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had a poorer chance of recovery than one who otherwise had healthy lungs. This well substantiated past experience may, however, not be so true today owing to the availability of means of detection and effective treatment of tuberculosis, particularly in the early stages, by chemotherapy, largely as a result of which the incidence of tuberculosis has fallen markedly and the risk of infection by contact has been reduced.

Exposure to silica dust occurs in the mining and quarrying of silica-containing rock and stone, in the manufacture of certain types of refractory materials, among stone-masons and coalminers, and in the metal founding and the pottery industries—to mention a few of the industries and occupations where silicosis has occurred.

The precise manner in which silica exerts its harmful action on the lung tissue is still not finally established. Originally, it was considered to be harmful because of the mechanical irritation caused by the small sharp edged particles of silica. It is known, in support of this view, that crystalline silica is more active than non-crystalline silica such as kiesulguhr. A more recent view is that the effect is a toxic one, brought about by liberation of silicic acid as the silica very slowly dissolves in the tissue and cell fluids. A third theory postulates that the action is brought about by a concentration of electro-chemical energy on the surface of freshly fractured silica particles ; and a fourth, the most recent, that the fibrous tissue formed in the lungs is the result of an immunological response.

The amorphous synthetic silicas which have become increasingly used in recent years, are composed of extremely minute particles which remain small even when aggregated into clumps. Animal dusting experiments to determine their fibrogenic activity and general toxicity have been in the main negative and, so far, no harmful effects in humans are known. The use of these compounds is being kept under close observation and clearly, at this stage, a high standard of dust control is necessary. These particles are readily soluble and the possibility that effects may be produced in organs remote from the lungs is being borne in mind.

Asbestos consists mainly of the silicates of magnesium and iron in fibrous forms and the dust, which microscopically is in the form of long sharp fibres, is a cause of fibrosis of the lungs. The symptoms of asbestosis resemble those of silicosis, although the X-ray changes are very different. Like silicosis, asbestosis is a disease of insidious onset which may lead to permanent disablement. On the other hand asbestosis has been less evidently associated with tuberculosis than silicosis has been. There is, moreover, evidence of an association between asbestosis (but not silicosis) and lung cancer. Asbestos dust is generally considered to act as a mechanical irritant to the lung tissues.

With the exception of asbestos, silicates (silica in a combined form) do not cause damage to the lung tissue to a degree comparable to that caused by free silica. However, prolonged exposure to some other silicate dusts in heavy concentrations may produce a pneumoconiosis, the best known being that due to talc dust. Talc or soapstone is a silicate occurring in fibrous or plate form closely resembling asbestos chemically. The flat plate particles confer good lubricating properties for which talc is widely used in industry, particularly in the rubber, plastics and metal founding industries.

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A study of death certif
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Although earlier non-fatal cases of pneumoconiosis due to talc dust exposure had been described, the first case in Great Britain to be proved by pathological examination was described by Dr. A. I. G. McLaughlin, H.M. Medical Inspector of Factories, and his co-authors in 1949. Since then many additional cases have been reported both here and abroad.

Cases of a diffuse fibrosis of the lung in workers exposed to aluminium dust have been reported as occurring in Germany and this country. The men were engaged in the manufacture, by stamping and mixing, of aluminium powder, in which processes a proportion of the finely divided aluminium is oxidised to alumina (aluminium oxide). A considerable concentration of dust of less than 10 microns in size may thus be produced. The latent period is very variable and lasts from a few months to many years. Symptoms are tiredness, loss of appetite and loss of weight, dyspnoea, cough and tightness of the chest. X-ray changes are not characteristic, but the lungs show a diffuse increased fibrosis with bronchitis and emphysema. The condition may be associated with tuberculosis and spontaneous pneumothorax, and death often results from pneumonia or right-sided heart failure.

This condition may have some relation to the fibrosis of the lung which has occurred in individuals preparing corundum (aluminium oxide) from bauxite. The fumes to which such workers are exposed contain both alumina and finely divided free silica.

A study of death certificates recording pneumoconiosis or fibrosis of the lungs and the occupation of the deceased has formed the basis of a table to be found on page 38 of this Report.

Inert Dusts not producing Fibrosis of the Lungs

Certain other dusts, chiefly the oxides of iron and tin and certain compounds of barium, when inhaled over a long period of time produce changes in the X-ray appearances of the lungs which may be difficult to distinguish from those produced by silica dust. These aggregations of dust particles of metallic compounds which are radio-opaque set up no fibrotic response on the part of the lung tissue and may remain for years without apparent harm to the individual . Dr. A. T. Doig and Dr. A. I. G. McLaughlin first called attention in 1936 to X-ray changes in the lungs of 16 electric arc welders. Clinical examination of these men showed no disability and all were apparently in good health. Work by other investigators has borne out these findings and follow-up examinations by Drs. Doig and McLaughlin over many years have shown that the X-ray abnormality does not progress but may even regress and disappear after some years' absence from exposure. It would seem that the inhalation of iron oxide dust produced during welding causes no harm. This condition, known as siderosis, has also been described as occurring in silver polishers who use rouge or red oxide of iron. Sometimes, however, welders who have worked in circumstances involving exposure to both iron oxide dust and silica dust as may occur, for example, in foundries, have become disabled; this is due, in all probability, to a silicotic reaction.

Dusts Causing Inflammation of the Lungs

The dusts arising from the processing of certain compounds of manganese, vanadium, osmium or beryllium cause acute inflammation of the mucous