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4400 FIFTH AVENUE -:- PITTSBURGH, PA. 15213

551 Pulmonary Function in Bagasse Worker's Lung Disease. A. K. Pierce et al. Am. Rev. Resp. Dis. 97, 561-579 (April, 1968).

Seven previously well men working in a fiberboard plant developed signs and symptoms of acute bagasse worker's lung during a ten-week period. Two of these patients had open lung biopsies to confirm the diagnosis. Pulmonary functions were measured from 2.5 weeks to 26 months after the onset of symptoms. All patients had a restrictive lung defect due to a reduced inspiratory capacity; partial airway obstruction was not a feature of the illness. All patients had a severe reduction in the transfer coefficient of the lung for carbon monoxide at the outset; this was primarily due to a reduction in membrane diffusing capacity, whereas the volume of blood in the pulmonary capillaries was more nearly normal. Although pulmonary functions returned toward normal, the total lung capacity, inspiratory capacity, vital capacity, forced expiratory volume, transfer coefficient of the lung for CO, and membrane diffusing capacity remained significantly abnormal more than one year after the onset. Three patients were treated with adrenocorticosteroids and 4 were not. There was no significant difference between the treated and the untreated patients in the rate of objective improvement or in the extent of residual impairment of pulmonary functions. These data suggest that steroids do not hasten the resolution of a granulomatous infiltrate nor do they make resolution more complete. There are 28 references. -- Authors' summary.

552 Metal and Mineral Concentrations in Lungs of Bituminous Coal Miners. J. V. Crable, et al. Am. Ind. Hyg. Assn. J. 29, 106-110 (March-April, 1968).

Lung and pulmonary lymph node samples from 26 West Virginia bituminous coal miners have been analyzed for total dust, coal, and free silica. In addition, beryllium, cobalt, manganese, nickel, titanium, and vanadium were determined by the quantitative spectrographic methods; lead was determined by the USPHS dithizone method; and copper, iron, magnesium, and zinc were determined by atomic absorption spectrophotometric methods. The summarized results of the mineral analyses from this study and the authors' previous study are presented. The concentration ranges and mean values for eleven elemental constituents are compared with normal values reported by Tipton and Shafer and Cholak. There are 9 references. -- Authors' summary

553 Tissue Response to Intraperitoneal Asbestos With Preliminary Report of Acute Toxicity of Heat-Treated Asbestos in Mice. J. Jagatic, et al. Environ. Research 1, 217-230 (Nov., 1967).

Intraperitoneal asbestos not only produced fibrosis, but a special and peculiar type of fibrosis which was proliferative, granulomatous and invasive, and histologically similar to mesothelioma although morphologic evidence of actual malignancy was not obtained. Further, asbestos fibers exposed to high temperature produced a high degree of toxicity in experimental animals: this resulted in a 60% mortality rate. -- Authors' abs

Editor's Note: Although the authors of this 14-page article insist that the fibrous inflammatory tissue resulting from intraperitoneally injected asbestos is histologically similar to mesothelioma and that it is "invasive", they gave no evidence in support of these opinions. The 22 illustrations that are included in this report, support neither the claim of similarity to mesothelioma nor of "invasiveness" of the inflammatory tissue. -- P. G

554 Asbestos—A Hazard to the Community. C. Gold and J. Cuthbert. Public Health(London) 80, 261-270 (Sept., 1966).

During a recent study of pulmonary fibrosis in a Southeast Glasgow clinic, 21 proved cases and 3 possible cases of lung pathology associated with exposure to asbestos have come to light. A patient with suspected asbestosis should have, in addition to x-rays, an examination for asbestos bodies in the sputum, lung function tests, and open lung biopsy, since asbestosis has been found in patients with normal or borderline x-rays by the lung function test and most reliably by biopsy. It is also important to take a complete occupational history in cases of obscure pulmonary fibrosis, since asbestosis or pleural tumors may occur many years after a short exposure to the asbestos dust. Also, persons in occupations usually not associated with health hazards may be endangered by working in close proximity with people who use asbestos, especially in confined spaces. Case histories are given and a table is presented showing the type of asbestos, duration, length of exposure, age, and period elapsed since exposure of the 24 patients studied. Since the use of asbestos has become more widespread in recent years, it is recommended

possible alternative materials to asbestos should be used whenever possible. A proposal to mix asbestos with tarmacadam for road use is viewed with concern. -- APCA Absts.

Editor's Note: Regarding 554-566, interested readers are referred to the Editorial in the May issue of IHD and IHF Medical Series Bulletins No. 11 and 12 which report progress and planning of IHF asbestos bioeffects research. -- R. T. P. deT.

The Epidemiology and Clinical Features of Asbestosis and Related Diseases. P. C. Elmes. Postgrad. Med. J. 42, 623-635 (Oct. 1966).

Pulmonary fibrosis caused by asbestos dust has become less common since the introduction of dust suppresssion measures in 1932-33. However, in occupations where these safety measures are not observed, asbestosis is still a threat. Symptoms of asbestosis are breathlessness on exertion, productive cough, tightness in the chest, clubbing of fingers, warts, cyanosis, restricted chest movement, kyphosis, and fine rales heard over the lung bases. Changes in x-rays are not conclusive, since they also occur with other forms of chronic diffuse fibrosis involving the pleura. No laboratory tests except lung biopsy are diagnostic of asbestosis but sputum examination and respiratory function tests help to support the diagnosis. Carcinoma of the lung resulting from exposure to asbestos appears to be common in patients whose exposure to the dust was insufficiently long or intense to cause crippling fibrosis. The rapidly increasing number of cases of fatal mesothelioma of the pleura and peritoneum have been definitely traced to exposure to asbestos dust. The degree of exposure in many cases is slight and there can be a long interval between exposure to the pollutant and the development of the tumor. Preventive measures recommended are restriction of use and greater precaution in the handling of all types of asbestos. Crocidolite fiber, in particular, should be eliminated from commercial use. -- APCA Absts.

Asbestos—An Environmental Health Hazard. W. D. Norwood, P. A. Fuqua and T. F. Mancuso. Northwest Med. 66, 821 (Sept., 1967).

Four Case Reports demonstrate asbestosis with pulmonary emphysema and cor pulmonale, asbestosis with lung cancer, mesothelioma, and rectal cancer. The occupational histories of workers as plumbers, boiler makers, carpenters, pipe fitters, steam fitters, mechanics, stationary engineers, undercoaters, foremen, maintenance electricians, builders, rubber workers, construction workers, cement workers, boiler repairers, sheet metal workers and laborers must all be elicited if diagnosticians hope to record the more than 3,000 different exposures to asbestos. For the sake of workers and their dependents with industrial health compensation rights, the diagnostician must not be misled by recent occupational history nor overlook other work exposures within the lifetime of the patients. The obvious need for decreasing the exposure to asbestos by better occupational hygiene programs is recognized but no detailed criteria were presented. Considering the growing uses of asbestos, this occupational and environmental disease may get worse before it gets better. -- J. Occ. Med. Absts.

Talc in Atmospheric Dusts. H. Windom, J. Griffin, and E. D. Goldberg. Environ. Sci. Tech. 1, 923-926 (Nov. 1967).

The mineral talc has been observed in dusts recovered directly from the atmosphere and in the solid mineral phases of rain and snow. The talc, where detected, attains levels of the order of a per cent by weight in the solid phases. This talc probably arises from agricultural activity where the mineral is used as a carrier and diluent for pesticides. The amounts of talc found in atmospheric dusts appear to reflect a local introduction rather than a generalized global fallout. -- APCA Absts.

Measurement of Asbestos Exposure. J. R. Lynch and H. E. Ayer. J. Occ. Med. 10, 21-24 (Jan., 1968).

As an outcome of an epidemiologic study, a safe level of exposure should be set in terms of a method of exposure measurement which meets the following criteria in the order given: (1) The environmental factor measured should be sufficiently relevant to the disease mechanism to correlate with health status even in environments where exposures to mixed dust occur. (2) The sensitivity of the method should be such as to measure levels well below the Threshold Limit Values (TLV). (3) The method should lend itself to an appropriate sampling strategy; e.g., long-period personal samples in the case of asbestos. (4) The expense of conversion from existing methods should be reasonable. The impinger method of measuring asbestos exposure does not meet any of the criteria well with the exception of expense. Weight methods would be preferred if there were an analytical breakthrough. At present fiber counts on membrane filters are the best method of estimating exposure as related to the risk of asbestosis and the airborne fiber concentration as a factor in the risk of lung cancer. There are 9 references.

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559 Industrial Hygiene for Insulation Workers. J. L. Balzer.
J. Occ Med. 10, 25-31 (Jan., 1968).

The asbestos worker is exposed to amosite and chrysotile asbestos-containing materials, fibrous glass, cork, plastics, and adhesives. Working in industrial and commercial building projects and marine construction and repair, he is exposed to many other environmental hazards not created by his own trade. Although he works with asbestos-containing products 45% of the time, the over-all time-weighted average exposure to asbestos-containing materials is below the presently recognized Threshold Limit Values (TLV) of 5 mppcf. The three work areas in which the dust levels were above the TLV (prefabrication, tearing out, and mixing) account for less than 20% of his total work time. However, the incidence of radiographic changes indicative of asbestosis is over 25% in our men with 20 years or more of work. This and other evidence suggest that the present TLV is too high. Incidence of asbestosis and the risk of malignancies in the asbestos worker can be reduced by local and general ventilation, substitution of materials, changes in work habits and personal respiratory protection combined with education of the men to reduce their own exposures to asbestos-containing dusts. There are 17 references.
-- Author's summary.

560 Asbestos as an Environmental Hazard. I. R. Tabershaw.
J. Occ. Med. 10, 32-37 (Jan., 1968).

In summary, if one accepts the assumptions (1) that asbestos minerals increase the risk of lung cancer in occupational groups, (2) that they lead to an unusual risk of mesothelioma of the pleura and peritoneum in occupational groups and those living near asbestos plants, (3) that such malignancies usually result from exposures 30 to 50 years earlier, (4) that the "asbestos bodies found in from 25 to 50% of lung smears from routine autopsies are probably due to asbestos in most cases, (5) that these "asbestos bodies" may result from recent exposures as well as those many years earlier, (6) that world production and use of asbestos has increased from 500,000 tons to 3,500,000 tons in 30 years, it is important to consider whether or not asbestos is a major threat to public health. One is not yet justified in such a conclusion, in view of the fact that most of the world tonnage goes into uses that do not lead to air contamination; that asbestos is not actually indestructible; that the effects are dose-dependent; and that low doses probably lead to lower rates and longer latency. Nevertheless, there is need for epidemiologic studies directed to groups with intermediate exposures and for evaluation of the beneficial effects of cessation of smoking. Another need is for experimental and industrial hygiene studies to determine the nature and degree of exposure. Biologic studies centered on the meaning of the "asbestos body" are crucial to understanding the clinicopathologic response. Strict control of industrial and neighborhood environments is essential, but it is premature to extrapolate from the effects of heavy exposures to minor and low level exposures. There are 15 references. -- Author's summary.

561 Research on Health Effects of Asbestos. L. J. Cralley, et al.
J. Occ. Med. 10, 38-41 (Jan., 1968).

Asbestos is a general term applied to a group of fibrous crystalline hydrated silicate minerals. Although a number of different types of asbestos minerals exist, only four or five are of commercial importance. Each differs somewhat from the others in chemical composition, physical properties such as ability to withstand heat and chemical erosion, crystalline structure, fiber dimension, and degree of fiber harshness and brittleness. It has been known since the early nineteen hundred's that excessive exposure to asbestos gives rise to the disabling pulmonary disease "asbestosis." More recently, evidence has been developed that the incidence of respiratory tract and other malignancies in asbestos workers is excessive. A major problem in studying the health effects of asbestos is the long latent period of 20 or more years from initial exposure to the onset of disease. Also in the mid-nineteen thirties and earlier, there was little dust control and the workers were often exposed to massive levels of dust from asbestos and other associated materials in the manufacture of asbestos products. Thus, the causative agents of the resultant disease are essentially unknown. Included in these potential sources of causative agents, either alone or in combination, are asbestos fibers themselves, materials associated with the fibers in the ores such as trace minerals and polycyclic aromatic hydrocarbons, materials added during processing such as metals, tars, and pitches, and concomitant exposures to tobacco smoke or other air pollutants. A strong supported long-term program is needed to provide the information regarding the pathogenesis of asbestosis and the other diseases that appear associated with the inhalation of asbestos dust. More precise data on the

and chemical characterization of the asbestos minerals which lead to their being inhaled and retained in the body, in their carrying with them other chemicals, in their migration, may open up unsuspected avenues of biological research. -- Cond. from text.

Clinical and Pathological Studies of Pulmonary Asbestosis. I. Nakamura. J. Nara Med. Assn. 18, 455-465 (Aug., 1967).

The environmental conditions in asbestos factories in Osaka and Nara were investigated. The nature of the dust in the factories was studied by electron microscopy. The concentration of suspended particles is tabulated for different plant operations in a Nara factory. The occurrence of asbestosis among the employees of these factories was studied by periodic x-ray examinations. Although definite asbestosis could not be found in employees working less than 5 years, the frequency of detection of definite asbestosis increased in those working more than 5 years as follows: there was 21% in those employed between 5 and 10 years, 54% between 10 and 15 years, 70% between 15 and 20 years, and 100% for those employed for over 20 years. The classification of x-ray findings and the development of asbestosis are discussed. Case histories and photographs of x-rays and lung sections are presented. -- APCA Absts.

Mesothelioma and Its Association With Asbestosis. M. Borow, et al. J. Am. Med. Assn. 201, 587-591 (Aug. 21, 1967).

Within a three-year period 17 cases of mesothelioma (9 of the pleura and 8 of the peritoneum) were seen at a community hospital in New Jersey located near a major asbestos mill. The incidence of mesothelioma as well as asbestosis appears to be increasing.
-- Am. Rev. Resp. Dis. Absts.

Pulmonary Function Tests in Asbestos Workers. G. L. Leathart. Trans. Soc. Occ. Med. 18, 49-55 (April, 1968).

There are three ways in which pulmonary function tests may contribute to the management of workers exposed to asbestos; they may be used to confirm a diagnosis of asbestosis, to follow the progress of the disease, or to monitor unaffected workers at risk. The object of this paper is to consider how successfully these three parts are played. The typical physiological abnormalities are described, serial studies in cases of asbestosis are presented, and tentative conclusions are drawn from a small prospective study of asbestos workers who were free of disease when first seen. The findings from this investigation are summarized as follows: (1) Established asbestosis causes a loss of diffusing capacity, vital capacity and compliance. Pleural calcification by itself does not. (2) Progressive loss of function is seldom arrested when the patient is transferred to other work and most cases deteriorate. (3) Diffusing capacity appears to be the best measurement for making an early diagnosis, but the diagnosis has been subsequently confirmed by other means in only four of the cases reported in the literature. (4) The development of crepitations at the lung bases sometimes precedes a significant drop in diffusing capacity and this may be a useful observation. (5) Finally, as a general conclusion, the function tests should not be interpreted in isolation nor be given undue respect. They should always be considered in conjunction with clinical and radiographic examination.
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Source and Identification of Respirable Fibers. L. J. Cralley, et al. Am. Ind. Hyg. Assn. J. 29, 129-135 (March-April, 1968).

Fibrous bodies with an iron-containing coating have been found in the lungs of persons coming to autopsy in a number of urban hospitals, the number of fibrous bodies varying greatly with approximately 4 to 6% of the persons examined showing numerous bodies. Because these findings raise questions with regard to the possibility that asbestos is a factor in increased lung cancer, questions concerning the nature, source, and significance of these bodies are discussed in the light of research needed to find answers. There are 19 references.-- Authors' abst.

Pulmonary Ferruginous Bodies. Development in Response to Filamentous Dusts and a Method of Isolation and Concentration. P. Gross, et al. Arch. Pathol. 85, 539-546 (May, 1968). Reprints available from Industrial Hygiene Foundation, 4400 Fifth Ave., Pittsburgh, Pa. 15213.

Formation of ferruginous bodies should not be confused with pathogenicity. Failure to understand this differentiation may result in the erroneous generalization that all fibrous dusts share the