Asbestos

By D. O. Kennedy[1] and Victoria M. Roman[2]

THE UNITED STATES consumed 29 percent of the world output of asbestos in 1960 but produced only 6 percent of its requirements. Although domestic output was less than 2 percent of world production, the Nation ranked seventh among world producers.

LEGISLATION AND GOVERNMENT PROGRAMS

In response to invitations sent out late in 1959 for the national stockpile, Arizona producers submitted identical bids, causing all bids to be rejected. Second invitations were sent to the producers in 1960 and bids were accepted from four producers for a total of 500 short tons of Arizona No. 2 fiber. Delays in testing procedures and fiber processing prevented fulfillment of the contracts in 1960.

The Office of Minerals Exploration announced on August 17 the extension of exploration assistance to include nonstrategic varieties of asbestos.

TABLE 1.—Salient asbestos statistics

	1951–55 (average)	1956	1957	1958	1959	1960
United States:						
Production (sales)—short tons	50,431	41,312	43,653	43,979	[1] 45,459	45,223
Value—thousands	$4,534	$4,742	$4,918	$5,127	[1] $4,391	$4,231
Imports for consumption (unmanufactured)—short tons	716,480	689,910	682,732	644,331	713,047	669,495
Value—thousands	$59,339	$61,939	$60,104	$58,314	$65,006	$63,345
Exports (unmanufactured) [2] short tons	7,001	2,950	2,893	3,026	4,461	5,525
Value—thousands	$1,497	$375	$350	$424	$793	$857
Exports of asbestos products (value) [2] thousands	$12,464	$14,181	$15,223	$13,233	$12,921	$13,703
Consumption, apparent—short tons	759,910	728,272	723,492	685,284	[1] 754,045	709,193
World: Production [1]—do	1,670,000	1,990,000	2,080,000	2,050,000	2,260,000	2,420,000

[1] Revised figure.
[2] Includes reexports.

DOMESTIC PRODUCTION

Asbestos production in the United States remained the same in 1960; from an estimated 1 million tons of rock, 45,000 tons of fiber was recovered.

Vermont Asbestos Mines Division of Ruberoid Co., at Belvedere Mountain near Hyde Park, Vt., continued to be the only large asbestos producer in the United States. The small quantity of spinning length fiber produced was used in electrolytic cells rather than in textiles.

Six companies reported shipments of asbestos from mines in the Globe district of Arizona in 1960. They were: Jaquays Mining Corp.,

[1] Assistant chief, Branch of Nonmetallic Minerals, Division of Minerals.
[2] Statistical clerk, Division of Minerals.

Minerals Yearbook: Asbestos Chapters, 1960
ACL Doc 10999 · Page 1 of 12
Published by AsbestosClaims.Law
asbestosclaims.law/library/10999/1

Kyle Asbestos Mines of Arizona, Le Tourneau Asbestos Corp., Metate Asbestos Corp., Pan American Fiber Corp., and Phillips Asbestos Mines. A mill was erected by Le Tourneau Asbestos Corp. on the outskirts of Globe and plans were announced to treat asbestos fiber with hydrochloric acid to remove lime and dust.[3]

Asbestos Bonding Co. reported production and shipments of chrysotile asbestos from the Phoenix mine in Napa County, Calif. In addition, the following four companies reported mining asbestos for experimental purposes: Coalinga Asbestos Co., Inc., National Mill and Mining Co., Inc., and Union Carbide Nuclear Co. in Fresno County; and Rawhide Asbestos Corp. in Tuolumne County. Jefferson Lake Sulphur Co. acquired ground for a mill site and tailing disposal contiguous to its asbestos deposit near Copperopolis. Interest in California asbestos deposits continued as two companies, Tri-Gem Mining Co., and Mik-Ron Corp. announced plans to mine asbestos ore in San Benito County.

Amphibole asbestos was produced by the Powhatan Mining Co. from mines in Transylvania and Yancey Counties, N.C.

Oregon Asbestos Co. produced a small quantity of chrysotile asbestos from its property in Oregon. Operations started in 1959 continued in 1960.

CONSUMPTION AND USES

Consumption of chrysotile asbestos decreased from 711,000 tons in 1959 to 670,000 tons. As in former years, nearly 97 percent of the chrysotile asbestos consumed was short fiber used principally in asbestos-cement and asbestos-asphalt building materials.

Consumption of crocidolite, as represented by imports, decreased from 26,000 tons in 1959 to 20,000 in 1960.

PRICES

Canadian (Quebec) chrysotile asbestos prices f.o.b. mine, remained unchanged during 1960 as follows:

Grade:	*Per short ton*
Crude No. 1	Can$1,410–Can$1,475
Crude No. 2—Crude run of mine and sundry	610– 875
No. 3—Spinning fiber	350– 650
No. 4—Shingle fiber	180– 245
No. 5—Paper fiber	120– 150
No. 6—Waste, stucco, or plaster	86
No. 7—Refuse or shorts	40– 80

Prices of British Columbia chrysotile asbestos, f.o.b. Vancouver, as quoted by Bell Asbestos Mines, Ltd., sales representatives for Cassiar Asbestos Corp., Ltd., were as follows:

Grade:	*Per short ton*
No. 1 crude	Can$1,522
AAA (C&G 1)	787
AA (C&G 2)	625
A (3K)	470
AC (C&G 3)	325
AK (4K)	220
AS (4T)	181
AX (5D)	142

[3] Mining World, Arizona Asbestos Industry Is Growing Steadily Around Globe: Vol. 22, No. 10, September 1960, pp. 44–45.

Published by AsbestosClaims.Law
asbestosclaims.law/library/10999/2

Prices of Vermont asbestos f.o.b. Hyde Park or Morrisville, Vt., were unchanged during 1960 as follows:

Grade:	Per short ton
Group No. 3—Spinning and filtering	$353–$440
Group No. 4—Shingle fiber	181– 218
Group No. 5—Paper fiber	120– 142
Group No. 6—Waste, stucco, or plaster	86
Group No. 7—Refuse or shorts	41– 75

Asbestos magazine published the following prices, f.o.b. Globe, on Arizona asbestos:

Grade:	Per short ton
No. 1 soft	$1,475–$1,800
No. 2 soft	830– 1,050
Group 3—Filtering and spinning	350– 450
Group 4—Plastic and filtration	190– 250
Group 5—Plastic and molding	125– 177
Group 7—Refuse and shorts	60– 100

Market quotations were not available for African and Australian asbestos because purchases and sales are negotiated individually. U.S. Department of Commerce reports showed the following values for imports:

Imports:	Per short ton 1959	1960
Amosite	$153.10	$151.83
Crocidolite:		
Australian	205.99	211.40
Union of South Africa	199.13	219.18

FOREIGN TRADE [4]

Imports of amosite increased 16 percent. In contrast, imports of crocidolite decreased 26 percent and chrysotile 6 percent compared with 1959, resulting in a net decrease of 6 percent in total imports.

TABLE 2.—U.S. imports for consumption of asbestos (unmanufactured), by classes and countries

Year and country	Crude (including blue fiber)		Mill fibers		Short fibers		Total	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
1959:								
North America: Canada	339	$109,269	149,341	$28,184,066	504,845	$26,681,457	654,525	$54,974,792
South America: Venezuela			90	11,800	26	2,200	116	14,000
Europe:								
Finland	102	3,630			123	3,000	225	6,630
Italy			8	9,525			8	9,525
Portugal	14	1,680					14	1,680
U.S.S.R.	3	643					3	643
Yugoslavia	5,646	212,869					5,646	212,869
Africa:								
British East Africa					49	6,450	49	6,450
Rhodesia and Nyasaland, Federation of [1]	4,347	897,760	729	143,317	111	24,542	5,187	1,065,619
Union of South Africa [2]	36,446	6,485,909	1,511	322,986	760	141,860	38,717	6,950,755
Oceania: Australia	8,557	1,762,690					8,557	1,762,690
Total	55,454	9,474,450	151,679	28,671,694	505,914	26,859,509	713,047	65,005,653

See footnotes at end of table.

[4] Figures on imports and exports compiled by Mae B. Price and Elsie D. Jackson, Division of Foreign Activities, Bureau of Mines, from records of the U.S. Department of Commerce, Bureau of the Census.

Published by AsbestosClaims.Law
asbestosclaims.law/library/10999/3

TABLE 2.—U.S. imports for consumption of asbestos (unmanufactured), by classes and countries—Continued

Year and country	Crude (including blue fiber		Mill fibers		Short fibers		Total	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
1960:								
North America:								
Canada	357	$64,989	148,584	$29,055,547	467,860	$24,998,784	616,801	$54,119,320
Guatemala	2	400					2	400
South America: Venezuela	15	2,100			46	6,210	61	8,310
Europe:								
Finland					165	8,250	165	8,250
Italy			[3] 6	[3] 7,785	2	338	8	8,123
Portugal	22	2,800					22	2,800
Yugoslavia	4,578	157,122					4,578	157,122
Africa:								
Rhodesia and Nyasaland, Federation of [1]	1,865	494,055	110	24,209	464	99,476	2,439	617,740
Union of South Africa [2]	36,644	6,771,421	522	90,024	3,627	583,382	40,793	7,444,827
Oceania: Australia	4,626	977,959					4,626	977,959
Total	48,109	8,470,846	149,222	29,177,565	472,164	25,696,440	669,495	63,344,851

[1] All believed to be from Southern Rhodesia.
[2] Includes 1959: 75 tons ($9,066) other chrysotile crude, 2 tons ($787) blue crocidolite, 818 tons ($179,364) spinning fibers, and 446 tons ($92,517) short fibers credited by the Bureau of the Census to the United Kingdom; 8 tons ($6,580) amosite crude credited by the Bureau of the Census to Italy; 294 tons ($53,308) other chrysotile crude, 287 tons ($52,197) blue crocidolite, 73 tons ($10,303) short fibers credited by the Bureau of the Census to Mozambique; and 459 tons ($74,879) blue crocidolite, and 129 tons ($18,002) amosite crude credited by the Bureau of the Census to the Federation of Rhodesia and Nyasaland. 1960: 4 tons ($3,262) blue crocidolite, 484 tons ($91,089) amosite crude, 61 tons ($14,724) spinning fibers, 2 tons ($3,024) paper fibers, 1,085 tons ($251,814) short fibers credited by the Bureau of the Census to United Kingdom; 25 tons ($2,700) blue crocidolite, 121 tons ($11,811) short fibers credited by the Bureau of the Census to Mozambique; and 1,347 tons ($296,643) blue crocidolite, 1,211 tons ($241,275) amosite crude credited by the Bureau of the Census to the Federation of Rhodesia and Nyasaland.
[3] Adjusted by Bureau of Mines to include 4 short tons ($5,490) reported by the Bureau of the Census as short fibers.

Source: Bureau of the Census.

TABLE 3.—U.S. imports for consumption of asbestos, from specified countries, by grades

(Short tons)

Grade	1959			1960		
	Canada	Southern Rhodesia [1]	Union of South Africa	Canada	Southern Rhodesia [1]	Union of South Africa
Chrysotile:						
Crude:						
No. 1	41	35			353	
No. 2	30	20		28	18	
Other	268	4,292	[2] 1,826	329	1,494	2,164
Spinning or textile	20,488	527	[2] 1,173	19,172	110	[2] 219
Shingle	72,679	202	300	88,475		301
Paper	56,174		38	40,937		[2] 2
Short fiber	504,845	111	[2] 760	467,860	464	[2] 3,627
Crocidolite (blue)			[2] 18,006			[2] 14,899
Amosite			[2] 16,614			[2] 19,581
Total	654,525	5,187	38,717	616,801	2,439	40,793

[1] Reported by the Bureau of the Census as Federation of Rhodesia and Nyasaland. Believed to be from Southern Rhodesia.
[2] Includes countries adjusted by Bureau of Mines. See table 2, footnote 2, for explanation.

Source: Bureau of the Census.

Published by AsbestosClaims.Law
asbestosclaims.law/library/10999/4

Imports of low-iron chrysotile of spinning length from British Columbia increased from 5,988 tons in 1959 to 6,254 tons in 1960. Nearly 97 percent of the chrysotile imported was short fiber of less than spinning length.

The Union of South Africa supplied crocidolite and chrysotile and was the only source of amosite. Imports from Australia consisted solely of crocidolite. Only chrysotile was imported from other countries.

Exports of unmanufactured asbestos increased from 4,461 tons in 1959 to 5,525 tons in 1960.

TABLE 4.—U.S. exports[1] and reexports[2] of asbestos and asbestos products

Product	1959		1960	
	Quantity	Value	Quantity	Value
Exports:				
Unmanufactured:				
Crude and spinning fibers.....short tons	1,216	$295,549	1,524	$339,996
Nonspinning fibers.....do	802	200,003	867	150,557
Waste and refuse.....do	2,299	267,736	3,070	354,054
Total unmanufactured.....do	4,317	763,288	5,461	844,607
Products:				
Brake lining and blocks—molded, semimolded and woven	[3]	4,673,987	[3]	4,488,132
Clutch facing and lining.....number	1,427,059	1,139,154	1,461,015	1,149,765
Construction materials, n.e.c.....short tons	11,031	2,423,793	9,961	2,237,444
Pipe covering and cement.....short tons	2,414	1,081,061	3,488	1,906,238
Textiles, yarn, and packing.....short tons	1,164	2,812,663	1,323	3,128,870
Manufactures, n.e.c.	[4]	771,660	[4]	776,905
Total products		12,902,318		13,687,354
Reexports:				
Unmanufactured:				
Crude and spinning fibers.....short tons	53	12,570	40	7,290
Nonspinning fibers.....do	19	3,600	24	4,972
Waste and refuse.....do	72	13,780		
Total unmanufactured.....do	144	29,950	64	12,262
Products:				
Brake lining and blocks—molded, semimolded and woven.....short tons	[5]	18,519	[5]	1,251
Construction materials, n.e.c.....short tons			[5]	1,154
Textiles, yarn, and packing.....short tons			56	13,720
Total products		18,519		16,125

[1] Materials of domestic origin, or foreign material that has been milled, blended, or otherwise processed in the United States.
[2] Material that has been imported and later exported without change.
[3] Values have been summarized; quantities not shown.
[4] Quantity not recorded.
[5] Less than 1 ton.

Source: Bureau of the Census.

WORLD REVIEW

NORTH AMERICA

Canada.—With the opening of a pilot plant in the St. Malo Industrial center of Quebec by the Quebec Department of Mines,[6] facilities for processing asbestos ore samples in quantities up to carload lots were made available to mine operators. Problems confronting Canada

[6] Northern Miner (Toronto), Quebec Government Opens Pilot Plant for Ore Research: Vol. 46, No. 4, Apr. 21, 1960, p. 18.

Published by AsbestosClaims.Law
asbestosclaims.law/library/10999/5

as the producer of nearly 50 percent of the world's asbestos supply were discussed.[6]

TABLE 5.—World production of asbestos by countries[1 2]

(Short tons)

Country[1]	1951–55 (average)	1956	1957	1958	1959	1960
North America:						
Canada (sales)[3]	960,336	1,014,249	1,046,086	925,331	1,050,429	1,118,456
United States (sold or used by producers)	50,431	41,312	43,653	43,979	45,459	45,223
Total	1,010,767	1,055,561	1,089,739	969,310	1,095,888	1,163,679
South America:						
Argentina	422	238	319	285	[4] 275	[4] 275
Bolivia (exports)	341	62	121		168	66
Brazil	2,038	3,739	2,654	3,816	2,075	1,577
Venezuela	681	5,041	8,390	9,152	5,095	4,333
Total	3,482	9,080	11,484	13,253	7,613	6,251
Europe:						
Bulgaria	948	1,100	1,100	1,100	[4] 1,100	[4] 1,100
Finland[5]	12,620	8,282	10,031	7,977	9,420	10,534
France	11,295	13,357	16,008	20,503	23,096	27,558
Greece	14	6	9			
Italy	27,647	39,446	40,361	39,921	48	56,654
Portugal	144	35	64	98	49,770	[4] 45
Spain	51				19	
U.S.S.R.[4]	322,000	500,000	500,000	550,000	600,000	660,000
Yugoslavia	3,295	4,165	6,128	5,960	4,748	5,970
Total[4]	380,000	570,000	575,000	625,000	690,000	760,000
Asia:						
China[4]	12,000	26,000	33,000	66,000	88,000	88,000
Cyprus	16,736	15,375	15,028	16,494	14,424	[6] 17,167
India	871	1,378	1,925	1,302	1,464	1,886
Japan	5,638	9,914	13,192	11,187	13,633	17,073
Korea, Republic of	60	54	96	22	88	740
Taiwan	126	118	268	47	150	485
Turkey	79	634	99	839	411	238
Total[4]	36,000	54,000	64,000	96,000	118,000	126,000
Africa:						
Bechuanaland	711	1,356	1,582	1,734	1,410	1,849
Kenya	270	170	109	120	43	117
Morocco: Southern zone	626	379	132	110		
Mozambique	99	202	152	198	37	
Rhodesia and Nyasaland, Federation of: Southern Rhodesia	87,091	118,973	132,124	127,115	119,699	133,963
Swaziland	32,518	29,875	30,727	25,261	24,807	32,026
Union of South Africa	112,975	136,520	157,474	175,644	182,405	175,867
United Arab Republic (Egypt Region)	332		22	485	502	[4] 550
Total	234,622	287,475	322,322	330,667	328,903	344,372
Oceania:						
Australia	4,850	9,709	14,670	15,570	17,856	[4] 15,400
New Zealand	369	368	230	454	640	[4] 600
Total	5,219	10,077	14,900	16,024	18,496	[4] 16,000
World total (estimate)[1 2]	1,670,000	1,990,000	2,080,000	2,050,000	2,260,000	2,420,000

[1] Asbestos also is produced in Czechoslovakia, Eritrea, Iran, North Korea, Rumania and Uganda. No estimates for these countries are included in the total, as production is believed to be negligible.

[2] This table incorporates some revisions. Data do not add to totals shown because of rounding where estimated figures are included in the detail.

[3] Exclusive of sand, gravel and stone (waste rock only), production of which is reported as follows: 1951–55 (average) 29,042 tons; 1956, 45,427 tons; 1957, 13,652 tons; 1958, 18,450 tons; 1959, 29,532 tons; 1960, 51,625.

[4] Estimate.

[5] Includes asbestos flour.

[6] Exports.

Compiled by Helen L. Hunt, Division of Foreign Activities.

[6] Mulvihill, R. P., Canadian Asbestos for World Markets: Foreign Trade (Ottawa), vol. 114, No. 6, Sept. 10, 1960, pp. 22–23.

Minerals Yearbook: Asbestos Chapters, 1960 Published by AsbestosClaims.Law
ACL Doc 10999 · Page 6 of 12 asbestosclaims.law/library/10999/6

During the year 33.2 million tons of rock was mined and 1.1 million tons of fiber was recovered from 15.3 million tons of ore milled.

Descriptions of mining operations at the Jeffrey mine of the Canadian Johns-Manville Co., Ltd., at Asbestos, Quebec, were published.[7]

TABLE 6.—Canada: Sales of asbestos by grades

Grades	1959			1960		
	Short tons	Value		Short tons	Value	
		Totals (thousands)	Average per ton		Totals (thousands)	Average per ton
Crude No. 1, 2, and other	432	$491	$1,137	330	$341	$1,034
Milled group:						
3	30,375	13,338	439	32,190	14,272	443
4	238,185	44,210	186	294,092	54,757	186
5	135,459	17,409	129	156,901	19,799	126
6	166,346	13,838	83	179,361	14,763	82
7	465,052	20,256	44	445,509	18,794	42
8	14,580	303	21	10,073	208	21
Total, all grades	1,050,429	109,845	105	1,118,456	122,844	110
Waste rock	29,532	29	1	51,625	46	1

Source: Dominion Bureau of Statistics.

Asbestos recovery from the Black Lake mine of the United Asbestos Corp. increased to 5.15 percent in the first half of the year, compared with 4 percent in the same period in 1959, and production nearly doubled.

Exploration at the Munro mine of the Canadian Johns-Manville Co., Ltd., revealed new ore bodies between the two main ore zones, below the main 637-foot haulage level, and in an extension of the west stoping section. Since conversion to underground mining, the ore recovered was reported to be considerably higher grade than that obtained from open pit operations. Changes were made in the mill to improve the quality of fiber produced; an improved type of screening was provided, and installation of a new type of dryer was planned.[8]

Increased sales reported by the Cassiar Asbestos Corp., Ltd., in British Columbia were due largely to stronger demand for cement-grade product, with sales holding steady for the spinning grades. A reserve of 5 million tons of asbestos ore was reported by the company to have been developed at its Clinton Creek property. Expansion of the Cassiar mills to a daily capacity of 1,500 tons of ore was completed in January.

Development of the Baie Verte property of Advocate Mines, Ltd., Northern Newfoundland, was planned. Fiber from the deposit was reported to be grade 4 chrysotile, of good quality, for use in asbestos-cement products.[9] Drilling by the Murray Mining Corp., Ltd., at its Ungava deposit on Hudson Strait, 30 miles south of Deception Bay,

[7] Guimond, R., The World's Largest Asbestos Mine: Precambrian-Mining in Canada (Winnipeg), vol. 33, No. 6, June 1960, pp. 16–19, 22–25.
Jarman, H. G., Asbestos in Canada: Min. Mag. (London), vol. 102, No. 2, February 1960, pp. 95–98.
[8] Northern Miner (Toronto), Johns-Manville Finds New Ore at Munro Mine: Vol. 46, No. 27, Sept. 29, 1960, pp. 1, 5.
[9] Skillings Mining Review, Asbestos Orebody in Newfoundland Under Development: Vol. 49, No. 31, Oct. 29, 1960, p. 11.

609599—61——15

Published by AsbestosClaims.Law
asbestosclaims.law/library/10999/7

Northern Quebec, indicated nearly 4 million tons of asbestos ore. Testing by the Quebec Department of Mines indicated about 12 percent fiber in the ore, mainly in groups four and five, equal or better in quality to that in Southern Quebec. Central Asbestos Mines completed test drilling of its new property in Coleraine Township and shipped the core to Quebec for mill tests. In Northern Ontario, drilling at the property of Normalloy Explorations, Ltd., indicated a large zone of asbestos-bearing rock containing mainly short-fiber asbestos of the type used in molded products. Young-Davidson Mines planned to drill claims 7 miles northeast of Munro mine in Ontario. Four asbestos occurrences in the Prince George area of British Columbia were reported by the Geological Survey of Canada.[10]

Guatemala.—Asbestos de Guatemala announced plans to develop asbestos deposits near El Rancho, El Progresso, and Pozo de Agua, all in the Sierra de Chuacus. Mill tests of a 700-pound sample were made at Globe, Ariz., and results were reported to be satisfactory.

SOUTH AMERICA

Argentina.—Large deposits of asbestos were reported in the province of La Rioja by a West German company.

Brazil.—S. A. Mineracão de Amianto operated its chrysotile asbestos mine at Djalma Dutra (Pocões) in the State of Bahia at a somewhat lower level of production than in 1959.

Venezuela.—The entire production of asbestos in 1959 came from the Tinaquillo mines of Amianto de Venezuela Co., in the State of Cojedes.

EUROPE

Greece.—Kennecott Copper Corp. completed legal requirements necessary for a mining company in Greece, and exercised its option to purchase the asbestos property it had explored in the Kozani area.

Italy.—According to preliminary figures, 1959 imports of asbestos totaled 15,574 tons, valued at US $3,062,000; exports totaled 10,568 tons, valued at US $969,000.

U.S.S.R.—An extensive deposit of asbestos was discovered in Aktyubinskaya Oblast. Development plans for the Bazhenovo chrysotile asbestos deposit, northeast of Sverdlovsk, were discussed in a Russian publication.[11]

Yugoslavia.—Preparations were under way to develop the Picelj mine in the mountains of Kopaonik, where reserves sufficient for 20 years were reported.

ASIA

Cyprus.—Asbestos exports in 1959 were shipped from the port of Limassol mainly to Denmark, Sweden, United Kingdom, Thailand, and Czechoslovakia. Cyprus Asbestos Mines, Ltd. produced from

[10] Canadian Mining Journal, Asbestos Discoveries Pinpointed by G.S.C.: Vol. 82, No. 4, April 1961, p. 156.
[11] Karchevskaya, Ye.P. [Prospects of Developing the Bazhenovo Asbestos Mine]: Min. Jour. (Moscow), No. 7, 1959, pp. 47–50.

Published by AsbestosClaims.Law
asbestosclaims.law/library/10999/8

deposits on Troodos Mountain near Amiandos, 1,443,000 tons of rock in 1959 and 1,409,000 tons in 1958.

Japan.—Imports from Canada supplied Japan's requirements for high quality asbestos. Reserves of chrysotile asbestos in Japan were estimated to be about 39 million tons, averaging 1.1 percent fiber.[12]

North Borneo.—Newly discovered asbestos deposits were investigated.

AFRICA

Bechuanaland.—Workings were expanded and operations further mechanized in Bangwaketse Territory deposits.

Morocco.—Imports in 1959, primarily from Canada and the Union of South Africa, totaled 1,034 tons.

Rhodesia and Nyasaland, Federation of.—Over 86 percent of the chrysotile asbestos produced in 1959 was exported. Twenty-one companies reported production in 1959 but only six produced spinning grades: Asbestos Refining Co. (Rhod.) (Pvt.), Ltd., Bulawayo; Lanninhurst Asbestos, Ltd., West Nicholson; Rhodesian and General Asbestos Corp. (Pvt.), Ltd., Bulawaya; Rhodesian Monteleo Asbestos, Shabani; Ross McIntyre & Partners (Pvt.), Ltd., Shabani; and Rosey Cross Asbestos (Pvt.), Ltd., Mashaba.[13]

TABLE 7.—Southern Rhodesia: Asbestos production

Year	Short tons	Value (thousands)	Year	Short tons	Value (thousands)
1956	118,973	$23,832	1959	119,699	$20,735
1957	132,124	25,185	1960	133,963	20,888
1958	127,115	24,147			

Sudan.—Areas of ultrabasic rocks in the Qala en Nahl region, Eastern Sudan, were examined for possible asbestos deposits by the Sudan Geological Department.

Swaziland.—A short description of operations at the Havelock asbestos mine in the Barberton area was published.[14]

Union of South Africa.—Plans were revealed for improving operations at the Lalkloof chrysotile mine of the African Asbestos-Cement Corp., Ltd., following appointment of Johannesburg Consolidated Investment Co., Ltd., as technical and administrative advisers. The company increased the development work at its Lalkloof Mine, and rearrangement of the grading plant was planned.[15] Associated Ore and Metal Corp. suspended production temporarily to reduce accumulated stocks and increased its property holdings in the Pietersburg area, northern Transvaal. Msauli Asbestos Mining and Exploration Co. purchased mechanical equipment and began constructing a hydroelectric plant for its operations. Barberton Chrysotile Asbestos, Ltd. drew from the large accumulation of broken ore in the mine, increas-

[12] Geology and Mineral Resources of Japan, Second Edition: Geol. Survey of Japan, Hisamoto-cho, Kawaski-shi, Japan, March 1960, p. 214.
[13] Bureau of Mines, Mineral Trade Notes: Vol. 51, No. 2, August 1960, pp. 9–12.
[14] Canadian Mining Journal, Barberton Area: Vol. 81, No. 8, August 1960, pp. 63–64.
[15] South African Mining and Engineering Journal, African Asbestos-Cement Corporation Limited: Vol. 71, No. 3542, Dec. 23, 1960, pp. 1654–1655.

Published by AsbestosClaims.Law
asbestosclaims.law/library/10999/9

ing its milling rate and lowering costs. The tonnage of broken ore remaining was estimated to be 700,000 tons.

TABLE 8.—Union of South Africa: Asbestos production by varieties and sources

(Short tons)

Variety and source	1956	1957	1958	1959	1960
Amosite (Transvaal)	50,097	56,798	69,773	71,720	68,630
Chrysotile (Transvaal)	24,336	25,646	27,403	29,326	29,471
Blue (Transvaal)	14,399	15,303	16,670	13,113	11,185
Blue (Cape)	47,688	59,549	61,520	68,024	66,567
Tremolite (Transvaal)	----------	178	278	222	14
Total	136,520	157,474	175,644	182,405	175,867

TABLE 9.—Union of South Africa: Production and exports of asbestos

Year	Production (short tons)			Exports	
	Transvaal	Cape Province	Total	Short tons	Value (thousands)
1956	88,832	47,688	136,520	122,867	$20,432
1957	97,925	59,549	157,474	142,799	25,278
1958	114,124	61,520	175,644	145,796	25,420
1959	114,381	68,024	182,405	151,515	25,971
1960	109,300	66,567	175,867	174,810	28,965

OCEANIA

Australia.—Mining operations of Australian Blue Asbestos, Ltd., in the Hamersley Range in northwest Western Australia were described.[16]

TECHNOLOGY

Research on the synthesis of asbestos continued with publication of two reports on fiber morphology. Electron micrographs were used to study the physical properties of natural inorganic fibers.[17] Bundles of chrysotile fibers embedded in "Araldite" were examined in an electron microscope.[18] Electron micrographs of cross sections of the fibers showed mainly circular-shaped concentric tubes with amorphous-appearing material plugging voids between tubes and within hollow fibers. The authors concluded that the presence of this material would explain the density of massive chrysotile which appeared too high for a tubular morphology.

A patent was issued for a method of forming capillary-like fibers of chrysotile by leaching antigorite with hydrochloric acid to remove from 5 to 75 percent of the magnesium hydroxide.[19]

Reports on the geology and genesis of asbestos deposits discussed conditions leading to chrysotile deposition in the Cassiar Mountains

[16] Bureau of Mines, Mineral Trade Notes: Vol. 52, No. 1, January 1961, pp. 4–8.
[17] Huggins, C. W., Electron Micrographs of Asbestiform Minerals: Bureau of Mines, Rept. of Investigations 5551, 1960, 14 pp.
[18] Maser, M., Rice, R. V., and Klug, H. P., Chrysotile Morphology: Am. Mineral., vol. 45, Nos. 5 and 6, May–June 1960, pp. 680–688.
[19] Kaleusek, G. L. (assigned to Owens-Corning Fiberglas Corp.), Synthesis of Asbestos: U.S. Patent 2,926,997, Mar. 1, 1960.

Published by AsbestosClaims.Law
asbestosclaims.law/library/10999/10

of British Columbia, and the occurence near Lusaka, Northern Rhodesia, of slip-fiber crocidolite asbestos, classified as magnesioriebeckite.[20]

A Czechoslovakian publication discussed the origin of East Asian chrysotile asbestos deposits.[21]

The Baie Verte chrysotile asbestos deposit, Newfoundland, was described as occupying a tabular zone in serpentine under a surface capping of pyroxene-rich peridotite.[22]

Block-caving methods at the King Mine, Quebec, and Munro Mine, Ontario, were described.[23]

Several patents were issued for machines to separate fiber from heavier gangue material.

An improved electrostatic air filter, tested on a pilot plant scale by the Council of Scientific and Industrial Research in South Africa, had collecting efficiencies of 98 and 99 percent for dust and asbestos fibers, respectively. A full-scale unit of similar design was installed at the Kuruman Cape Blue Asbestos plant in Kuruman, Union of South Africa.[24]

The addition of 2 to 3 percent Group 7 asbestos fibers to asphalt paving mixtures was said to considerably improve physical properties of pavements, thereby promising reduced maintenance costs. Tests were conducted in the laboratory and on 18 test strips of highway in various parts of the United States and Canada.[25] The experimental use of short and waste grades of asbestos fiber in asphalt paving gave promise of greater markets and utilization for such products.

A patent was issued for a machine to produce a multi-colored asbestos-cement sheet.[26]

New types of asbestos papers, suitable for temperatures ranging from 300° F. to 500° F., were marketed. A new refractory material containing asbestos and an asbestos cloth were said to withstand temperatures of 3,000° F.

Numerous patents were issued covering the use of asbestos in special heat insulating applications, sealing compounds, and asphalt coatings.

Tests were made in Japan to produce a special cement by mixing abestos calcined at 650° C. with magnesium hydroxide calcined at 800° C.

The qualities of this cement were said to be about the same as magnesium oxychloride cement.

---

[20] Gabrielse, H., The Genesis of Chrysotile Asbestos in the Cassiar Asbestos Deposit, Northern British Columbia: Econ. Geol., vol. 55, No. 2, March–April 1960, pp. 327–337.
Drysdall, A. R., and Newton, A. R., Blue Asbestos from Lusaka, Northern Rhodesia, and Its Bearing on the Genesis and Classification of This Type of Asbestos: Am. Mineral., vol. 45, Nos. 1 and 2, January–February 1960, pp. 53–59.

[21] Vejnar, Z., A Contribution to the Problem of the Origin of Some Chrysotile Asbestos Deposits in Eastern Asia: Sbornik Ustredniho Ustavu Geologickeho, Svazek 24–1957, Praha, Czechoslovakia, 1959, 76 pp.

[22] Bichan, W. J., Commercial Chrysotile Deposits, Baie Verte, Notre Dame Bay District, Newfoundland—Preliminary Notes: Econ. Geol., vol. 55, No. 2, March and April 1960, pp. 399–401.

[23] Harris, C. G., and Sluyter, R., Undercutting at the King Mine of Asbestos Corporation, Limited: Can. Min. and Met. Bull. (Montreal), vol. 53, No. 578, June 1960, pp. 392–396.
Parsons, G. W., and Sampson, R. E., Conversion From Open Pit to Underground Mining at the Munro Mine: Can. Min. and Met. Bull. (Montreal), vol. 53, No. 578, June 1960, pp. 397–405.

[24] South African Mining and Engineering Journal (Johannesburg), Passes Stringent Tests—But No Dust: Vol. 71, No. 3527, pt. 2, Sept. 9, 1960, p. 629.

[25] Engineering News-Record, Asbestos-Asphalt Surface Mixes Tested: Vol. 164, No. 16, Apr. 21, 1960, p. 70.

[26] Field, B. H., and Mayo, J. W. (assigned to The Patent and Licensing Corp.), Multi-Colored Asbestos—Cement Product and Process: U.S. Patent 2,929,735, Mar. 22, 1960.

Published by AsbestosClaims.Law
asbestosclaims.law/library/10999/11

Published by AsbestosClaims.Law
asbestosclaims.law/library/10999/12