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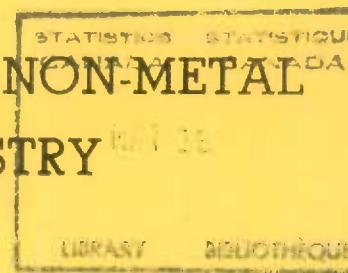
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CANADA

THE MISCELLANEOUS NON-METAL  
MINING INDUSTRY

1953



DOMINION BUREAU OF STATISTICS

Industry and Merchandising Division

Mineral Statistics Section

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THE MISCELLANEOUS NON-METAL MINING INDUSTRY

1953

*Published by Authority of*

The Right Honourable C. D. Howe, Minister of Trade and Commerce

## NOTICE

The annual reports prepared by the Industry and Merchandising Division of the Bureau of Statistics are divided into 3 volumes, as follows: Volume I — The Primary Industries, including mining, forestry and fisheries; Volume II — Manufacturing; Volume III — Merchandising and Services. The volumes are made up of parts, and the parts in turn are subdivided according to the industries which they comprise.

Volume I consists of the following parts:

- Part I — Mineral Statistics
- Part II — Forestry Statistics — Operations in the Woods
- Part III — Fisheries Statistics

Part I includes the following reports which constitute the complete series on Mineral Statistics of Canada. Individual reports are issued as the information becomes available; they are arranged in a form suitable for binding.

- A — General Review of the Mining Industry, 50¢
- B — The Gold Mining Industry, 50¢
- C — The Silver-Lead-Zinc Mining Industry, 25¢
- D — The Nickel-Copper Mining, Smelting and Refining Industry, 25¢
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- S — The Sand and Gravel Industry, 25¢
- T — The Stone Industry, 25¢
- U — Contract Drilling in the Mining Industry, 25¢

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# THE MISCELLANEOUS NON-METAL MINING INDUSTRY

## 1953

Canadian operators which produce certain industrial or non-metallic minerals, and which are usually too few in number to permit the publication separately of complete details of operations, have been classified for statistical purposes to a group which has been designated as the Miscellaneous Non-Metal Mining Industry. Minerals or primary mineral products recovered (or deposits developed) by this industry during 1953 included barite, brucite, diatomite, fluorspar, graphite, grindstones, dolomitic-magnesite, mineral waters, perlite, phosphate rock, silica brick, sodium carbonate and sodium sulphate.

During 1953 there were 29 operators who reported as having shipped some materials. The gross value of production was \$9,987,665 in 1953 compared with

\$9,299,130 in the preceding year. Salaries and wages paid to 1,405 employees amounted to \$4,168,645. Fuel cost \$1,047,907 and 20,247,115 kwh. of electricity were purchased for \$213,457. Process supplies cost \$1,030,764 and containers used were valued at \$130,437.

This report also includes data for arsenious oxide, titanium oxide, and sulphur contained in pyrites and smelter gases; these are by-products of the metal mining and smelting industries and output, employment, etc., are credited to the producing industries. Also, for convenience, the statistics for the mica mining industry and for the iron oxides mining industry are published in this report, although they are not included in the figures for the Miscellaneous Non-Metal Mining Industry.

**TABLE 1. Principal Statistics Relating to The Miscellaneous Non-Metal Mining Industry, 1951-1953**

	1951	1952	1953
Number of plants .....	39	42	40
Number of employees:			
Administrative and office .....	132	202	146
Workmen .....	1,227	1,333	1,259
Total .....	<b>1,359</b>	<b>1,535</b>	<b>1,405</b>
Man-hours worked:			
Administrative and office .....	259,356	383,884	297,594
Workmen .....	3,050,736	2,886,421	2,812,765
Total .....	<b>3,310,092</b>	<b>3,270,305</b>	<b>3,110,359</b>
Salaries and wages:			
Administrative and office .....	\$ 442,866	567,116	543,105
Workmen .....	\$ 3,256,923	3,690,729	3,625,540
Total .....	<b>\$ 3,699,789</b>	<b>4,257,845</b>	<b>4,168,645</b>
Gross selling value of products .....	\$ 8,914,360	9,299,130	9,987,665
Cost of fuel and electricity .....	\$ 1,471,290	1,327,929	1,261,364
Cost of process supplies used .....	\$ 925,537	1,022,488	1,030,764
Cost of containers.....	\$ 138,341	146,809	130,437
Freight .....	\$ 169,306	122,127	59,240
Net value of production .....	\$ 6,209,886	6,679,777	7,505,860

TABLE 2. Production of Miscellaneous Non-metallic Minerals, 1952 and 1953

Item		1952		1953	
		Quantity	Value	Quantity	Value
			\$		\$
Barite .....	tons	136,002	1,521,162	247,227	2,220,292
Diatomite .....	"	28	1,074	103	12,150
Fluorspar .....	"	82,187	2,523,408	88,569	2,670,585
Garnet (schist) .....	-	-	-	-	-
Graphite .....	tons	2,040	255,732	3,466	366,528
Grindstones .....	"	42	5,720	15	900
Dolomitic-magnesite .....	-	...	2,161,472	...	2,016,640
Mineral waters .....	Imp. gal.	311,495	166,033	309,585	165,484
Perlite .....	tons	-	-	1,112	11,120
Phosphate .....	-	-	-	-	-
Silica brick .....	M	3,544	606,394	3,720	712,271
Sodium carbonate .....	-	-	-	-	-
Sodium sulphate .....	tons	122,590	1,708,807	115,565	1,681,258
Total .....	-	-	8,949,802	...	9,857,228
Sulphur <sup>1</sup> .....	tons	423,788	3,851,183	358,850	3,172,698
Iron oxides .....	"	11,487	194,922	10,308	195,801
Mica .....	"	1,007	194,106	1,133	161,128
Arsenious oxide <sup>2</sup> .....	"	859	76,876	702	56,150
Titanium dioxide <sup>2</sup> .....	"	30,805	1,238,103	100,527	4,206,496

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 and titanium dioxide are included with the non-ferrous smelting industry.

Note. Value of containers is excluded.

TABLE 3. Workmen, by Months, in the Miscellaneous Non-metal Mining Industry, 1952 and 1953

Month	1952						1953					
	Mine		Mill		Total	Mine		Mill		Total		
	Surface	Under-ground				Surface	Under-ground				Male	Female
	Male	Female	Male	Female		Male	Female	Male	Female		Male	Female
Number												
January.....	325	3	308	695	2	1,333	330	3	297	631	2	1,263
February.....	321	3	305	711	2	1,342	321	3	297	613	2	1,236
March.....	326	4	317	696	2	1,345	294	3	289	660	2	1,248
April.....	343	4	315	671	2	1,335	305	3	294	643	2	1,247
May.....	382	4	308	628	2	1,324	380	3	276	604	2	1,265
June.....	376	3	313	628	2	1,322	391	3	276	617	2	1,288
July.....	405	3	325	667	2	1,402	398	3	297	560	2	1,260
August.....	385	3	332	630	2	1,352	380	3	308	546	2	1,239
September.....	368	3	330	617	2	1,320	375	3	303	605	3	1,289
October.....	339	3	332	665	2	1,341	371	3	310	582	3	1,269
November.....	299	3	332	638	2	1,274	373	3	315	546	2	1,239
December.....	296	3	317	641	2	1,259	345	3	315	552	2	1,217
Average .....	351	4	319	657	2	1,333	357	3	298	598	3	1,259

TABLE 4. Fuel and Electricity Used in the Miscellaneous Non-metal Mining Industry, 1953

Kind		Quantity	Cost at plant
			\$
Bituminous coal (a) From Canadian mines .....	short tons	6,977	81,364
(b) Imported .....	"	542	7,063
Sub-bituminous coal (from Alberta mines only) .....	"	90	1,414
Anthracite coal .....	"	10	224
Lignite coal.....	"	26,462	138.070
Coke (for fuel only) .....	—	—	—
Gasoline, (includes gasoline used in cars and trucks).....	Imp. gal.	376,668	116,944
Kerosene or coal oil.....	"	2,051	525
Fuel oil (does not include lubricating oil) .....	"	6,087,880	642,072
Wood (cords of 128 cubic feet of piled wood).....	cords	424	3,054
Gas (a) Liquefied petroleum gases (propane, etc.) .....	—	—	—
(b) Other manufactured gas .....	—	—	57,104
(c) Natural gas .....	—	—	73
Other fuel.....	—	—	—
Electricity purchased for power and lighting (includes service charge) .....	kwh	20,847,115	213,457
Electricity purchased for other purposes (includes service charge).....	—	—	—
<b>Total (cost only)</b> .....	—	—	<b>1,261,364</b>
Electricity generated (a) For own use.....	kwh	7,558,858	—
(b) For sale .....	"	118,368	2,924

TABLE 5. Power Equipment (Including stand-by or emergency equipment). 1953

Description	Ordinarily in use		In reserve or idle	
	Number of units	Total h.p. (according to manufacturer's rating)	Number of units	Total h.p. (according to manufacturer's rating)
1. Steam engines.....	—	—	—	—
2. Steam turbines .....	—	—	—	—
3. Diesel engines .....	20	3,175	2	885
4. Gasoline, gas and oil engines, other than Diesel engines	9	390	3	340
5. Hydraulic turbines or water-wheels.....	2	600	—	—
6. Electric motors—(except those reported under item 10): (a) Operated by purchased power.....	748	9,988	132	2,431
7.     Total (1), (2), (3), (4), (5) and (6a) .....	779	14,153	137	3,656
8.     (b) Operated by power generated by (1), (2), (3), (4) and (5)	80	982	17	160
9. Stationary boilers for power purposes only .....	—	—	1	10
10. Motor-generator sets .....	18	1,410	2	87

## ARSENIOUS OXIDE

Shipments of arsenious oxide during 1953 amounted to 1,403,740 pounds valued at \$56,150. Included in the output is some arsenic which was recovered from foreign ores. The Canadian and foreign ores are mixed for treatment and separate data are not available.

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 6. Production, Imports and Exports of Arsenic, 1952 and 1953

	1952		1953	
	Quantity	Value	Quantity	Value
	lb.	\$	lb.	\$
<b>Production:</b>				
White arsenic (crude and refined) <sup>1</sup> .....	1,708,351	76,876	1,403,740	56,150
<b>Imports:</b>				
Arsenic acid .....	670,303	29,919	1,126,802	40,181
Arsenious oxide and arsenic sulphide.....	19,249	3,521	32,233	5,881
Sodium arsenate and sodium stannate .....	73,088	27,138	137,798	41,650
Arsenate of lead .....	73,480	15,049	44,832	8,517
Arsenate of lime .....	134,000	10,612	236,672	15,888
<b>Exports:</b>				
Arsenic <sup>2</sup> .....	3,571,600	147,594	935,300	39,675

1. Includes some arsenic recovered from foreign ores.  
 2. Includes arsenic content in gold ores exported from British Columbia.

TABLE 7. Production, Imports and Exports of White Arsenic, 1944-1953

Year	Production (crude and refined, but no duplication)	Imports <sup>1</sup>	Exports	
			Refined	Crude
Pounds				
1944.....	2,627,022	2,405	2,016,000	—
1945.....	2,045,730	—	1,519,697	—
1946.....	745,885	500	418,000	—
1947.....	787,736	246,379	130,300	—
1948.....	1,161,996	84,390	170,800	—
1949.....	526,645	256,957	12,400	—
1950.....	794,091	16,290	361,400	—
1951.....	2,353,367	35,231	1,508,200	334,000
1952.....	1,708,351	19,249	294,800	—
1953.....	1,403,740	32,233	934,000	—

1. Arsenious oxide and arsenic sulphide.

TABLE 8. Consumption of Refined White Arsenic, 1950-1953

Industry	1950	1951	1952	1953
Pounds				
Glass .....	384,079	362,426	340,631	343,279
Insecticides <sup>1</sup> .....	2	2	2	2
White metals .....	62,830	99,821	68,127	36,515
Miscellaneous chemicals.....	107,293	41,308	114,314	88,804
<b>Total accounted for .....</b>	<b>554,202</b>	<b>503,555</b>	<b>523,072</b>	<b>468,598</b>

1. Does not include arsenic acid ( $As_2O_5$ ) imported for use in making insecticides, as follows: 1950 - 2,114,532 pounds; 1951 - 1,664,855 pounds; 1952 - 670,303 pounds; 1953 - 1,002,424 pounds.

2. Included with miscellaneous chemicals total.

TABLE 9. World Production of White Arsenic, by Countries  
(Taken from the "Minerals Yearbook", by the United States Bureau of Mines)

Country <sup>1</sup>	1949	1950	1951	1952	1953
Metric tons <sup>2</sup>					
Australia .....	257	163	122	122	-
Belgium-Luxembourg (exports) .....	527	1,909	325	1,003	9,809
Brazil .....	959	1,067	1,321	963	3
Canada .....	239	360	1,068	775	646
France .....	1,964	2,460	5,680	6,290	3
Germany, West (exports) .....	1,081	1,124	3,504	111	612
Greece .....	20	33	56	88	3
Iran <sup>4</sup> .....	80 <sup>5</sup>	25 <sup>5</sup>	3	3	3
Italy .....	1,440	726	1,769	2,144	1,164
Japan .....	2,001	1,327	1,374	1,500 <sup>5</sup>	3
Mexico .....	3,576	8,987	12,766	2,866	2,951
New Zealand .....	19	10	-	-	3
Peru .....	-	-	-	15	3
Portugal .....	975	255	561	1,317	3
Southern Rhodesia .....	148	114	76	515	378
Spain .....	124	159	375	273	3
Sweden .....	8,967	14,512	18,531	3	3
Union of South Africa .....	-	-	-	-	-
United Kingdom <sup>6</sup> .....	3	3	3	3	3
United States .....	11,607	12,041	14,687	14,218	9,864
<b>Total<sup>7</sup> .....</b>	<b>35,000</b>	<b>47,000</b>	<b>63,000</b>	<b>48,000</b>	<b>51,000</b>

1. Arsenic is also believed to be produced in Argentina, Austria, China, Czechoslovakia, East Germany, Hungary, Korea, and U.S.S.R., but data are not available.

2. This table incorporates revisions of data published in previous white arsenic chapters.

3. Data not available; estimate included in total.

4. Year ended March 20, of year following that stated.

5. Estimate.

6. White arsenic, including arsenic soot.

7. Total includes estimates for Austria and Germany but no estimates are included for other countries listed in footnote 1.

## BARITE

Shipments of barite from Canadian mines in 1953 amounted to 247,227 tons valued at \$2,220,292 compared with 136,002 tons worth \$1,521,162 in 1952. The greater portion of Canada's output was produced in Nova Scotia by the Canadian Industrial Minerals, Limited. In British Columbia barite was mined at Brisco and Parson.

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.

The content of  $\text{BaSO}_4$  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. The requirements are a minimum specific gravity of 4.25 (corresponding to a  $\text{BaSO}_4$  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  $\text{BaSO}_4$ , under 3 per cent moisture, and not more than 0.4 per cent iron oxide ( $\text{Fe}_2\text{O}_3$ ), with a fineness range of 20 to 100 mesh.

TABLE 10. Production of Barite, 1944-1953

Year	Short tons	Value	Year	Short tons	Value
		\$			\$
1944.....	118,719	1,023,696	1949.....	47,138	557,662
1945.....	139,589	1,211,403	1950.....	77,177	750,378
1946.....	120,419	1,006,473	1951.....	98,113	1,131,917
1947.....	128,675	1,380,753	1952.....	136,002	1,521,162
1948.....	95,747	1,073,380	1953.....	247,227	2,220,292

TABLE 11. Imports of Barite, 1944-1953

Year	Tons	Value	Year	Tons	Value
		\$			\$
1944.....	1,824	47,913	1949.....	934	32,269
1945.....	1,150	32,531	1950.....	2,089	70,095
1946.....	1,547	42,904	1951.....	1,068	37,471
1947.....	1,737	51,060	1952.....	1,445	44,488
1948.....	1,263	39,613	1953.....	1,207	40,143

TABLE 12. Consumption of Barite, 1950-1953

	1950	1951	1952	1953
	Tons			
(a) By uses:				
Paints.....	1,457	1,219	1,051	1,200
Rubber goods.....	589	375	513	437
Glass.....	265	212	209	238
Oil-well drilling, estimate.....	1,000	1,976	2,000	2,000
Miscellaneous.....	821	866	254	279
<b>Total accounted for.....</b>	<b>4,132</b>	<b>4,648</b>	<b>3,927</b>	<b>4,154</b>
(b) By provinces:				
Newfoundland.....	19	10	14	—
Nova Scotia.....	1,659	1,517	838	780
Quebec.....	1,140	890	932	1,090
Ontario.....	155	112	106	126
Manitoba.....	1	—	—	—
Saskatchewan.....	1,096	2,053	1,986	2,099
Alberta.....	62	66	51	59
British Columbia.....				
<b>Total accounted for.....</b>	<b>4,132</b>	<b>4,648</b>	<b>3,927</b>	<b>4,154</b>

**TABLE 13. World Production of Barite, by Countries, 1949-1953**  
 ("Taken from the "Minerals Yearbook" of the United States Bureau of Mines)

Country <sup>1</sup>	1949	1950	1951	1952	1953
Metric tons <sup>2</sup>					
North America:					
Canada.....	42,763	70,013	89,006	123,378	225,863
Cuba (exports).....	—	—	—	3	3
United States.....	663,428	629,060	767,092	918,802	834,628
<b>Total North America</b> .....	<b>710,200</b>	<b>704,100</b>	<b>861,200</b>	<b>1,092,200</b>	<b>1,065,500</b>
South America:					
Argentina.....	3	3	13,008 <sup>4</sup>	13,000 <sup>4</sup>	13,000 <sup>4</sup>
Brazil.....	6,010	6,860	50	6,899 <sup>5</sup>	14,391 <sup>5</sup>
Chile.....	1,461	1,360	1,095	3	3
Colombia.....	58	—	3	3	7,750
Peru.....	6,350	3,051	23,015	9,104	15,530
<b>Total South America</b> .....	<b>26,000</b>	<b>25,000</b>	<b>37,300</b>	<b>31,000</b>	<b>52,200</b>
Europe:					
Austria.....	8,260	10,119	9,645	5,160	1,920
France.....	30,295	28,609 <sup>4</sup>	37,626	28,449	24,000
East Germany.....	15,000 <sup>4</sup>	15,000 <sup>4</sup>	20,000 <sup>4</sup>	20,000 <sup>4</sup>	25,000 <sup>4</sup>
West Germany.....	181,467	310,896	417,479	345,840	383,856
Greece.....	15,604	20,799	29,399	21,679	25,459
Ireland.....	5,968	4,821	8,238	1,829	3
Italy.....	51,583	54,426	76,541	56,274	69,319 <sup>4</sup>
Portugal.....	427	128	719	621	700 <sup>4</sup>
Spain.....	7,665	7,147	12,449	15,868	17,896
Sweden.....	923	30	150	3	3
U.S.S.R. (estimate).....	90,000	95,000	100,000	100,000	100,000
United Kingdom <sup>6</sup> .....	119,216	98,160	88,822	71,271	3
Yugoslavia.....	36,445	29,730	24,822	34,819	81,154
<b>Total Europe</b> .....	<b>567,000</b>	<b>680,000</b>	<b>830,000</b>	<b>710,000</b>	<b>790,000</b>
Asia:					
India.....	21,457	12,155	10,639	7,621	3
Japan.....	9,840	14,239	16,706	14,231	17,554
Korea, Republic of.....	—	—	—	793	918
<b>Total Asia</b> .....	<b>40,000</b>	<b>36,000</b>	<b>37,000</b>	<b>35,000</b>	<b>40,000</b>
Africa:					
Algeria.....	16,874	22,800	21,021	9,845	12,840
Egypt.....	30	—	41	30	3
French Morocco.....	305	4,912	3,256	3,111	50
Southern Rhodesia.....	488	261	85	271	268
South West Africa.....	48	—	—	—	—
Swaziland.....	104	441	477	403	413
Tunisia.....	630	25	10	25	—
Union of South Africa.....	2,222	2,268	2,038	1,718	1,898
<b>Total Africa</b> .....	<b>20,701</b>	<b>30,797</b>	<b>26,928</b>	<b>15,403</b>	<b>15,469</b>
Australia.....	5,552	6,028	6,277	5,023	5,563
<b>World total (estimate)</b> .....	<b>1,400,000</b>	<b>1,500,000</b>	<b>1,800,000</b>	<b>1,900,000</b>	<b>1,975,000</b>

1. In addition to countries listed, barite is produced in China, Czechoslovakia, Mexico and North Korea, but production data are not available. Estimates are included in total.

2. This table incorporates a number of revisions of data published in previous barite chapters.

3. Data not available; estimate included in total.

4. Estimate.

5. Exports.

6. Includes witherite.

## 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 in 1951 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.

## DIATOMITE

Shipments of diatomite during 1953 amounted to 103 tons. Only 3 tons came from the Nova Scotian deposits; the remainder was an impure diatomaceous earth from a deposit in Ontario. For statistical purposes it has been included in diatomite. 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 at Trail, British Columbia, and at 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 14. Production of Diatomite, 1944-1953

Year	Short tons	Value	Year	Short tons	Value
		\$			\$
1944.....	13	437	1949.....	60	1,703
1945.....	46	1,238	1950.....	49	1,665
1946.....	90	2,532	1951.....	92	3,148
1947.....	103	2,677	1952.....	28	1,074
1948.....	46	1,487	1953.....	103	12,150

TABLE 15. Consumption of Infusorial Earth in the Sugar Refining Industry, 1944-1953

Year	Tons	Value	Year	Tons	Value
		\$			\$
1944.....	2,188	115,053	1949.....	2,871	187,503
1945.....	1,992	102,961	1950.....	2,989	205,836
1946.....	2,196	104,794	1951.....	2,322	169,743
1947.....	2,490	141,885	1952.....	2,020	132,796
1948.....	2,865	167,259	1953.....	1,944	128,633

TABLE 16. Consumption of Diatomaceous Earth in the Manufacture of Fertilizers, 1949-1953

Year	Tons	Value
		\$
1949.....	7,469	324,702
1950.....	7,861	344,461
1951.....	7,352	350,685
1952.....	7,683	371,124
1953.....	8,643	427,881

TABLE 17. Imports of Diatomaceous Earth, 1944-1953

Year	Tons	Value	Year	Tons	Value
		\$			\$
1944.....	11,664	335,939	1949.....	16,914	551,954
1945.....	13,217	362,882	1950.....	18,247	599,216
1946.....	17,063	469,968	1951.....	21,069	709,433
1947.....	15,074	431,125	1952.....	15,888	563,950
1948.....	17,050	512,115	1953.....	19,350	670,610

TABLE 18. World Production of Diatomite, by Countries<sup>1</sup>, 1949-1953

(Taken from the "Minerals Yearbook" by the United States Bureau of Mines)

Country <sup>1</sup>	1949	1950	1951	1952	1953
Metric tons					
North America:					
Canada .....	54	44	83	25	3
United States <sup>2</sup> .....	232,800	232,800	272,000	272,000	272,000
Costa Rica .....	129	7	454	680	390
South America:					
Chile .....	3,313	154	3	3	3
Europe:					
Austria .....	3,536	3,285	3,894	3,901	4,000 <sup>4</sup>
Denmark:					
Diatomite .....	4,038	4,122	4,859	5,000 <sup>4</sup>	5,000 <sup>4</sup>
Moler <sup>4</sup> .....	70,000	70,000	95,000	100,000	100,000
Finland .....	1,457	1,025	1,345	1,121	1,000 <sup>4</sup>
France .....	37,632	35,400	37,000	40,000	40,000 <sup>4</sup>
Germany, West .....	29,335	33,707	43,952	47,852	50,350
Italy .....	6,629	11,487	10,565	8,500	10,000
Northern Ireland .....	7,914	6,546	8,866	8,838	7,384
Sweden .....	1,844	1,780	1,847	1,572	1,500 <sup>4</sup>
United Kingdom .....	10,770	3,796	9,348	17,273	20,000 <sup>4</sup>
Africa:					
Algeria .....	13,581	13,710	20,992	20,016	25,704
Egypt .....	1,178	1,062	2,752	711	119
Kenya .....	2,224	2,613	4,286	6,027	4,448
Union of South Africa .....	1,155	436	87	1,080	109
Oceania:					
Australia .....	4,128	6,321	8,869	6,468	2,883
New Zealand .....	96	121	121	207	3
Total (estimate) .....	480,000	480,000	580,000	590,000	600,000

1. Diatomaceous earth believed to be produced also in Argentina, Brazil, Hungary, Japan, Korea, Norway, Portugal, Romania, Spain, and U.S.S.R., but complete data are not available; estimates included in total.

2. Average annual production 1951-53.

3. Data not available; estimate included in total.

4. Estimate.

## FLUORSPAR

Shipments of fluorspar by Canadian producers during 1953 amounted to 88,569 tons valued at \$2,670,585 compared with 82,187 tons worth \$2,523,408 in the preceding year. Over 98 per cent of the output came from the fluorspar deposits at St. Lawrence, Newfoundland. Ontario's production originated in the Madoc area.

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 hydrofluoric acid, which is used mainly in making artificial cryolite and aluminum fluoride for the aluminum industry; the fluorspar from Newfoundland is used for this purpose at Arvida, Quebec. The ceramic industry is next, using 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 19. Principal Statistics of the Fluorspar Mining Industry, 1951-1953

		1951	1952	1953
Active firms .....	No.	5	4	3
Employees:				
Administrative .....	No.	22	71	36
Workmen.....	No.	381	439	449
Total .....	No.	403	510	485
Salaries and wages:				
Administrative .....	\$	75,960	150,462	121,140
Workmen.....	\$	982,588	1,179,061	1,256,870
Total .....	\$	1,058,548	1,329,523	1,378,010
Gross value of production.....	\$	2,189,875	2,523,408	2,670,585
Cost of fuel and electricity .....	\$	156,330	177,468	205,621
Cost of process supplies .....	\$	85,179	118,194	187,240
Freight on material shipped .....	\$	75,009	54,348	-
Net value of production.....	\$	1,873,357	2,173,398	2,277,724

TABLE 20. Production of Fluorspar, 1944-1953

Year	Short tons	Selling value f.o.b. works	Year	Short tons	Selling value f.o.b. works
		\$			\$
1944.....	6,924	217,701	1949 .....	64,477	1,592,908
1945.....	7,369	233,708	1950 .....	64,213	1,553,004
1946.....	8,042	237,491	1951 .....	74,211	2,189,875
1947.....	7,186	209,886	1952 .....	82,187	2,523,408
1948.....	11,340	344,834	1953 .....	88,569	2,670,585

TABLE 21. Imports of Fluorspar, 1944-1953

Year	Tons	\$	Year	Tons	\$
1944.....	37,100	840,309	1949 .....	2,510	81,650
1945.....	20,517	530,670	1950 .....	1,572	66,823
1946.....	31,813	717,094	1951 .....	8,188	239,120
1947.....	32,001	702,419	1952 .....	22,714	684,968
1948.....	48,925	1,105,190	1953 .....	20,161	546,915

TABLE 22. Consumption of Fluorspar, 1950-1953

	1950	1951	1952	1953
Tons				
(a) By uses:				
Steel .....	21,800	23,374	22,576	22,730
Glass .....	484	586	642	672
Enamelling and glazing .....	229	300	131	152
Heavy chemicals .....	29,620	33,266	45,399	59,556
White metal alloys .....	4	—	—	6
Total accounted for .....	52,137	57,526	68,748	83,116
(b) By provinces:				
Nova Scotia .....	8,570	8,928	9,477	10,071
Quebec .....	27,670	30,695	42,546	57,077
Ontario .....	15,598	17,507	16,242	15,566
Manitoba .....	214	285	370	247
Alberta .....	—	57	63	100
British Columbia .....	85	54	50	55
Total accounted for .....	52,137	57,526	68,748	83,116

TABLE 23. World Production of Fluorspar, by Countries

(Taken from the "Minerals Yearbook" by the United States Bureau of Mines)

Country <sup>1</sup>	1949	1950	1951	1952	1953
Metric tons					
North America:					
Canada .....	58,492	58,253	67,323	74,558	81,717
Mexico (exports) .....	55,772	65,747	66,761	188,000	166,000
United States (shipments) .....	214,733	273,524	314,813	300,524	288,516
Total North America .....	328,997	397,524	448,897	563,082	536,233
South America:					
Argentina (shipments) .....	2	2	2	2	2
Bolivia (exports) .....	264	61	38	80	19
Brazil .....	537	600 <sup>3</sup>	2	—	—
Total South America <sup>3</sup> .....	3,000	3,000	3,000	3,000	3,000
Europe:					
Belgium .....	2	2	2	2	2
France .....	46,029	41,653	50,816	56,189	54,700
Germany, East <sup>3</sup> .....	40,000	60,000	70,000	80,000	80,000
West .....	46,942	92,520	143,741	157,338	245,000
Italy .....	20,810	29,183	41,019	58,684	76,270
Norway .....	895	838	903	680	700 <sup>3</sup>
Spain .....	59,594	33,168	59,674	62,504	78,360
Sweden (sales) .....	—	4,284	5,087	4,469	4,500 <sup>3</sup>
U.S.S.R. <sup>4</sup> .....	4	4	4	4	4
United Kingdom .....	67,575	64,019	75,954	77,040	80,398
Total Europe <sup>3</sup> .....	286,000	330,000	452,000	501,000	624,000
Asia:					
China .....	2	2	2	2	2
Japan .....	960	2,425	3,996	3,952	16,537
Korea, Republic of .....	1,560	5,467	4,243	5,553	11,012
North .....	2	2	2	2	2
Turkey .....	500	—	—	—	100
U.S.S.R. <sup>3</sup> .....	70,000	80,000	80,000	80,000	80,000
Total Asia <sup>3</sup> .....	84,000	101,000	95,000	100,000	123,000
Africa:					
French Morocco .....	445	40	1,968	3,304	2,892
Southern Rhodesia .....	239	447	111	—	338
South-West Africa .....	—	73	779	4,418	5,117
Tunisia .....	352	—	—	2,470	2,040
Union of South Africa .....	4,857	6,948	12,280	10,290	14,541
Total Africa .....	5,893	7,508	15,138	20,482	24,928
Australia .....	571	585	497	87	308
World total (estimate) .....	710,000	840,000	1,015,000	1,190,000	1,310,000

1. This table incorporates a number of revisions of data in previous fluorspar chapters.

2. Data not available; estimate included in total.

3. Estimate.

4. U.S.S.R. in Europe included in U.S.S.R. in Asia as deposits are predominantly in Asiatic Russia.

## GARNET

In 1953 there was no garnet mined in Canada. 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 of 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.

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 24. Mine Shipments of Graphite, 1944-1953

Year	Short tons	\$	Year	Short tons	\$
1944 .....	1,582	179,457	1949 .....	2,147	212,496
1945 .....	1,910	187,364	1950 .....	3,586	390,815
1946 .....	1,975	180,405	1951 .....	1,569	231,167
1947 .....	2,398	207,364	1952 .....	2,040	255,732
1948 .....	2,539	239,931	1953 .....	3,466	366,528

TABLE 25. Imports and Exports of Graphite<sup>1</sup>, 1951-1953

	1951	1952	1953
	\$	\$	\$
<b>Imports:</b>			
Plumbago, not ground .....	96,725	97,658	125,740
Crucibles, plumbago, and covers .....	215,297	213,429	217,066
Plumbago, ground, and manufactures of .....	476,511	434,650	481,982
<b>Exports:</b>			
Graphite, crude and refined .....	156,536	191,563	320,638
Carbon and graphite electrodes .....	1,805,834	2,824,885	1,383,851

1. Includes artificial graphite.

TABLE 26. Available Data on the Consumption of Graphite, 1950-1953

—	1950	1951	1952	1953
Pounds				
By industries:				
Iron and steel foundries .....	2,541,000	3,106,697	3,521,413	3,744,135
Paints .....	104,000	113,968	138,379	108,870
Electrical apparatus .....	692,000	619,862	700,619	536,397
Heavy chemicals .....	535,000	663,236	617,644	635,134
Prepared foundry facings .....	440,000	445,781	113,556	435,740
Polishes .....	66,000	47,973	45,415	20,259
Brass and bronze foundries .....	59,000	84,722	75,495	46,747
<b>Total for above industries</b> .....	<b>4,437,000</b>	<b>5,112,243</b>	<b>5,212,521</b>	<b>5,577,882</b>
By provinces:				
Newfoundland .....	11,000	45,385	11,601	9,537
Nova Scotia .....	2,000	2,831	2,119	4,986
Quebec .....	948,000	1,314,416	927,158	1,184,491
Ontario .....	3,234,000	3,513,310	3,881,686	4,110,292
Manitoba .....	51,000	70,185	122,856	35,783
Saskatchewan .....	7,000	9,646	2,765	4,300
Alberta .....	16,000	11,431	41,580	18,300
British Columbia .....	168,000	140,040	222,756	210,193
<b>Total</b> .....	<b>4,437,000</b>	<b>5,112,243</b>	<b>5,212,521</b>	<b>5,577,882</b>

TABLE 27. World Production of Natural Graphite, by Countries

(Taken from the "Minerals Yearbook" of the United States Bureau of Mines)

Country <sup>1</sup>	1949	1950	1951	1952	1953
Metric tons <sup>2</sup>					
North America:					
Canada .....	1,948	3,253	1,423	1,851	3,153
Mexico .....	23,812	24,626	32,286	24,152	30,330
United States .....	5,536	4,628	6,473	5,080	5,698
South America: Brazil .....	556	471	610	3	—
Europe:					
Austria .....	14,400	14,685	18,227	19,711	14,683
Czechoslovakia .....	3	3	3	3	3
Germany, West .....	5,097	6,563	10,300	8,963	7,459
Italy .....	4,639	4,521	4,514	3,960	4,910
Norway .....	2,257	2,457	3,453	4,120	3,000 <sup>4</sup>
Spain .....	256	310	274	783	250 <sup>4</sup>
Sweden .....	109	—	—	—	—
Yugoslavia .....	—	—	—	687	3
Asia:					
Ceylon (exports) .....	12,437	13,030	12,824	7,782	7,334
India .....	988	1,611	1,603	2,182	3
Japan .....	5,664	4,008	4,872	4,650	3,900 <sup>4</sup>
Korea, Republic of .....	40,671	16,382	21,578	15,066	20,629
Taiwan (Formosa) .....	3	3	3	700	—
Africa:					
Egypt .....	—	—	—	—	3
French Morocco .....	72	74	131	21	98
Kenya .....	—	—	—	35	3
Madagascar .....	9,141	14,013	18,338	18,478	13,325
Mozambique .....	110	—	240	—	—
South West Africa .....	2,264	1,380	2,626	1,184	3
Spanish Morocco .....	15	3	—	17	3
Union of South Africa .....	107	244	328	353	375
Australia .....	126	147	135	81	3
<b>Total (estimate)</b> .....	<b>170,000</b>	<b>160,000</b>	<b>195,000</b>	<b>185,000</b>	<b>180,000</b>

1. In addition to countries listed, graphite has been produced in Argentina, China, and U.S.S.R. but production data not available; estimates included in total.

2. This table incorporates a number of revisions of data published in previous graphite chapters.

3. Data not available; estimate included in total.

4. Estimate.

## 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 1953 the shipments of grindstones amounted to 15 tons valued at \$900 compared with 42 tons valued at \$5,720 in the preceding year.

TABLE 28. Production of Grindstones, Pulpstones and Scythestones, 1944-1953

Year	Tons	\$	Year	Tons	\$
1944.....	225	12,000	1949.....	195	12,450
1945.....	225	10,870	1950.....	100	10,000
1946.....	295	17,450	1951.....	60	6,000
1947.....	335	21,475	1952.....	42	5,720
1948.....	220	20,100	1953.....	15	900

TABLE 29. Purchases of Pulpstones by the Canadian Pulp and Paper Industry, 1946-1953

Year	Number for 2 ft. wood	Value	Number for 2.5 ft. wood	Value	Number for 4 ft. wood	Value
		\$		\$		\$
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
1949.....	105	102,685	26	29,650	95	295,664
1950.....	136	101,029	12	8,773	124	378,050
1951.....	107	111,295	25	34,251	155	511,676
1952.....	82	104,718	11	21,057	179	605,840
1953.....	100	107,291	16	33,503	160	588,329

## IRON OXIDES

Ochreous iron oxides shipped during 1953 amounted to 10,308 tons valued at \$195,801 compared with 11,487 tons valued at \$194,922 in 1952. All production came from deposits in Quebec. The depletion of ore stopped operations 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 was used for the purification of illuminating gas.

TABLE 30. Principal Statistics of The Natural Iron Oxides Industry, 1951-1953

		1951	1952	1953
Number of firms.....	No.	5	4	4
Number of employees:				
Administration.....	No.	5	5	2
Workmen .....	No.	38	40	35
Total .....	No.	43	45	37
Man-hours worked:				
Administrative and office .....	No.	12,521	9,800	4,400
Workmen .....	No.	77,419	73,054	68,608
Total .....	No.	89,940	82,854	73,008
Salaries and wages:				
Administrative.....	\$	12,864	14,489	6,273
Workmen .....	\$	74,419	78,934	76,822
Total .....	\$	87,283	93,423	83,095
Gross selling value of products .....	\$	262,277	194,922	195,801
Cost of fuel and purchased electricity .....	\$	22,896	25,166	23,776
Cost of process supplies.....	\$	3,651	840	2,250
Freight .....	\$	15,878	15,861	16,817
Net value of production .....	\$	219,852	153,055	152,958

TABLE 31. Production of Natural Iron Oxides, 1944-1953

Year	Quantity	Value	Year		Quantity	Value
			Short tons	\$		
1944 .....	8,599	150,250	1949.....		13,625	207,887
1945 .....	10,314	172,053	1950.....		13,696	262,632
1946 .....	12,695	152,268	1951.....		13,342	262,277
1947 .....	13,418	258,322	1952.....		11,487	194,922
1948 .....	13,181	203,391	1953.....		10,308	195,801

TABLE 32. Imports and Exports of Ochres and Colours, 1952 and 1953

		1952		1953	
		Quantity	Value	Quantity	Value
Imports:					
Ochres, ochrey earths, siennas and umbers.....		998	56,740	1,171	71,564
Oxides, fireproofs, rough stuff, fillers and colours, dry, n.o.p.		4,215	3,016,916	5,258	3,869,255
Exports:					
Iron oxides .....		3,060	350,614	3,048	359,886

TABLE 33. Consumption of Iron Oxides in Specified Canadian Industries, 1949-1953

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	\$
1949 .....	8,189	77,824	2,045	291,378	260	48,240
1950 .....	11,624	114,138	2,453	378,423	268	51,514
1951 .....	10,310	105,709	2,946	467,059	249	50,851
1952 .....	8,302	81,822	2,442	406,781	227	49,738
1953 .....	7,989	85,579	2,456	450,031	243	54,180

1. Oxide and purifying materials.

TABLE 34. Fuel and Electricity Used in the Natural Iron Oxides Industry, 1953

Kind		Quantity	Cost at plant
		\$	
Bituminous coal (a) From Canadian mines .....	—	—	—
(b) Imported.....	short tons	1,009	16,648
Sub-bituminous coal (from Alberta mines only).....	—	—	—
Anthracite coal .....	—	—	—
Lignite coal .....	—	—	—
Coke (for fuel only).....	—	—	—
Gasoline, (includes gasoline used in cars and trucks).....	Imp. gal.	7,245	3,012
Kerosene or coal oil .....	"	100	20
Fuel oil (excludes lubricating oil) .....	"	3,400	1,020
Wood (cords of 128 cubic feet of piled wood).....	cords	3	18
Gas (a) Liquefied petroleum gases (propane, etc.) .....	—	—	—
(b) Other manufactured gas .....	—	—	—
(c) Natural gas .....	—	—	—
Other fuel .....	—	—	—
Electricity purchased for power and lighting (includes service charge) .....	kwh	183,736	3,058
Electricity purchased for other purposes (includes service charge) .....	—	—	—
<b>Total (cost only)</b> .....	—	...	<b>23,776</b>
Electricity generated (a) For own use .....	—	—	—
(b) For sale .....	—	—	—

TABLE 35. Power Equipment (Including stand-by or emergency equipment)

Description	Ordinarily in use		In reserve or idle	
	Number of units	Total h.p. (according to manufacturer's rating)	Number of units	Total h.p. (according to manufacturer's rating)
1. Steam engines .....	—	—	—	—
2. Steam turbines .....	—	—	—	—
3. Diesel engines .....	—	—	—	—
4. Gasoline, gas and oil engines, other than Diesel engines ...	1	30	—	—
5. Hydraulic turbines or water-wheels .....	—	—	—	—
6. Electric motors (except those reported under item 10):				
(a) Operated by purchased power .....	21	101	4	4
7. <b>Total (1), (2), (3), (4), (5) and (6a)</b> .....	22	<b>131</b>	4	4
8. (b) Operated by power generated by(1),(2),(3),(4)and(5)	—	—	—	—
9. Stationary boilers for power purposes only .....	—	—	—	—
10. Motor-generator sets.....	—	—	—	—

### LITHIA

The chief lithium minerals are amblygonite, spodumene and lepidolite; their ores contain respectively, about 8, 6 and 4 per cent of lithia or lithium oxide ( $\text{Li}_2\text{O}$ ). Spodumene is in the greatest supply and is the base raw material for the manufacture of many lithium salts, lithium metal and alloys.

Lithia deposits are being developed in Canada near Val d'Or, Northwestern Quebec; also exploratory work has been done in the Winnipeg River-Cat Lake area of Southeastern Manitoba and in the Yellowknife-Beaulieu region of the Northwest Territories.

Lithium hydroxide is used to make special greases which are water-resistant and retain lubricating qualities through a wide range of tem-

perature. The electrolyte in the Edison cell storage battery contains lithium hydroxide. Lithium compounds are used as a flux in porcelain enamels for stoves, refrigerators and bathtubs.

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 were shipped. Total production in Canada during the active period, 1925-1937 inclusive, has been estimated at about 250 tons which was exported to the United States.

Prices for lithium ore are nominal. Spodumene ore with a content of 6%  $\text{Li}_2\text{O}$  would have a price range of \$60-\$72 per ton. Lithium metal was quoted in New York at \$11-\$14 per pound.

### 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 soil conditioner. 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 36. Production of Magnesitic Dolomite, 1944-1953

Year	Value	Year	Value
	\$		\$
1944 .....	1,139,281	1949 .....	1,536,200
1945 .....	1,278,596	1950 .....	1,717,879 <sup>1</sup>
1946 .....	1,225,593	1951 .....	2,437,773 <sup>1</sup>
1947 .....	1,167,584	1952 .....	2,715,266 <sup>1</sup>
1948 .....	1,587,709	1953 .....	3,056,392 <sup>1</sup>

1. Includes some metallic magnesium.

Note. Above figures include the value of brucite shipped.

TABLE 37. Magnesite and Dolomite Used in the Canadian Primary Iron and Steel Industry, 1949-1953

Year	Calcined dolomite		Dolomite, crude		Magnesite	
	Short tons	Value	Short tons	Value	Short tons	Value
	\$		\$		\$	
1949 .....	25,769	533,679	233,372	569,348	17,094	843,274
1950 .....	29,857	648,830	255,616	611,762	14,315	711,658
1951 .....	32,852	755,989	290,052	692,684	18,240	995,071
1952 .....	37,129	870,888	343,241	780,777	24,472	1,506,382
1953 .....	66,586	1,562,163	400,923	817,999	14,184	821,769

**TABLE 38. World Production of Magnesite, by Countries<sup>1</sup>**  
 (Taken from the "Minerals Yearbook" of the United States Bureau of Mines)

Country <sup>1</sup>	1949	1950	1951	1952	1953
Metric tons <sup>2</sup>					
North America:					
United States .....	260,646	389,536	607,962	463,342	501,804
South America:					
Venezuela .....	1,800	1,400	1,600	3	3
Europe:					
Austria .....	520,500	543,817	664,296	742,259	804,716
Czechoslovakia.....	3	173,000 <sup>4</sup>	3	3	3
Germany, West .....	11,264	1,311	3	3	3
Greece .....	17,090	26,256	63,859	81,591	73,540
Italy .....	735	274	246	3	76
Norway .....	1,108	1,850	1,453	1,479	1,000 <sup>4</sup>
Spain.....	6,691	7,632	13,733	12,625	15,107
Yugoslavia.....	87,934	59,269	89,915	37,782	122,517
Asia:					
Cyprus (exports) .....	20	20	20	20	20
India .....	92,018	53,707	118,650	90,470	100,000 <sup>4</sup>
Korea, Republic of .....	—	3	3	3	3
Turkey .....	6,370	450	505	750	400 <sup>4</sup>
Africa:					
Kenya .....	10	181	—	—	—
Southern Rhodesia .....	7,640	8,615	14,814	10,952	9,819
Tanganyika (exports) .....	—	83	2,716	—	102
Union of South Africa.....	10,487	11,782	18,773	24,409	22,887
Oceania:					
Australia .....	34,129	35,960	39,762	42,813	47,142
New Zealand .....	568	346	589	588	525
<b>Total (estimate) .....</b>	<b>2,700,000</b>	<b>3,000,000</b>	<b>3,800,000</b>	<b>3,800,000</b>	<b>4,000,000</b>

1. Unless otherwise stated, quantities in this table represent crude magnesite mined. In addition to countries listed, magnesite is also produced in Brazil, Canada, China, Mexico, Poland, and U.S.S.R. but data on tonnage output are not available; estimates included in total.

2. This table incorporates a number of revisions of data published in previous magnesite chapters.

3. Data not available; estimate included in total.

4. Estimate.

**TABLE 39. Calcined Magnesite Used by the Artificial Abrasives Industry, 1949-1953**

Year	Tons	Value
		\$
1949 .....	1,416	156,290
1950 .....	2,510	291,566
1951 .....	3,688	407,191
1952 .....	2,396	288,941
1953 .....	3,644	412,281

### 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 40. Production of Natural Magnesium Sulphate<sup>1</sup>, 1941-1953

Year	Tons	Value
		\$
1941.....	265	7,343
1942.....	1,140	38,760
1943-1953 .....	—	—

1. Produced entirely in British Columbia.

TABLE 41. Imports of Magnesium Sulphate, 1944-1953

Year	Tons	Value	Year	Tons	Value
		\$			\$
1944.....	2,684	108,795	1949.....	2,783	120,881
1945.....	2,545	101,695	1950.....	2,793	100,644
1946.....	3,463	132,342	1951.....	3,065	95,005
1947.....	2,908	108,840	1952.....	2,186	76,419
1948.....	2,797	118,792	1953.....	2,761	80,885

TABLE 42. Available Data on Consumption of Magnesium Sulphate, 1950-1953

Industry	1950	1951	1952 <sup>1</sup>	1953
tons				
Leather tanneries .....	673	554	582	642
Medicinals .....	570	570	622	649
Fertilizers .....	81	81	50	471
Textiles .....	42	36	—	—
Total accounted for .....	1,366	1,241	1,254	1,762

1. Revised figures.

**MICA**

Amber mica or phlogopite is mined in Quebec and Ontario. The major portion of the output is derived from Quebec mines. Muscovite production

is from Ontario mines. The mica obtained from the schist rock in British Columbia is included for statistical purposes in the muscovite class.

**TABLE 43. Principal Statistics of the Mica Mining Industry, 1951-1953**

—	1951	1952	1953
Number of firms or operators.....	31	28	44
Number of employees:			
Administrative .....	3	2	3
Workmen.....	135	113	100
<b>Total</b> .....	<b>138</b>	<b>115</b>	<b>105</b>
Man-hours worked:			
Administrative and office .....	2,138	3,000	5,720
Workmen.....	179,360	234,064	199,699
<b>Total</b> .....	<b>182,033</b>	<b>237,064</b>	<b>205,419</b>
Salaries and wages:			
Administration .....	\$ 2,673	\$ 2,035	\$ 8,396
Workmen.....	\$ 179,360	\$ 166,141	\$ 143,888
<b>Total</b> .....	<b>\$ 182,033</b>	<b>\$ 168,176</b>	<b>\$ 152,284</b>
Gross selling value of products .....	\$ 447,650	\$ 194,106	\$ 161,128
Cost of fuel and electricity .....	\$ 14,580	\$ 15,674	\$ 14,811
Cost of process supplies used .....	\$ 18,148	\$ 19,140	\$ 11,540
Net value of production.....	\$ 414,922	\$ 159,292	\$ 134,777

**TABLE 44. Mica Production (Primary Sales), by Classes, 1952 and 1953**

Grade	1952		1953	
	Pounds	Total value f.o.b. shipping point	Pounds	Total value f.o.b. shipping point
Rough, mine-run or rifted .....	14,350	850	62,744	5,310
Mica sold for mechanical splitting .....	105,794	19,756	168,537	30,521
Splittings .....	6,900	10,849	8,289	16,568
Ground or powdered .....	988,052	41,545	664,741	25,236
Scrap, mine or shop waste and mica mined and sold for grinding .....	838,220	9,276	1,284,334	16,597
Trimmed mica .....	61,625	111,830	50,933	65,949
Unclassified .....	...	...	25,550	947
<b>Total mica shipments</b> .....	<b>2,014,941</b>	<b>194,106</b>	<b>2,265,128</b>	<b>161,128</b>
Varieties:				
Phlogopite mica (amber) and biotite .....	1,499,381	84,162	1,863,130	106,767
Muscovite mica (white) and schist .....	515,560	109,944	401,998	54,361

**TABLE 45. Production of Mica, by Provinces and by Varieties, 1953**

Province	Phlogopite and biotite		Muscovite and schist		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
	\$		\$		\$	
Quebec .....	1,478,615	99,080	—	—	1,478,615	99,080
Ontario .....	384,515	7,687	81,998	51,481	466,513	59,168
British Columbia .....	—	—	320,000	2,880	320,000	2,880
<b>Total Canada</b> .....	<b>1,863,130</b>	<b>106,767</b>	<b>401,998</b>	<b>54,361</b>	<b>2,265,128</b>	<b>161,128</b>

TABLE 46. Production of Mica, 1944-1953

Year	Short tons	\$	Year	Short tons	\$
1944 .....	3,342	841,026	1949 .....	1,745	108,458
1945 .....	3,522	233,270	1950 .....	1,940	252,611
1946 .....	4,360	199,039	1951 .....	2,481	447,650
1947 .....	4,159	200,903	1952 .....	1,007	194,106
1948 .....	3,951	219,948	1953 .....	1,133	161,128

TABLE 47. Imports and Exports of Mica, 1951-1953

	1951		1952		1953	
	Pounds	Value	Pounds	Value	Pounds	Value
Imports:		\$		\$		\$
Mica and manufactures of, n.o.p. ....	...	976,467	...	728,889	...	719,544
Exports:						
Mica, scrap and waste .....	980,400	10,555	889,000	8,434	1,354,700	19,583
Mica splittings .....	—	—	3,500	5,089	—	—
Mica manufactures .....	...	2,217	...	363	...	123
Mica, rough, untrimmed .....	246,700	49,060	178,800	31,319	240,500	43,704
Mica, trimmed .....	430,700	378,846	50,600	85,634	79,400	93,560
Mica, ground .....	775,000	44,090	440,400	26,020	320,000	19,158
Total mica exports .....	...	484,768	...	156,859	...	176,128

TABLE 48. Consumption of Mica, in Specified Industries, as Reported to The Annual Census of Industry, 1950-1953

	1950	1951	1952	1953
Pounds				
By industries:				
Paints .....	1,680,720	1,594,733	1,503,321	1,686,228
Electrical apparatus .....	485,602	737,030	520,957	498,433
Rubber goods .....	349,792	313,147	308,795	364,685
Roofing .....	1,068,000	994,000	782,000	836,000
Wallpaper .....	184,000	150,000	98,000	62,500
Mica products .....	118,108	119,719	62,203	106,801
Miscellaneous .....	—	216,247	148,795	231,674
Total accounted for .....	3,886,222	4,124,876	3,424,071	3,786,321
By provinces:				
Nova Scotia .....	50	—	—	—
Quebec .....	1,932,804	1,933,818	1,553,133	1,669,777
Ontario .....	1,264,158	1,617,679	1,358,778	1,517,168
Manitoba .....	5,568	5,592	11,222	9,883
British Columbia .....	683,642	567,787	500,938	589,493
Canada .....	3,886,222	4,124,876	3,424,071	3,786,321

**TABLE 49. World Production of Mica by Countries**  
 (Taken from the "Minerals Yearbook" of the United States Bureau of Mines)

Country <sup>1</sup>	1949	1950	1951	1952	1953
Metric tons <sup>2</sup>					
North America:					
Canada (sales).....	1,583	1,760	2,250	914	842
Mexico (exports).....	13	176	33	3	3
United States (sold or used by producers):					
Sheet .....	233	262	270	317	385
Scrap .....	29,806	62,922	65,200	68,253	66,459
South America:					
Argentina:					
Sheet <sup>4</sup> .....	300	300	300	300	300
Scrap <sup>4</sup> .....	1,100	1,100	1,100	1,100	1,100
Brazil.....	1,363	1,813	1,658	1,260	1,196
Uruguay .....	2	1	1	1	1
Europe:					
Austria.....	253	368	307	—	—
Norway (including scrap) .....	331	553	985	531	3
Spain .....	9	14	11	8	13
Sweden:					
Block .....	11	2	42	8	3
Ground .....	50	165	173	157	3
Asia:					
Ceylon .....	—	—	5	9	6
India (exports):					
Block .....	418	773	1,637	1,479	
Splittings.....	9,161	12,070	13,939	5,738	
Scrap .....	4,164	3,736	9,351	8,399	
Korea, Republic of.....	—	—	—	6	—
Taiwan (Formosa):					
Sheet .....	—	—	15	1	
Scrap .....	—	—	470	13	
Africa:					
Angola:					
Sheet .....	12	15	15	29	19
Scrap and splittings.....	45	154	121	200	10
Eritrea .....	5	1	—	—	—
French Morocco:					
Sheet .....	—	1	12	—	5
Scrap .....	198	74	25	6	13
Kenya.....	4	6	1	2	—
Madagascar:					
Block .....	126	57	958	41	52
Splittings.....	833	762	—	1,028	764
Mozambique.....	103	41	11	2	1
Northern Rhodesia:					
Sheet .....	3	2	6	16	8
Southern Rhodesia:					
Block .....	87	76	94	95	67
Scrap .....	216	331	254	664	91
South West Africa:					
Scrap .....	—	59	114	—	—
Tanganyika (exports):					
Block and sheet .....	60	50	70	108	75
Ground .....	36	60	—	15	—
Scrap .....	—	25	—	1	52
Uganda.....	2	5	5	5	—
Union of South Africa:					
Sheet .....	1	14	5	5	5
Scrap .....	1,065	1,357	1,774	2,663	1,943
Australia <sup>6</sup> :					
Total (estimate) <sup>1</sup> .....	736	738	536	501	446
	<b>70,000</b>	<b>105,000</b>	<b>125,000</b>	<b>120,000</b>	<b>115,000</b>

1. In addition to countries listed, mica is also produced in China, Romania and U.S.S.R., but data on production are not available; estimates are included in total.

2. This table incorporates a number of revisions of data published in previous mica chapters.

3. Data not available; estimate included in total.

4. Estimate.

5. Less than 0.5 tons.

6. These figures include the following tonnages of damourite produced in South Australia: 1949: 703 tons; 1950: 707 tons; 1951: 513 tons; 1952: 468 tons; 1953: 413 tons.

TABLE 50. Fuel and Electricity Used in the Mica Mining Industry, 1953

Kind		Quantity	Cost at plant
			\$
Bituminous coal:			
(a) From Canadian mines .....	short tons	69	1,446
(b) Imported .....	—	—	—
Sub-bituminous coal (from Alberta mines only).....	—	—	—
Anthracite coal .....	short tons	—	—
Lignite coal .....	—	—	—
Coke (for fuel only).....	—	—	—
Gasoline, (includes gasoline used in cars and trucks) .....	Imp. gal.	9,471	3,854
Kerosene or coal oil .....	—	—	—
Fuel oil (does not include lubricating oil) .....	Imp. gal.	39,090	5,871
Wood (cords of 128 cubic feet of piled wood) .....	cords	88	755
Gas:			
(a) Liquefied petroleum gases (propane, etc.) .....	—	—	—
(b) Other manufactured gas .....	—	—	—
(c) Natural gas.....	—	—	—
Other fuel .....	—	—	—
Electricity purchased for power and lighting(includes service charge)	kwh	116,962	2,885
Electricity purchased for other purposes (includes service charge) ...	—	—	—
<b>Total (cost only) .....</b>		...	<b>14,811</b>
Electricity generated:			
(a) For own use .....	—	—	—
(b) For sale .....	—	—	—

TABLE 51. Power Equipment (Including stand-by or emergency equipment)

Description	Ordinarily in use		In reserve or idle	
	Number of units	Total h.p. (according to manufacturer's rating)	Number of units	Total h.p. (according to manufacturer's rating)
1. Steam engines .....	—	—	—	—
2. Steam turbines .....	—	—	—	—
3. Diesel engines.....	1	80	—	—
4. Gasoline, gas and oil engines, other than Diesel engines .....	15	637	1	6
5. Hydraulic turbines or water-wheels .....	—	—	—	—
6. Electric motors —(except those reported under item 10):				
(a) Operated by purchased power .....	9	152	4	48
7. <b>Total (1), (2), (3), (4), (5) and (6a).....</b>	<b>25</b>	<b>869</b>	<b>5</b>	<b>54</b>
8. (b) Operated by power generated by (1), (2), (3), (4) and (5)	—	—	—	—
9. Stationary boilers for power purposes only .....	—	—	2	100
10. Motor-generator sets .....	—	—	—	—

## 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-Francois river in Yamaska county, Potton Springs in Brome county and the Coulombia 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 1952. Twelve of these firms were in Quebec and 2 in Ontario.

TABLE 52. Shipments of Natural Mineral Waters from Canadian Springs, 1944-1953

Year	Quebec		Ontario		Canada	
	Imp. gal.	Value	Imp. gal.	Value	Imp. gal.	Value
		\$		\$		\$
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
1950 .....	316,654	158,457	2,175	440	318,829	158,897
1951 .....	322,800	146,521	2,500	450	325,300	146,971
1952 .....	309,125	165,593	2,370	440	311,495	166,033
1953 .....	309,285	165,334	300	150	309,585	165,484

## PERLITE

Perlite is a volcanic glass characterized by a concentric "onion skin" fracture and usually a 2 to 5 per cent water content. When heated rapidly in a furnace it expands into a frothy material of low density.

Commercially-expanded perlite is granular material and is generally white. Because of its cellular nature it is light in weight and has good insulating and sound-proofing qualities. Expanded perlite is used chiefly in lightweight concrete aggregates, insulating and sound-proofing pre-cast wallboard, and in lightweight plaster. A sack of

expanded perlite containing 3 cubic feet weighs approximately 30 to 36 pounds.

Development work has been done on deposits of perlite at Francois Lake, British Columbia, about eighteen miles by road from Burns Lake on the C.N.R. Other deposits have been found in British Columbia at Empire Valley northwest of Clinton.

Shipments of 1,112 tons of perlite valued at \$11,120 were made from the British Columbia deposits to the expanding plant of Western Gypsum Products Ltd., Calgary, Alberta.

## 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 1951 about 6 tons were shipped but there were no shipments in subsequent years.

For many years, the Electric Reduction Company Limited, 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 53. Production of Phosphate Rock, 1944-1953

Year	Short tons	Value	Year	Short tons	Value
		\$			\$
1944 .....	482	6,716	1949 .....	20	291
1945 .....	299	4,356	1950 .....	129	1,070
1946 .....	57	869	1951 .....	6	94
1947 .....	—	—	1952 .....	—	—
1948 .....	—	—	1953 .....	—	—

TABLE 54. Imports of Phosphate Rock, 1944-1953

Year	Short tons	Value	Year	Short tons	Value
		\$			\$
1944 .....	388,247	1,710,378	1949 .....	620,808	3,879,523
1945 .....	317,695	1,450,580	1950 .....	491,026	3,296,341
1946 .....	373,677	2,164,841	1951 .....	499,711	3,178,899
1947 .....	485,391	2,857,522	1952 .....	470,913	3,130,306
1948 .....	482,008	2,911,168	1953 .....	576,500	3,951,318

TABLE 55. Consumption of Phosphate Rock, 1950-1953

	1950	1951	1952	1953
	Tons			
(a) By uses:				
Fertilizers .....	419,000	425,107	418,495	416,714
Chemicals .....	43,957	67,509	65,394	78,408
Steel .....	236	236	—	532
Refractories .....	252	286	—	—
Stock and poultry feeds .....	13,305	16,516	17,615	15,986
Miscellaneous .....	9,183	9,500	9,582	450
Total .....	485,933	518,918	511,086	512,090
(b) By provinces:				
Prince Edward Island .....	190	130	}	410
Nova Scotia .....	223	318		
New Brunswick .....	373	408	433	674
Quebec .....	115,610	134,680	127,330	122,206
Ontario .....	93,078	93,981	93,197	89,694
Manitoba .....	362	809	846	798
Saskatchewan .....	169	259	289	165
Alberta .....	432	344	607	625
British Columbia .....	275,496	287,989	287,895	297,518
Canada .....	485,933	518,918	511,086	512,090

**TABLE 56. World Production of Phosphate Rock, by Countries<sup>1</sup>**  
 (Taken from the "Minerals Yearbook," of the United States Bureau of Mines).

Country <sup>1</sup>	1949	1950	1951	1952	1953
Metric tons <sup>2</sup>					
North America:					
Canada .....	18	117	5		
United States .....	9,019,957	11,292,541	10,947,971	12,258,534	12,704,516
West Indies:					
Netherlands Antilles .....	92,784	104,240	107,144	106,902	96,035
South America:					
Brazil (apatite) .....	4,553	13,850	3	17,959	3
Chile (apatite) .....	49,311	13,437	37,182	26,417	50,000 <sup>4</sup>
Europe:					
Belgium .....	44,643	50,846	129,065	58,983	35,896
France .....	59,643	73,752	110,000	102,000	73,000
Germany, West .....	—	—	—	—	—
Ireland <sup>5</sup> .....	3	29,000 <sup>4</sup>	25,000 <sup>4</sup>	3	3
Spain .....	23,093	24,080	22,830	23,474	21,862
Sweden (apatite) .....	1,604	2,044	9,013	21,422	3
U.S.S.R. <sup>6</sup> .....	2,540,000	2,540,000	2,794,000	3,000,000	3,000,000
Asia:					
British Borneo (guano) .....	508	653	659	707	642
China <sup>7</sup> .....	20,000	20,000	20,000	20,000	30,000
Christmas Island (exports) .....	255,236	320,423	338,693	354,762	284,689
India (apatite) .....	588	3,074	423	452	3
Indonesia <sup>8</sup> .....	5,000	5,000	—	—	828
Israel .....	—	—	297 <sup>6</sup>	17,200	23,092
Japan .....	684	258	143	—	—
Jordan .....	—	—	6,635	24,941	28,700
Korea .....	3	3	3	3	3
Philippines (guano) .....	10,998	32,606	4,821	4,231	640
Africa:					
Algeria .....	648,202	684,657	776,575	702,587	602,753
Angola .....	3	1,033	943	—	—
British Somaliland (guano) <sup>7</sup> .....	580	308	691	3	3
Egypt .....	350,480	397,207	499,976	522,214	484,176
French Morocco .....	3,692,958	3,872,241	4,716,800	3,953,100	4,156,000
French West Africa .....	5,675	11,909	24,500	43,150	52,400
Madagascar .....	—	—	—	1,305	1,556
Seychelles Island (exports) .....	14,171	10,005	4,547	11,120	8,859
Southern Rhodesia .....	67	36	—	—	—
South West Africa (guano) .....	957	581	785	1,675	1,604
Tanganyika Territory .....	1,130	468	439	169	151
Tunisia .....	1,441,918	1,524,833	1,678,905	2,264,641	1,718,530
Uganda .....	—	467	2,242	5,010	5,448
Union of South Africa .....	56,471	51,844	81,840	96,568	80,125
Oceania:					
Angaur Island .....	157,049	137,000 <sup>4</sup>	144,843 <sup>7</sup>	83,905 <sup>7</sup>	112,524 <sup>7</sup>
Australia .....	11	1,653	8,056	5,623	3
Makatea Island .....	265,082	270,300	227,858	213,555	250,511
Nauru Island (exports) .....	802,070	1,070,358	942,945	1,164,038	1,178,364
Ocean Island (exports) .....	265,087	251,218	256,451	249,542	286,894
Total (estimate) .....	19,850,000	22,800,000	24,000,000	25,500,000	25,500,000

1. In addition to countries listed, Poland may produce phosphate rock; but data of output are not available, and no estimates have been included in the total.

2. This table incorporates a number of revisions of data published in previous phosphate rock chapters.

3. Data not available; estimate included in total.

4. Estimate.

5. Year ended June 30, of year stated.

6. Production started second half of December, 1951.

7. Exports.

#### 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 57. Production of Silica Brick, 1944-1953

Year	M	Value	Year	M	Value
		\$			\$
1944 .....	3,997	312,092	1949 .....	3,663	453,797
1945 .....	4,208	317,263	1950 .....	3,126	408,813
1946 .....	2,902	197,804	1951 .....	3,510	465,229
1947 .....	3,094	193,998	1952 .....	3,544	606,394
1948 .....	3,464	393,821	1953 .....	3,720	712,271

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 neighbourhood 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 58. Production of Sodium Carbonate (Natural), 1944-1953

Year	Tons	Value	Year	Tons	Value
		\$			\$
1944 .....	44	484	1949 .....	47	513
1945 .....	286	3,146	1950 .....	—	—
1946 .....	—	—	1951 .....	—	—
1947 .....	163	1,793	1952 .....	—	—
1948 .....	—	—	1953 .....	—	—

#### SODIUM SULPHATE (NATURAL)

Natural sodium sulphate was obtained from the brine lakes in Saskatchewan. During 1953 the shipments amounted to 115,565 tons valued at \$1,631,258 compared with 122,590 tons valued at \$1,708,807 in 1952.

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 59. Principal Statistics of the Sodium Sulphate Mining Industry, 1951-1953

		1951	1952	1953
Active firms.....	No.	5	5	4
Producing plants .....	No.	5	5	4
Employees:				
Administrative .....	No.	45	28	12
Workmen .....	No.	203	195	145
Total .....	No.	248	223	157
Salaries and wages:				
Administrative .....	\$	114,449	70,618	56,296
Workmen .....	\$	605,689	548,639	422,078
Total .....	\$	720,138	619,257	478,374
Gross value of production .....	\$	2,383,770	1,711,907	1,681,258
Cost of fuel and electricity .....	\$	662,601	471,176	291,639
Cost of process supplies and containers .....	\$	113,806	75,413	74,033
Net value of production .....	\$	1,607,363	1,165,318	1,311,696

TABLE 60. Production of Natural Sodium Sulphate, 1944-1953

Year	Short tons	Selling value f.o.b. shipping points	Year	Short tons	Selling value f.o.b. shipping points
		\$			\$
1944 .....	102,421	987,842	1949 .....	120,259	1,614,731
1945 .....	93,068	884,322	1950 .....	130,730	1,615,867
1946 .....	105,919	1,117,683	1951 .....	192,371	2,383,770
1947 .....	163,290	1,793,043	1952 .....	122,590	1,708,807
1948 .....	153,698	2,136,276	1953 .....	115,565	1,631,258

TABLE 61. Production of Manufactured Sodium Sulphate<sup>1</sup>, 1944-1953

Year	Salt cake		Year	Salt cake	
	Tons	Value		Tons	Value
	\$				\$
1944 .....	3,758	46,077	1949 .....	3,738	83,996
1945 .....	2,850	35,226	1950 .....	3,674	74,555
1946 .....	2,584	33,333	1951 .....	3,297	72,206
1947 .....	3,175	51,047	1952 .....	2,382	54,956
1948 .....	3,198	69,876	1953 .....	2,345	59,793

1. Salt cake produced as a by-product is not included.

TABLE 62. Imports of Sodium Sulphate, 1944-1953

Year	Salt cake		Glauber's salt	
	Tons	Value	Tons	Value
	\$			\$
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
1950 .....	15,705	201,260	2,256	62,996
1951 .....	19,432	340,740	3,234	102,930
1952 .....	19,576	313,739	4,577	122,294
1953 .....	32,802	516,863	5,493	150,263

TABLE 63. Exports of Sodium Sulphate, 1945-1953

Year	Long tons	Value	Year	Long tons	Value
		\$			\$
1945 .....	15,682	270,013	1950 .....	25,335	302,329
1946 .....	20,041	352,407	1951 .....	56,416	735,902
1947 .....	41,906	530,388	1952 .....	24,236	382,274
1948 .....	26,439	468,561	1953 .....	17,975	298,374
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 above in the "U.S. Imports for Consumption of Merchandise" by the U.S. Department of Commerce.

TABLE 64. Available Data on Consumption of Sodium Sulphate (Salt Cake) in Canada, by Industries, 1950-1953

Industry	1950	1951	1952	1953
Net tons				
Pulp and paper .....	114,494	141,640	113,322	125,332
Glass, including glass wool .....	1,412	1,587	1,976	2,662
Medicinals .....	31	28	25	20
Soaps .....	N/A	889	1,463	1,504
<b>Total accounted for .....</b>	<b>115,937</b>	<b>144,144</b>	<b>116,786</b>	<b>129,518</b>

### 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.

Sulphuric acid is made from the sulphur dioxide derived from the roasting of zinc concentrates at Arvida.

Pyrite is produced as a by-product in the treatment of copper ores at Quemont, East Sullivan, Waite-Amulet, Weedon Pyrite, Normetal 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, has done extensive work on a process for the recovery of elemental sulphur from pyrites, and mention has been made of plans for a commercial plant in the near future.

Elemental sulphur, amounting to 18,298 tons in 1953 and 8,931 tons in 1952, was produced by treating the hydrogen sulphide in sour natural gas in Alberta. For statistical purposes this is included in the manufacturing industries under sub-group absorption gasoline industry.

TABLE 65. Production of Sulphur<sup>1</sup>, 1944-1953

Year	Tons	Value	Year	Tons	Value
		\$			\$
1944 .....	248,088	1,755,739	1949 .....	261,871	2,039,384
1945 .....	250,114	1,881,321	1950 .....	301,172	2,189,660
1946 .....	234,771	1,784,666	1951 .....	371,790	3,120,785
1947 .....	221,781	1,822,867	1952 .....	423,788	3,851,183
1948 .....	229,463	1,836,358	1953 .....	358,850	3,172,698

1. Sulphur content of pyrites and of recovered smelter gases; does not include sulphur from natural gas.

**TABLE 66. Production of Pyrite with Sulphur Content, Including Sulphur Contained in Sulphuric Acid, etc., Made from Smelter Gases, 1951-1953**

-	Pyrite			Smelter gas		Total sulphur	
	Sales	Sulphur content		Sulphur content			
	Tons	Tons	Value	Tons	Value	Tons	Value
1951			\$		\$		\$
Quebec .....	335,000	161,489	895,253	—	—	161,489	895,253
Ontario .....	—	—	—	15,605	156,050	15,605	156,050
British Columbia .....	109,948	53,874	661,257	140,822	1,408,225	194,696	2,069,482
Canada .....	<b>444,948</b>	<b>215,363</b>	<b>1,556,510</b>	<b>156,427</b>	<b>1,564,275</b>	<b>371,790</b>	<b>3,120,785</b>
1952							
Quebec .....	...	...	1,567,953	—	—	—	1,567,953
Ontario .....	—	—	—	—	183,460	—	183,460
British Columbia .....	...	...	677,760	...	1,422,010	...	2,099,770
Canada .....	<b>553,987</b>	<b>263,241</b>	<b>2,245,713</b>	<b>160,547</b>	<b>1,605,470</b>	<b>423,788</b>	<b>3,851,183</b>
1953							
Quebec .....	...	...	1,211,343	—	—	...	1,211,343
Ontario .....	—	—	—	—	—	...	371,300
British Columbia .....	...	...	239,355	...	...	...	1,590,055
Canada .....	<b>408,257</b>	<b>186,650</b>	<b>1,450,698</b>	<b>153,919</b>	<b>1,539,190</b>	<b>358,850</b>	<b>3,172,698</b>

**TABLE 67. Available Data on the Consumption of Sulphur (Brimstone), 1949-1953**

-		1949	1950	1951	1952	1953
		Tons of 2,000 pounds				
(a) By industries:						
Pulp and paper .....	252,502	282,608	308,666	290,607	258,172	
Heavy chemicals .....	68,508	80,008	97,172	88,332	85,479	
Rubber goods .....	2,001	2,524	2,558	2,269	2,475	
Explosives .....	1,712	1,900	2,084	2,271	2,094	
Insecticides .....	2,333	4,114	1	1	1	
Adhesives .....	83	95	76	72	85	
Starch .....	241	268	292	328	256	
Fruit and vegetable preparations .....	185	76	—	5	4	
Sugar refining .....	153	213	377	171	358	
Petroleum refining .....	215	220	158	258	190	
Matches .....	71	64	1	1	1	
Miscellaneous chemicals .....	295	257	3,952	3,193	3,235	
Total accounted for .....	<b>328,302</b>	<b>372,347</b>	<b>415,335</b>	<b>387,506</b>	<b>352,348</b>	
(b) By provinces:						
Newfoundland .....	15,659	14,078	17,861	17,082	18,078	
Nova Scotia .....	6,233	5,769	6,339	6,493	6,086	
New Brunswick .....	35,731	38,399	40,237	35,819	34,718	
Quebec .....	115,475	128,962	136,474	136,267	111,884	
Ontario .....	125,223	149,624	169,392	145,972	136,895	
Manitoba and Saskatchewan .....	2,125	2,250	2,188	2,378	2,288	
Alberta .....	93	119	73	91	78	
British Columbia & Northwest Territories .....	27,763	33,146	42,771	43,404	42,321	
Canada .....	<b>328,302</b>	<b>372,347</b>	<b>415,335</b>	<b>387,506</b>	<b>352,348</b>	

1. Included in miscellaneous chemical industry.

**TABLE 68. Imports of Sulphur, 1944-1953**

Year	Tons	Value	Year	Tons	Value
		\$			\$
1944 .....	235,955	3,875,649	1949 .....	280,557	5,213,921
1945 .....	248,846	4,063,324	1950 .....	390,333	7,730,126
1946 .....	273,502	4,271,081	1951 .....	395,928	8,959,677
1947 .....	361,424	5,466,201	1952 .....	415,185	8,376,824
1948 .....	354,622	5,528,740	1953 .....	359,205	8,526,804

**TABLE 69. World Production of Pyrites (Including Cupreous Pyrites), by Countries<sup>1</sup>**  
 (Taken from the "Minerals Yearbook" of the United States Bureau of Mines).

Country <sup>1</sup>	1951		1952		1953	
	Gross weight	Sulphur content	Gross weight	Sulphur content	Gross weight	Sulphur content
Metric tons <sup>2</sup>						
North America:						
Canada .....	403,648	195,373	502,566	238,807	356,189	169,325
Cuba .....	—	—	10,161	4,613	50,803	24,600
United States .....	1,034,104	439,766	1,010,301	424,850	937,455	385,637
South America: Brazil .....	3	3	—	—	—	—
Europe:						
Austria .....	10,237	2,746	8,034	2,297	6,070	2,786
Czechoslovakia .....	3	3	3	3	3	3
Finland .....	232,546	98,790	244,926	104,886	259,587	111,000
France .....	280,558	123,446	294,414	129,542	298,000	131,120
Germany, West .....	533,530	194,616	527,932	191,768	529,983	192,078
Greece .....	180,120	88,200 <sup>4</sup>	201,238	98,600 <sup>4</sup>	225,134	112,600 <sup>4</sup>
Italy .....	898,186	404,100 <sup>4</sup>	1,141,417	513,638	1,225,368	551,416
Norway .....	696,049	295,621	712,616	307,179	740,000	320,000
Poland .....	3	3	3	3	3	3
Portugal .....	729,611	328,325	755,897	340,154	651,136	293,011
Romania <sup>4</sup> .....	3	3	3	3	3	3
Spain .....	2,004,126	962,000	2,378,607	1,142,000	1,786,548	857,500 <sup>4</sup>
Sweden .....	406,934	202,806	411,276	203,210	470,000 <sup>4</sup>	225,600 <sup>4</sup>
United Kingdom .....	13,501	5,400 <sup>4</sup>	15,836	6,400	3	3
Yugoslavia .....	153,779	69,600 <sup>4</sup>	188,129	84,866	173,003	78,300 <sup>4</sup>
Asia:						
China .....	3	3	3	3	3	3
Cyprus .....	959,838	460,722	1,072,568	515,025	1,001,572	482,195
India .....	539	234	2,203	945	281	120 <sup>4</sup>
Japan .....	2,250,784	904,815	2,628,357	1,053,971	2,343,260	937,304
Korea, Republic of .....	—	—	755	340 <sup>4</sup>	777	350 <sup>4</sup>
Taiwan (Formosa) .....	6,728	2,153	33,232	10,634	25,291	6,300 <sup>4</sup>
Turkey <sup>4</sup> .....	50,000	25,000	55,000	27,500	60,000	30,000
Africa:						
Algeria .....	31,450	13,838	24,010	10,564	29,760	13,100
French Morocco .....	1,949	877	2,025	871	2,037	917
Southern Rhodesia .....	28,269	12,156	19,053	8,193	36,665	15,766
Tunisia .....	—	—	—	—	—	—
Union of South Africa .....	33,378	14,474	31,141	13,410	93,844	36,841
Australia .....	153,818	72,589	201,902	95,070	169,687	79,060
<b>Total (estimate) .....</b>	<b>13,200,000</b>	<b>5,500,000</b>	<b>15,000,000</b>	<b>6,300,000</b>	<b>14,000,000</b>	<b>5,900,000</b>

1. In addition to countries listed, East Germany, Kenya, Korea, and U.S.S.R. produce or have produced pyrites, but production data are not available; estimates are included in total.

2. This table incorporates a number of revisions of data published in previous pyrites chapters.

3. Data not available; estimate included in total.

4. Estimate.

### 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 were mined from a deposit in Bagot township, Renfrew county, and after grinding in a small mill erected on the property were 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 were 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.

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 inter-growth of fluorspar, celestite, feldspar, quartz, mica, and pyrite.

## VERMICULITE

Vermiculite, a hydrated magnesian aluminum silicate, resembles mica closely but is softer and inelastic. Colours range from black through brown and dark green to almost colourless. Its principal characteristic is its ability to expand many times on heating, and in its expanded form it possesses low bulk density, low thermal conductivity, high heat resistance, chemical inertness, and acoustic properties. Vermiculite is generally regarded as a product of alteration and is usually associated with metamorphosed ultra-basic rocks.

There has been no production of vermiculite in Canada up to the present. Imports, all of which have been obtained from United States and South Africa, were valued at \$320,338 in 1952 and \$305,339 in 1951.

Known deposits of vermiculite in Canada are located at Stanleyville, near Perth, Ontario, and

at Blue River, Kamloops Mining Division, British Columbia.

The principal uses for vermiculite are loose insulation in buildings; concrete and plaster aggregate; lightweight fire-resistant and acoustic tile and wallboard; rooting medium; and soil amendment. It is also used in lubricants, dry chemicals, (as a diluent), combination refractory and insulating brick, as a pigment and extender in paint, and as decorative filler in wallpaper. Vermiculite has been used as fireproof deck covering and partitions on ships, as loose insulation in fire and sound-proof partitions in vehicles and aircraft, as filler for life jackets and in finely powdered forms, for oil-less bearings.

In 1953 there were 6 plants in Canada making insulation aggregates, etc., from imported vermiculite.

**TABLE 70. World Production of Vermiculite, by Countries**  
(Taken from the "Minerals Yearbook" by the United States Bureau of Mines).

Country <sup>1</sup>	1949	1950	1951	1952
Metric tons				
Australia .....	165	122	56	63
Egypt .....	—	—	637	60
India .....	—	53	236	2
Kenya .....	5	4	3	2
Southern Rhodesia .....	962	711	502	—
Union of South Africa .....	21,196	42,423	24,507	36,213
United States (sold or used by producers) .....	153,149	188,781	189,608	189,515
<b>Total</b> .....	<b>175,477</b>	<b>232,094</b>	<b>215,549</b>	<b>226,000<sup>3</sup></b>

1. In addition to countries listed, vermiculite is produced in Brazil and U.S.S.R. but data are not available, and no estimates are included in the total.

2. Data not available; estimate included in total.  
3. Estimate.

## 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 Industry, 1953

Name of operator	Head office address	Plant or mine location
<b>BARITE</b>		
<b>Nova Scotia:</b> Canadian Industrial Minerals Ltd..... Maritime Barytes Ltd.....	Walton ..... Brookfield .....	Walton Brookfield
<b>Quebec:</b> Beach, Mahlon W. <sup>1</sup> .....	Box 9, Barrie, Ontario .....	Woodbridge Twp.
<b>British Columbia:</b> Mountain Minerals Ltd. ....	Box 273, Lethbridge, Alberta .....	Bolden M.D.
<b>BRUCITE</b>		
<b>Quebec:</b> Aluminum Company of Canada Ltd.....	Sun Life Bldg., Montreal .....	Wakefield
<b>DIATOMITE</b>		
<b>Nova Scotia:</b> Wightman, Mrs. G.W. .....	Smith's Cove .....	Digby Co.
<b>Ontario:</b> P.B.S. Organic Minerals Ltd.....	153 Sheridan Ave., Toronto.....	McKee Twp.
<b>British Columbia:</b> Fairey and Co. <sup>1</sup> .....	661 Taylor St., Vancouver.....	Cariboo M.D., Vancouver
<b>FLUORSPAR</b>		
<b>Newfoundland:</b> Newfoundland Fluorspar Ltd..... St. Lawrence Corporation of Nfld., Ltd.....	Bank of Montreal Bldg., St. John's..... 120 Broadway, New York, U.S.A.....	St. Lawrence St. Lawrence
<b>Ontario:</b> Reliance Fluorspar Mining Synd. Ltd. .... Huntingdon Fluorspar Mines Ltd. ....	Madoc .....	Huntingdon Twp.
	Madoc .....	Huntingdon Twp.
<b>GARNET</b>		
<b>Ontario:</b> Niagara Garnet Co. <sup>1</sup> .....	c/o Wm. A. Yarwood, 8373 Krull Parkway, Niagara Falls, New York, U.S.A.	River Valley
<b>GRAPHITE</b>		
<b>Quebec:</b> Frobisher Limited <sup>1</sup> .....	25 King St. W., Toronto, Ontario .....	Buckingham Twp.
O, Clot Graphite Mines Co. Ltd. <sup>1</sup> .....	St. Jovite .....	Canton Joly
Steel and Graphite Co. Ltd. <sup>1</sup> .....	2270 Est Blvd. Gouin, Montreal .....	Papineau
<b>Ontario:</b> Frobisher Exploration Co. Ltd. ....	Black Donald Mines .....	Brougham Twp.
<b>GRINDSTONES</b>		
<b>New Brunswick:</b> Read, H.C. .... Bay of Chaleur Grindstone Co. ....	Bathurst .....	Stonehaven Gloucester Co.
1434 Ste-Catherine St. W., Montreal, Quebec		
<b>IRON OXIDE</b>		
<b>Quebec:</b> Argall, Mrs. Thomas H..... Girardin, Chas. D..... Leveille, Oscar .....	1695 boul. St-Louis, Trois-Rivières .....	Pointe-du-Lac
The Sherwin-Williams Co. of Canada .....	Yamachiche .....	Almaville en Haut
	791 Ste-Catherine, St-Louis de France .....	St-Louis de France
	2875 Centre St., Montreal .....	Red Mill, Champlain Co.
<b>LITHIUM MINERALS</b>		
<b>Quebec:</b> Canadian Lithium Co. Ltd. <sup>1</sup> .....	100 Adelaide St. W., Toronto, Ontario.....	Landrienne Twp.
LaCorne Lithium Mines Ltd. <sup>1</sup> .....	320 Bay St., Toronto, Ontario.....	LaCorne Twp.
<b>Manitoba:</b> Lithium Corp. of Canada Ltd. <sup>1</sup> .....	403 Avenue Bldg., Winnipeg .....	Bernic and Cat Lakes

## Directory of Firms in the Miscellaneous Non-metal Mining Industry, 1953 — Continued

Name of operator	Head office address	Plant or mine location
<b>MAGNESITE 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 ..... Eau Minérale Etoile..... Orange Crush Ltd. .... Lemay, Lucien ..... Gauthier, Charles ..... Montclair-Richelieu Spring Water Co. Ltd. .... Pellerin, Rolland ..... Paille, J.J. .... Sources Abenakis Springs Ltd. .... Source Columbia ..... Source d'eau Minérale Radnor ..... Usine d'Embouteillage Maski. ....	632 Concord Ave., St. Hyacinthe ..... Ste-Geneviève de Batiscan ..... 1590 O'Connor Drive, Toronto, Ontario.... St-François-du-Lac ..... Louiseville ..... 1521 Mountain St., Montreal ..... St. Barnabé Nord ..... Maskinongé ..... St-François-du-Lac ..... L'Epiphanie ..... St-Maurice ..... 60 Duplessis, Cap de la Madeleine .....	St. Hyacinthe Batiscan Varennes Nicolet Twp. St-Léon Chambly St. Maurice Maskinongé St-François-du-Lac L'Epiphanie St-Maurice St-Justin
<b>Ontario:</b> Carlsbad Springs, The..... Deneault, J.F. ....	Carlsbad Springs ..... Bourget .....	Gloucester Twp. Bourget
<b>MICA</b>		
<b>Quebec:</b> Bigelow, Gordon..... Blackburn Bros. Ltd. .... Burke, A. .... Caron, O. .... Cross, W.C. .... Cherney, John. .... Coté, W.L. .... Couture, T. .... Dominion Petroleum Co. Reg'd. .... Gagné, C. .... Larmond, E. .... Lusk, H. .... Lusk, R. .... Martel, C., & Lord, J.M. .... McAra, C. .... Mica Co. of Canada Ltd. .... Paiment, J.L. .... Poirier, C. .... Quevillon, J. .... Rainboth, J.E. .... Rousseau, Comé ..... Renaud, E. .... Scullion, I. .... Siscoe Vermiculite Mines Ltd. .... St-Amour, D. .... Thompson, M. .... Valley, P. .... Wallingford, A. .... Wallingford, E. .... Warwick & McClements .....	Glen Almond..... 85 Sparks St., Ottawa, Ontario ..... R.R. No. 1, Thurso ..... Pointe Comfort..... 209 Bridge St., Hull ..... Pointe Comfort..... 117 Filiatrault, Ville St-Laurent ..... Glen Almond..... 163 Laurier W., Ottawa, Ontario..... St-Michel de Wentworth ..... Buckingham ..... Luskville ..... Luskville ..... St. Odilon ..... Beachgrove ..... 2 Lois St., Hull..... Perkins ..... Wilson's Corners ..... Notre Dame de Sallete ..... 270 Fairmont Ave., Ottawa, Ontario ..... St-Rémi ..... Perkins ..... Billings Bridge ..... Cornwall, Ontario ..... Buckingham ..... Buckingham ..... Buckingham ..... Pointe Gatineau. .... Perkins ..... Glen Almond.....	Buckingham Twp. Cantley Papineau Blake  Cantley Wentworth Buckingham Templeton Wentworth Villeneuve Twp. Beachgrove Beachgrove Templeton Twp. Beachgrove  Papineau Wakefield Portland West Hull Argenteuil Cantley Templeton Suzar Twp. Buckingham Portland East Portland West South Hull Templeton Templeton  Perth Burgess N. Burgess Lanark N. Burgess Twp. North Burgess N. Burgess Kaladar Bedford Twp. Burgess Twp. Mattawa Twp. Burgess Twp. Mazanawa Buck Lake Lanark
<b>Ontario:</b> Buchanan, Geo. .... Burgess Mica Mine..... Brady, T.P. .... Cordick, H.V. .... Donnelly, J.C. .... Green, W.E. and E.C. .... Farrell, P. .... Johnson, M.F. .... Marks, Oliver, & Son ..... McGlade, W.A. .... North Bay Mica Co. .... Powers, Fred ..... Orser, C.C. .... Thompson, Frank ..... Watts, Weekes & Gibson .....	31 South St., Perth ..... Newboro ..... Perth ..... Perth ..... Stanleyville ..... Perth Road ..... Stanleyville ..... R.R. No. 1, Flinton ..... Sydenham ..... 8 Church St., Perth ..... 1060 Cassell St., North Bay ..... Stanleyville ..... Verona ..... Perth Road ..... 21 Isabella St., Perth .....	Perth Burgess N. Burgess Lanark N. Burgess Twp. North Burgess N. Burgess Kaladar Bedford Twp. Burgess Twp. Mattawa Twp. Burgess Twp. Mazanawa Buck Lake Lanark
<b>British Columbia:</b> Fairey & Co. ....	661 Taylor St., Vancouver.....	Vancouver

## Directory of Firms in the Miscellaneous Non-metal Mining Industry, 1953 — Concluded

Name of operator	Head office address	Plant or mine location
<b>PERLITE</b>		
<b>British Columbia:</b> Western Gypsum Products Ltd. ....	Childs Building, Winnipeg, Manitoba .....	Francois Lake
<b>PHOSPHATE</b>		
<b>Quebec:</b> Bigelow, Robert <sup>1</sup> ..... Blackburn Bros. Ltd. <sup>1</sup> ..... Quebec Smelting & Refining Ltd. <sup>1</sup> ..... Industrial Phosphate Mines Ltd. <sup>1</sup> .....	Buckingham ..... 85 Sparks St., Ottawa, Ontario ..... 215 St. James St. W., Montreal ..... 18 Toronto St., Toronto, Ontario .....	Bowman Twp. Perkins Notre Dame de la Salette Portland East Twp.
<b>Ontario</b> Ontario Phosphate Industries Ltd. <sup>1</sup> ..... McGlade, W.A. ....	Room 1101-62 Richmond St. W., Toronto 8 Church St., Ferth.....	Bedford Twp. Burgess Twp.
<b>SILICA BRICK</b>		
<b>Nova Scotia:</b> Dominion Steel & Coal Corp. Ltd. ....	Sydney .....	Sydney
<b>Ontario:</b> Algoma Steel Corp. Ltd. ....	Sault Ste. Marie .....	Sault Ste. Marie
<b>SODIUM CARBONATE (Natural)</b>		
<b>British Columbia:</b> Bishop, V.G. (Mrs.) <sup>1</sup> .....	c/o Boyd's Garage, Clinton.....	Clinton area
<b>SODIUM SULPHATE (Natural)</b>		
<b>Saskatchewan:</b> Ormiston Mining & Smelting Co. Ltd. .... Midwest Chemicals Ltd. .... Sybouts Sodium Sulphate Co. Ltd. .... Saskatchewan Minerals (Sodium Sulphate Div.)	Ormiston ..... Palo ..... Gladmar ..... Chaplin .....	Ormiston Whiteshore Lake Gladmar Chaplin
<b>SULPHUR (Pyrite and smelter gas)</b>		
<b>Quebec:</b> East Sullivan Mines Ltd. .... Quemont Mining Corp. Ltd. .... Noranda Mines Ltd. .... Normetal Mining Corp. Ltd. .... Waite-Amulet Mines Ltd. .... Weedon Pyrite & Copper Corp. Ltd. .... Sulgas Properties Ltd. ....	1604 Aldred Bldg., Montreal ..... 350 Bay St., Toronto, Ontario..... Royal Bank Bldg., Toronto, Ontario..... 44 King St. W., Toronto, Ontario .....	Bourlamaque Twp. Rouyn Twp. Noranda Normetal Duprat Twp. Weedon Ascot Twp.
<b>Ontario:</b> International Nickel Company of Canada Ltd. <sup>2</sup>	Copper Cliff .....	Copper Cliff
<b>British Columbia:</b> Consolidated Mining & Smelting Company of Canada Ltd. <sup>2</sup> Britannia Mining & Smelting Co. Ltd. ....	Trail .....	Trail
	Britannia Beach.....	Britannia Beach

1. Active but not producing.  
2. Recover sulphur from smelter gas.

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