

## BOOK REVIEWS

SEA SNAKES. By Harold Heatwole. The New South Wales University Press, 1987, viii + 85 pp., illustrated. Australian \$12.95 (paper).

This is a semitechnical review of current knowledge and ongoing research on sea snakes, chiefly what Heatwole calls the "true sea snakes" (Hydrophiidae) and the "sea kraits" (Laticaudidae), with some information on acrochordids and colubrids. There are five chapters: The Kinds of Sea Snakes (11 pp.), Natural History of Sea Snakes (19 pp.), Adaptations of Sea Snakes (22 pp.), Sea Snake Venom (20 pp.), Sea Snakes and Humans (6 pp.). There is a listing of "Further Reading" (17 references and two documentary films) and an index (5 pp.). This book is part of the "Australian Studies in Biological Sciences Series" that proposes to "represent the biology profession in Australia to all levels of government and the media for the purpose of promoting education and research in biology." The previous book in this series is about Creationism. As such it would seem to be aimed at a nonherpetological audience.

This book is timely in that the only similar overview of sea snake research (W. Dunson, Ed., *The Biology of Sea Snakes*, 1975, University Park Press) is over a decade old and is now out of print. Heatwole's book, unlike Dunson's book, is a short popular review, not a comprehensive text for specialists. Consequently, Heatwole's book lacks literature citations throughout. This may make for easier reading for some but greatly limits the book's usefulness for both the general reader and the herpetologist. The lack of citations and the very short bibliography make it difficult to evaluate the coverage of the literature. Studies on Australian species are emphasized over those on species from other areas (e.g., Malaysia), but this could be due both to the intended audience and to the intensified (since 1975) research in Australia, much of which was done by Heatwole and coworkers. In

marked contrast to Dunson's book, few studies of eastern Pacific *Pelamis* are mentioned. This reflects the increased attention being paid to other species which previously had been largely ignored.

As a major worker in the field, Heatwole provides thoughtful insight based upon personal experience on most topics. He also points out problems for future study, possible solutions, and, importantly for the general reader, the significance of such research. The writing is clear and succinct, with only a few questionable generalizations. A few examples can be mentioned. Although *Acrochordus javanicus* may be predominantly a freshwater species, it has often been recorded from brackish or marine situations (p. 6). I would seriously question the assertion that developing embryos within the posterior trunk region "would not greatly affect locomotion" in terrestrial snakes, although it is claimed they would do so in swimming sea snakes (p. 15). Pythons are not the only snakes to have retained elements of the hind limb or girdle (pp. 59-60). The fossil genus *Anomalophis* (not "*Anomalopsis*") should be placed in the Anomalopheidae [sic; should be Anomalophiidae] (see Rage, J.-C. 1984. *Serpentes. Handbuch der Palaeoherpetologie*, Teil 11) rather than the Palaeophiidae (p. 1).

The printing and binding of this book are adequate and the price is quite reasonable. Most of the illustrations are clear and effective, but several of the photographs are poorly reproduced. Typos are few, but tend to occur within scientific names. "*Ptenosphenus*" (for *Pterosphenus*) and "*Palaeophidae*" (for *Palaeophiidae*) (both p. 1) will probably not seriously mislead the reader, but the transposition of Typhlopoidea and Typhlopoidae [sic] on p. 4, Fig. 1.1, might do so.

A significant omission is the lack of a listing of the species of sea snakes, which is surprising when 11 pages are devoted to the "Kinds of Sea Snakes". Heatwole notes the instability of sea snake nomenclature

and even of their familial status, and so would not be expected to provide "the" definitive species list for inclusion in this book. Nevertheless, a provisional listing of commonly accepted species names would have been quite useful to general readers and herpetologists alike. This would be especially true for Australian readers, who may have limited access to Dunson's book, where such information is available.

These few criticisms should not deter any herpetologically-oriented reader from this book. Sea snakes are good examples of adaptive radiations, and this book would be valuable to anyone with interests in reptilian ecology, evolution, physiology, venomology, or zoogeography. Heatwole has contributed greatly to our knowledge of sea snakes through his own research and now by this useful review. Would that similar "state of the art" overviews were available for other herp groups!

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SNAKES: ECOLOGY AND EVOLUTIONARY BIOLOGY. Edited by Richard A. Seigel, Joseph T. Collins, and Susan S. Novak. MacMillan Publ. Company, New York, 1987, xiv + 529 pp., illustrated. \$55.00 (cloth).

Don't judge this book by its cover. The volume is actually attractive once the garish dust cover is removed. Inside, contributors review a number of important topics in snake biology: McDowell (systematics), Rage (fossil history), Cadle (zoogeography), Cundall (functional morphology), Fitch (field techniques), Murphy and Campbell (captive maintenance), Gillingham (social behavior), Seigel and Ford (reproductive ecology), Parker and Plummer (population ecology), Mushinsky (foraging ecology), Vitt (communities), Gregory et al. (movement), Gibbons and Semlitsch (activity patterns), Lillywhite (physiological ecology), and Dodd (conservation). All of the chapters are valuable, up-to-date reviews. The authors have done an outstanding job of including pivotal

recent papers (e.g., B. Jaynes' studies of locomotion, C. R. Peterson's study of thermoregulation) as well as unpublished doctoral dissertations. Each chapter evaluates the state-of-the-art for a particular field and suggests profitable directions for future work.

Cundall, for example, points to the need for functional studies of feeding in primitive snakes. Studies of regional variation in the vertebrae of extant species are needed in order to evaluate the fossil record (Cadle). Gillingham stresses the need for field studies of social behavior (e.g., male combat). Seigel and Ford discuss the neglected but important issue of year-to-year variation in fecundity and other aspects of reproduction. Parker and Plummer point to the lack of population studies of aniliids, boids, uropeltids, and leptotyphlopids. Mushinsky stresses ontogenetic change in diet and mentions the need for studies of juvenile foraging ecology. Vitt emphasizes the need for studies of the morphological dimension of species diversity and for experimental studies of food limitation. The virtual absence of work on gene flow is mentioned by Gregory, Macartney, and Larsen. The need for field study of activity of gravid females is listed by Gibbons and Semlitsch. The effects of prey size on net energy gain should be investigated, according to Lillywhite.

Our knowledge of snakes is not, however, a tabula rasa. Many important generalizations and intriguing facts are presented. (1) Cadle's molecular studies indicate that *Heterodon* is more closely related to *Diadophis* than to *Xenodon*. (2) Swimming involves different muscular mechanisms and is less energy demanding than lateral undulation on land. (3) Avian and mammalian alarm calls can be used to find snakes in the field. (4) Recently, several genera of snakes (e.g., *Elaphe*, *Lampropeltis*, and *Thamnophis*) have been successfully and routinely bred in captivity. (5) Male-male combat is probably a manifestation of competition for mates. (6) Relative clutch mass in egg-layers is about 20% greater than in live-bearers. (7) Small, secretive snakes that are earthworm-specialists (*Carphophis*, *Dia-*

*dophis*, and *Virginia*) attain the highest known population densities.

Every school kid knows that snakes are the best reptiles, but many authors in this volume suffer from lizard-envy, to use Seigel's memorable phrase. Ecological studies on lizards generally have advanced further than work on snakes but ophidian researchers have performed better on some fronts. For example, snakes have provided superior longitudinal data on thermoregulation, perhaps because they are pre-adapted to house radiotransmitters. Snake diets are better known than lizard diets, and stimulus control of feeding has received more attention. Genetical studies on snakes, though primitive by *Drosophila* standards, are more extensive than work on lizards. Finally, snakes are probably better candidates for demographic work on long-lived species than are most lizards.

The book suffers from only minor deficiencies. A southeastern bias, for exam-

ple, creeps into Gibbon's and Semlitsch's otherwise excellent chapter. They discuss diel patterns of activity without mentioning the predominance of nocturnal species in the deserts of the American Southwest and elsewhere. Klauber (1939) presented some of the best data on seasonality of activity, but his results are never cited.

The book beautifully succeeds at its goals of summarizing the scattered literature on snakes and pointing out new directions for research. Anyone working with snakes or contemplating such work will want to own this book.

#### LITERATURE CITED

KLAUBER, L. M. 1939. Studies of reptile life in the arid southwest. *Bull. Zool. Soc. San Diego* 14:1-100.

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#### NEW EDITORS FOR *HERPETOLOGICA*

Two assistant editors joined the staff of *Herpetologica* on 1 March 1988. William Cooper, Jr. (Auburn University at Montgomery) is the new Assistant Editor for Ethology; David Hillis is the new Assistant Editor for Amphibian Systematics and Morphology. Robert Kaplan (Reed College) joined the staff as Associate Editor for Physiology and Reproduction on 1 May 1988. The remainder of the staff continues to be John Iverson (Associate Editor for Reptilian Systematics and Morphology), Raymond Semlitsch (Associate Editor for Ecology), and Robert Jaeger (*Editor*).

#### KUDOS

The *Editor* and the Board of Trustees wish to thank Robert Gatten, Jr., who served *Herpetologica* as Associate Editor from 1985-1988. His critical evaluation of manuscripts has contributed greatly to the quality of this journal.

#### A SALAMANDER AND A CAECILIAN

The drawings on the back cover of *Herpetologica* were contributed by Daniel Holland.

#### HERPETOLOGICAL MONOGRAPHS

Herpetological Monographs No. 3 will be published in June 1989. This may be ordered on the dues envelope that you will receive in September 1988. To order *Herpetological Monographs* No. 2, published in June 1988, send \$9.00 (HL member) or \$18.00 (institution) to: E. Censky, *Publications Secretary, Section of Amphibians and Reptiles, Carnegie Museum, 4400 Forbes Avenue, Pittsburgh, PA 15213, USA.*

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