

Industrial Dust — The Pneumoconioses

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THE RELATION between dust and certain diseases of the lungs has been recognized for centuries, but only in recent years has it been given the intensive study it deserves. In the fifth century B.C., Hippocrates noted symptoms in a metal digger, comparable to those observed among present-day miners suffering from silicosis. Since that time, other investigators have recorded their impressions and observations on the effects of inhaled dusts and have emphasized the association of these with tuberculosis. It was not until the latter part of the nineteenth century, however, that real interest in the subject was manifested.

To South Africa must be given the credit for the earliest serious contribution to our knowledge of the industrial dust hazard. Here, in 1902, physical examinations were made on 3000 rock drillers and for the first time, x-rays of the chest were used in a comprehensive study of 300 cases. Diagnostic standards of disease, safe limits of particle concentration in the air of working places, and engineering methods for dust control were instituted. From 1915 on, Great Britain, Germany, Australia, Italy, Canada, and the United States made further investigations, but the most noteworthy progress in these countries occurred during the last few years.

Kronenberg and Morse¹ have suggested the following classification of industrial dusts:

TABLE I.

I. ORGANIC DUSTS:	II. INORGANIC DUSTS:
A. Non-Living:	A. Toxic and (or)
1. Toxic and (or)	Irritant.
Irritant.	B. Fibrosis Producing.
B. Living:	C. Non-Fibrosis Producing.
1. Bacteria	
2. Fungi.	

Generally speaking, organic dusts originate from plants or animals, but many thousands of these substances are made synthetically. They may produce

toxic and systemic effects, but usually their main consequence is local or irritant. They do not cause pulmonary fibrosis, but such things as dermatitis, dental lesions, irritations of the nasal mucous membranes, and conjunctivitis are fairly common in workers handling these materials. Digestive disturbances have been observed. Allergic symptoms may occur in those exposed to pollens, horse hair, furs and wool, and various types of wood dust are known to affect susceptible persons. Bacteria such as the anthrax bacillus are capable of producing cutaneous lesions, or "wool sorters' disease," when inhaled. Sappington² has listed over 100 occupations which may produce exposure resulting in allergy, asthma, or irritation of the skin and upper air passages.

Fungi, such as mycelia and spores of molds, are apt to cause rashes and painful fissures of the skin, while cotton weavers develop a form of disease known as aspergillosis from inhaling spores of a mildew which occasionally occurs on threads.

The inorganic dusts which have significance in industry are derived mainly from minerals and metals. In the process of grinding, crushing, blasting and drilling these earthy substances, dust particles ranging in size from microscopic to visible are liberated and remain in suspension in the air for varying periods depending on their size and settling velocity. Inhalation of those particles which contain silica in the uncombined state produces the type of pulmonary fibrosis known as silicosis. Gardner³ demonstrated the specific action of silica and made it clear that only silica in the "free" state is capable of causing this type of tissue reaction.

The toxic inorganic dusts are those of the heavy metals and their salts, such as lead, mercury, manganese, etc. They are usually considered under the heading of industrial poisons rather than of dusts.

¹The text of Dr. HAMLIN'S Lecture at the Second Post-Graduate Course in Industrial Medicine, Long Island College of Medicine, Brooklyn, Friday, November 5, 1948.