

Book reviews

Evolutionary Genetics. By JOHN MAYNARD SMITH. Oxford University Press. 1989. 325 pages. Paperback £16.95. ISBN 0 19 854215 1.

The challenge to writing an introductory textbook on evolutionary genetics (and indeed to teaching a course on this subject) is to present the major theoretical concepts in sufficient detail that their main conclusions can be appreciated and their limitations understood, without becoming so bogged down in technical details that the original problem is forgotten. In this text, intended for advanced undergraduates and graduates, John Maynard Smith has met this challenge admirably. The first chapters provide historical background and develop the basic concepts of population genetics: Hardy–Weinberg equilibrium, natural selection, mutation, selective maintenance of single-locus genetic variation, inbreeding, random genetic drift, migration, evolution at more than one locus, and quantitative genetic variation. Included in this part of the book is an introduction to the evolutionary game theory models of phenotypic evolution pioneered by Maynard Smith. In the later chapters these concepts are applied to topics of current research in evolution: the evolution of co-operative behaviour and kin selection; evolution of bacteria, viruses, plasmids and transposons; the organization and evolution of the eukaryotic genome; the evolution of sex and recombination; and speciation and macroevolution.

The author's stated objectives were to make evolutionary concepts accessible to students interested in whole organisms and population biology, and to those who wish to specialize in molecular biology; and to convey the impression that research in evolution is a dynamic and current activity. He has succeeded on both counts. The verbal exposition of each topic is exemplary and clear, and each section is well-illustrated with classic examples from the literature. Balanced accounts are given of current controversies, but the author does not shy away from stating his own opinion on occasion. Additional details and some mathematical derivations are given in supplementary boxes. Accompanying each chapter are suggestions for further reading, and problems of varying levels of difficulty. The answers to the problems are given at the back of the book. The suggested computer projects at the end of most chapters are a unique feature, although I suspect the majority are rather too difficult for the average undergraduate. Otherwise the only

background knowledge assumed of the reader is of elementary transmission genetics, probability and statistics, algebra, and a tiny bit of calculus.

I thoroughly enjoyed reading this book, and can recommend its adoption as a reference text in advanced undergraduate/graduate courses in evolution.

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Complex Organismal Functions: Integration and Evolution in Vertebrates. Edited by D. B. WAKE and G. ROTH. Chichester, UK: John Wiley and Sons. 1989. 451 pages. Cloth (£57.50). ISBN 0 471 92375 3.

'How did complex functional systems, apparently stabilized by high degrees of integration, evolve to their present diversity?' This question (quoted from the cover of their book) was tackled by 48 biologists from 12 countries who met at a Dahlem Workshop in Berlin, in the summer of 1988. They were a very distinguished group, including many of the world's leading vertebrate morphologists and a few of the principal evolutionary theorists. They were organised in sub-groups, each of which listened to several related papers presented by individuals and then worked as a committee to formulate conclusions. Their book presents both the papers and the group reports.

The conference dealt only with vertebrates but was presumably intended to discover principles that would apply to the evolution of organisms generally. One group considered feeding, one locomotion and one reproduction (especially viviparity). The fourth discussed the evolution of integrated systems more generally.

Many of the authors contribute to our understanding of evolution only by presenting what one of them (more aware, perhaps, of the dangers than some of the others) describes as 'persuasive scenarios': they were described more graphically in a famous paper as 'Just So Stories'. These stories are changing, sometimes in very interesting (and it must be admitted, persuasive) ways. We used to think of the sprawling gait of reptiles as inferior to the more erect gait of mammals because it seemed to require larger forces in