pellerin, A., and Sons	St. Barnabe N.	St. Maurice
Paille J. J.	Maskinonge	Maskinonge
Sources Abenakis Springs Ltd.	366 rue Racine, Granby	St. François du Lac
Source Coulombia	L'Epiphanie	L'Epiphanie
Source d'eau Minerals Radnor	St. Maurice	St. Maurice
Usine d'Embouteillage Maski	St. Justin	St. Justin
Ontario -		
Carlsbad Springs, The	Carlsbad Springs	Gloucester Tp.
Deneault, J. F.	Bourget	Bourget
	MICA	
Quebec -		
Blackburn Bros.	85 Sparks St., Ottawa, Ontario	Cantley
Bole, Floyd	Cantley	Cantley
Bon Ami Ltd.	13719 Notre Dame St. E., Pointe aux Trembles	Buckingham
Charbonneau, L	Perkins Mills	Perkins
Chamberot, E.	78 Chauveau St., Hull	Cantley

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Name of Operator	Head Office Address	Plant Location
	MICA (Concluded)	
Quebec -		
Cross, W. C.	209 Bridge St., Hull	Cantley
de Rainville, Paul	Perkins	Templeton
Egan, J. J.	Box 94, Hull	Cantley
Gauthier, J. B.	Box 226, Buckingham	Denholm
Gagne, Marc	Cascades,	Gatineau
Groulx & Cherney	195 Gigues St., Ottawa, Ontario	Gatineau
Joannesse , Leo	31 Graham St., Hull	Hincks
Lavoie, S.	Waltham	Hincks
Lamoureux, O.	Hull	Hull
McGarry, W. P.	Wakefield	Hull Tp.
Murphy, Philip	Gatineau Point	Hull Tp.
Marcoux, G.	13 Champagne, Hull	Hull Tp.
Mica Co. of Canada	2 Lois St., Hull	Hull Tp.
Paiement, B.	Perkins Mills	Papineau
Prud'homme, Real	Perkins	Templeton
Prud'homme, Oscar	Perkins	Templeton
Pink Lake Mica Mines	Old Chelsea	Hull
Poirier, Adelard	Wilson's Corners	Wilson's Corners
Regal Mortgage & Discount	196 Sparks St., Ottawa, Ontario	Wilson's Corners
Renaud, J.	Perkins	Perkins
Sabourin, V.	Perkins	Perkins
Suzorite Co. Ltd.	907 Dominion Square Bldg., Montreal	McCarthy
Scarfe, Len	Wakefield	Hull Tp.
Wallingford, Ed.	Perkins	Templeton
Wilson, Neil	Cantley	Hull Tp.
Ontario -		
Bancroft Mica & Stone Co.	Selby	Faraday Tp.
Cordick, H. V.	Perth	Lanark
Donnelly, J. G.	Stanleyville	N. Burgess Tp.
Lemieux, Frank	Godfrey	Bedford Tp.
Loughborough Mining Co. Ltd.	Sydenham	Frontenac
Powers, Art	Stanleyville	Burgess Tp.
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
British Columbia -		
Fairey & Co.	661 Taylor St., Vancouver	Vancouver
	PHOSPHATE	
Quebec -		
Bigelow, Robert (x)	Buckingham	Bowman Tp.
Blackburn Bros. Ltd. (x)	85 Sparks St., Ottawa, Ontario	Perkins
High-Rock Phosphates Ltd. (x)	41 Main St., Buckingham	Portland W. Tp.
Cross, Stanley (x)	28 Warren Ave., Ottawa, Ontario	Hull Tp.
Ontario -		
Ontario Phosphate Industries Ltd.(x)	Room 1101, 62 Richmond St. W., Toronto	Bedford Tp.
	SILICA BRICK	
Nova Scotia -		
Dominion Steel & Coal Corp. Ltd.	Sydney	Sydney
Ontario -		
Algoma Steel Corp. Ltd.	Sault Ste. Marie	Sault Ste. Marie

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Name of Operator	Head Office Address	Plant Location
	SODIUM CARBONATE	
British Columbia -		
Bishop, V. C. (Mrs.)	c/o Boyds Garage, Clinton	Clinton area
	SODIUM SULPHATE	
Saskatchewan -		
Horseshoe Lake Mining Co. Ltd. (x)	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
	SULPHUR (Pyrite)	
Quebec -		
Noranda Mines Ltd.	Royal Bank Bldg., Toronto, Ontario	Noranda
Waite-Amulet Mines Ltd.	Noranda	Duprat Tp.
Ontario -		
International Nickel Company of Canada Ltd. (‡)	Copper Cliff	Copper Cliff
British Columbia -		
Consolidated Mining & Smelting Company of Canada Ltd. (‡)	Trail	Trail
Britannia Mining & Smelting Co. Ltd.	Britannia Beach	Britannia Beach