

ORNITHOLOGICAL LITERATURE

THE HERONS OF THE WORLD. By James Hancock and Hugh Elliott. Harper and Row, New York, 1978: 304 pp., 61 color plates, 10 halftone drawings, 4 pages of maps. \$65.00.—When I first began to explore the ornithological literature some 40 years ago, the great color-illustrated monographs of the 19th and early 20th centuries held a particular fascination for me, epitomizing a bygone era of opulence. As a child of the Depression years, I wondered what it must have been like to order routinely for one's personal library (always envisioned with a balcony and a fireplace) such works as those of Gould, D. G. Elliott, Selater, and Sharpe. It never seemed right to learn of a dollar cost for such treasures—somehow it seemed more appropriate that they should be priced in guineas.

The incessant flow of bird books in subsequent years has been mentioned by many authors and reviewers. Most of these books, if illustrated in color, have been regional, either such elaborate and costly works as Bannerman on West Africa, the British Isles, and the Atlantic Islands, or field guides to satisfy the needs of the increasingly peripatetic army of bird watchers.

More recently we have seen a return to the publication of large, relatively expensive monographs of taxonomic groups of birds, started by Delacour's "Pheasants of the world" (1951), and including such works as Brown and Amadon's "Eagles, hawks and falcons of the world" (1969), Delacour and Amadon's "Curassows and related birds" (1973), Forshaw's "Parrots of the world" (1973) and "Birds of paradise and bower birds" (1977), Ripley's "Rails of the world" (1977), and too many books on waterfowl and owls to possibly list. Some family monographs have been somewhat more modest in format and less lavishly illustrated, such as Gilliard's "Birds of paradise and bower birds" (1969), Goodwin's "Pigeons and doves of the world" (1967) and "Crows of the world" (1976).

Taking an honored place among these monographs is the beautifully produced book on herons by James Hancock and Sir Hugh Elliott. Although it has some flaws, as an example of the fine art of the bookmaker (designed by London Editions Ltd., with printing and binding by Amilcare Pizzi of Italy) it is equalled or surpassed only by Ripley's rail monograph and the original edition of Forshaw on parrots, and, at $9\frac{1}{2} \times 14 \times 1\frac{1}{4}$ in., is a much more manageable size than either of the others.

Although the texts of such books should be their most definitive features, most people who have thumbed through the heron monograph have commented to me on the plates; these tend to be quickly (and often superficially) evaluated by those who have neither the time nor the inclination to *read* the book. In deference to this first-impressions approach, therefore, I will begin with my own commentary on the illustrations. The halftones are all by Robert Gillmor, surely England's (if not the world's) most productive bird artist, and the color plates are by Gillmor and a lesser-known English artist, Peter Hayman. Although Hayman's paintings are not really *bad*, they seem to be responsible for most of the negative reactions to this book that I have heard, though I tend to prefer them to the anatomically impossible grotesqueries in "Rails of the world." Hayman does not yet belong in the league of Gillmor, Gilbert, Eckelberry, Tudor, and other illustrators of recent major works. Many of his paintings are annoyingly stiff, looking as if they had been painted directly from mounted birds: see, for example, the 4 *Botaurus* and the tiger-herons. Hayman also tends to adhere to the school of bird art

that believes every feather should be shown; compare his plate of the white *Ardeola idae* with Gillmor's paintings of the various white egrets. The 2 Cattle Egret (*Bubulcus ibis*) figures on Gillmor's plate stand 17 and 13 cm high, and Gillmor understands that if living Cattle Egrets were at a distance from the observer such that their *apparent size* were 17 and 13 cm, the eye would simply not see the margins of each of the white body feathers. Although most of Hayman's figures are no more than profiles of standing birds, a few of his paintings are more lively and successful, such as the series of *Ixobrychus* bitterns flying and at the nest. His most daring attempt, a head-on view of the Boat-billed Heron (*Cochlearius cochlearius*) in display, verges on the disastrous, as he does not understand such matters as the interrelationships of feather tracts and the anatomy of legs. The very broad crest feathers, which number fewer than 2 dozen (see photograph in Rand 1966), are shown as approximately 80 narrowly linear feathers. Fortunately the species account of *Cochlearius* is also illustrated by a small halftone by Gillmor, showing the species in a more relaxed and lifelike pose.

Gillmor's paintings always seem more alive, even if the bird is portrayed in a simple profile and not "doing" anything. Frequently, however, his herons are shown in typical foraging positions. He often uses 2 or more figures on a plate showing characteristic poses such as birds with necks extended and drawn back. In general, I find Gillmor's paintings highly attractive, although in a few instances (presumably species with which he has had little or no field experience), he fails to catch the "jizz" (as the British call the general distinctive overall appearance and attitude); in this category I would place his plates of the Little Blue (*Egretta caerulea*) and Tricolored (= Louisiana) (*E. tricolor*) herons. His foraging Reddish Egret (*E. rufescens*) is properly lively, but not nearly shaggy enough. For a few little-known species, his plates are almost as stiff as those of Hayman, notably the 4 species assigned in this book to the genus *Gorsachius*. In connection with the latter genus, it is a pity that only the adults of *melanophus* and *leuconotus* were portrayed, as their juvenal plumages are far more different from the adults than are those of the figured *Ardea cinerea* and *goliath*; similarly only the blue definitive plumage of *Egretta caerulea* is shown, although the white-to-blue plumage sequence of this species is unique.

The authors have given special attention in the text to the "soft part colors," which are notoriously changeable with the seasonal cycles of herons, but those in the plates do not always agree with the text descriptions. In particular, the bills of *Ixobrychus* sp. and the adjacent facial skin look as if they were painted directly from dried specimens.

The maps, gathered together in the back of the book, are well done and easily understood. However, maps are presented *only* for *Ardeola*; the "Little Egret-Reef Herons superspecies" (which unaccountably omits *Egretta thula*, surely an allospecies of *E. garzetta* and considered conspecific with it by Curry-Lindahl [1971]); *Botaurus*; the "Great Herons"; the "Tropical Night Herons" (= *Gorsachius* of this book); and "The Grey Superspecies plus the White-necked Heron." The latter map omits the breeding population of *Ardea herodias* on islands off the Venezuela coast. No explanation is given as to why maps were restricted to these groups; maps of the distributions of *Ixobrychus*, *Butorides*, and *Nycticorax*, for example, would have been highly instructive.

The authors are uniquely qualified to write a monograph on herons with an emphasis on the living birds, in contrast to earlier works that have stressed morphological characters. Mr. Hancock has travelled almost worldwide in connection with his business interests, and has taken every possible opportunity to study herons in the field. Sir

Hugh Elliott, President of the B.O.U. since 1975, is rightly described in the dust-jacket blurb as being one of Britain's most travelled ornithologists. The authors reckon that between them, they have seen in the field some $\frac{3}{4}$ of the 61 species of herons recognized in their book, and have visited all major portions of the world inhabited by herons except central Asia and New Zealand.

Turning now to the text, the species accounts are preceded by the apparently mandatory Foreword by Roger Tory Peterson, an introduction, and brief ($2\frac{2}{3}$ to 4 pages) chapters on plumage and molt, breeding, feeding, migration and dispersal (half of which is devoted to a special account of the range expansion of the Cattle Egret), and conservation (which strangely omits any possible effects of chemical pesticides). The $6\frac{1}{2}$ -page chapter on classification includes a species list.

The writing is highly readable and a trifle discursive; the authors are inevitably courteous even to those authors with whom they completely disagree. The rather rambling style is not obtrusive in the introductory chapters, but becomes a handicap in the species accounts. The latter are uniformly divided into 3 sections headed "Distribution, migration and habitat;" "General appearance and identification;" and "Behaviour" (the latter subdivided into "feeding" and "breeding"), with many species having a fourth section for "Taxonomic notes." However, information *within* these sections is not organized consistently, and particular facts may be difficult to find. For example, a few species accounts describe voices, but in order to make comparisons of vocal descriptions it is necessary to read the whole species account to find out whether voice has even been mentioned. Although egg measurements are given for every species, the only measurements given for the birds themselves are approximations of *total length*. These are sometimes given as a range ("The Little Blue Heron is 64-74cm [25-29in.] in length"), but just as often as a single figure ("the White-necked is nearly twice as big [as the Pied], 92cm [36in.] compared with 48cm [19in.]"). These figures can appear *anywhere* in the "General appearance and identification" section, from the first sentence to 1 of the last.

The user of this book should therefore expect to do much more *reading* than is usually necessary in a reference work. But it will often be enjoyable reading, as the frequent use of the authors' firsthand information brings a special liveliness and authentic touch to the text that is often missing in monographs that are basically compilations. Additionally, they often mention observations that conflict with their own. For example, they saw *Ardea cocoi* in Argentina "constantly . . . feeding during the day though usually in deep shade," and mention them walking "more often than not upstream," implying a riverine habitat. They then cite a personal communication from D. Mock, who has always seen *cocoi* in Venezuela feeding right out in the open, often in blazing sunshine, agreeing with my own observations in Argentina, where most *cocoi* seen were standing singly out in flooded fields, with no shade whatsoever.

The first half page of the chapter on "Plumage and moult" is a superfluous recitation of the colors found in the Ardeidae. There is no general description of typical newly hatched herons, with their long, loose natal downs, most conspicuous on the head. This diminishes the impact of the statement on p. 139 that the downy young of *Cochlearius cochlearius* is "unique in being pure grey above, dull white below and with a blackish crown lacking erectile tufts. . . ." In fact, the natal down of *Cochlearius* is so short and dense as to resemble superficially that of a duckling (see Dickerman 1971, photograph p. 13). The authors also err in stating that the Boatbill differs from other night-herons in *not* having a distinctive juvenal plumage different from that of the adult. *Egretta* is said to lack the first Prealternate molt, but this was formerly

believed to be true of *Ardea cinerea* and *A. herodias* until specimens were carefully examined and the molt found to occupy the place in the cycle where it "ought" to be (Humphrey and Parkes 1963b:500). One finishes this chapter with the definite impression that plumage sequences of herons have been inadequately studied; that they are probably complicated by geographic variation; and that errors have been made in interpreting them. Although the authors cite the paper by Humphrey and Parkes (1963a) on *Syrigma*, they overlooked in that paper our discovery that the buff or tawny nuptial plumes of the Cattle Egret are *white* when they first break from their sheaths. This point was reiterated by Parkes (1978), and surely in such a readily available species this exceptional plumage phenomenon should be investigated.

The chapter on "Breeding" is a valiant but foredoomed effort to synopsise the tremendous variation among herons in nesting habits, courtship, incubation, feeding and survival of chicks, and so on. The difficulty is illustrated by a report of nest-site selection in a mixed Florida colony observed by the authors, which mentions *Egretta alba* nesting "low in the leafy understorey," a statement at variance with the detailed descriptions and measurements of Great Egret nest-sites in 2 papers published too late for inclusion in this book (Burger 1978b, McCrimmon 1978). The chapter on "Feeding" is a good summary based primarily on the works of Meyerriecks and Kushlan.

In the chapter "Migration and dispersal" the latter term is used for several rather different phenomena: (1) migratory species storm-drifted outside of their normal range; (2) normally sedentary species appearing in new areas because of drought or other unfavorable conditions; (3) "overshooting" of the breeding area by spring migrants; and (4) post-breeding wandering, often in random directions in tropical forms, and in the direction opposite to the subsequent true migration in temperate forms. The authors describe typical migration routes for the major areas of the world where migratory herons are found, a summary that would have been impossible a generation ago, prior to the growth of mass banding programs. The second half of this chapter is devoted to the Cattle Egret. It is interesting to note that the northward expansion of *Bubulcus i. ibis* in Eurasia has not been at the dramatic pace of its New World colonization, and that American writers have generally overlooked the parallel dramatic spread of *B. i. coromandus* to New Guinea, Australia and New Zealand.

In the "Conservation" chapter we learn that only 2 herons are known to have been extirpated in historic times: *Nycticorax caledonicus crassirostris* of the Bonin Islands (last seen 1889), and a supposedly flightless night-heron on Rodríguez. Oddly, about 32% of this chapter is devoted to the impact of *natural* predation, slightly more than the 29% on the history of the plume trade. It is a sign of the times that this famous devastation can be dismissed as ancient history, with a brief but adequate summary, emphasizing the astonishing recovery of virtually all of the persecuted species (with the probable exception of *Egretta eulophotes* of eastern Asia). Wetland drainage and destruction of trees, especially in the tropics, are stressed as the modern threats to heron survival. Although no case histories are given, an unfortunate example unknown to the authors is the fate of the "recently" (= 1961) discovered breeding colony of *Agamia agami* near Minatitlán, Veracruz (p. 287), which was completely abandoned due to pollution only about 4 years after its discovery, and thus about 12 years before its announcement as "new" in this book (Dickerman, pers. comm.).

The authors have made a genuine attempt to achieve a "common sense" classification of herons, based primarily on the seminal paper by Bock (1956) as amended by more recent research on particular species or groups, and by their own experience. They have been (in my view) properly cautious about accepting the more radical innovations

proposed by Curry-Lindahl (1971) and Payne and Risley (1976), although they conscientiously present the findings of these and other authors with whom they disagree, explaining the reasons for their dissent. I could live reasonably well with their proposed classification, with a few exceptions. The chief 1 of these deals with the genera of night herons. Bock (1956) transferred 2 monotypic genera (*Caltherodius leuconotus* and *Oroanassa magnifica*) into the genus *Gorsachius* of Asia. Payne and Risley (1976) lumped the 4 species of Bock's *Gorsachius* into *Nycticorax*, from which they excluded the Yellow-crowned Night Heron. Hancock and Elliott have followed Bock's concept of *Gorsachius*, thus including the African White-backed Night Heron, *leuconotus*. I cannot accept this species as a member of *Gorsachius*, of which the type, *G. goisagi*, is a strange little Asian bird with a rather bittern-like plumage pattern and a stubby bill, the shortest in proportion to size in the entire family Ardeidae. The African *leuconotus*, in my opinion, is a *Nycticorax*, although differing somewhat from the remainder of the genus (the *nycticorax-caledonicus* superspecies and *violaceus*). The juvenile *leuconotus* is enough like that of *nycticorax* to have misled an inexperienced curatorial assistant into putting a young *leuconotus* in the Black-crowned Night Heron tray. The crest shape and dorsal plumes of *leuconotus* are those of a *Nycticorax* (*Gorsachius* has no dorsal plumes at all), and its general color and pattern are reminiscent of *N. caledonicus* and are completely unlike those of the Asian *Gorsachius*. In spite of Payne and Risley's failure to find osteological differences that they considered significant, the proportions of the 2 typical *Gorsachius* are quite unlike those of *Nycticorax*, including *leuconotus*. The status of the fourth species that has been assigned to *Gorsachius*, the all but unknown *magnificus* of China and Hainan, must remain tentative until more information is available on both its anatomy and its habits.

Dickerman's study (1971) of *Cochlearius* concluded that this genus be placed in its own tribe Cochleariini to reflect the many differences (in addition to bill shape) separating it from the typical night herons. The A.O.U. Committee on Classification and Nomenclature has agreed to adopt this recommendation, rather than to leave the Boatbill, as Hancock and Elliott have, as just another night heron.

The authors follow Bock in associating (Bock having combined as a superspecies) the 3 giant species of *Ardea*: *goliath*, *imperialis* and *sumatrana*. This seems to be based entirely on large size (Parkes 1978). Whereas *imperialis* and *sumatrana*, the Asian species, may indeed be related derivatives of typical *Ardea* such as the *cinerea* superspecies, *A. goliath* of Africa seems much more likely to have been independently derived from "*Pyrrherodia*" stock, the subgenus that now includes only *A. purpurea*, the Purple Heron. Among other points of resemblance between *goliath* and *purpurea* are their ground-nesting rather than tree-nesting habits, and their scutellate rather than reticulate tarsal envelopes, characters in which they differ from *imperialis* and *sumatrana* as well as from *Ardea* in general. There are also obvious color and pattern resemblances between the Goliath and Purple herons.

In their proposed classification, the authors use the usual brackets to indicate superspecies, most of which are non-controversial. Oddly, no superspecies are bracketed within *Egretta* (although a map caption indicates a "Little Egret-Reef Herons superspecies"). Surely *E. thula*, *gularis* and *garzetta* qualify for superspecies status. The authors depart from recent classifications in considering the coastal East African *dimorpha* to be a subspecies of the Western Reef Heron (*E. gularis*), rather than of *E. garzetta*. Other classifications have listed *dimorpha*, *gularis* and *garzetta* as full species. Considering the dimorphic form as a member of the coastal *gularis* makes problematical the status of the several inland sight records of dark egrets, such as the

one I saw among a flock of about a dozen *Egretta garzetta* at Lake Nakuru, Kenya, 1 November 1976.

Although space limitations necessitated much condensation and omission, the book provides a bibliography of nearly 1000 titles for further reference. It was most unfortunate that the proceedings of the North American Wading Bird Conference held in 1976 (Sprunt et al. 1978), a meeting attended by the senior author, were withheld from publication far beyond the date originally promised to the participants, who were asked to have their manuscripts completed for publication *before* the meeting. The wealth of data in this symposium volume should have been available to Hancock and Elliott. A good indication of the current popularity of herons as study species is the appearance already of several other major papers too late for inclusion in the monograph, such as Burger (1978a), McCrimmon (1978), Mock (1978), Rodgers (1978), and Willard (1977). Biderman and Dickerman (1978) challenge, on the basis of field observations, Mock's hypothesis (quoted in the monograph) on feeding behavior of *Cochlearius*.

The authors missed at least a few pertinent references published earlier. Among these, in taxonomic order, are Dickerman (1973), in which *Ixobrychus exilis hesperis* was shown to be invalid; Norton (1965), in which a new subspecies, *I. e. limoncochae* was described from eastern Ecuador; Blake (1977:161), in which geographic variation in size was shown in *I. involucris*; Bond (1966), in which a record of *Egretta garzetta* from Barbados, although identified and published belatedly, was shown to be the first New World specimen (16 April 1954). The "doubtful" record of *Ardea cinerea* from New Zealand was verified by Parkes (1974), and the authors also overlooked the description of the resident East Indian populations as *A. c. alirostris* by Mees (1971). Finally, in several of the "supplements" to Bond's 1956 Check-list of West Indian birds, there are discussions of the status (both as to breeding and morphology) of the Caribbean population *Ardea herodias repens*.

Omission of these references from the massive bibliography hardly detracts from the overwhelming task Hancock and Elliott have accomplished in giving the reader access to so much of the heron literature. They have produced a handsome and reasonably complete compendium of our knowledge of this family as of 1977. The present dynamic state of heron research makes it virtually certain that theirs will be the standard reference work for a good many years.—KENNETH C. PARKES.

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THE LAROUSSE GUIDE TO BIRDS OF BRITAIN AND EUROPE. By Bertel Bruun, illus. by Arthur Singer. 516 birds in color, 448 maps. Larousse and Co., Inc., New York, 1978: 319 pp. \$7.95.—This is a pocket-sized field guide (soft cover) to the birds of Europe, including European Russia. Like other recent guides, the format is very convenient. On the right hand pages are colored paintings of several species, while on the facing left hand pages are brief descriptions and range maps for the same species. Thus one does not need to leaf through the book in search of corresponding sections.

This is not a new book, but a reissue by a new publisher of an older, but still useful work. It was originally published in England as *The Hamlyn Guide to the Birds of Britain and Europe* (1970). At the same time or soon after, it was published in the U.S. by McGraw-Hill as *Birds of Europe*. The present version is identical except for the title and publisher. However, the same author and illustrator published another book also called *Birds of Europe*, which was not a small field guide but a large hard-cover book. This was published by Hamlyn in Europe (1969) and later (1971) by the Golden Press in New York. The large *Birds of Europe* is the same book as the small *Birds of Europe, Hamlyn Guide . . .*, and *Larousse Guide . . .*, except that it has a

number of full page paintings and considerable text material not found in the smaller book(s). Most of the illustrations, however, are the same ones found in the field guide(s). In addition, these illustrations are captioned with the same descriptive material that accompanies the field guide illustrations. In other words, the large *Birds of Europe* is an expanded field guide, or perhaps the field guide is a reduced large *Birds of Europe*. It is all very confusing.—ROBERT J. RAIKOW

GRANIVOROUS BIRDS IN ECOSYSTEMS. Edited by Jan Pinowski and S. Charles Kendeigh. Cambridge University Press, New York and London, 1978: xxi + 431 pp., 60 text figs., 76 tables. \$41.00—Grain-eating man has a group of bird species, often locally very abundant, which exploit his staple grain crops in every part of the world. Several of the most significant of these are in the genus *Passer* and the most important is the ubiquitous House Sparrow (*Passer domesticus*). This species is known to have occurred 10,000 to 15,000 years ago in the Near East where man first developed a sedentary agriculture based on wheat and barley, and subsequently it spread to Europe as agriculture developed. From there the House Sparrow has accompanied European man in his colonization of the Earth's temperate regions and now enjoys almost worldwide distribution. It is the only grain-eating bird which is a true commensal of man and represents "one apex" of granivory. Study of the House Sparrow and the related European Tree Sparrow (*P. montanus*) was the main impetus for this book.

The present volume is No. 12 in a projected 19 volumes synthesizing biologists' production during the International Biological Program, which ended in 1974. It is the product of the Working Group on Granivorous Birds whose major objective was an "integrated cooperative study of the genus *Passer*." The House Sparrow received most attention because of its status as a pest species in many grain growing areas and because it had already been intensively studied on several continents. Considerable data were also obtained on the other nearly world-wide species of the genus, the European Tree Sparrow. The scope of the synthesis was expanded to include information on 7 other oscines of present or potential significance as granivore commensals; the essentially Mediterranean Spanish Sparrow (*Passer hispaniolensis*), the African Red-billed Quelea (*Quelea quelea*) and the New World Red-winged Blackbird (*Agelaius phoeniceus*), Common Grackle (*Quiscalus quiscula*), Dickcissel (*Spiza americana*), Brown-headed Cowbird (*Molothrus ater*), and Horned Lark (*Eremophila alpestris*). Other granivores among the Galliformes, Columbiformes and the Anseriformes were ignored.

The first 5 chapters of the volume combine studies of adaptability and evolution with ecological studies of population dynamics, productivity and a detailed overview of avian energetics. The remaining 4 chapters attempt an assessment of the potential impact of grain-eating birds in ecosystems by use of a simulation model, outline the difficulties inherent in devising management strategies, and discuss adaptations to granivory in birds.

Despite the fact that 11 authors contributed to this volume the theme is logically and coherently developed and the chapters are suitably cross-referenced. The book is rich in information and in stimulating ideas and insights. It is only possible to mention a few highlights. The section on avian energetics is an immensely valuable summary that may well serve as a primer on the field. Particularly noteworthy is the inclusion

of a large amount of new data on metabolic rates obtained by Dol'nik and Gavrilov made available to western biologists for the first time.

Anyone contemplating a campaign against a pest species should be required to read Dyer's and Ward's chapter on management of pest situations. The difficulties of ecosystem management, the frustrating tendency for solutions to be counterproductive and the failure of direct "common sense" solutions are convincingly presented. Most valuable is their scheme for making a logical choice of appropriate management strategy. Similarly Wiens' and Dyer's use of a simulation model for impact assessment demonstrates an approach to impact studies one hopes will have wide influence. The concluding discussion on adaptive strategies of granivory is a highlight of the book. Finally any student looking for a career's work should read the brief epilogue in which the state of knowledge of bird function in ecosystems is evaluated and the kinds of information still needed are enumerated.

The book is an outstanding achievement. Students of avian population ecology, energetics, the role of birds in ecosystems and management of pest species will find it indispensable. I recommend it highly.—WILLIAM J. MAHER.

SYSTEMATICS OF SMALLER ASIAN NIGHT BIRDS BASED ON VOICE. By Joe T. Marshall. Ornithological Monographs No. 25, American Ornithologists' Union, 1978; v + 58 pp., frontispiece, 15 plates, phono disc supplement, appendices I-III. \$7.00 (\$6.00 to A.O.U. members).—Joe Marshall has been studying owls, especially the genus *Otus*, for a long time, and has published extensively on New World members of the genus. The present work is essentially a treatise on Asian *Otus* and their relationships to *Otus* on other continents. The only other birds included in this study are some caprimulgiforms (Podargidae, Caprimulgidae) which Marshall says were "an incidental by-product of the research" (on *Otus*). Starting with the premise that the plumage of owls and other night birds "varies geographically so that the bird is camouflaged appropriately for its regional flora while sleeping in the daytime," resulting in similar coloration for different species, Marshall's aim was to find vocal clues to the confusing taxonomy of Asian *Otus*. Stationed in Thailand for 13 years, he spent his leave time travelling widely in Asia recording night birds. Alarmed by the rapid destruction of natural forests he decided to hear and tape-record as many owls as possible rather than make detailed studies of a few species. His main contribution in this work is the presentation of vocalizations that have never been taped before. He is to be congratulated for his energy and pertinacity in getting to so many out-of-the-way places while there was still some forest left and coming back with a fine collection of recordings. An excellent disc, produced in the Bioacoustic Archive of the Florida State Museum, University of Florida, Gainesville, accompanies the text, wherein are presented both Marshall's recordings and those of other workers. Ten pages of sonagrams keyed to the recordings are included in the text.

In his discussion of the taxonomy of night birds, Marshall's guiding principle is "All taxa with the same song belong together," an assumption basic to vocalization studies. Strict adherence to this rule, however, results in some very curious distributions. Vocal division of *Otus* into those with trills or rhythmic phrases of more than 4 notes per sec and those with short songs with fewer than 4 notes per sec results in the trilling *Otus leucotis* of Africa being grouped with the New World Screech Owls and the hooting

O. flammeolus of North America being included among the Old World Scops Owls. *Otus insularis* of the Seychelles has a gruff voice remarkably similar to that of *O. magicus* on Biak, off New Guinea, and is consequently reduced by Marshall to a subspecies of *magicus*. *Otus hartlaubi* from the island of São Tomé in the Gulf of Guinea is also placed with the Indonesian species *O. magicus*. Marshall defends these far-flung distributions by pointing out that *Otus* spp. are successful colonizers of islands, and he reminds us that the type of *O. elegans* was taken on board ship in the middle of the East China Sea. While it is entirely possible, if astonishing, that *Otus magicus* should cross 7000 km of the Indian Ocean to reach Mahé Island in the Seychelles, it is almost inconceivable that it should fly around or across Africa to reach a small island off the west coast. Is this, then, a relict distribution? Marshall makes no suggestions, merely presenting us with the information. He notes that the quality of the note of *Otus hartlaubi* resembles that of *O. scops* of southern France, but apparently discards the latter as a possible relative (which would be geographically more believable) because of the long interval between notes, more characteristic of *O. magicus*. One wonders if too much weight is not being given to a single character here.

In spite of the emphasis on voice, Marshall admits the importance of morphological criteria, and these are given a lot of space in the text. Information on the caprimulgiforms is presented in the form of morphological keys, 1 to the species of *Batrachostomus* and the other to Southeast Asia nightjars. Vocal information is given in the keys, but voice is not used as a separating character within the keys. *Otus icterorhynchus* of Africa is closely linked with *O. balli* of the Andamans and *O. stresemanni* of Sumatra on the basis of plumage alone, the voices of the latter 2 being unknown.

Whether one agrees with Marshall's ideas or not, he has certainly provided a wealth of information from which others may draw their own conclusions. This is a valuable contribution to the literature on avian vocalizations and a welcome addition to the list of published sound recordings. Especially the record is a must for anyone interested in the songs of night birds.—STUART KEITH.

SOURCEBOOK ON THE ENVIRONMENT. By K. A. Hammond, G. Macinko and W. B. Fairchild (eds.). University of Chicago Press, 1978:613 pp. \$20.00.—This comprehensive work dealing with various environmental questions was initiated by the Association of American Geographers. Its goal was to "provide a broad guide to selected aspects of the environmental literature." Section 1 deals with "Environmental Perspectives and Prospects" and includes chapters on human-environment interactions, resource scarcity, the limits to growth and model ecosystems. Each chapter contains a quick review of the major research works in that particular area, and concludes with an extensive bibliography. Part 2 deals with "Environmental Modification: Case Studies" and includes chapters on the effects of industrial activity on water quality, mining and the environment, and solid waste recovery. Part 3 is concerned with the "Major Elements of the Environment" and deals with air quality, water quality, energy policy and animals in the environment. Being a zoologist, I examined the animal chapter in some detail. Ecology is covered in about 2 pages and, as might be expected, lacunae are evident. The most recent texts cited are Kendeigh (1961) and MacFayden (1963). No reference is made to the modern texts of Pianka (1974), Krebs (1978), Ricklefs (1973) and others (although Krebs is cited in an earlier chapter dealing with wildlife ecology). The

author of the chapter did not realize that Dr. A. S. Romer died some years ago. In general, many of the citations deal with broad textbooks or reference works. For an ecologist, the chapter is not exceptionally useful, although it probably gives a non-ecologist a place to begin working. Thus each chapter in the book will serve as an orientation chapter to specialists in other disciplines. The last major section entitled "Research Aids" presents lists of environmental periodicals, major environmental legislation and environmental organizations.

This is a useful book for any person needing a quick reference to a variety of environmental problems. The citations will at least point up some of the major research papers published through about early 1976.—MICHAEL A. MARES.

COMPARATIVE STUDY OF TODIES (TODIDAE): WITH EMPHASIS ON THE PUERTO RICAN TODY, *Todus mexicanus*. By Angela Kay Kepler. Publications of the Nuttall Ornithological Club, No. 16, Museum of Comparative Zoology, Harvard University, Cambridge, MA, 1977: 190 pp., 8 maps, 37 tables, 65 figs., \$11.75—Despite their tameness, endemism to the Greater Antilles, and many other interesting features, todies have not been studied extensively. Yet the family is an ideal subject for analyzing population regulation in tropical birds, species abundance in tropical habitats, specialization of birds on oceanic islands, and ecological equivalence. This is just what Kepler set out to do, and she does it well. The natural history of the family is documented, the niches of each of the 5 species in widely differing communities are analyzed, and the pathways of evolution are discussed.

Kepler conducted field work in Puerto Rico over a 3 year period. In order to determine the distribution, abundance, and optimum habitats of *Todus mexicanus*, to evaluate its niches in different forest communities, and to discover possible mechanisms of population regulation, she made detailed analyses of population densities in major habitat types: rainforest, moist and dry limestone forest, and Cordillera forest. Additionally, trips were made to other Caribbean islands and to South America to study other species of *Todus* and birds of related interest such as tody-flycatchers (*Todistrostrum*), motmots (*Momotidae*), and warblers (*Parulidae*).

The first 2 chapters provide a brief morphological description of the birds and detail the distribution of the family in the Greater Antilles. The major vegetation is described for a variety of habitats, especially those in Puerto Rico.

There follows an in depth study of tody behavior. Maintenance behavior is discussed. Vocalization and wing rattling are described and their function in defense and courtship are explained. Territoriality, associated displays, and vocalizations are described, as are foraging locations and microhabitats, and feeding habits, rates, and efficiency. An appendix lists food items eaten by Puerto Rican Todies with brief notes on the other species. A comparison is made with competitors and ecological equivalents such as tody-flycatchers and some warblers that also use leaf undersurfaces.

Several chapters deal with the breeding biology of todies. Burrow size, location and construction are described. Courtship displays, eggs, incubation, and the care and development of the young through fledging are carefully detailed. Kepler reports nest helpers among todies and discusses their effect on clutch-size. Food, climate, predation, territoriality, availability of nest sites, and interspecific competition are discussed as factors in population regulation.

Kepler concludes with a discussion of evolution in the family. The morphological uniformity of todies is noted and differences in size, color and behavior among the species are tabulated. Other morphological, behavioral and developmental characters are considered, and it is concluded that todies are most closely related to motmots. The author postulates a short-billed Central American prototype that colonized the West Indies, speciating linearly eastward in more recent times. Evolutionary pathways among the islands are proposed. The 2 sympatric Hispaniolan species are shown to have diverged from other forms of *Todus* and from each other in morphology and behavior. Courtship displays, vocalizations, feeding and habitat separation serve as isolating mechanisms.

This monograph is well-written and almost devoid of errors. A White-fronted Nunbird (*Monasa morphoeus*) (p. 137) is termed coraciiform. No citation is given for *Paleotodus emryi* (p. 47) until much later in the book. This study is an excellent blend of ecology, ethology and morphology, and deserves to be read as a notable field study of an interesting and unique family.—DAVID R. MAURER.

BIRD FAMILIES OF THE WORLD. By C. J. O. Harrison (ed.), illus. by Ad Cameron. Harry N. Abrams, Inc., New York, 1978: 264 pp., over 500 color illustrations. \$25.00.—All the families of living birds and major fossil families as well are surveyed in this large-format (9 × 12 in.), copiously illustrated work. Each family is discussed in some detail with an introductory section covering appearance and size, and additional sections dealing with distribution, feeding, nesting and the young, behavior, and composition (taxonomic relationships). For some groups other sections are also given, such as economic importance. The sections vary in length, but may be up to several paragraphs long, and considerable information is thereby provided. More than 40 different authors have contributed articles about families with which they are especially familiar, so the text as a whole has an authoritative ring to it. At the same time the accounts are not highly technical, so the work is appropriate for students and interested nonprofessional ornithologists. Despite the multiple authorship, however, a common style is followed throughout, giving the book continuity and coherence.

In spite of the obviously careful editing, a number of errors and unfelicitous statements have crept in. Most frequent are misspellings of scientific names, especially in figure legends. Examples are *Scopus umbrella* (for *umbretta*, p. 51), *Ephippiohynchus* and *Ephippiorynchus* for *Ephippiorhynchus* (p. 52), and *Laniarus* for *Laniarius* (p. 197). The Andean and James' flamingoes are said to lack a hallux (p. 56), but in the illustration on p. 55 have re-evolved these lost structures. In the figure on p. 60 the Hooper and Coscrocra swans have their identifying numerals reversed. Parrots are defined as birds in which the upper mandible "articulates with the skull" (p. 120). This presumably refers to their especially conspicuous cranial kinesis, but is true of birds generally.

The many color illustrations by Ad Cameron are a major contribution to the book. One of their purposes is to show variation among the members of a family, so in each case a number of species are drawn so that differences in their plumages, bills, etc. may be readily compared. Another purpose is to illustrate typical or unusual behaviors, so instead of the usual static depictions of birds perching or standing around idly, we see them feeding, courting, carrying food, giving various displays, building nests, and so on.

The birds are lifelike and realistic for the most part, though in many cases the heads and bills appear a bit too large.

These criticisms are minor. Altogether this is an excellent survey of the birds of the world, and is highly recommended. Considering the absurd prices of some books today, this volume is an excellent value.—ROBERT J. RAIKOW.

STATUS AND DISTRIBUTION OF ALASKA BIRDS. By Brina Kessel and Daniel D. Gibson. *Studies in Avian Biology*, No. 1, Cooper Ornithological Society, 1978: 100 pp., 1 map, 2 tables, 7 photographs. \$8.00.—This is the first in a new series of monographs published by the COS for papers too long to include in *The Condor*. It replaces the previous series, *Pacific Coast Avifauna*, and is intended to broaden the range of subjects eligible for publication. This first number, however, is quite in keeping with the more limited goals of the old series. It is a compilation of data on the distribution of birds in the largest state, and their status in regard to abundance, breeding activities, and so forth. Of 381 species that have been recorded in Alaska, 202 are discussed in detail in this work. The remainder are adequately treated in previous publications.—R.J.R.

THE CALIFORNIA QUAIL. By A. Starker Leopold, illus. by Gene M. Christman. University of California Press, Berkeley, 1977: 281 pp., 1 color plate, 4 range maps, 95 numbered text figs., 40 tables. \$14.95—The name Leopold has become synonymous with the cause of conservation in North America. This family has probably done more than any other in educating the American public in the principles of wise use of our natural resources and the concept of a "land ethic." A. Starker Leopold's book on the California Quail continues this tradition. It was written primarily as "a stimulus and guide to the preservation and management of the California Quail." But in so doing Leopold has managed to tell his readers a great deal about this bird, its habitat requirements, and the impact that man has had on both its distribution and abundance.

The book is divided into 3 parts: "The Bird and Its History," "Natural History," and "Quail Management." The first deals with the bird's historical distribution and the flow and ebb in abundance with the settlement of its range by Europeans. As with so many avian species in North America, the California Quail appears to have benefitted greatly by the first agricultural pursuits of these immigrants. The initial increase in heterogeneity of the environment, as the result of grazing and tilling small plots, undoubtedly provided a much enhanced habitat for this bird, allowing it to increase in numbers, probably to levels never before realized and, as Leopold points out, unlikely ever to be achieved again. This is because the small grazed and tilled plots have been expanded, destroying the intervening quail habitat, to become vast expanses of farmed land devoid of habitat usable by this bird. It is here that one senses Leopold's frustration with his fellow North Americans and their general lack of a resource conscience. He discusses a fundamental paradox in our land tenure system that continues to frustrate individuals and agencies concerned about the future of our native flora and fauna. He states that there "is a paradox in the legal basis for conservation of resident game species . . . In the State is vested ownership of the game and responsibility for its management. Yet the State is largely powerless in exercising the on-the-ground husbandry required to maintain a

suitable habitat where the species can exist." Usually in the "process of land-use decision making, the [State] plays a minor role or none at all. Yet the [State] is nominally the custodian of wildlife." Is it not time that we in North America attempted to do something about this paradox?

The second part of the book summarizes the studies that Leopold and his students have undertaken to interpret the morphological, physiological and behavioral adaptations that this magnificent little bird shows to the range of habitats it occupies. For me, the most exciting chapter is that dealing with the impact of rainfall on reproduction. This species seems very well adapted to respond to any change in precipitation which, over most of its range, is the 1 environmental factor of overriding importance. The apparent feedback of plant chemicals, themselves controlled by available soil moisture, on the reproduction of this bird, would appear to be a very elegant mechanism for population regulation. It needs to be studied in greater depth in this species and in others occupying such habitats. Another aspect of this bird's biology that would seem to promise great rewards to the patient observer is that of dominance relationships among birds in broods, within coveys and between coveys. It is unclear to what extent dominance and dispersal are important phenomena in the dynamics of populations of this bird.

The third section deals with practical suggestions for the improvement of quail habitat. It is directed primarily, I would think, towards the holders of private estates, mainly ranchers who may be the most sympathetic to Leopold's suggestions. Leopold's advice seems both realistic and appropriate, albeit somewhat piecemeal and often of transitory usefulness, no doubt because this bird's position in community succession is one associated with what can be considered pioneer stages. At times I felt the material presented here had already been dealt with adequately in other sections, for example, the need to create or maintain cover near water. This is stated in various ways several times. Perhaps, however, Leopold thinks this is a point that needs to be impressed upon the reader. I also found Appendices A (by Nissen) and C (by Erwin) very anticlimactic. If Erwin's material is significant, why wasn't it published elsewhere?

The book is attractively put together, liberally illustrated with figures in the text and pleasing sketches by Christman heading each chapter. Christman's color plate, reproduced on the dust jacket, is very attractive indeed. The text is virtually free of typographical errors (I found only 2) and the graphic material is generally good (Fig. 50 has been printed on its side and Fig. 68, upside down). The photographs, although presumably depicting adequately that for which they were chosen, would, I suggest, not meet with the approval of California's tourist agencies!

Hopefully, this book will spark considerable interest among land managers throughout the range of the California Quail, and prompt them to set aside habitat for this species. The lessons provided in this book also have applicability throughout North America and beyond; one can substitute any species for the quail and apply the same principles expounded here equally well. The second section of the book will appeal to ornithologists in general in its summation of the salient data on the biology of this bird. The many, as yet unanswered, questions about "the natural controls over population numbers in this fascinating species" should stimulate us to further research efforts.—DAVID A. BOAG.

THE ECOLOGY AND BEHAVIOR OF THE PRAIRIE WARBLER *Dendroica discolor*. By Val Nolan, Jr. Ornithological Monographs No. 26, 1978; xxii + 595 pp. American Ornithologists' Union. \$29.50.—It is appropriate that this volume bears a dedication, in addition

to the author's wife, to the late Margaret Nice, because it is inevitable that this book will be compared to her classic "Studies in the Life History of the Song Sparrow." For years her 2 volume work stood as a model of thoroughness in the study of the life history of a single species. When announcing the imminent publication of the Nolan work at the 1978 meeting of the American Ornithologists' Union, the editor, John William Hardy, commented that it now represents the most complete life history study of any bird. After reading it, I agree.

Nolan studied Prairie Warblers near Bloomington, Indiana intensively from 1952 to 1965, and made additional incidental observations to 1972. He worked on 2 tracts of land measuring a total of 100 ha. Analysis of the data and reworking of the text extended into 1976, so the book covers a considerable period of field study and analysis.

The book contains 41 chapters covering such topics as the Prairie Warbler in winter, spring migration, various aspects of behavior during the breeding season, clutch-size, eggs, development of the nestlings, the mating system and sex ratio, interrelations between the Brown-headed Cowbird (*Molothrus ater*) and the Prairie Warbler, reproductive success and recruitment from reproduction, survival and mortality, population structure, and, finally, plumages, measurements and molts; in other words, just about every aspect of Prairie Warbler life history. There are 9 appendices detailing present breeding range, descriptions of breeding habitats, winter habitats, simulation of reproductive success of a hypothetical Prairie Warbler, plumage color details, pterylosis, miscellaneous anatomical and physiological data, and scientific names of organisms referred to in the text.

Most of the material is highly quantitative. There are 186 tables of quantitative data, and most of the 42 figures illustrate statistical analyses. Descriptions of maintenance and comfort behavior are mostly qualitative, but descriptions of courtship behavior, for example, are rather heavily quantified. Although these descriptions are very detailed, drawings of the birds in the various display postures would have helped the reader to envision them. Overall, the author has gone to great lengths to apply statistical treatment to his observations in order to analyze and interpret them.

I found particularly interesting the chapter detailing behavior during pair formation. In my own experience it is very difficult to observe the first encounter of male and female passerine birds on territory in the spring, because it is an unpredictable occurrence, and requires that the males be kept in view for long periods of time in anticipation of the encounter. That Nolan was able to observe what seemed to be the first encounter of several mated pairs is an indication of the amount of time he spent in observation.

Also of interest was his documentation of long distance movements (up to 1 km) of males and females off territories that they had occupied early in the breeding season. Some males simultaneously held 2 different territories, sometimes contiguous, but sometimes separated by extensive natural boundaries. Males also moved considerable distances from their territories as "explorers." Nolan suggests that what have been considered a "floating surplus" of males in some species may actually be explorers.

It has usually been the accepted procedure in describing the behavior of a species to provide a general synthesis of the various individual behaviors; the range of variation is described, of course, but individuals are not often analyzed in detail. Nolan presents a great deal of detail on specific individuals. This practice illustrates clearly to the reader the degree to which individual birds differ among themselves, but it does make for more tedious reading. A good example of this presentation of detailed individual data is found in Table 62. This table is entitled "Some measurements of eggs of selected

females." Nolan presents data for length, breadth, volume and elongation of eggs from each of 6 females, all at least 2 years old, that had at least 2 clutches. I question the value of this much individual detail, and would have been satisfied with the summary table, also provided, which includes all eggs measured. Besides the table on variation among old females, and the summary table, there are tables of egg characteristics according to the order in which laid, and according to age of female.

Because of the great amount of detail presented, the reader becomes aware of a rather high degree of repetition. For example, on p. 125, Nolan presents data on nest weights according to date, and attributes the greater bulk of first nests to a need for better insulation early in the season when temperatures are lower. Again on p. 155 in a section on the duration of nest building, he discusses nest size, climate, and duration of building, and reiterates that early nests may be bigger, and for that reason take longer to build, because it is adaptive to install more insulation against cold. Because the topic naturally comes up during the discussion of different aspects of the general subject of nest building, I am not sure it is possible to avoid the repetition, but it does prove mildly annoying when encountered.

It is a little disconcerting in this otherwise extremely quantitative and precise work to encounter the rather vague sentence (p. 203), "I passed numerous other nests at dark on the day before laying of the final egg, and females were probably always present." Likewise, on p. 316 the statement "stretching of one wing and then the other probably was observed once." These indefinite and poorly supported statements seem out of place to me. It would have been better to omit such bits of information rather than pursue the goal of completeness to the point of including tenuous data. Perhaps David Lack was going too far when he decided (*Life of the Robin*, 1953) to include only those actions seen on at least 6 occasions, but it does seem justifiable, and desirable, to include only those actions seen clearly and surely.

Nolan was not content merely to observe the presumably undisturbed behavior of Prairie Warblers on his study area, but he also tried various experimental procedures including manipulation of nests during construction, and of the number of eggs and young in nests in order to ascertain the response of adults to different conditions. These manipulations enabled him to fill in some details of behavior that would not otherwise have been available, and also to interpret the factors underlying certain behaviors.

Perhaps 1 of the most significant sections of the book is the chapter on the Brown-headed Cowbird and its effects on Prairie Warbler populations. Nolan points out that "The simple and direct way to investigate the impact of the cowbird would be to compare production of female Prairie Warblers that escaped parasitism for a full season with that of the female population as a whole." He feels that this method cannot be used in this study "because information is incomplete for the many females that built one or more nests too high to inspect or spent only part of the season on the study area." In order to analyze the effects of cowbirds on Prairie Warbler populations he therefore calculated the production of hypothetical warbler populations, using simulation, and plugging in data obtained in the field. The simulation suggests that the Brown-headed Cowbird lowered the warbler's production by 13.3%. Comparing his actual observation of production of fledglings per nest with his simulated results, he finds 2.16 warbler fledglings per nest in the real population, and 1.96 in the simulated population, vs. 2.26 in a simulated, unparasitized population. The very fact of carrying out the simulation is impressive, but it is difficult to evaluate it. Is it really worth all the effort? Are the results from the simulated population really more accurate, that is, do they reflect reality better than the rather incomplete field data? It is hard to be sure.

There is an incredible amount of information packed into this book. Having attempted to observe many of the life history details of other species that Nolan describes for the Prairie Warbler, I find it amazing that he was able to observe as much as he did during his study period. There is no question in my mind that, despite a few minor flaws, the book represents an important milestone, setting a new standard for life history studies of birds.—WILLIAM L. THOMPSON.

OBSERVATIONS ON PELAGIC BIRDS IN THE SOUTH ATLANTIC OCEAN IN THE AUSTRAL SPRING. By Maurice A. E. Rumboll and Joseph R. Jehl, Jr. Trans. San Diego Soc. Nat. Hist., 19(1):1-16, 1977. 12 Figs., 1 table. No price given.—A study of seabird distribution between Tierra del Fuego (53°S) and southern Brazil (29°S) in 1975.—R.J.R.

APPENDICULAR MYOLOGY AND RELATIONSHIPS OF THE NEW WORLD NINE-PRIMARYED OSCINES (AVES: PASSERIFORMES). By Robert J. Raikow. Bulletin of Carnegie Museum of Natural History, No. 7, 1978: 43 pp., 5 tables, 10 figures. \$3.50.—The gross morphology of the forelimb and hindlimb muscles was studied in approximately 100 species of songbirds, and analyzed cladistically to construct a phylogeny of the New World nine-primaried oscines. Methods and problems of cladistic analysis are discussed, and the rationale for the proposed phylogeny is presented. The Vireonidae are excluded from the assemblage. The Parulidae are the most primitive family in the group, the Thraupidae somewhat more advanced, but possibly polyphyletic. The Icteridae may be sister group to the Emberizinae, with *Spiza* as a link. The Drepanididae arose from the Carduelinae. The position of various problematic genera is discussed. A noncladistic classification is presented that does not depart greatly from current concepts.—R.J.R.

ENVIRONMENTAL STATUS OF THE LAKE MICHIGAN REGION. VOL. 14. BIRDS OF THE LAKE MICHIGAN DRAINAGE BASIN. By George J. Wallace. Argonne National Laboratory, Argonne, IL, 1977: 112 pp., \$5.50 (paperbound), \$3.00 (microfiche).—Order from National Technical Information Service, U.S. Dept. of Commerce, 5285 Port Royal Road, Springfield, VA 22162.

OWLS BY DAY AND NIGHT. By Hamilton A. Tyler, illus., by Don Phillips. Naturegraph Publishers, Inc., Happy Camp, California, 1978: xii + 208 pp., 16 color plates, a few black-and-white photos, many halftones and black-and-white drawings, 9 tables, 18 range maps. \$6.95 paper, \$11.95 cloth.—Although low priced, this is one of the more useful books on the market today for the beginning student of the natural history of North American owls. It is the intent of the author not simply to describe each of the 18 species of owls found in North America, but to illustrate and discuss each species in a manner that emphasizes the differences between, as well as the particular uniqueness of, the various species. On the whole, he has succeeded.

Part I contains 6 chapters that introduce the reader to "owlness" and describes the

general traits shared by all strigiforms. Included in some detail are the distributions of each species (illustrated by range maps) tabular descriptions matching species with habitat-types, and discussions of raptorial lifestyle, with special emphasis on the beneficial aspects of predation. Feeding behavior and pellet formation, the general response of potential avian prey species to owls (mobbing), species-specific vocalizations, nesting behavior, and a short history of American Indian lore concerning owls are also discussed.

Part II contains 2 chapters that together are subdivided into 20 sections. The first chapter has 1 section devoted to the characteristics of the Tytonidae and 1 to *Tyto alba*. The second chapter covers the Strigidae and its 17 members. Each species account begins with a halftone of the owl under consideration, its common and scientific names, range, and body size. Then, approximately 5 pages of text are used for discussing such topics as feeding and reproductive behavior, morphology, nesting, and personal experiences of the author with the species. The book ends with a short afterword by the author, a listing of alternative common names for each species, the Latin and Greek meanings of the generic and specific names, a list of references for further readings, and an index.

As with all such efforts there are some dogmatic statements, anthropomorphisms and a few outright errors (i.e., ". . . the Burrowing Owl makes no distinction at all between night and day . . ." p. 42, "Some small owls take special pains to conceal themselves by projecting calls with a ventriloquial effect . . ." p. 44, both male and female Burrowing Owls sing, p. 137, and "The pitch of an owl's hoot, for example, depends upon the diameter of air passages, and that in turn depends on the size of the bird." p. 53). However, most of these commissions are rather minor and already so well ingrained in the general avian literature that they will probably never be uprooted. Major failings of the text are few: state boundary lines are excluded from the range maps, greatly reducing their usefulness, and much of the recent literature concerning a variety of topics has been ignored. For example, the most recent citations of research on vision and hearing are Dice (Am. Nat. 79:385-416, 1945) and Payne (Living Bird 1:151-159, 1962), respectively. However, examples such as the latter are not too serious inasmuch as the focus of this book is on general natural history rather than the specifics of anatomy, physiology, etc.

The illustrations by Phillips are generally poor and are not alone of sufficient quality to warrant the purchase of this book . . . even at \$6.95! Most photos are blurry or simply "bad shots." Line drawings are not exceptional, while the halftones are small and of a quality equaled by many other works. The color plates are inferior to almost any others I have seen. Size relationships among the owls and the other animals in the paintings are often inaccurate. Colors, particularly those of the facial region, are over-done (especially red). Habitat settings for the owls are inappropriate at times. *Otus trichopsis* in Plate III sits atop an *Opuntia* sp. with Mesquite (*Prosopis* sp.) in the background, while the text states correctly that the species' habitat is "pine-oak."

This book contains much more information than a field guide and, as its length necessitates, considerably less than that found in the Bent series. The high points of the natural history of each species of owl, however, are well covered by Tyler and they are presented in an interesting and easily digestible manner. Its size is about right (14 × 21 cm) for the bookshelf, the dash of the car, or one's 60/40 coat pocket; its price is definitely right in today's climate of escalating publishing costs. I recommend this book highly to all beginning students with inclinations toward learning more about owls.

—DENNIS J. MARTIN.