Insect Biochemistry and Function

Edited by D. J. Candy and B. A. Kilby
Chapman and Hall; London, 1975
xii + 314 pages. £8.50 : ISBN 0 412 11770 3

The title of this book suggests a comprehensive account of insect biochemistry, but in fact reviews of three areas of interest are included: the biochemistry of insect flight, excretion in insects, and synaptic transmission in insects. The editors point out in their introduction that a few topics have been selected which seem to deserve treatment at this time.

The first topic, a detailed picture of how insect flight muscle can maintain a very high rate of metabolism, is presented in two chapters. B. Sacktor reviews the utilization of fuel by muscle, and E. Bailey describes fuel supply. The biochemistry of excretion is discussed by D. G. Cochran, who includes useful physiological details where necessary. Finally, a short chapter by G. G. Lunt describes synaptic transmission in insects, a field which the author points out has been largely neglected by biochemists. Each chapter is well documented with many recent references, and the book as a whole is well produced.

Some aspects of insect biochemistry are treated in recent accounts of insect physiology [1,2], while other reviews of selected areas of insect biochemistry have appeared [3–5]. The topics covered in this book are discussed in more detail than is possible in wider accounts of the field [6]. However, it is a pity that more chapters of similar quality could not have been added to justify the breadth of the title and to provide a really comprehensive study of insect biochemistry. Even so, the book will interest students of insect biochemistry and of comparative biochemistry, and will be a valuable reference text for those particularly concerned with the specific topics covered.

[1] *The Physiology of Insecta*, (1974) (M. Rockstein, ed) Academic Press; New York and London.
[2] Wigglesworth, V. B. (1972) *The Principles of Insect Physiology, 7th Edn*, Chapman and Hall; London.
[3] *Aspects of Insect Biochemistry*, (1965) (T. W. Goodwin ed) Academic Press; New York and London.
[4] Chen, P. S. (1971) *Biochemical Aspects of Insect Development*, S. Karger; Basel.
[5] Gilmour, D. (1965) *The Metabolism of Insects*, Oliver and Boyd; Edinbugh.
[6] Rees, H. H. (1976) *Insect Biochemistry*, Chapman and Hall; London.

A. S. Beedle

Ciba Foundation Symposium No. 29

Cell Patterning

Edited by Ruth Porter and J. Rivers
Elsevier/Excerpta Medica/North-Holland; Amsterdam, Oxford, New York, 1975
viii + 356 pages. Dfl. 62.50, $26.95

This book is the transcript of 14 lectures and discussions held during the 1974 CIBA Symposium on Cell Patterning. The symposium's aim was to throw light on the question of how cells become grouped

into regions and acquire similar properties, sharply demarcated by boundaries from other neighbouring groups of cells.

Morphogenetic gradients are postulated in individual body segments of insects which determine the pattern formation within each segment by both Peter Lawrence and Klaus Sanders. Peter Bryant finds evidence for a gradient radiating from the centre of *Drosophila* imaginal discs, (the larval structures which develop into the appendages of the imago such as antennae, wings, legs and genitalia). Transdetermination in *Drosophila* imaginal discs (the process whereby after culturing for several cell generations out of the larva the fate of a disc changes from, for example, a genital disc to an antennal disc) is also cited as evidence for boundaries formed by overlapping morphogenetic gradients by Kauffman. Gurdon reviews the known biochemical differences in regions of animal eggs and effects of maternal mutants (i.e. 'cytoplasmic inheritance') on development. As yet, no molecules have been identified which definitely establish regional differences in embryos.

Are there any opportunities for biochemists to characterize the postulated morphogenetic substances? It does not seem likely because, as the chairman Sidney Brenner draws attention to in his introduction, the developing systems studies are measured in micrometers, and may require painstaking dissection from other tissues before any experiments can be started. In addition, it is not certain whether all the postulated gradients are of actual molecules. Support for Lewis Wolpert's hypothesis that the number of cell divisions completed in an organizer zone decides a cell's characteristics comes from Meinertzhagen's studies of neuronal correction patterns in insect retina, and from Hunt's studies on Xenopus retinotectal patterns.

Cell patterning is determined very early on in development, several cell generations before cell differentiation becomes apparent. Because of this limitation, one of the most potentially powerful approaches is the use of genetic markers in chimaeras. With careful interpretation, the past-histories of cells can be inferred from their observed fate at a later stage of embryonic development. This approach is used by Gancia-Bellido with mosaics of *Drosophila* imaginal discs from known genetic mutants, and by Gardner and Johnson with chimaeras of rat and mouse embryos.

The fact that no firm conclusions can be derived from the Symposium is indicative of the difficulties of the field, but this book will give an insight to biochemists of the problems involved in studying developing systems, and it gives a good review of experiments which are presently being attempted by developmental biologists.

P. M. Clissold

Entropy-Driven Processes in Biology. Polymerization of Tobacco Mosaic Virus Protein and Similar Reactions.

by Max A. Lauffer
Springer-Verlag; Berlin, Heidelberg, New York, 1975
x + 264 pages. DM 73.00, $ 31.80

This book is No. 20 in Springer-Verlag's series on Molecular Biology, Biochemistry and Biophysics and is of a kind that makes one feel that many of the activities of scientific publishers are nugatory. The Preface says that the book's purpose is to bring together, from the fields of chemistry, biophysics, virology and cell biology, results of research into processes that have the important common feature of being endothermic and, therefore, entropy-driven. The processes discussed are mainly reversible reactions leading to the formation of large structures and the main burden of the argument being that the increase