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SUMMARY

Miscellaneous non-metal Mines are part of other non-metal mines — Industry 079 of the Standard Industrial Classification Manual, Catalogue No. 12-501.

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 by this industry during 1966 included barite, brucite, diatomite, fluorspar, gemstones, grindstones, iron oxides, magnesitic dolomite, lithia, mica, potash, phosphate and sodium sulphate.

Data presented in this report under the heading of Miscellaneous Non-metal Mines (Tables 1-6) reflect the full implementation of the revised Standard Industrial Classification (S.I.C.) and the New Establishment Concept including an extension of the latter to cover total activities of mining establishments (see Explanatory Notes section of 1964 report). Commodity statistics reflecting total production from all sources, world figures on production, trade data, etc. are presented along the same general lines as in the earlier issues of this report.

The combination of improvements in internal procedures with the introduction of the final stage of the establishment concept in the annual Census of Mining produced changes which, for some industries, required major adjustments in industry statistical data — see Explanatory Notes in the 1964 issue of this report.

TABLE 1. Principal Statistics Miscellaneous Non-metal Mines, 1962-66

Year	Establishments	Mining activity							Total activity				
		Production and related workers			Cost of fuel and electricity	Cost of materials and supplies	Value of production	Value added	Working owners and partners		Total employees		Total value added
		Number	Man-hours paid	Wages					Number	Withdrawals	Number	Salaries and wages	
	No.		'000	$'000						$'000		$'000	
1962	15	911	1,900	3,805	1,816	3,025	17,985	13,144	x	x	1,129	5,008	13,167
1963	15	988	2,152	4,464	2,550	4,338	36,809	29,920	x	x	1,311	6,735	29,936
1964	17	1,139	2,459	5,453	3,425	6,249	47,838	38,165	x	x	1,567	7,979	38,260
1965	17	1,498	3,284	7,837	5,210	10,320	75,072	59,542	–	–	2,052	11,523	59,699
1966	14	1,530	3,330	8,798	5,274	10,587	77,291	61,430	–	–	2,054	12,581	61,179

TABLE 2. Employment and Payroll, Miscellaneous Non-metal Mines, 1962-66

Year	Employees										Salaries and wages				
	Production and related workers		Other		Administrative and office		Sales and distribution		Total		Production and related workers	Other	Administrative and office	Sales and distribution	Total
	Mining														
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Mining				
	number										$'000				
1962	910	1	–	–	198	20	–	–	1,108	21	3,805	–	1,203	–	5,008
1963	986	2	–	–	293	30	–	–	1,279	32	4,464	–	2,271	–	6,735
1964	1,137	2	–	–	377	51	–	–	1,514	53	5,453	–	2,526	–	7,979
1965	1,497	1	3	–	487	64	–	–	1,987	65	7,837	17	3,668	–	11,522
1966	1,530	1	11	1	513	64	–	–	2,054	66	8,798	79	3,704	–	12,581

TABLE 3. Production and Related Workers, Miscellaneous Non-metal Mines, 1965 and 1966

	Mine			Mill	
	Surface		Under-ground	Male	Female
	Male	Female			
	number				
1965					
January	196	1	492	671	—
February	187	1	510	672	—
March	207	1	540	705	—
April	198	1	526	725	—
May	198	1	567	783	—
June	244	1	570	794	—
July	230	—	574	777	—
August	238	1	578	780	—
September	246	1	568	770	—
October	201	1	570	784	—
November	169	—	552	724	—
December	152	—	560	707	—
Averages	205	1	551	741	—
1966					
January	152	—	570	739	1
February	169	—	567	743	1
March	160	—	575	763	1
April	165	—	580	798	1
May	208	—	598	789	1
June	200	—	592	801	1
July	196	—	584	804	1
August	197	—	595	806	1
September	194	—	608	803	1
October	182	—	534	801	1
November	168	—	531	742	1
December	161	—	526	746	1
Averages	179	—	572	778	1

TABLE 4. Purchased Fuel and Electricity Used, Miscellaneous Non-metal Mines 1965 and 1966

Description		1965		1966	
		Quantity	Cost	Quantity	Cost
			$'000		$'000
1. Large establishments reporting commodity detail:					
Bituminous coal:					
(a) From Canadian mines	ton	6	--	6	..
(b) Imported	"	41	1	—	—
Sub-bituminous coal (from Alberta mines only)		—	—	—	—
Anthracite coal		—	—	—	—
Lignite coal	ton	20,000	60	18,995	70
Coke		—	—	—	—
Gasoline (including gasoline used in cars and trucks)	Imp. gal.	318,195	109	267,415	99
Fuel oil including kerosene or coal oil	"	10,500,903	968	8,268,289	765
Wood		—	—	—	—
Gas:					
(a) Liquefied petroleum gases	Imp. gal.	86,769	12	32,271	5
(b) Other manufactured gas		—	—	—	—
(c) Natural gas	M cu. ft.	8,609,596	2,307	9,477,794	2,531
Other fuel		...	—	...	—
Electricity purchased	kwh.	209,073,166	1,753	237,725,350	1,804
Steam purchased		...	—	...	—
Total fuel and electricity used		...	**5,210**	...	**5,274**
Electricity generated:					
(a) For own use	kwh.	7,672,923	...	87,599,308	...
(b) For sale	"	86,957	2	90,312	..

TABLE 5. Materials and Supplies, Miscellaneous Non-metal Mines, 1965 and 1966

Description	Cost	
	1965	1966
	$'000	
One or other semi-processed materials purchased and used in mine/mill operations	277	66
Containers, shipping materials and supplies used	277	331
Operating, maintenance and repair supplies used (excluding fuel)	8,486	8,835
Amount paid out to others for work done on materials owned by establishments	1,280	1,355
Totals	**10,320**	**10,587**

TABLE 6. Value of Production, Miscellaneous Non-metal Mines, 1965 and 1966

Description	Value	
	1965	1966
	$'000	
Value of production	75,072	77,815
Amount received in payment for work done on materials and products owned by others	–	–
Less adjustment for value of sales taxes, excise duties and outward transportation charges which could not be deducted from the individual commodity items described above	–	524
Total value of production and work done	**75,072**	**77,291**

TABLE 7. Drilling Completed on Miscellaneous Non-metal Deposits, 1965 and 1966

	Footage drilled	
	1965	1966
Diamond drilling for exploration and testing:		
By mining companies with their own personnel and equipment	36,708	26,422
By diamond drilling contractors	408	6,616
Other diamond drilling:		
Blast hole diamond drilling:		
By mining companies with their own personnel and equipment	–	–
By diamond drilling contractors	–	–
Drilling by percussion on other machines[1]	819,638	718,152

[1] Not complete as records are unobtainable at certain mines.

TABLE 8. Specified Taxes Paid by Companies in Miscellaneous Non-metal Mines Operations,[1] 1965 and 1966

Taxes paid	1965	1966
	$'000	
Dominion income taxes	2,635	2,644
Provincial taxes	1,694	2,547
Municipal taxes	560	736

[1] Includes related corporate activities associated with operations of Miscellaneous Non-metal Mines.

TABLE 9. Miscellaneous Expenditures Made by Companies Engaged in Miscellaneous Non-Metal Mines Operations,[1] 1966

Description	Amount
	$'000
(a) Workmen's compensation	324
(b) Silicosis Assessment	—
(c) Unemployment insurance	87
(d) Aggregate cost of structures, roads, machinery, equipment, etc., built by or purchased from out side contractors or suppliers and chargeable to Fixed Assets Account	9,928
(e) Book value of fixed assets (new structures, roads, machinery equipment etc., including major repairs and alterations) produced by own employees and chargeable to Fixed Assets Account	77
(f) Other capital expenditures not reported in (d) and (e)	—
(g) Cost of materials and supplies used in the production of machinery and equipment and in the construction of roads and new structures (including major repairs and alterations by own employees and chargeable to Fixed Assets Account)	51
(h) Cost of office supplies used during the year, not chargeable to Fixed Assets Account. Excludes cost of stamps and meter expenses	149

[1] Includes related corporate activities associated with Canadian operations of Miscellaneous Non-metal Mines not allocable separately elsewhere.

TABLE 10. Producers' Shipments of Miscellaneous Non-metallic Minerals, 1965 and 1966

Item		1965		1966	
		Quantity	Value	Quantity	Value
			$'000		$'000
Barite	ton	203,025	2,167	221,376	2,199
Diatomite	"	82	4	70	4
Fluorspar		..	2,680	..	4,986
Gemstones	lb.	71,129	16	11,633	13
Grindstones	ton	5	1	5	1
Iron oxides	"	309	14	390	10
Lithia	lb.	1,013,565	1,141	253,566	261
Magnesitic dolomite, brucite	ton	..	4,011	..	3,949
Mica	"	274	25	270	18
Phosphate	"	5	--	—	—
Potash (K_2O)	"	1,491,301	55,971	1,990,053	62,665
Sodium sulphate	"	345,469	5,527	405,314	6,472
Total		...	**71,557**	...	**80,578**
Pyrite, pyrrhotite[1]	ton	382,177	1,285	326,954	1,139
Sulphur[2] in smelter gases	"	444,758	4,317	500,338	6,051
Sulphur, elemental[3]	"	2,068,394	26,395	2,041,528	40,254
Arsenious oxide[1]	"	202	13	351	36
Titanium dioxide, etc.[1]		..	22,425	..	20,497

[1] General statistics relating to pyrite, arsenious oxide and titanious dioxide are included with the smelting industry.
[2] Data for 1965 and 1966 include sulphur in smelter gases in the form of acid or sulphur dioxide. General statistics relating to the production of sulphur are included with those of the metal mining and non-ferrous smelting industries.
[3] Produced from sour gas, includes sulphur recovered in processing nickel-copper matte.

Note: (a) The value of containers is excluded.
(b) The above and subsequent tables contain data on commodities in various forms and sources, therefore the figures are not directly comparable to those appearing in the industry series, that is, Tables 1-8.

TABLE 11. Consumption[1], of Non-metallic Minerals, 1965 and 1966

Item	Used during	
	1965	1966
	tons	
Arsenic trioxide (refined)	299	345
Barite:[2]		
Lump	x	x
Ground	3,163	2,873
Bentonite:[2]		
Swelling (also called sodium or Wyoming bentonite)	122,905	154,034
Non-swelling (also called calcium or Southern decolorizing bentonite)	11,563	13,820
Clay:		
China clay (Kaolin)	157,021	162,360
Fire clay	208,510	199,115
Ball clay	132,462	146,021
Diatomite (diatomaceous earth, Kieselguhr, Celite, etc.)		
Ground or powdered:		
Natural	10,376	13,621
Calcined	1,458	1,755
Other	380	1,584
Feldspar	10,419	12,046
Fluorspar:		
Metallurgical grade (lump)	150,052	147,995
Ceramic and other	2,759	2,839
Acid	14,728	15,456
Fullers earth	1,789	1,838
Graphite:		
Natural	3,815	4,253
Magnesia:		
Dead burned	83,506[r]	78,628
Calcined	x	39,528
Mica — Muscovite:		
Sheet, splittings	196	46
Wet ground	820	619
Other ground	500	511
Nepheline syenite	51,389	52,937
Phosphate rock	1,607,884	1,735,488
Potash (muriate of potash):		
Agricultural	190,443	202,631
Chemical	2,353	2,215
Silica:		
Lump (quartz, quartzite, sandstone)	794,682	746,607
Sand (including foundry sand but excluding concrete sand)	1,926,594	1,875,758
Flour or pulverized	84,712	128,263
Sodium sulphate:		
Lump crude	4,214[r]	7,408
Salt cake	268,874	325,479
Glauber's salts	1,734	665
Sulphur:		
Elemental (lump, powder, liquid etc.)	585,654[r]	672,298
Liquid sulphur dioxide (sulphur content only)	153,560	140,811
Talc, soapstone, pyrophyllite	34,694	34,048
Whiting or Whiting substitute:		
Ground chalk, precipitated calcium carbonate	44,011	60,449
Whiting substitute, ground limestone and ground marble	69,501	87,728
Sold to oil well drilling firms:[3]		
Barite	9,436	12,223
Bentonite	37,400	35,239

[1] Due to a difference in coverage and concept the data in this table will differ from those relating to "Available consumption" as reported by specified industries shown in subsequent tables e.g. Tables 14, 19, 24, 25, 29, 34, and 50.
[2] In addition barite and bentonite were sold to oil well drilling firms. See end of table.
[3] Not included in the consumption of barite and bentonite above.

Source: Special survey "Consumption of Non-metallic Minerals" conducted by Manufacturing and Primary Industries Division, DBS.

ARSENIOUS OXIDE

During 1966 the producers of arsenious oxide (arsenic trioxide) shipped 701,537 pounds valued at $35,610. Included in the output was some arsenic which was recovered from foreign ores. The Canadian and foreign ores are mixed for treatment and separate data are not available.

Production in Ontario was at the smelter of the Cobalt Refinery, Cobalt, Ont. which treated the cobalt-silver concentrates from Cobalt and Gowganda, and other custom ores.

Compounds of arsenic such as lead arsenate and calcium arsenate are used in insecticides, rodenticides and other pesticides. Other uses are: as a decolourizer in glass, as preservatives and depilatories in the tanning of hides, in the chemical debarking of trees; in pyrotechnics; and in paint pigments.

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.

TABLE 12. Producers' Shipments, Imports and Exports of Arsenic, 1965 and 1966

	1965		1966	
	Quantity	Value	Quantity	Value
	lb.	$'000	lb.	$'000
Producers' shipments:				
White arsenic (crude and refined)	403,011	13	701,537	36
Imports:				
Botanical arsenical formulation	1,178,800	354	1,243,200	434
Other	..	..	..	..
Exports:				
Arsenic	..	..	..	..

Source: Trade of Canada, "Imports by Commodities", Catalogue No. 65-007 and "Exports by Commodities", Catalogue No. 65-004.

TABLE 13. Production, Imports and Exports of White Arsenic, 1957-66

Year	Production, crude and refined, but no duplication	Imports[1]	Exports
			Refined
	pounds		
1957	3,697,317	1,559	3,229,800
1958	2,323,320	..	1,703,200
1959	1,578,307	..	1,130,400
1960	1,724,326	..	1,054,200
1961	419,300	..	244,500
1962	160,750	..	100
1963	187,450	..	4,800
1964	323,900	..	..
1965	403,011	..	..
1966	701,537	..	..

[1] Arsenious oxide and arsenic sulphide.

TABLE 14. Consumption of Refined White Arsenic, 1962-66

Industry	1962	1963	1964	1965	1966
	pounds				
Glass	179,163	172,404	168,793	196,095	158,336
Metal rolling, casting, extruding	82,529	69,731	112,234	154,395	154,044
Miscellaneous chemicals	426,416	393,860	437,099	421,646	539,077
Totals accounted for	**688,108**	**635,995**	**718,126**	**772,136**	**851,457**

TABLE 15. World Production of White Arsenic, by Countries

Country[1]	1962	1963	1964	1965	1966
	short tons				
Brazil	164	323	207	282	275[2]
Canada	80	94	162	202[2]	225
France	7,477	11,668	12,563	11,436[3]	11,200[2]
Germany, West (exports)	75	62	42	78	416
Italy	140	..	..	..	..
Japan	1,011	904	550	528[r]	603
Mexico[4]	16,352	14,666	16,380	15,188	18,000[2]
Peru	572	683	685	550	550[2]
Portugal	634	622	410	440[5]	330[2]
Rhodesia, Southern	1,207	605	206	70[3]	..
South-west Africa	..	..	..	..	44
Spain	234	161	158	131[r]	123
Sweden	6,342	16,369	19,809	18,188[r]	18,200[2]
World totals[1,2]	**49,600**	**61,000**	**64,500**	**66,300[r]**	**66,300**

[1] Arsenic is also produced in Argentina, Austria, China, Czechoslovakia, Finland, East Germany, Hungary, U.S.S.R. United Kingdom and Yugoslavia but there is too little information to estimate production. Estimate is included in world total for Belgium and United States. U.S. figures withheld to avoid disclosing individual company confidential data.
[2] Estimate.
[3] Exports.
[4] Including black arsenic.
[5] Estimated equivalent recoverable arsenic trioxide content of concentrates produced.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

BARITE

The producers of barite in Canada shipped 221,376 tons valued at $2,199,054 in 1966 compared with 203,025 tons worth $2,167,006 in the preceding year. Nova Scotia produced most of the nation's barite. The open pit operation is located near Walton at the head of the Bay of Fundy. Shipments are made by boat from Walton. In British Columbia barite was quarried at Brisco in the East Kootenay district, then shipped to a grinding plant at Lethbridge, Alberta. Shipments were made from Spillimacheen, B.C., to a grinding plant at Cnoway, Alberta.

The principal use of barite is in oil-well drilling muds with bentonite and minor conditioning agents. Barite is used also as a pigment and filler in paints, rubber, linoleum and papers; in the manufacture of barium chemicals; as an additive to glass batches; as an aggregate in concrete where additional weight is required (such as coatings for under water pipes), or where shielding is required against radiation such as in X-ray rooms or atomic energy plants.

Barium compounds are used widely in industry. Barium carbonate is used to reduce "dry house" scum on bricks; in pharmaceuticals; as a flux in the enamelling and ceramic trades; and in heat treatment compounds. The chloride is used as a pigment in lithographic inks; in the purification of salt brine and in water treatment; as a mordent in dyeing textiles; and in many other applications. Other compounds include the hydrate, phosphate, oxide, sulphide, stearate and chlorate.

TABLE 16. Production of Barite, 1957 - 66

Year	Short tons	Value	Year	Short tons	Value
		$'000			$'000
1957	228,048	2,993	1962	226,600	2,124
1958	195,719	2,196	1963	173,503	1,693
1959	238,967	2,255	1964	169,149	1,574
1960	154,292	1,462	1965	203,025	2,167
1961	191,404	1,799	1966	221,376	2,199

TABLE 17. Imports of Barite, 1965 and 1966

Imported from	1965		1966	
	Tons	Value	Tons	Value
		$'000		$'000
Germany, West	155	7	122	5
United States	3,531	198	4,043	231
Totals	**3,686**	**205**	**4,165**	**236**

Source: Trade of Canada, "Imports by Commodities", Catalogue No. 65-007.

TABLE 18. Exports of Barite, 1965 and 1966

Destination	1965		1966	
	Tons	Value	Tons	Value
		$'000		$'000
Norway	500	12	–	–
Trinidad-Tobago	17,606	326	9,279	172
Venezuela	4,301	36	–	–
United States	162,625	1,315	189,774	1,738
Totals	**185,032**	**1,689**	**199,053**	**1,910**

Source: Trade of Canada, "Exports by Commodities", Catalogue No. 65-004.

TABLE 19. Consumption of Barite, 1962 - 66

	1962	1963	1964	1965	1966
	tons				
By uses:					
Paints and varnish	1,244	1,854	1,858	2,402	3,119
Rubber goods	–	1	..	..	–
Glass	628	838	680	786	896
Oil-well drilling	19,797	14,495	14,475	..	..
Rubber tire and tube	..	..	19	14	12
Rubber industries	..	..	284	190	197

See footnote 1 Table 11.

TABLE 20. World Production of Barite, by Countries

Country[1]	1962	1963	1964	1965	1966
	short tons				
North America:					
Canada	226,600	173,503	169,149	203,025[r]	221,376
Mexico	350,684	283,246	368,220[r]	406,027[r]	321,306
United States	886,964	803,106	816,706	845,656	1,006,965
South America:					
Argentina	13,819	25,350	15,989[r]	21,843[r]	23,700
Brazil	60,241	37,601	36,968	70,945[r]	44,344
Chile	1,156	1,124[r]	1,203	3,132[r]	2,345
Colombia	8,800	11,574	11,244	9,700[r]	9,900[2]
Peru	126,271	137,557	138,252[r]	122,104[r]	128,579
Europe:					
Austria (marketable)	1,192	2,395	1,390	2,573[r]	3,086
France	92,570	82,078	92,397	114,733[r]	110,200[2]
Germany West (marketable)	512,231	503,430[r]	515,290[r]	517,374[r]	497,418
Greece	78,712	94,000[r]	75,000[r]	132,000[2]	143,000
Ireland	22	14,918[r]	45,232[r]	92,581[r]	137,789
Italy	133,976	114,229	115,461[r]	156,412	190,411
Poland	49,841	50,376[2]	50,376[2]	50,376[2]	51,800[2]
Portugal	1,489	1,828	384	1,199	1,054
Rumania	..	..	..	50,000[r]	55,000[2]
Spain	42,923	53,312[r]	65,183	61,140[r]	..
U.S.S.R.	200,000[2]	220,000[2]	243,000[r,2]	254,000[r,2]	276,000[2]
United Kingdom[3]	84,754	61,066	68,343	67,241	34,172
Yugoslavia	114,379	115,176	112,072	107,045[r]	88,393
Africa:					
Algeria	30,404	32,421	32,665	47,142	82,700[2]
Kenya	—	—	—	40	108
Morocco	98,980	104,228	99,036	114,508	117,126
Rhodesia, Southern	—	1,953	1,561	1,500[2]	..
South Africa, Republic of	1,873	2,704	2,835	1,477	6,815
Swaziland	68	93	17	541	1,150
United Arab Republic (Egypt)	1,356	4,545	5,017[r]	16,924	16,500[2]
Asia:					
Burma	4,462	2,127[r]	—	1,940[r]	8,800[2]
China (mainland)	90,000[2]	88,000[2]	110,000[2]	110,000[2]	121,000[2]
India	36,004	41,752	51,763[r]	53,223[r]	56,949
Iran	16,535	16,500[2]	47,399[r]	68,000[r,2]	68,000[2]
Japan	42,016	41,360	43,810	46,606[r]	44,396
Korea:					
North	65,000[2]	77,000[r,2]	77,000[r,2]	88,000[r,2]	110,000[2]
South	1,014	3,040	3,024	1,419	40
Pakistan	3,264	5,422	13,235	9,740	8,624
Philippines	459	1,008	1,627	—	[2]
Turkey	2,094	1,081	6,669	13,206	18,700[2]
Oceania:					
Australia	14,038	9,206	13,778	13,413[r]	15,370
World totals (estimate)[4]	**3,394,191[r]**	**3,218,309[r]**	**3,451,295[r]**	**3,876,785[r]**	**4,023,118**

[1] In addition to countries listed, barite is produced in Bulgaria, Czechoslovakia and East Germany, but production data are not available.
[2] Estimate.
[3] Includes witherite.
[4] Total is of listed figures only; no undisclosed data included.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

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 1961 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 economical and consequently marketable by-products would be necessary.

TABLE 21. World Production of Corundum, by Countries

Country[1]	1962	1963	1964	1965	1966
	tons				
India	332	725	595	530	424
Southern Rhodesia	3,348	5,940	2,870	4,630[2]	4,630[2]
South Africa, Republic of	349	79	60	344	400
World totals (estimate)	**4,029**	**6,744**	**3,525**	**5,504**	**5,454**

[1] Corundum is produced in U.S.S.R., data on production are not available.
[2] Estimate.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

DIATOMITE

In 1966 the producers shipped 70 tons of diatomite which was valued at $3,755. In the preceding year the production was 82 tons valued at $4,420. All the diatomite recovered in recent years came from deposits in British Columbia.

Diatomite, also known as diatomaceous earth and Kieselguhr, consists of microscopically small, opaline silica, skelatal remains of organisms known as diatoms. The purest varieties of diatomite are chalklike in appearance, free from grit, porous, and friable and an apparent specific gravity under one when dry.

It is the physical properties of porosity and chemical inertness that account for most of the uses of diatomite. The principal uses are as a filtering medium filler, and as an insulator against heat, cold and sound. Diatomite is important in many industries, such as sugar refining, liquor distilling, dry cleaning and water purification. For filtration the important considerations are size and shape of principal diatoms present, purity, and density of the consolidated material.

Diatomite is used as a filler in rubber, paper, asphalt products, plastics, explosives, insecticides, paints, and many other products. It is used as a concrete admixture and as the mild abrasive in metal polishes and dentifrices. Important properties of diatomite to be considered for such uses include: color, freedom from grit, low density, inertness, and particle size. Diatomite imparts bulk with little increase in weight, along with certain desirable physical properties to the end products.

TABLE 22. Producers' Shipments of Diatomite, 1957-66

Year	tons	Value	Year	tons	Value
		$			$
1957	120	2,400	1962	211	10,228
1958	27	540	1963	798	26,830
1959	5	100	1964	1,143	64,555
1960	44	1,430	1965	82	4,420
1961	214	8,817	1966	70	3,755

TABLE 23. Imports of Diatomaceous Earth, 1965 and 1966

Imported from	1965		1966	
	Tons	Value	Tons	Value
		$'000		$'000
United States	25,089	1,386	29,220	1,579
Totals	**25,089**	**1,386**	**29,220**	**1,579**

Source: Trade of Canada, "Imports by Commodities", Catalogue No. 65-007.

TABLE 24. Consumption of Infusorial Earth in the Sugar Refining Industry, 1957-66

Year	Tons	Value	Year	Tons	Value
		$'000			$'000
1957	2,260	175	1962	2,093	189
1958	1,965	164	1963	2,317	219
1959	2,113	167	1964	2,243	222
1960	2,218	191	1965	2,325	214
1961	2,089	189	1966	2,043	202

See footnote 1 Table 11.

TABLE 25. Consumption of Diatomaceous Earth in the Manufacture of Fertilizers, 1962-66

Year	Tons	Value
		$'000
1962	12,086	718
1963	15,771	780
1964	12,387	759
1965	12,296	753
1966	13,530	814

See footnote 1 Table 11.

TABLE 26. World Production of Diatomite, by Countries

Country[1]	1962	1963	1964	1965	1966
	short tons				
North America:					
Canada	211	798	1,143	82[r]	70
Costa Rica	827	2,000[2]	4,000[2]	3,307[r]	3,300[2]
Mexico	–	979	2,260	987	9,327
Nicaragua	1,414	1,760[2]	–	–	–
United States	482,208[3]	580,278[4]	580,278[4]	580,278[4]	700,000
South America:					
Argentina	3,741	6,256	8,567	6,774[r]	8,267
Brazil	..	3,500[2]	3,500[2]	3,500[2]	3,500[2]
Colombia	165	2,425	255	220[r]	–
Peru	1,624	2,733	2,858[r]	2,724[r]	1,742
Europe:					
Austria	4,613	4,339	4,224	4,447[r]	4,138
Denmark:					
Diatomite	22,000[2]	22,000[2]	22,400[r,2]	13,800[r]	11,000
Moler[5]	230,800[2]	212,000[2]	210,750[r,2]	235,000[r]	225,000
Finland	1,323[r]	2,535	2,392	1,047[r]	1,323
France[6]	140,093	146,304	146,600[2]	166,046[r]	154,323
Germany, West (marketable)[6]	67,792[2]	47,289	52,737[r]	58,005[r]	57,331
Italy	62,379	65,509	76,445[r]	66,000[2]	66,000[2]
Portugal[6]	1,598	2,067	2,207	2,896[r]	3,765
Spain[6]	13,352	11,229	12,500[2]	13,131[r]	12,600[2]
Sweden (marketable)[7]	252	400	239[r]	439[r]	440
U.S.S.R.	330,000[2]	340,000[2]	350,000[2,r]	360,000[2,r]	385,000[2]
United Kingdom	22,412	15,946	15,363[r]	16,888[r]	15,400[2]
Yugoslavia	4,960[r]	11,600[2]	11,600[2]	11,600[2]	11,600[2]
Africa:					
Algeria	30,565	19,454[r]	22,163[r]	18,092[r]	18,100[2]
Kenya	3,207	3,677	3,368	2,445[r]	1,953
Mazambique	386	–	–	–	36
Rhodesia, Southern[6]	423	301	347	530[2]	530[2]
South Africa, Republic of	647	220	546	1,076[r]	240
United Arab Republic (Egypt)	55	916	44,080[8]	80,375[8]	70,111[8]
Asia:					
Korea, South	758	1,916	41,031	638	282
Oceania:					
Australia	8,189	5,749[r]	9,780	7,793[r]	7,967
New Zealand	2,099	1,796	1,881	1,987	5,219
World totals[9]	**1,438,093**	**1,515,976[r]**	**1,633,514[r]**	**1,660,057[r]**	**1,778,555**

[1] Diatomaceous earth is produced in Bulgaria, Hungary, Japan and Rumania, but complete data are not available. Estimates included in total. Hungary and Rumania may produce diatomaceous earth but data are not available and no estimates are included in total.
[2] Estimate.
[3] Average annual production 1960-62.
[4] Average annual production 1963-65.
[5] Data represents estimates of moler earth used as a raw material in making refractory bricks plus moler earth exported in bulk form.
[6] Includes tripoli.
[7] Includes calcined.
[8] Includes refractory clay.
[9] Total is of listed figures only; no undisclosed data included.

FLUORSPAR

During 1966 the value of fluorspar shipped amounted to $1,895,768 compared with $2,679,862 worth in the preceding year. Fluorspar is mined in Newfoundland and is produced as a by-product from a silica deposit in British Columbia.

In Canada fluorspar is consumed chiefly by the aluminum industry. The fluorspar is used to make hydrofluoric acid, which in turn is used to make a flux (artificial cryolite). The flux, together with a small amount of fluorspar, dissolves alumina, and from this solution aluminum is recovered electrolytically. Fluorspar finds its other major use as a flux in the steel industry. In smaller but increasing amounts, fluorspar is used in the heavy-chemical, glass, enamelling, glazing, white-metal alloy and metal refining industries.

In the United States the largest consumer is the steel industry, which is followed by the hydrofluoric acid manufacturers. Hydrofluoric acid is used in large amounts by the aluminum, fluorine, chemical and uranium industries. It is worth noting that despite the steel-production increase of recent years, the rate of fluorspar consumption is growing faster in the manufacture of hydrofluoric acid than in the use of fluorspar as a flux in steel plants.

Standard fluxing gravel or lump grade for metallurgical purposes is usually sold on a specification of a minimum of 85 per cent CaF_2 and a maximum of 5 per cent SiO_2 (silica) and 0.3 per cent sulphur. Fines should not exceed 15 per cent.

Ceramic or glass and enamel grades call for not less than 94 per cent CaF_2 with a maximum 3.5 per cent $CaCo_3$ (calcium carbonate), 3 per cent SiO_2 and 0.1 per cent Fe_2O_3 (ferric oxide). The material must be in mesh sizes ranging from coarse to extra fine.

Acid grade has the most rigid specifications. It must be over 97 per cent CaF_2 and not over 1 per cent SiO_2. Like ceramic grade, it is used in powdered form.

TABLE 27. Production of Fluorspar, 1957-66

Year	Selling value f.o.b. works	Year	Selling value f.o.b. works
	$'000		$'000
1957	1,757	1962	1,870
1958	1,543	1963	1,976
1959	1,850	1964	2,259
1960	1,922	1965	2,680
1961	1,990	1966	1,896

TABLE 28. Imports of Fluorspar, 1957-66

Year	Tons	Value	Year	Tons	Value
		$'000			$'000
1957	14,547	378	1962	67,847	2,052
1958	30,408	763	1963	66,798	1,946
1959	26,588	719	1964	69,986	2,061
1960	59,690	1,286	1965	69,848	2,100
1961	32,769	914	1966	75,324	2,143

Source: Trade of Canada, "Imports by Commodities", Catalogue No. 65-007.

TABLE 29. Consumption of Fluorspar, 1962 - 66

	1962	1963	1964	1965	1966
			tons		
By uses:					
Steel	33,824	41,822	41,533	37,399	33,842
Glass	1,157	1,968	2,744	2,598	2,424
Heavy chemicals	7,848	8,982	11,246	12,827	14,028
Smelting and refining	78,034	84,995	65,104	105,935	111,040
Totals accounted for	**120,863**	**137,767**	**120,627**	**158,759**	**161,334**
By provinces:					
Nova Scotia	6,060	7,880	6,882	5,664	5,597
Quebec	83,718	92,849	75,866	118,573	124,871
Ontario	30,028	35,215	36,526	33,324	30,167
Manitoba and Saskatchewan	317	324	332	369	382
Alberta	400	693	489	419	172
British Columbia	340	806	532	410	145
Totals accounted for	**120,863**	**137,767**	**120,627**	**158,759**	**161,334**

See footnote 1 Table 11.

TABLE 30. World Production of Fluorspar, by Countries

Country[1]	1962	1963	1964	1965	1966
			short tons		
North America:					
Canada	75,000[2]	85,000[2]	96,000[2]	112,000[2,r]	79,000[2]
Mexico	553,642	530,893	708,644	810,618[r]	799,602
United States (shipments)	206,026	199,948	217,137	240,932	253,068
South America:					
Argentina	13,799	10,761	12,703[r]	12,883[r]	10,472
Europe:					
France[3]	154,064	160,307	215,119	215,573[r]	237,476
Germany:					
East	80,000	77,000[2,r]	77,000[2,r]	88,000[2,r]	88,000[2]
West[3]	116,592	115,272[r]	98,960[r]	91,402[r]	93,195[r]
Italy	176,709	148,407	137,449	162,990	215,193
Spain[3]	165,356	169,094	164,995	243,248[r]	230,315
Sweden (sales)	3,855	3,253	—	—	—
United Kingdom[4]	80,358[r]	96,342[r]	114,199[r]	128,750[r]	138,891
U.S.S.R.	265,000[2]	300,000[2]	330,000[2]	385,000[2]	385,000[2]
Africa:					
Morocco	546	7,000	7,242	3,307	3,300[2]
Rhodesia, Southern	20	343	77	165[2]	..
South Africa, Republic of	111,683	57,761	66,431	72,517	90,266
South-West Africa	240	480	—	—	—
Tunisia	—	—	—	3,300[2]	2,894
Asia:					
China (mainland)	220,000[2]	220,000[2]	220,000[2]	240,000[2]	280,000
India	724	780	429	607	1,178
Japan	17,120	23,037	21,078	18,205[r]	15,472
Korea, North	33,000	33,000[2]	33,000[2]	33,000[2]	33,000[2]
Korea, South	36,343	43,855[2]	62,167[2]	43,174[2]	35,283
Mongolia	41,800	54,000	63,000[2,r]	83,000[2,r]	83,000[2]
Thailand	11,806	32,221	70,039	57,132	52,941
Turkey	640	719	1,436	1,187	1,659
Oceania:					
Australia	—	17	—	—	—
World totals[2,5]	**2,364,323[r]**	**2,369,490[r]**	**2,717,105[r]**	**3,046,990[r]**	**3,129,205**

[1] Fluorspar is also produced in Brazil and Bulgaria; data are not available.
[2] Estimate.
[3] Marketable.
[4] Excludes recovery from lead and zinc mine dumps.
[5] Total is of listed figures only; no undisclosed data included.

GARNET

The garnet deposit near River Valley, Ontario has not been in production since 1961. The garnets which were mined in the earlier years were used as abrasives for cutting granite building stone at the firms other stone plants.

The garnet group of minerals are aluminum silicates containing variable amounts of iron, magnesium, manganese calcium and chromium. They are common constituents of many rocks, particularly metamorphic types, and some beach sands.

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.

GEM STONES

There were no shipments of amethyst during 1966. All the reported shipments of Gem Stones consisted of Jade from British Columbia.

TABLE 31. Producers' Shipments of Gem Stones, 1959-66

Year	Pounds	Value	Year	Pounds	Value
		$'000			$'000
1959	15,000	5	1963	16,000	16
1960	50,300	10	1964	11,537	14
1961	69,751	21	1965	71,129	16
1962	56,935	21	1966	11,633	13

GRAPHITE

There were no shipments of graphite during the year. With the exception of 1961 there have been no shipments since 1954 when the Black Donald mine closed in Renfrew county, Ontario. This mine was flooded by the mountain chute hydro project in 1967.

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 32. Producers' Shipments of Graphite, 1956-66

Year	Tons	Value
		$
1956-60	–	–
1961	1	146
1962-66	–	–

TABLE 33. Imports and Exports of Graphite[1] and Carbon Products 1964-66

	1964	1965	1966
		$'000	
Imports:			
Battery carbons	134	166	107
Carbon or carbon electrodes	1,935	2,825	2,248
Graphite and carbon basic products	2,026	1,633	2,968
Graphite and carbon brush stock	147	252	492
Graphite and carbon crucibles	245	278	278
Graphite and carbon refractories	311	361	790
Lighting and welding carbons	134	177	264
Exports:			
Carbon and carbon electrodes	1,202	1,096	1,054

[1] Includes artificial graphite.

Source: Trade of Canada, "Imports by Commodities", Catalogue No. 65-007 and "Exports by Commodities", Catalogue No. 65-004.

TABLE 34. Available Data[1] on the Consumption of Graphite, 1962-66

	1962	1963	1964	1965	1966
			pounds		
By industries:					
Paints	48,577	60,722	46,645	—	—
Copper and alloy	94,421	119,445	139,941	902,175	446,100
Industrial chemicals	651,047	955,130	1,544,005	838,881	1,185,310
Boilers and platework	1,330	1,219	1,462	1,944	—
Iron and steel mills	1,944,000	2,660,000	2,506,000	2,568,000	2,010,000
Agricultural implements	800	1,950	1,450	1,600	28,800
Railroad rolling stock	23,849	8,000	6,209	22,591	13,250
Iron foundries	738,664	789,671	1,045,821	2,049,009	3,059,623
Heating equipment	200	240	306	45,000	71,600
Refractories	328,000	372,000	486,000	564,000	696,000
Electrical industrial equipment	—	1,005	150	225	225
Batteries	503,157	316,039	217,696	359,832	272,211
Miscellaneous non-metallics	—	—	—	344,430	149,950
Miscellaneous metal fabricating	733,807	880,600	694,110	837,430	1,483,036
Motor vehicle parts	413,900	430,500	622,700	795,300	910,788
Communications equipment	540	262	525	—	—
Miscellaneous machinery and equipment	309,923	612,625	504,652	712,854	373,588
Miscellaneous electrical equipment	50	736,343	864,898	387,664	170,650
Truck body and trailer	—	—	—	3,359	—
Smelting and refining	172,644	169,206	138,398	178,434	1,408,000
Fabricated structural metals	—	—	—	5,500	6,000
Hardware, tool and cutlery	—	—	—	5,002	2,000
Major appliances	—	—	—	80	150
Totals for above industries	**5,964,909**	**8,114,957**	**8,820,968**	**10,623,310**	**12,287,281**
By provinces:					
Newfoundland, Nova Scotia, New Brunswick	9,120	21,384	23,375	1,303,522	929,520
Quebec	1,769,120	2,835,867	2,690,433	2,804,245	4,021,959
Ontario	3,767,981	4,460,073	5,243,349	4,963,682	5,923,136
Manitoba	108,067	76,288	31,979	162,135	51,630
Saskatchewan	1,954	1,650	8,752	2,200	10,720
Alberta	188,236	414,391	237,771	314,576	455,574
British Columbia	120,431	305,304	585,309	1,072,950	894,742
Totals accounted for	**5,964,909**	**8,114,957**	**8,820,968**	**10,623,310**	**12,287,281**

See footnote 1 Table 11.

TABLE 35. World Production of Natural Graphite, by Countries

Country[1]	1962	1963	1964	1965	1966
	tons				
North America:					
Mexico	31,992	20,176[r]	33,441	44,548	42,717
South America:					
Argentina	522	306	245[r]	202[r]	154
Brazil	1,775	1,650[2]	1,270[2]	1,292	1,408
Europe:					
Austria	98,416	109,778	112,697	94,529	87,677
Germany, West	13,134	14,122[r]	14,796	15,005	14,488
Italy	3,327	2,053	1,443	1,353	1,179
Norway	7,222	8,408[r]	7,983[r]	9,348[r]	9,458
U.S.S.R.	60,000[2]	60,000[2]	66,000[r,2]	66,000[r,2]	72,000[2]
Africa:					
Malagasy Republic	19,274	21,214	14,521	18,756	18,040
South Africa, Republic of	1,308	671	1,042	447	1,161
South West Africa	—	—	276[r]	396	400
Asia:					
Ceylon (exports)	9,665	9,280	11,957	9,789	11,051
China (mainland)[2]	45,000[2]	45,000[2]	45,000[2]	45,000[2]	45,000[2]
Hong Kong	902	891	795	—	—
Japan	3,812	3,305	2,700	2,482[r]	2,428
Korea:					
North	72,000[2]	77,000[2]	77,000[2]	77,000[2]	83,000[2]
South	204,032	374,428	291,515	283,315[r]	144,338
World totals[1,2,3]	**572,381**	**748,282**	**682,681**	**669,462**	**534,499**

[1] Graphite has been produced in Czechoslovakia but production data are not available; U.S. figure withheld to avoid disclosing individual company confidential data.
[2] Estimate.
[3] Total is of listed figures only; no undisclosed data included.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

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.

TABLE 36. Production of Grindstones, Pulpstones and Scythestones, 1956-66

Year	Tons	Value	Year	Tons	Value
		$'000			$'000
1956-58	—	—	1963	10	2
1959	60	9	1964	—	—
1960	10	2	1965	5	1
1961	10	2	1966	5	1
1962	10	2			

IRON OXIDES

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.

Canadian producers of ochreous iron oxides shipped 390 tons valued at $10,199 in 1966 compared with 309 tons worth $13,879 in 1965.

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.

TABLE 37. Production of Natural Iron Oxides, 1957-66

Year	Tons	Value	Year	Tons	Value
		$'000			$'000
1957	7,518	187	1962	771	58
1958	1,632	113	1963	978	75
1959	1,235	108	1964	1,033	79
1960	909	77	1965	309	14
1961	808	68	1966	390	10

TABLE 38. Imports and Exports of Ochres and Colours, 1965 and 1966

	1965		1966	
	Tons	Value	Tons	Value
		$'000		$'000
Imports:				
Orange and yellow pigments	651	1,270	692	1,408
Pigments, color lakes, toners	2,177	2,381	2,464	2,823
Exports:				
Iron oxides	2,795	505	4,577	911

Source: Trade of Canada, "Imports by Commodities", Catalogue No. 65-007 and "Exports by Commodities", Catalogue No. 65-004.

TABLE 39. Consumption of Iron Oxides in Paints and Varnishes, 1962-66

Year	Iron oxides[1] pigments		Ochres, siennas and umbers	
	Tons	Value	Tons	Value
		$'000		$'000
1962	1,955	470	150	56
1963	2,009	520	168	74
1964	2,178	584	191	76
1965	2,097	550	250	83
1966	2,448	629	286	102

[1] Includes synthetic iron oxides.

LITHIA

During 1966 the producers of lithia shipped 253,566 pounds valued at $260,611 compared with 1,013,565 pounds worth $1,141,426 in 1965. These figures on quantities are the lithia or lithium oxide content of spodumene concentrates exported for processing and of lithium compounds. The Quebec Lithium Corporation operated the chemical plant which produced lithium carbonate and other lithium chemicals. The mine, mill and chemical plants are located at Barraute, Quebec.

Lithium compounds find their most important applications in the ceramic industry and in the manufacture of lubricating greases. Practically all lithium concentrates are converted chemically to lithium carbonate or hydroxide, the usual basic compounds used in industry. For chemical processing, the only specification available is for the spodumene that Quebec Lithium Corporation is exporting. Four and a half per cent lithia is required as a minimum in the concentrate. However, practically all producers of lithium compounds either own or have a share in mining properties from which they obtain concentrates; standard specifications have, therefore, not been established and grades are a matter of individual negotiation.

Lithium greases, first evolved in 1943, came to play an important role in lubrication wherever operational extremes of temperature were experienced, as they maintain their lubricating qualities between -60° and +320°F and, moreover, have excellent water-insolubility characteristics. In wartime, lithium greases were invaluable for aircraft engines. Since the war their industrial use has grown rapidly, as their unique properties make possible the production of multi-purpose greases, simplifying both manufacture and application.

In ceramics, lithia services primarily as a flux, permitting the development of low-temperature ceramic bodies with the attendant benefits of refractoriness, fuel economies and wider colour use. It also makes possible the production of glass transparent to ultraviolet light for use in germicidal lamps. Lithium compounds reduce the maturing temperature and increase the fluidity and gloss of glass, glazes and enamels, facilitate production of certain glasses of high electrical resistance and have many other desirable effects that render them of great benefit in the field of ceramics.

Lithium as a metal has so far had limited application. Its principal use appears to be as a scavenger of impurities in refining non-ferrous metals and as a grain-refining agent. Only very small amounts are added for these purposes. Lithium alloys of magnesium, aluminum, copper, lead and zinc are under development and have promise.

The use of lithium in nuclear-energy production and as a source of fuel for rockets and guided missiles has received much publicity, and speculation as to its exact function has been widespread. Little information is available in either case, but from scientific publications it has become generally known that tritium, a reported constituent of the hydrogen bomb, is obtained by bombarding the lithium −6 isotope with neutrons. The association of lithium with solid fuels is in the form of lithium hydride. The chemical compound furnishes a readily available source of hydrogen, which is a high-energy fuel.

Other common applications include the use of lithium hydrozide as a constituent of the electrolyte in alkaline storage batteries, of lithium chloride and bromide in air-conditioning units, and in refrigeration systems; of lithium fluoride as a flux in the welding and brazing of aluminum; and of compounds in the production of single-crystal optical units, in the control of reactions leading to the formation of alkyd resins for use in paints and in the manufacture of dry-cell batteries which will function at extremely low temperatures where normal cells are inoperative.

TABLE 40. Producers' Shipments of Lithia, 1957-66

Year	Pounds	Value	Year	Pounds	Value
		$'000			$'000
1957	5,140,257	2,827	1962	499,736	559
1958	3,853,322	2,048	1963	644,354	682
1959	2,756,280	1,422	1964	1,056,408	1,155
1960	204,666	84	1965	1,013,565	1,141
1961	536,190	393	1966	253,566	261

TABLE 41. World Production of Lithium Minerals, by Countries

Country	Mineral produced	1962	1963	1964	1965	1966
		short tons				
North America:						
Canada[1]	Spodumene	[2]250	[2]322	[2]528	[2]507	[2]127
United States	Lithium minerals					
South America:						
Argentina	Lithium minerals	496	1,583	799	686	287
Brazil	Amblygonite (exports)	—	—	—	28	—
	Spodumene (exports)	165	28	—	7,512	100[3]
Surinam	Amblygonite (exports)	827	568	..	..	..
Africa:						
Mozambique	Lepidolite	302	115	—	83	—
Rhodesia, Southern	Eucryptite	866	1,142[r]	806	705[3]	..
	Amblygonite	35	52	—	—	..
	Lepidolite	21,244	16,157	22,943	17,700[3]	..
	Petalite	21,704	29,946	36,449	29,900[3]	..
	Spodumene	1,496	2,235	6,965	15,300[3]	..
Rwanda	Amblygonite	359	406	325	—	—
South Africa, Republic of	Lithium minerals	1,263	417	179	958[r]	337
South-West Africa	Amblygonite	141	128	13	39	30
	Lepidolite	1,781	86	407	298	365
	Petalite	1,008	865	798	1,332	1,344
Uganda	Amblygonite	22	53	22	22	—
Oceania:						
Australia	Petalite	94	437	233		
	Amblygonite	31	22	—	347[r]	1,112
	Spodumene	26	24	58		

[1] Tons of lithia in spodumene concentrates.
[2] Figure withheld to avoid disclosing company confidential data.
[3] Estimate.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

MAGNESITE AND BRUCITE

Magnesitic dolomite is mined 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.

Most of the magnesia output is sold for the manufacture of basic refractories, but some is used as a 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.

Brucitic limestone, a rock composed of granules of the mineral brucite (magnesium hydroxide) thickly distributed throughout a matrix of calcite, was quarried from large deposits near Wakefield, Quebec, but this mine is now closed.

TABLE 42. Production of Magnesitic Dolomite, 1957-66

Year	Value	Year	Value
	$'000		$'000
1957	3,046	1962	3,432
1958	2,529	1963	3,440
1959	3,051	1964	3,570
1960	3,279	1965	4,011
1961	3,064	1966	3,949

Note: Above figures include the value of brucite shipped, dead burned magnesitic dolomite and serpentine used or sold.

TABLE 43. Magnesite and Dolomite Used in the Canadian Primary Iron and Steel, 1962-66

Year	Calcined dolomite		Dolomite, crude		Magnesite	
	Tons	Value	Tons	Value	Tons	Value
		$'000		$'000		$'000
1962	90,269	2,316	667,613	1,258	15,320	1,030
1963	100,415	2,565	663,560	1,280	13,588	967
1964	103,609	2,635	729,514	1,415	14,600	981
1965	120,249	3,090	765,707	1,520	12,478	802
1966	111,022	2,773	819,352	1,766	8,573	495

TABLE 44. World Production of Magnesite, by Countries[1]

Country	1962	1963	1964	1965	1966
	tons				
North America:					
United States	492,471[1]	527,655	[2]	[2]	[2]
South America:					
Brazil	103,348	99,536	103,331	137,394[r]	220,462[3]
Colombia	110	276	243	209	209[3]
Europe:					
Austria	1,771,863	1,447,099	1,826,058	2,001,363	1,779,829
Czechoslovakia	440,000[r,3]	475,000[r,3]	530,000[r,3]	550,000[r,3]	..
Greece	240,264[r]	294,999[r]	220,000[3]	385,000[3]	410,000[3]
Italy	9,275	7,512	6,954	3,898	2,867
Poland	37,589	29,321	41,900	46,300	46,000[3]
Spain	78,691	93,315	102,874	103,000[3]	103,000[3]
U.S.S.R.	2,760,000[3]	2,980,000[3]	3,090,000[3]	3,200,000[3]	3,200,000[3]
Yugoslavia	411,561	454,107	548,311	579,750[r]	580,570
Africa:					
Kenya	—	288	187	74	747
Rhodesia, Southern	11,619	12,067[r]	42,410	39,242[r]	33,000[3]
South Africa, Republic of	102,352	108,309	93,443	95,789	102,847
Sudan	—	—	—	—	3,307
Tanzania (exports)	—	94	546	1,260	5,270
Asia:					
China (mainland)	880,000[3]	990,000[3]	1,100,000[3]	1,100,000[3]	1,100,000[3]
India	234,669	258,564	228,985	263,128	255,736
Iran	551	..	6,033	..	..
Korea, North	550,000[3]	880,000[3]	990,000[3]	990,000[3]	1,100,000[3]
Pakistan	336	968	680	577	550[3]
Turkey	10,736	19,750	43,065	83,320	45,903
Oceania:					
Australia	69,654	63,780	35,001	28,405[r]	11,000[3]
New Zealand	711	875	676	937	624
World Totals[3]	**8,355,000**	**8,905,000[r]**	**9,790,000[r]**	**10,365,000[r]**	**9,775,000**

[1] Quantities in this table represent crude magnesite mined. Magnesite is also produced in Canada and Bulgaria but data on tonnage output are not available; estimates included in total.
[2] Withheld to avoid disclosing individual company confidential data.
[3] Estimate.

Source. "Minerals Yearbook" published by the United States Bureau of Mines.

MAGNESIUM SULPHATE

There has been no commercial production of magnesium sulphate in Canada since 1942.

Natural hydrous magnesium sulphate (Epsom salts of 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 lakes in Saskatchewan.

Canada's output of magnesium sulphate has come chiefly from a deposit near Basque, British Columbia.

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 45. Imports of Magnesium Sulphate, 1957-66

Year	Tons	Value	Year	Tons	Value
		$'000			$'000
1957	2,558	71	1962	2,806	81
1958	2,453	71	1963	3,361	88
1959	2,721	71	1964	..	..
1960	2,434	64	1965	..	..
1961	2,591	70	1966	..	..

Source: Trade of Canada, "Imports by Commodities", Catalogue No. 65-007.

TABLE 46. Available Data on Consumption of Magnesium Sulphate, 1962-66

Industry	1962	1963	1964	1965	1966
	tons				
Leather tanneries	412	436	397	368	362
Medicinals	571	408	513	492	750
Fertilizers	40	131	85	165	79
Totals accounted for	**1,023**	**975**	**995**	**1,025**	**1,191**

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 47. Mica Production (Primary Sales), by Classes, 1965 and 1966

Grade	1965		1966	
	Pounds	Total value f.o.b. shipping point	Pounds	Total value f.o.b. shipping point
		$'000		$'000
Rough, mine-run or rifted	–	–	–	–
Mica sold for mechanical splitting	10,800	2	–	–
Splittings	–	–	–	–
Ground or powdered	299,500	13	339,800	14
Scrap, mine or shop waste and mica mined and sold for grinding	236,050	7	199,960	4
Trimmed mica	1,261	3	960	[1]
Unspecified	–	–	–	–
Totals, mica shipments	**547,611**	**25**	**540,720**	**18**
Varieties:				
Phlogopite mica (amber) and biotite	547,611	25	–	–
Muscovite mica (white) and schist	–	–	–	–

[1] Less than $1,000.

TABLE 48. Producers' Shipments of Mica, 1957 - 66

Year	Tons	Value	Year	Tons	Value
		$'000			$'000
1957	641	112	1962	602	85
1958	752	90	1963	592	44
1959	407	63	1964	599	86
1960	856	94	1965	274	25
1961	908	125	1966	270	18

TABLE 49. Imports and Exports of Mica, 1964 - 66

	1964		1965		1966	
	Pounds	Value	Pounds	Value	Pounds	Value
		$'000		$'000		$'000
Imports:						
Rough, scrap or schist	544,000	19	228,000	10	..	..
Blocks, sheets or ground	5,340,000	568	6,007,600	482	6,368,300	579
Fabricated	...	742	...	605	...	682
Exports	..	..	..	..	..	..

Source: Trade of Canada, "Imports by Commodities", Catalogue No. 65-007 and "Exports by Commodities", Catalogue No. 65-004.

TABLE 50. Consumption of Mica, in Specified Industries, 1962-66

	1962	1963	1964	1965	1966
	pounds				
By industries:					
Paints	1,780,195	1,938,765	2,071,989	1,712,211	1,461,634
Rubber tire and tube	...	...	542,815	506,360	560,018
Rubber footwear	6,524	7,123	273	290	240
Rubber industries	..	..	93,097	90,246	98,782
Roofing	42,000	38,000	456,000	—	—
Non-metallic mineral products	150,000	213,000	257,921	273,535	137,320
Small electrical appliances	120,000	54,770	32,673	62,985	90,435
Major appliances	250,000	255,000	240,000	98,561	55,314
Communications equipment	18,141	4,150	4,120	45,687[r]	60,374
Electrical industrial equipment	87,239	390,728	459,945	379,468	367,905
Electrical wire and cables	7,400	13,900	1,250	2,105	2,359
Miscellaneous electrical products	4,000	8,000	40,400	150	—
Totals accounted for	**2,465,499**	**2,923,436**	**4,200,483**	**3,171,498[r]**	**2,829,652**
By provinces:					
Quebec, Nova Scotia and Newfoundland	1,307,237	1,469,183	1,453,279	1,129,137	947,047
Ontario	985,910	1,271,958	1,965,249	1,638,030[r]	1,394,406
Manitoba	60,830	54,217	70,887	66,729	66,667
Alberta	42,000	42,000	624,257	203,500	281,624
British Columbia	69,522	86,078	86,811	134,102	139,908
Canada	2,465,499	2,923,436	4,200,483	3,171,598[r]	2,834,381

See footnote 1 Table 11.

TABLE 51. World Production of Mica by Countries

Country[1]	1962	1963	1964	1965	1966
	thousands of pounds				
North America:					
Canada (shipments):					
Block	132	16	89	13	4
Ground	610	814	616	298	340
Scrap	456	353	494	236	201
Mexico	—	578	670	1,204	873
United States (sold or used by producers):					
Sheet	363	103	243	716	4
Scrap	215,404	218,646	229,458	240,510	226,263
South America:					
Argentina:					
Sheet	108	196	315	231	990[2]
Waste and splittings	—	—	1,173	260	260[2]
Brazil	3,885	3,289	3,241	3,089	2,244
Europe:					
Austria[3]	33	—	—	—	—
France	190	381	646	430[r]	440[2]
Germany, West	20	11	18	26[r]	25[2]
Norway, including scrap	2,200	6,610[2]	8,814[r]	6,614[r]	6,610[2]
Sweden, ground	126	44	46	—	—
Yugoslavia	4	77	26	119[r]	120[2]

See footnote(s) at end of table.

TABLE 51. World Production of Mica by Countries – Concluded

Country[1]	1962	1963	1964	1965	1966
	thousands of pounds				
Africa:					
Angola:					
Scrap and splittings	108	–	–	–	–
Malagasy Republic (phlogopite):					
Block	181	214	205	201	141
Splittings	2,780	1,914	1,299	1,186	1,440
Mozambique (including scrap)	2	–	–	22	..
Rhodesia, Southern:					
Block	33	60	75	64	..
Crude	172	225	157	176	..
South Africa, Republic of:					
Sheet	2	40	104	2	1
Scrap	4,900	4,680	6,764	5,000	4,927
South West Africa	150	1,197	831	260	55
Tanzania (exports):					
Sheet	218	236	212	227	194
Scrap	–	–	324	370	880
Zambia: Sheet	–	–	4	9	..
Asia:					
India (exports):					
Block	4,396	3,979	4,264	3,179	3,662
Splittings	18,838	15,595	19,378	20,781	14,138
Scrap	45,523[3]	55,547[3]	42,256[3]	58,787[3]	54,901[3]
Oceania:					
Australia: Damourite	–	1,102[r]	1,270	1,728[r]	1,193
World totals[1,2,4]	**300,834**	**315,907**	**322,992**	**345,738**	**319,906**

[1] Mica is also produced in China, Rumania and U.S.S.R., but data on production are not available.
[2] Estimate.
[3] Includes condenser film as follows: 1962, 412,000 pounds; 1963, 234,000 pounds; 1964, 198,000 pounds; 1965, 178,500 pounds; 1966, 212,000 pounds.
[4] Total is of listed figures only; no undisclosed data included.

Source: "Minerals Yearbook" Published by the United States Bureau of Mines.

PERLITE

Perlite is a volcanic glass characterized by a concentric "onion skin" fracture and usually a 2 to 6 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 has been no production reported since.

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 phosphorous and various phosphorous 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, 1943-66

Year	Tons	Value	Year	Tons	Value
		$'000			$'000
1943	1,451	18	1948	–	–
1944	482	7	1949	20	--
1945	299	4	1950	129	1
1946	57	1	1951	6	--
1947	–	–	1952-66	–	–

TABLE 53. Imports of Phosphate Rock, 1957-66

Year	Tons	Value	Year	Tons	Value
		$'000			$'000
1957	723,220	5,898	1962	1,155,966	10,843
1958	744,164	6,854	1963	1,297,427	12,204
1959	747,068	7,468	1964	1,406,424	11,719
1960	941,998	8,320	1965	1,695,296	13,991
1961	1,056,885	9,679	1966	2,181,341	19,850

Source: Trade of Canada, "Imports by Commodities", Catalogue No. 65-007.

TABLE 54. Consumption of Phosphate Rock, 1962-66

	1962	1963	1964	1965	1966
	tons				
By uses:					
Fertilizers, mixed	339,509	400,217	532,759	561,003	584,881
Chemicals	752,796	781,427	908,695	1,127,758	1,308,070
Feed manufacturers	34,659	30,325	37,951	42,751	50,942
Totals	**1,126,964**	**1,211,969**	**1,479,405**	**1,731,512**	**1,943,893**
By provinces:					
Newfoundland, Prince Edward Island, Nova Scotia	356	773	947	1,154	1,415
New Brunswick	1,367	1,587	2,305	1,589	1,798
Quebec	235,502	251,742	255,353	369,106	288,872
Ontario	288,046	352,031	474,800	488,620	480,997
Manitoba	2,231	2,093	2,608	24,710	49,445
Saskatchewan	995	961	967	1,156	1,482
Alberta	176,574	179,378	185,551	257,884	449,048
British Columbia	421,893	423,404	556,874	587,293	670,836
Canada	**1,126,964**	**1,211,969**	**1,479,405**	**1,731,512**	**1,943,893**

TABLE 55. World Production of Phosphate Rock by Countries

Country[1]	1963	1964	1965	1966
	thousand short tons			
North America:				
Mexico	38[r]	37[r]	44	61
Netherlands Antilles (exports)	141	132	127	163
United States	22,238	25,715	29,436	39,044
South America:				
Brazil: Apatite	237	215	211	325
Phosphate rock	70	56	96	92
Chile: Apatite	15	14	11	—
Guano	24	17	24	17
Peru: Guano	206	226	187	61
Venezuela	—	—	7[2]	66[2]
Europe:				
Belgium	15	24	24[2]	24[2]
France: Phosphatic-chalk	56	48	38	26
Poland	71	98	103	103[2]
U.S.S.R.: Apatite	5,250[r,2]	7,360[r,2]	8,650[r,2]	9,300[2]
Sedimentary rock	4,200[r,2]	4,800[r]	6,670[r,2]	7,440[2]
Africa:				
Algeria	384	80	95	88[2]
Morocco	9,423	11,131	10,830	10,405
Senegal: Aluminum phosphate	139	133	149	160
Calcium phosphate	518	746	956	1,091
Seychelles Islands: Guano (exports)	8	4	7	4
South Africa	501	638	672	1,172
Togo	567	829	1,065	1,228
Tunisia	2,613	3,032	3,351	3,527
Uganda: Apatite	8	11	18	17
Asia:				
China (mainland)	800[2]	900[2]	1,000[2]	1,100[2]
Christmas Island	730	868	828	1,065
India: Apatite	14	4	8[r]	18
Indonesia	1	4	4[2]	11[2]
Israel	331	265	428	441[2]
Jordan	677	666	913	1,142
Korea, North: Apatite	220[2]	220[2]	220[2]	276[2]
Viet-Nam, North: Apatite	1,020[2]	1,100[2]	1,100[2]	1,100[2]
Phosphate rock	55[2]	55[2]	55[2]	55[2]
Oceania:				
Australia	6	6	5	6
Makatea Island	370	428	340	195
Nauru Island (exports)	1,733	2,038	1,649[r]	2,245
Ocean Island (exports)	399	362	414[r]	419
Totals	**53,078[r]**	**62,262[r]**	**69,735[r]**	**82,487**

[1] A negligible amount of phosphate rock was produced in Cambodia, Jamaica, Philippines and Tanzania and of Guano in Argentina, Territory of South-West Africa and Philippines.
[2] Estimate.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

POTASH

All producers of potash were located in Saskatchewan. The International Minerals and Chemical Corp. at Esterhazy and the Potash Company of America at Patience Lake operated underground mines. Kalium Chemicals Limited at Belle Plaine produced potash by solution mining.

Although the products may be potassium chloride, the market quotations and other calculations are usually based on the K_2O equivalent. In recent years many millions of dollars have been expended in developing the extensive potash deposits in Saskatchewan. Drilling has indicated that these beds of sylvite and carnallite extend westward from the Manitoba border through the Saskatoon area to Unity, a distance of nearly 400 miles. Several firms were sinking shafts to mine these deposits which lie at depths of from 2,550 to 3,500 feet.

TABLE 56. Principal Statistics,[1] Potash Mines, 1965 and 1966

Year	Establishments	Mining activity							Total activity				
		Production and related workers			Cost of fuel and electricity	Cost of materials and supplies	Value of production	Value added	Working owners and partners		Total employees		Total value added
		Number	Man-hours paid	Wages					Number	Withdrawals	Number	Salaries and wages	
	No.		'000	$'000						$'000		$'000	
1965	3	674	1,427	4,110	3,133	7,344	58,392	47,915	–	–	1,050	6,616	47,948
1966	3	749	1,700	5,067	3,347	8,660	62,608	50,601	–	–	1,195	7,880	50,308

[1] These statistics have been included in Table 1.

TABLE 57. Producers' Shipments of Potash (K_2O), 1959-66

Year	Tons	Value	Year	Tons	Value
		$'000			$'000
1959	..	1,408	1963	626,860	22,[illegible]
1960	..	179	1964	858,351	31,[illegible]
1961	–	–	1965	1,491,301	55,[illegible]
1962	..	3,000	1966	1,990,053	62,[illegible]

TABLE 58. World Production of Potash (Marketable) in Equivalent K_2O, by Countries

Country	1962	1963	1964	1965	1966
			short tons		
North America:					
Canada	150,000[1]	626,860	858,351	1,491,301[r]	1,990,053
United States	2,452,921	2,864,037	2,897,000	3,140,000	3,320,000
South America:					
Chile nitrate	19,541[1]	20,540[1]	14,881[1]	15,650[1]	16,200
Europe:					
France	1,897,958	1,897,661	1,991,390[r]	2,080,794[r]	1,964,418
Germany:					
East	1,931,247	2,034,000	2,046,990	2,123,049[r]	2,211,234
West	2,138,637	2,147,300	2,426,184	2,623,722[r]	2,525,392
Italy	170,142	180,779[r]	210,541[r]	265,657[r]	287,703[1]
Spain	259,156	331,165[r]	379,913[r]	474,643[r]	522,225
U.S.S.R.[1]	2,100,000[1]	2,260,000[1]	2,425,000[1]	2,590,000[1]	2,800,000[1]
Asia:					
Israel[2]	100,200	124,561	281,640	341,700[1]	410,100
World totals[3]	**11,219,802**	**12,486,903**	**13,531,890**	**15,151,516**	**16,047,325**

[1] Estimate.
[2] Year ended March 31 of year following that stated.
[3] Total is of listed figures only; no undisclosed data included.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

POZZOLAN

This mineral name has alternate spellings, pozzuolana, pozzuolane and pozzolana. It is a siliceous rock or leucitic tuff which was first quarried near Pozzuoli, Italy and used in the manufacture of hydraulic cement. Artificial pozzolan is made from slag, fly ash, etc. In British Columbia, at Bamberton the British Columbia Cement had facilities to produce this commodity. At Saltspring Island a rotary kiln plant was operated by Holdfast Natural Resources Ltd. Producers' shipments were valued at $4,927 in 1962; $17,994 in 1963; 35,200 in 1964 and nil in 1965. Pozzolan production appears to be uneconomic.

PYRITE, PYRRHOTITE

Pyrite and pyrrhotite are by-products which are produced from the processing of the metal sulphide ores of Noranda, Quemont, and Normetal 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.

At Copper Cliff, a plant of the international Nickel Co. of Canada Ltd. treats pyrrhotite, containing some nickel, to produce iron oxide pellets and nickel carbonate. Since 1961 the data on this material have been included in the figures on by-products iron ore. Falconbridge Nickel Mines Ltd. calcines the sulphide ore to produce a feed material for the iron and steel furnaces.

TABLE 59. Producers' Shipments Pyrite and Pyrrhotite, 1957-66

Year	Gross weight	Sulphur content	Value	Year	Gross weight	Sulphur content	Value
	tons		$'000		tons		$'000
1957	1,166,416	515,096	4,808	1962	517,308	257,084	1,880
1958	1,191,731	512,427	4,249	1963	476,438	235,410	1,644
1959	1,099,564	465,611	3,433	1964	351,850	173,182	1,126
1960	1,032,288	437,790	3,316	1965	382,177	186,960	1,285
1961	517,258	255,376	1,831	1966	326,954	162,300	1,139

TABLE 60. World Production of Pyrites (including Cupreous Pyrites), by Countries

Country	1963		1964		1965		1966	
	Gross weight	Sulphur content	Gross weight	Sulphur content	Gross weight	Sulphur content	Gross weight	Sulphur content
	thousand long tons							
North America:								
Canada (sales)	425	210[r]	314	152[r]	341[r]	167[r]	291	145
Cuba	33	15	30	13	30[1]	13[1]	30[1]	13[1]
United States	825	344	847	354	875	354	872	356
Europe:								
Bulgaria	128	54	144	61	151[r]	63[r]	157[1]	66[1]
Czechoslovakia	342	134	355	140	369[r]	144[r]	346	135[1]
Finland	533	224	539	258	573	278	508	261[1]
France	248	107	188	78	132	57	87	36
Germany:								
West	349	158	417	184[1]	432	194	443	203
Greece	136	62	138	62	102[r]	46[r,1]	133	60[1]
Italy	1,380	638	1,373	618	1,379	609	1,284	578
Norway	710	323	698	314	698	312[r]	667	297
Poland	213	85	230	87	235[1]	90[1]	235[1]	90[1]
Portugal	593	273	598	275	604	279	549	253
Rumania	328	131	403	160	405[1]	160[1]	354	138
Spain	1,995	941	2,355	1,117	2,386[r]	1,131[r]	2,380	1,115
Sweden	396	186	438	220[1]	434[r]	217[r]	427	218
U.S.S.R.	3,150[1]	1,670[1]	3,150[1]	1,670[1]	3,250[1]	1,720[1]	3,250[1]	1,720[1]
Yugoslavia	351	140	421	168	401	160	372	156
Africa:								
Algeria	37	17	60	28	56	26	50[1]	25[1]
Morocco	23	7	21	6	18	5	15	4
Rhodesia, Southern	65	24	81	30	81[1]	30[1]	..	..
South Africa, Republic of	412	165[1]	426	161[r,1]	422	170[1]	474	189[1]

See footnote(s) at end of table.

TABLE 60. World Production of Pyrites (including Cupreous Pyrites), by Countries – Concluded

Country	1963		1964		1965		1966	
	Gross weight	Sulphur content	Gross weight	Sulphur content	Gross weight	Sulphur content	Gross weight	Sulphur content
	thousand long tons							
Asia:								
China	1,180[1]	530[1]	1,280[1]	575[1]	1,480[1]	665[1]	1,480[1]	665[1]
Cyprus[4]	905	440	674[r]	324[r]	947	475[r]	972	380
Japan[2]	3,833	1,623	4,081	1,743	4,255	1,808[r]	4,659	1,958
Korea:								
North[2]	395[1]	157[1]	415[1]	167[1]	445[1]	177[1]	490[1]	195[1]
South	[3]	[3]	[3]	[3]	[3]	[3]	4	1
Philippines	57	27	43	21	104	48	113	51
Taiwan	46	17	46	17	39	16	41	17
Turkey	96	44	111	51	130	60	171	81
Oceania:								
Australia	194	85	220	95	204[2]	89[r]	246	107
World totals[2]	**19,378**	**8,831**	**20,096**	**9,149**	**20,978**	**9,563**	**21,100**	**9,513**

[1] Estimate.
[2] Tons of ore mined containing pyrites in thousand long tons: 1963, 2,139; 1964, 1,631; 1965, 3,330 tons and 1966, 3,507 tons.
[3] Less than ½ unit.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

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 with 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 61. Production of Sodium Carbonate (Natural), 1941-66

Year	Tons	Value	Year	Tons	Value
		$			$
1941	186	1,488	1946	–	–
1942	256	2,048	1947	163	1,793
1943	468	5,148	1948	–	–
1944	44	484	1949	47	513
1945	286	3,146	1950-66	–	–

SODIUM SULPHATE (NATURAL)

All the natural sodium sulphate produced in Canada was obtained from the brine lakes in Saskatchewan. Producers shipped 405,314 tons valued at $6,471,795 in 1966 compared with 345,649 tons valued at $5,527,281 in the preceding year.

Sodium sulphate occurs as crystals or in the form of highly concentrated brines in many lakes and deposits throughout Western Canada. From these, hydrated sodium sulphate, known as Glauber's salt, and anhydrous sodium sulphate, known to the trade as "salt cake", are produced in Canada.

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

TABLE 62. Producers' Shipments of Natural Sodium Sulphate, 1957-66

Year	tons	Selling value f.o.b. shipping point	Year	tons	Selling value f.o.b. shipping point
		$'000			$'000
1957	157,800	2,569	1962	246,672	3,954
1958	173,217	2,863	1963	256,914	4,121
1959	179,535	2,882	1964	333,263	5,222
1960	214,208	3,449	1965	345,469	5,527
1961	250,996	4,037	1966	405,314	6,472

TABLE 63. Imports of Sodium Sulphate, 1957-66

Year	Salt cake		Glauber's salt	
	Tons	Value	Tons	Value
		$'000		$'000
1957	28,086	511	1,512	51
1958	25,812	478	1,217	39
1959	27,157	511	966	40
1960	24,706	472	1,156	38
1961	32,310	575	899	29
1962	31,347	609	426	23
1963	19,002	386	495	28
1964	30,833	599	[1]	[1]
1965	29,347	537	[1]	[1]
1966	31,262	583	[1]	[1]

[1] Included with salt cake.

Source: Trade of Canada, "Imports by Commodities", Catalogue No. 65-007.

TABLE 64. Exports of Sodium Sulphate, 1957-66

Year	Tons	Value	Year	Tons	Value
		$'000			$'000
1957	37,023	593	1962	74,049	1,211
1958	39,763	646	1963	65,348	1,077
1959	47,922	752	1964	107,318	1,776
1960	63,831	1,026	1965	116,345	1,927
1961	87,131	1,331	1966	101,417	1,687

Source: Trade of Canada, "Exports by Commodities", Catalogue No. 65-004.

TABLE 65. Available Data on Consumption of Sodium Sulphate (Salt Cake) in Canada, by Industries, 1962 - 66

Industry	1962	1963	1964	1965	1966
	tons				
Pulp and paper	200, 166	221, 107	242, 858	261, 835	323, 911
Glass, including glass wool	3, 026	3, 035	3, 264	3, 281	3, 987
Medicinals	56	71	151	79	55
Soaps	1, 136	958	2, 393	1, 944	1, 472
Mineral wool	259	306	301	209	299
Explosives and ammunition	—	200	..	..	..
Totals accounted for	**204, 643**	**225, 677**	**248, 967**	**267, 348**	**329, 724**

SULPHUR

Native sulphur deposits of commercial grade have not been found in Canada, but large tonnages of metal sulphide ores are smelted. In smelting these ores sulphur dioxide gas is produced, some of which is recovered to make sulphuric acid or liquid sulphur dioxide. At Trail, British Columbia, the sulphur dioxide generated by smelting lead-zinc sulphide ores is converted into sulphuric acid. At Copper Cliff, Ontario, the Canadian Industries Limited uses the smelter gases from the International Nickel plant to make sulphuric acid and sulphur dioxide. Zinc sulphide concentrates are shipped to Arvida where the concentrates are calcined to produce sulphur dioxide which is used to make sulphuric acid. The roasted material is exported to smelters for the recovery of zinc and other metals. Concentrates are similarly processed at the Sherbrooke Metallurgical Co. Limited, Port Maitland, Ontario and at Allied Chemical Canada Ltd., Valleyfield, Quebec.

Sour natural gas in the western provinces is processed to remove the hydrogen sulphide. The treatment of large volumes of natural gas means that there are large tonnages of elemental sulphur produced as a by-product. The output of sulphur has exceeded the market demand. Statistics on the operations of the sulphur plants are included in Petroleum and Natural Gas, Standard Industrial Classification – 054.

Elemental sulphur is also produced in the processing of nickel sulphides at the nickel refineries.

TABLE 66. Sulphur in Smelter Gases, 1957 - 66

Year	Quantity[1]	Value	Year	Quantity[1]	Value
	tons	$'000		tons	$'000
1957	235,123	2, 322	1962	292, 728	3, 090
1958	241, 055	2, 361	1963	353, 243	3, 488
1959	277, 030	2, 716	1964	443, 448	4, 262
1960	289, 620	2, 855	1965	444, 758	4, 317
1961	277, 056	2, 708	1966	500, 338	6, 051

[1] Includes sulphur in acid made from zinc sulphide at Arvida, Port Maitland and Valleyfield.

TABLE 67. Sulphur (Elemental)[1,2] Recovered from Crude Petroleum, Natural Gas and Sulphides, 1957 - 66

Year	Output	Shipments	
		Quantity	Value
	tons	tons	$'000
1957	107, 478	93, 338	..
1958	186, 055	94, 377	1, 873
1959	294, 775	145, 656	2, 621
1960	454, 045	274, 359	4, 299
1961	550, 101	394, 762	7, 288
1962	1, 167, 999	695, 098	9, 287
1963	1, 440, 802	1, 249, 887	13, 360
1964	1, 664, 413	1, 788, 165	18, 538
1965	1, 812, 612	2, 068, 394	26, 395
1966	1, 979, 298	2, 041, 528	40, 254

[1] Does not include sulphur from imported crude petroleum.
[2] Includes sulphur produced at nickel refineries.

TABLE 68. Imports of Sulphur, 1957-66

Year	Tons	Value	Year	Tons	Value
		$'000			$'000
1957	416,930	9,752	1962	195,089	4,638
1958	380,331	8,324	1963	150,637	3,505
1959	332,430	6,925	1964	149,567	3,475
1960	328,765	6,629	1965	162,201	3,829
1961	329,555	7,094	1966	145,465	4,160

Source: Trade of Canada, "Imports by Commodities", Catalogue No. 65-007.

TABLE 69. Available Data on the Consumption of Sulphur (Brimstone), 1962-66

	1962	1963	1964	1965	1966
	tons				
By industries:					
Pulp and paper	315,279	332,550	349,568	367,233	397,726
Industrial chemicals	243,318	257,669	243,696	269,060	343,146
Rubber footwear	108	102	120	111	107
Rubber tire and tube	...	...	2,209	2,320	2,623
Rubber industries	...	...	994	1,025	956
Miscellaneous foods	323	416	22	—	—
Fruit and vegetable preparations	1	1	—	11	—
Sugar refining	169	147	338	211	224
Petroleum refining	186	160	156	107	207
Steel and iron	1,349	1,407	238	264	168
Miscellaneous chemicals, explosives	27,880	30,537	30,137	32,553	31,583
Malt products	127	...	...	...	...
Totals accounted for	**588,740**	**622,989**	**627,478**	**672,894**	**776,740**
By provinces:					
Newfoundland and Prince Edward Island	21,998	23,115	25,337	25,375	26,107
Nova Scotia	11,883	11,456	13,661	13,042	14,957
New Brunswick	42,722	44,942	44,920	49,375	50,964
Quebec	165,364	174,867	166,874	176,109	211,345
Ontario	188,197	207,656	229,638	225,275	245,492
Manitoba and Saskatchewan	27,959	25,175	6,875	15,839	17,209
Alberta	68,188	71,904	73,213	93,496	142,336
British Columbia and Northwest Territories	62,429	63,874	66,960	74,383	68,330
Canada	**588,740**	**622,989**	**627,478**	**672,894**	**776,740**

TABLE 70. Exports of Sulphur and Pyrite, 1962-66

Year	Pyrite	Sulphur	
	Value	Tons	Value
	$'000		$'000
1962	890	400,026	6,650
1963	938	820,929	11,972
1964	879	1,294,587	19,526
1965	979	1,497,947	26,491
1966	981	1,399,096	33,590

Source: Trade of Canada, "Exports by Commodities", Catalogue No. 65-004.

TABLE 71. World Production of Elemental Sulphur, by Countries

Country	1962	1963	1964	1965	1966
	long tons				
Native sulphur:					
Frasch:					
Mexico	1,350,375	1,456,656	1,635,773	1,481,241	1,611,446
United States	5,025,418[r]	4,881,927[r]	5,228,365[r]	6,116,406[r]	7,001,503
Totals	**6,375,793[r]**	**6,338,583[r]**	**6,864,138[r]**	**7,597,647[r]**	**8,612,949**
From sulphur ores:					
Argentina	22,303	22,338	21,955	23,391[r]	29,942
Bolivia (exports)	7,247	9,793	10,635	9,306	56,554
Canary Islands	5,905	6,889	9,842[r]	7,000[1]	7,000[1]
Chile	74,713[r]	42,751[r]	43,185[r]	34,413	39,671
China	120,000[1]	120,000[1]	120,000[1]	120,000[1]	120,000
Colombia	10,046	12,795	11,942	18,114	20,649
Ecuador	..	163	232	150	123
Indonesia	917	1,033	1,668	1,268	1,200[1]
Italy	53,454	134,640[r]	94,484	93,992	92,122
Japan[2]	220,438	219,095	237,413	209,881[r]	226,087
Mexico	26,751	28,968	25,989[r]	33,800[r]	29,322
Philippines	51[r]	47	68	47[r]	14
Poland	206,684	231,486	289,948	424,195	468,976
Taiwan	7,462	7,144	6,389	4,424	4,522
Turkey	18,247	19,123	21,849	21,947[r]	22,292
U.S.S.R.	950,000[1]	950,000[1]	950,000[1]	1,000,000[1]	1,000,000[1]
United Arab Republic (Egypt)	5,900[1]	490[1]	..	..	..
United States	40,840	415	158	133	143
Totals[3]	**1,770,958**	**1,807,170**	**1,845,757**	**2,002,061**	**2,117,294**
Totals, native sulphur	**8,146,751**	**8,145,753**	**8,709,895**	**9,599,708**	**10,730,243**
Other elemental:					
Recovered:					
Belgium	..	4,921	4,921	3,445	4,921
Brazil[4]	..	5,659	..	4,943	5,825
Bulgaria[5]	5,502	6,291	6,720	6,720[r]	11,000
Canada (sales)[6]	620,622	1,115,968	1,596,574	1,846,778[r]	1,822,800
China[4,5]	130,000[1]	130,000[1]	130,000[1]	130,000[1]	130,000
Finland	—	37,611	67,063	72,606	72,478
France[7]	1,325,538	1,386,285	1,486,846	1,497,180[r]	1,515,683
Germany:					
East	118,560[r]	117,981[r]	123,081[r]	122,836[r]	125,682
West	89,268[r]	84,949[r]	76,602[r]	75,412[r]	78,540
Hungary	3,576	2,938	3,050	3,396	3,500[1]
Iran[4]	15,000[1]	20,000[1]	20,000[1]	20,000[1]	20,000[1]
Italy	2,067	1,279	787	2,461	2,500[1]
Japan[4]	8,549	11,429	18,499	35,988[r]	52,187
Mexico[7]	46,545	43,308	36,284[r]	45,984[r]	38,111
Netherlands[5]	30,511	34,447[r]	28,444	26,475[r]	38,876
Netherlands Antilles: Aruba, Curacao	30,500[1]	34,400[1]	28,500[1]	30,000[1]	30,000[1]
Portugal[5]	6,677	15,358[r]	6,033	9,583[r]	6,228
South Africa, Republic of[4]	1,913	1,981	5,701	7,102	8,904
Spain	41,836	68,036	75,452	43,253[r]	27,819
Sweden[8]	29,980	25,885	27,009[r]	21,082[r]	9,842
Taiwan[4]	2,130	2,310	2,780	2,348	2,337
Trinidad[4]	7,157[1]	6,629[r]	5,322[r]	3,723[r]	4,010
U.S.S.R.	370,000[1]	400,000	400,000[1]	430,000[1]	430,000[1]
United Arab Republic (Egypt)	2,039	2,355[r]	2,427	3,648	11,490
United Kingdom[9]	51,929	46,529	53,701	47,992[r]	39,898
United States	899,598	946,753	1,021,358	1,215,168	1,240,386
Uraguay	—	—	—	—	49
Totals other Elemental	**3,839,497**	**4,553,302**	**5,227,154**	**5,708,123**	**5,733,066**
World Totals	**11,986,248**	**12,699,055**	**13,937,049**	**15,307,831**	**16,463,309**

[1] Estimate.
[2] Includes sulphur from mixed sulphur-sulfide ore.
[3] In some years Iran produces mined sulphur equivalent to 250-1,500 tons sulphur. No estimate in total.
[4] From refinery gases.
[5] From sulphide ores.
[6] Produced from natural gas. Includes a small quantity derived from treatment of nickel sulfide ores.
[7] From natural gas.
[8] From shale oil.
[9] Including sulphur recovered from petroleum refineries.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

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 intergrowth 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.

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 oilless bearings.

TABLE 72. World Production of Vermiculite, by Countries

Country[1]	1962	1963	1964	1965	1966
	tons				
Argentina	2,962	3,064	4,071[r]	1,857[r]	2,200[2]
Brazil	..	..	..	..	441
India	477[r]	746	473	807[r]	551
Kenya	22	101	37	24	84
South Africa, Republic of	85,534	98,758	111,872	126,911	113,732
Sudan	55	—	—	—	—
Tanzania	72	30	144	108	177
United Arab Republic (Egypt)	313[3]	33[3]	459[3]	639[3]	2,057[4]
United States (sold or used by producers)	205,747[r]	226,278	226,299	249,352	262,321
Totals[1,2]	**295,182**	**329,010**	**343,355[r]**	**379,698[r]**	**381,563**

[1] Vermiculite is produced in U.S.S.R., but data are not available, and no estimates are included in the total.
[2] Estimate.
[3] Includes Mica.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

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 1934 to 1953 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.

TABLE 73. World Production of Pumice, by Countries

Country[1]	1962	1963	1964	1965	1966
	tons				
Argentina[2]	12,916[r]	13,467[r]	4,383[r]	7,158[r]	8,900
Austria: Trass	30,696	23,349	25,223	22,516	23,238
Cape Verde Islands: Pozzolan	7,503	13,035	11,296	4,562[r]	4,400[3]
Chile: Pozzolan	120,315	142,002	155,885	156,094	160,291
France:					
Pumice	1,876	849	1,010	780[r]	888
Pozzolan	521,751	601,488	645,547	782,136[r]	740,370
Germany, West (marketable)	6,290,883	7,043,761	6,416,547	5,617,372	5,941,686
Greece:					
Pumice	87,938	111,858[r]	252,500[r]	220,000[3]	330,000[3]
Santorin earth	207,273	262,764[r]	345,745[r]	440,000[3]	390,000[3]
Iceland	7,200[3]	13,800[r]	11,000[r]	11,000[3]	11,000[3]
Italy:					
Pumice	349,862	722,917	679,206[r]	508,729[r]	582,258
Pumicite	160,607[r]	308,646[r]	382,061[r]	391,972[r]	..
Pozzolan	3,322,318	4,765,354	4,483,622[r]	4,265,113[r]	4,197,750
Kenya	1,243	1,245	1,585	1,145	874
New Zealand	36,425	18,599	22,980	120,807	20,807
Spain[4]	1,918	1,685	2,528	62,099	..
United Arab Republic[5]	..	5,600[3]	14,000[3]	15,100[3]	—
United States (sold or used by producers):					
Pumice and pumicite	533,226[r]	1,050,178	1,165,379	484,047	548,433
Volcanic cinder	1,788,077[r]	1,567,825	1,611,093	2,888,006[r]	2,685,324[6]
World Totals[7]	**13,482,027**	**16,668,422**	**16,231,600**	**15,998,636**	**15,646,219**

[1] Pumice is also produced in Japan, Mexico and U.S.S.R. (sizeable quantity) but data on production are not available.
[2] Includes volcanic ash and cinders and pozzolan.
[3] Estimate.
[4] In 1962, 1963 and 1964 Spain produced pumice in the Canary Islands only; production in Continental Spain began in 1965.
[5] Estimated on basis of 1 cubic meter = 1,300 pounds.
[6] Includes American Samoa.
[7] Totals are of listed figures only, no undisclosed data included.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

Operators of Miscellaneous Non-metallic Mineral Deposits, 1966

Name of operator	Head office address	Plant or mine location
BARITE		
Nova Scotia:		
Magnet Cove Barium Corp.	Walton	Pembroke
British Columbia:		
Baroid of Canada Ltd.	Box 250, Onoway, Alberta	Spillimacheen
Mountain Minerals Ltd.	Box 700, Lethbridge, Alberta	Brisco
BRUCITE		
Quebec:		
Aluminum Company of Canada Ltd.	Box 6090, Montreal	Wakefield
FLUORSPAR		
Newfoundland:		
Newfoundland Fluorspar Ltd.	327 Duckworth St., St. John's	St. Lawrence
MAGNESITIC DOLOMITE		
Quebec:		
Canadian Refractories Ltd.	540 Canada Cement Bldg., Montreal	Kilmar
POTASH		
Saskatchewan:		
International Minerals & Chemical Corp. of Canada Ltd.	4 King St. W., Toronto, Ontario	Esterhazy
Kalium Chemicals Ltd.	400 Bank of Canada Bldg., Regina	Pense
Potash Company of America	Box 509, Saskatoon	Patience Lake
SODIUM SULPHATE		
Saskatchewan:		
Midwest Chemicals Ltd.	Box 66, Edmonton, Alberta	Palo
Ormiston Mining & Smelting Co. Ltd.	Box 502 Scott Bldg., Moose Jaw	Ormiston
Saskatchewan minerals (sodium Sulphate Division)	Chaplin	Chaplin, Bishopric
Sybouts Sodium Sulphate Co. Ltd.	Box 1911, Wilmington, Delaware, U.S.A.	Gladmar, Saskatchewan
MICA		
Quebec:		
Blackburn Bros. Limited	85 Sparks St., Ottawa, Ontario	Cantley, Quebec

Operators of Miscellaneous Non-metallic Mineral Deposits, 1966 — Concluded

Name of operator	Head office address	Plant or mine location
SUPPLEMENT		
The following establishments classified to other industries e.g. Smelting and Refining recover the commodities indicated and are included for information purposes to support the statistical material relevant to these commodities which is presented in this report.		
DIATOMITE		
British Columbia:		
Fairey and Co. Ltd.	661 Taylor St., Vancouver	Quesnel
FLUORSPAR		
British Columbia:		
Pacific Silica Ltd.	Box 397, Oliver, B.C.	Oliver
GEMSTONES		
British Columbia:		
Osterlund, Ed	Lillouet	Lillouet
Purvis, Ron	Box 426, Lillouet	Lillouet
Seywerd, Josef	226-2nd Ave., Chilliwack	Chilliwack
GRINDSTONES		
New Brunswick:		
Read, H.C.	Sackville	Sackville
IRON OXIDE		
Quebec:		
Gélinas, Bruno	1521 Notre Dame, Trois-Rivières	Portneuf Co.
Red Mill Industries Ltd.	R.R. 1, Cap-De-La-Madeleine	Red Mill, Champlain Co.
LITHIUM MINERALS		
Quebec:		
Quebec Lithium Corp.	507 Place D'Armes, Montreal	Barrautre
PYRITE-PYRRHOTITE		
Quebec:		
Noranda Mines Ltd.	44 King St. W., Toronto, Ontario	Noranda
Normetal Mining Corp. Ltd.	44 King St. W., Toronto, Ontario	Normetal
Quemont Mining Corp. Ltd.	44 King St. W., Toronto, Ontario	Rouyn Twp.
British Columbia:		
Anaconda Co. (Canada) Ltd., (The)	260-8th St., Toronto, Ontario	Britannia Beach
SULPHUR (IN SMELTER GAS)		
Quebec:		
Allied Chemical Canada Ltd.	Valleyfield	Valleyfield
Aluminum Co. of Canada Ltd.	Sun Life Bldg., Montreal	Arvida
Canadian Electrolytrie Zinc Ltd.	44 King St W., Toronto	Valleyfield
Ontario:		
Canadian Industries Ltd.	Box 10, Montreal, Quebec	Copper Cliff
Sherbrooke Metallurgical Ltd.	Dunnville	Dunnville
British Columbia:		
Consolidated Mining & Smelting Company of Canada Ltd.	Trail	Trail

MISCELLANEOUS NON-METAL MINE 1966