

EVALUATION OF FIBER SAMPLES TAKEN FROM THE VICINITY OF TWO VILLAGES IN TURKEY¹

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As Dr. Wagner mentioned, this Turkish disease situation is a very interesting one. It is confined to two villages, and upon moving a few kilometers away from these villages the disease situation apparently disappears.

The samples which we have received from this area indicate that the rock is of a volcanic origin, a tuff. Examining these samples, we found that the only real significant difference in the rock types between the two villages with disease and the other villages (without any disease) was in the fiber content of the rocks.

Figure 1 is an electromicrograph of particles prepared by washing the dust off rock specimens. The electromicrograph reveals large numbers of fibers that appear very similar to amphibole asbestos fibers. A second electromicrograph (Figure 2) shows typical amphibole-like fibers with quite a large number of extremely fine fibers present in the sample.

We have examined these materials and have found that these fibers are zeolite materials. Table 1 contains the analyses of fibers from two of the specimens of rock

TABLE 1. Average Chemical Analysis of Fibres found in Rock Specimens Turk 1 and 3, together with Reference Data Expressed as Oxide Weight Percentages

	Turk 1	Turk 3	Chabazite ¹	Erionite ¹
Al ₂ O ₃	17.6	18.5	23.14	48.90
SiO ₂	73.0	72.1	62.57	69.64
CaO	5.6	3.5	12.53	3.54
Na ₂ O	0.3	0.4	1.25	1.4
MgO	1.0	2.6	—	1.4
K ₂ O	1.5	1.2	0.77	4.1
TiO ₂	0.4	0.4	—	—
MnO	0.1	0.2	—	—
FeO	0.6	1.1	—	—
Al+Si %	90.6	90.6	85.7	88.54

¹From Deer Howie and Zussman neglecting water content.

¹This presentation was made in conjunction with Dr. Wagner's presentation "The Complexities in the Evaluation of Epidemiologic Data of Fiber-Exposed Populations".

Dusts and Diseases: occupational and environmental exposures
to selected fibrous and particulate dusts.
Lemen + Dement + Pathotax Publishers Inc. 1977



FIGURE 1. Electron micrograph of fibres detected in Turkish rock Specimen 1.

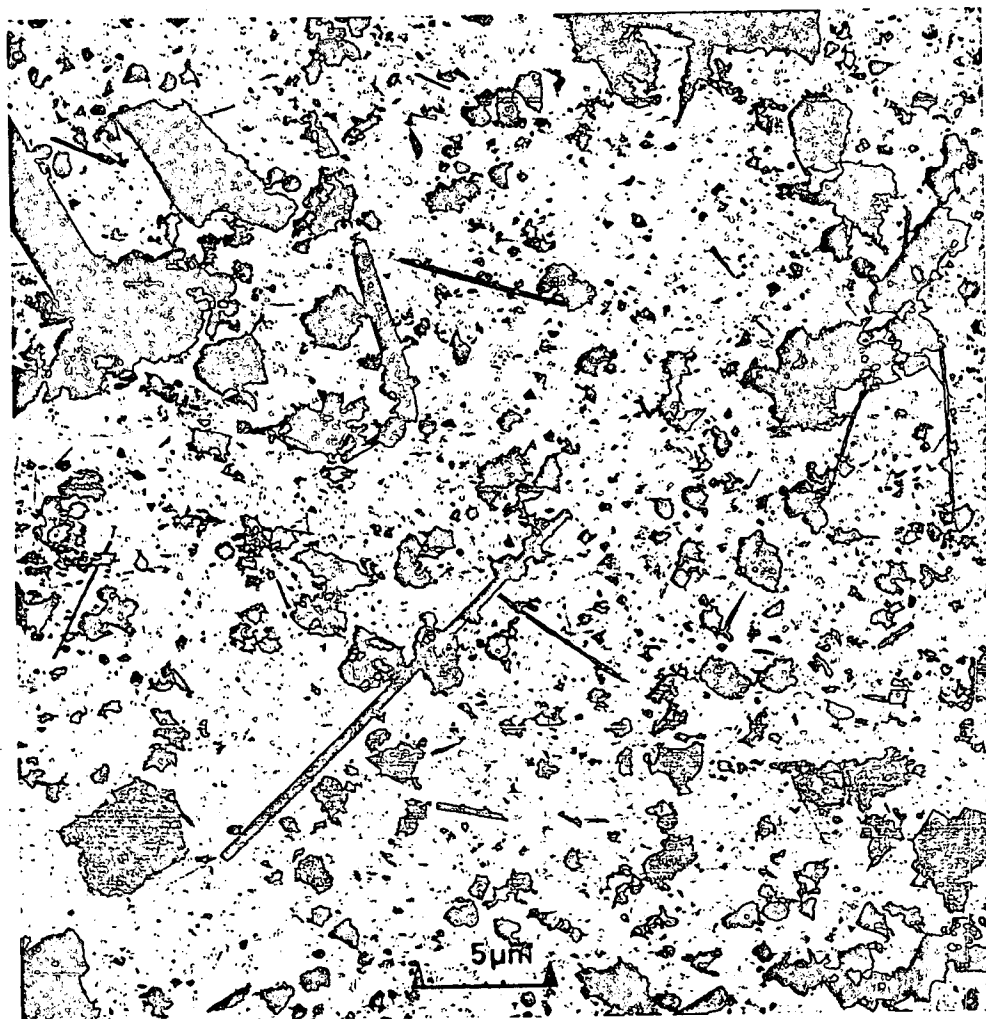


FIGURE 2. Electron micrograph of fibres detected in Turkish Specimen 2.

so far examined, together with chemical data for two zeolite minerals which most closely match the fibers observed. As can be observed, the closest match is with the mineral erionite. These fibers are nearly 90 percent, on a weight basis, composed of aluminum and silicon oxides.

We have also sized these fibers. We find that, in terms of the size distribution, there are a number of very small, submicroscopic fibers present in these samples. We find 75% of the fibers below 0.25 microns in diameter, and we see that there are quite a large number of longish fibers present in the dust created from these rocks.

These samples are obviously very interesting, as in this situation we have a very high incidence of mesothelioma associated with a fiber exposure which is not asbestos fiber. Perhaps this is a very useful key in the story of the influence of fibers with respect to disease response.