

of separate organs and this should facilitate the isolation and purification of *Drosophila* enzymes for detailed study. Luckily for much genetic work, useful information can be obtained from extracts of single flies by gel electrophoresis and histochemical staining and hundreds or even thousands of individual flies can be screened within reasonable time. It is noted that a biochemically defined system permits quantitative measurement instead of qualitative description when dealing with mutants, but ease of assay often determines the enzyme systems studied. The first chapter gives a general review of the usefulness of gene—enzyme systems in the investigation of various problems and can be read with profit by the non-specialist. The subsequent chapters discuss examples of various gene—enzyme systems in detail and are possibly of more value to those already working in the field or about to do so.

The second chapter deals with Eye Colour Mutants and their Enzymes and it is fitting that they have

pride of place because of the classical work in the development of biochemical genetics by Morgan, Beadle, Tatum and their associates. Only in a few cases are the specific enzyme defects known in visible mutants of *Drosophila* but the eye pigment story shows what can be achieved. The third chapter reviews xanthine dehydrogenase, aldehyde oxidase and pyridoxal oxidase since these are involved in one of the most complex and interesting gene—enzyme systems yet investigated in any eukaryote. The rest of the book deals with dehydrogenases, enzymes of tyrosine metabolism, amylase and other hydrolytic enzymes and finally a mixed bag of miscellaneous enzymes.

The book is well produced with about 400 references with dates up to 1973. Clearly a very useful addition to this series of books on Developmental Biology.

B. A. Kilby

### *Insect Hormones (2nd English edition)*

by V. J. A. Novak

Chapman and Hall; London, 1975

xxii + 600 pages, 37 plates and 73 figures. £16.80

The author of this fine book is the Head of the Department of Insect Physiology in the Entomological Institute of the Czechoslovak Academy of Sciences and his interest in insect hormones dates from a period 30 years ago when he worked with Professor V. P. Wigglesworth in Cambridge. There has been great activity in the field of insect endocrinology since then and especially in the last decade so that there are now over 6000 relevant papers in the literature. The first English edition of 1966 listed 3000 papers published up to that time and the new, revised and enlarged edition lists the 3000 published since 1966 (133 pages of them!). The two editions together therefore provide an unrivalled guide to the scattered literature on the subject.

There are three main causes for the great upsurge

of interest in insect endocrinology. Hormones are now known to play an important role in almost all functions of the insect—growth, morphogenesis, moulting, reproduction, diapause, colour change, digestion, excretion, movement, nervous activity, etc., so that they must be taken seriously by anyone working on almost any aspect of insect biochemistry and physiology. Secondly, a study of insect hormones often contributes to other and wider fields such as morphogenesis, phylogenetic relationships, neuro-physiology, etc. One remembers, for instance, the elegant demonstration of the effect of a hormone at the molecular level when Clever and Karlson showed puffing at specific loci in the giant chromosomes of insect salivary glands within a few minutes of exposure to ecdysone, the moulting hormone. Finally, the elucidation

tion of the structure of the juvenile hormone has led to the synthesis and testing of huge numbers of compounds for juvenile hormone activity; the driving force is the hope that such compounds could provide the third generation of insecticides to follow the present toxic chemicals, since the powerful and highly selective effect on insect growth and development of suitable synthetic compounds might yield both great agricultural benefits and substantial industrial profits. There is thus a large number of people who now have a theoretical or practical interest in insect hormones and the present book will be an invaluable standard text for them as it provides a comprehensive and well documented review of the whole field. After an introductory chapter on methods and techniques, there is a long account of the three hormones of metamorphosis — the activation, moulting and juvenile hormones. Then an account of natural and synthetic substances with insect hormone activity. One surprising finding is that an active steroid, dihydroxyecdysone, is present in the roots of the common European polypodium fern to the extent of

over 1% dry weight!. There are separate chapters on hormones and morphogenesis, hormones and diapause, on neurohormones and on protohormones (i.e. neurohumoral factors and gene hormones). The account of incompletely known substances with allegedly hormonal characteristics could be a happy hunting ground for ideas for research projects.

Pheromones such as sexual attractants are excluded from the book but exohormones of Hymenoptera such as the inhibitory substances produced by queen bees to inhibit ovary development in workers are included.

The book is attractively produced, the line drawings are clear and the photographs satisfactorily reproduced. Those whose interests impinge in any way on insect endocrinology should insist on the immediate purchase of a copy by their departmental or institutional librarian. Make sure the Librarian does not discard the earlier edition however — remember those 3000 references.

B. A. Kilby

### *Microbial Interaction with the Physical Environment*

Edited by D. W. Thayer

Dowden, Hutchinson & Ross, Inc; Stroudsburg, Penn., 1976

xv + 431 pages. £15.00, \$30.00

'Microbial interaction with the physical environment' edited by D. W. Thayer is the ninth volume in the series Benchmark papers in Microbiology published by Dowden, Hutchinson and Ross, Inc. The editor has selected 31 articles including both reviews and original papers published between 1901 and 1974 and grouped them into sections each covering one environmental parameter. These are: hydrogen ion concentration, water activity and osmotic pressure, halophilic interactions, hydrostatic pressure, electrokinetic properties, and sound. Temperature and radiation are two environmental factors not covered in this volume. A review by Skinner on the limits of microbial existence is included in the introductory section. The papers in each section are introduced by an editorial commentary and where necessary refer-

ences are given for additional reading. The selection of articles for a book of this type is obviously difficult and the editor is to be commended on his choice of papers and in particular on the inclusion of the earlier publications. It is unfortunate that one review on water relations in food spoilage organisms was too long to be included. The book does provide an insight into the interaction of micro-organisms with their environment and is valuable in drawing the attention of the reader to certain of the more significant papers in this expanding area of research. It is convenient to have these papers collected in one volume and this introduction should provide a stimulus for further study by the reader.

D. Kerridge