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Mica. Canada

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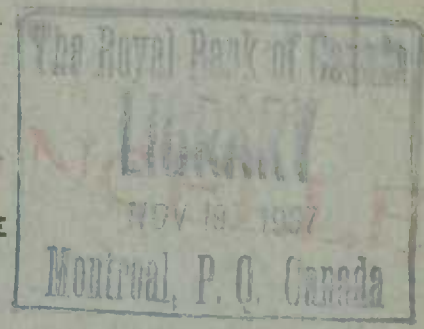
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DEPARTMENT OF TRADE AND COMMERCE

DOMINION BUREAU OF STATISTICS

CENSUS OF INDUSTRY

MINING, METALLURGICAL & CHEMICAL BRANCH



THE MICA INDUSTRY

IN

CANADA

1936



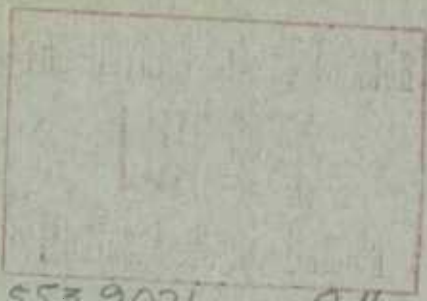
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1937

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DEPARTMENT OF TRADE AND COMMERCE  
DOMINION BUREAU OF STATISTICS  
MINING, METALLURGICAL AND CHEMICAL BRANCH  
OTTAWA - CANADA

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MICA - 1936.

The production of mica in Canada during 1936 totalled 1,601,557 pounds valued at \$74,556, according to finally revised figures issued by the Dominion Bureau of Statistics, Ottawa. Shipments during the year under review were 27.5 per cent higher in quantity and 9.1 per cent lower in value than those of the preceding year. Tonnage increases over 1935 were realized for knife-trimmed, thumb-trimmed, and scrap grades, whereas decreases were recorded for rough cobbled and splittings. The average price for rough cobbled mica showed a distinct increase over 1935, declines, however, occurred in the average prices for knife-trimmed, splittings and thumb-trimmed grades; the average price of scrap mica remained practically unchanged.

Commercial shipments of mica in 1936 were reported only from Ontario and Quebec and of the tonnage sold, 66 per cent came from Ontario properties. The total value of Quebec shipments was considerably higher than that reported for Ontario; this higher valuation resulted from the production in Quebec of a greater quantity of the better grades. In addition to the commercial production of mica recorded for Quebec and Ontario there was a shipment in 1936 of some thirty tons of fine flake muscovite mica to Vancouver; this was produced at Baker Inlet near Prince Rupert and was destined for grinding.

The value of Canadian mica production has declined greatly during recent years, particularly since 1926 when the value of shipments totalled \$229,204. Canadian mica sales in 1886, the first year for which statistics are available, were valued at \$29,008; from 1898 to 1927, inclusive, the annual output, with the exception of those of 1915 and 1921, exceeded \$100,000 in value. The value of Canadian mica production in 1920 totalled \$376,022, the highest ever recorded in the Dominion.

The value of Canadian mica exports in 1936 totalled \$87,300 compared with \$75,950 in 1935; of the 1936 total the combined exports of rough cobbled, knife and thumb-trimmed grades comprised 70 per cent or \$61,474 and of these particular grades those shipped to the United Kingdom were appraised at \$52,350 and those to the United States at \$7,659. Exports of scrap and waste in 1936 totalled 2,473,600 pounds valued at \$14,152 as against 1,340,000 pounds at \$6,189 in 1935; the entire export in 1936 was to the United States.

The mica mining industry reported twenty-two properties as active during 1936, sixteen of these being located in Quebec and six in Ontario. Capital employed in 1936 amounted to \$221,800 and \$44,550 were distributed as salaries and wages to 101 employees. The gross value of products totalled

\$74,556 and the net value was estimated at \$64,732.

The Bureau of Mines, Ottawa, describes the production of sheet mica in Canada as almost wholly of the phlogopite or amber mica variety. It is derived almost entirely from adjacent sections of Ontario and Quebec, within an area extending roughly from Kingston, on Lake Ontario, northeastward into Hull and Papineau counties, Quebec.

"The production of muscovite, or white mica, in Canada has been negligible. Small amounts have been recovered occasionally from feldspar mining operations but, in general, the proportion of sound, merchantable sheet mica in Canadian pegmatites has proved too low for profitable mining.

"There was some prospecting and working of both old and new properties in 1936 and toward the end of the year two long-idle mines in the Gatineau River district of Quebec were reopened. In addition there was a small production of muscovite mica from the old Pied des Monts mine, near Murray Bay, Quebec, as well as some prospecting of other muscovite occurrences in the Saguenay region.

"The abundant supply of cheap, skilled native labour, both in India (the main source of muscovite mica) and Madagascar, has reduced the making of all classes of splittings to small proportions on the American continent. The better grades of Canadian amber mica, however, are considered superior in point of heat-resistance to much of the Madagascar product, and the improvement in trimming practice has resulted in a revived interest by the British trade in Canadian supplies of sheet mica for heater purposes."

Vermiculite is a term applied to a group of micaceous minerals that generally are alteration products of mica; connected with the loss of water upon ignition is the common character of exfoliation. Calcined vermiculite products include house insulation, acoustic plaster and a variety of other materials. There is no record to date of any commercial production of crude vermiculite in Canada. The mineral is, however, being imported from Montana for processing in Canadian plants.

#### STANDARDS AND SPECIFICATIONS - UNITED STATES

(National Association of Purchasing Agents, 11 Park Place, New York)

"The specifications on which mica is purchased naturally vary according to its uses. For electrical purposes the dielectric strength, power factor, resistance to heat, and sometimes flexibility are important properties. Specifications for dielectric strength differ widely for different electrical uses and with different consumers, but all mica free from cracks, pinholes, and certain types of staining has such a high dielectric strength that it rarely fails from electric puncture. Some types of staining seem to have little effect on the dielectric strength; in recent tests by the Bureau of Standards the dielectric strength of some stained micas in thickness of 5 mils and over was superior to that of perfectly clear micas. According to these same tests, bubbles in mica do not appear to affect its dielectric strength materially. A good dielectric mica, either stained or unstained, should withstand at least 1,000 volts per mil in thicknesses of 4 to 6 mils when tested with 2-inch plate electrodes.

"Mica for use in electrical condensers should have a low power factor; otherwise it will heat excessively under an electric load. Hence, stained micas or those containing bubbles should not be employed for this purpose. A satisfactory condenser mica should have a power factor of 0.02 per cent or less.

"All good electrical muscovite is sufficiently resistant to heat for ordinary electrical uses and will withstand 500° to 600° C. without appreciable change. Therefore no specification for heat resistance is usually required if the mica is not to be subjected to higher temperatures. A soft, light-colored phlogopite, however, should be specified for use above 600° C., as these grades of phlogopite are more resistant to heat than muscovite. Phlogopite is generally specified for use in commutators because it wears at the same rate as the copper segments, thereby keeping the surface of the commutator smooth.

"Flexibility is sometimes an important property of electrical mica; for example, a flexible mica is required in wrapping the spindles of spark plugs where thin sheets have to be rolled to small diameters. A usual specification for so-called "cigarette" mica is that a sheet 1 mil thick can be rolled into a cylinder 1/4 inch in diameter without cracking.

"Wet-ground mica is employed principally in the wall paper industries where a high luster and ability to mix smoothly with liquid vehicles are required. Wet-grinding under carefully regulated conditions is the only process known for reducing mica to fine sizes without destroying its sheen and slip. Freedom from biotite, heavy staining with clay or iron oxides, and excessive quantities of gritty minerals is a requisite for wet-ground mica for the wall paper trade. Color is also important, as some micas do not produce as white a product as others. If wet-ground mica is intended for the rubber trade color and freedom from dark specks is generally unimportant. Wet-ground mica should have a high metallic luster, should feel slippery and be free from grit, and should mix smoothly with liquid vehicles.

"Dry-ground mica is used chiefly to prevent adhesion between surfaces of asphalt shingles and rolled roofing and to impart wearing qualities and a pleasing finish to these products. For this purpose 10- to 40-mesh size weighing 14 to 20 pounds per cubic foot is usually specified. A light-weight mica is desired by the roofing trade, as it has a greater covering power per unit of weight than a heavier product. However, in an effort to obtain large coverage the appearance of the articles is sometimes sacrificed, as the flakes of an unusually light mica are so thin that the dark background of the material is too readily seen through them. Consequently they do not produce as bright and pleasing a finish as thicker and heavier flakes. Coarser sizes of dry-ground mica (4- to 10-mesh) are used for Christmas-tree snow and similar decorative purposes, but the consumption of these sizes is comparatively small."

Table 1 - PRINCIPAL STATISTICS OF THE MICA MINING INDUSTRY IN CANADA, 1934-1936.

	1 9 3 4	1 9 3 5	1 9 3 6
Number of firms .....	16	24	22
Capital employed .....	\$ 139,716	145,557	221,800
Number of employees - On salary .....	4	3	3
On wages .....	98	89	98
Total .....	102	92	101
Salaries and wages - Salaries .....	\$ 2,475	2,513	3,565
Wages .....	\$ 47,916	42,704	40,985
Total .....	\$ 50,391	45,217	44,550
Selling value of products (gross) .....	\$ 97,071	82,038	74,556
Cost of fuel and electricity .....	\$ 50	347	1,351
Cost of process supplies used .....	\$ (a)	348	3,473
Selling value of products (net) .....	\$ (a)	81,343	69,732

(a) Information not available.

Table 2 - NUMBER OF WAGE-EARNERS ON PAYROLL OR TIME RECORD ON 15th of EACH MONTH OR NEAREST REPRESENTATIVE DATE, 1935 and 1936.

Month	1 9 3 5		1 9 3 6	
	Mine	Shop	Mine	Shop
January .....	43	45	54	31
February .....	41	52	56	33
March .....	33	47	65	37
April .....	44	39	56	27
May .....	74	28	71	29
June .....	68	43	75	33
July .....	70	48	65	35
August .....	69	20	63	26
September .....	57	22	60	25
October .....	50	22	65	24
November .....	36	27	59	24
December .....	37	22	62	27

Table 3 - PRODUCTION OF MICA IN CANADA, BY GRADES, 1935 and 1936.

	1 9 3 5			1 9 3 6		
	Quantity Pounds	Value, f.o.b. shipping point \$	Price per pound \$	Quantity Pounds	Value, f.o.b. shipping point \$	Price per pound \$
Rough cobbed ..	30,605	2,448	0.08	10,940	2,615	0.24
Knife-trimmed .	111,459	52,959	0.48	113,169	48,086	0.42
Thumb-trimmed .	12,013	3,616	0.30	35,289	3,233	0.09
Splittings ....	32,921	15,506	0.47	24,376	9,780	0.40
Scrap .....	1,068,618	7,509	0.007	1,417,783	10,842	0.008
TOTAL .....	1,255,616	82,038	...	1,601,557	74,556	...

Table 4 - PRODUCTION OF MICA IN CANADA, BY PROVINCES, IMPORTS AND EXPORTS, 1935 and 1936.

	1935	1936	1935	1936
	Pounds	Value	Pounds	Value
		\$		\$
<b>PRODUCTION (SALES) -</b>				
Quebec .....	745,790	74,894	544,214	63,123
Ontario .....	509,826	7,144	1,057,343	11,433
British Columbia .....	...	...	(a)	(a)
TOTAL .....	1,255,616	82,038	1,601,557	74,556
<b>IMPORTS -</b>				
Mica and manufactures of, n.o.p. -				
From - United Kingdom .....	...	13,041	...	15,491
United States .....	...	46,765	...	45,790
British India .....	...	4,620	...	12,412
Germany .....	...	2,375	...	3,761
Other countries .....	...	...	...	368
TOTAL .....	...	66,801	...	77,822
Chalk, China, Cornwall or cliff stone and mica schist .....	...	20,229	...	32,253
<b>EXPORTS -</b>				
Mica, rough, cobbled, knife-trimmed and thumb-trimmed -				
To - United Kingdom .....	105,500	44,904	103,200	52,350
United States .....	42,200	6,571	61,200	7,659
Other countries .....	1,900	721	3,900	1,465
Mica, scrap and waste -				
To - United States .....	1,339,500	6,186	2,473,600	14,152
United Kingdom .....	500	3	...	...
Mica splittings -				
To - United Kingdom .....	800	308	5,100	1,415
United States .....	33,800	16,307	21,800	8,916
Mica plate and manufactures of (micanite) .....	...	950	...	1,343
TOTAL .....	...	75,950	...	87,300

(a) Fine flake muscovite was reported as being shipped in 1936 but no statistics are available.

Table 5 - PRODUCTION (SALES) OF MICA IN CANADA, BY PROVINCES, and EXPORTS OF MICA, JANUARY 1 to JUNE 30, 1936 and 1937.

Province	1936	1937	1936	1937
	Pounds	Value	Pounds	Value
		\$		\$
<b>PRODUCTION (SALES) -</b>				
Quebec .....	393,953	29,057	670,635	61,553
Ontario .....	783,628	5,879	656,845	4,184
British Columbia .....	(a)	(a)	(a)	(a)
TOTAL .....	1,177,581	34,936	1,327,480	65,737
<b>EXPORTS -</b>				
Rough cobbled and thumb-trimmed .....	33	25,614	58	41,620
Mica splittings .....	4	3,232	34	28,758
Mica scrap and waste .....	661	7,676	618	6,685
Mica plate and manufactures of (micanite) .....	...	776	...	916
Talc .....	4,643	46,369	4,232	41,892

(a) Data not available.

Table 6 - CANADIAN DEALERS' QUOTATIONS AT THE END OF 1936 WERE AS FOLLOWS:-

	<u>Knife-trimmed sheet</u>		<u>Splittings</u>
	<u>per pound</u>		<u>per pound</u>
	\$		
1 x 3 inches .....	0.44	1 x 1 inches .....	45 cents
2 x 3 inches .....	0.70	1 x 2 inches .....	50 cents
2 x 4 inches .....	0.95		
3 x 5 inches .....	1.65		
4 x 6 inches .....	2.00		
5 x 8 inches .....	3.00		

Ground mica, 20 mesh, \$25 per ton; 60 mesh, \$30; 120 mesh, \$45; all prices f.o.b. Ottawa, in ton lots. (Bureau of Mines, Ottawa).

The Engineering and Mining Journal, New York (Metal and Mineral Markets) quoted U. S. mica prices, October, 1937, as follows:- per ton, f.o.b. New Mexico, scrap, white, \$14; off color, \$10. Punch, white, for disks, per pound, 12 cents; for washers, 9 cents. Per ton, f.o.b. New Hampshire, roofing mica, \$23; snow, \$34; 40 mesh white, \$40; 60 mesh, \$48; 100 mesh, \$60; 200 mesh, \$75. Clean dry mixed bench and mine scrap, \$13. Per pound, f.o.b. North Carolina, punch, 3 to 5 cents; 1½ x 2 inch, 15 to 40 cents; 2 x 2, 30 to 60 cents; 3 x 3, 75 cents to \$1.20; 3 x 4 inch, \$1 to \$1.40; 3 x 5, \$1.25 to \$1.60; 4 x 6, \$2 to \$2.50; 6 x 8, \$2.50 to \$3.50; 8 x 10, \$3.50 to \$5; these prices apply to No. 1 and No. 2 stock. Stained qualities take from 10 to 25 per cent discount. White North Carolina mica, 70 mesh, \$60 to \$80 per ton. Biotite or black mica, \$10 a ton unground. White, Georgia, 300 mesh, \$19.50; sericite, 300 mesh, \$15; mica schist, 20 mesh, \$14.

Table 7 - PRODUCTION (x) OF MICA IN CANADA, 1927-1936.

Year	Short tons	\$	Year	Short tons	\$
1927 .....	2,738	174,377	1932 .....	309	6,828
1928 .....	3,660	87,168	1933 .....	944	49,284
1929 .....	4,053	118,549	1934 .....	998	97,071
1930 .....	1,170	96,004	1935 .....	628	82,038
1931 .....	1,339	54,066	1936 .....	801	74,556

(x) Sales.

Table 8 - CONSUMPTION OF MICA IN THE CANADIAN ELECTRICAL APPARATUS AND SUPPLIES INDUSTRY, 1931 - 1936.

Year	Pounds	\$	Year	Pounds	\$
1931 .....	150,561	101,531	1934 .....	93,297	60,520
1932 .....	102,410	68,747	1935 .....	73,621	58,016
1933 .....	35,098	27,129	1936 .....	(not complete)	



Table 9 - CONSUMPTION OF GROUND MICA IN THE MANUFACTURE OF CANADIAN COMPOSITION ROOFINGS, 1931 - 1936.

Year	Tons	\$	Year	Tons	\$
1931 .....	(not available)		1934 .....	71	2,086
1932 .....	21	683	(x) 1935 .....	60	1,844
1933 .....	48	1,849	1936 .....	90	2,522

(x) In addition, 40 tons of mica valued at \$1,750 were also consumed in the pulp and paper industry.

Table 10 - CONSUMPTION OF GROUND MICA IN THE CANADIAN RUBBER INDUSTRY, 1931 - 1936.

Year	Pounds	\$	Year	Pounds	\$
1931 .....	103,177	6,265	1934 .....	135,424	6,792
1932 .....	73,600	4,111	1935 .....	124,350	6,297
1933 .....	89,165	4,769	1936 .....	(not complete)	

Table 10(a) - CONSUMPTION OF MICA IN THE PAINT, COAL TAR DISTILLATION AND IRON FOUNDRY INDUSTRIES, 1935 and 1936.

Industry	1 9 3 5		1 9 3 6	
	Tons	\$	Tons	\$
Paints .....	1	21	1	45
Coal tar distillation .....	42	1,702	29	945
Iron foundry (mica schist) ..	332	2,701	(x)	(x)

(x) Data not yet complete.

Table 11 - CONSUMPTION OF MICA IN THE CANADIAN MICA PRODUCTS INDUSTRY, 1931 - 1936.

Year	Pounds	\$	Year	Pounds	\$
1931 .....	(x)	10,099	1934 .....	16,553	7,040
1932 .....	10,100	4,290	1935 .....	17,320	7,018
1933 .....	16,025	6,553	1936 .....	16,227	7,790

(x) Not available.

Table 12 - MICA IMPORTED FOR CONSUMPTION IN THE UNITED STATES IN 1935 and 1936. by kinds.

(Source - United States Bureau of Mines)

	1 9 3 5		1 9 3 6	
	Pounds	Value	Pounds	Value
Unmanufactured:		\$		\$
Waste and scrap, valued at not more than 5 cents per pound .....	5,986,043	18,897	7,786,193	22,666
Untrimmed phlogopite mica from which no rectangular piece exceeding in size 1 inch by 2 inches may be cut ..	30,606	2,677	30,131	2,593

Table 12 - MICA IMPORTED FOR CONSUMPTION IN THE UNITED STATES IN 1935 and 1936 by kinds. (concluded)

Kind	1 9 3 5		1 9 3 6	
	Pounds	Value	Pounds	Value
Unmanufactured: (concluded)				
Other:				
Valued at not above 15 cents per pound	146,815	17,936	290,209	34,315
Valued at above 15 cents per pound ...	417,022	172,046	539,913	202,470
	6,580,486	211,556	8,646,446	262,044
Manufactured:				
Cut mica .....	94,237	83,382	58,496	51,698
Films and splittings:				
Not cut or stamped to dimensions:				
Not above 12 ten-thousands of an inch in thickness .....	2,764,150	450,216	3,877,310	622,309
Over 12 ten-thousands of an inch in thickness .....	276,435	131,655	586,777	218,384
Cut or stamped to dimensions .....	823	2,786	3,201	7,825
Mica plates and built-up mica .....	32,495	25,383	47,801	38,242
All other manufactures of which mica is the component material of chief value .....	7,867	3,406	2,844	2,784
Mica ground or pulverized .....	...	...	132,712	2,282
	3,176,007	696,828	4,709,141	943,524
	9,756,493	908,384	13,355,587	1,205,568

Table 13 - SCRAP MICA IMPORTED INTO THE UNITED STATES IN 1935 and 1936, BY COUNTRIES. (Source - United States Bureau of Mines)

Country	1 9 3 5			:	1 9 3 6		
	Short tons	Value Total	Value Average		Short tons	Value Total	Value Average
		\$	\$			\$	\$
Canada .....	696	6,191	8.90	1,185	11,643	9.83	
India (British) ...	1,667	9,204	5.52	2,708	11,023	4.07	
U.S.S.R. (Russia) .	630	3,502	5.56	...	...	...	
	2,993	18,897	6.31	3,893	22,666	5.82	

Exports of mica and manufactures thereof from the United States in 1936 amounted to 2,955,040 pounds valued at \$170,011, slightly less in quantity but a little greater in value than those of 1935 (2,998,762 pounds valued at \$165,385). Of this, the unmanufactured mica exported in 1936 amounted to 367,672 pounds valued at \$6,671, and exports of manufactures of mica totalled 2,587,369 pounds valued at \$163,340.

United States production of sheet and scrap mica increased in 1936 to 21,615 short tons valued at \$464,473 from the 19,320 tons valued at \$405,101 in 1935, according to a preliminary report issued by the United States Bureau of Mines. The increase in tonnage was largely the result of further improvement in demand for ground mica for roofing purposes but production of all kinds of mica increased in the United States. Total sales of uncut sheet mica in 1936 amounted to 1,319,233 pounds valued at \$203,879, an increase of 41 per cent in quantity and 27 per cent in value over 1935. Punch and circle mica accounted for 77 per cent of the total sales in 1936; decreases occurred in the quantity produced in Connecticut and New Mexico while production increased in Alabama, Georgia, New Hampshire, North Carolina, South Carolina, and Virginia.

Scrap mica produced in the United States and sold or used by producers in 1936 was 20,955 short tons valued at \$260,594 or an increase of 11 per cent in quantity and 7 per cent in value over 1935; the increase in production was due largely to an increase in the production of by-product mica and mica from schists; North Carolina was the principal producing state, followed by South Dakota and Georgia.

The quantity of ground mica sold by United States producers in 1936 was 23,418 tons valued at \$374,807; production included mica from schists and fine mica recovered from kaolin washing; of the total sales, 18,112 short tons were consumed in the roofing industry.

Table 14 - EXPORTS OF MICA FROM INDIA, 1934 - 1936.

		1934	1935	1936
In blocks .....	Cwt.	20,617	23,774	27,235
	Rupees	3,520,930	4,334,680	4,572,240
Splittings .....	Cwt.	72,301	118,040	150,429
	Rupees	2,509,595	3,700,001	4,604,271
Total of Mica -				
To - United Kingdom .....	Cwt.	29,606	37,448	43,049
	Rupees	3,106,625	3,836,105	4,360,558
Germany .....	Cwt.	10,013	12,813	19,053
	Rupees	565,451	618,839	787,952
France .....	Cwt.	1,763	3,713	7,743
	Rupees	147,282	386,253	374,845
United States .....	Cwt.	39,517	69,397	93,080
	Rupees	1,306,297	1,994,942	2,790,668
Other countries .....	Cwt.	12,019	18,443	14,739
	Rupees	904,870	1,198,542	862,488
<hr/>				
TOTAL .....	Cwt.	92,918	141,814	177,664
	Rupees	6,030,525	8,034,681	9,176,511
<hr/>				
Value of rupee in Canadian funds .....		37.66 cents	37.17 cents	37.55 cents

According to the Imperial Institute, London, the output of mica in India consists almost entirely of muscovite from pegmatites in the Monghyr, Hazaribagh and Gaya districts of Bihar; from the Nellore district of Madras, and from Ajmer-Merwara and Jaipur, Rajputana. It is generally accepted that the export figures give a more accurate representation of the India mica industry than do the production figures as very little mica is consumed in India. The discrepancy between the production and export figures is usually attributed to theft at the mines but the true explanation apparently lies in the growing demand by the electrical industries for splittings; this has led to the exploitation of old mines and factory dumps for small-sized block mica suitable for conversion into splittings and which was formerly discarded; such factory production does not appear in the output returns.

The following table, supplied by the National Association of Purchasing Agents, New York City, shows the area of usable mica in the rectangles that can be cut from each of the various sizes of the Indian grading and the approximate corresponding sizes of the United States classification:

Table 15 - Comparison of Indian and United States Gradings for Size.

India grading	Area of usable mica based on rectangular sizes, square inches	Approximate corresponding sizes in United States classification, inches
6 .....	1 to 2½	Punch
5½ .....	2½ to 3	1½ by 2
5 .....	3 to 6	2 by 2
4 .....	6 to 10	(2 by 3 (3 by 3
3 .....	10 to 15	3 by 4
2 .....	15 to 24	3 by 5
1 .....	24 to 36	4 by 6
A-1 .....	36 to 48	5 by 8
Special .....	48 to 60	6 by 8
Extra Special .....	60 to 80	8 by 8
Extra extra special .....	80 and over	8 by 10

Indian grading for quality comprises the nine following classes in descending order of value: 1, clear; 2, clear and slightly stained; 3, fair-stained; 4, good-stained; 5, stained; 6, heavy-stained; 7, black-spotted; 8, black-stained; and 9, badly stained. The American Society for Testing Materials in attempting to standardize grading for quality has combined the four poorer grades listed above and adopted the grading described herewith.

Quality	Description
Clear .....	(Free of all mineral and vegetable inclusions, stains, air inclusions, waves or buckles. (Hard transparent sheets.
Clear and slightly stained	(Free of all mineral and vegetable inclusions, cracks, waves, and buckles but may contain slight stains and air inclusions.

<u>Quality (continued)</u>	<u>Description (continued)</u>
Fair-stained .....	(Free of mineral and vegetable inclusions and cracks, hard, and contains slight air inclusions (and is slightly wavy.
Good-stained .....	(Free of mineral inclusions and cracks but contains air inclusions, some vegetable inclusions, (and may be somewhat wavy.
Stained .....	(Free of mineral inclusions and cracks but may contain considerable clay and vegetable stains (and may be more wavy and softer than the better qualities.
Black-stained or spotted .	(Same as stained but contains mineral inclusions.

Table 16 - IMPORTS OF MICA INTO THE UNITED KINGDOM, 1931 - 1936.

Year	Long tons	Value £	Year	Long tons	Value £
1931 .....	1,984	244,994	1934 .....	2,421	300,530
1932 .....	1,634	172,926	1935 .....	2,625	378,495
1933 .....	1,879	218,247	1936 .....	3,226	410,684

Of the 1935 imports into the United Kingdom, 823 long tons were slab mica of which 575 long tons came from British India and 92 long tons from Madagascar; splittings totalled 1,165 long tons of which British India supplied 1,047 long tons and Madagascar, 53; other grades imported consisted of 637 long tons of ground mica and waste, 285 long tons of which originated in the United States.

Table 17 - EXPORTS OF MICA FROM MADAGASCAR, 1936.  
(Supplied by H. Barre, Commercial Attache, Paris)

	Metric tons (x)
Muscovite .....	.130
<u>Phlogopite -</u>	
Series -	
1st .....	5.993
2nd .....	32.574
3rd .....	278.824
4th .....	125.067
5th .....	9.870
Total Mica .....	452.458

(x) 1 metric ton = 1.102 short tons.

Table 18 - MADAGASCAR SYSTEM OF GRADING MICA FOR SIZE (1935).  
(Source - National Association of Purchasing Agents, New York City).

Series	Grade	Size of rectangle, square inches
1	00	Over 48
1	0	36 to 48
1	1	24 to 36
2	2	15 to 24
2	3	10 to 15
2	4	6 to 10
3	5	3 to 6
3	6	1 to 3
3	All splittings	-
4	Smaller sheet than grade 6	-
4	Scrap and ground mica	-

Table 19 - EXPORTS OF MICA FROM MADAGASCAR, BY DESTINATION, 1935 and 1936.  
(Source - United States Department of the Interior)

Country	1 9 3 5		1 9 3 6	
	Metric tons	Value francs	Metric tons	Value francs
France .....	175	1,956,000	90	1,267,000
England .....	67	641,000	207	1,865,000
United States ...	156	1,327,000	148	1,273,000
Germany .....	10	92,000	7	64,000
Others .....	1	3,000	...	...
TOTAL .....	409	4,019,000	452	4,469,000

Note - 1 metric ton = 1.102 short tons.

Since the devaluation of French currency, the value has been about 21.50 francs to the United States dollar.

"Phlogopite-mica is not produced anywhere in South Africa. Muscovite-mica of good quality is found in the Letaba area, North Eastern Transvaal. The mica occurs in great dykes, and irregular lenses of coarse grained pegmatite; as a rule the distribution of the mica within the pegmatite is quite irregular. The mineral is marketed in the form of sheet mica and waste or scrap mica. Actual market prices naturally fluctuate but generally speaking the value of sheet mica of good quality is in the order of a few pence per pound for the smallest sizes/ to several shillings per pound for the larger ones. The production of sheet mica at present (1936) is comparatively small. Most of it is used locally in the electrical industry but occasionally small consignments are exported. Mica production in South Africa, as the statistics show, has never been a big industry and in recent years it has been principally the waste mica business which has kept the producers going. Waste mica is sold by the ton and the prices realized by producers in South Africa have been in the neighbourhood of £1 per ton free on rail. Sales and shipments of mica in the Transvaal during 1936 totalled 378.36 short tons valued at £1,098 as compared with 212.87 short tons worth £286 in 1935." (Department of Mines - Union of South Africa).

According to Prof. N. M. Fedorovsky of the All-Union (Soviet) Scientific Research Institute, very valuable deposits of mica are found in Eastern Siberia and Karelia. Here the Soviet Government has established several mica mines and factories for working up the raw materials. Near Irkutsk there is a great deposit of phlogopite mica and muscovite is found on the Mama and Biryusa rivers. Three years ago there were discovered two deposits of hydrated mica - vermiculite - hitherto unknown in the U.S.S.R. Complete data relating to Russian mica production and exports for 1936 are not available; exports during 1935 were reported at 1,263 long tons.

Table 20 - BRAZILIAN MICA EXPORTS, 1935 and 1936.

Country of Destination	1 Kilos	9 3 5 Milreis	1 9 3 6 Kilos	Milreis
United States .....	44,084	343: 699 \$	86,328	796: 340 \$
Great Britain .....	36,054	372: 860 \$	49,029	461: 822 \$
Germany .....	4,301	35: 116 \$	51,531	577: 292 \$
France .....	17,570	77: 395 \$	24,698	138: 400 \$
Italy .....	1,662	20: 875 \$	23,415	312: 747 \$
Holland .....	5,919	38: 987 \$	...	...
Belgium .....	...	...	1,017	30: 000 \$
Japan .....	88	316 \$	859	5: 475 \$
<b>TOTAL .....</b>	<b>109,678</b>	<b>889: 248 \$</b>	<b>236,877</b>	<b>2,322: 076 \$</b>

NOTE - June 7, 1937: 1 mileris (\$) = \$0.066 Canadian currency.  
1 Kilo = 2.204 pounds.

"As all the saleable mica produced is exported and no stock is carried on hand or consumed locally to any extent, the above figures on exports may also be taken as those of production for their respective years.

"According to Brazilian export statistics, the average prices received for mica f.o.b. ports of shipments in 1935 were 8 \$100 milreis and in 1936, 9 \$800 milreis per kilo or about 52 cents and 63 cents United States currency, respectively.

"Both commercial varieties of mica are produced in Brazil - muscovite and phlogopite. By far the greater quantities of mica exported from Brazil are of the muscovite variety. Mica mining in Brazil is centred chiefly in the State of Minas Geraes; the mica deposits occur in the Archean rocks of gneiss and pegmatite, mining in the mica mines, all of which are open pit, is entirely by hand labour, and no scientific methods are employed. The Indian methods of grading and qualifying are used for determining the value of mica.

"After preparing the sheets, the mica is trimmed or left in semi-trimmed condition, accomplished by hand knife, following the natural shape or contour of the sheet. It is classified by size into grades. A scale is used showing the grade areas to determine the grade or size. The waste is sold as scrap for grinding." (United States Bureau of Mines).

Relatively small quantities of mica are also produced in Northern and Southern Rhodesia. In the latter country the chief mica centre is in the Lomagundi district where the mineral occurs in pegmatite veins cutting mica schists and quartz schists. The veins are reported of much more regular occurrence and the mica itself is much more uniformly distributed through them than is usual under such geological conditions. The area over which the mica is spread is also extensive and the mineral itself is of a first rate quality. Exports of mica from Southern Rhodesia in 1935 totalled 6 long tons.

In Nyasaland mica occurs in various districts and in the Dowa district there was an output of 125 long tons between 1910 and 1916. According to the Imperial Institute, London, good quality muscovite mica is obtained in Tanganyika Territory from pegmatite veins in the vicinity of Morogoro and elsewhere in the Uluguru mountains, and in 1935 production extended to the Mpwapwa district; production during 1935 amounted to 25.26 tons of sheet valued at £5,010 and 21.42 tons of ground mica valued at £215; the output in 1936 was 11½ tons of sheet mica and 23 tons of ground mica.

Mica of good quality occurs at several localities in Kenya; two tons were raised in 1929, principally in West Suk, since when there has been no production. In the Somaliland Protectorate mica of the muscovite variety has been found in several areas, notably the Mirsa Plateau and the Golis range; in 1927 a concession was granted to a syndicate to prospect a large area in the latter district; much work was done but the concession was later abandoned.

Table 21 - WORLD'S PRODUCTION OF MICA, 1933 - 1935.

(Taken from the Imperial Institute's publication - The Mineral Industry of the British Empire and Foreign Countries)  
(Long tons)

Producing Country	1933	1934	1935
<u>BRITISH EMPIRE</u>			
Northern Rhodesia .....	1	1	2
Southern Rhodesia .....	4	2	4
Tanganyika Territory -			
Sheet .....	11	9	25
Waste .....		22	21
Union of South Africa (b) .....	391	273	573
Canada -			
Knife trimmed .....	4	27	50
Thumb trimmed .....	23	41	5
Splittings .....	33	33	15
Rough cobbled .....	...	1	14
Scrap .....	783	788	477
Ceylon (exports) .....	(2 cwt.)	20	2
India (exports) -			
Sheet .....	785	1,032	1,189
Splittings .....	2,047	3,615	5,902
Australia .....	41	120	(a)



Table 21 - WORLD'S PRODUCTION OF MICA, 1933 - 1935. (concluded)

Producing country	1933	1934	1935
<u>FOREIGN COUNTRIES</u>			
Italy .....	3	5	(a)
Norway .....	5	17	11
Sweden .....	67	16	31
U.S.S.R. (Russia) .....	5,687	(a)	(a)
Madagascar -			
Muscovite .....	(692 lb.)	(1,543 lb.)	(1,917 lb.)
Phlogopite, etc. ....	170	289	513
United States (sales) -			
Sheets (uncut) .....	163	261	418
Scrap .....	7,813	6,892	16,832
Argentina .....	74	172	221
Bolivia (exports) .....	2	4	2
Brazil .....	28	12	(a)
Korea .....	23	101	86

(a) Information not available.

(b) Nearly all scrap.

The following amounts of lithia mica were produced:-

	1933	1934	1935
South West Africa .....	...	231	489 long tons
France .....	500	1,200	(a) " "
Germany .....	72	(a)	(a) " "
Portugal .....	870	294	8 " "

DIRECTORY OF OPERATORS IN THE CANADIAN MICA MINING INDUSTRY, 1936.

<u>Name of Operator</u>	<u>Head Office Address</u>	<u>Location of Mine or Plant</u>
<u>QUEBEC -</u>		
Ahearn, W.	538 MacLaren St., Ottawa, Ont.	Hull Co.
Bazinet, M. F.	5778 Rue Cartier, Montreal	Joliette Co.
Blackburn Bros.Ltd.(a) (b)	301 Blackburn Bldg., Ottawa, Ont.	Templeton Tp.
Boulanger, J. C.	255 Grand Allee, Quebec	-
Chenier, Z. E.	Box 12, Rockland, Ont.	Grenville
Cleary, Geo.	Wilson's Corners	Wakefield (E)Tp.
Cross, W. C. (b)	Bridge St., Hull	Hull
Eriksen, Erik J.	Alcove	Wakefield Tp.
Martin, A. G. (b)	236 Besserer St., Ottawa, Ont.	Wilson's Corners, Ottawa.
McGarry, Ed.	Wakefield	Wakefield Tp.
McGlashan, Wm. M.	Wilson's Corners	Wakefield Tp.
Morlot, Chas.	Low	Low
O'Brien and Fowler Ltd.	Victoria Bldg., Ottawa, Ont.	Hull Dist.

DIRECTORY OF OPERATORS IN THE CANADIAN MICA MINING INDUSTRY, 1936 (concluded)

<u>Name of Operator</u>	<u>Head Office Address</u>	<u>Location of Mine or Plant</u>
<u>QUEBEC (concluded) -</u>		
Papineauville Lumber Co. Ltd.	Papineauville	-
Poirier, Adelard	Wilson's Corners	Wilson's Corners
Simard, Eug.	Bon Desir	Saguenay Co.
Sparks, W. J. (b)	343 Bell St., Ottawa, Ont.	Lac Ste. Marie
Radium Exploration Ltee. (x)	278 rue Saint-Paul, Quebec	Charlevoix Co.
Trudeau, W. (b)	Old Chelsea	Hull Dist.
Wallingford, Ed. (b)	Perkins	Perkins
<u>ONTARIO -</u>		
Bennett, H. V.	Perth	Perth Dist.
Haughian, Frank	Perth	Perth Dist.
Kent Bros. (b)	Gore St., Kingston	Kingston
Lee, W. W.	Bedford Mills	Buck and Bobs Lakes.
Loughborough Mining Co. Ltd. (b)	Sydenham	Sydenham
Thirty Island Lake Mica Co. (b)	Verona	Frontenac and Lanark counties.
White, J. A.	Stanleyville	Stanleyville

- (x) Active but not producing.  
 (a) Operates a grinding plant.  
 (b) Operates a dressing works.



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