reviews

Models of selection

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Organismic Evolution. By Verne Grant. Pp. 418 (Freeman: San Francisco and Reading, 1977.) £11.70.

Organismic Evolution was designed and written, we are told, as an advanced text. It proceeds in fairly conventional fashion from simple concepts of population genetics through aspects of natural selection and speciation to a consideration of macroevolution. The main part of the text concludes with a section on humans, including social and cultural evolution. The book is broken down into a total of 39 chapters (one of barely two pages), most of which are further subdivided into a number of sections often followed by a list of "collateral readings", wherein are duplicated, in full, items from the main bibliography. Thus, to choose but one example, the bibliographical details of the author's 1963 book, *The Origin of Adaptation*, are repeated ten times.

What seems to be lacking most of all is a synthetic approach—the development and application of the basic principles presented in earlier chapters, to the broader fields of evolution which follow. This impression is perhaps unduly strengthened by the fragmented text, with its many short subsections, the relevance of some of which, to the book as a whole, is often in doubt. For example, three pages, including a photograph, map and table are devoted to the population details of the Giant Sequoia, and yet the next subsection is on "Polymorphism"; the sequoias and whatever significance they may have are forgotten.

Although most of the book is devoted to diploid organisms, the basic model of selection is developed in terms of haploids. Whereas this may make for simplicity in some directions, it is very misleading in others, particularly in ignoring the existence of heterozygotes; this also possibly explains an earlier assertion that in balanced polymorphism, the polymorphic types are preserved by selection in favour of diversity, thus denying the idea of heterozygote advantage which is, however, dealt with elsewhere. Equally misleading is the equation of selective advantage with reproductive rate, and also the strangely restrictive interpretation placed on the term fitness. In a discussion on evolution, fitness should have a wealth of meaning and refers to far more than just the number of progeny left by a genotype; it is *not* a "purely quantitative and operational concept". One also gets the impression that adaptive landscapes have been misinterpreted—the steeper the slope, the quicker would be the ascent.

A quotation from p112 exemplifies some of the unsubstantiated generalisations that occur from time to time: "Natural selection operates most effectively under conditions of competition; conversely, the selective pressures are relaxed when competition is absent from the scene . . . ". One has only to look back a few pages to find descriptions of several situations in which selection is not dependent on competition.

The statement (p115) that "Density-dependent factors tend to have a stabilizing effect on population number" is perhaps a truism when the factor affects the growth, or death, rate of the population as a whole; but when the factor is the selective advantage of one form compared with another, there is no reason why population number should be in any way affected. The treatment of frequency-dependent selection is no clearer; most effects of the relative proportions of model and mimic would conventionally be regarded as density dependent, not frequency dependent. On the other hand, if more than one form of the mimic species were present, frequency-dependent selection would certainly be important; this situation is not discussed.

The shortcomings in the fundamental aspects of selection do less than justice to the author's treatment of evolution at, and above, the species level. Here, one sees, to great advantage, the admixture of relevant botanical and zoological examples, but it is a surprise to find so little discussion of changes at the chromosomal level; perhaps these are encompassed by neither microevolution nor macroevolution? Recent developments, such as rates of molecular evolution, are also dealt with in a less than satisfactory way, though here the author makes his position clear in one of the many personal statements which add interest to this not uninteresting book.

Are we really to believe (p161) that the decreasing frequency of blood group B, as one passes from central Asia to Western Europe, is a consequence of the decrease in numbers of invading Mongolians as one gets further from Mongolia? And perhaps a little more space might be devoted to the concept (p304) that water-breathing lungs of some fishes were the forerunners of the air-breathing lungs of primitive land vertebrates.

Great care has clearly been taken in the preparation of this volume, but Figs 11.1 and 13.1 would both have been easier to interpret had their respective curves enclosed equal areas. The notation for the haemophilia alleles on p32 seems to have undergone redundant duplication in places. The same could be said of the subject index which, while running to only three pages, has a very large degree of overlap with another index labelled "Key to Technical Terms".

All in all, a very disappointing book which assumes too much for use at an introductory level, but which is inadequate for the more advanced student. □

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Cell population kinetics

An Introduction to Cell Population Kinetics. By W. A. Aherne, R. S. Camplejohn and N. A. Wright. Pp. 88. (Edward Arnold: London, 1977.) £2.95.

THIS little book provides a very welcome and readable introduction to cell kinetics for the uninitiated. The cell cycle, its constituent phases and the concept of the growth fraction are all explained, as are the techniques commonly used to measure these parameters. There is a particularly clear exposition of the use of frequency of labelled mitosis (FLM) curves; and various techniques of cell cycle analysis based on continuous labelling and the use of stathmokinetic agents are also explained. There is a chapter on the kinetics of cell populations showing how they can be classified into different