

Environmental physiology

Environmental Physiology. By D. Bellamy, G. J. Goldsworthy, K. C. Highnam, W. Mordue and J. G. Phillips (Editor). Pp. ix+198. (Blackwell Scientific: Oxford and London, 1975.) £3.25.

THIS book attempts to present, at a fairly introductory level, a general view of physiology as it relates to animals in their natural environment; as is stated in the preface, it seeks to give expression to the conceptual link between physiology and ecology. The text is divided into three parts. The first of these introduces the animal and its environment, pointing out the main relationships between them, and goes on to consider the internal environment of the organism. As with any introductory text, basic concepts need to be outlined and it is in this first part of the book that the physiological ideas of homeostasis, active transport, osmotic pressure, nerve impulses and the like are explained.

The orientation of the material presented in the second and third parts is more ecological. Part two examines the problems and mechanisms which are associated with the organism-environment interfaces. The structure and function of the epidermis, gills and lungs, excretory organs and the alimentary tract are

treated phyletically. These chapters are liberally sprinkled with examples which bring out the underlying problems facing the chosen animal types in different habitats. The third part of the book deals with specific interactions of organisms with their environment, beginning with what might at first seem to be a curious chapter to have in an essentially physiological text. The chapter is entitled 'Global diversity and animal distribution' and explains how and why climate and season vary over the earth's surface. A useful table is presented which summarises the physical features of the main biogeographical areas, their characteristic plants and animals, and the adaptations enabling these organisms to exist in each area. This chapter proves to be a valuable introduction to the third part. A series of specific problems facing animals in certain environments are discussed, with particular stress on salt and water availability, and there is also a chapter on the maintenance and function of rhythms. This is followed by a complementary chapter on the effect of seasonal rhythms on the organisms, with particular emphasis on diapause.

The third part ends with three short chapters, one on animal colour and colour change, one on biotic relationships between organisms, and a final chapter on man's impact on the environment. The biotic relationships chapter really only whets the appetite for the increasingly important field of behaviour, and much the same sort of comment can be applied to the last chapter in which the topic of pollution is scarcely introduced. In a book of this title rather larger components of behaviour and pollution might be expected, particularly as regards the physiological effects of man's pollutants on organisms.

The general finish of the book is high although the plastic laminate of the paperback version tends to part company easily from the rest of the cover, and the book quickly becomes dog-eared in use. The overall impression is that it is a useful first and second year reading for undergraduates in both physiology and ecology and that this book may also find a place in sixth form teaching.

Bryan D. Turner

Genes, receptors, signals

The Immune System: Genes, Receptors, Signals. Edited by E. W. Sercarz, A. R. Williamson, and C. F. Fox. Pp. xxiv+632. (Academic Press, New York and London, 1974.) \$22.50.

It becomes increasingly obvious on reading the proceedings of the Third ICN-UCLA Symposium on Molecular Biology that an immunological event of some importance took place at Squaw Valley, California, in March of last year.

Practically everyone who is anyone in the field of cellular immunology seems to have been there, searching for answers to many of the outstanding questions about the control and expression of immune responses at the molecular level.

Although there were a few reports on the structural basis of antigen (or haptan) binding sites, particularly in relation to antibody specificity and diversity, and even half a paper on the IgE system, the main emphasis was placed firmly on the genetic and cellular control of antibody synthesis.

The reader of the proceedings unfortunately misses what (from the Preface) must have been much lively and uninhibited discussion at the Workshop sessions; transcripts of which have not been included. But the published papers cover a wide range of 'up-to-the-minute' topics in the vanguard areas of immunology and should, therefore, provide informative reading for workers in many different branches of the discipline.

Inevitably many questions are left unanswered, including some key ones—such as the nature of T cell surface receptor. Nevertheless, the reader is treated to stimulating new thoughts about fascinating topics like the nature and control of antibody diversity, the relationship between the genetic control of histocompatibility antigens and immune responses, lymphocyte membrane organisation, the mechanism of development of B memory cells, and the role of T cells in immune responsiveness and tolerance. The proceedings also contain a range of valuable technical information, including descriptions of: the 'finger printing' of thymus cells by physicochemical procedures, the fractionation of lymphocytes and probing of their surface structure, the estimation of messengerRNA responsible for Ig heavy chain synthesis and the measurement of clonal development of single antibody-forming cells in culture.

The only disappointing aspect of the book is that dealing with the triggering of lymphoid cells. The treatment of mechanistic aspects of cell activation and transformation is sparse to say the least, in spite of the reference to 'receptors' and 'signals' in the title. This no doubt reflects the wide gap that still exists between immunological observation and biochemical understanding of lymphocyte stimulation processes. In view of the growing evidence, however, that immunological triggering processes have important features in common irrespective of the nature of the target cell, it is to be hoped that the next Symposium on this topic will take into consideration the valuable clues about lymphocyte function to be gleaned from the fundamental investigations now in progress on other immunologically controlled cell systems such as those involving mast cells and macrophages. Denis R. Stanworth

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