

Marsupial biology

The Biology of Marsupials. Edited by Bernard Stonehouse and Desmond Gilmore. Pp. viii+486 (Macmillan: London, 1977.) £19.50.

It is a measure of current interest in marsupial biology that two substantial volumes with identical titles but different editors and panels of authors have been published on this subject in 1977. The volume edited by Stonehouse and Gilmore is concerned very largely with Australian marsupials, and 28 of the 34 contributors have studied marsupials in Australia or New Zealand. Although the editors' hope that the book "should form an introduction to current research on this long-neglected but fascinating group of mammals" is a laudable one, only about half the contributors have attempted to do this by reviewing their particular field. These chapters are all useful and some are excellent.

Clemens' chapter provides an overview of current theories of marsupial origins and relationships to other therian groups. His conclusion that most land masses could have been inhabited by primitive therians in the early Cretaceous, any one of which could have been the site of origin of marsupials and placentals, is provocative, as it allows for a reversal of the conventional view of origin in North America and a southward spread in the late Cretaceous and Tertiary.

Hayman reviews the field of marsupial karyology from a much firmer data base. The chromosomes of marsupials are better known than for most of the orders of mammals and understanding of the evolution has reached an advanced stage which this chapter reviews.

The functions of the adrenal cortex of marsupials are admirably reviewed by McDonald, while Setchell has written a wide ranging, scholarly account of reproduction in male marsupials, a field hitherto often neglected.

Of the ecological chapters, that by Lee, Bradley and Braithwaite on the resolution of the unique phenomenon of synchronous mortality of male *Antechinus* is fascinating as a piece of problem solving by a coordinated group with several different skills, while Parker's more theoretical chapter, deserves special mention as the first serious attempt to compare the ecological consequences of marsupial and eutherian reproductive strategies. Her conclusion is that the marsupial strategy allows a much slower rate of resource utilisation, first by the mother and subsequently by the slower growing offspring. "Viewed in this context, the

reproductive biology of marsupials cannot be deemed less efficient than that of placentals and may indeed have considerable advantages in the range of environments in which marsupials are found."

This quotation may stand as the theme of the volume itself, for it is a conclusion that is reiterated by many of the contributors whether in relation to physiology, to biochemistry, to ecology or to behaviour.

I have two criticisms for the editors of *The Biology of Marsupials*. The first is that almost half the chapters are reports of hitherto unpublished work more appropriate to a journal, or are narrowly restricted to reviewing an author's own work. A firmer editorial direction to authors would have made the book much more useful and better value to the wider audience. Second, those unfamiliar with marsupials are likely to be confused by the variety of synonyms and common names used in different chapters. The worst example

occurs on p328 where four of the eight species named in Table 19.1 are different from the check-list; and the marsupial mouse *Antechinus swainsonii* is provided with the generic name of the common wombat. Uniform nomenclature throughout the volume could easily have been achieved, since Kirsch and Calaby in their chapter provide a comprehensive check-list of all living species of marsupials.

Despite these shortcomings, *The Biology of Marsupials* provides many reasoned and informed reviews, which will be standard references for some time to come, and which should help to lay to rest the old and now uninformed view that marsupials are intrinsically inferior mammals unworthy of serious study.

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Non-linear acoustics

Theoretical Foundations of Non-Linear Acoustics. By O. V. Rudenko and S. I. Soluyan. Pp. 274 (Plenum: New York, 1977.) \$47.40.

NON-LINEAR ACOUSTICS deals with a very wide range of fascinating phenomena nowadays, including ultrasonic propagation, cavitation in liquids and large amplitude stress waves in solids, as well as the more familiar finite amplitude waves in gases and liquids. Despite the rapidly increasing practical applicability of these phenomena, and despite the review articles, it is a subject which still receives far too little attention in the West, where most of the activity is motivated only by applications to underwater sonar equipment, to propagation in aeroengine ducts or to supersonic aerodynamics.

The Physics Department of Moscow State University, under the late Professor R. V. Khokhlov, has contributed greatly to non-linear acoustics, and has taken a wider view of the subject than any other group. The book under review is by two of Khokhlov's former students, now distinguished in their own right, and is devoted largely to Soviet work. Some of the work is in fact new, and much of it is made accessible to Western readers for the first time in this publication.

The book gives an account of theoretical developments in plane-wave propagation, with diffusion and relaxation, of cylindrical and spherical waves, of sound-sound interaction, acoustic

streaming, the propagation of non-linear beams with lateral diffraction included, and of phenomena occurring in plane waves subject to stochastic influences of various kinds. Of these, the last two are the most novel and repay careful study. Throughout, the authors' aim is to arrive quickly, though often superficially, at a relatively simple governing equation generalising the well-known Burgers' equation for plane flow, which is then solved by *ad hoc* approximate techniques or numerical methods. No attempt is made to use modern asymptotic techniques (such as have been used in Western work on non-linear gas dynamic problems, which are ignored in the references given here). The book therefore loses in the range of problems which can be solved and to some extent in unity of approach. Comparisons with experiment are only made in a generalised fashion.

Despite these criticisms this is a valuable book, and should arouse much interest in the West. The price, however, is high and the translation literal and unidiomatic. More notes from the translator would have helped; readers will search in vain for a description of the "Method of Stages Simplifications", and there is much more here in similar vein. But Dr Beyer and the publishers have served us nonetheless by making this book available reasonably quickly after its appearance in the USSR.

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