Asbestos

By G. W. JOSEPHSON AND F. M. BARSIGIAN

GENERAL SUMMARY

THE world-wide shortage of asbestos continued to be acute in 1948. After the war many asbestos-products manufacturers embarked upon expansion programs as demand increased, but it soon became apparent that the supplies of raw asbestos were inadequate to support this rapid expansion program. Consequently, growth of the industry has been inhibited, and it has not been possible to take full advantage of all the manufacturing capacity available. The shortage has stimulated the search for substitute fibers that might be available in larger quantity.

Asbestos was mined in the United States at a record rate, but the total was only a small fraction of our requirements—only 5 percent of the asbestos consumed in the United States in 1948.

The bulk of the asbestos produced in the United States is chrysotile, coming largely from Vermont and Arizona. The market for amphibole asbestos is still comparatively small but has increased recently owing to use in a new type of insulating product.

Imports of asbestos also attained a new record. Canada is our principal supplier of chrysotile; relatively small quantities are received from Southern Rhodesia and Russia.

United States amosite supplies come from South Africa, as does nearly all of the crocidolite used in this country. Interest in and development of blue asbestos deposits in other countries, such as Australia and Bolivia, have been noteworthy during the past year, but these have not yet become suppliers of large tonnages.

The general shortage of asbestos fibers has been so acute that comparatively little progress was made in their procurement for the National Strategic Stock Pile during the past year.

Prices of raw asbestos increased considerably during 1948.

Salient statistics of the asbestos industry in the United States, 1947–48

	1947		1948	
	Short tons	Value	Short tons	Value
Domestic asbestos—				
Produced:				
Chrysotile	24,462	(1)	(2)	(1)
Amphibole	677	(1)	(2)	(1)
Total produced	25,139	(1)	37,237	(1)
Sold or used by producers:				
Chrysotile	23,586	$912,340	(2)	(2)
Amphibole	449	6,218	(2)	(2)
Total sold or used by producers	24,035	918,558	37,092	$1,806,261
Imports (unmanufactured)	594,839	29,821,519	647,881	37,974,092
Exports (unmanufactured)	2,087	316,414	6,530	1,173,259
Apparent consumption [3]	616,787	30,423,663	678,443	38,607,094
Exports of asbestos products	(1)	12,823,480	(1)	10,471,059

[1] Figure not available.
[2] Bureau of Mines not at liberty to publish figure separately.
[3] Quantity sold or used by producers, plus imports, minus exports.

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PRODUCTION

In 1948 production of asbestos in the United States attained a new record of 37,237 short tons—48 percent more than in 1947. Chrysotile production was reported from Vermont and Arizona and amphibole from California, Georgia, and North Carolina. During 1948 considerable exploration was carried on, but no large commercial developments were reported. However, one promising deposit of chrysotile was being investigated.

Asbestos sold or used by producers in the United States, 1944–48, by varieties

Year	Chrysotile		Amphibole		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1944	6,275	$373,112	392	$7,222	6,667	$380,334
1945	11,986	442,056	240	3,989	12,226	446,045
1946	13,645	499,260	430	5,504	14,075	504,764
1947	23,586	912,340	449	6,218	24,035	918,558
1948	(1)	(1)	(1)	(1)	37,092	1,806,261

[1] Bureau of Mines not at liberty to publish figure separately.

Alaska.—Alaska has some rather inaccessible deposits of tremolite and chrysotile in the Kobuk River district, but in 1948 no output was reported from them.

Arizona.—In 1948 chrysotile production in Arizona was substantially higher than in the previous year. The following firms and individuals were active: Apache Asbestos Mines, Inc., Arizona Chrysotile Asbestos, Arthur Enders, Ted Heron, Charles Ireland, Louis Kuehne, Roger Q. Kyle, Phillips Asbestos Mines, K. Reidhead, and the Globe Asbestos Co. The Globe firm operates the largest mill in the area.

California.—In Shasta County production of tremolite was reported by Homer E. Fenn of Hazel Creek, Ray J. Sylvester of Mount Shasta, and the Powhatan Mining Co. (Woodlawn, Baltimore, Md.). H. Zimdars and J. Delume of Foresthill mined a small quantity of tremolite in Placer County but discontinued mining later in the year.

Georgia.—Powhatan Mining Co. mined anthophyllite in Rabun County near Dillard and in Barrow County near Statham.

North Carolina.—The only asbestos production in North Carolina in 1948 came from an amphibole mine in Macon County, operated by Powhatan Mining Co. of Woodlawn, Baltimore, Md.

Vermont.—Vermont was the principal asbestos-producing State in 1948. The Vermont Asbestos Mines Division of the Ruberoid Co., the only producer in Vermont, increased its production considerably. This asbestos is a high-grade chrysotile that is milled by the company, largely for use in its own asbestos products.

CONSUMPTION AND USES

A census of manufactures covering 1947 was taken by the Bureau of the Census during 1948. This is the first such census taken since 1939. The production statistics for asbestos products are shown in the following table.

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Production of asbestos products in the United States, 1939 and 1947, and shipments, 1947

[U. S. Bureau of the Census]

Product	Unit of measure	1939		1947		
		Production [1]		Production	Shipments and interplant transfers	
		Quantity	Value $1,000	Quantity	Quantity	Value $1,000
Asbestos-cement products:						
Siding shingles and clapboard	M squares	(2)	(3)	4,928	4,889	$30,682
Roofing shingles	do	664	$4,599	900	881	6,846
Flat sheets and wallboard (¼-inch basis)	M sq. ft	(2)	(3)	157,238	147,516	13,419
Corrugated sheets	do	7,551	845	45,839	41,321	5,140
Other (including pipe, conduits, and ducts)			[3] 11,207			14,323
Total			(2)			70,410
Asbestos friction materials:						
Brake linings:						
Woven (containing asbestos yarn, tape, or cloth)	M lin. ft	(2)	14,377	19,601	19,589	6,968
Molded (including all nonwoven types)	Cu. ft	(2)		[4] 454,215	[4] 425,859	31,787
Clutch facings:						
Woven (containing asbestos yarn, tape, or cloth)	M pieces	9,084	2,446	20,732	20,004	9,851
Molded (including all nonwoven types)	do	(2)	(5)	39,513	40,296	10,000
Total			(2)			58,606
Asbestos insulation:						
Pipe insulation:						
Cellular and laminated		(2)	(2)			6,687
85 percent magnesia		(2)	(2)			6,578
Other		(2)	(2)			2,998
Block insulation (including sheet and lagging):						
Cellular and laminated	M bd. ft	(2)	(2)	13,073	13,529	1,558
85 percent magnesia	do	(2)	(2)	31,343	31,888	4,573
Other	do	(2)	(2)	10,652	11,442	2,094
Total			11,712			24,488
Asbestos textiles:						
Carded fiber	M pounds	(2)	(6)		506	178
Roving and lap	do	4,437	1,018	23,358	4,960	1,819
Wick and rope	do	(2)	(6)	3,221	2,785	1,291
Yarn, cord, and thread	do	7,923	2,683	25,285	9,748	4,815
Cloth	do	5,263	1,813	11,940	7,998	5,624
Tape	do	2,212	1,174	6,543	3,266	2,469
Other	do	(2)	1,997	1,039	1,036	795
Total			8,685			16,991
Other asbestos products:						
Asbestos, asbestos-metallic, and asbestos-rubber gaskets		(2)	(2)			31,915
Asbestos compressed sheet	M pounds	5,448	1,205	10,779	7,639	2,795
Asbestos (except compressed sheet), asbestos-metallic, and asbestos-rubber packing	do	(2)	(2)	8,919	8,937	9,459
Asbestos millboard	Ton	9,137	867	20,218	19,355	2,812
Asbestos paper	do	42,615	4,476	97,119	96,760	10,592
Asphalt floor tile	M sq. yds	4,933	3,633	41,479	40,981	37,825
Other			[7] 15,693			[8] 7,812

[1] Probably represents production for sale only.
[2] Figure not available.
[3] Figures for siding shingles and clapboard, flat sheets and wallboard, and asbestos flexible roofing are included with "Other asbestos-cement products."
[4] Partly estimated.
[5] Included in "Other" under "Other asbestos products."
[6] Included in "Other asbestos textiles."
[7] Represents asbestos conduits and ducts (other than cement), molded clutch facings, paper, table mats and protectors, asbestos insulating cement, 85-percent magnesia cement, and high-temperature cements.
[8] Represents asbestos drier felts, fabricated asbestos-paper products, stove mats and table pads, asbestos insulating cement, asbestos gloves, and miscellaneous asbestos products.

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Apparent consumption of raw asbestos in the United States, 1944–48

Year	Short tons	Value	Year	Short tons	Value
1944	389, 241	$18, 864, 291	1947	616, 787	$30, 423, 663
1945	378, 030	15, 926, 622	1948	678, 443	38, 607, 094
1946	459, 752	17, 840, 775			

The Census data, as well as those in the accompanying table of raw-asbestos consumption, indicate the rapid rate of expansion that has taken place in the asbestos industry. The major uses of asbestos in industry are in such products as pipe covering, packing, gaskets, brake linings, and various textiles. The building industry also consumes very large tonnages in asbestos-cement products (such as shingles, sheets, and pipes), floor tile, and other uses. The correlation between activity in construction, general industrial production, and asbestos consumption during the past 29 years is shown in figure 1.

Market Conditions.—As in 1947, the world demand for asbestos was greater than the supply. Production was being expanded, particularly in Canada, but the increase during the year was not nearly sufficient. American factories purchased the largest part of world production, but the demands of other consumers were becoming increasingly important factors in the market. Toward the latter part

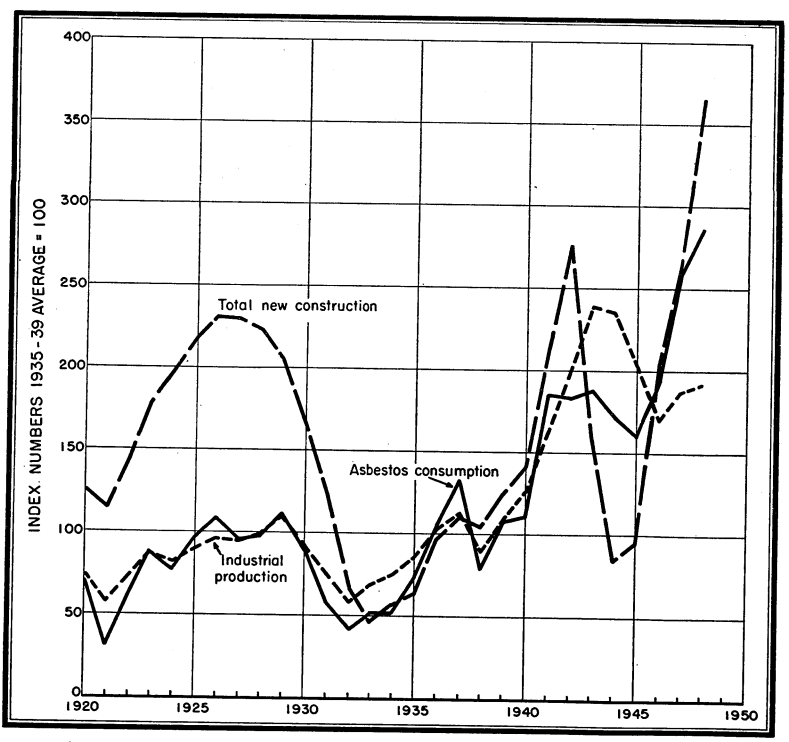


FIGURE 1.—Consumption of asbestos compared with total new construction and industrial production, 1920–48. Units are reduced to percentages of the 1935-39 average. Statistics on value of construction from Bureau of Foreign and Domestic Commerce and on industrial production from Federal Reserve Board.

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of the year there was some evidence that the shortage of textile fibers was easing, but this did not reach a point that would release fiber for stock piling. There was also a slight recession in demand for shorts during part of the year, but this is said to have been largely overcome. The exploration and mine-development work that are progressing throughout the world promise some relief for the future. As indicated in the World Review section of this chapter, a number of important expansion programs are in progress. However, at the end of 1948 contracting activities indicated that more than the available supply would be required for 1949 and that any early relief from the shortage can come only from a decline in demand for asbestos products.

Asbestos varies widely in physical properties and consequently in utility. Each variety has fundamental advantages and disadvantages, and even within a single variety the properties vary so much that great care must be exercised in proper handling and processing of the product in order to attain the most efficient use of the raw materials. A brief paper discussing asbestos research and the properties that determine utilization was published in 1948.[1]

New Uses.—Some noteworthy new products were announced during 1948. An outstanding example is Quinterra paper. In making this product, chrysotile fibers are formed by a special paper-making process into a paperlike tape having a thickness of only 1.5 to 20 mills. It is used for electrical wire insulation.[2] A new plant has been built for its manufacture.[3]

Another new product that attracted attention during 1948 was phospho-asbestos, a molded asbestos material having superior properties for use in circuit breakers.[4]

Many varieties of asbestos have found commercial use, but anthophyllite generally has such a weak fiber that comparatively little has been consumed in the United States in the past. However, it appears to be the most suitable type for use in a newly developed insulating material composed principally of a plastic and anthophyllite. The product is now in commercial production, and the prospect of developing a substantial market for it is considered to be promising.

PRICES

Under current market conditions, coupled with higher material and labor costs, the prices of all grades of crude and milled asbestos fiber from both Canada and Vermont increased in 1948. As quoted in the magazine, Asbestos, the prices per short ton of Canadian fiber, f. o. b. mines, in January were as follows, in United States dollars: Group 1 (Crude No. 1), $800; group 2 (Crude No. 2, Crude Run-of-Mine, and Sundry), $302.50–$545; group 3 (Spinning or Textile Fiber), $170.50–$354.50; group 4 (Shingle Fiber) $82.50–$127; group 5 (Paper Fiber), $58–$73.50; group 6 (Waste, Stucco, or Plaster), $43–$47.50; and group 7 (Refuse or Shorts), $19.50–$44.50.

Prices of Canadian asbestos increased in February and these figures were quoted from then until December: Crude No. 1, $896–$960;

[1] Badollet, M. S., Research on Asbestos Fibers: Canadian Min. and Met. Bull., vol. 42, No. 432, April 1948, pp. 213–216.
[2] Asbestos, Quinterra, a New Type of Electrical Insulation: Vol. 30, No. 2, August 1948, pp. 12–14.
[3] Asbestos, Johns Manville's Newest Plant: Vol. 30, No. 5, November 1948, pp. 16–18.
[4] Asbestos, Phospho-Asbestos; Vol. 30, No. 5, November 1948, pp. 10–12.

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Crude No. 2, Crude Run-of-Mine, and Sundry, $350–$545; Spinning or Textile Fiber, $204.50–$378; Shingle Fiber, $84.50–$128; Paper Fiber, $69.50–$78; Waste, Stucco, or Plaster, $47–$51.50; and Refuse or Shorts, $24.50–$46.

At the end of the year, another general price increase was being put in effect.

The prices of Vermont asbestos in short tons f. o. b. Hyde Park or Morrisville, Vt., quoted in January 1948, were: Shingle Fiber, $92.50–$102.50; Paper Fiber, $65–$73; Waste, Stucco, or Plaster, $48.50; Refuse or Shorts, $25.50–$44.50. These prices were increased in March 1948 and remained unchanged throughout the year, as follows: Shingle Fiber, $97–$107; Paper Fiber, $68.50–$85; Waste, Stucco, or Plaster, $51; Refuse or Shorts, $25.50–$46.50.

FOREIGN TRADE[5]

As the major producing countries are not large consumers, a very high proportion of the asbestos output of the world moves in foreign trade. The United States has only a negligible export trade in unmanufactured asbestos. The exported material is largely domestic chrysotile from Arizona and a modest tonnage of foreign material that is reexported, with or without blending, to higher-priced markets. On the other hand, exports of manufactured asbestos products are substantial, totaling $10,471,059 in 1948.

Asbestos imported for consumption in the United States, and asbestos and asbestos products exported from the United States, 1944–48

[U. S. Department of Commerce]

Year	Asbestos (unmanufactured)				Manufactured asbestos products—exports (value)
	Imports		Exports		
	Short tons	Value	Short tons	Value	
1944	383,049	$18,542,940	475	$58,983	$5,614,243
1945	374,354	16,317,752	8,550	837,175	7,264,288
1946	456,688	18,731,378	11,011	1,395,367	9,263,092
1947	594,839	29,821,519	2,087	316,414	12,823,480
1948	647,881	37,974,092	6,530	1,173,259	10,471,059

United States imports of unmanufactured asbestos were 9 percent higher than in 1947. Canada supplied 93 percent of the total, the Union of South Africa 3 percent, Southern Rhodesia 2 percent, and Russia 2 percent. Small quantities were received from other countries as indicated in the accompanying table.

[5] Figures on imports and exports compiled by M. B. Price, of the Bureau of Mines, from records of the U. S. Department of Commerce.

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Asbestos (unmanufactured) imported for consumption in the United States, 1947–48, by countries and classes

[U. S. Department of Commerce]

Country	Crude (including blue fiber)		Mill fibers		Short fibers		Total	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
1947								
Australia	(1)	$198					(1)	$198
Canada	497	264, 148	162, 302	$13, 936, 784	396, 480	$11, 053, 272	559, 279	25, 254, 204
Italy	4	2, 318	4	4, 855			8	7, 173
Southern Rhodesia [2]	8, 894	1, 735, 167	98	15, 484			8, 992	1, 750, 651
Union of South Africa	20, 031	2, 144, 528			3	88	20, 034	2, 144, 616
U. S. S. R.	6, 524	663, 788					6, 524	663, 788
United Kingdom	1	705					1	705
Venezuela			1	184			1	184
	35, 951	4, 810, 852	162, 405	13, 957, 307	396, 483	11, 053, 360	594, 839	29, 821, 519
1948								
Australia	3	1, 550					3	1, 550
Bolivia	68	11, 445					68	11, 445
Canada	676	361, 316	168, 690	16, 884, 386	432, 850	14, 512, 547	602, 216	31, 758, 249
China			2	238			2	238
India	(1)	68					(1)	68
Italy			10	11, 122			10	11, 122
Southern British Africa	692	87, 741					692	87, 741
Southern Rhodesia [2]	10, 463	2, 033, 398	20	6, 873	30	8, 546	10, 513	2, 048, 817
Turkey					4	400	4	400
Union of South Africa	18, 859	2, 073, 371					18, 859	2, 073, 371
U. S. S. R.	7, 327	851, 656	8, 187	1, 129, 380			15, 514	1, 981, 036
United Kingdom	(1)	55					(1)	55
	38, 088	5, 420, 600	176, 909	18, 031, 999	432, 884	14, 521, 493	647, 881	37, 974, 092

[1] Less than 1 ton.
[2] Includes the following crude credited to Mozambique by the U. S. Department of Commerce: 1947—67 tons, $17,778; 1948—1,055 tons, $106,431.

Manufactured asbestos products exported from the United States, 1947–48, by kinds

[U. S. Department of Commerce]

Products	1947		1948	
	Quantity	Value	Quantity	Value
Brake blocks, short tons	312	$494, 165	132	$219, 670
Brake lining:				
Molded and semimolded, do	1, 654	2, 907, 716	1, 301	2, 238, 135
Not molded, linear feet	949, 449	552, 244	681, 364	404, 085
Clutch facing, number	1, 636, 400	794, 688	1, 134, 146	550, 937
Paper, millboard, and roll board, short tons	1, 078	272, 823	1, 639	308, 384
Pipe covering and cement, do	2, 765	510, 887	1, 599	298, 781
Sheets, do	5, 292	641, 069	3, 718	455, 816
Textiles, yarn, and packing, do	2, 101	2, 622, 055	1, 575	2, 302, 384
Asbestos roofing, squares	164, 114	1, 152, 621	210, 238	1, 392, 071
Other asbestos manufactures, except roofing, short tons	(1)	1, 186, 845	(1)	1, 151, 088
Magnesia and manufactures, do	(1)	1, 688, 367	(1)	1, 149, 708
		12, 823, 480		10, 471, 059

[1] Quantity not recorded.

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TECHNOLOGY

Iron removal received considerable attention during 1948, and a review was published on the subject.[6] The problem is of particular importance because of the use in military equipment of low-iron chrysotile that is now obtained principally from Southern Rhodesia. Development of methods of beneficiating more available grades of asbestos would improve our military supply position.

The shortage of amosite is resulting in serious efforts to find substitutes. In this case one of the most promising lines of investigation is leading toward the substitution of glass fiber in some heat-insulating products.

WORLD REVIEW

Although official statistics are not available for some producing areas, it is estimated that Canada supplied nearly two-thirds of the world asbestos output in 1948. Russia probably was in second place, Southern Rhodesia third, and the Union of South Africa fourth.

World production of asbestos, 1943–48, by countries, in metric tons [1]

[Compiled by P. Roberts]

Country [1]	1943	1944	1945	1946	1947	1948
Argentina	349	292	153	(2)	(2)	(2)
Australia:						
New South Wales	422	2,598	2,674	241	290	(2)
South Australia	11	6	7	8	40	[3] 40
Tasmania	19	105	281			
Western Australia	247	313	1,109	380	1,069	977
Bolivia (exports)	22	13	61		76	147
Brazil	(2)	(2)	(2)	(2)	3	10
Canada (sales) [4]	423,831	380,349	423,559	506,371	600,391	650,239
Chile	(2)	(2)	313	280	(2)	(2)
China	[3] 20,000	(2)	(2)	(2)	(2)	(2)
Cyprus (exports)	1,189	1,983	3,125	5,993	6,369	8,108
Egypt	7	240	[5] 50	65	1,015	1,625
Finland [6]	7,466	7,733	4,197	5,781	(2)	(2)
France	78	31	400	575	475	(2)
French Morocco	182	506	480	446	790	399
India	909	592	833	312	123	(2)
Indochina, French	312	242				
Italy	8,459	7,238	5,222	8,814	10,468	[3] 11,770
Japan	5,302	12,900	8,044	3,997	3,708	4,590
Kenya	321	341	389	[3] 165	582	(2)
Korea	5,310	4,779	1,303	(7)	(7)	(7)
Madagascar	(8)	3	1	1	(8)	(8)
New Zealand	190	17	2			
Portugal	96	33	20	12	(2)	(2)
Southern Rhodesia	52,749	52,882	51,119	50,686	49,073	62,502
Spain	50					(2)
Swaziland	17,179	29,628	21,243	29,155	25,360	29,421
Switzerland	11	7	35	40		
Turkey	133	234	138	55	(2)	203
Union of South Africa	32,347	31,372	25,597	18,348	27,344	41,490
United States (sold or used by producers)	5,456	6,048	11,091	12,769	21,804	33,649
Venezuela	(2)	(2)	(2)	65	293	192
Total (estimate)	633,800	601,800	632,400	725,600	866,800	989,400

[1] In addition to countries listed asbestos is produced in Algeria, Bulgaria, Czechoslovakia, Uganda, and U. S. S. R. Estimates by authors of the chapter are included in total.
[2] Data not available; estimate by authors of the chapter included in total.
[3] Estimate.
[4] Exclusive of sand, gravel, and stone (waste rock only), production of which is reported as follows: 1943, 6,272 tons; 1944, 4,101 tons; 1945–48 data not available.
[5] January to September, inclusive.
[6] Includes asbestos flour.
[7] South Korea only.
[8] Less than 1 ton.

[6] **Asbestos, Removal of Iron from Asbestos Fiber: Vol. 30, No. 6, December 1948, pp. 26–32.**

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CANADA

In 1948 the Canadian asbestos industry reached a new output record of 716,769 short tons valued at $42,231,475, an increase of 8 percent in tonnage over 1947. The block-caving method is coming into greater use. Seven companies that are not now producers are said to have been carrying on exploration and development work. It was reported that the United Asbestos Corp. has discovered a large deposit under Black Lake, and an aggressive drilling program is in progress. Indications are that the deposit contains 50,000,000 tons averaging 4½-percent asbestos.[7]

The Potash Co. of America optioned 25,000 acres held by the Reed estate and has started an exploration program. Another firm reported to be carrying on a diamond-drilling program is the Coleraine Asbestos Co.[8]

Sales of asbestos in Canada, 1947–48, by grades

[Quebec Department of Mines]

	1947			1948		
	Short tons	Value		Short tons	Value	
		Total	Average per ton		Total	Average per ton
Grade:						
Crudes	958	$503,137	$525.20	977	$594,594	$608.59
Fibers	222,196	20,221,444	91.01	241,953	25,943,710	107.23
Shorts	438,667	12,281,167	28.00	473,839	15,693,171	33.12
	661,821	33,005,748	49.87	716,769	42,231,475	58.92
Rock mined	9,837,045			10,759,016		
Rock milled	7,740,828			7,894,461		

AFRICA

Southern Rhodesia.—During 1948 preparations for the reopening of the Croft mine were being made by Mashaba Rhodesian Asbestos Co. In the Belingwe area, Vanguard Asbestos Mines, which has absorbed claims previously held by the H. M. H. Syndicate, was making arrangements to mine a large deposit.[9] In the Mashaba district the Mangwana property was investigated and found to have promise as a possible source of shingle fiber.[10]

Southern Rhodesian asbestos is distributed to many countries. In 1947 the bulk, over 40 percent, went to the United Kingdom and 20 percent to the United States. Australia, India, and France followed in that order.[11]

[7] Northern Miner, United Asbestos Big Tonnage: Vol. 34, No. 33, Nov. 4, 1948, p. 4.
[8] Northern Miner, Asbestos Industry Hits New Peaks: Vol. 34, No. 28, Sept. 30, 1948, pp. 1–3.
[9] Mining Magazine (London), vol. 79, No. 2, February 1948, p. 93.
[10] Vanderburg, W. O., Opportunity for American Capital to Acquire Asbestos Property in Southern Rhodesia: U. S. Consular Rept. 284 (Pretoria, Union of South Africa), Dec. 10, 1948, p. 4.
[11] Bureau of Mines, Mineral Trade Notes: Vol. 26, No. 1, January 1948, p. 35.

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Asbestos produced in Southern Rhodesia, 1943–48

Year	Short tons	Value	Year	Short tons	Value
1943	58,146	£1,673,025	1946	55,872	£1,676,503
1944	58,293	1,674,467	1947	54,094	1,738,484
1945	56,349	1,788,386	1948	68,897	2,604,623

Swaziland.—The asbestos produced in Swaziland is chrysotile mined at the Havelock mine by Turner & Newhall, Ltd. Both open-pit and underground mining methods are used.[12] Output in 1948 totaled 29,421 metric tons—almost equal to the record of 29,628 tons produced in 1944.

Union of South Africa.—Exploratory work by the Stoltzburg Asbestos Co., in the Eastern Transvaal, has revealed reserves of over 5,000,000 tons of ore ranging from 3 to 5 percent asbestos. The deposit is being prepared for mining by ring stoping or block caving. Expansion of the mill to bring capacity up to 350–400 tons of fiber per month was in progress.[13]

It is reported that a program for expanding amosite production capacity by at least 50 percent was started in 1948.

The principal grades of crocidolite and amosite as outlined by the Department of Mines of the Union of South Africa are as follows:[14]

Cape blue:

	Length of fiber, in.
No. 3 or S	0 to ⅜.
2 or A	⅜ to ¾.
1 or B	¾ to 1¼.
Long or C, D, E	1½ plus.

Transvaal blue:

Crude:	Fiberized:	
TX	TDX	+1½.
T1	TD1	−1¼ to +⅞.
T2	TD2	−⅞ to +½.
T3	TD3	−½ to +¼.
T4	TD4	−¼.

Amosite:

Longs	¾ in. and over.
Shorts	¾ in. and less.
B1	Best long grayish-white fiber.
B3 and D3	Second-grade long fiber, varying in color from yellow to dark brown.
M	Uniform mixed shorts.
MD	Shorts of all grade.

White amosite fiber:

Crudes:	Fiberized:	*Length of fiber, in.*
AL1	D1	+1½.
AL2	D2	−1½ to +¾.
AL3	D3 or DD	−¾ to +½.

[12] South African Mining and Engineering Journal, Asbestos: Progress and Prosperity: Vol. 59, No. 2894, July 31, 1948, pp. 627–629.
[13] South African Mining and Engineering Journal, Progress at Stoltzburg Mine: Vol. 59, Part 1, No. 2885, May 29, 1948, p. 396.
[14] Asbestos, Asbestos Grades in South Africa: Vol. 30, No. 6, December 1948. p. 16.

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Tan or brown fiber:

Crudes:	Fiberized:	*Length of fiber, in.*
B1	DB1	+1½.
B2	DB2	−1½ to +¾.
B3	DB3	−¾ to +½.
	DDB	−½.
	DDDB	Shorts for consumption in Union of South Africa.

Asbestos produced in and exported from the Union of South Africa, 1943–48 [1]

Year	Production (short tons)			Exports	
	Transvaal	Cape Province	Total	Short tons	Value
1943	27,768	7,888	35,656	35,940	£880,019
1944	26,747	7,835	34,582	28,174	672,941
1945	20,016	8,200	28,216	22,005	591,124
1946	12,636	7,589	20,225	21,481	557,008
1947	21,959	8,183	30,142	33,237	927,371
1948	37,434	8,301	45,735	38,550	1,138,792

[1] Data from Union of South Africa, Department of Mines, Quarterly Report.

Asbestos produced in the Union of South Africa, 1943–48, by varieties and sources, in short tons [1]

Variety and source	1943	1944	1945	1946	1947	1948
Amosite (Transvaal)	23,189	22,848	16,737	9,838	18,780	30,372
Chrysotile (Transvaal)	2,034	2,014	1,765	1,666	2,253	4,441
Blue (Transvaal)	2,456	1,831	1,471	1,102	896	2,608
Blue (Cape)	7,888	7,835	8,200	7,589	8,183	8,301
Anthophyllite (Transvaal)	89	54	43	30	30	13
Total	35,656	34,582	28,216	20,225	30,142	45,735

[1] Data from Union of South Africa, Department of Mines, Quarterly Report.

OTHER COUNTRIES

Australia.—Blue asbestos is being mined on a modest scale in the Wittenoom Gorge of the Hammersley Range in a remote section of Western Australia. The two asbestos seams are said to total 2 to 6 inches in thickness and are mined by the room-and-pillar method. The asbestos occurs in a hard, ferruginous quartzite. First about 48 inches of the quartzite is removed from above the asbestos, and then the bottom 24-inch section containing the two seams of cross-fiber crocidolite is mined. The mine is operated by Blue Asbestos, Ltd., a subsidiary of Colonial Sugar Recovery, Ltd. The product is used almost entirely in Australia itself. Output is now comparatively small, but capacity is being increased.[15]

Bolivia.—Bolivian crocidolite output is small, as it is somewhat lacking in strength; however, some interest in the fiber has developed, as it appears to serve satisfactorily as a filtering material.

Finland.—Finska Mineral Aktiebolaget produces about 6,000 tons of anthophyllite annually from surface mines at Paakkila in Northern

[15] Mining Magazine (London), Blue Asbestos Deposits in the Hammersley Range: Vol. 78, No. 4, April 1948, pp. 205–207.

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Savolax and at Maljasalmi in Northern Karelia. The company also operates an asbestos-products plant in Helsinki, where most of its own asbestos as well as chrysotile from the Urals is used.[16]

France.—During 1948 a deposit of tremolitic asbestos near Chateau-Queyras, France, received considerable attention. It had been operated on a small scale in the past. The fiber is said to be of promising quality, and an attempt is being made to bring the deposit into commercial production.[17] In 1948 the Canari mine in Corsica was being developed for a projected production rate of 15 to 20 tons per day of chrysotile slip fiber.[18] A deposit of chrysotile is being operated on a small scale in French Morocco.

Italy.—Articles on the geology of Italian asbestos deposits were published during 1948.[19]

Switzerland.—Deposits of asbestos close to Alp Quadrada, near Poschiavo (Canton Grisons), Switzerland, are mined by Studiengesellschaft für Asbestgewinnung. The mine has been worked since 1942, producing 85.2 metric tons from 1942 to 1946. The product is considered to be of good quality for use in filters.[20]

U. S. S. R.—Russia exported 500 tons of raw asbestos to Norway in 1947.[21]

[16] Asbestos, Finska Mineral Aktiebolaget: Vol. 30, No. 1, July 1948, pp. 12–13.
[17] Ru Keyser, W. A., Asbestos at Chateau-Queyras, France: Asbestos, vol. 29, No. 10, April 1948, pp. 8–20.
[18] Asbestos, The Canari Mine—Corsica: Vol. 30, No. 3, September 1948, pp. 20–21.
[19] Asbestos, Geology of Italian Deposits: Vol. 29, No. 7, January 1948, pp. 16–24. Asbestos Deposit at San Vittore (Balangero), Italy: Vol. 29, No. 12, June 1948, pp. 16–24.
[20] Bureau of Mines, Mineral Trade Notes: Vol. 27, No. 1, July 1948, p. 26.
[21] Bureau of Mines, Mineral Trade Notes: Vol. 26, No. 5, May 1948, p. 28.

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