DISCUSSION

The proliferation of reticulin in the lungs of rats injected with fine asbestos particles and an asbestos-quartz admixture, was found to differ significantly in the later stages of the experiment. In the asbestos-quartz group a progressive increase of reticulin and collagen in the dust lesions was observed, resulting terminally in the production of compact, partially acellular, collagenous nodules. In the asbestos group progression of the initial reticulin was limited and it ended with only slight increase in compactness, with or without a few fine collagen fibres in cases with acute infection.

The present results demonstrate that fine asbestos particles are of a very low toxicity to lung tissue and produce only peribronchiolar, and to a lesser degree perivascular, reticulin networks. Even in cases with acute infections, fibrogenesis did not progress beyond grade-2 fibrosis. The typical asbestosis of humans could not be induced with pure fine asbestos dust in the lungs of rats. However, the addition of silica dust (12·5 mg.) to the same asbestos dust (37·5 mg.) led to massive fibrosis (advanced grade-3). Both the maturity and the amount of fibrosis seemed excessive when compared to the lesions caused by equivalent amounts of the individual dusts. The microscopic pattern of the pathological changes appeared to be very similar to those described by Gloyne[16] and Lynch and Cannon[17] in humans. Bouser *et al.*[18] concluded that the common factor in the lungs of miners of asbestos and iron-ore is silica and it is suggested that this may be the carcinogenic agent, causing pulmonary fibrosis, which precedes the initiation of the malignant process. Doll[8] also pointed out that the risk of lung cancer in asbestos workers was of the order of 10 times that experienced by other men. Probably this risk was greater before 1933 and has become progressively less during recent years as the duration of employment under the old dusty conditions has decreased.

The fact that no malignant tumours have been produced by either crocidolite asbestos or a quartz-asbestos admixture might be due to the very high resistance of the rat species to neoplasms, as well as to the limited duration of the present experiments. However, it appeared that free silica enhanced the pathogenicity of asbestos dust and that in the presence of silica some pleural changes have been produced, although not of a malignant nature.

Recently it was pointed out by Harrington[19] that oils containing 3.4 benzpyrene and related substances occur in crocidolite and amosite. The significance of the association between asbestos fibres and hydrocarbons on the one hand and the production of malignant neoplasms on the other hand could not be assessed from the present experiments, because weathered crocidolite has been used, in which the hydrocarbon content might have been extremely low. However, it is doubtful whether the concentration of 3.4 benzpyrene in virgin crocidolite would be high enough to produce neoplasms, seeing that coal dust with a relatively higher concentration appeared to be inert.

The present results support the conclusions of Bouser *et al.*[18] that silica in combination with asbestos may be extremely dangerous.

SUMMARY

The pathogenicity of pure, very fine crocidolite particles and of a mixture of crocidolite and quartz was investigated after intratracheal injection of 50 mg. of these dusts into the lungs of rats. The proliferation of reticulin due to these two dusts respectively was found to differ significantly.

The crocidolite particles elicited an initial reticulinosis that became slightly more compact, with or without collagen fibres, especially in cases with acute infections. It appeared that exposure only to asbestos dust predisposed to acute respiratory infections.

The asbestos-quartz admixture gave a progressive increase in reticulin and collagen, resulting in partially acellular collagenous nodules (grade-3 fibrosis). The histological picture of the pathological changes appeared to be very similar to those observed in human asbestosis. Asbestos dust in combination with a small amount of free silica should be regarded as extremely dangerous.

No malignant tumours have been produced in the experimental period by either asbestos or the asbestos-quartz admixture. Some non-malignant pleural changes were observed in animals of the asbestos group with infection, and in animals of the asbestos-quartz group.

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A CASE OF PERSISTENT THYMUS DIVERTICULA IN THE NECK

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The persistence of stalks of thymic tissue in the neck, demonstrating the embryological origin of the thymus gland from the entoderm of the third pharyngeal pouch, is undoubtedly a rare condition. In the course of 30 years' experience of teaching anatomy this is the first instance of such a condition that I have seen in the dissecting room. Descriptions of such a congenital abnormality are absent in many standard anatomical and embryological textbooks, and only a few references could be found. In Braus' *Anatomie des Menschen* (1924)[1] there is a schematic and hypothetical drawing of the neck and upper thoracic region in the adult, with the various