REVIEWS

THE EVOLUTION OF AN EVOLUTIONIST. C. H. Waddington. Edinburgh University Press, Edinburgh. Pp. 328+30 text-figures. £6 net.

This book consists of a collection of papers on a variety of evolutionary topics by the late Professor C. H. Waddington. They span a period of more than thirty years and illustrate the diversity of the author's interests. The title invites the reader to look for continuity of ideas, combined with progressive change, and the articles which take up the first half of the book do indeed provide evidence of this. The author acknowledges his early debt to Whitehead's concept of processes whose individual character is influenced by relations with other processes which together form a unity. He came quite early to the conviction that insight into evolutionary changes and the origin of adaptation requires an understanding of how particular developmental processes evolve. Genesis of the concept of canalisation apparently owed a great deal to the callosities of the ostrich which are clearly adaptive in the adult but also appear in the embryo where they have no function. Generalisation from such instances led to the hypothesis that variation which arises as a product of the interaction between genotype and particular environmental conditions can, under the pressure of natural selection, lead to far reaching change in development which acquires a stability of expression by various processes of regulation.

Waddington explored this idea in detail and on many occasions and provided practical demonstrations of the phenomenon in his experiments on genetic assimilation in *Drosophila*, in which selective breeding from those individuals which developed an altered phenotype, when subjected to an unusual environmental treatment led, in due course, to emergence of a strain which manifested the new phenotype in the absence of the stimulus. When the first of these experiments appeared Lysenkoism was still an issue, in some quarters at any rate, and so they had an added topicality. The articles include a perceptive discussion of Piaget's observations on the modifications of shell type in *Limnaea stagnalis* in the Swiss lakes. Waddington treats these as natural examples of genetic assimilation, which prompts the reviewer to suggest there is still a need for systematic study of the incidence and properties of genetic variation in characters which vary adaptively in relation to defined environmental conditions. Plants, which are not discussed by Waddington, would appear to offer ideal material for this kind of analysis.

The second half of the book offers less evidence of evolutionary progression and the individual articles are devoted to such topics as selection for sexual isolation, colonising species, disruptive selection, random search in evolution, etc., and they become more general and philosophical in later years. The last article in the book deals with the evolution of culture and language. Some of the papers are joint and they include several reviews.

One topic to which I feel the author would have liked attention drawn refers to his reservation as to how far contemporary neo-Darwinian concepts and models are adequate to account for the classic features of macro-evolution, a doubt he shared with another philosophically minded geneticist,

Richard Goldschmidt. Perhaps the kernel of these doubts lies in the suggestion that the relevant new variation should make possible the exploitation of previously unexploited environments or, to use contemporary imagery, the mutations must be able to rewrite the programme not merely introduce new parameters into an existing programme. These thoughtful essays may be commended to all those whose evolutionary horizons are bounded by enzyme polymorphism and the circumstances of its occurrence. How relevant is such variation to evolutionary change in phenotype? If it turns out that there is some correspondence between morphological and behavioural complexity and the physical organisation of the genome, Waddington's doubts may in due course appear prophetic.

There are plenty of stimulating ideas in this book and any biologist of a reflective frame of mind will find profit in these pages, while the historian of science will scan them for clues to the way the author's very active mind worked.

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GENETICS AND BIOGENESIS OF MITOCHONDRIA AND CHLOROPLASTS. Edited by C. W. Birky, Jr., P. S. Perlman and T. J. Byers. Ohio State University Press, Columbus, Ohio. Pp. 361 + 67 text-figures. Hardback \$15.

I approached this book with considerable misgivings. For, in the most rapidly moving area of genetics, it is distanced by an eighteen-month publication lag from the colloquium held in September 1974 whose proceedings it contains. However, on closer examination, the situation is by no means bleak, and this book has a good deal to commend. The list of contributors is a distinguished one, representing many of the best North American workers (including Attardi, Mahler, Perlman, Birky, Hooper, Sager, Wildman and Laughnan) plus two very good choices from Britain (Griffiths and Tilney-Bassett). This extraordinarily well-balanced choice of contributors ensured an extensive coverage. Furthermore, in at least some cases, the manuscripts appear to have been updated to offset partially the publication lag. Sager, for example, refers to her article with Kitchin on selective silencing of eukaryotic DNA, which did not appear in *Science* until August 1975. A number of the papers, especially those of Mahler *et al.*, Perlman and Birky, take an approach which is sufficiently historical on the one hand and analytically abstract on the other to merit serious consideration as material for teaching advanced undergraduates. I think that it can be combined with Sager's *Cytoplasmic Genes and Organelles* to provide most of the essential reading material for a course in organelle genetics in a convenient way. At least, I intend to try it in my organelle genetics course this coming year.

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THE DISTRIBUTION OF THE HUMAN BLOOD GROUPS AND OTHER POLYMORPHISMS. A. E. Mourant, Ada C. Kopec and Kazimiera Domaniewska-Sobczak. Second edition, 1976, 1055 pp. Oxford University Press. £55 net in U.K.

During the two decades that have passed between the first and second editions of this book, information about human polymorphisms and their