vary from a few hundred to a few million nanometers. Chemical analyses of chrysotile asbestos from four important mining localities are given in Table 2.

ASBESTOS IN THE WORLD ECONOMY

Early beginnings

While the general use of asbestos in international commerce dates only to the late 19th century, its utility in human culture goes back to at least 2500 B.C. Archeological studies (Europaeus-ÄyrÄpÄÄ, 1930) show that the inhabitants of the Lake JuojÄrvi region of East Finland knew how to strengthen earthenware pots and cooking utensils with anthophyllite asbestos. This asbestos probably came from the same areas where it was commercially exploited in recent times. According to Huuskonen (1980; see also Europaeus ÄyrÄpÄÄ, 1930; Noro, 1968), the use of asbestos-strengthened ceramic wares began during the Stone Age and continued throughout the Bronze Age and into the Iron Age. The use of such utensils spread over a wide area of Finland, Scandinavia, and Russia. The most important modern use of asbestos, to strengthen materials, was apparently also the first use -- dating back several thousand years.

Until recently, however, most other uses of asbestos were trivial; its fabrication into such curiosities as cremation cloth (Pliny refers to this as a rare and costly cloth -- linum vivum -- the funeral dress of kings), tablecloths (reputedly, Charlemagne, or according to some writers, Charles V, astonished guests by throwing the cloth into fire and later withdrawing it cleansed, but unconsumed), and lamp wicks (Plutarch recorded that the vestal virgins used "perpetual" lamps). The fabrication of lamp wicks may have been a cottage industry during certain times in history; Herodotus clearly documented use of such asbestos wicks in the earlier Greek civilization. Even well into the last century, asbestos could not be regarded as a product of commerce unless one includes such endeavors as the small industry developed in Russia during the rule of Peter the Great, where chrysotile asbestos from the Urals was used for a short period in the production of textiles.

In the 1860's and 1870's the market for asbestos products rapidly

Table 2: Chemical analyses and formulas of commercial chrysotile asbestos (Hodgson, 1979)

	1.	2.	3.	4.
SiO_2	38.75	35.00	39.70	39.93
Al_2O_3	2.09	4.66	3.17	3.92
Fe_2O_3	1.59	0.54	0.27	0.10
FeO	2.03	1.53	0.70	0.45
MnO	0.08	0.11	0.26	0.05
MgO	39.78	38.22	40.30	40.25
CaO	0.69	2.03	1.08	1.02
K_2O	0.18	0.07	0.05	0.09
Na_2O	0.10	0.07	0.04	0.09
H_2O^+	12.22	11.37	12.17	12.36
H_2O^-	0.60	0.77	0.64	0.92
CO_2	0.48	1.03	2.13	1.04
	99.79	100.20	100.37	100.22
	NUMBER OF IONS ON BASIS OF O=9, OH=4			
Si	1.845	1.831	1.865	1.882
Al	0.155	0.169	0.135	0.118
	2.000	2.000	2.000	2.000
Al	0.018	0.112	0.082	0.108
Fe^{3+}	0.057	0.019	0.010	0.004
Fe^{2+}	0.081	0.061	0.028	0.018
Mn	0.003	0.006	0.010	0.002
	3.047	3.013	3.025	3.016
Mg	2.823	2.704	2.853	2.827
Ca	0.049	0.103	0.055	0.052
K	0.011	0.006	0.003	0.005
Na	0.009	0.006	0.004	0.006

1. Chrysotile, King Power Mine, Thetford Mines, Quebec
2. Chrysotile, Asbest, Urals, U.S.S.R.

Table 3. World asbestos production in 1978 (Clifton, 1979)

Fiber	Locality	Production (in thousands of metric tonnes)
Chrysotile		
	North America	
	Canada	1620
	United States	93
	South America	
	Argentina	1
	Brazil	100
	Europe	
	Bulgaria	21
	Italy	162
	U.S.S.R.	2562
	Yugoslavia	10
	Africa	
	Zimbabwe	210
	South Africa	116
	Swaziland	48
	other	1
	Asia	
	China	210
	Cyprus	37
	India	21
	Japan	7
	Korea	7
	Taiwan	1
	Turkey	10
	Oceania	
	Australia	58
(World chrysotile total)		5317
Crocidolite		
	South Africa	210
Amosite		

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