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Experimental Studies on the Effects of Heated Chrysotile Asbestos and Automobile Brake Lining Dust Injected into the Body Cavities of Mice[1]

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A series of experiments with mice involving the intrapleural injection of chrysotile asbestos dust heated to varying temperatures up to 1000°C suggests that the physical shape of the dust particles is more important than the altered chemistry of the dust. Chrysotile heated to no more than 400°C produced dust samples containing many long fibers, and these samples resulted in large pleural granulomas. Chrysotile heated to more than 400°C produced dust containing mainly particles of low aspect ratio, and these produced very small granulomas. The initial size of the granulomas was very closely related to the final degree of fibrosis found in the animals and, therefore, chrysotile heated to 400°C or less was much more fibrogenic than when it was heated to higher temperatures. A sample of automobile brake lining dust was found to contain very little recognizable chrysotile, and consisted mainly of particles with a low aspect ratio. When this dust was injected into the pleural cavities of mice it produced very small granulomas and little fibrosis.

The discovery by Wagner *et al.* (1960) that exposure to asbestos dust was often associated with the production of mesothelial tumors caused concern about the possible pollution of the normal urban atmosphere by asbestos dust. Wagner had shown that very small doses were apparently sufficient to produce tumors in some cases and it was suggested that the use of asbestos products from ironing boards to brake linings might be liberating sufficient dust into the atmosphere to cause a health hazard. Since automobile brake linings are constantly being abraded in use and since many tons of asbestos are consumed in this manner each year, the possibility of atmosphere pollution from brake lining dust has received particular attention.

In order to test the level of atmospheric pollution by asbestos a number of studies have been undertaken. The lungs from unselected autopsy cases from different parts of the world have been examined and initially, since uncoated asbestos dust is difficult to find in tissues, the presence of asbestos bodies was used as a likely index of the presence of asbestos. The figures obtained showed an increase in the percentage of cases containing bodies with the increasing sophistication of the techniques used. The first of these studies was that undertaken by

[1] The dust samples used in this study were prepared in the laboratories of T.B.A. Industrial Products Ltd. of Rochdale, England. This work was undertaken as part of the research programe organised by the British Asbestosis Research Council.

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