



Fig. 1. Silicotic foci of 51 days duration in the omental tissues. The largest on the right consists mostly of dense collagen with fibroblasts at the periphery. The other two are still largely fibroblastic with only early formation of collagen fibres. Iron haematoxylin and Van Gieson. $\times 80$

Fig. 2. Concentration of sulphur-35 is low in the mucopolysaccharide of the collagenous focus. It is high in the fibroblasts at the periphery of this focus and in those of the cellular foci. Autoradiograph. $\times 80$

fibroblasts dependent on the specificity of this technique.

Mucopolysaccharides are present in developing quartz foci, in the cytoplasm of fibroblasts and in unphagocytosed dust⁷. The large cells which invade and phagocytose the dust are stimulated to intense collagen production. There is stainable mucopolysaccharide in their cytoplasm, and some is liberated into the focus.

In autoradiographs, sulphur-35, given as sulphate ion, is 'fixed' only in the sulphated mucopolysaccharides of the tissues and is present in particularly high concentration within the cytoplasm of cells producing these. Mammals are unable to incorporate the $^{35}\text{SO}_4$ ion into the sulphur-containing amino-acids, and the trace of sulphur-35 found in cystine is almost certainly formed by the animal's intestinal micro-organisms. In this way the autoradiographic method determines accurately only those cells which elaborate mucopolysaccharide.

Silicotic foci were produced in the peritoneal tissues of albino mice by the methods already described⁷ and lesions of ages from 9 to 120 days were studied. Sulphur-35 was administered as sulphate ion at pH 7 and autoradiographs prepared⁸.

Sulphur-35 was taken up and retained within the developing quartz foci. Invariably the element was in high concentration only in the cellular fibroblastic zones (Figs. 1 and 2). Where fibroblasts were widely dispersed, localization of the ion could be confirmed within their cytoplasm. Only low concentrations of sulphur-35 were present in the extracellular mucopolysaccharide, particularly when this was accompanied by abundant collagen fibres. Testicular hyaluronidase (Benger's 'Hyalase') had no effect on

the distribution of the radioactive ion. In view of the specific nature of the location of the $^{35}\text{SO}_4$ ion within the cytoplasm of cells forming mucopolysaccharide⁹, the evidence presented here strengthens greatly the belief that fibroblasts do form and secrete mucopolysaccharides into the surrounding tissues during collagen formation.

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¹ Meyer, K., *Physiol. Rev.*, **27**, 335 (1947).

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³ Asboe-Hansen, G., *Cancer Res.*, **13**, 587 (1953).

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⁵ Klemperer, P., *Amer. J. Path.*, **28**, 505 (1950); *Bull. New York Acad. Med.*, **28**, 204 (1952).

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⁷ Curran, R. C., *Brit. J. Exp. Path.*, **33**, 82 (1952); *J. Path. Bact.*, **66**, (1), 271 (1953).

⁸ Curran, R. C., and Kennedy, J. S., *J. Path. Bact.* (in the press).

"Animal Cytology and Evolution"

WE were surprised at the content, and still more at the tone, of the review by Prof. C. D. Darlington of M. J. D. White's "Animal Cytology and Evolution"¹. In our opinion, it would be unfortunate if the many criticisms given under the authority of Darlington's name were allowed to obscure what seem to us the merits of this book. White's book contains not only a most useful and critical compilation of scattered data, but also many stimulating discussions of a variety of topics; and it is a valuable part of Dr. White's work that he makes it clear which of his remarks are intended to be factual and which theoretical.

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¹ "Genetics and the Chromosomes", *Nature*, **175**, 4 (1955).

"Independence in Publication"

THE subject of Prof. A. V. Hill's communication¹ is one of long standing.

Prof. Elliott Coues published a "Handbook of Field and General Ornithology" in 1890² in which he gives instructions for the collection of specimens. He lists all the details that should be recorded on labels, including: "Name of the person in charge of the [survey, voyage, exploration, or other expedition (if any), during which the specimen was collected] (and it may be remarked that the less he really cares about birds, and the less he actually interests himself to procure them, the more particular he will be about this)."

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¹ *Nature*, **175**, 266 (1955).

² Coues, E., "Handbook of Field and General Ornithology" (Macmillan, London, 1890).