

BOOK REVIEWS

VARIATIONS OF HAEMOGLOBIN

Man's Haemoglobins

By H. Lehmann and R. G. Huntsman. Pp. xi+331. (Amsterdam: North-Holland Publishing Company, 1966.) 70s.

THIS book has immediate appeal because of the clarity of production, the obvious broadness of approach and the profusion of illustrations—some in colour.

In his preface Professor F. G. Young describes it as "most readable and unquestionably authoritative". Few could argue with the first description. The many anecdotes skilfully interwoven with the hard facts will bring pleasure to anyone interested in the nature of biological variation.

Many approaches have been used in the study of haemoglobin, from the clinical to the physico-chemical. The literature is not only too vast to be read in a working week but requires an impossible range of specialist information for its understanding. This must be borne in mind when trying to assess the authors' attempt to place their medically based interest in haemoglobin in its context of biology, genetics and biochemistry.

The introductory scheme promises well, but in detail the section is disappointing. A little more about iron in Chapter 1 would have been welcome, perhaps instead of the out of date description of the electron transport chain. (Surely it is time that the hydride ion was given equal status with the proton in elementary biochemistry.) Haem is mentioned, but the formula is not given until Chapter 2 and its biosynthesis, carried out entirely unaided by enzymes, is saved for Chapter 3. One looks in vain to discover how the iron atom may be modified by combination with porphyrin and protein to act either as an electron carrier or as an oxygen acceptor.

In Chapter 2 the praiseworthy intention of showing man's haemoglobins against a background of those of other animals has paved the way to an underworld of easy inaccuracies. There are oversimplified statements about the way in which insects and jellyfish satisfy their oxygen requirements. Later, the marine worm, *Sabella* (illustrated), is said to have haemoglobin in its muscle. This is a confusion of species. H. Munro Fox showed in 1949 that although a number of marine annelids contain haemoglobin in various tissues, including the muscle of *Potamilla*, *Sabella* does not. The thoughts on evolution which follow lack the incisiveness expected in the milieu of molecular biology.

A discussion of oxygen dissociation and the Bohr effect is developed by referring to the lamprey, in which the authors assume the embryo contains monomeric haemoglobin molecules which aggregate during maturation. Manwell reports, however, that the degree of aggregation, never very great in this species, depends not on age but on the state of oxygenation. The lamprey also provides a warning against such dogmatic statements as close this section, that the Bohr effect is absent from single haem polypeptide chains and "depends on the combination of α and β chains". Lamprey haemoglobin shows a greater Bohr effect than human haemoglobin. The mammals are negotiated without mishap and one is shown the first of many excellent electrophoretograms marred only by an irritating failure to indicate in many of them the origin, if present, and positive and negative poles.

A first-rate account of protein structure profusely illustrated with some familiar and a number of original figures is followed by a lucid elementary account of genetics

and protein synthesis. A useful addition here would have been a section on population genetics in preparation for later discussions of the geographical distribution of haemoglobin variants.

The next eleven chapters are an excellent compilation describing the haemoglobin variants, their racial distribution, the diseases they cause, their diagnosis and management. The presentation here is in striking contrast to the elementary introduction and, to the reviewer off his home ground, the lack of definitions in describing the clinical aspects makes some of these sections tough going. Minor criticisms which can be made do not detract from the overall merit of the work. For example, Murayama's work on haemoglobin S receives little consideration—one might expect a comment on the curious fact that the treatment recommended for this disease, "keeping the patient warm", is the very opposite of the conditions required to minimize cell sickling; three shots at a concise explanation of the cause of thalassaemia, all different, at no point give the evidence on which the conclusions are based; and discussions of genetic principles occasionally use an unhappy turn of phrase as in (page 190) "... gene mutation resulted from a natural defence mechanism against malaria".

For many, the last section alone—a practical one outlining the principles and methods involved in tracking down haemoglobin variants—will be worth the price of this book. Descriptions of general methods are barely adequate for the complete novice. Simple problems, such as the choice of anticoagulants, are overlooked; however, the main section on trouble shooting methods for tracking down specific haemoglobins, use of hybridization techniques, procedure for fingerprinting (by D. Beale) and the analysis of peptide maps is of inestimable value.

Although the authors are not completely successful in their attempt at an integrated approach, *Man's Haemoglobins* is nevertheless a valuable contribution both to the book shelf and at the bench. It should prove of particular value to the busy clinician where an appreciation of the modern approach is more important than errors in detail.

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PLANT ANATOMY

Vascular Differentiation in Plants

By Katharine Esau. Pp. ix+160. (New York and London: Holt, Rinehart and Winston, 1965.) 36s.

IN this concise picture of patterns and problems in the differentiation of primary vascular tissues Prof. Esau has given us an account which (in substance rather than in any formal sense) follows on from her reviews of one and two decades earlier. Her emphasis is mainly on the shoot, where the problems are the more striking, and her approach is one which emphasizes not only the unity of the vascular system rather than the distinctness of its parts (for instance, the cauline and leaf-trace components) but also the unity of the problems of its development: for instance, whether procambial differentiation determines the sites of leaves, or vice versa, is regarded as too narrow an enquiry. The student is thus led to consider vascularization processes as a whole, and, for example, to look at phyllotaxis not only in terms of the arrangement of leaf primordia near the apex, but also in terms of the vasculature of the shoot.