

ASBESTOS.

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PRODUCTION AND PRICES.

The United States is one of the largest manufacturers of objects made from asbestos, but it is not a large producer of crude asbestos. The supply of asbestos of all grades in Quebec, Canada, is so large and so conveniently obtained and the quality of the Canadian asbestos is so excellent as to delay the development of asbestos deposits in the United States. The demand for high-grade asbestos has always been active, but recently, under the stimulus of war conditions abroad, it has become still greater, and the available supply, although larger than before, is frequently not equal to the demand. In 1916 the total output of asbestos in the United States was 1,479 short tons. The imports during the same time, almost wholly from Canada, amounted to 116,162 short tons, making a total supply available for manufacture in the United States of 117,641 tons.

Asbestos imported into the United States in 1916.

[Figures furnished by Bureau of Foreign and Domestic Commerce, Department of Commerce.]

Country.	1915			1916		
	Unmanufactured.		Manufactured (value).	Unmanufactured.		Manufactured (value).
	Quantity (short tons).	Value.		Quantity (short tons).	Value.	
Austria-Hungary.....			\$10,502			
British South Africa.....				112	\$10,625	
Canada.....	93,565	\$1,980,749	1,867	114,978	3,069,617	\$1,841
Colombia.....						109
Cuba.....			538			
Denmark.....			49			
England.....			106,412	1,072	223,228	119,123
France.....			139			10,762
Germany.....	1	734	14,117			100
Japan.....						298
Italy.....			2,624			2,538
Netherlands.....			190			
Scotland.....			879			293
	93,566	1,981,483	137,317	116,162	3,303,470	135,064

Five States now produce asbestos—Arizona, California, Idaho, Georgia, and Virginia. Arizona and Georgia are the largest producers—Arizona of high-grade fiber, and Georgia of fiber below the spinning grade.

The prices for asbestos produced in the United States during 1916 are said to have ranged, according to grade, from \$15 to \$1,000 a ton. In 1915 normal prices ranged from \$10 to \$400 a ton.

ARIZONA.

The asbestos of Arizona is chrysotile and occurs in serpentine associated with limestone altered by intrusions of diabase. As the strata are nearly horizontal, they are for the most part best exposed on the sides of canyons throughout the State. The cross-fiber veins of chrysotile are commonly parallel to the bedding of the limestone but are very irregular in their distribution, a fact which results from the irregularity of the contact between the limestone and the intruding diabase. The asbestos has to be won by tunneling into the canyon wall. As the amount of asbestos at any one place is small, thus limiting the production, the cost of production is increased, but in obtaining the best grade a considerable amount of valuable short fiber is accumulated on the dump and is available for future milling.

The asbestos of the Arizona mines is of two grades; one is very fine, soft, silky fiber of first-class textile quality, and the other is not suitable for textile manufacture. Although the second grade may have great length, it is harsh and when put through textile processes creates a good deal of "splint," which makes a rough-looking yarn altogether unsuited for higher textile uses. Both grades may occur in the same mine. The lower grade appears to be the more abundant, and the available quantity of first-class textile fiber is thus limited. The small percentage of iron contained in the best grade of Arizona fiber compared with Canadian fiber renders that of Arizona especially useful for its electric insulating qualities. As the whole mass of available good fiber is small, it should be mined with particular care to avoid waste. The limit of the asbestos field of Arizona is not yet known. The output will probably never be large compared with that of Canada, but under proper management the deposits may yield say 1,000 tons of valuable fiber annually for years to come.

CALIFORNIA.

The Klamath Mountains, Coast Range, and Sierra Nevada, in California, are rich in serpentine, and in places this rock contains considerable asbestos. The only producing point in 1916 was on Mears Creek, near Sims, in Shasta County, from which 3 carloads were shipped to an asbestos factory in Oakland. There is no fiber of spinning grade at this locality, and as the demand for the fiber mined is small the mining operations have not been extensive. The

mine is within a few miles of the Southern Pacific Co.'s main line, and good water power for milling the fiber is available in Mears Creek. The serpentine is cut by a variety of dikes in the vicinity of the asbestos deposits. Cross-fiber veins of asbestos half an inch or less in thickness are common, and a prominent vein of slip fiber occurs on the same slope. There is considerable asbestos near the head of Mears Creek, and if there were a large demand for the lower grades of fiber a mill on this stream could do much toward meeting it.

Other prospects of asbestos in California that have attracted attention occur in Napa County near Canyon station on the stage road from Napa to Monticello, in Placer County, near Towle and Iowa Hill, and in Calaveras County near Valley Spring.

IDAHO.

In the vicinity of Kamiah, Lewis County, Idaho, there are rocks made up wholly of asbestos arranged in fibrous bundles. The fibers are short and brittle and are consequently far below spinning grade and suited only for use as a filler in the manufacture of heat-resisting or fireproofing covers, cements, or paints. There is only one producer at present. The demand is slight, but the supply of asbestos is large and the material is easily quarried, as it constitutes the whole mass of the rock. It occurs within a dozen miles of a railroad, 186 miles southeast of Spokane, Wash.

GEORGIA.

The asbestos mine near Sall Mountain, Ga., with a mill at Gainesville, has for years been the largest producer of asbestos in the United States. The asbestos, like that of Kamiah, Idaho, is of the mass-fiber type of anthophyllite, which forms fibrous bundles and constitutes the whole mass of the rock. Only the surface portion of the rock mass, which has been softened by weathering, is milled for fiber. The solid, unweathered portion of the rock is too hard for successful milling, and unless some way can be found to treat this portion successfully this limitation will greatly reduce the reserve for future needs. Georgia is far south of the glacier-swept region, and the mantle of residual softened rock is unusually deep, so that there still seems to be a fairly good supply for the near future.

VIRGINIA.

Rocks similar to those that furnish the asbestos in Georgia are common in the mountain region of North Carolina and Virginia, and in the latter State there is a very small production of asbestos used in manufacturing a dental product.

VERMONT.

The country rocks of the asbestos deposits in Quebec, Canada, extend southwestward into Vermont, where they contain considerable

bodies of chrysotile that was mined more or less successfully a few years ago. The Vermont area contains very little spinning fiber but a considerable quantity of good milling fiber, and it is now attracting much attention. No production has yet been made. Although in the production of chrysotile asbestos Vermont can not compete successfully with Canada, the material in Vermont should be regarded as a valuable reserve if the Canadian deposits were not available.

WYOMING.

The asbestos deposits of Wyoming are largely chrysotile, but they contain only a trace here and there of fair spinning fiber. They have attracted much attention for years, especially from a speculator's point of view, but have not yielded a production. The possibilities of the region are not yet fully known. They should be tested and developed by an experienced manufacturer of asbestos who needs raw material. There is no doubt that a large amount of good-grade mill fiber occurs in that part of the country, including the Laramie, Wind River, and Big Horn mountains, which is so situated with reference to transcontinental as well as Great Lakes and Gulf traffic as to be readily accessible.

CONCLUSION.

With a view to increasing the available supply of asbestos, especially the spinning grades, which are so much in demand, all areas of peridotite and pyroxenite rocks more or less altered to serpentine should be prospected for cross-fiber veins of asbestos in which the fibers are three-fourths of an inch or more in length. The content of such fiber necessary to yield a profit may be less than 1 per cent of the whole rock quarried, and in obtaining it a much larger percentage of mill fiber will most probably be taken out.

Although the Arizona chrysotile fiber is excellent for certain purposes and finds a ready sale to those who need it for electric insulation, its mode of occurrence necessitates expensive operation and small production, and it should be mined with especial reference to avoiding waste and obtaining all within reach.

The origin of asbestos, especially that of Arizona, is not well understood, and much field investigation is needed to discover the causes determining its distribution and the best methods of mining so as to utilize as far as possible all the available grades of fiber.

The United States, being the largest manufacturer of asbestos and having only a meager domestic supply, has to depend very largely upon imported asbestos, but fortunately the chief source, which is Canada, is close at hand. Under increased demand the output of the United States is likely to be greatly augmented, although it can hardly be expected ever to supply all the asbestos needed for increasing manufacture.