

Incidentally, only three of our five patients were known to have had occupational exposures to asbestos (labor in asbestos plant; tile manufacturing; pipe insulation). The other two presumably belong in the category of asbestosis of unrecognized origin. Asbestos bodies have been found at autopsy in the lungs of a large proportion of males without occupational exposure, the incidence in this country ranging from 25 to 97%.^{10, 13, 14}

It is now clear that less intense grades of asbestosis, even minor or trivial ones, cannot be excluded from consideration in the background of these malignant tumors. Duration rather than extent of asbestosis appears to be decisive. An average interval of 38.7 years has been observed between initial exposure to asbestos and death from lung cancer.¹¹ Less intense grades of asbestosis are more likely to be associated with malignant mesothelioma. According to Selikoff the intervals between initial exposure to asbestos and pleural or peritoneal mesothelioma average 34.8 and 43.0 years, respectively.¹¹ Perhaps the amount of asbestos fibers inhaled by an ordinary urban dweller is sufficient to cause minor grades of pulmonary asbestosis. Asbestos fibers may become widely disseminated by the blood and lymph throughout the human body. Selikoff has found them in bone marrow, kidney, liver, adrenal glands, and spleen.⁹ The possibility that they also enter the circulation by penetrating the mucosal barrier of the gastrointestinal tract after ingestion with contaminated food must also be considered.

The first step in proving the development of malignant tumors as a result of occupational or environmental exposure to chemical or physical carcinogens is the compilation and presentation of data such as these. The association of such exposure with increased incidence of tumors does not conclusively prove *per se* their etiologic relationship. Final proof must await the experimental induction of tumors by the

incriminated agent. Experience in man already suggests the propensity of many types of tissue to develop malignant tumors in the presence of asbestosis. These and other hazards of asbestosis, one of man's additions to his own environment, are indeed numerous—and frightening.

Acknowledgment. Sylvan E. Moolten, M.D., Middlesex General Hospital, New Brunswick, N. J., granted permission for use of the material and helped in the preparation of this paper.

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