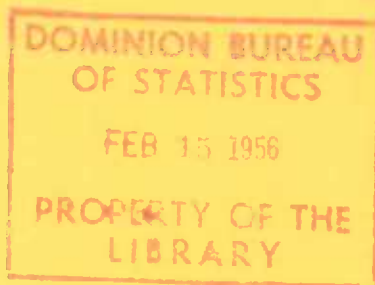


26-220

c.3



THE MISCELLANEOUS NON-METAL  
MINING INDUSTRY  
1954



DOMINION BUREAU OF STATISTICS  
Industry and Merchandising Division  
Mineral Statistics Section

DOMINION BUREAU OF STATISTICS

Industry and Merchandising Division

Mineral Statistics Section

# THE MISCELLANEOUS NON-METAL MINING INDUSTRY

1954

*Published by Authority of*

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

6502-625-124

Price 25 cents

Vol. 1—Part 1—O-1

## 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¢
- E - The Miscellaneous Metal Mining Industry, 25¢
- F - The Smelting and Refining Industry, 25¢
- G - The Coal Mining Industry, \$1.00
- H - The Crude Petroleum and Natural Gas Industry, 25¢
- I - The Asbestos Mining Industry, 25¢
- J - The Feldspar and Quartz Mining Industry, 25¢
- K - The Gypsum Industry, 25¢
- L - The Peat Industry, 25¢
- M - The Salt Industry, 25¢
- N - The Talc and Soapstone Industry, 25¢
- O - The Miscellaneous Non-metal Mining Industry, 25¢
- P - The Cement Manufacturing Industry, 25¢
- Q - The Clay and Clay Products Industry, 25¢
- R - The Lime Industry, 25¢
- S - The Sand and Gravel Industry, 25¢
- T - The Stone Industry, 25¢
- U - Contract Drilling in the Mining Industry, 25¢

## TABLE OF CONTENTS

	Page
Principal statistics.....	5
Arsenious oxide.....	7
Barite .....	9
Corundum .....	11
Diatomite .....	11
Fluorspar .....	13
Garnet .....	15
Graphite .....	15
Grindstones, Pulpstones and Scythestones (natural).....	17
Iron oxides (natural) .....	17
Lithia .....	20
Magnesite and Brucite .....	20
Magnesium sulphate (natural) .....	22
Mica.....	23
Mineral waters (natural).....	26
Perlite.....	27
Phosphate rock .....	27
Silica brick.....	30
Sodium carbonate (natural).....	30
Sodium sulphate (natural).....	30
Strontium.....	35
Sulphur .....	33
Vermiculite.....	36
Volcanic dust.....	36
Directory of firms .....	37

# THE MISCELLANEOUS NON-METAL MINING INDUSTRY

1954

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 1954 included barite, brucite, diatomite, fluorspar, graphite, grindstones, dolomitic magnesite, lithia, mineral waters, perlite, phosphate rock, silica brick, sodium carbonate and sodium sulphate.

During 1954 there were 30 operators who reported as having shipped some materials. The gross value of production was \$10,421,552 in 1954 compared with \$9,987,665 in the preceding year. Salaries and

wages paid to 1,343 employees amounted to \$4,839,822. Fuel cost \$1,159,513 and 22,969,414 kwh. of electricity were purchased for \$259,928. Process supplies cost \$934,193 and containers used were valued at \$268,054. Freight paid amounted to \$83,392.

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 of the Miscellaneous Non-metal Mining Industry, Significant Years<sup>1</sup> 1921-1954

Year	Establishments	Employees	Earnings	Cost of fuel and electricity	Cost of process supplies and containers	Gross value of production	Net value <sup>2</sup> of production
	No.	No.	\$	\$	\$	\$	\$
1921 .....	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1929 .....	38	506	545,216	79,463	"	1,502,574	"
1931 .....	34	275	297,394	205,149	"	1,247,697	"
1933 .....	36	297	241,999	176,512	"	913,380	"
1937 .....	53	530	658,723	321,919	228,953	1,687,317	1,136,445
1939 .....	47	465	539,143	260,652	133,705	1,358,922	964,565
1941 .....	62	683	878,700	482,043	315,521	2,442,748	1,645,184
1944 .....	52	865	1,500,250	706,929	462,999	3,986,579	2,797,719
1946 .....	43	911	1,582,846	822,546	493,642	4,248,107	2,859,009
1949 .....	37	1,160	2,632,808	1,011,021	576,919	6,236,811	4,461,930
1950 .....	42	1,121	2,640,013	1,048,111	797,858	6,709,579	4,821,324
1951 .....	39	1,359	3,699,789	1,471,290	1,063,878	8,914,360	6,209,886
1952 .....	42	1,535	4,257,845	1,327,929	1,169,297	9,299,130	6,679,777
1953 .....	40	1,405	4,168,645	1,261,364	1,161,201	9,987,665	7,505,860
1954 .....	47	1,343	4,839,822	1,419,441	1,202,247	10,421,552	77,116,472

1. During the years under review there have been changes in the methods of compilation. Some commodities have been added to this group and some commodities have been removed to form a separate classification.

2. Gross value of production, less the value of fuel, electricity, process supplies, containers and freight.

TABLE 2. Production of Miscellaneous Non-metallic Minerals, 1953 and 1954

Item		1953		1954	
		Quantity	Value	Quantity	Value
			\$		\$
Barite .....	tons	247, 227	2, 220, 292	221, 472	2, 003, 796
Diatomite .....	"	103	12, 150	4	192
Fluorspar .....	"	88, 569	2, 670, 585	118, 969	2, 987, 026
Garnet (schist) .....	—	—	—	—	—
Graphite .....	tons	3, 466	366, 528	2, 463	254, 534
Grindstones .....	"	15	900	—	—
Dolomitic-magnesite .....	—	—	2, 016, 640	—	1, 909, 163
Mineral waters .....	Imp. gal.	309, 585	165, 484	284, 078	148, 057
Perlite .....	tons	1, 112	11, 120	—	—
Silica brick .....	M	3, 720	712, 271	3, 578	465, 157
Sodium carbonate .....	—	—	—	—	—
Sodium sulphate .....	tons	115, 565	1, 681, 258	158, 417	2, 385, 573
<b>Total</b> .....	—	...	<b>9, 857, 228</b>	...	<b>10, 153, 498</b>
Lithia <sup>1</sup> .....	lb.	—	—	17, 052	6, 300
Sulphur <sup>2</sup> .....	tons	358, 850	3, 172, 698	532, 406	4, 875, 969
Arsenious oxide <sup>3</sup> .....	"	702	56, 150	590	48, 333
Titanium dioxide <sup>3</sup> .....	"	100, 527	4, 206, 496	88, 408	3, 841, 270
Iron oxides .....	"	10, 308	195, 801	5, 798	183, 507
Mica .....	"	1, 133	161, 128	853	85, 139

1. General statistics of lithia mines under development are included in miscellaneous non-metallic minerals, but the general statistics for the 1954 lithia production is included in tantalite-columbite mining.

2. 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 cop-per-gold mining and non-ferrous smelting industries.

3. General statistics relating to arsenious oxide and titanium dioxide are included with the smelting industry.

Note. Value of containers is excluded.

TABLE 3. Employees and Their Earnings in the Miscellaneous Non-metallic Mining Industry, 1950-1954

	Number of employees					Number of man-hours worked (all employees)	Earnings		
	Office and Administrative		Workmen		Total		Office and Adminis- trative	Workmen	Total
	Male	Female	Male	Female					
							\$	\$	\$
1950.....	122	18	978	3	1, 121	...	413,968	2, 226,045	2, 640,013
1951.....	119	13	1, 222	5	1, 359	3, 310,092	442,866	3, 256,923	3, 699, 789
1952.....	177	25	1, 327	6	1, 535	3, 270, 305	567,116	3, 690, 729	4, 257, 845
1953.....	126	20	1, 253	6	1, 405	3, 110, 359	543, 105	3, 625, 540	4, 168, 645
1954.....	145	17	1, 177	4	1, 343	2, 984, 543	574, 756	4, 265,066	4, 839, 822

TABLE 4. Workmen, by Months, in the Miscellaneous Non-metal Mining Industry, 1953 and 1954

Month	1953						1954					
	Mine			Mill		Total	Mine			Mill		Total
	Surface		Under-ground				Surface		Under-ground			
	Male	Female		Male	Female		Male	Female		Male	Female	
	Number						Number					
January .....	330	3	297	631	2	1, 263	352	2	279	537	2	1, 172
February .....	321	3	297	613	2	1, 236	325	2	293	512	2	1, 134
March .....	294	3	289	660	2	1, 248	316	2	316	518	2	1, 154
April .....	305	3	294	643	2	1, 247	303	2	322	453	2	1, 082
May .....	380	3	276	604	2	1, 265	319	2	332	415	2	1, 070
June .....	391	3	276	617	2	1, 288	327	2	340	469	2	1, 140
July .....	398	3	297	560	2	1, 260	360	2	330	506	2	1, 200
August .....	380	3	308	546	2	1, 239	388	2	322	556	2	1, 270
September .....	375	3	303	605	3	1, 289	419	2	338	528	2	1, 289
October .....	371	3	310	582	3	1, 269	412	2	301	493	2	1, 210
November .....	373	3	315	546	2	1, 239	481	2	368	517	2	1, 370
December .....	345	3	315	552	2	1, 217	425	2	373	494	2	1, 296
Average .....	357	3	298	598	3	1, 259	351	2	326	500	2	1, 181
Total man-hours worked						2,812,765						2,708,339



## ARSENIOUS OXIDE

Shipments of arsenious oxide during 1954 amounted to 1,180,350 pounds valued at \$48,333. 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. In 1954 the Cobalt Chemical Division of Quebec Metallurgical Industries Ltd. recovered arsenic from cobalt-silver ores at Cobalt, Ontario.

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 5. Production, Imports and Exports of Arsenic, 1953 and 1954

	1953		1954	
	Quantity	Value	Quantity	Value
	lb.	\$	lb.	\$
Production:				
White arsenic (crude and refined) <sup>1</sup> .....	1,403,740	56,150	1,180,350	48,333
Imports:				
Arsenic acid .....	1,126,802	40,181	1,099,314	38,641
Arsenious oxide and arsenic sulphide .....	32,233	5,881	—	—
Sodium arsenate and sodium stannate .....	137,798	41,650	109,772	27,343
Arsenate of lead .....	44,832	8,517	98,168	16,447
Arsenate of lime .....	236,672	15,888	110,000	6,050
Exports:				
Arsenic <sup>2</sup> .....	935,300	39,675	1,422,600	58,871

1. Includes some arsenic recovered from foreign ores.

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

TABLE 6. Production, Imports and Exports of White Arsenic, 1945-1954

Year	Production, crude and refined, but no duplication	Imports <sup>1</sup>	Exports	
			Refined	Crude
	Pounds			
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	—
1954.....	1, 180, 350	—	1, 422, 600	—

1. Arsenious oxide and arsenic sulphide.

TABLE 7. 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 8. World Production of White Arsenic, by Countries  
(Taken from the "Minerals Yearbook", by the United States Bureau of Mines)

Country <sup>1</sup>	1950	1951	1952	1953	1954
	Short tons <sup>2</sup>				
North America:					
Canada.....	397	1,177	854	702	222
Mexico.....	9,906	14,072	3,159	2,204	2,675
United States.....	13,273	16,190	15,673	10,873	13,167
South America:					
Argentina.....	3	3	3	3	3
Brazil.....	1,176	1,456	1,062	411	3
Peru.....	—	—	17	—	3
Europe:					
Austria.....	3	3	3	3	3
Belgium (exports).....	2,104	358	1,106	1,903	1,979
France.....	3,864	5,844	6,934	6,217	3
Germany East.....	3	3	3	3	3
West (exports).....	1,239	3,862	122	675	239
Greece.....	36	62	97	68	3
Italy.....	800	1,754	2,209	1,179	3
Portugal.....	281	618	1,452	1,301	661
Spain.....	175	332	173	60	3
Sweden.....	15,997	20,427	17,189	3	3
United Kingdom.....	3	3	3	3	3
Asia:					
Iran <sup>4</sup> .....	28	—	—	—	3
Japan.....	1,463	1,515	1,545	1,576	3
Africa:					
Southern Rhodesia.....	126	84	568	417	459
Union of South Africa.....	—	—	—	—	—
Oceania:					
Australia.....	180	134	134	—	—
New Zealand.....	11	—	—	—	—
<b>Total (estimate)<sup>1</sup>.....</b>	<b>52,000</b>	<b>69,000</b>	<b>54,000</b>	<b>45,000</b>	<b>50,000</b>

1. Arsenic is also believed to be produced in China, Czechoslovakia, Hungary 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.



## BARITE

Shipments of barite from Canadian mines in 1954 amounted to 221,472 tons valued at \$2,003,796 compared with 247,227 tons worth \$2,220,292 in 1953. 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 9. Production of Barite, 1945-1954

Year	Short tons	Value	Year	Short tons	Value
		\$			\$
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
1949 .....	47,138	557,662	1954 .....	221,472	2,003,796

TABLE 10. Imports of Barite, 1945-1954

Year	Tons	Value	Year	Tons	Value
		\$			\$
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
1949 .....	934	32,269	1954 .....	1,236	39,264

TABLE 11. 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 .....	4,132	4,648	3,927	4,154
<b>Total accounted for .....</b>	<b>4,132</b>	<b>4,648</b>	<b>3,927</b>	<b>4,154</b>

**TABLE 12. 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>				
<b>North America:</b>					
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>
<b>South America:</b>					
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>
<b>Europe:</b>					
Austria .....	8,260	10,119	9,645	5,160	1,920
France .....	30,295	28,609	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
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 .....	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>
<b>Asia:</b>					
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>
<b>Africa:</b>					
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>
<b>Australia .....</b>	<b>5,552</b>	<b>6,028</b>	<b>6,277</b>	<b>5,023</b>	<b>5,563</b>
<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 1954 amounted to 4 tons. In 1953 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 13. Production of Diatomite, 1945-1954

Year	Short tons	Value	Year	Short tons	Value
		\$			\$
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
1949.....	60	1,703	1954.....	4	192

TABLE 14. Consumption of Infusorial Earth in the Sugar Refining Industry, 1945-1954

Year	Tons	Value	Year	Tons	Value
		\$			\$
1945.....	1,992	102,961	1950.....	2,989	205,856
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	128,658
1949.....	2,871	187,508	1954.....	1,871	126,414

TABLE 15. Consumption of Diatomaceous Earth in the Manufacture of Fertilizers, 1950-1954

Year	Tons	Value
		\$
1950.....	7,861	344,461
1951.....	7,352	350,685
1952.....	7,683	371,124
1953.....	8,643	427,881
1954.....	9,384	448,533

TABLE 16. Imports of Diatomaceous Earth, 1945-1954

Year	Tons	Value	Year	Tons	Value
		\$			\$
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
1949.....	16,914	551,954	1954.....	19,373	664,016

TABLE 17. 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
<b>Total (estimate).....</b>	<b>480,000</b>	<b>480,000</b>	<b>580,000</b>	<b>590,000</b>	<b>600,000</b>

1. Diatomaceous earth is 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 1951-1953.

3. Data not available; estimate included in total.

4. Estimate.



## FLUORSPAR

Shipments of fluorspar by Canadian producers during 1954 amounted to 118,969 tons valued at \$2,987,026 compared with 88,569 tons worth \$2,670,585 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 18. Principal Statistics of the Fluorspar Mining Industry, Significant Years 1921-1954

Year	Establishments	Employees	Earnings	Cost of fuel and electricity	Cost of process supplies and containers	Gross value of production	Net value <sup>1</sup> of production
	No.	No.	\$	\$	\$	\$	\$
1921 .....	3	81	29,422	13,181	N.A.	136,267	N.A.
1929 .....	2	42	40,414	...	"	268,120	"
1931 .....	1	...	...	...	"	620	"
1933 .....	2	2	310	—	"	1,064	"
1937 .....	1	2	1,500	—	20	2,550	2,530
1939 .....	2	15	12,376	544	450	4,995	4,001
1941 .....	5	60	63,563	15,449	7,831	97,767	74,487
1944 .....	10	78	102,331	14,869	10,148	217,701	192,684
1946 .....	4	72	91,674	16,648	9,729	237,491	211,114
1949 <sup>2</sup> .....	5	314	632,164	139,205	48,785	1,592,908	1,404,918
1950 .....	5	332	726,504	146,433	60,926	1,553,004	1,345,645
1951 .....	5	403	1,058,548	156,330	85,179	2,189,875	1,873,357
1952 .....	4	510	1,329,523	177,468	118,194	2,523,408	2,173,398
1953 .....	3	485	1,378,010	205,621	187,240	2,670,585	2,277,724
1954 .....	3	430	1,528,769	165,694	185,618	2,987,026	2,634,026

1. Gross value of production, less the value of fuel, electricity, process supplies, containers and freight.

2. Newfoundland joined confederation.

TABLE 19. Production of Fluorspar, 1945-1954

Year	Short tons	Selling value f.o.b. works	Year	Short tons	Selling value f.o.b. works
		\$			\$
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
1949 .....	64,477	1,592,908	1954 .....	118,969	2,987,026

TABLE 20. Imports of Fluorspar, 1945-1954

Year	Tons	\$	Year	Tons	\$
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
1949 .....	2,510	81,650	1954 .....	16,240	382,935



TABLE 21. 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
<b>Total accounted for .....</b>	<b>52,137</b>	<b>57,526</b>	<b>68,748</b>	<b>83,116</b>
(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
<b>Total accounted for .....</b>	<b>52,137</b>	<b>57,526</b>	<b>68,748</b>	<b>83,116</b>

TABLE 22. 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
<b>Total North America .....</b>	<b>328,997</b>	<b>397,524</b>	<b>448,897</b>	<b>563,082</b>	<b>536,233</b>
South America:					
Argentina (shipments) .....	2	2	2	2	2
Bolivia (exports) .....	264	61	38	80	19
Brazil .....	537	600 <sup>3</sup>	2	—	—
<b>Total South America<sup>3</sup> .....</b>	<b>3,000</b>	<b>3,000</b>	<b>3,000</b>	<b>3,000</b>	<b>3,000</b>
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
<b>Total Europe<sup>3</sup> .....</b>	<b>286,000</b>	<b>330,000</b>	<b>452,000</b>	<b>501,000</b>	<b>624,000</b>
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
<b>Total Asia<sup>3</sup> .....</b>	<b>84,000</b>	<b>101,000</b>	<b>95,000</b>	<b>100,000</b>	<b>123,000</b>
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
<b>Total Africa .....</b>	<b>5,893</b>	<b>7,508</b>	<b>15,138</b>	<b>20,482</b>	<b>24,928</b>
Australia .....	571	585	497	87	308
<b>World total (estimate) .....</b>	<b>710,000</b>	<b>840,000</b>	<b>1,015,000</b>	<b>1,190,000</b>	<b>1,310,000</b>

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 1954 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. This mine closed during the spring of 1954. A small quantity was shipped from a Quebec mine.

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 23. Producers' Shipments of Graphite, 1945-1954

Year	Short tons	\$	Year	Short tons	\$
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
1949.....	2,147	212,496	1954.....	2,462	254,534

TABLE 24. Imports and Exports of Graphite<sup>1</sup>, 1952-1954

	1952	1953	1954
	\$	\$	\$
Imports:			
Plumbago, not ground .....	97,658	125,740	54,385
Crucibles, plumbago, and covers .....	213,429	217,066	156,516
Plumbago, ground, and manufactures of .....	434,650	481,982	548,824
Exports:			
Graphite, crude and refined .....	191,563	320,688	199,612
Carbon and graphite electrodes .....	2,824,885	1,383,851	1,251,411

1. Includes artificial graphite.

TABLE 25. 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	143,968	138,379	108,870
Electrical apparatus .....	692,000	619,862	700,619	586,397
Heavy chemicals .....	535,000	663,236	617,644	635,134
Prepared foundry facings .....	440,000	445,781	113,556	435,740
Polishes .....	66,000	47,978	45,415	20,859
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 .....				
New Brunswick .....	2,000	2,831	2,119	4,986
Quebec .....	948,000	1,314,416	927,158	1,184,491
Ontario .....	3,234,000	3,518,310	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 26. World Production of Natural Graphite, by Countries

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

Country <sup>1</sup>	1950	1951	1952	1953	1954
	Short tons <sup>2</sup>				
North America:					
Canada .....	3,586	1,569	2,040	3,466	1,626
Mexico .....	27,145	36,691	26,623	33,433	24,013
United States .....	5,102	7,135	5,606	6,281	3
South America:					
Argentina .....	5	5	5	5	5
Brazil .....	519	672	938	—	5
Europe:					
Austria .....	16,187	20,092	21,728	16,185	19,184
Czechoslovakia .....	5	5	5	5	5
Germany, West .....	7,234	11,970	9,880	8,222	10,448
Italy .....	4,984	4,976	4,837	5,412	4,139
Norway .....	2,708	3,806	4,542	3,255	3,993
Spain .....	342	302	863	352	320 <sup>4</sup>
Sweden .....	—	—	—	—	—
Yugoslavia .....	—	—	757	—	—
Asia:					
Ceylon (exports) .....	14,363	14,136	8,578	8,084	8,548
China .....	—	—	—	220	2,061
Hong Kong .....	—	—	—	859	5
India .....	1,776	1,944	2,405	4,889	4,431
Japan .....	4,418	5,370	5,126	21,416	15,344
Korea, Republic of .....	18,058	26,074	16,601	—	5
Taiwan (Formosa) .....	5	5	772	—	5
Africa:					
Egypt .....	—	—	—	—	—
French Morocco .....	82	144	23	108	—
Kenya .....	—	—	39	205	224
Madagascar .....	15,447	20,214	20,368	14,847	13,284
Mozambique .....	—	265	—	—	5
South West Africa .....	1,521	2,895	1,305	—	44
Spanish Morocco .....	3	—	19	—	5
Tanganyika .....	—	28	—	21	—
Union of South Africa .....	269	362	389	413	1,396
Australia .....	162	52	89	17	5
<b>Total world (estimate)<sup>1</sup> .....</b>	<b>175,000</b>	<b>220,000</b>	<b>205,000</b>	<b>200,000</b>	<b>185,000</b>

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

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

3. Production included in total; Bureau of Mines not at liberty to publish separately.

4. Estimate.

5. Data not available; estimate included in total.

## 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 1954 the shipments of grindstones was nil compared with 15 tons valued at \$900 in the preceding year.

TABLE 27. Production of Grindstones, Pulpstones and Scythestones, 1945-1954

Year	Tons	\$	Year	Tons	\$
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
1949 .....	195	12,450	1954 .....	—	—

TABLE 28. Purchases of Pulpstones by the Canadian Pulp and Paper Industry, 1946-1954

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
1954 .....	78	120,549	18	41,158	201	703,596

## IRON OXIDES

Ochreous iron oxides shipped during 1954 amounted to 5,798 tons valued at \$183,507 compared with 10,308 tons valued at \$195,801 in 1953. 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 was used for the purification of illuminating gas.



TABLE 29. Principal Statistics of The Natural Iron Oxides Industry, Significant Years, 1921-1954

Year	Estab- lish- ments	Em- ployees	Earnings	Cost of- fuel and electricity	Cost of process supplies and containers	Gross value of products	Net value <sup>1</sup> of production
	No.	No.	\$	\$	\$	\$	\$
1921 .....	4	32	42,693	10,858	N.A.	93,610	N.A.
1929 .....	4	48	47,324	13,564	"	115,932	"
1931 .....	4	30	29,194	8,560	"	49,205	"
1933 .....	4	22	15,631	5,755	"	53,450	"
1937 .....	6	50	35,368	13,368	510	83,640	69,762
1939 .....	7	38	26,916	8,094	100	88,418	80,224
1941 .....	4	44	42,152	15,697	5,697	142,069	120,675
1944 .....	6	55	49,876	19,115	6,700	150,250	112,765
1946 .....	5	60	77,727	16,656	4,200	152,268	116,251
1949 .....	8	44	73,111	20,692	4,424	207,887	167,481
1950 .....	6	44	70,404	22,405	3,049	262,632	225,272
1951 .....	5	43	87,283	22,896	3,651	262,277	219,852
1952 .....	4	45	93,423	25,166	840	194,922	153,055
1953 .....	4	37	83,095	23,776	2,250	195,801	152,958
1954 .....	3	31	67,564	21,822	3,904	186,856	150,871

1. Gross value of production, less the value of fuel, electricity, process supplies, containers and freight.

TABLE 30—Production of Natural Iron Oxides, 1945-1954

Year	Quantity	Value	Year	Quantity	Value
	Short tons	\$		Short tons	\$
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
1949 .....	13,625	207,887	1954 .....	5,798	183,507

TABLE 31. Imports and Exports of Ochres and Colours, 1953 and 1954

	1953		1954	
	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$
Imports:				
Ochres, ochrey earths, siennas and umbers .....	1,171	71,564	1,052	61,418
Oxides, fireproofs, rough stuff, fillers and colours, dry, n.o.p.	5,258	3,869,255	4,443	3,237,811
Exports:				
Iron oxides .....	3,048	359,886	3,111	421,535



TABLE 32. Consumption of Iron Oxides in Specified Canadian Industries, 1950-1954

Year	Coke and gas		Paints and varnishes			
			Iron oxide pigments		Ochres, siennas and umbers	
	Quantity Tons <sup>1</sup>	Value \$	Quantity Tons	Value \$	Quantity Tons	Value \$
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
1954 .....	9,167	100,240	2,190	389,588	212	52,691

1. Oxide and purifying materials.

TABLE 33. Employees and Their Earnings in the Natural Iron Oxides Industry, 1950-1954

	Number of employees					Number of man-hours worked (all employees )	Earnings		
	Office and administrative		Workmen		Total		Office and Adminis- trative	Workmen	Total
	Male	Female	Male	Female					
							\$	\$	\$
1950 .....	4	1	39	—	44	...	8,737	61,667	70,404
1951 .....	4	1	38	—	43	89,940	12,864	74,419	87,283
1952 .....	4	1	40	—	45	82,854	14,489	78,934	93,423
1953 .....	1	1	35	—	37	72,008	6,273	76,822	83,095
1954 .....	2	1	28	—	31	55,327	9,661	57,903	67,564

TABLE 34. Workmen in the Natural Iron Oxides Industry, by Months, 1953 and 1954

Month	1953					1954				
	Quarry		Mill		Total	Quarry		Mill		Total
	Male	Female	Male	Female		Male	Female	Male	Female	
	Number									
January .....	16	—	20	—	36	7	—	18	—	25
February .....	6	—	19	—	35	2	—	16	—	18
March .....	2	—	19	—	21	—	—	17	—	17
April .....	2	—	12	—	14	—	—	13	—	13
May .....	16	—	20	—	36	10	—	20	—	30
June .....	22	—	21	—	43	14	—	20	—	34
July .....	21	—	22	—	43	16	—	19	—	35
August .....	22	—	21	—	43	17	—	18	—	35
September .....	20	—	22	—	44	19	—	16	—	35
October .....	21	—	20	—	38	16	—	18	—	34
November .....	22	—	20	—	40	14	—	12	—	26
December .....	21	—	20	—	35	14	—	17	—	31
Average .....	15	—	20	—	35	11	—	17	—	28
Man-hours of labour.....	68,608					49,727				

## 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 temperature. 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.

In 1954 Boreal Rare Metals exported amblygonite from the Hearn Channel property in the Northwest Territories. The shipment contained about 17,000 pounds of lithia valued at \$6,300. There had 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 35. Production of Magnesitic Dolomite, 1945-1954

Year	Value	Year	Value
	\$		\$
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>
1949.....	1,536,200	1954.....	4,394,280 <sup>1</sup>

1. Includes some metallic magnesium.

Note. Above figures include the value of brucite shipped.

TABLE 36. Magnesite and Dolomite Used in the Canadian Primary Iron and Steel Industry, 1950-1954

Year	Calcined dolomite		Dolomite, crude		Magnesite	
	Short tons	Value	Short tons	Value	Short tons	Value
		\$		\$		\$
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
1954.....	48,266	1,165,247	355,505	673,437	9,940	546,026

**TABLE 37. 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
Total (estimate) .....	2,700,000	3,000,000	3,800,000	3,800,000	4,000,000

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 38. 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 39. Production of Natural Magnesium Sulphate<sup>1</sup>, 1941-1954

Year	Tons	Value
		\$
1941.....	265	7,343
1942.....	1,140	38,760
1943-1954.....	—	—

1. Produced entirely in British Columbia.

TABLE 40. Imports of Magnesium Sulphate, 1945-1954

Year	Tons	Value	Year	Tons	Value
		\$			\$
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
1949.....	2,783	120,881	1954.....	2,365	70,374

TABLE 41. 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	—	—
<b>Total accounted for.....</b>	<b>1,366</b>	<b>1,241</b>	<b>1,254</b>	<b>1,762</b>

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 42. Principal Statistics of the Mica Mining Industry, Significant Years, 1921-1954

	Establish- ments	Employees	Earnings	Cost of fuel and electricity	Cost of process supplies and containers	Gross value of production	Net value <sup>1</sup> of production
	No.	No.	\$	\$	\$	\$	\$
1921.....	20	104	74,432	4,404	N.A.	70,063	N.A.
1929.....	14	83	47,362	355	"	118,549	"
1931.....	11	28	22,556	444	"	54,066	"
1933.....	15	41	25,007	80	"	49,284	"
1937.....	34	199	97,547	3,768	13,778	133,731	116,185
1939.....	61	224	112,653	7,570	11,444	147,321	128,307
1941.....	81	246	181,800	17,705	21,824	335,288	295,759
1944.....	70	178	359,797	23,586	33,038	841,026	784,402
1946.....	27	129	153,616	20,308	17,778	199,039	160,953
1949.....	34	96	115,667	14,490	6,026	108,458	87,942
1950.....	26	100	136,727	18,620	28,768	252,611	205,223
1951.....	31	138	182,033	14,580	18,148	447,650	414,922
1952.....	28	115	168,176	15,674	19,140	194,106	159,292
1953.....	44	105	152,284	14,811	11,540	161,128	134,777
1954.....	32	44	59,194	7,778	6,154	85,139	71,207

1. Gross value of production, less the value of fuel, electricity, process supplies, containers and freight.

TABLE 43. Mica Production (Primary Sales), by Classes, 1953 and 1954

Grade	1953		1954	
	Pounds	Total value f.o.b. shipping point	Pounds	Total value f.o.b. shipping point
		\$		\$
Rough, mine-run or rifted .....	62,744	5,310	11,416	1,495
Mica sold for mechanical splitting .....	168,537	30,521	40,150	8,841
Splittings .....	8,289	16,568	1,901	3,551
Ground or powdered.....	664,741	25,236	937,076	44,057
Scrap, mine or shop waste and mica mined and sold for grinding.....	1,284,334	16,597	687,205	8,571
Trimmed mica.....	50,933	65,949	18,939	17,811
Unclassified.....	25,550	947	10,083	813
<b>Total mica shipments .....</b>	<b>2,265,128</b>	<b>161,128</b>	<b>1,706,770</b>	<b>85,139</b>
Varieties:				
Phlogopite mica (amber) and biotite.....	1,863,130	106,767	1,440,770	82,546
Muscovite mica (white) and schist.....	401,998	54,361	266,000	2,593

TABLE 44. Production of Mica, by Provinces and by Varieties, 1954

Province	Phlogopite and biotite		Muscovite and schist		Total	
	Pounds	Value	Pounds	Value	Pounds	value
		\$		\$		\$
Quebec.....	1,303,562	78,351	—	—	1,303,562	78,351
Ontario.....	137,208	4,195	—	—	137,208	4,195
British Columbia .....	—	—	266,000	2,593	266,000	2,593
<b>Total Canada .....</b>	<b>1,440,770</b>	<b>82,546</b>	<b>266,000</b>	<b>2,593</b>	<b>1,706,770</b>	<b>85,139</b>



TABLE 45. Production of Mica, 1945- 1954

Year	Short tons	\$	Year	Short tons	\$
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
1949 .....	1,745	108,458	1954 .....	853	85,139

TABLE 46. Imports and Exports of Mica, 1952- 1954

	1952		1953		1954	
	Pounds	Value	Pounds	Value	Pounds	Value
Imports:		\$		\$		\$
Mica, unmanufactured .....	—	—	—	—	232,700	87,215
Mica, manufactures of, n.o.p. ....	...	728,889	...	719,544	...	365,990
Exports:						
Mica, scrap and waste .....	889,000	8,434	1,354,700	19,583	453,600	6,241
Mica splittings .....	3,500	5,089	—	—	—	—
Mica manufactures .....	...	363	...	123	...	2,847
Mica, rough, untrimmed .....	178,800	31,319	240,500	43,704	60,200	12,647
Mica, trimmed .....	50,600	85,634	79,400	93,560	17,400	21,583
Mica, ground .....	440,400	26,020	320,000	19,158	240,000	13,319
Total mica exports reported .....	...	156,859	...	176,128	...	56,637

TABLE 47. 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 48. 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	11,182
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	23
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 .....	1,085	1,357	1,774	2,663	1,943
Australia <sup>6</sup> .....	736	738	536	501	446
Total (estimate) <sup>1</sup> .....	70,000	105,000	125,000	120,000	115,000

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 ton.

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 49. Employees and Their Earnings in the Mica Mining Industry, 1950-1954

Year	Number of employees					Number of man-hours worked (all employees)	Earnings		
	Office and administrative		Workmen		Total		Office and adminis- trative	Workmen	Total
	Male	Female	Male	Female					
							\$	\$	\$
1950.....	8	2	56	34	100		27,999	108,728	136,727
1951.....	2	1	81	54	138	261,892	2,673	179,360	182,033
1952.....	1	1	68	45	115	237,064	2,035	166,141	168,141
1953.....	3	2	69	31	105	205,419	8,396	143,888	152,284
1954.....	1	1	36	6	44	77,423	3,550	55,644	59,194

TABLE 50. Workmen in the Mica Mining Industry, by Months, 1953 and 1954

Month	1953					1954				
	Mine		Mill or shop		Total	Mine		Mill or shop		Total
	Male	Female	Male	Female		Male	Female	Male	Female	
	Number									
January .....	38	—	21	28	87	17	2	11	3	33
February .....	39	—	22	28	89	25	2	14	4	45
March .....	45	—	24	29	98	26	2	14	4	46
April .....	49	—	24	29	102	22	—	15	3	40
May .....	55	3	31	27	116	28	—	9	3	40
June .....	48	3	27	42	120	33	—	9	6	48
July .....	47	3	26	46	122	36	—	8	12	56
August .....	43	3	26	45	117	33	—	6	11	50
September .....	39	3	45	18	105	29	—	6	10	45
October .....	33	3	25	7	68	26	—	6	5	37
November .....	20	3	25	4	52	21	—	4	1	26
December .....	15	3	18	4	40	15	—	3	—	18
Average .....	45	2	25	28	100	27	1	9	5	42
Total man - hours worked.....	199,699					74,515				

## NATURAL MINERAL WATERS

Most of the bottled natural mineral waters are obtained from springs in Quebec. Among the larger producers are Orange Crush Limited at Varennes, Sources Abenakis Ltee at St-Francois du Lac, Eau Minerale Naturelle St-Leon at St-Leon and Usine d'Embouteillage Maski Engr. at St-Justin.

The directory at the end of this bulletin gives the location of other springs of natural mineral waters.

There were 13 firms reporting production of natural mineral waters in the Dominion in 1954. Eleven of these firms were in Quebec and 2 in Ontario.

TABLE 51. Shipments of Natural Mineral Waters from Canadian Springs, 1945 - 1954

Year	Quebec		Ontario		Canada	
	Imp. gal.	Value	Imp. gal.	Value	Imp. gal.	Value
		\$		\$		\$
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
1954.....	282,078	147,307	2,000	750	284,078	148,057

### 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, during 1953. There was no production reported in 1954.

### 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 52. Production of Phosphate Rock, 1945-1954

Year	Short tons	Value	Year	Short tons	Value
		\$			\$
1945 .....	299	4,356	1950 .....	129	1,070
1946 .....	57	869	1951 .....	6	94
1947 .....	—	—	1952 .....	—	—
1948 .....	—	—	1953 .....	—	—
1949 .....	20	291	1954 .....	—	—

TABLE 53. Imports of Phosphate Rock, 1945-1954

Year	Short tons	Value	Year	Short tons	Value
		\$			\$
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
1949 .....	620,808	3,879,523	1954 .....	644,860	4,577,633

TABLE 54. 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
<b>Total .....</b>	<b>485,933</b>	<b>518,918</b>	<b>511,086</b>	<b>512,090</b>
(b) By provinces:				
Prince Edward Island .....	190	130	489	410
Nova Scotia .....	223	318		
New Brunswick .....	373	408		
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
<b>Canada .....</b>	<b>485,933</b>	<b>518,918</b>	<b>511,086</b>	<b>512,090</b>



TABLE 55. 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>4</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>4</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>4</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
<b>Total (estimate) .....</b>	<b>19,850,000</b>	<b>22,800,000</b>	<b>24,000,000</b>	<b>25,500,000</b>	<b>25,500,000</b>

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 56. Production of Silica Brick, 1945 - 1954**

Year	M	Value	Year	M	Value
		\$			\$
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
1949.....	3,663	453,797	1954.....	3,578	465,157

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 57. Production of Sodium Carbonate (Natural), 1945 - 1954**

Year	Tons	Value	Year	Tons	Value
		\$			\$
1945.....	286	3,146	1950.....	—	—
1946.....	—	—	1951.....	—	—
1947.....	163	1,793	1952.....	—	—
1948.....	—	—	1953.....	—	—
1949.....	47	513	1954.....	—	—

**SODIUM SULPHATE (NATURAL)**

Natural sodium sulphate was obtained from the brine lakes in Saskatchewan. During 1954 the shipments amounted to 158,417 tons valued at \$2,385,573 compared with 115,565 tons valued at \$1,631,258 in 1953.

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 58. Principal Statistics of the Sodium Sulphate Mining Industry, Significant Years, 1921-1954

Year	Establishments	Employees	Earnings	Cost of fuel and electricity	Cost of process supplies and containers	Gross value of production	Net value <sup>1</sup> of production
	No.	No.	\$	\$	\$	\$	\$
1921.....	2	N.A.	N.A.	N.A.	N.A.	18,850	N.A.
1929.....	3	29	46,637	32,038	"		"
1931.....	5	83	101,026	144,512	"	267,863	"
1933.....	7	116	92,065	135,546	"	485,416	"
1937.....	6	122	153,181	159,673	26,459	618,028	431,896
1939.....	7	102	136,416	146,692	32,917	628,151	448,542
1941.....	7	125	193,298	231,964	50,128	931,554	649,462
1944.....	6	158	264,004	253,043	39,722	987,842	695,077
1946.....	4	167	251,887	254,450	66,423	1,118,783	797,910
1949.....	5	212	492,277	399,355	58,891	1,616,631	1,158,385
1950.....	6	181	470,894	431,040	97,062	1,620,639	1,092,537
1951.....	5	225	671,878	662,601	113,806	2,391,813	1,615,406
1952.....	5	223	619,257	471,176	75,413	1,711,907	1,165,318
1953.....	4	157	478,374	291,639	77,923	1,685,148	1,315,586
1954.....	4	173	553,911	449,207	78,819	2,394,473	1,866,447

1. Gross value of production, less the value of fuel, electricity, process supplies, containers and freight.

TABLE 59. Production of Natural Sodium Sulphate, 1945 - 1954

Year	Short tons	Selling value f.o.b. shipping points	Year	Short tons	Selling value f.o.b. shipping points
		\$			\$
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
1949.....	120,259	1,614,731	1954.....	158,417	2,385,573

TABLE 60. Production of Manufactured Sodium Sulphate<sup>1</sup>, 1945 - 1954

Year	Salt cake		Year	Salt cake	
	Tons	Value		Tons	Value
		\$			\$
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
1949.....	3,738	83,996	1954.....	not available	

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

TABLE 61. Imports of Sodium Sulphate, 1945-1954

Year	Salt cake		Glauber's salt	
	Tons	Value	Tons	Value
		\$		\$
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
1954.....	30,235	482,652	5,134	144,979

TABLE 62. Exports of Sodium Sulphate, 1945-1954

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	1954.....	58,972	1,039,284

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 63. 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
Total accounted for.....	115,937	144,144	116,786	129,518

TABLE 64. Employees and Their Earnings in the Sodium Sulphate Mining Industry, 1950-1954

Year	Number of employees					Number of man-hours worked (all employees)	Earnings		
	Office and administrative		Workmen		Total		Office and administrative	Workmen	Total
	Male	Female	Male	Female					
							\$	\$	\$
1950.....	20	4	156	1	181		62, 536	408, 358	470, 894
1951.....	18	4	202	1	225	611, 590	66, 189	605, 689	671, 878
1952.....	31	7	194	1	223	432, 861	70, 618	548, 639	619, 257
1953.....	12	—	144	1	157	341, 265	56, 296	422, 078	478, 374
1954.....	12	2	158	1	173	335, 078	45, 670	508, 241	553, 911



## 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. At Kimberley the waste iron sulphides are used to produce acid for the fertilizer plant. Shipments of pyrite were made to pulp and paper mills and chemical plants in Canada and abroad.

Pyrite was treated at Noranda Mines plant at Port Robinson to produce sulphur dioxide, elemental sulphur and iron residue suitable for iron ore. Similar products are expected from the treatment of pyrrhotite at the Copper Cliff plant of the International Nickel Co. of Canada Ltd. The statistics for these plants are included in the chemical industry.

Elemental sulphur, amounting to 23,320 tons in 1954, 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>, 1945-1954

Year	Tons	Value	Year	Tons	Value
		\$			\$
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
1949.....	261,871	2,039,384	1954.....	532,406	4,875,969

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, 1952-1954

—	Pyrite			Smelter gas		Total sulphur	
	Sales	Sulphur content		Sulphur content			
	Tons	Tons	Value	Tons	Value	Tons	Value
1952			\$		\$		\$
Quebec .....	...	...	1,567,953	—	—	—	1,567,953
Ontario .....	—	—	—	...	183,460	...	183,460
British Columbia .....	...	...	677,760	...	1,422,010	...	2,099,770
Canada .....	553,987	263,241	2,245,713	160,547	1,605,470	423,788	3,851,183
1953							
Quebec.....	...	...	1,211,343	—	—	...	1,211,343
Ontario .....	—	—	—	...	371,300	...	371,300
British Columbia .....	...	...	239,355	...	1,350,700	...	1,590,055
Canada .....	408,257	186,650	1,450,698	172,200	1,722,000	358,850	3,172,698
1954							
Quebec .....	...	...	1,854,489	—	—	...	1,854,489
Ontario .....	—	—	—	...	495,980	...	495,980
British Columbia .....	...	...	809,010	...	1,716,490	...	2,525,500
Canada .....	687,928	311,159	2,663,499	221,247	2,212,470	532,406	4,875,969

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 .....	244	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
<b>Total accounted for .....</b>	<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
<b>Canada .....</b>	<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, 1945-1954

Year	Tons	Value	Year	Tons	Value
		\$			\$
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
1949.....	280,557	5,213,921	1954.....	310,127	7,816,301

**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 \$348,158 in 1954.

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 1954 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>	1950	1951	1952	1953	1954
	Short tons				
Australia .....	134	62	69	32	2
Egypt .....	—	702	66	100 <sup>3</sup>	—
India .....	58	260	24	—	2
Japan .....	—	—	—	—	882
Kenya .....	4	3	—	82	403
Rhodesia; Nyasaland, Fed. of; Southern Rhodesia	784	553	—	—	—
Tanganyika .....	—	—	—	—	—
Union of South Africa .....	46,763	27,014	39,918	33,844	45,632
United States (sold or used by producers) .....	208,096	209,008	208,906	189,535	195,538
<b>Total</b> .....	<b>255,839</b>	<b>237,602</b>	<b>248,983</b>	<b>223,000<sup>3</sup></b>	<b>242,500<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, 1954

Name of operator	Head office address	Plant or mine location
<b>BARITE</b>		
<b>Nova Scotia:</b>		
Canadian Industrial Minerals Ltd. ....	Walton .....	Walton
Maritime Barytes Ltd. <sup>1</sup> .....	Brookfield .....	Brookfield
Fluor-Bar Mines Ltd. <sup>1</sup> .....	1980 Sherbrooke St. W., Montreal, Quebec	Lake Ainslie
<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. ....	Bank of Montreal Bldg., St. John's .....	St. Lawrence
St. Lawrence Corporation of Nfld., Ltd. ....	120 Broadway, New York, U.S.A. ....	St. Lawrence
<b>Ontario:</b>		
Huntingdon Fluorspar Mines Ltd. ....	Madoc .....	Huntingdon Twp.
<b>GARNET</b>		
<b>Ontario:</b>		
Niagara Garnet Co. <sup>2</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.
Quebec Graphite Mines Co. Ltd. <sup>1</sup> .....	619 St. James St. W., Montreal .....	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.
Knefeld Graphite Gold Mines Ltd. <sup>1</sup> .....	R.R. No. 2, Walton .....	Vogt Twp.
<b>GRINDSTONES</b>		
<b>New Brunswick:</b>		
Read, H.C. <sup>1</sup> .....	Bathurst .....	Stonehaven
Bay of Chaleur Grindstone Co. <sup>1</sup> .....	1434 Ste-Catherine St. W., Montreal, Quebec	Gloucester Co.
<b>IRON OXIDE</b>		
<b>Quebec:</b>		
Argall, Mrs. Thomas H. ....	1695 boul. St-Louis, Trois-Rivières .....	Pointe-du-Lac
Girardin, Chas. D. ....	Yamachiche .....	Almaville en Haut
Leveille, Oscar <sup>1</sup> .....	791 Ste-Catherine, St-Louis de France ..	St-Louis de France
The Sherwin-Williams Co. of Canada .....	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.
International Lithium Mining Corp. <sup>1</sup> .....	25 Adelaide St. W., Toronto, Ontario .....	Lamotte Twp.
Iso Uranium Mines Ltd. <sup>1</sup> .....	100 Adelaide St. W., Toronto, Ontario ...	Lacorne
Magnet Consolidated Mines Ltd. <sup>1</sup> .....	185 Bay St., Toronto, Ontario .....	Figury Twp.
Northern Québec Explorers <sup>1</sup> .....	Première Ave Ouest, Amos. ....	Canton Piedmont
Quebec Lithium Corp. <sup>1</sup> .....	1403 Edifice Aldred, Montreal .....	Barraute
Tide Lake Lithium Mines Ltd. <sup>1</sup> .....	100 Adelaide St. W., Toronto, Ontario ...	Figury Twp.
<b>Manitoba:</b>		
Lithium Corp. of Canada Ltd. <sup>1</sup> .....	403 Avenue Bldg., Winnipeg .....	Bernic and Cat Lakes
<b>Northwest Territories:</b>		
Boreal Rare Metals .....	414 St. James St. W., Montreal, Quebec ..	Hearn Channel

1. Active but not producing.  
2. Holds dormant property.

## Directory of Firms in the Miscellaneous Non-metal Mining Industry, 1954 - 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 .....	Kilmar and Harrington
<b>MINERAL WATERS</b>		
<b>Quebec:</b>		
Brevages Lazure .....	1385 Choquette, St- Hyacinthe .....	St- Hyacinthe
Eau Minérale Naturelle St-Leon .....	Louiseville .....	St- Leon
Eau Minérale Etoile .....	Ste- Geneviève de Batiscan .....	Batiscan
Ferdinand Fortin .....	24, rue Lisotte, Roberval .....	Chambord
Orange Crush Ltd. ....	1590 O'Connor Drive, Toronto, Ontario ..	Varennes
Lemay, Lucien .....	St-Francois-du-Lac .....	Nicolet Twp.
Montclair-Richelieu Spring Water Co. Ltd. ....	1521 Mountain St., Montreal .....	Chambly
Pellerin, Rolland .....	St. Barnabé Nord .....	St-Maurice
Paille, J.J. ....	Maskinongé .....	Maskinongé
Sources Abenakis Springs Ltd. ....	St-Francois-du-Lac .....	St-Francois-du-Lac
Source d'eau Minérale Radnor .....	St-Maurice .....	St-Maurice
Usine d'Embouteillage Maski .....	60 Duplessis, Cap de la Madeleine .....	St-Justin
<b>Ontario:</b>		
Carlsbad Springs, The .....	Carlsbad Springs .....	Gloucester Twp.
Excel Beverages Ltd. ....	Bourget .....	Bourget
<b>MICA</b>		
<b>Quebec:</b>		
Blackburn Bros. Ltd. ....	85 Sparks St., Ottawa, Ontario .....	Cantley
Cameron, P.N., & Sons .....	Buckingham .....	Portland West
Charlebois, M. ....	St-Michel de Wentworth .....	Wentworth
Cross, W.C. ....	209 Bridge St., Hull .....	
Cherney, John .....	Pointe Comfort .....	Cantley
Coté, W.R. ....	62 Filiatrault, Ville St-Laurent .....	Wentworth
Cousineau, J. ....	Perkins Mills .....	Wilson's Corners
Gagné, L. ....	St-Michel de Wentworth .....	Wentworth
Holmes, J.T. ....	Cantley .....	Cantley
Holt, R.J. ....	674 Cooper St., Ottawa, Ontario .....	Wakefield
Joanisse, Leo .....	31 Graham St., Hull .....	Templeton
Latour, L. ....	Buckingham .....	Wells
Lusk, H. ....	Luskville .....	Beachgrove
Lusk, R. ....	Luskville .....	Beachgrove
McAra, C. ....	Beachgrove .....	Beachgrove
Mica Co. of Canada Ltd. ....	2 Lois St., Hull .....	
Pooke, R. ....	388 Gladstone Ave., Ottawa, Ontario .....	Templeton
Poirier, A. ....	Wilson's Corners .....	Wakefield Nord
Poirier, C. ....	Wilson's Corners .....	Wakefield
Rainboth, J.E. ....	270 Fairmont Ave., Ottawa, Ontario .....	West Hull
Rabouin, M. ....	Wakefield .....	Gatineau
Roussel, J. ....	Notre Dame du Laus .....	Wells
Rousseau, Comé .....	St-Rémi .....	Argenteuil
Renaud, E. ....	Perkins .....	Cantley
Sabourin, V. ....	Perkins Mills .....	Templeton
Siscoe Vermiculite Mines Ltd. ....	Cornwall, Ontario .....	Suzar Twp.
St-Amour, D. ....	Buckingham .....	Buckingham
Thompson, M. ....	Buckingham .....	Portland East
Valley, P. ....	Buckingham .....	Portland West
Wallingford, A. ....	Pointe Gatineau .....	South Hull
Wallingford, E., Ltd. ....	Perkins .....	Templeton
Warwick & McClements .....	Glen Almond .....	Templeton
<b>Ontario:</b>		
Cordick, H.V. ....	Perth .....	Lanark
Donnelly, J.C. ....	Stanleyville .....	N. Burgess Twp.
Green, W.E. and E.C. ....	Perth Road .....	North Burgess
Johnson, M.F. ....	R.R. No. 1, Flinton .....	Kaladar
Marks, Oliver, & Son .....	Sydenham .....	Bedford Twp.
McGlade, W.A. ....	8 Church St., Perth .....	Burgess Twp.
North Bay Mica Co. ....	1060 Cassell St., North Bay .....	Mattawa Twp.
Orser, C.C. ....	Verona .....	Mazanawa
Thompson, Frank .....	Perth Road .....	Buck Lake
Watts, R.W. ....	21 Isabella St., Perth .....	Lanark
Woodruff, R.H. ....	Hartington .....	Loughboro
<b>British Columbia:</b>		
Fairey & Co. ....	661 Taylor St., Vancouver .....	Vancouver

## Directory of Firms in the Miscellaneous Non-Metal Mining Industry, 1934 - 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>2</sup> .....	Buckingham .....	Bowman Twp.
Blackburn Bros. Ltd. <sup>2</sup> .....	85 Sparks St., Ottawa, Ontario .....	Perkins
Quebec Smelting & Refining Ltd. <sup>2</sup> .....	215 St. James St. W., Montreal .....	Notre Dame de la Salette
Industrial Phosphate Mines Ltd. <sup>2</sup> .....	18 Toronto St., Toronto, Ontario .....	Portland East Twp.
<b>Ontario:</b> Ontario Phosphate Industries Ltd. <sup>1</sup> .....	Room 1101-62 Richmond St. W., Toronto	Bedford Twp.
McGlade, W.A. <sup>2</sup> .....	8 Church St., Perth .....	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.C. (Mrs.) .....	c/o Boyd's Garage, Clinton .....	Clinton area
<b>SODIUM SULPHATE (Natural)</b>		
<b>Saskatchewan:</b> Ormiston Mining & Smelting Co. Ltd. ....	Ormiston .....	Ormiston
Midwest Chemicals Ltd. ....	Palo .....	Whiteshore Lake
Sybouts Sodium Sulphate Co. Ltd. ....	Gladmar .....	Gladmar
Saskatchewan Minerals (Sodium Sulphate Div.)..	Chaplin .....	Chaplin
<b>SULPHUR (Pyrite and smelter gas)</b>		
<b>Quebec:</b> East Sullivan Mines Ltd. ....	1604 Aldred Bldg., Montreal .....	Bourlamaque Twp.
Quemont Mining Corp. Ltd. ....	350 Bay St., Toronto, Ontario .....	Rouyn Twp.
Noranda Mines Ltd. ....	Royal Bank Bldg., Toronto, Ontario .....	Noranda
Normetal Mining Corp. Ltd. ....	44 King St. W., Toronto, Ontario .....	Normetal
Waite-Amulet Mines Ltd. ....	Noranda .....	Duprat Twp.
Weedon Pyrite & Copper Corp. Ltd. ....	507 Place d'Armes, Montreal .....	Weedon
Sulgas Properties Ltd. <sup>1</sup> .....	744 W. St., Vancouver, British Columbia	Ascot Twp.
<b>Ontario:</b> International Nickel Company of Canada Ltd. <sup>3</sup> ..	Copper Cliff .....	Copper Cliff
<b>British Columbia:</b> Consolidated Mining & Smelting Company of Canada Ltd. <sup>3</sup> .....	Trail .....	Trail
Britannia Mining & Smelting Co. Ltd. ....	Britannia Beach .....	Britannia Beach

1. Active but not producing.

2. Holds dormant property.

3. Recover sulphur from smelter gas.

STATISTICS CANADA LIBRARY  
BIBLIOTHÈQUE STATISTIQUE CANADA



1010739343