

pencil marks; it also has a slit in the posterior part of the abdomen. However, it is too large to be a syntype and probably represents Bleeker's illustrated specimen (Bleeker, 1875:pl. 1, fig. 1; 1877:pl. 390, fig. 6). Two of the remaining specimens (the 45.8-mm specimen and the specimen for which a total length could not be determined) differ markedly from all other specimens in RMNH 5926 in their extreme poor condition. The 35.8-mm SL specimen, in particular, lacks scales and fins. On this basis, it seems likely that these two specimens are the syntypes. This is a tenuous argument, however, and the lot was, therefore, not split. With the exception of the 35.8-mm SL specimen, which could not be identified because of its poor condition, all of the specimens in RMNH 5926 are referable to *P. cyanotaenia*.

*Pseudochromis melanotaenia* Bleeker (1863)  
[= *Pseudochromis tapeinosoma* Bleeker, 1853a]

Bleeker (1863) described *Pseudochromis melanotaenia* on the basis of a single 44-mm TL specimen from Atapupu, Timor. He included two specimens, 38 and 44 mm TL, from Atapupu and Ambiona in his 1875 revision. Hubrecht (1879) also listed two specimens, both in the A series. There are two specimens, 37.4 and 41.1 mm TL, in the Nationaal Natuurhistorische Museum under RMNH 5963. Both are referable to *P. tapeinosoma*. The larger of these is identified as the holotype based on size. It is in much poorer condition than the smaller specimen and appears to have been desiccated at some stage. The smaller specimen is now in RMNH 31182.

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## LITERATURE CITED

- BLEEKER, P. 1852. Derde bijdrage tot de kennis der ichthyologische fauna van Celebes. *Nat. Tijdschr. Ned. Ind.* 3:739-782.
- . 1853a. Derde bijdrage tot de kennis der ichthyologische fauna van Amboina. *Ibid.* 4:91-130.
- . 1853b. Vierde bijdrage tot de kennis der ichthyologische fauna van Celebes. *Ibid.* 5:153-174.
- . 1854. Bijdrage tot de kennis der ichthyologische fauna van het eiland Floris. *Ibid.* 6:311-338.
- . 1855a. Zevende bijdrage tot de kennis der ichthyologische fauna van Celebes. *Ibid.* 8:435-444.
- . 1855b. Tweede bijdrage tot de kennis der ichthyologische fauna van Halmaheira (Gilolo). *Ibid.* 9:105-112.
- . 1857. Tweede bijdrage tot de kennis der ichthyologische fauna van Boeroe. *Ibid.* 13:55-82.
- . 1863. Septième mémoire sur la faune ichthyologique de l'île de Timor. *Ned. Tijdschr. Dierk.* 1:262-276.
- . 1875. Sur la famille des Pseudochromidoides et révision de ses espèces insulindiennes. *Verh. Akad. Amsterdam* 15:1-32.
- . 1877. Atlas ichthyologique des Indes Orientales Néerlandaises. Vol. 9. F. Muller, Amsterdam, Netherlands.
- BOESEMAN, M. 1973. Introduction, p. 3-6. In: *Collected fish papers of Pieter Bleeker*. W. H. Lamme (ed.). W. Junk, The Hague, Netherlands.
- DIXON, J. M., AND L. M. HUXLEY. 1982. A catalogue of the Bleeker collection of fishes in the National Museum of Victoria. *Rept. Natl. Mus. Victoria* 1:111-123.
- GILL, A. C. 1990. A taxonomic revision of the fish subfamily Pseudochrominae (Perciformes: Pseudochromidae). Unpubl. Ph.D. diss., Univ. of New England, Armidale, New South Wales, Australia.
- GODKIN, C. M., AND R. WINTERBOTTOM. 1985. Phylogeny of the family Congrogadinae (Pisces; Perciformes) and its placement as a subfamily of the Pseudochromidae. *Bull. Mar. Sci.* 36:633-671.
- HUBRECHT, A. A. W. 1879. Catalogue des collections formées et laissées par M. P. Bleeker. De Breuk and Smits, Leiden, Netherlands.
- MEES, G. F. 1962. A preliminary revision of the Belonidae. *Zool. Verhandl.* 54:1-96.
- MÜLLER, J., AND F. H. TROSCHEL. 1849. *Horae Ichthyologicae. Beschreibung und Abbildung neuer Fische*. 3. Verlag von Kleit and Comp., Berlin, Germany.
- WHITEHEAD, P. J. P., M. BOESEMAN, AND A. C. WHEELER. 1966. The types of Bleeker's Indo-Pacific elopoid and clupeoid fishes. *Zool. Verhandl.* 84:1-159.
- ANTHONY C. GILL, *Department of Herpetology and Ichthyology, American Museum of Natural History, Central Park West at 79th Street, New York, New York 10024. Present address: Department of Zoology, Natural History Museum, Cromwell Road, London SW7 5BD, England. Submitted: 29 Nov. 1993. Accepted: 15 April 1994. Section editor: R. Winterbottom.*

## REVIEWS

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FAUNA OF AUSTRALIA. VOL. 2A, AMPHIBIA AND REPTILIA. C. J. Glasby, G. J. B. Ross, and P. L. Beesley (eds.). 1993. Australian Government Publishing Service, Canberra, Australia. ISBN 0-644-32429-5. 439 p. \$64.95 (hard cover).—At the recent World Congress of Herpetology in Adelaide, bibliophiles lined up at the publisher's table and then marched away clutching copies of this volume, much like a column of leaf-cutting ants. Why was this book so popular?

Part of a series, this volume describes the general biology of the Australian herpetofauna at the levels of class, order, and family. The book consists of 42 chapters by 41 experts. At each taxonomic level, a standard set of topics is covered: a description of the taxon and a history of its discovery is followed by sections on morphology, physiology, natural history, biogeography, and phylogeny. The volume is beautifully produced and pitched at the level of an advanced reference book.

The need for this book is underscored by the immense size of the Australian herpetofauna, 940 species and more on the way. By comparison, the North American field guides by Stebbins (1985) and Conant and Collins (1991) deal with 244 and 331 species, respectively; and the European field guide by Arnold and Burton (1978) covers just 135 species.

The family accounts in this book are especially valuable. Many families in the Australian fauna are so speciose and rich in genera that it is difficult to keep abreast of recent discoveries, much less gain an overview of these large radiations. The family chapters in this book admirably serve these tasks. I was intrigued to learn that the tadpoles of *Litoria coplandi* can occur in water as hot as 45 C (p. 24); the egg masses of *Helioporus eyrei* are commonly preyed on by phorid fly larvae (p. 50); 10% of Australian frog species may have declined or disappeared in the last 15 years (p. 53); introduced foxes (*Vulpes vulpes*) are important predators on turtle nests in some parts of Australia (p. 122); a recently described species of chelid was known only from specimens in the pet trade for two decades before its native habitat was discovered (p. 142-143); introduced water buffalo (*Bubalus*

*bubalis*) may have caused a contraction of the range of the pig-nosed turtle (*Carettochelys insulpta*; p. 155); *Strophurus* geckos can shoot streams of odious glue from glands in their tails (p. 228); chromosome analysis has helped reveal species complexes in several genera of geckos (p. 232); the pattern of digit loss in *Lerista* skinks is unusual in that toes keep their proportions even when reduced in size (p. 266); the homalopsine snake *Fordonia leucobalia* feeds on crabs by envenomating them and breaking off their legs (p. 291); and fewer than five people a year die of snakebite in Australia, although 3000 people are bitten each year (p. 306). In addition to such treasures, there are even-handed treatments of various controversies (e.g., phylogeography of myobatrachid frogs in south Australia, relationships of Australian hylid frogs with frogs of other continents) and useful reviews (e.g., of respiratory specializations in turtles).

The outstanding line drawings in this book immediately seize the attention of even the casual browser. Every chapter has original drawings by talented artists. Many of the most eye-catching drawings capture seldom-seen events, such as a female microhylid with its recently hatched offspring (p. 66), an agamid giving an open-mouth display to a python (p. 248), and male combat in varanids (p. 256). The drawings alone are worth the price of the volume, especially for an instructor of herpetology who wants to dress up otherwise dreary handouts. Photographs are used sparingly, except for 105 spectacular color plates. Unfortunately, these color photographs float disembodied from the text, between the sections on amphibians and reptiles, and are never referenced in the text.

The level of scholarship in this volume is extremely high. Some authors, however, cite only the most recent review, skipping past important classics. Literature surveys are generally thorough and up-to-date. Occasionally, a key reference is not given. For example, papers by Gans (1974, 1985) that describe modes of limbless locomotion are not cited in two relevant sections (p. 179, 291), and a major review by Janzen and Paukstis (1991) on sex determination is never mentioned. Even minor errors of scholarship are rare, but "epigamic" is incorrectly used as an adjective to describe environmental sex determination (p. 196). Epigamic refers to adaptations that promote the union of gametes

(Poulton 1890), especially sexually selected attributes (Huxley 1938); it is not a synonym for environmental. Such rough spots are unusual in this carefully edited volume.

A notion of which authors are having the largest contemporary impact on Australian herpetology can be gained by perusing the bibliographies in this volume. The big hitters are A. E. Greer, H. Heatwole, M. King, C. J. Limpus, E. R. Pianka, R. Shine, G. M. Storr, M. J. Tyler, and G. J. W. Webb, if we crudely judge impact using the criterion of 20 or more papers cited. Thumbing through this volume is an easy way to come up to speed on the output of these prolific authors.

This book is not just for bibliophiles. For a trip to Australia or more distant study of its herpetofauna, you will want this book for its accounts of families and higher taxa, as well as Cogger's (1992) incredible field guide, which gives accounts and figures of individual genera and species. Other less comprehensive but complementary books to consider are the spectacularly designed and illustrated books by Webb and Manolis (1989) and Shine (1991) and the penetrating account of evolutionary issues by Greer (1989). The present volume could serve as a general herpetology text in Australia or as a valuable reference for a herpetology course taught on other continents.

#### LITERATURE CITED

- ARNOLD, E. N., AND J. A. BURTON. 1978. A field guide to the reptiles and amphibians of Britain and Europe. Collins, London, England.
- COGGER, H. G. 1992. Reptiles and amphibians of Australia. Cornell Univ. Press, Ithaca, New York.
- CONANT, R., AND J. T. COLLINS. 1991. A field guide to reptiles and amphibians, eastern and central North America. Houghton Mifflin, Boston, Massachusetts.
- GANS, C. 1974. Biomechanics, an approach to vertebrate biology. Lippincott, Philadelphia, Pennsylvania.
- . 1985. Limbless locomotion—a current overview. *Fortschritte der Zoologie* 30:13–22.
- GREER, A. E. 1989. The biology and evolution of Australian lizards. Surrey Beatty and Sons, Chipping Norton, Australia.
- HUXLEY, J. S. 1938. Darwin's theory of sexual selection and the data subsumed by it, in the light of recent research. *Am. Nat.* 72:416–433.
- JANZEN, F. J., AND G. L. PAUKSTIS. 1991. A preliminary test on the adaptive significance of environmental sex determination in reptiles. *Evolution* 45: 435–440.
- POULTON, E. B. 1890. The colours of animals, their meaning and use, especially considered in the case of insects. Kegan Paul, Trench and Truber, London, England.
- SHINE, R. 1991. Australian snakes, a natural history. Cornell Univ. Press, Ithaca, New York.
- STEBBINS, R. C. 1985. A field guide to western reptiles and amphibians. Houghton Mifflin, Boston, Massachusetts.
- WEBB, G., AND C. MANOLIS. 1989. Australian crocodiles. Reed, Chatswood, England.
- STEVAN J. ARNOLD, *Ecology and Evolution, University of Chicago, Chicago, Illinois 60637.*

THE AMPHIBIANS AND REPTILES OF ALBERTA. Anthony P. Russell and Aaron M. Bauer. 1993. University of Calgary Press, Calgary, Alberta, and University of Alberta Press, Edmonton, Alberta, Canada. ISBN 1-895176-20-4, 1-895176-46-8, 0-88864-261-X, 0-88864-262-8. 264 p. \$29.95 (hardcover) and \$24.95 (paperback).—With the American Society of Ichthyologists and Herpetologists about to meet in Edmonton in 1995, I was pleased to be given the timely opportunity to review Russell and Bauer's book on the amphibians and reptiles of Alberta. Alberta's herpetofauna is a small one (18 species); but it has an interesting mix of species, and there are some special challenges for amphibians and reptiles in that province that make these animals all the more interesting.

Russell and Bauer have written a fairly short book that is part field guide and part general introduction to the biology of amphibians and reptiles. Their aim is "... to raise the level of awareness about the amphibians and reptiles of this province and to provide a base of information that we hope can be added to as time passes." It is always difficult to know to what extent one can be successful with such an objective, because it seems most likely that those who buy this book will be those who already have an interest in the subject. Nonetheless, for the layperson who wants to begin learning about amphibians and reptiles, this book would not be a bad place to start.

The field guide section of the book is sandwiched between chapters on the biology of these animals. Following a brief introductory chapter, we have a chapter describing the various groups of amphibians and reptiles and their characteristics, followed by short chapters on the herpetofauna of Alberta and on how to observe amphibians and reptiles (with appropriate cautions about not collecting animals and about safety in road-cruising). Chapter 5, A Guide to

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