

Hats off to McWilliams, Brauning, and their many contributors, on a very fine book. I heartily recommend it. It is a work for which the authors can be justly proud. This book ably fills a void in the literature and deserves a space on the bookshelf next to the *Atlas of Breeding Birds in Pennsylvania* (Brauning 1992). It is an essential reference that belongs in all university libraries of the region or any library that aspires to have a good ornithological collection. Birders and academics alike should own it. I hope to see updated and improved editions of this standard reference book in years to come.—DOUGLAS A. GROSS, 144 Winters Road, Orangeville, Pennsylvania 17859 USA. E-mail: dougross@sunlink.net

LITERATURE CITED

- BRAUNING, D. W., ED. 1992. *Atlas of Breeding Birds in Pennsylvania*. University of Pittsburgh Press, Pittsburgh, Pennsylvania.
- GROSS, D. A. 1998. Birds: A review of status in Pennsylvania, pages 137–170 in *Inventory and Monitoring of Biotic Resources in Pennsylvania* (J. D. Hassinger, R. J. Hill, G. L. Storm, R. H. Yahner, Technical Coordinators), Pennsylvania Biological Survey, University Park.
- POOLE, E. L. 1960. Unpublished manuscript, Department of Ornithology. Pennsylvania Academy of Natural Sciences, Philadelphia.
- POOLE, E. L. 1964. *Pennsylvania Birds: An Annotated List*. Livingston, Narbeth, Pennsylvania.
- PRICE, T., S. DROEGE, AND A. PRICE. 1995. *The Summer Atlas of North American Birds*. Academic Press, San Diego, California.
- ROSENBERG, K. V., AND J. V. WELLS. 1996. Importance of geographic areas to Neotropical migrant birds in the Northeast. Report submitted to U.S. Fish and Wildlife Service, Hadley, Massachusetts.
- TODD, W. E. C. 1940. *Birds of Western Pennsylvania*. University of Pittsburgh Press, Pittsburgh, Pennsylvania.
- WARREN, B. H. 1890. *Report on the birds of Pennsylvania*. 2nd ed., revised and augmented. State Board of Agriculture, Harrisburg, Pennsylvania.
- WOOD, M. 1979. *Birds of Pennsylvania, when and where to find them*. Pennsylvania State University, University Park.
- cut. 462 pp., 64 color plates, numerous maps and line drawings. ISBN 0-300-07920-6. Cloth, \$50.—Humans are fascinated with owls, and many birders and ornithologists seem to have an insatiable appetite for books on this enigmatic group of predators. Authors with little direct experience with owls have been quick to exploit this fascination, resulting in a spate of owl books that leave much to be desired. Thus, the appearance of a new book coauthored by noted owl researcher Claus König was welcome news to those of us who have been less than satisfied with several of the recent owl books produced by nonspecialists. König and his colleagues (most notably Petra Heidrich and Michael Wink) have been very active in describing new species of owls based on the application of molecular techniques and the understanding that vocalizations provide valuable clues about species limits in strigiforms. The notion that the number of owl species in the world has been vastly underestimated is reflected in the fact that 10 years ago, Hume and Boyer (1991) recognized only 151 species (13 tytonids, 138 strigids). Owing in large part to the work of König and his colleagues, del Hoyo et al. (1999) recently recognized 205 species of owls (16 and 189, respectively). In this new book, König et al. go even further than *Handbook of the Birds of the World* in recognizing 18 tytonids and 195 strigids, for a grand total of 213 species. Two species have been described since König et al. went to press (Rasmussen 1999, Rasmussen et al. 2000), and several more are in the works. Thus, the species tally in the next few years is likely to be much larger than that treated by König et al.
- The stated purpose of the book is to serve as an identification guide and an information source on the ecology and biology of owls. The introductory material includes brief but sound treatments of morphology and anatomy, topography, food habits, behavior, breeding biology, vocalizations, taxonomy, and conservation. Also included is a 19-page chapter by Wink and Heidrich entitled "Molecular Evolution and Systematics of the Owls (Strigiformes)" in which they summarize their research on owl phylogeny on the basis of mitochondrial DNA.
- The meat of the book occurs in its illustrations and species accounts. Each species is depicted in a color plate (oftentimes three or more illustrations per species), and the species accounts provide a range map and information on identification, vocalizations, distribution, movements, habitat, physical description, measurements, geographic variation (when present), habits, food, breeding, and status and conservation. The book includes an erratum sheet to correct mistakes on one of the plates and on five of the range maps. At least one other map, that for the recently rediscovered Forest Owlet (*Athene blewitti*), however, also is in need of correction (see Rasmussen and Colar 1998). Each species account concludes with a list of references.

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Owls: A Guide to the Owls of the World—Claus König, Friedhelm Weick, and Jan-Hendrik Becking. 1999. Yale University Press, New Haven, Connecticut.

How well does this book serve its purpose? In terms of providing an up-to-date list of the world's owls (but see below) and summarizing what is known about some of the more poorly known species, this book has no equal except for the lavishly produced and thus more expensive fifth volume of *Handbook of the Birds of the World*. The illustrations are adequate, although the colors are often washed out such that the irides and plumage of many species are much duller than they should be, and the subtle plumage characters that might allow one to separate similar species are not always readily apparent. For temperate North America and Eurasia, at least, existing field guides do a much better job in allowing one to identify the various species of owls by sight. In the tropics, however, the appearance of many owls, especially *Otus* and *Glaucidium*, provides little clue as to species identification, and one must rely on voice. Sadly, the CD that is to be the companion to this book, and said to provide vocalizations of ~90% of the world's owls, was not available when we wrote this review nearly a year after the book appeared. On balance then, this book's value as an identification tool will be most useful in areas not covered by standard field guides, and then probably only in conjunction with the CD.

As an information source on the ecology and biology of owls, this book falls far short of summarizing current knowledge for many of the species. Indeed, it is almost as though König et al. made a conscious effort to ignore most of the literature published in English during the last 15 years. Similarly, many North American authors have been guilty of ignoring parts of the vast literature on owls that was published in Europe in the second half of the twentieth century, but that is no excuse for the weak treatment of the literature by König et al.

Anyone who has kept up with the owl literature will be surprised to find that the book's bibliography of more than 700 citations contains not a single reference to the works of Jim Belthoff, Eric Forsman, Rocky Gutiérrez, Greg Hayward, Denver Holt, Stu Houston, Erkki Korpimäki, Carl Marti, Gary Ritchison, Geir Sonerud, and the authors of this review, to name but a sample of people who, over the last 20 years, have published more than a dozen papers apiece on owls. Moreover, many of the papers cited at the end of the species accounts are missing from the bibliography. A check of the species accounts for taxa that occur in the United States and Canada revealed 40 citations in the terminal list of references that are not in the bibliography, scores of important papers that have been omitted, and dozens of citations that are inappropriate. For example, why is Monroe's (1968) monograph on birds of Honduras cited in the species account for Barred Owl (*Strix varia*) when the species does not occur there? And what is the value in citing the National Geographic Society's *Field Guide to the Birds of North America* in the

account for Northern Saw-whet Owl (*Aegolius acadicus*)? Further, the references for the species accounts of Flammulated Owl (*Otus flammeolus*), Eastern Screech-Owl (*O. asio*), Great Horned Owl (*Bubo virginianus*), Spotted Owl (*Strix occidentalis*), Elf Owl (*Micrathene whitneyi*), Burrowing Owl (*Athene cunicularia*), Boreal Owl (*Aegolius funereus*), Northern Saw-whet Owl, Long-eared Owl (*Asio otus*), and Short-eared Owl (*A. flammeus*) are so incomplete that they can fairly be described as pitiful. This is completely unacceptable given that *Birds of North America* (BNA) species accounts were available for 13 owl species well before König et al. went to press. In fact, only one BNA account, for the Burrowing Owl (Haug et al. 1993), is cited in the book. We suspect that part of the problem is that König et al. compiled most of their literature long before writing the book, and then failed to update their references. It is also evident that the book received no more than cursory attention from the publisher's editorial staff nor any peer review by North Americans who were familiar with the recent literature on strigiforms (or if such input was obtained, it was ignored).

Two kinds of systematic revisions are included in this book. First, in several cases previously recognized polytypic species are split into multiple species-level taxa. Second, novel conclusions about higher-level relationships within owls are drawn; many of the latter are in the chapter on DNA sequencing results by Wink and Heidrich. Decisions about the species-level taxa of owls have always been difficult, largely because vocal differences, rather than plumages, seem to be important to the birds but are rarely associated with the museum voucher specimens that are used by systematists. Consequently, depending on how much is known about voice and on the taxonomic philosophy of the author, owl taxonomies tend to be more idiosyncratic than are treatments of other groups of birds. König et al. are splitters. They recognize more species-level taxa than have previous authors, relying more on vocalization differences, but occasionally simply on possible allopatric distributions (e.g. *Otus lambi*). We find this troublesome in cases where taxonomic revisions are made without precise sonogram, specimen, or locality information, and without normal peer review. Forms such as *O. roraimae* and *O. usta* may indeed be species-level taxa, but the argument presented in this book is too abbreviated to evaluate the issue, and unless more detailed publications appear, the logic and justification will not be available for further consideration.

The higher-level systematic results reported by Wink and Heidrich are based on 300 to 1,040 base pairs of DNA sequence of the mitochondrial cytochrome-*b* gene. This molecular work involved multiple representatives from most of the larger genera of owls. Many of the phylogenetic results obtained are encouraging: congeneric species tend to form clades, and some generally accepted opinions, such

as the allocation of the genus *Phodilus* to the Tytonidae, are confirmed. Relationships that make biogeographic sense, such as the monophyly of New World *Otus* and of Old World *Otus*, are recovered. Other results are surprising: the two *Otus* clades are not sister groups, and *Ketupa* and *Nyctea* are deeply embedded within *Bubo*. Overall, however, these molecular results are not very robust and ought not to be used as the basis for a revision of owl taxonomy. Alternate methods for inferring phylogenetic trees were used, such as parsimony, likelihood, and neighbor-joining, and they led to some surprisingly different results. In addition, the usually employed indices of robustness in phylogenetic analyses, such as bootstrap confidence levels for nodes on trees, are moderately high only for some nodes in the neighbor-joining tree. For example, they range from 0.5 to 0.7 for older, intergeneric relationships, but for the most part are less than 0.5 for the parsimony analysis. Much more mitochondrial data or slower-evolving nuclear genes are going to be required to settle the problem of intergeneric relationships among owls. It is fortunate, therefore, that König et al. have not adopted many of the DNA results in their classification. For example, most New and Old World *Otus* remain in that genus, and the Snowy Owl remains in *Nyctea*. However, *O. leucotis* becomes *Ptilopsis leucotis* and *P. granti* (taxa that may be more closely related to *Asio* than to *Otus*), and *Ketupa* and *Ciccaba* are merged into *Bubo* and *Strix*, respectively.

Despite our criticisms, König et al.'s *Owls* will be useful as the only medium-sized (and thus easily transported) book that illustrates and discusses all of the world's owls and as a source for many of the latest thoughts about owl systematics. However, readers must be cognizant of the fact that the lack of scholarship revealed in this book renders it nearly useless as a modern summary of what is known about the biology of the world's owls. The door continues to remain wide open for someone to tackle the challenging task of adequately synthesizing the current literature on the more than 200 species of strigiforms thought to occur in the world today.—JEFFREY S. MARKS, *Montana Cooperative Wildlife Research Unit, University of Montana, Missoula, Montana 59812, USA. E-mail: jmarks@selway.umt.edu* GEORGE F. BARROWCLOUGH, *Department of Ornithology, American Museum of Natural History, Central Park West at 79th Street, New York, New York 10024, USA. E-mail: gfb@amnh.org*

LITERATURE CITED

- DEL HOYO, J., A. ELLIOTT, AND J. SARGATAL, Eds. 1999. *Handbook of the Birds of the World*, vol. 5. Lynx Edicions, Barcelona, Spain.
- HAUG, E. A., B. A. MILLSAP, AND M. S. MARTELL. 1993. Burrowing Owl (*Speotyto cunicularia*). In *The Birds of North America*, no. 61 (A. Poole and F. Gill, Eds.). Academy of Natural Sciences, Philadelphia, and American Ornithologists' Union, Washington, D.C.
- HUME, R., AND T. BOYER. 1991. *Owls of the World*. Dragon's World, Limpsfield, United Kingdom.
- MONROE, B. L., JR. 1968. A distributional survey of the birds of Honduras. *Ornithological Monographs*, no. 7.
- RASMUSSEN, P. C. 1999. A new species of hawk-owl *Ninox* from North Sulawesi, Indonesia. *Wilson Bulletin* 111:457–464.
- RASMUSSEN, P. C., AND N. J. COLLAR. 1998. Identification, distribution and status of the Forest Owl-let *Athene (Heteroglaux) blewitti*. *Forktail* 14:41–49.
- RASMUSSEN, P. C., T. S. SCHULENBERG, F. HAWKINS, AND R. VONINAVOKO. 2000. Geographic variation in the Malagasy Scops-Owl (*Otus rutilus* auct.): The existence of an unrecognized species on Madagascar and the taxonomy of other Indian Ocean taxa. *Bulletin of the British Ornithologists' Club* 120:75–102.

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A Manual for Wildlife Radio Tagging—Robert E. Kenward. 2000. Academic Press, London, United Kingdom. x + 311 pp., 107 text figures. ISBN 0-12-404242-2. Cloth, \$65.00.—Radio tagging provides a convenient and cost-effective means of remotely monitoring the physiology, movements, resource selection, and demographics of wild animals. Consequently, radio tagging has become an important and attractive tool for ecologists. The past 10 years have been a particularly interesting time for users of telemetry. Radio tags have become smaller and more reliable; advancing technologies such as satellite telemetry, global positioning systems, and user-friendly, PC-based geographic information systems (GIS) have emerged; and new data-analysis techniques to incorporate those advancements are numerous and impressive. Despite those advancements, there has been no up-to-date synthesis on radio tagging wild animals. Kenward's *A Manual for Wildlife Radio Tagging* fulfills an important niche. In this book, Kenward has provided a scholarly review of study planning, available equipment, tag-attachment methods, and data-collection techniques in an informative and timely text. Assuredly, anyone embarking on a radio-tracking study, particularly first-time telemetry users, would benefit from Kenward's keen insight and cogent recommendations.

This book updates Kenward's *Wildlife Radio Tagging: Equipment, Field Techniques and Data Analysis*