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INDUSTRIAL HYGIENE FOUNDATION

MELLON INSTITUTE

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- 79 A Case of Pulmonary Asbestosis, with Its Development Followed by X-ray and Its Post-Mortem Study. P. Luton, J. Champeix, and P. Faure. Arch. maladies profess. 12, 629-633 (1951) French.

The case reported is said to have been the first one of asbestosis known to have occurred in France. The man had been exposed to high concentrations of asbestos for 11 years. Symptoms and progressive x-ray findings are described. After death the lungs showed general thickening throughout, especially of the plurae, but with no localized nodules. Many asbestos bodies were seen, isolated and in groups, together with giant cells and mineral particles. No evidence of tuberculosis was found. The dust particles could be traced not only in the lung vessels, but also in the vessels of the liver, kidneys and spleen. The action of asbestos is apparently mechanical rather than chemical.

-- Cond. from Bull. Hyg.

- 80 Byssinosis. J. B. M. Vismans, Ned. Tijdschr. Geneesk. 96, 800 (Apr. 5, 1952). Dutch.

Byssinosis occurs in workers in the cotton industry, chiefly in those who handle the cotton before it is sent to the spinning room. The author quotes from the literature and presents the histories of seven patients observed by himself which illustrate the three stages of the disease. He also comments on the incidence, etiology, pathologic anatomy, and diagnosis. Generally, the disease develops only after the worker has worked with cotton for at least five years. A constricted, tight feeling in the chest is usually the first manifestation, and since this symptom is often severest on Mondays, the term "Monday fever" or "Monday cough" has been applied to it. Patients with the advanced form of byssinosis may die of decompensation of the right side of the heart. Prophylaxis is of primary importance and should involve giving attention to the selection of workers and to dust control in cotton mills.

-- Arch. Ind. Hyg. & Occ. Med.

- 81 Studies on Cotton Dust in Relation to Byssinosis. Part III. Comparison of Cotton Dust and House Dust by Chemical and Skin Tests. H. R. Cayton, G. Furness, D. S. Jackson, and H. B. Maitland. Brit. J. Ind. Med. 9, 303-308 (Oct. 1952).

An extract of cotton dust has been compared chemically and by skin tests with extracts of house dust. Both contained a polysaccharide associated with a polypeptide grouping of amino-acids giving none of the usual color reactions for proteins. Quantitative and chromatographic tests revealed a similarity in the sugars and amino-acids detected. Both extracts produced the early type of skin reaction. Cotton dust generally produced also a late skin reaction, whereas the house dust did not. The two extracts, therefore, were not identical. Polysaccharide-polypeptide compounds were probably responsible for the early skin reaction. Their source is not known but they

and after treatment. It improved in 62% of the miners on an average of 204 cc. The improvement of neurotic conditions present in the majority of silicotics is an essential part of treatment. Rehabilitation as such is only possible in the early stages of the disease. It will be possible to consider the rehabilitation of patients no longer suitable for work in the mines only when they have been retrained for other work.

-- Cond. from Arch. Ind. Hyg. & Occ. Med.

- 77 Investigation of Silicotic Lungs with the Electron Microscope. H. Knöig. Staub No. 28, 31-38 (Mar. 15, 1952) German.

The lower limit of visibility, which is of the order of 0.3 micron for the light microscope, can be extended to particles 100 times smaller by the electron microscope. Electron diffraction patterns and chemical tests should be used to identify the components of dusts. Digestion of lung tissue containing silicotic nodules with concentrated sulfuric acid and potassium nitrate yielded platelets showing signs of chemical attack. On the other hand, when the tissues were treated with hydrogen peroxide, or washing the tissue below 300° C and digestion with potassium silicate the particles were less attacked and gave the electron diffraction pattern of montmorillonite. Whether the montmorillonite was formed in the lung by weathering of mica or whether it already occurred in the airborne dust remains to be studied. Identical lung residue shows quartz by x-ray diffraction but montmorillonite under the electron microscope. This is explained by the fact that these minerals occur in different size classes. Both methods should be used.

-- Cond. from Bull. Hyg.

- 78 Silicatosi: Etiology, Pathogenesis, and Clinical Treatment. M. A. Kovnatskii and others. Gigiena i Sanit. No. 8, 23-32 (1952). Russian.

A review is given of the disease caused by particles of silicates, rather than those of the type producing silicosis proper. A study of the disease caused by asbestos particles showed that the chemical and biological features are increased rate of respiration (compensatory) and in stages the level of blood saturation with oxygen is essentially normal, although changes in the myocardium are evident on the electrocardiogram. The tone of the veins is reduced, and the permeability of capillary walls suffers a decline in a considerable number of cases. This affects the oxidative processes as shown by the increase of oxidized glutathione and a decrease of total glutathione.

-- Chem. Abstr.

treated animals diffuse delicate connective tissue, consisting of loosely knit fibers and thin-walled blood vessels, surrounded the silicotic nodules. In the controls, a cellular fringe with fibroblasts suggested that active fibrosis was still progressing. The authors were unable to detect any reduction of collagen in established silicotic nodules in the treated animals, although further fibroblastic proliferation was apparently retarded. This suggests that cortisone will not have any lasting benefit on the collagen in human silicosis, although it might arrest progression of the lesions while it was being administered.

-- Cond. from J. Am. Med. Assn.

- 283 Pulmonary Tuberculosis in the Rhondda Fach: an Interim Report of a Survey of a Mining Community. J. G. Cox and T. F. Jarman. Brit. Med. J. 2, 843-853 (Oct. 18, 1952).

A field experiment was designed to study, in a mining community with a high prevalence of pneumoconiosis, the effect of reducing tuberculosis infectivity upon the rate of appearance of progressive massive fibrosis in miners already affected by simple pneumoconiosis. The present report is concerned with the findings of the first roentgenological survey of the adult population. Figures are given for the prevalence of tuberculosis by age and sex. The extent of tuberculosis is apparently typical of such areas in the country. About 30% of the miners and ex-miners had some roentgenological signs of pneumoconiosis; 15% had progressive massive fibrosis. All but two patients with infectious tuberculosis were given hospital treatment. The number of infectious cases has been reduced by about 60%, and the patients are all being closely supervised by a health visitor. Future surveys will show what effects this reduction will have on the tuberculin positivity and on the rate of appearance of new cases of tuberculosis and massive fibrosis.

-- Cond. from Authors' Summary

- 284 A Clinical and Pathological Study of a Case of Pulmonary Asbestosis. H. Bastenier, H. Denolin, A. Decoster, and R. Denolin-Reubens. Arch. belges med. sociale, hyg., med. travail et med. legale 10, 61-70 (Feb. 1952) French.

A diagnosis of asbestosis must depend upon a history of occupational exposure to asbestos dust, associated with effects on the respiratory organs. A case is reported in which a woman had worked for 25 years weaving asbestos in a factory with heavy dust exposure. The symptoms described are typical. The authors compared this case with those of uncomplicated silicosis; in the latter residual air is frequently increased, expiration is prolonged, and the maximum respiratory capacity is reduced, but hyperpnea is less, rapid breathing is not so intense, and anoxemia is never so important during effort, as in asbestosis. These differences are stressed as important when necessity may arise in determining the occupational origin of a case with obscure diagnosis.

-- Cond. from Bull. Hyg.

- 494 A Critical Review of the Chemical Theory of Silicosis. Luise Holzapfel. Beitr. Silikose-Forsch. No. 15, 1-19 (1952) German.

The solubility theory is first reviewed and reasons are given why it cannot be maintained in its original form, which says that silicosis is due to dissolved silica. The main argument is that silicosis requires years to develop, while the solubility of quartz drops in the course of days or weeks. A modified solubility theory is suggested by the author's published work and on her recent results with carbohydrates. From plant extracts, a fraction containing carbohydrate and silica could be isolated, and experiments with blood and quartz showed specific adsorption of a galactose complex. The galactose adsorbed on quartz still reacts with hydrazine, demonstrating that the aldehyde group does not take part in the reaction with quartz. Next follows a very speculative chapter dealing with the structure of silica-galactose complexes. Collagen is said to contain galactose but there is no evidence on its structure. The osazone reaction can be used to demonstrate quartz in human silicotic lesions, as well as to demonstrate galactose adsorption on quartz, and a number of colored illustrations of this effect are shown. Electron micrographs of serpentine asbestos after disintegration in water are also shown.

-- Cond. from Bull. Hyg.

- 495 Considerations on a Case of Progressive Massive Silicosis Following Past Limited Exposure. M. Bodo and L. Briccarello. Rass. med. ind. 21, 233-238 (May-June 1952) Italian.

The authors discuss a case of progressive massive silicosis of the lungs which was seen by them in April, 1951. The patient was a metal worker, aged 28, who had been employed, for 2 years only, at chiseling grindstones in 1939-40. Signs and symptoms of silicosis, which are described, appeared in November, 1950. At the time of the examination, signs and symptoms were said to be stationary. Tuberculosis was absent. X-rays showed a generalized deep and confluent shadow on the lungs, except for clear areas which may have been due to spontaneous pneumothorax or to localized emphysema. In the light of this case the authors question the statement that simple pneumoconiosis can be arrested by removing the patient from exposure to dust. The tendency to progress varies with the physico-chemical properties of the dust and the individual tissue reactivity. As in the case of hepatic cirrhosis, the causative agent may start a chain reaction which does not stop progressing after the cause has been removed.

-- Cond. from Bull. Hyg.

- 496 Usefulness of the Photoroentgen Method in Silicosis and Asbestosis Investigations of Workers. E. Zanetti. Rass. med. ind. 21, 130-132 (1952) Italian.

A comparative study of several tens of thousands of photoroentgen films and roentgenograms has produced several interesting conclusions concerning investigations of silicosis and asbestosis among workers. 33 mm. photoroentgen films were found to represent clearly massive silicosis, advanced

asbestosis, and nodular silicosis. In silicosis which is represented by reticulation, identification is more difficult, but it is still possible in the hands of an expert. The identification of mild or moderate asbestosis is still more difficult. Only a great deal of experience which is integrated with a knowledge of concentrations and exposures of the dust involved makes possible an intelligent interpretation of such films.

-- Biol. Absts.

- 497 Does Silicosis Affect the Silica Content of Human Blood? G. Worth and G. Campen. *Z. physiol. Chem. (Hoppe-Seyler's)* 288, 155-164 (1951). Germany

The authors determined the silica content of blood of 264 persons, half of whom were coal miners with various stages of silicosis, using the molybdenum blue technique. The mean result for the whole group was 8.3 ± 2.4 micrograms silica per ml. of blood. Neither sex, different kinds of inflammatory or other diseases, nor silicosis caused any difference in the silica content of the blood. Tests were also made after ingestion of organic silicon compounds. Here a rapid rise of silica content of blood and urine was found, but the blood silica had dropped to its normal value after 9 hours. The bearing of these findings on the silica solubility theory is discussed. If the theory is to be maintained, it must be assumed that the amounts dissolved are too small to be demonstrated in the blood or that excretion through the kidneys is too rapid.

-- Cond. from Bull. Hyg.

- 498 Silicotic and Tuberculosilicotic Lesions Simulating Carcinoma. F. G. Kergis. *J. Thoracic Surg.* 24, 545-567 (Dec. 1952).

The appearance of unilateral massive densities in the lungs of eight men between the ages of 49 and 69 with chronic pneumonitis has been reported. In each of these patients clinical and radiographic evidence strongly suggested bronchiogenic carcinoma. Five of the eight patients had prolonged exposure to silica-containing dust in various occupations. Five patients were treated by pneumonectomy, one by lobectomy, and one by thoractomy and biopsies were made. The fundamental feature of the pathological process in this group of patients was complete or partial bronchial obstruction by pressure of lymph nodes, which were the site of a chronic inflammatory reaction secondary to inhalation of silica-containing dust. In five patients the chronic obstructive pneumonitis was non-specific, and in three there was an added tuberculous infection. It is suggested that this condition be called "chronic silicotic lymphadenitis with obstructive pneumonitis (nontuberculous or tuberculous)." The patients are all alive; the six patients treated by excision have been relieved of their complaints.

-- Cond. from J. Am. Med. Assn.

- 601 Right Ventricular Hypertrophy in the Pneumoconiosis of Coalminers.
A. J. Thomas. Brit. Heart J. 13, 1-9 (1951).

A series of 50 hearts from cases of coalminers pneumoconiosis have been dissected and the ventricular weights recorded. The ratio of left ventricle to right ventricle, LV/RV ratio, shows a great reduction, and there is a consistent relative increase in the weight of the right ventricle. A cardiographic study of 146 persons (normal men, miners and non-miners, and patients with all stages of pneumoconiosis) has shown that V6 changes most with increasing severity of lung disorder. In the most severe groups the R wave of V6 is diminished and the S wave is increased in amplitude. A suggestion is made that a lead from the third interspace immediately above V2 may help in the diagnosis of right ventricular hypertrophy when it shows an r' wave of 4 mm. or more in height. Certain effects of respiration on the electrocardiogram are described, particularly the respiratory variation of the chest leads on the right side. This is presumed to be a positional change, but some findings suggest that the mechanism of respiratory variation should be further investigated in relation to respiratory function.

-- Author's summary (Bull. Hyg.)

- 602 Factors Favoring Phagocytosis by Reticulo-Endothelial Cells Early in Inflammation. Edna H. Tompkins and Mary A. Grillo. Am. J. Pathol. 29, 217-231 (March-April 1953).

The reticulo-endothelial cells of subcutaneous tissues, the so-called resting-wandering cells, represent active defenders in the first 12 hours of inflammation. They become activated in preparation for phagocytosis by contraction, excretion of fluid from their "fluid vacuoles," and changes in the consistency of their cytoplasm. Once activated, they are aided in making contact with particulate substances and are supported in "surface phagocytosis" by the movements of the underlying muscles and of the infiltrating ameboid polymorphonuclear cells. They carry the burden of phagocytosis before arrival of the polymorphonuclear cells; and they alone must phagocytose for about 12 hours the many invading substances that are not phagocytosible by the polymorphonuclear cells.

-- Authors' summary

- 603 Dust Diseases. G. E. Spencer. Bull. Allegheny Co. Med. Soc. 42, 389-391 (April 25, 1953).

This brief paper gives advice to family physicians to whom x-ray films from a mass survey have been referred when pneumoconiosis is indicated. Survey physicians do not attempt to differentiate the dust diseases, merely reporting the findings as "pneumoconiosis." It is the responsibility of the family physician to determine which of these diseases is present, and to decide what should be done. After miliary tuberculosis, carcinomatosis, certain fungus diseases, and siderosis due to organic disease are excluded, the various pneumoconioses must be considered. Anthracosis, silicosis,

siderosis, berylliosis, asbestosis, and the organic dust diseases are discussed briefly in relation to diagnosis. The importance of personal and occupational history is emphasized. The factors to be considered when deciding whether a man should be taken from his job are discussed.

- 104 The Clinical Picture and Pathology of Asbestosis. W. Behrens, Jr.
Z. Unfallmed. u. Berufkrankh. 45, 129-140 (June 15, 1952); 179-189
(Sept. 15, 1952). German.

This paper presents an extensive review of literature on asbestosis including distribution and types of asbestos, its mining, treatment, and use, dust hazards, and effects of length of exposure of the dust in different concentrations. Symptomatology, diagnosis, and x-ray findings in the different stages of asbestosis are described. Special mention is made of the association of asbestosis with carcinoma, which is much more frequent than that of silicosis. Post-mortem reports from the literature indicate that in 309 cases of asbestosis there were 44 lung carcinomas (14.2%), whereas in 2,204 cases of silicosis only 32 carcinomas were found (1.4%). The experience of the association of tuberculosis and asbestosis varies greatly in different countries. English investigators have recorded a high rate of tuberculous infection in asbestos workers, but it is a rare complication in America and the rate is low in Germany. The macroscopic and microscopic appearances of the lungs are described, and the nature and significance of asbestosis bodies are discussed and an extensive reference list dealing with that controversial subject is given.

-- Cond. from Bull. Hyg.

- 145 Lung Carcinoma Caused by Asbestos Inhalation. F. Boemke.
Med. Monatsschr. 7, 77-81 (1953) German.

The relation between fibrotic changes caused by asbestos deposits in the lung and carcinoma is discussed. The lower lobe is the site of predilection. Characteristic are the multicentered developments of flat epithelium carcinoma.

-- Chem. Absts.

PHYSICAL ASPECTS OF THE ENVIRONMENT

- 146 Carbon Dioxide and Respiratory Regulation at Altitude. F. G. Hall.
J. Appl. Physiol. 5, 603-606 (April 1953).

Fourteen young men exposed to a simulated altitude of 22,000 feet breathed gas mixtures with varying concentrations of carbon dioxide. The partial pressures of oxygen and carbon dioxide in alveolar air were correlated

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