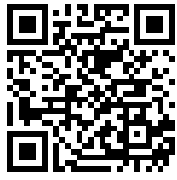
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ASBESTOS

SOURCES AND TRADE

Compiled in

MINERAL SECTION, BUREAU OF FOREIGN AND DOMESTIC COMMERCE

in collaboration with the

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Trade Information Bulletin No. 442

UNITED STATES DEPARTMENT OF COMMERCE

BUREAU OF FOREIGN AND DOMESTIC COMMERCE

UNIVERSITY OF ILLINOIS-URBANA
3 0112 104068249

Trade Information Bulletin No. 442

Price 10 cents

FOREWORD

The increasing importance of asbestos to modern engineering and mechanical practice, as well as to the efficient construction of buildings, wherever heat insulation and fire protection are involved, mark asbestos as an important index of progressive efficiency in the conservation of energy and elimination of waste in the national economy.

The United States ranks first in importance in the manufacture of asbestos products, drawing its supply of raw materials mainly from Canada and South Africa. The average annual consumption of crude asbestos in the United States, that is, production plus imports, for the five-year period 1920 to 1924, was 161,225 short tons. The estimated annual world production for the same period was 187,245 tons. Consequently, the United States may be said to consume 86 per cent of the world's production. Domestic production is only one-third of 1 per cent of world production.

The minerals section, Bureau of Foreign and Domestic Commerce, and the Bureau of Mines, have in their files data on production and trade in metallic and nonmetallic minerals in all parts of the world. This material will be made available to interested American firms on application.

JULIUS KLEIN, *Director*,
Bureau of Foreign and Domestic Commerce.

OCTOBER, 1926.

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ASBESTOS: SOURCES AND TRADE

DEPOSITS AND PRODUCTION OF ASBESTOS

Although deposits of asbestos are found in many countries of the world, there are comparatively few sources of spinning fibers. Manufacturers of asbestos textiles are dependent upon South Africa and Canada for their supply of chrysotile, or long-fiber asbestos, essential in the production of such products.

Short-fiber amphibole is found in Canada, Rhodesia, Union of South Africa, Australia, India, and in the island of Cyprus. To some extent this grade is also produced in Italy, China, Spain, France, Germany, Japan, and Finland. Prior to 1914 the rich asbestos mines of Russia were worked extensively and produced a good percentage of the world's supply. These mines are said to be gradually assuming a pre-war volume of output.

WORLD PRODUCTION OF UNMANUFACTURED ASBESTOS [1]

[In long tons]

Country	1924	1925	Country	1924	1925
Canada	[2] 208,762	273,522	Italy	[6] 2,126	[7] 2,490
South Africa:			India	[8] 125.3	([4])
Rhodesia	26,141	34,349	Australia	[9] 78	([4])
Union of South Africa	[3] 6,464	9,078	China	[10] 239	330
Cyprus	[3] 3,904	([4])	United States	[11] 268	1,123
Russia	[5] 8,331	10,000			

[1] Figures covering output, if any, not available for Spain, France, Germany, Finland, Japan, and Austria.
[2] Report on mining operations, Quebec, 1925.
[3] Sales and shipments.
[4] Figures not available.
[5] For fiscal year ending Sept. 31.
[6] Revista del Servizio Minerario, 1925.
[7] Estimated by Revista del Servizio Minerario, 1925.
[8] Geological Survey of India.
[9] The Australian Mines and Metals Association.
[10] Exports of unmanufactured and manufactured products.
[11] Bureau of Mines, Department of Commerce.

UNITED STATES

Although the United States exceeds all other countries in the manufacture of finished asbestos products, it will be seen from the following figures that this country is quite dependent upon foreign sources for its raw material:

	1924	1925
Estimated world production of unmanufactured asbestos	256,438	330,892
United States output of unmanufactured asbestos	268	1,123
United States imports of unmanufactured asbestos	163,616	205,821
United States exports of unmanufactured asbestos	1,134	990

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According to the Bureau of Mines during 1925 the total domestic output of 1,123 long tons consisted of 83 tons of chrysotile mined in Arizona and California and 1,040 tons of amphibole mined in Georgia, Idaho, and Maryland.

UNITED STATES IMPORTS AND EXPORTS OF ASBESTOS

Year	Imports			Exports		
	Unmanufactured		Manufactured	Unmanufactured		Manufactured
	Long tons	*Value*	*Value*	*Long tons*	*Value*	*Value*
1920	149,605	$9,120,253	$619,054	549	$141,071	$4,431,132
1921	64,699	2,948,302	379,858	464	101,616	2,606,426
1922	133,417	5,144,700	308,910	336	49,939	1,494,747
1923	189,661	7,445,143	417,684	607	48,525	[1] 2,089,951
1924	163,616	5,602,945	500,306	1,134	93,163	[1] 1,988,316
1925	205,821	7,134,302	752,697	990	70,846	[1] 2,407,659

[1] Except roofing.

UNITED STATES TRADE IN UNMANUFACTURED ASBESTOS

Countries	1920	1921	1922	1923	1924	1925
IMPORTS	*Long tons*	*Long tons*	*Long tons*	*Long tons*	*Long tons*	*Long tons*
Australia	3	1	7	1		
Belgium					5	
British India				1		1
British South Africa	1,994	449	367	250	929	376
Canada	145,283	63,760	131,782	185,945	160,760	201,730
China	15	45		6		
Chile		1				
England	666	179	1,137	1,571	372	541
Germany		10		132	50	170
Hongkong		1				
Greece	72				80	
Italy	3	2	1		2	
Japan	89	1		9		
Portuguese Africa	1,414	249	123	1,745	1,416	2,838
Netherlands				1	2	
Trinidad and Tobago		1				
Turkey in Asia	66					
British West Africa						165
Total	149,605	64,699	133,417	189,661	163,616	205,821
EXPORTS						
British India			1			
France	115	158	8	109	9	359
Germany	82	67	101	7	267	195
Italy	96			27	45	40
Netherlands	60	72	92		5	7
England	10	64	1	129	61	34
Canada	128	102	10	85	31	21
Dominican Republic	7		9			
China	1	1				
Japan	5		76	224	458	187
Australia	15			1	33	10
Philippine Islands	30					
Switzerland			10			
Mexico			5	12	4	45
British West Indies			1	1	2	
Dutch East Indies			22		1	
Norway				4		
Spain				2		
Cuba				4	5	1
New Zealand				2		1
Belgium					179	88
Chile					31	
Colombia					3	2
Total	549	464	336	607	1,134	990

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CANADA

Consul C. B. Hosmer, Sherbrooke, Quebec

Although small specimens of asbestos were observed in different parts of Quebec Province, Canada, at an earlier date, it was not until 1877 that the product was found in the present producing region, at Thetford and at Black Lake, in Coleraine Township. Tests made with this fiber showed it to be of the finest for spinning purposes.

Mining commenced in 1878, when 50 tons of crude asbestos were produced, but the market was still so small that the asbestos was disposed of with great difficulty. A very gradual increase in the production of the various quarries, then engaged only in the hand production of crude asbestos, took place up to 1888, when the first asbestos mill was erected and the first effort made to extract asbestos from rock whenever it did not appear in veins of sufficient size to extract it simply by breaking the rock with a hammer. Previously all asbestos, except the large veins of it, had been thrown out as waste. This is noteworthy when it is realized that 98 per cent of the tonnage of the various grades of asbestos now produced at Canadian mines is extracted in mills from rock which was formerly thrown aside. The establishment of the first mill may be regarded as the beginning of the modern asbestos industry in Canada, although many years elapsed before milling methods were satisfactory or the increased use of asbestos brought production to an important figure.

The limited number of important asbestos operators throughout the world has prevented much progress in the standardization of methods in mining, and a distinctly individual system will be found at each mine.

The largest producing mines in Canada are at Thetford, Black Lake, Asbestos, and East Broughton, in the Province of Quebec. Ontario produced 172 tons of asbestos valued at $91,900 in 1924. A new mill erected in 1925 is expected to increase production.

A few of the mines have underground workings, but most of them are huge pits or quarries which have been blasted away in terraces into the solid asbestos-bearing rock, until they cover several acres, in one case to a depth of 400 feet.

MINING METHODS EMPLOYED

As soon as a large quantity of rock has been blasted (and in this connection it is interesting to note that for greater safety the different companies in each locality arrange to blast simultaneously) a crew of trained men immediately sets to work extracting the crude asbestos with small hand sledges. Crude asbestos is by far the most important and valuable product taken, and must be handled very carefully in order to prevent breakage of the delicate long fibers. Nothing better has been devised to supplant the original hand method of extraction.

The remaining rock is then loaded into railway cars by means of cranes or steam shovels. In some cases it is loaded into huge overhead cable cars which carry and dump it into railway cars at the surface.

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The treatment of the rock is almost identical at every mill, although the equipment varies considerably. Recently constructed mills have been able to evolve more economical and effective means of treatment.

The first process applied to the rock is that of crushing, which leaves pieces of considerable size and permits men stationed on either side of the large carrier belt conveying it through the mill to pick out pieces of "crude" which have been liberated. These men are paid in accordance with the weight of crude they are able to salvage. The crushing process is continued until the rock is scarcely more than gravel, after which it is conveyed on a power-driven belt or bucket carriers to a rotary dryer, by means of which the asbestos is made dry and fluffy, something absolutely essential to the next process of extraction.

The actual extraction of the fiber then takes place in a machine known as a "cyclone," which has been perfected after many difficulties and disappointments. It is a huge metal case, so inclined that gravity will carry the ore through it; within, on a central shaft are a number of propeller blades which rotate at great speed and beat the rock to pieces, thus freeing the fiber. The fiber, fluffy in character, is carried off, together with small pieces of rock and sand, through the top of the casing by means of a strong suction, while most of the rock continues on the dump.

The fiber thus obtained contains sand and small particles of stone which must be separated from the fiber in a series of following machines.

The asbestos falls first upon a shaking, inclined screen. This shaking brings the lighter material, the asbestos, to the top and it is carried off by large suction pipes suspended over the screen, while the stone and sand fall through the mesh and down a chute at the bottom of the screen onto a carrier which conveys them to the dump.

GRADING OF OUTPUT

The grading of the asbestos is then completed by passing it over several series of inclined shaking screens having different sized meshes, thereby separating it into grades which have a fairly uniform fiber length, the significance of which will be hereinafter described. Each grade is carried by air or conveyor belt to a compartment of the mill where only that grade is bagged for storage or shipment. At no time after it enters the primary crusher as rock until it is in one of these compartments ready for packing is any hand work connected with the process, except the separation of "crude" from the picking belt.

Each mill has its individual designations for the different grades (except crude) and the classes described below should, therefore, be accepted as general divisions rather than well-recognized trade terms. The requirements of important customers govern the grading by the various mills. Crude asbestos is hand cobbed and does not go through the mill.

Crude No. 1.—Fiber which exceeds three-fourths inch in length. It is used in manufacturing the finest grades of asbestos textiles, i. e., curtains, brake linings, and cloth of all kinds.

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Crude No. 2.—A crude asbestos having a fiber from one-fourth to three-fourths inch in length, used in the same manner as No. 1, crude, except to make cheaper grades of goods.

Long Spinning Fibers.—The longest fibers extracted at the mill. This grade is long enough for a spinning fiber, but the milling somewhat detracts from its fineness and strength and its value is, therefore, less than "crude."

Magnesia and Compressed Sheet Fibers.—Very short spinning fibers, used in a cheap grade of asbestos textile or in making compressed sheets.

Shingle and Paper Stock.—Quite short but long enough for use in the manufacture of asbestos shingles and as paper-base stock for asbestos paper. The many uses of asbestos paper are well known, but the most important single use is doubtless for "air-sell pipe covering."

Cement Stock and Short Fibers.—So short they are hardly discernable from powder. However, their fire resisting qualities are excellent and they find a good market for making fireproof cement, roof paints, linings for heating plants, etc.

Floats.—Have the appearance of very fine, light-gray powder. When united by a binder this grade has been found invaluable in the manufacture of all grades of insulating materials.

Refuse and sand.—Sometimes applied to the lower grades of fiber, but the meaning is usually applied to the residue left after all the above classes have been separated. It is not understood to have any fire-resisting qualities of importance, but construction firms sometimes use it in their work because of its uniformity.

It is remarkable to find an industry so important to the general industrial world which at the same time has so few mills as to make it hardly worth while for any company to specialize in the manufacture of its necessary machinery. A very large percentage of its machinery is built upon special orders and in accordance with the individual ideas of the engineering staff of each mill.

MERGER OF CANADIAN PRODUCERS

One of the chief difficulties of operation and production has been caused by an almost immediate overproduction whenever particularly attractive prices have prevailed for asbestos products. This overproduction tends to reduce prices to an unprofitable level and a number of operators have at times been forced to curtail or cease operations.

The instability of the industry, caused by this class of competition, naturally creates a tendency toward combinations into large companies, thereby reducing operating expenses and making it possible to limit production to the reasonable needs of the market.

During the last quarter of 1925, seven of Canada's asbestos companies agreed to merge. This amalgamation, designed to stabilize prices, eliminate price cutting, and effect economies in production by unified operation of the companies concerned, had been in the process of negotiation for several months. The constituent firms will be operated by the Asbestos Corporation (Ltd.). The companies involved, with their addresses, names, and locations of mines, are as follows:

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Operator and address	Name of mine	Location
Asbestos Corporation of Canada (Ltd.), Canada Cement Building, Montreal.	Fraser [1]	East Broughton, Quebec.
	Kings	Thetford Mines, Quebec.
	Beaver	Do.
Black Lake Asbestos & Chrome Co. (Ltd.), 282 St. Catherine W., Montreal.	British Canadian	Black Lake, Quebec.
	Union	Do.
	Imperial	Do.
	Southwark (Bells)	Do.
Thetford Vimy (Ltd.),[2] Canada Cement Building, Montreal.	Ward	Thetford Mines, Quebec.
	Edith [1]	Vimy Ridge, Quebec.
	Vimy	Do.
Consolidated Asbestos (Ltd.), Canada Cement Building, Montreal.	Thetford	Thetford Mines, Quebec.
	Belmina [1]	Coleraine, Quebec.
	Kitchener [1]	Rumpelville, Quebec.
Federal Asbestos Co., Canada Cement Building, Montreal.	B and A (Federal)	Robertsonville, Quebec.
Maple Leaf Asbestos Corp. (Ltd.), Thetford Mines	Maple Leaf (Dunn)	Thetford Mines, Quebec.
	Reed	Black Lake, Quebec.
Asbestos Mines (Ltd.), 282 St. Catherine W., Montreal.	Boston	East Broughton, Quebec.

[1] Idle.
[2] Includes Bennett-Martin Asbestos & Chrome Mines (Ltd.), with mines at Thetford Mines and Vimy Ridge, Quebec. At present controlled by Asbestos Corporation of Canada (Ltd.).

The total output in 1924 of the companies mentioned as entering the merger amounted to 102,995 tons, or 45½ per cent of the total production in Canada. Sales aggregated 102,677 tons, valued at $3,041,498. The production during 1924 of the companies that will continue to operate independently totaled 123,302 tons, of which 122,895 tons worth $3,577,432 were sold or shipped.

PRODUCTION, MANUFACTURE, EXPORTS, AND IMPORTS OF ASBESTOS

Production of asbestos in Quebec [1] during 1925, according to the Report on Mining Operations in the Province of Quebec, 1925, totaled 273,522 long tons valued at $8,976,645, as compared with the output of 208,762 tons valued at $6,561,659 in 1924. These figures do not include the by-product "sand and gravel." Production by grades was as follows:

Grade	Shipments and sales		Stocks on hand, Dec. 31	
	1924	1925	1924	1925
	Long tons	*Long tons*	*Long tons*	*Long tons*
Crude No. 1	871	1,044	1,387	1,191
Crude No. 2	3,550	3,777	1,801	704
Crude, run of mine	222	348	547	340
Spinning fiber	9,799	16,070	7,634	3,115
Shingle fiber	21,569	30,010	6,432	4,536
Millboard, paper fiber, filler, float, and other short fibers	172,751	222,273	23,565	25,286
Total	208,762	273,522	41,366	35,172
By-products (sand and gravel)	16,464	16,865	----------	----------
Grand total	225,226	290,387	----------	----------

NOTE.—Asbestos rock mined in 1924 amounted to 3,324,727 long tons; in 1925, 4,121,258 long tons.

According to the Dominion Bureau of Statistics, Ottawa, Canada's manufacturers of asbestos and allied products in 1925 amounted to $1,344,097, as compared with $589,339 in 1924. A total of 12 plants

[1] Figures covering output of unmanufactured asbestos in the Province of Ontario during 1925 not available.

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reported in 1925—6 in Ontario, 4 in Quebec, 1 in Nova Scotia, and 1 in British Columbia. The following table indicates the output of manufactured asbestos products in Canada during 1924 and 1925:

Commodity	1924		1925	
	Quantity	Value	Quantity	Value
Asbestos lining ---square feet	429, 698	$186, 295	1, 636, 355	$272, 217
Asbestos packing---pounds	219, 422	128, 037	1, 246, 594	187, 916
Asbestos pipe and boiler covering		12, 622		179, 717
All other products		252, 106		702, 748
Received for customs work and repairs		10, 279		1, 499
Total value		589, 339		1, 344, 097

NOTE.—Value of Ontario's output in 1923 was $2,600; in 1924, 172 tons valued at $91,900; 1925 production unknown at time of writing; the erection of a new mill in 1925 will probably increase annual output.

Exports of asbestos and its products from Canada during 1925 amounted to $9,737,964. Of this total, $55,572 worth was in the form of manufactures. Imports of manufactured asbestos products amounted to $448,769 in 1925.

Canada's exports of asbestos and manufactures thereof during 1924 and 1925 were:

Commodity	1924		1925	
	Tons	Value	Tons	Value
Asbestos unmanufactured	109, 730	$6, 297, 819	136, 750	$8, 090, 106
Asbestos sand and waste	95, 019	1, 219, 270	121, 267	1, 592, 286
Asbestos manufactures		44, 132		55, 572
Total value		7, 561, 221		9, 737, 964

Three of the largest companies in mining interests and in production operating in Canada are controlled by American capital. These three companies, not associated with the newly formed merger, together with the Asbestos Corporation of Canada, a member of the merger, are reported as producers of about 80 per cent of the Canadian output, which in turn is estimated to be over 80 per cent of the world's production of unmanufactured asbestos. The Asbestos Corporation of Canada, with the newest and largest mill, is at present the largest single producer, but the three American companies each produce an important proportion of the total output.

Although Canada is the world's largest producer of asbestos,[2] it has been estimated that less than 12 per cent of its output was consumed within the country during 1925. The percentage of Canada's ouput of unmanufactured asbestos during the years 1923, 1924, and 1925 consigned to the various consuming countries was as follows:

[2] The Rhodesian output in 1925 was estimated at 34,000 tons, chiefly of crude asbestos of spinning quality, while Canada's output of the same grade during 1925 amounted to only 5,169 tons.

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DISTRIBUTION OF CANADA'S UNMANUFACTURED ASBESTOS PRODUCTION BY PERCENTAGE

Countries	1923	1924	1925	Countries	1923	1924	1925
United States	60.35	71.68	72.27	Netherlands	0.20	0.47	1.23
Germany	3.48	4.67	3.83	Australia	.10	.21	.47
Great Britain	19.14	4.30	3.00	Austria	.22		
Japan	2.73	4.09	2.45	Other	.09	.29	.18
France	2.78	2.64	1.97	Canada (consumption)	6.63	9.30	11.15
Belgium	4.00	1.27	2.14				
Italy	.28	1.08	1.31	Total	100.00	100.00	100.00

The following companies are owners of mines operated at or near the address given, and are engaged in the active mining and milling of asbestos:

Asbestos Corporation of Canada, Thetford Mines, Quebec (mine at Black Lake also).
Asbestos Mines (Ltd.), East Angus, Quebec.
Asbestos Quarries (Ltd.), Black Lake, Quebec.
Black Lake Asbestos & Chrome Co. (Ltd.), Black Lake, Quebec.
Canadian John-Manville Co. (Ltd.), Asbestos, Quebec.
Consolidated Asbestos (Ltd.), Thetford Mines, Quebec.
Federal Asbestos Co., Robertsonville, Quebec.
Johnson's Co., Thetford Mines, Quebec.
Keasbey & Mattison Co. (Bell Mines), Thetford Mines, Quebec.
Maple Leaf Asbestos Corp. (Ltd.), Thetford Mines, Quebec.
Northern Asbestos Co. (Ltd.), Thetford Mines, Quebec.
Quebec Asbestos Corp., East Broughton, Quebec.
Porcupine Asbestos Mining Syndicate, Deloro Township, Ontario.

RUSSIA

Russian Review, New York, February, 1926; Foreign Trade, Moscow, February, 1925; Economic Life, Moscow, November 3, 1923; Soviet Union Monthly, June, 1926; and information transmitted by C. J. Mayer, commercial attaché, Riga, Latvia

Before the war the Russian asbestos industry ranked second, next to the Canadian, among producers. During the war, and particularly during the revolution, its status changed and Russian asbestos disappeared completely from the world market. In 1922, as a result of the organization of a special state trust, the Ural Asbestos Trust (Uralasbest), the industry revised. This organization now produces 90 per cent of all Russian asbestos. Its sources of supply are in the Bazhenovo, Ostaninsk, and Krasno-Uralsk (formerly Nevyansk) deposits. The Alapayevsk asbestos mines are operated as a concession by the Allied American Co. (Alamerico). All of the important deposits are located in the Urals.

According to Soviet information, the comparative production of the above-named syndicate for recent fiscal years, as compared with the pre-war production of asbestos in the Urals, was as follows:

Year	Unmanufactured asbestos	Asbestite	Asbestos sheets	Other asbestos products
	Long tons	*Long tons*	*Long tons*	*Long tons*
1913	22,513	970	490	30
1921–22	3,314		500	26
1922–23	4,200	1,200	164	25
1923–24	8,331	2,970	83	35
1924–25	10,000	3,000	500	40

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Before the war Russian asbestos exports went almost exclusively to European countries, Austria and Germany taking up to 60 per cent of the total. During the war asbestos began to be shipped in large quantities to England, which took as much as 80 per cent of the entire exports. Small quantities were shipped to the United States and Japan. Russia's exports of asbestos prior to the war represented 80 per cent of its production, about 10 per cent of the world's total consumption of asbestos, and 40 per cent of the consumption of higher grades.

The export program of the Ural Asbestos Trust for the current fiscal year 1925–26 provides for the attainment of the pre-war volume of asbestos shipments.

Exports during the year 1923–24 netted the trust 3 rubles per pood (1 pood=36 pounds; 1 ruble=$0.514), which represents a net loss to the trust of 45 kopecks (1 kopeck is one one-hundredth of a ruble) per pood. The export of the higher grades of asbestos at a loss is made necessary by lack of demand for these grades on the domestic market, and is covered from large domestic sales of the low-cost lower grades of asbestos. Of the lower grades of asbestos, there were manufactured in 1923–24, 2,993 tons of asbestite, 58 tons of asbestos board, and 34 tons of various other manufactures of asbestos; these products were all sold in the domestic market. The present cost of production is more than double the pre-war cost.

Besides the export demand the possibilities in the asbestos industry in the Russian domestic market are considerable. According to Russian opinion, the greatest opportunity lies in the manufacture of eternite, which is a world-wide substitute for roofing material. The lower grades of asbestos, together with the cheap and near-by Ural cement, make up the mixture from which eternite is made, the cheapest and most fire-resistant roofing material for the highly inflammable Russian villages. There are also possibilities for a mixture of asbestos with magnesia from Ural magnesite.

FINLAND

From The Mineral Industry, 1924

Production of asbestos in Finland, first reported in 1922, has increased considerably. The mines of Suomen Asbesti O. Y., or Finnish Asbestos Co. (Ltd.), produce about 3,000 tons per year, most of which is exported to Germany. A factory for the manufacture of asbestos products began operation in 1923. Its production is sufficient to supply the total requirements of the country, with a surplus for export.

ISLAND OF CYPRUS

From The Mineral Industry, 1924

In 1907 a concession was granted to the Cyprian Mining Co. (Ltd.), of Trieste, to mine asbestos in the Troodos Forest for 99 years. In 1919 this concession was canceled and a mining lease was granted to a local syndicate, the Cyprus Asbestos Co. (Ltd.).

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Practically the entire output of asbestos is exported. The above-mentioned company reported early in 1924 advanced sales of its entire 1924 production of standard fiber (shingle stock). Additions of new milling machinery were made to increase plant capacity. Delayed figures give shipments and sales of fiber for 1922 as 1,530 tons, valued at £37,725; for 1923, 1,556 tons, valued at £29,357; and for 1924, 3,904 tons, valued at £80,070.

AUSTRIA

Consul Robert W. Heingartner, Vienna

Asbestos deposits are frequently found in the Austrian Alps, but only at a few places in quantity and quality which permits of mining on a commercial basis. Asbestos is mined in Lend-Gastein, in Salzburg, the output being used by the asbestos factory there. These deposits lie about 2,000 feet above the valley. A second mine is in operation near St. Lorenzen, Styria. Further, there are some important asbestos deposits in Tyrol which have not yet been exploited. There are no statistics as to asbestos production in Austria.

A rich deposit of amianth has been found in Gasteinertal, Tyrol. This asbestos results from the tremolite in the slate. On the west side of the Gasteinertal, in the Grabenbauergrund, a deposit 2 meters thick has been discovered, located 350 meters above the bottom of the valley. Only 25 square meters are uncovered. About 50 meters farther to the northeast another deposit, which is almost entirely covered by rocks and vegetable earth, has been located. This asbestos must be worked thoroughly before it yields its short fibers. Long-fiber asbestos has not been found there. Long-fiber asbestos has been located in the Wiednertal, on the Wiedneralm and Angertal. Experts state that the deposit on the Wiedneralm is excellent, but it is situated in ore 1,800 to 2,000 meters above sea level. Good asbestos, however, has been found in a more favorable location on the Toerkelwaende and in the Planitzingergrund.

The geological conditions under which asbestos is found in the Gasteinertal and in the neighboring Tauerntaeler are favorable for mining and the search for deposits. Discoveries of useful asbestos have been made in the Fuschertal, in Sulzbach, and in Obersulzbach. These prove that the occurrence of the mineral in Gasteinertal is not accidental. Additional discoveries reasonably may be expected in the contiguous territory east and west parallel with the Tauern Mountains (Tyrol and Styria).

Mines have been established in St. Lorenzen in the Paltental (Styria) and in Bruck an der Mur. Uear St. Lorenzen asbestos (it is commonly stated that this deposit is amianth) is found in two strata. The one is situated on the left slope of the valley, the other at the bottom of the valley. The asbestos is interwoven with talc, is partly fine and fibrous, is reasonably flexible, and its color ranges from grayish green to white. Its quality is not yet ascertained. Near Bruck an der Mur inferior quality asbestos is found.

A large deposit of asbestos has been found in the lower Tauern (Gollingtal near Steinach-Irdning), but the samples furnished lead one to believe that it can not compete with the imported commodity.

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Asbestos has been located in the serpentine rocks of the Katschberg territory (Salzburg-Kaerntnerisches Grenzgebiet). No reliable information about its quality is at hand, but it probably would not pay to investigate these deposits.

The Tyrol is comparatively rich in asbestos, but almost no mining is going on. The deposits are partly amianth and partly chrysotile. The territories of the Tauern (south side of the Venediger group), such as Dor-Alpe, Tummelbach, Walcheralm, Goeslerwand, Grossbachalpe, Pregatten, and Matrei on the Venediger, are especially rich in asbestos. Many varieties are found there—amianth, mountain silk, mountain wood, mountain wool, etc. One variety looks like cotton and is used as trimming for Christmas trees. Regular mining has never been attempted on these deposits.

The Zillertal contains many interesting varieties, but the deposits are too small for profitable mining on a large scale. The deposits in Oetztal and Pfitschtal are, likewise, too small for profitable mining.

INDIA

Consul William L. Jenkins, Calcutta

According to the director of the geological survey in India, the production of asbestos there during the years 1919 to 1924, inclusive, was as follows:

	1919	1920	1921	1922	1923	1924
	Long tons	*Long tons*	*Long tons*	*Long tons*	*Long tons*	*Long tons*
Bihar and Orissa: Seraikela State			11.5			92.0
Central Provinces: Bhandara	9			14		19.8
Madras: Cuddapah						13.5
Mysore:						
Bangalore		107	67.0			(1)
Hassan	379	1,711	237.0	228	247	(1)
Total	388	1,818	315.5	242	247	125.3

[1] Not available.

During 1917 the production amounted to 148 tons and in 1918 to 357 tons. The value of the 388 tons (2,240 pounds each) produced in 1919 is given as £1,656, of the 1,818 tons in 1920 as £7,272, of the 315.5 tons in 1921 as £884, of the 242 tons in 1922 as £701, and of the 247 tons in 1923 as £659.

In 1923 the production of asbestos in India amounted to 247 tons, valued at 9,880 rupees, obtained in the Hassan district of Mysore State, south India. The 1924 production was only 125.3 tons, but it was valued at 18,826 rupees and was derived from the Seraikela State in Singhbhum, the Bhandara district in the central Provinces, and the Cuddapah district of Madras.

The customs statistics do not include any exports of asbestos for the fiscal year ended March 31, 1925, nor for the six months ended September 20, 1925. The imports of raw asbestos during the first-mentioned period amounted to only 5 hundredweights (112 pounds each), valued at 550 rupees, while during the six-month period ended September 30, 1925, there were no such imports listed. The imports of asbestos packing and manufactures of asbestos other than packing, were valued at 468,151 rupees and 1,151,481 rupees, respectively,

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in the fiscal year ended March 31, 1925, and 192,164 rupees and 780,189 rupees, respectively, during the first six months of the present fiscal year.

SOURCES AND QUALITY

On the whole, the reports on the quality of Indian asbestos have been unfavorable. The principal objections to it are that the fiber is brittle and weak and that, owing to its lack of tensile strength, it is unsuitable for spinning purposes.

With reference to attempts to develop asbestos in India, the records of the Geological Survey of India, Volume III, for 1921, contains the following information:

> Attempts to develop asbestos in India have not yet met with any marked success on account of the inferior quality of the material in the deposits hitherto discovered. In 1910 3 tons of asbestos valued at £6 were extracted in the Bhandara district, Central Provinces, presumably during prospecting operations; this source has recently been given a fresh trial, yielding 7 tons in 1917 and 13 tons in 1918. In 1913 a small amount of work was carried out in the Hassan district, Mysore, where asbestos of fair quality is found in veins traversing actinolite schist, and the supply rose to 344 tons in 1918. Several fresh occurrences were discovered during the period 1909–1913, of which two appeared to be of some size. One of these, near Dev Mori in Idar State, Bombay Presidency, contains a considerable amount of amphibole asbestos in large rod-like masses yielding long-staple asbestos up to 8 inches; hopes were at first entertained of this product but unfortunately it has proved to be too brittle. The other occurrence is in the Seraikela State, Singhbhum, the asbestos being of the amphibole variety in long columnar masses, the more superficial portions suffering from the same defect of brittleness; recently, however, it has been found that the quality improves with depth, and hopes are entertained that this may prove to be the case in other localities also.

EXPORTS

A large firm of engineers and contractors has written under date of July 28, 1925, that although it does not export crude asbestos in the ordinary sense, it sent a ton or two to England some years ago but that nothing came of it. It also confirms the opinion that there is little or no crude asbestos now exported from India, and adds that it has "never been able to secure a valuation at a figure which would permit of business."

Asbestos is not listed separately in the export statistics of British India. The customs authorities have written that there were no exports during the calendar year 1924, either from southern India or from Calcutta, and there have also been no shipments during the first six months of 1925. There were no exports of this product to the United States declared at American consulates in India during 1924 or the first six months of 1925.

IMPORTS

The imports of raw asbestos into British India by sea during the last three years have been very small. They were valued at only 45 rupees in the calendar year 1922, amounted to 126 hundredweights valued at 3,125 rupees in 1923, and 5 hundredweights valued at 578 rupees in 1924. The imports, however, of asbestos packing were valued at 459,944 rupees in 1922, 524,818 rupees in 1923, and 445,904 rupees in 1924. The total value of imports of manufactured asbestos, other than for packing, according to customs figures was 718,583 ru-

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pees in 1922, 742,068 rupees in 1923, and 874,020 rupees in 1924. (The exchange value of the rupee was $0.286 in 1922, $0.207 in 1923, and $0.315 in 1924.)

A representative of a large asbestos company, which has factories in the United States, Canada, and Great Britain, states that practically all of the imports into India of manufactured asbestos come form the United Kingdom. It is likely that the total use of asbestos manufactures in India is greater than the above statistics would indicate, since other items, such as cement boiler covering, into the composition of which asbestos almost certainly enters to a large extent, are shown under other headings. It is also not known whether the asbestos manufactures included in the above figures take into account all the asbestos and fiber-cement goods imported for building and similar purposes, such as corrugated sheets, roofing tiles, boards, and floorings. They may in some cases but not in others.

CHINA

Vice Consul R. B. Streeper, Tientsin

Asbestos is known to occur in a number of places throughout China, but it has never been mined or marketed there to any great extent. Asbestos deposits have been located in Hupeh, at Yunyang; northwestern corner of Kwantung, at Yangshan; Kweichow, to the east and southeast of Pingyihsien; in Chihli Province; in Kwangsi, to the east of the town of Padaho; in Shantung, at Chingkwoshan and Laotzoshan; principally in Szechwan, around Pochow and Chengtu. In Manchuria it is obtained in Suiyuen, and three mines are being worked in the Kwantung Leased Territory in the southeastern section of the Province, most of the output there being sent to Japan.

Chinese asbestos is not the true chrysotile type but is very similar to the asbestos found in Penge, South Africa, and though small lots may be found in China which are superior to the South African quality, the bulk of production has been very much inferior.

The mines are to large extent operated by individual owners or a small group of owners associated as a company. The deposits are worked in a very primitive manner and the owners operate with small capital. The openings are shallow and mining is more or less desultory. Large stocks of crude asbestos never accumulate.

The Chinese generally do not grade their asbestos fiber in exact accordance with western standards, but according to the individual producer's idea of what is his best grade. Roughly, however, the No. 1 grade of Chinese asbestos corresponds to the No. 1 of the Occidental standard longer than three-fourths inch. No. 2, or the second grade, would be below three-fourths inch in length. Reliable statistics of mineral production are not usually available in China. Chinese producers report that there are approximately 2,500 tons of asbestos of all grades which can be made available yearly in North China. Of this estimated annual production, there might be obtained 120 tons of highest quality, white, silky fiber, 2 inches long or longer, of high tensile strength; possibly 500 tons of good white fiber of No. 1 grade, averaging 1 inch in length. Most of the remainder would be of No. 2 grade, less than three-fourths inch in

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length, mostly white and of good tensile strength. Representative specimens of Chinese asbestos are in the collection of the National Museum at Washington.

So far as can be learned, asbestos is manufactured by only two firms in China, one located in Peking and the other in Tientsin. Boiler composition, millboard, sheets, packing, and yarn constitute the principal manufactures. Both firms operate on a comparatively small scale and in a rather primitive fashion.

Asbestos from China has heretofore been used chiefly in Japan. Small experimental lots have been sent to England, and before the war Germans in Szechwan Province were operating very actively for export to Germany. Small quantities have been sent to the United States.

China's exports of asbestos are not of sufficient importance to be included in the annual Statistical Abstract published by the Chinese Maritime Customs, but are included in the official quarterly port returns of the three districts, Dairen, Hankow, and Tientsin. These export figures include unmanufactured and manufactured asbestos products grouped together. The exports of unmanufactured asbestos are small. Official figures indicating the actual quantity produced or exported are not available.

EXPORTS OF UNMANUFACTURED AND MANUFACTURED ASBESTOS PRODUCTS

From—	1923	1924	1925
	Long tons	*Long tons*	*Long tons*
Dairen	90	65	70
Tientsin	106	172	260
Hankow	1.4	2.3	----------

Tientsin.—The major portion of the unmanufactured asbestos arriving in Tientsin originates in northeastern Shansi and northwestern Chihli. The product produced in these mines is of only fair quality, the fiber being short and of very low tensile strength, thus restricting its use somewhat and probably accounting for the lack of demand from American manufacturers, who demand high-grade fibers. The somewhat erratic production also plays an important part in restricting the export of the local product, foreign buyers usually preferring to buy in a market where the supply is a little more constant and less affected by internal disturbances. There was no asbestos produced or exported in this district during 1926, owing to a lack of transportation facilities. A complete shutdown of the mines resulted, and they will probably remain so until such time as rolling stock again becomes available and an outlet for the mines' production is assured.

There is one factory in Tientsin manufacturing asbestos products, the Tientsin Asbestos Manufacturing Co., with an annual production in 1923 of 270,467 pounds. Its principal output consists of asbestos boiler composition and asbestos sheets and packing, but they also manufacture some millboard and yarn. About two-thirds of their production is used locally, the remaining third going to Japan and other Chinese ports. This factory has not operated during 1926, because of the impossibility to obtain raw asbestos from the mines.

Hankow.—The asbestos produced in the vicinity of Hankow is reported to be of a much better quality than that produced in the

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Tientsin district. In normal times the Hankow mines are much easier of access, but here also production has ceased temporarily, because of civil war. Under date of July 12, 1926, the American consulate at Tientsin transmitted the following information, as submitted by the consulting engineer of the Sino-American Syndicate of Tientsin:

The Sino-American Syndicate has on hand at Hankow a considerable stock of ungraded run-of-mine asbestos fiber (chrysotile), and experiments are soon to be inaugurated in order to determine the most economical commercial grading of the rough product. The firm would be glad to make an effort to meet the requirements of foreign buyers if the latter will submit their preferred grading table and state approximately the price offered for each grade, c. i. f.. foreign port of delivery.

The production of the mines tributary to Hankow is very small, amounting to only 10 tons of rock a day. Internal disturbances make it impossible to guarantee continuity of supply, but a few months of peace would enable extensive shipments of accumulated material to Hankow, whence they could be graded and exported without further hindrance.

The asbestos above mentioned is of exceptionally good quality and compares most favorably with the highest grades produced in Italy and Canada, as evidenced by analyses.

AUSTRALIA

Vice Consul T. C. Wasson, Melbourne

Asbestos has been found in various parts of Australia, but until the present time it has not been produced in any considerable quantity. The Australian Mines and Metals Association places the total 1924 output at 78 tons, valued £2,286. At South Wales 204 tons of fiber, valued at £4,267 were raised during 1923 from deposits in the Banaba division. In Queensland seams of asbestos have been found over a belt of country extending from Cawarral to Canoona, as well as in other districts. Samples of the fiber proved suitable for the manufacture of fibro-cement sheeting and tiles, but so far the deposits have not been commercially exploited. Deposits of asbestos have been located at various places in South Australia. Production in 1923 amounted to 147 hundredweight, valued at £161. Chrysotile asbestos of high grade is found in various localities in Western Australia, particularly in the serpentine rocks between Nullagine and Roebume, over a distance of 200 miles. The production in 1923 amounted to 115 tons, valued at £4,032 obtained in the Nullagine and Marble Bar districts of the Pilbara gold field. In 1899 Tasmania raised 200 tons, valued at £363, but there was no further production until 1916, when a small quantity was raised at Anderson's Creek, near Beaconsfield. In 1917, 271 tons, valued at £271; in 1918, 2,854 tons, valued at £5,008; and in 1919, 51 tons, valued at £1,275, were produced, but there is no subsequent record of production.

Following is a list of Australian producers and exporters of asbestos:

O. T. Lampriere & Co., 360 Collins Street, Melbourne.
Moullin & Co., Freemantle, Western Australia.
Barnett Asbestos Co., Perth, Western Australia.

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ARGENTINA

Assistant Trade Commissioner H. A. Bates, Buenos Aires

The only known deposit of asbestos in Argentina was opened in 1923. Its location is in the Province of Mendoza, about 40 miles from the rail line. Early in 1926 the first attempt to market the product was made. Although the asbestos from this mine had been reported to be of a high quality, a sample examined proved to be of a very ordinary grade of amphibole. There has been no active development at the mine yet and therefore production or export figures are not available.

UNION OF SOUTH AFRICA

Trade Commissioner P. J. Stevenson and Consul G. K. Donald, Johannesburg

The exploitation of asbestos deposits within the Union of South Africa dates from about 1893, when the Cape Asbestos Co. started developing deposits of fiber, known as "Cape blue" (crocidolite) found in the northwestern parts of the Cape Province. The year 1905 marks the first attempt to exploit chrysotile occurrences, near Carolina, in the eastern Transvaal; more recently the same variety has been found to occur in large quantities in the Barberton district, where it is being vigorously exploited to-day. In 1907 a third variety of fiber, known as amosite, was located in the Lydenburg district, and has been under active exploitation since that year.

The less valuable forms of asbestos, like tremolite and anthophyllite, are also found within the Union; one of them, locally known as "asbestic," being available in very large quantities.

The following kinds of fiber occur in the Union under conditions satisfying the commercial requirements of quantity and quality, and are enumerated in the approximate order of their importance: (1) Chrysotile, or "white" asbestos, the well known and valuable hydrated silicate of magnesia (Transvaal and Natal); (2) crocidolite, or "Cape blue," a lavender-blue ferrous silicate amphibole (Cape Province and Transvaal); (3) amosite, an ash-gray ferrous silicate amphibole (Transvaal); (4) asbestic, a mass fiber variety of anthophyllite (Transvaal); (5) tremolite, silicate of lime (Natal).

Chrysotile.—Near the village of Kaapsche Hoop, Barberton district, Transvaal, is an important occurrence of chrysotile which is being actively exploited by Amianthus (Ltd.), Munnik-Myburgh Asbestos (Ltd.), and Kaapsche Hoop Chrysotile (Ltd.). This is at present the productive source of chrysotile in the Union. There are also a series of deposits being worked by Munnik-Myburgh Asbestos (Ltd.) on Government ground at Uitkyk and Sunnyside, adjoining Joubertsdal on the south. These deposits lie in the identical belt of serpentine, with a class of fiber similar in appearance and quality to that produced in the aforementioned section. The development of this section is still in its early stages, but as the mining conditions are favorable a substantial increase in production may be expected.

Crocidolite.—This variety has been known and worked longer than any other asbestos in the Union, and from its lavender-blue color is known in the market as Cape blue. It was first produced in the Cape Province, but during the last few years additional deposits have been opened up in the northeastern Transvaal.

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In the Cape Province the crocidolite is found in the northern parts, over a very extensive belt of country from the south to the Orange River, near Prieska, in a general northerly or northeasterly direction through Kuruman, at least as far as the Mashowing River in British Bechuanaland, and most probably beyond that in the district of Vryburg and Mafeking. The eastern portion of the belt coincides with the hilly tract known as the Asbestos Mountains.

The total length of the Cape asbestos country is not less than 240 miles. Its width at the greatest extent is 30 miles. It is one of the most extensive stretches of asbestos-bearing formations known and is one of the principal sources of crocidolite.

The chief centers of activity are at Keikamspoort, a few miles south of Prieska; at a number of localities close to the latter village; at Koegas and Westerberg, including several farms worked by the Cape Asbestos Co.; at Danielskuil; and in the vicinity of Kuruman.

The oldest and most important producer is the Cape Asbestos Co., with headquarters at Koegas, some 35 miles northwest of Prieska. This company recovers asbestos from eight farms, the most important of which is at Westerberg. The Cape Asbestos Co. is also a manufacturer of asbestos products in Europe. The most thoroughly opened up and also the oldest mine is at Westerberg, which now produces the major portion of the company's output. This is the only locality in the whole field where the development of the fiber deposits is carried on as an organized mine, with underground workings, etc.

The methods of market preparation are simple, and comprise hand cobbing and sieving by means of inclined hand-worked sieves, the product of which passes through a machine-driven classifier. Grading is based on fiber length. The deposits in the southern section of Cape Province depend on the Upington-Prieska-De Aar line for railway connection. Those of the northern section rely on Vryburg, Taungs, Kimberley, etc., as their railheads, and are handicapped by distance from the railway line, which in some cases is over 100 miles away. Among the concerns exploiting the northern section there may be mentioned the Northern Asbestos Co., with Kimberley as headquarters, and Gillander & Campbell, at Kuruman.

Crocidolite production in the Transvaal Province is restricted to the northeastern part of the Province, situated east of Chuniespoort, and embraces the southern portion of the Haenertsburg gold fields at an average distance of 60 miles from Pietersburg, the nearest railway station. These deposits have been opened during the last few years, so that production is still low, but are undoubtedly capable of a substantial increase.

Amosite.—Amosite, a new variety of asbestos, was discovered in 1907 and is now under active exploitation. It is an ash-gray ferrous silicate amphibole, containing little or no soda; its geological conditions of occurrence, however, are identical with those associated with crocidolite.

Amosite is found in the Transvaal Province some 60 miles along both banks of the Olifants River, from the junction of that stream and the Steelpoort River, generally northward to Malips Drift in the Haenertsburg gold fields. The chief centers of activity are Penge, some 60 miles north of Lydenburg, and Malips Drift, about 45 miles

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southeast of Pietersburg. The exploitation of the Penge district has been to some extent hampered by transport difficulties, but the new railway line from Lydenburg has reduced road transport to 18 miles. The Egnep and the Amosa mines are the chief producers. The former has now been opened up for some 2,500 yards along the outcrops and has reached a depth of 400 feet. Very large quantities are available.

Market preparation of amosite is simple, since grading does not depend on fiber length (the entire output being spinnable) and consists of sieving and hand cobbing. The gradation depends upon color, flexibility, etc.

The quality of amosite is different from that of any other asbestos. In texture the mineral, though delicately fibrous, tensile, and readily fiberized, is harsher to the touch than cape blue or chrysotile. Difficulty was at first experienced in marketing amosite, but it has been taken up to some extent, both in America and Europe. It can be placed on the market at a much lower price than other classes of spinnable fiber, as it occurs in unlimited quantities.

Asbestic.—In the Zoutpansberg district of the northern Transvaal there is an occurrence of so-called "asbestic." The deposit has been opened up in several small quarries, and these show that the fiber extends to a depth of some 30 feet. A certain amount has been produced, and worked up by very simple methods into boiler lagging, etc. Recent experiments tend to show that asbestic forms a valuable insulator when mixed with magnesia, and though its value is low there are large quantities available which could be exploited at very low mining costs, so that the potentialities of this deposit merit attention.

Tremolite.—This variety occurs in Zululand, some 45 miles from Dundee Station, and the deposit has been opened up by the African Asbestos Co. The workings are open cut, in the Klip River location, along the Macebeko River. A certain amount of both the talcose country rock and of the termolite was worked up at Dundee into asbestos-stone bricks, so-called buffalo jointing, boiler lagging, and steam packing.

CONSUMPTION OF ASBESTOS IN THE UNION

A start has been made in establishing industries for the production of asbestos-cement products. The Asbestos-Cement Manufacturing Co., Wentworth, near Durban, obtains practically all of its raw material from South Africa. John Wilson & Sons (Ltd.), have recently begun operations in their factory at Meyerton, in the Transvaal, where they turn out a variety of concrete and asbestos-cement products, the main product being asbestos-cement sheets.

Owing to the pressure of competition with foreign manufacturers (principally those of Great Britain, Belgium, Holland, and the United States), both concerns are forced to operate on the basis of a restricted output in spite of a protective tariff.

The following table indicates the sales and shipments of asbestos, according to Provinces, during the years 1914 to 1925, the quantities being stated in short tons.

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Year	Cape Colony	Natal	Transvaal	Total	Year	Cape Colony	Natal	Transvaal	Total
1914	1,160	------	30	1,190	1920	3,526	45	3,541	7,112
1915	2,083	------	56	2,139	1921	3,467	62	1,593	5,122
1916	4,228	21	407	4,656	1922	2,991	6	1,392	4,389
1917	2,999	28	3,193	6,220	1923	4,317	------	4,076	8,393
1918	2,739	5	930	3,674	1924	3,001	------	4,239	7,240
1919	3,204	98	631	3,933	1925	2,540	------	7,628	10,167

Exports of asbestos in 1925 from the Union amounted to 6,633 short tons, of which the United Kingdom took over one-third; Germany, Australia, Italy, and the United States being second, third, fourth, and fifth in order of importance. The following table gives the exports in detail for 1924 and 1925:

Country of destination	1924	1925	Country of destination	1924	1925
	Short tons	*Short tons*		*Short tons*	*Short tons*
United Kingdom	2,323	2,527	Italy	87	685
Australia	1,232	809	Portuguese East Africa	6	1
Straits Settlements	8	----------	Japan	151	266
Belgium	470	226	United States	1,275	533
France	244	218			
Germany	795	1,312	Total	6,603	6,633
Netherlands	12	55			

Following is a list of asbestos producers and exporters in the Union of South Africa:

ASBESTOS PRODUCERS

Amianthus Mines (Ltd.), P. O. box 2641, Johannesburg.
Amosa (Ltd.), P. O. box 1146, Johannesburg.
African Asbestos Mining Co. (Ltd.), box 504, Bulawayo.
African Asbestos Corporation, Sbabani, Southern Rhodesia.
Asbestos Syndicate, C. & B., Kuruman, Cape Province.
Beatrice Asbestos Syndicate, P. O. Malips Drift, Transvaal.
Brits Blue Asbestos Syndicate, P. O. Strathmore, Cape Province.
Bryant, E. G., box 11, Prieska, Cape Province.
Cape Asbestos Co. (Ltd.), P. O. box 40, Kimberley, Cape Province.
Carn Brea Asbestos Syndicate, P. O. box 8, Prieska, Cape Province.
Crown Lands Asbestos Syndicate (Ltd.), P. O. box 14, Kuruman, Cape Province.
Dublin Asbestos Mine, P. O. Malips Drift, Transvaal.
Egnep (Ltd.), P. O. box 1146, Johannesburg.
Ellandsfontein Mine, Ellandsfontein, Cape Province.
Gellepsdour Asbestos Mine, Springputs, via Prieska, Cape Province.
Gillanders & Campbell, P. O. box 15, Kuruman, Cape Province.
Hanock, J. S., Pangani Asbestos Mine, Bulawayo.
Kaapsche Hoop Chrysotile (Ltd.), P. O. box 6776, Johannesburg.
King, Geo., D. S. O. Asbestos Mine, Victoria, Rhodesia.
Malips Drift Asbestos Mines (Ltd.), P. O. box 1146, Johannesburg.
Munnik-Myburgh Asbestos (Ltd.), P. O. box 6766, Johannesburg.
New Amianthus Mines (Ltd.), P. O. box 2641, Johannesburg.
Northern Asbestos Syndicate, P. O. box 625, Kimberley, Cape Province.
Orange River Asbestos Mines (Ltd.), 25 Bedford Street, Strand, London, W. C. 2.
Orcadia Asbestos Co., P. O. box 15, Kuruman, Cape Province.
Rhodesian & General Asbestos Corp. (Ltd.), Sbabani, Southern Rhodesia.
Rhodesian King Asbestos Co. (Ltd.), Victoria, Rhodesia.
South African Nitrate & Potash Corporation (Ltd.), (Klipuhuis Asbestos Mine), P. O. box 3692, Johannesburg.
Springputs Mine, P. O. Springputs, Cape Province.
Willoughby's Consolidated Co. (Ltd.), Main Street, Bulawayo.

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ASBESTOS EXPORTERS

Asbestos Manufacturing Syndicate (Ltd.), 92 Adderley Street, Cape Town.
Asbestos Syndicate, C. & B., 112 Loop Street, Cape Town.
Bell's United Asbestos (London) African Agency (Ltd.), 94 Strand Street, Cape Town.
Chiappine Bros. (Ltd.), Chiappine Chambers, St. George's Street, Cape Town.
Divine Gates & Co., 8 St. George's Street, Cape Town.
Spilhaus & Co. (Ltd.), Strand Street, Cape Town.
Weingarten & Co., S. 92 Adderley Street, Cape Town.

RHODESIA

Through rapid expansion of the industry during recent years Rhodesia has won second place as an asbestos producer. Production in 1925 exceeded all previous records, a tonnage of 34,349 being reported, a large proportion of which is spinning fiber. The average price per ton of $112.40 in 1924 was somewhat lower than that of 1923, when it averaged $149.97 at normal exchange.

The mineral is produced mainly in two important districts, the Bulawayo and the Victoria, with minor production in the Lomagundi district. The British Asbestos & Chrome Co. is conducting development work in the latter area. The Rhodesian & General Asbestos Corporation (Ltd), operating the King and Gath mines, controls practically the entire output of the Victoria district. Until recently four companies were in operation in the Bulawayo district: Willoughby's Consolidated (Ltd), operating the Birthday mine; African Asbestos Mining Co. (Ltd), operating the Nil Desperandum; J. S. Hancock, operating the Pangaui; and the Rhodesian & General Asbestos Corporation (Ltd.), operating the Shabanie mine. In September, 1924, the latter company purchased the Birthday mine, which has not been operated since 1922. With the later addition of several adjoining properties this company now holds a commanding position, producing about 80 per cent of the total output. The Shabanie is the largest asbestos mine in Rhodesia, producing nearly 1,000 tons a month.

RHODESIAN PRODUCTION

Year	Quantity	Value	Year	Quantity	Value
	Long tons			*Long tons*	
1913	290	£5,224	1920	18,823	£459,572
1914	487	8,612	1921	19,528	795,698
1915	2,010	32,190	1922	14,249	577,699
1916	6,157	99,059	1923	20,364	626,898
1917	9,562	189,890	1924	26,141	603,423
1918	8,574	158,684	1925	34,349	
1919	9,798	425,240			

ITALY

Consul Dana C. Sycks, Turin

Italian asbestos is of the amphibole variety. While it may be used to some extent as a substitute for Canadian fiber or to mix with it, the supply of high-grade fiber is not great and domestic manufac-

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turers are obliged to import a considerable proportion of the crude product required.

The principal producing districts are:

Susa Valley near the French border; area about 10 square miles; 6,000 to 10,000 feet above sea level.

Aosta Valley near Ivrea, 40 miles north of Turin; the valley is 75 miles long and 5 to 40 miles wide; the deposits are said to be rather extensive; the product is long fibered and of a high tensile strength.

The Valley of Val Malenco, near Sondrio, in Lombardy; the deposit is 3,600 to 7,200 feet above sea level and is quite extensive; the asbestos properties cover 40 square miles; the product is of good quality.

The latest edition of the Revista del Servizio Minerario, published in Rome, gives Italy's production of asbestos for 1924 at 2,160 metric tons, and the estimated production for 1925 at 2,530 metric tons.

ASBESTOS AND ITS PRODUCTS EXPORTED BY ITALY

Items	January–November, 1923		January–November, 1924	
	Quintals	*Lire*	*Quintals*	*Lire*
Crude asbestos, including that in form of powder	3,813	546,439	4,994	804,946
Asbestos board, mixed with rubber or metal wire cloth	17	19,644	138	55,270
Asbestos textiles and their products, not rubber coated	1,129	1,880,262	983	2,105,844
Asbestos thread and cord	1,093	2,377,665	1,543	2,563,949
Shingles, asbestos mixed with cement	33,570	3,266,417	54,300	5,801,030

The American consul at Turin, Italy, reports that Piedmont produces an average of 175 tons of asbestos a month, but it is understood that the amount produced is not sufficient for the local requirements, as asbestos is imported from Canada by manufacturers of asbestos goods.

One of the producing companies is Capamianto, Società Anonima Italiana, Corso Francis, Tesoriera, Turin, which produces asbestos and manufactures asbestos products. The output of the company is consumed in Italy. Capital, 1,000,000 lire; approximate annual turnover, 5,000,000 lire; number of employees, 140.

The Società Anonima Cave di San Vittore, Balangero, Province of Turin, Italy, produces asbestos from the company's mines at Balangero. Capital, 6,000,000 lire, approximate annual turnover, 4,000,000 lire.

The important Italian manufacturers of asbestos products using imported crude material are the following:

Società Italo-Russa per l'Amianto, Borgo Leumann (Torino). Makers of brake lining, asbestos cloth, string, board, etc.

"Eternit," S. A., Via Caffaro 3, Genoa (6). Has its plant in Casale Monferrato (Alessandria), the country's chief center of cement production.

"Capamianto" S. A. I., Tesoriera (Torino). Makes asbestos cloth, cord, etc., and owns its own mine in Griqualand, South Africa.

Stabilimento di Amianto e Gomma Elastica (formerly Bender & Martiny), Nole Canavese (Torino). Manufacturer of asbestos articles (especially high-pressure steam-pipe packing, brake lining, and packing of asbestos mixed with copper).

The above manufacturers use almost all the crude asbestos, whether imported or obtained from Italian mines. A communication from the "Eternit" Co. states that it imports annually about

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3,000 metric tons (30,000 quintals), two-thirds of which comes from Canada—almost all of it short-fiber material, or "shingle stock."

The Sociatà Italo-Russa estimates 10,000 quintals as the total quantity of material employed by Italian manufacturers for the weaving of asbestos textiles, it alone using half that quantity, or 5,000 quintals. The other half would be worked up by the Capamianto and Stabilimenti di Gomma, named in the above list, and other manufacturers. It is also the opinion of the director of the Italo-Russa that the Eternit Co. takes fully two-thirds of the imported raw material to work up into its products.

There are certain products of asbestos imported, for instance, some textiles mixed with rubber from Germany and Great Britain. However, the best-known asbestos import is the British brake lining, Ferodo, which has established a distinct place for itself in the local market.

Generally speaking, Italy comes pretty close to self-sufficiency in the way of facilities for the manufacture of asbestos articles. Because its mines are deficient in an adequate quantity and in grades of material best fitted for many industrial purposes, it must import large amounts of crude asbestos.

CONCLUSION

There has been no attempt made to incorporate in this report details relative to the asbestos-manufacturing industry abroad, nor market information which would facilitate foreign sales of asbestos products. It is intended primarily as an aid to domestic manufacturers interested in foreign sources of the raw material upon which they are largely dependent.

The Bureau of Foreign and Domestic Commerce has compiled trade lists of foreign dealers and importers of asbestos products, which were prepared especially to assist American manufacturers in establishing reliable contacts abroad. These lists may be obtained by American concerns upon request made direct to the Bureau of Foreign and Domestic Commerce or to any of its district or cooperative offices.

The manuscript of this report was reviewed by Dr. Oliver Bowles, Bureau of Mines.

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WASHINGTON : GOVERNMENT PRINTING OFFICE : 1926

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