

BOOK REVIEWS

Genes, organisms, populations: Controversies over the units of selection edited by Robert N. Brandon and Richard M. Burian. The MIT Press, Cambridge, Massachusetts, USA, 1984, pp. xiv + 329, \$ 34.44.

He is a collection of papers on natural selection published over the past 25 years. The unit (or units) of selection is the subject of discussion. Charles Darwin felt that the individual was the target of selection, not races, groups or populations. Alfred Wallace, on the other hand, thought that selection acted on groups in addition to the individual. Against this historical background of the two originators of the idea of natural selection, the editors have put together current views of selection, the levels as well as the units on which selection acts.

The papers are grouped under three heads: Historical readings; Levels and units of selection; Models of selection. Each part has an introduction, contributed by the editors, who as students of philosophy appear to have found some sudden and unexplained interest in problems of evolution.

Several of the papers included in the volume were written long before the question of natural selection hotted up some five years ago and so are of limited interest. Nevertheless, they are of considerable influence in determining the level at which selection is believed to operate.

The main thrust of selection at levels higher than the individual level is offered by Altruism, which Darwin was clearly unaware of and which has only recently come to the fore. Seemingly contradictory, the different levels harmonize at a certain order; it seems to be the endeavour of the authors to find this conformation.

Sewall Wright's admirable paper written over 50 years ago (1932) finds its mark in the general caution he administered, that evolution's success depended not on the efficacy or predominant power of any one of the factors: Gene mutation, selection, breeding, but on a balance among them, a heed which many enthusiastic evolutionists seem to ignore.

A more recent analysis of selection (1982) presents the general picture of evolution as it seems today. Written by A.J. Arnold and Kurt Fristrup, it summarizes the hierarchical nature of biological structure and function. It also warns against a purely reductionistic approach to the understanding of biological phenomena, especially in the light of the failure of the reductionistic mode in modern physics.

A great deal of what is included in this volume may appear redundant by the turn of the century; almost all of it could be no more than history to the biologist in 2001 A.D. For then, the sciences would have, hopefully, come together in a powerful synthesis of concept and experience.

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Bioenergetics: An introduction to the chemiosmotic theory by David G. Nicholls. Academic Press, Orlando, Florida 32887, 1982, pp. 190, \$ 14.

Bioenergetics, the subject that deals with the study of energy transformations in living systems, is in modern parlance synonymous with the two best understood phenomena of energy transduction, namely, oxidative phosphorylation and photophosphorylation. The enunciation in the 1960s of the chemiosmotic hypothesis which proposed a unitary mechanism for electron transport-dependent energy transduction opened a new era of skilful experimentation, and the subject has advanced in leaps and bounds in the last two decades. A major achievement of this book is that it successfully strives to present before the reader a 'worm's eye view' of the mitochondrion, the chloroplast, electron transport and coupled ATP synthesis looking through 'chemiosmotic' glasses. This feature distinguishes it from the classical book of Lehninger and from those of Munn, Wainio or Tzagaloff in all of which the emphasis is on the organelle.

The 'central dogma' of the hypothesis is dealt in understandable physico-chemical terms. The more recent developments like the 'Q cycle' and the submit composition of proton translocating ATPase are included. One only wishes that a fuller discussion on H⁺ stoichiometry and 'conformation coupling' was attempted. Also, instead of relegating to a cartoon, a chapter on thermogenesis, the forte of the author, could have added to the uniqueness of the book.

The illustrations are simple and drive home the point. However, opinions on the usefulness of cartoons would be divided. These borrowed and symbolic cartoons serve more to satisfy the craze for 'modernism' than the cause of science. Every laboratory and research worker handling mitochondria would find the book handy and useful.

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Leukocyte locomotion and chemotaxis edited by E.V. Keller and G.O. Till. Birkhauser Verlag, CH-4010, Basel, Switzerland, 1983, pp. 440.

Leukocyte movement, particularly directional response to stimuli, is a subject of considerable contemporary interest. An index of the level of activity in an area of scientific research can be roughly gauged by the number of international meetings on the subject. This book presents an edited version of the 1st International Conference on Leukocyte Locomotion and Chemotaxis at Gersau, in the summer of 1982, and was published in 1983. The volume brings together stimulating groups of papers which cover a broad spectrum of activities in this field. The presence of an edited version of the discussions and an adequate subject index make this book interesting and useful. The final summary by E.L. Becker provides a clear overview of the meeting and the state of the field. The reader would do well to begin here and work his way to specific papers of interest. The individual contributions are of a uniformly readable quality and range from mathematical treatments of leukocyte motility to clinical disorders of phagocyte locomotion. Studies aimed at understanding the molecular mecha-

nisms underlying cell movement and response to chemical stimuli form a major portion of this book. It is clear however that a detailed picture of chemotactic response, the role of receptors and the mechanisms of signal transduction is yet to emerge. Undoubtedly this volume is only the forerunner of others to come. It is certainly important reading for those interested in leukocyte chemotaxis.

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ERRATA

The cover date of Volume 65(C), No. 3, was inadvertently printed as March 1985 instead of March 1984.