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The Pneumoconioses

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PLAINTIFF'S EXHIBIT

CHAPTER 2

Asbestosis

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Historians have recorded the fact that the ancient world was well aware of the peculiar properties of the asbestos fibre, chiefly its resistance to fire and the ability of the fibres to be spun into cloth. In Plutarch we read about the vestal virgins who had lamps with "perpetual" wicks; elsewhere we find reference to lamps with incombustible wicks made from "Carpathian flax," derived from a mineral found on islands near Cyprus. Pliny refers to the "funeral dress of kings" which apparently were shrouds of woven asbestos used in funeral ceremonies of the nobility. When Marco Polo travelled through Siberia he found a fossil substance which "When woven into cloth and thrown into the fire, remains uncombustible."

The term "asbestos" is generally used to describe several fibrous magnesium silicates which are different in their chemical composition and physical properties. The most important types of fibres are chrysotile, amosite, crocidolite, anthophyllite, actinolite and tremolite. Deposits of various types of this mineral are found in many countries, but the largest mines are located in Canada, Africa and Russia. About 90 per cent of the fibres produced today are of the chrysotile variety.

Open pit or underground mining methods are employed to obtain the asbestos fibre. The fibre-containing rock is transported to the mill where it is dried, crushed and the rock separated from the fibre by screening methods. The fibres then are opened, cleaned, graded and bagged for shipment. It is estimated that there are between 12 to 15 thousand people in North America employed in the production and primary manufacturing of asbestos. No estimate has been made of the number of people who handle finished asbestos products.

Individual chrysotile fibres are white, but when seen together as they occur in the veins of serpentine rock their colors vary from green, to yellow-green, to amber. Amosite fibres usually are yellow-

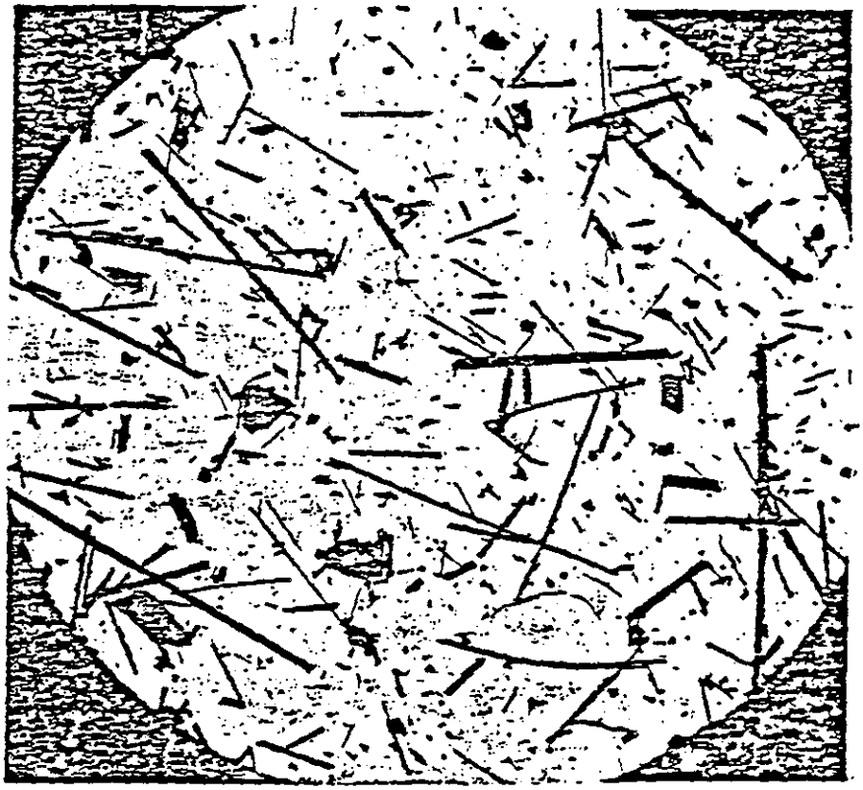

Fig. 3. Electron micrograph, crocidolite asbestos; × 4000.

Therefore, it seems more appropriate to use the term "asbestos" bodies rather than "asbestosis" bodies, signifying exposure to the fibres but not necessarily indicating disease. In addition, the finding of occasional asbestos bodies, singly or in clumps in pulmonary tissue does not definitely indicate generalized parenchymal asbestosis.

If increasing quantities of the fibres are continually inhaled, the tissue reaction progresses, and a generalized, diffuse fibrosis gradually appears throughout the lower lobes of the lungs. With additional exposure, this fibrosis will spread to the other lobes, eventually causing respiratory embarrassment and finally cardiac failure.

There is no allergic response of the skin or respiratory tract membranes to contact with the asbestos fibre. Thus poisoning or similar toxicological effects of the fibre should not be considered.

The theory of mechanical irritation is interesting. Will the asbes-

pational diseases because of the serious Workmen's Compensation implications. The term "asbestos worker" has been used too freely in recent years by many physicians. When alluding to an asbestos worker one would naturally assume that the individual used asbestos fibre in his occupation. Any physical disability in this person then might be attributed to his inhalation of the asbestos fibre.

Unfortunately, the term "asbestos worker" very frequently is used to denote a member of the asbestos workers union, a group of people whose chief occupation is the application of insulating materials. Many years ago, the asbestos fibre was the only insulating material commonly used. Today, mineral wool, glass fibre, magnesia, and a host of other products are used in the insulation industry, but the applicators still are called "asbestos workers" because of their union affiliation. Hence, when the literature presently available is reviewed, it would be advisable to ascertain the true occupational job title.

Some observers in the past few years have associated various conditions such as lung cancer, bronchiectasis, emphysema and bronchitis with the asbestos worker. No attempt was made to associate the disease with the clinical, radiological and pathological entity, known as asbestosis. The occupational title of the individual was sufficient to associate a certain disease with the asbestos fibre. Clear-thinking and diligent authors have associated other pulmonary diseases with asbestosis. It is unfortunate that less accurate authors have generalized their comments and thereby confused intelligent readers. Perhaps with more accurate reporting the alleged association of inhalation of asbestos fibre and other intercurrent disease conditions would be clearer today. It is entirely possible that the asbestos fibre may be a carcinogen, or a co-carcinogen. However, the true relationship will remain obscure until responsible reporters can evaluate the relationship between agent and disease and not just job title and disease.

This author's experience has extended over a period of eighteen years, during which time over 50,000 physical examinations and chest X-ray films have been observed among workers in the asbestos-mining, milling and fabricating operations. Among these workers who were exposed only to chrysotile fibre, there were no more cases of pulmonary malignancy than among the general population.