

might expect and thus rarely come into the forefront of interest. I was slightly puzzled by the chapter on avian parental care. First, Ligon repeatedly states that his book does not deal with parental behavior. Yet, as this chapter makes clear, it is virtually impossible to understand sexual selection and mating behavior without it. Second, the ancestral state of avian parental care, as well as phylogenetic transitions, are contentious issues, and Ligon makes clear his favorite views. Nevertheless, I found it unsatisfactory that the only rigorous study that was based on a large data set (McKittrick 1992) was mentioned only briefly, whereas other somewhat more hypothetical scenarios were discussed and praised at length.

Chapters 11 to 16 provide excellent syntheses of social monogamy, extrapair copulations, polygyny, cooperative breeding, and classical polyandry and include many detailed case studies of some of the best-known avian systems. However, I have the feeling that some of Ligon's conclusions are premature. For example, Ligon concurs with David Lack that monogamy (associated with biparental care of young) must be the most productive mating system for most birds (p. 265). To demonstrate that socially monogamous birds achieve higher reproductive success than deserting ones, one needs to show that (1) the payoff from staying with the mate and caring for the young exceeds (2) the payoff from desertion (i.e. reproducing with a new mate and/or improving survival until future breeding seasons) for males and females. Although simple male-removal experiments (summarized in his table 11.1) potentially could estimate (1) for the male, they neither investigate (2) nor say anything about the payoffs for the female. Because behavior (e.g. caring/deserting decisions) and qualities (e.g. body condition, attractiveness) may be phenotypically correlated, both (1) and (2) must be estimated experimentally. As far as I know, this has not been done fully with any socially monogamous bird.

The "Conclusions" propose several interesting lines of research for further investigation. I fully concur with the author that new phylogenetic studies are required to understand the evolutionary history of mating behaviors. However, I was somewhat surprised that Ligon does not express concern that much of our current information on the costs and benefits of certain mating systems (e.g. classical polyandry) is based on observational studies and thus is open to alternative explanations. Few research projects have estimated fully the major components of mating decisions from a life-history perspective, especially for both sexes. In my view, additional experiments, preferably in the natural habitats of various bird species, remain necessary to have a better understanding of why a particular mating behavior occurs in one species but not in another.

Overall, I liked this book because it condenses a

wealth of information. The book is timely, because studies of mating behavior are rapidly proliferating. Also, the basic questions and some of the research methodologies have been defined, but luckily controversial issues exist that still attract students and keep researchers busy. However, I was disappointed to find little mention of recent advances in theoretical models of sexual selection. Some of these models focus on a single sex and use standard optimization procedures (e.g. static optimization), whereas others explore the interactions between individuals using a game-theoretic approach. The latter are particularly important for analyzing the conflicting interests of males and females that lie at the heart of sexual selection. From a broader perspective, theories often have a major influence on the way empiricists think about their favorite animal. In turn, influential empirical studies frequently motivate modelers to focus on some specific questions in a rigorous way. Thus, my point is that the feedback between contemporary theoretical and empirical research is one of the cornerstones of research in animal behavior, and much remains to be learned by integrating such approaches in studies of mating behavior.

These concerns should not reduce the value of this ambitious book, which is the best review available on avian mating systems. Overall, I found the book to be strong in factual information and packed with good natural history, although it is less useful if you want to update your knowledge about the theoretical foundation of mating behavior and match these theories with current empirical studies. I highly recommend this book to professional and amateur ornithologists. Unfortunately, it is quite expensive at \$98, so many students and amateur bird fans probably will not be able to buy it. In any case, it is well worth recommending it to your institution's library.—TAMÁS SZÉKELY, *Centre for Behavioural Biology, University of Bristol, Bristol BS8 1UG, United Kingdom.*

LITERATURE CITED

- MCKITTRICK, M. C. 1992. Phylogenetic analysis of avian parental care. *Auk* 109:828–846.
 REYNOLDS, J. D. 1996. Animal breeding systems. *Trends in Ecology and Evolution* 11:68–72.

The Auk 117(2):532–534, 2000

Handbook of the Birds of the World, Volume 5, Barn-owls to Hummingbirds.—Edited by Josep del Hoyo, Andrew Elliott, and Jordi Sargatal. 1999. Lynx Edicions, Barcelona, Spain. 759 pp., 76 color plates,

406 color photographs, 758 distribution maps, 10 figures and tables. ISBN 84-87334-25-3. Cloth, \$185.00.—With the appearance of Volume 5 (of a projected 12 volumes) of this series, reviewers are running out of superlatives. To embark upon the task of producing a fully illustrated handbook covering every species of bird in the world is audacious enough; to actually bring it off at the level of quality established in this series will be an incredible accomplishment. At this point, the odds of completing the series sometime near the target of 2010 look very promising indeed. Not only is the book comprehensive and authoritative, it is also beautiful. Despite the wealth of detailed information that is de rigueur in a work of this sort, the text, especially the lengthy treatments of each of the families, is very readable in spite of being packed with interesting facts.

This volume covers the families Tytonidae (barn-owls; 16 species), Strigidae (true owls; 189 species), Steatornithidae (Oilbird; 1 species), Aegothelidae (owlet-nightjars; 9 species), Podargidae (frog-mouths; 12 species), Nyctibiidae (potoos; 7 species), Caprimulgidae (nightjars; 89 species), Apodidae (swifts; 92 species), Hemiprocnidae (tree-swifts; 4 species), and Trochilidae (hummingbirds; 328 species). Several of these are difficult groups. The nocturnal owls, nightjars, and allies often are poorly known, and very few species have been studied in detail. In these groups, as well as in the swifts and hummingbirds, the relationships of genera and species limits are not well understood.

As with previous volumes, this one contains a foreword dealing with some general topic. In this case, Nigel Collar discusses risk indicators and status assessment in birds. He describes, with examples, the IUCN system for classifying the conservation status of bird populations. After discussing the criteria used to identify species at risk, Collar concludes that "... the single most important perception that follows from the criteria ... is that the majority of extinction-prone species can only be secured by protected areas, many of them large, many of them strict; only, in other words, by setting aside significant tracts of the planet with the full intention that the factors rendering their inhabitants extinction-prone shall be absolutely minimized" (p. 26). This, of course, is not news, but perhaps if we repeat it enough times we will someday actually do something about it. It is possible that he thought the connection so self evident as to require no explicit comment, but I think it unfortunate that he made no mention whatsoever of unrestrained growth in the human population, the direct cause or exacerbating factor in virtually all of the problems faced by bird populations that are at risk.

Each family is introduced with a lengthy discussion that includes information on the fossil record and taxonomic history of the family, morphology, habitats occupied, general habits with many specific

examples, voice, food and feeding habits, breeding behavior and ecology, movements, relationships with humans (an eclectic collection that is fun to read), and status and conservation. These family accounts are heavily illustrated with stunning photographs that are not only technically superb in nearly all cases, but also illustrate a vast array of interesting aspects of the biology of these birds. The photos are not just present as pretty pictures (though they are surely that), because most of them make some salient point related to the accompanying text. Simply locating all of these photographs must have been a daunting task. Given that many of the species treated in this volume are nocturnal and poorly known, it is remarkable that such excellent images even exist. Many rare photos and photos of rare species appear: Congo Bay-Owl (*Phodilus prigoginei*), a species with only two definite records from a single locality; Long-whiskered Owllet (*Xenoglaux loweryi*), a cloud-forest endemic discovered in Peru in 1977; Sokoke Scops-Owl (*Otus irenae*); Seychelles Scops-Owl (*O. insularis*); Comoro Scops-Owl (*O. pauliani*), known only from the type specimen and a few photos; the only known photo of Javan Scops-Owl (*O. angelinae*); Forest Owllet (*Athene blewitti*), rediscovered in 1998 in India; Puerto Rican Nightjar (*Caprimulgus noctitherus*); Scissor-tailed Hummingbird (*Hylonympha macrocerca*) of northeastern Venezuela; Juan Fernandez Firecrown (*Sephanoides fernandensis*); and numerous others. As other reviewers have noted, these volumes easily qualify as beautiful coffee table books as well as serious scientific works.

The species accounts come after the treatment of each family and follow a standard format. French, German, and Spanish common names are provided. Taxonomic notes follow, including reference to the original description (citations provided in a separate reference list). Distribution is described, and if there are recognized subspecies, their ranges are very briefly noted. Each species account is accompanied by a range map. These appear to be generally accurate, but they are small and not detailed. A description is given for sexes and ages, including a verbal description of vocalizations. The descriptions are not designed to facilitate field identification, and little note is made of features that distinguish similar species. Then follow brief descriptions of habitat, food and feeding habits, breeding season, nest, clutch size, etc., movements, and status and conservation. Each account ends with a list of citations by name and date; full references appear in the bibliography. Information on many of these species is scant, so most of the species accounts are short (typically about a half column). The extensively studied and worldwide Barn Owl (*Tyto alba*) merited the longest account in the series so far (one and two-thirds pages).

The species accounts are accompanied by color plates by 19 artists. Each species is illustrated, and in cases where significant geographic variation or color

morphs exist, there may be as many as three or four illustrations per species. Both sexes are depicted when there is significant sexual dimorphism in plumage. The birds are presented in unadorned field-guide type plates, typically in perched poses. Swifts are depicted in flight, and small flight paintings accompany many of the nightjars as well. The plates vary somewhat in accuracy, but overall they are excellent.

In such a massive volume containing so much factual information, there must be a substantial number of errors and omissions. Experts on particular species and groups will no doubt delight in pointing these out. In general, extralimital records are very inconsistently presented. In North America, for example, Texas occurrences of Mottled Owl (*Ciccaba virgata*) and Stygian Owl (*Asio stygius*), many records of Plain-capped Starthroat (*Heliomaster constantii*) in Arizona and Bahama Woodstar (*Calliphlox evelynae*) in Florida, and Cinnamon Hummingbird (*Amazilia rutila*) occurrences in Arizona and New Mexico are not mentioned, whereas old and probably invalid Texas records of Rufous-tailed Hummingbird (*A. tzacatl*) are noted. The Green Violet-ear (*Colibri thalassinus*) is said to stray to the extreme southwestern United States, when in fact the records are from the central and eastern parts of North America. A bird reported (p. 413, 420) to be a Black Swift (*Cypseloides niger*) of Caribbean origin from Martha's Vineyard, Massachusetts, was never identified and may, in fact, have been an *Apus* (W. Petersen pers. comm.). These are quibbles; the book was not intended to deal with distribution in this detail. However, readers should be warned that this information should be taken with a grain of salt.

The most serious flaw in these volumes, and one that reduces their usefulness, is that references are not cited in the text. Reading the family accounts, one comes across many interesting and provocative statements and fascinating facts that merit further exploration. But the text provides no efficient way to find the source of the information. At the end of each family account appears an extensive list of references, but without titles. The only way to try to ferret out the source of a particular piece of information is to check each of these citations against the bibliography. All but the most persistent readers will throw up their hands in the face of this task. The usefulness of future volumes would be greatly enhanced by using small superscript numerals or some other space-efficient means of connecting information with its source. Approximately 8,000 references are cited, and it is a shame that this vast collection of data is not made more accessible.

This volume, along with its companions, represents a stunning achievement. Collectively, this set of volumes will be the indispensable primary source of information on the birds of the world for the next several decades.—KENNETH P. ABLE, *Department of*

Biological Sciences, State University of New York, Albany, New York 12222, USA.

The Auk 117(2):534–536, 2000

Bull's Birds of New York State.—Edited by Emanuel Levine. 1998. Cornell University Press, Ithaca, New York. xx + 622 pp., 7 maps, 6 figures, 8 tables, 30 black-and-white sketches. ISBN 0-8014-3404-1. Cloth, \$39.95.—State bird books serve many functions and assume many formats. Some works contain lavish illustrations and provide copious detail on the precise status of every species known to have occurred in a particular region; others are either so superficial or so provincial that they provide little of interest to anyone except a reader with a specific interest only in the bird life of a particular state. *Bull's Birds of New York State* provides a pleasing blend of regional information in a format that is both informative and reader friendly. A 50th anniversary project of the Federation of New York State Bird Clubs, this publication is the product of a collegial effort involving individuals, institutions, and organizations combining their talents to produce a valuable contribution to the ornithological literature of the Empire State. This reference substantially updates John Bull's 1974 treatise, *Birds of New York State*, by effectively integrating information published in Andrlé and Carroll's (1988) *The Atlas of Breeding Birds in New York State* and field reports gleaned since 1974 from the Federation's quarterly journal, *The Kingbird*. From the latter source, the majority of unusual reports and all of those representing new species or new breeding records for New York have been carefully screened by the New York State Avian Records Committee.

Besides the species accounts, which represent the main body of the volume, there is much useful information to recommend in the introductory sections of this book. In keeping with the tradition found in most state bird books, the physical environment of New York is described in considerable detail. In addition to including a revision of Bull's 1974 narrative of New York's physical environment, this book provides a 12-page description of the ecozones of the state, along with a colored ecozone boundary map and maps showing elevation contours and landcover types. Although it is nice to have this information between two covers, the fact that much of the material was previously published in *The Atlas of Breeding Birds in New York State* adds an element of redundancy. The inclusion of this material apparently is justified by the fact that many of the species accounts