ASBESTOS

By Oliver Bowles and B. H. Stoddard

Asbestos, a fibrous mineral used for fireproof textiles, packings, and heat-insulating products, is mined in relatively small quantities in the United States. Domestic mines supplied only about 3½ percent of consumers' requirements during 1932. As shown in the summary of statistical data, commercial production in 1932 increased about 10 percent in quantity but decreased about 11 percent in value compared with 1931. The increase in volume of production was due to a moderate enlargement of activity in the plant at Hyde Park, Vt. Although asbestos mining is a restricted industry, the manufacture of asbestos products is an activity of large proportions.

Salient statistics of the asbestos industry, 1931–32

	1931		1932	
	Short tons	Value	Short tons	Value
Domestic asbestos sold or used by producers:				
Chrysotile	2,857	$111,708	(1)	(1)
Amphibole	371	7,259	(1)	(1)
Total	3,228	118,967	3,559	$105,292
Imports (unmanufactured)	136,361	3,749,340	96,754	2,250,200
Exports (unmanufactured)	1,714	122,391	1,707	94,936
Apparent consumption	137,875	3,745,916	98,606	2,260,556
Exports, asbestos products		2,606,166		1,608,880

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

While production figures show no striking departure from those of 1931, domestic supplies form so small a part of total consumption that a true picture of the asbestos industry as a whole may be gained only by considering imports and exports. As the accompanying figures show, imports decreased greatly compared with 1931, the drop in tonnage amounting to about 29 percent and that in value to 40 percent. Exports have always been small.

If stocks of asbestos in consumers' hands, for which the Bureau of Mines has no data, are disregarded, a fair measure of activity in the manufacture of asbestos products can be gained from a determination of apparent consumption—arrived at by adding production to imports and subtracting exports. The following table of domestic consumption, value of manufactured products, and exports of prod-

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ucts shows major trends in the asbestos-products industry of the United States during recent years:

Raw asbestos consumed in the United States and asbestos products manufactured in and exported from the United States, 1923–32

Year	Apparent consumption of raw asbestos (short tons)	Asbestos [1] products (value)	Exports of manufactured-asbestos products (value)
1923	211,967	$69,811,681	$2,850,387
1924	182,280		2,529,795
1925	230,669	80,144,936	2,383,325
1926	257,875		3,481,814
1927	226,365	87,200,889	2,687,086
1928	231,984		3,999,022
1929	264,873	101,597,171	4,640,599
1930	212,152		4,193,510
1931	137,875	60,574,579	2,606,166
1932	98,606		1,608,880

[1] Figures obtained from Bureau of the Census.

Market conditions.—Market demands for asbestos products, and therefore for raw asbestos, were small throughout the year. As the total value of building contracts awarded in 1932 was only 28 percent of the 1923 to 1925 average, there was very little demand for asbestos paper, other heat-insulating products, and millboard. Automobile production was also so low that brake-band requirements were small. Even the replacement trade, which is more stabilized than the requirements for new cars, failed to maintain the asbestos-products industry at a level higher than the average of 1921 and 1923. Future market conditions will be controlled to some extent by new developments in uses, some of which are covered in the following section.

New developments in uses.—The well-known uses of asbestos may be enumerated briefly. The principal asbestos of commerce is known as chrysotile. The longer fibers, roughly three eighths inch or more, are spun chiefly into yarn, which is woven into textile products, such as brake-band linings, theater curtains, packings, and fireproof suits and gloves. Shorter grades are used for compressed sheets, asbestos paper, asbestos-cement shingles, and millboard. The shortest fibers are used in asbestos cement, fireproof paints, packings, and insulating materials.

Amphibole fiber produced in the United States is too weak and brittle for spinning or for manufacture of asbestos paper or roofing. Special grades of domestic amphibole are used for acid filters, and other types are used for fillers and insulation.

According to Bureau of the Census figures there is a marked tendency toward a more extensive use of molded brake bands in automobiles. Of the brake bands made in 1929 about 83 percent were woven and 17 percent molded. In 1931, 73 percent were woven and 27 percent molded. This trend indicates a relatively wider use of nonspinning asbestos at the expense of spinning grades.

A short fiber known as "microasbestos," obtained in Austria, has given satisfactory results in that country when mixed in proportions of 4 to 6 percent with asphalt for surfacing roads. This application suggests a possible use of short fibers for road-surfacing purposes in the United States.

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Asbestos-cement pipe is finding successful use for water mains and for conveyance of various liquids and gases, particularly for solutions that must be kept free from iron rust.

Asbestos has been found to be a satisfactory polishing agent. A rough asbestos cloth is used for common scouring and an acid-refined asbestos cloth for imparting a high luster.

Perhaps the most important technical development of the year is the perfecting of a process whereby asbestos may be cemented to steel by means of metallic adhesives.

Prices.—Prices of Canadian asbestos as quoted in Mineral and Metal Markets were almost constant throughout 1932. Quotations per ton at Quebec mines, tax and bags included, were as follows: Crude no. 1, $400 to $450; crude no. 2, $200; spinning fibers, $75 to $125; magnesia and compressed sheet fibers, $70 to $90; shingle stock, $45 to $60; paper stock, $27.50 to $35; cement stock, $15 to $20; and floats, $10 to $15. The only exceptions to these uniform quotations were magnesia and compressed sheet fibers and shingle stock, which were quoted somewhat higher in January. Rhodesian crude no. 1 quotations, c.i.f. New York, dropped from $300 a ton in January to $250 in February and to $170 for the remainder of the year. Rhodesian crude no. 2 likewise dropped from $200 in January to $175 in February and to $120 thereafter. Vermont shingle stock was quoted at $40 to $45 a ton, paper stock at $30 to $35, and cement stock at $18 to $22 f.o.b. mines.

Foreign sources of supply.—Aside from a comparatively small but increasing supply from Vermont practically the entire United States requirements of short fibers are obtained from Canada. For many years Canada was the chief source of spinning fibers also, but since 1916 Africa has supplied large quantities, and since 1927 Russia has also become an important source; however, according to import figures, very little Russian asbestos reached America in 1932. Imports of asbestos by classes and countries of shipment are shown in the following table. Asbestos obtained from the United Kingdom is chiefly of African origin, and that shipped from Germany comes principally from Russia.

Asbestos (unmanufactured) imported into the United States in 1932, by countries and classes

[General imports]

Country	Crude (including blue fiber)		Mill fiber		Stucco and refuse		Total	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Africa:								
British:								
Union of South Africa	212	$23,890					212	$23,890
Other	1,114	93,884					1,114	93,884
Canada	305	60,298	30,759	$1,225,501	63,606	$827,744	94,670	2,113,543
Germany	(1)	30					(1)	30
Italy	18	8,365	67	1,262	629	7,719	714	17,346
United Kingdom	1	399			43	1,108	44	1,507
	1,650	186,866	30,826	1,226,763	64,278	836,571	96,754	2,250,200

[1] Less than 1 ton.

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Export trade.—As indicated previously, very little unmanufactured asbestos is exported. However, the foreign trade in manufactured asbestos products is considerable. The various types of asbestos products exported, with the quantity and value of each, are shown in the following table.

Manufactured asbestos products exported from the United States, 1931 and 1932, by kinds

Grade	1931		1932	
	Quantity	Value	Quantity	Value
Brake lining:				
Molded and semimolded, linear feet	(1)	$419,763	(1)	$396,543
Not molded, do	3,791,500	720,360	1,959,796	299,220
Paper, millboard, and roll board, short tons	635	125,833	293	61,062
Pipe covering and cement, do	1,050	119,810	1,226	136,140
Textile yarn and packing, do	636	662,030	452	431,218
Magnesia and manufactures, do	1,453	200,543	610	91,117
Asbestos roofing, squares	26,556	109,767	30,886	59,306
Other manufactures, except roofing, short tons	1,196	248,060	647	134,274

[1] Quantity not recorded.

REVIEW BY STATES AND TERRITORIES

Alaska.—Deposits of amphibole asbestos of uncertain quality have been developed to a limited extent on Admiralty Island, at Chitina on the Copper River, and at other points, A deposit at Shungnak on the Kobuk River in northwestern Alaska was described as early as 1910, but the material found at that time was of poor quality. Further exploration in this locality has uncovered veins of long-fibered chrysotile of high quality. Specimens sent to the Bureau for examination were of the finest quality ever observed from undeveloped deposits. According to data supplied by Stewart [1] the fiber occurs in serpentine and parallels the vein walls, therefore it appears to be a slip fiber rather than the ordinary cross fiber found in replacement veins in Canada, Rhodesia, and Russia. Several thin veins have been found over a distance of about 2 miles.

Arizona.—No production is recorded for Arizona in 1932. Sales were made from stocks on hand by the Johns-Manville Products Corporation at Chrysotile and by the Bear Canyon Asbestos Co. at Globe. A new highway recently completed shortens the distance to the railroad and greatly reduces the cost of transportation. This will be of great advantage to Arizona producers in the future.

Georgia.—Small shipments of mass-fiber anthophyllite (amphibole) were made by the Clayton Paving Co., 220 Capitol Boulevard, Nashville, Tenn., from stock on hand. No asbestos was mined in 1932 at the company property near Helen, White County, Ga.

Maryland.—A high-grade anthophyllite suitable for chemical filters was produced in Maryland by the Powhatan Mining Corporation, Woodlawn, Baltimore, from the Jenkins mine near Pylesville.

Vermont.—The Vermont Asbestos Corporation, 82 Devonshire Street, Boston, Mass., which began operation in 1929 at its property near Hyde Park, Lamoille County, was fairly active during the year. High-quality mill fibers of various grades were marketed.

[1] Stewart, B. D., Mining Investigations and Mine Inspection in Alaska: Rept. to Governor of Alaska for Biennium Ending Mar. 31, 1933, pp. 21–22.

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Washington.—The Asbestos-Talc Products of Washington, Inc., Burlington, Wash., reported the use of several tons of asbestos from the company's property at Burlington in the manufacture of insullating, building, and roofing products.

PRODUCTION IN FOREIGN COUNTRIES

As the United States produces so small a proportion of the domestic demand for unmanufactured asbestos, foreign sources of supply have unusual interest. World production by countries for a series of years, insofar as figures are available, is shown in the following table:

World production of asbestos, 1928–32, in metric tons

Country [1]	1928	1929	1930	1931	1932
Africa:					
Portuguese East Africa			[2] 16	[3]	[3]
Southern Rhodesia	36,251	38,677	34,260	21,810	14,302
Union of South Africa	21,821	29,970	17,491	14,221	10,951
Australia:					
New South Wales				8	[3]
South Australia		1		6	[3]
Western Australia	12	259	144	116	[3]
Canada [4]	247,690	277,647	219,641	149,047	111,562
China	[3]	277	315	264	[3]
Cyprus [2]	11,765	14,017	5,487	3,628	[3]
Finland	1,462	1,563	1,188	581	[3]
France	730	750	503	[3]	[3]
Greece	[3]	[3]	2	10	[3]
India, British	159	324	34	[6]	[3]
Italy	4,950	2,847	851	632	[3]
Japan [5]	1,000	1,000	1,000	1,000	1,000
Russia	[6] 26,492	[6] 29,520	54,083	64,674	[3]
United States	2,031	2,862	3,848	2,928	3,229

[1] In addition to the countries listed, Bolivia, Brazil, and Madagascar are reported to produce small quantities of asbestos. Statistics of production are not available for Bolivia and Brazil, but exports reported are considerably less than a ton. Production in Madagascar is reported as follows: 1928, 108 kilograms; 1929, 545 kilograms.
[2] Exports.
[3] Data not available.
[4] Exclusive of sand and gravel, the production of which is reported as follows: 1928, 20,672 tons; 1929, 17,215 tons; 1930, 36,949 tons; 1931, 6,540 tons; 1932, 3,151 tons.
[5] Approximate production.
[6] Year ended Sept. 30.

CANADA

Asbestos production in Canada fell to a very low level in 1932. The tonnage produced was 25 percent less than in 1931, and the value decreased 37 percent. Price levels fell considerably below the already low average of 1931. The principal markets for Canadian asbestos are in the United States where, as mentioned heretofore, manufacturers' requirements in 1932 were very small.

Until the recent business decline Canada was becoming increasingly important as a manufacturer of asbestos products. According to the Dominion Bureau of Statistics 13 asbestos-products plants were in operation in 1931. Their output was valued at about $1,308,000, which was approximately $1,000,000 less than the value reported in 1930.

Owing to unsatisfactory results obtained from the testing machine used for many years in Quebec, the Canadian National Research Council after exhaustive tests has developed a new standard testing machine which will make it possible to guarantee the grades of the several mill products. It is reported that the new machine has the unanimous approval of Quebec producers.

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Production figures for 1932, taken from the preliminary report of the Quebec Bureau of Mines, are quoted in the following table:

Production of asbestos in the Province of Quebec for 1932

Designation of grade	Shipments and sales		Average value per ton	Stocks on hand Dec. 31, 1932	
	Tons	Value		Tons	Value [1]
Crude no. 1	144	$57,159	$396.94	207	$82,167
Crude no. 2	313	60,230	192.43	3,115	599,419
Other crudes	14	1,832	130.86	85	11,123
Spinning fiber	6,004	548,510	91.36	13,558	1,238,659
Shingle fiber	6,625	328,895	49.64	7,131	353,983
Paper fiber	32,694	1,008,436	30.84	5,307	163,668
Waste, stucco, or plaster	3,984	92,800	23.29	511	11,901
Refuse or shorts	73,199	941,859	12.87	13,350	171,815
Total	122,977	3,039,721	24.72	43,264	2,632,735
Sand, gravel, and stone (waste rock only)	3,473	3,369	.97		
Total	126,450	3,043,090			

[1] Values calculated at average price of each grade. These figures are given merely as a guide to approximate valuation of stocks on hand.

NOTE.—Quantity of rock mined during the year 1932, 1,145,340 tons; quantity of rock milled during the year 1932, 1,029,709 tons; quantity of tailings re-treated during the year 1932, 709,094 tons.

AFRICA

Rhodesia.—Asbestos production in Rhodesia in 1932 decreased 34 percent in volume and 49 percent in value compared with 1931, due in part to a decidedly lessened demand by consuming industries and in part to increasing competition with Russia. However, an agreement has been reached between Rhodesian and Russian producers and European consumers for an apportionment of orders, and this arrangement has been helpful to the Rhodesian industry. Turner & Newall, Ltd., the principal producing company, paid a dividend of 3¾ percent for the year ended September 30, 1932, as against 5 percent for the year ended September 30, 1931. Earnings were in excess of the dividend.

The following table shows Rhodesian production for 10 years:

Asbestos produced in Rhodesia, 1923–32

Year	Short tons	Value	Year	Short tons	Value
1923–27 (average)	29,475	£703,547	1930	37,765	£1,070,847
1928	39,960	970,327	1931	24,042	386,493
1929	42,634	1,186,627	1932	15,766	197,092

Union of South Africa.—Recession during 1932 in the asbestos industry of the Union of South Africa was not as great as had been forecast in the press. Tonnage declined about 23 percent and value 47 percent from 1931 figures, both decreases being somewhat smaller than those recorded for Rhodesia. Maintenance of the industry at a relatively higher level in the Union of South Africa than in Rhodesia is difficult to explain in view of the handicap created in the former country through adherence to the gold standard. A 10 percent subsidy granted by the Government on asbestos exports to meet this

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difficulty was insufficient to permit competition on a parity with countries like Rhodesia which were not on the gold standard. A more favorable export situation developed when the Union of South Africa went off the gold standard in December 1932.

It was reported late in the year that all but one of the properties owned by the Cape Asbestos Co. had closed and that the New Amianthus chrysotile mine in the Transvaal had also suspended operations. Production for several years is shown in the following table.

Asbestos produced in the Union of South Africa, 1923–32

Year	Short tons				Total value
	Transvaal	Cape Province	Natal	Total	
1923–27 (average)	8,672	3,736	----------	12,408	£188,682
1928	18,976	5,078	----------	24,054	399,550
1929	26,984	6,030	23	33,037	497,393
1930	13,800	5,481	----------	19,281	340,795
1931	12,025	3,651	----------	15,676	246,583
1932	9,106	2,964	----------	12,070	130,704

The Union of South Africa is unique in that it produces three types of asbestos—chrysotile, the principal asbestos of commerce; amosite, a long-fibered amphibole used to some extent for spinning; and crocidolite, or blue asbestos, used both for spinning and nonspinning purposes. The following table shows the tonnage and value of the different varieties of asbestos produced.

Asbestos produced in the Union of South Africa, 1930–32, by varieties

	1930		1931		1932	
	Short tons	Value	Short tons	Value	Short tons	Value
Amosite (Transvaal)	3,281	£36,885	2,087	£20,608	1,391	£13,906
Chrysotile (Transvaal)	10,519	160,381	9,938	125,439	7,715	60,194
Blue (Cape)	5,481	143,529	3,651	100,536	2,964	56,604
	19,281	340,795	15,676	246,583	12,070	130,704

RUSSIA

As the following table shows, production of asbestos in Russia is steadily increasing. Figures for 1932 are not yet available, but the general statement has been made that they were considerably higher than those for 1931. A fiber-concentration plant equipped with modern machinery began operation in 1931, and a new and much larger plant with a capacity of 40,000 metric tons of asbestos a year began activity in 1932.

It is significant that the ratio of exports to production is constantly decreasing—a condition that reflects the great expansion in the manufacture of asbestos products in the Soviet Union. It is reported that four new plants for the manufacture of insulating products began operations on a large scale about the middle of 1932. Thus, Russia is attaining prominence both as a producer of raw asbestos and as a manufacturer of asbestos products.

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As noted previously, very little Russian asbestos entered the United States in 1932, due doubtless to orders forbidding entry of Russian asbestos except under bond pending an investigation by the Tariff Commission on possible violation of section 337 of the Tariff Act of 1930. As a report of the Commission favorable to Russia has been approved by the President, restrictions on imports have been lifted. This decision may have a definite influence on imports during 1933.

Production and exports of Russian asbestos, 1929–31,[1] *in metric tons*

Year	Production	Exports
1929	39,942	12,603
1930	54,083	15,749
1931	64,674	13,239

[1] Figures quoted from Economic Review of the Soviet Union, vol. 7, Oct. 15, 1932.

OTHER COUNTRIES

Italy.—The most important asbestos deposits of Italy are centered around Balangero in Piedmont. The fiber is a chrysotile comparable with that obtained in Canada. Amphibole asbestos is produced at Valtellina. Total production ranges from 2,000 to 5,000 short tons a year.

Cyprus.—The Cyprus Asbestos Co. has been reorganized as the Cyprus & General Co. Sales of short-fiber chrysotile produced on the island have been decreasing steadily during recent years. Business was conducted at a considerable loss during the year ending June 30, 1932.

Finland.—One company in east-central Finland produces 1,000 to 1,500 metric tons of amphibole asbestos a year.

Ireland.—It is reported that an asbestos deposit at Avoca, County Wicklow, Ireland, discovered in 1931, will probably be developed in the near future.

Mexico.—An interesting specimen of "mountain cork" consisting of interlaced amphibole asbestos fibers has been received by the Bureau from San Luis Potosi, San Luis Potosi, Mexico. There is said to be a large deposit of the material which may have possibilities for insulation uses. No definite data on location or extent of the deposit are available.

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