

Grades of evolution

Paul H. Harvey

Evolutionary Biology. By Eli C. Minkoff.
Addison-Wesley: 1983. Pp.627.

\$29.95, £21.70.

Sex, Evolution, and Behavior, 2nd Edn.
By Martin Daly and Margo Wilson.

Willard Grant Press/Wadsworth: 1983.

Pp.402. \$17.55.

Natural Selection and its Constraints.

By Oliver Mayo.

Academic: 1983. Pp.145. Hbk £12,

\$19.50; pbk £5.95, \$9.50.

ENCYCLOPAEDIC textbooks are expected to be a little boring. They also, inevitably, introduce and perpetuate a few errors. But Eli C. Minkoff has managed to purvey so much erroneous information in a book that surveys the whole field of evolutionary biology that I could not possibly recommend it as a course text. Several old favourites, such as character displacement in nuthatches and the surface area interpretation of Bergmann's Rule, are recreated for the misinformation of a new generation of students. Those same students will attempt to understand why females of haplodiploid species share 25% of their genotypes with their sons. And they will even be told that there is good evidence that the sex ratio responds to selection in *Drosophila*. I could go on. Fortunately, and contrary to the author's claims, there is a textbook that covers accurately most of the same ground in evolutionary biology. It has the same title as Minkoff's but was written by Douglas Futuyma and published by Sinauer in 1979.

It is a pleasure to turn from an unsatisfactory book to a good one. Daly and Wilson's *Sex, Evolution, and Behavior* has now appeared in a second edition which is even better than the first. Since 1978, when their first edition was published, a lot has happened in sociobiology. Many adaptive stories, particularly relating to human behaviour, have been subjected to comparative and experimental tests. Eric Charnov has brought together a disparate series of research topics, concerned with how individuals partition resources into male and female function, into a unified theoretical discipline which he calls sex allocation theory. These and other developments are integrated by Daly and Wilson into a wholly rewritten text.

There are a few mistakes, and I was particularly unhappy about their treatment of some aspects of sexual selection — Fisher did *not* model the runaway process and Zahavi's handicap principle is *not* likely to explain peacocks' tails, even when "genetic modelers approach [it] in the right spirit". Such flippant treatment of formal mathematical arguments characterizes a lot of work in this area and has led to several disagreements caused by loose

thought. Indeed, Daly and Wilson's discussion of "confidence of paternity" confused me precisely because they did not give a formal presentation of their verbal argument; I do not know what assumptions lead to their conclusions. The book carefully avoids mathematical arguments, presumably because much of the intended audience (which includes social scientists) prefers the intuitive insights that can accompany verbal presentation.

Mayo's useful little book lies at the other extreme. He presents his audience with a terse series of eleven essays that attempt to survey the constraints within which natural selection works. Topics covered include allometry, the rate of evolution, canalization, senescence and speciation. This is not a book for undergraduate study, nor does it attempt to explain concepts or to review fields of research. For example, senescence is allotted two pages. Instead, Mayo provides a framework within which graduate students can study contemporary problems in evolutionary biology. Key papers up to 1981 are cited in each section, together with a series of topics for discussion. This makes excellent material for a series of graduate seminars in evolution and I intend to use the book for exactly that purpose. □

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Anatomical types

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Comparative Anatomy of the Vertebrates, 5th Edn.

By George C. Kent.

Mosby/Blackwell Scientific: 1983.

Pp.604. \$29.95, £26.

Analysis of Vertebrate Structure, 2nd Edn.

By Milton Hildebrand.

Wiley: 1983. Pp.654. Hbk £30.35, \$42.50;

pbk £5.95, \$11.50.

COMPARATIVE anatomy of the vertebrates is continuing to flourish, it seems, judged by the appearance of a fifth edition of George Kent's *Comparative Anatomy of the Vertebrates*. In this age of theory, principles and problem-solving in biology, one wonders exactly what is the role of such a descriptive book. True, lip service is paid to functional anatomy, adaptation, phylogeny and evolution, and occasionally development, but the great bulk of the book is straightforward description, modernized in details but indistinguishable in approach from the equivalent works of fifty years ago.

What Kent fails to convey is the great strides in methodology and philosophy that have underwritten the various aspects

of comparative biology. In the book classification and phylogeny are treated as virtually synonymous which is by no means necessarily the case; functional interpretation is restricted to comments on single features, despite the growing holistic view of animal function; and the various concepts of morphology are considered no more worthy of theoretical treatment than pictures in a dissection guide. But Kent's book is no worse than several others in the field, and at least he hints here and there that the subject might have more depth than he makes explicit.

The question is, then, whether there is a place in teaching for a volume such as this. The answer depends on the use to which the book is put. If it is meant to provide a self-contained course of study, then it is not a course that I should wish to give to undergraduates. As a reference source, a kind of glorified handout, accompanying an interesting course on the biology and evolution of the vertebrates, then it does have merit. After the obligatory chapters on the characters and origin of the vertebrates, there is an extremely superficial who's-who of the group. There is then a series of chapters, quite unrelated to one another, covering the various classic vertebrate systems one at a time. Plenty of good-quality illustrations, often made clearer by the use of red and blue colouring, are included. Each chapter has a reference/literature list which tends to be rather idiosyncratic and on the whole rather out of date. This is a dull, basically worthy textbook.

The second edition of Milton Hildebrand's *Analysis of Vertebrate Structure* is much more welcome since his explicit aim is to show how structure is related to function, in which he succeeds well. After a brief outline of vertebrate history, there is a long system-by-system comparative section, but in this case the adaptive and functional meanings are clearly brought out. The anatomy is thus made to work for its living, so to speak, generating a lively account. The best part of the book is the last section, which is a clear and quite detailed exposition of the various forms of vertebrate locomotion, showing how the skeleton and muscles are designed to perform the required functions efficiently. A final part treats feeding mechanisms in vertebrates from the same point of view.

I have found the first edition of Hildebrand a valuable teaching text for undergraduates, complete with its excellent illustrations and useful reference lists. This edition continues the tradition, and has been brought up to date by the addition of new references and a number of new diagrams. In the words of the preface "Finally, it is hoped that this book will be found interesting". It is. □

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