

the most benighted backwoodsman.

Perhaps the most impressive thing about the book is that the author takes nothing for granted. Each chapter builds a careful edifice of logic, examining the underpinnings of a particular aspect of evolutionary theory. Along the way, there are some very fine set-pieces. The section on population genetics is excellent, with the finest and clearest discussions of migration and multilocus genetics that I have seen in an introductory text. Ridley also has sensible things to say about the problem of species, carefully presenting ideas underlying the biological, phenetic, recognition and ecological species concepts and showing why they all provide necessary parts of the puzzle.

I particularly enjoyed his discussion of punctuated evolution, which is carefully and appropriately embedded in a much larger general examination of evolution rates, macroevolutionary trends and patterns of extinction. These sections bring a welcome sense of balance to this needlessly polarized debate. And he gives a careful analysis of a debate that is at the very core of our understanding of how evolution works, the conflicting views on how genetic variation is retained in populations in the face of long-continued stabilizing selection. R. Lande's contention that newly arising mutation is enough to supply the variation that is lost is contrasted with M. Turelli's argument that unrealistically large numbers of mutations of large effect would have to take place. The only thing I missed in this discussion was an examination of the question of whether most variation found in natural populations really is in fact newly arisen. This leads to the further question of whether and how the phenotypic variation produced by new mutations can be distinguished from similar phenotypic variation that is produced by mutations with a longer selective history. But, because the various arguments are set out so clearly, students reading this section should be led to wonder about these questions and about the possibility of designing experiments to address them.

There are, of course, a few things that are left out or not dealt with in as much depth as they deserve. The most obvious area of contention that Ridley misses is that surrounding the origin of life, and there is a disappointingly brief discussion of the origin of the genetic code. Generally, molecular evolution is dealt with rather briefly and in several scattered places throughout the book. Discussions of the roles of transposable elements and viruses in mutation turn up here and there, but not in the logical place, the chapter on mutation. The discussion of mitochondrial evolution is rather out of date. I was disappointed that the seminal

work of T. Dobzhansky on chromosomal polymorphisms was given little space and rather poorly explained — the distinction between the genetic effect of inversions in dipterans and in other organisms that have recombination in both sexes is not dealt with. And an otherwise excellent survey of genetic load is flawed by a discussion of truncation models that misses the essential point — that such models provide for a very large range of fitnesses whereas multiplicative models do not.

But these are minor caveats. Somebody else reviewing the book would doubtlessly find a completely different set of sins of omission (a better and more complete index, for example,

would be welcome). I read the book with great enjoyment, and can recommend it with enthusiasm. Few of us have the retentive mind of a Darwin, enabling us to push a multitude of new evolutionary facts into the front of our brains without having an equal number fall out the back. As I read, I was reminded of controversies I had quite forgotten about, and each chapter led me to think anew about the premises underlying evolutionary theories that I tend to take for granted. It will be a lot of fun to teach a course using this book. □

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Bats and their battalions

A. M. Hutson

Bats: A Community Perspective. By J. S. Findley. Cambridge University Press: 1993. Pp. 167. £27.95, \$44.95.

THE study of animal communities is not a new field, but has deservedly taken a higher profile in recent years. This review of the community structure of bats is particularly welcome, because the creatures comprise a diverse group, rich in fascinating aspects, even peculiarities, of distribution, population structure, morphology, feeding and other behaviour.

But the difficulties of studying bats in the field cannot be underestimated, and there is still a long way to go. Hence this review poses many more questions than it answers; bats will probably never offer the same opportunity for study that, say, birds do. Nevertheless, the author could have taken a more optimistic approach. In his preface he states that on being asked to write the book his initial reaction was that there was not much to write about. This pessimism comes across strongly in a chapter on methodology in the study of bats, in which he discusses the problems and limitations of field studies but does not highlight promising areas where there have been recent advances. This chapter is also rather sparsely referenced, a regrettable deficiency in such a key area.

In other chapters, the author provides a more investigative review of the bat assemblages found in the zoogeographic regions, the influence of resource limitation and competition, and the pattern of bat communities with reference to species richness, diversity of higher taxa, trophic and morphological diversity, and biomass and abundance. He also looks at the factors that may influence these

patterns. Inevitably, he has had to be selective in the faunas and features that he analyses and comments on. This can lead to difficulties. For example, in comparing the morphological diversity of samples from the Palaearctic and Afro-tropical regions, he resorts to fairly out-of-date species lists of Italy and Ghana. Although this choice probably makes little difference to the final analysis, it does seem to be slightly restrictive. Similarly, his comparison of the whole fauna of the European part of the former Soviet Union with the cave-hibernating fauna of the Netherlands may be misleading.

Nevertheless, this is a valuable review that indicates areas for future work. Not least among the topics for further investigation are the author's final assumptions: that in the case of forest bats, the forest's area and its refuge potential are the basic influences on diversity (species richness) and that taxonomic, morphological and trophic diversity follow in relation to species richness — there is in fact little evidence of competition or resource limitation affecting bat numbers or diversity.

Issued in the Cambridge Studies in Ecology series, this book is intended for final-year undergraduates, teachers and researchers. It will hopefully persuade them that bats are exciting biological models (enhanced by their unusual status as *K*-selected small vertebrates), offer a wide range of research opportunities and have an important place in biodiversity studies, a subject that has now achieved international recognition, if at the cost of a somewhat diffuse definition. □

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