

REVIEWS

EDITED BY WILLIAM E. SOUTHERN

The following reviews express the opinions of the individual reviewers regarding the strengths, weaknesses, and value of the books they review. As such, they are subjective evaluations and do not necessarily reflect the opinions of the editors or any official policy of the A.O.U.—Eds.

Cranes of the world.—Paul A. Johnsgard. 1983. Bloomington, Indiana, Indiana University Press. xiii + 258 pp., 23 color plates, 24 black-and-white plates, 15 figures, 35 tables, 15 maps. ISBN 0-253-11255-9. \$35.00.—A period of 76 yr elapsed between the publication of Blaaw's "A Monograph of the Cranes" (1897, Leiden and London, E. J. Brill) and Walkinshaw's "Cranes of the World" (1973, New York, Winchester Press). Now a third monograph has been published after only 10 yr. One might wonder why such a short period was involved between Walkinshaw's book and the present treatment by Johnsgard. As Johnsgard points out in his preface, interest in cranes has intensified recently, primarily because all crane species are in precarious condition. Presently, 5 of the 14 species are either endangered or vulnerable. Furthermore, the establishment of the International Crane Foundation and other factors have stimulated research on the cranes; much has been published since Walkinshaw's monograph. Nearly 58% of the 428 publications cited in Johnsgard's book have appeared in the past decade.

The book is divided into two sections: I, Comparative biology of cranes, and II, Natural histories of individual crane species. In Section I, 75 pages are devoted to Classification and evolution, Individualistic and social behavior, Vocalization, Ecology and population dynamics, Comparative reproductive biology, Aviculture and hybridization, Endangered species and conservation, and Cranes in myth and legend.

The chapter on Classification and evolution consists of 8 pages and discusses the relationships of cranes to other Gruiformes. Much of the discussion involves the families Gruidae, Aramidae, and Psophiidae (cranelike birds), and very little is said about other members of the Order. Considering the controversial nature of crane systematics, this brevity of discussion is reasonable. Three recent classifications of the cranelike birds are presented (p. 8). Relationships between other Orders also are discussed briefly in this chapter. The relationships of the four genera of cranes follow. Johnsgard explains his reasons for considering the four forms of Crowned Cranes (*Balearica*) as a single species, and his basis for removing the Siberian Crane (*Bugeranus leucogeranus*) from the genus *Grus* and placing it into the genus *Bugeranus* also is covered. These two revisions represent the major taxonomic differences between Walkinshaw's monograph and this publication.

Individualistic and social behavior are described in the longest chapter (14 pages) of Section I. Six pages are devoted to line drawings. The copulatory behavior illustration is excellent, while others are poor to adequate. Behavioral terminology should have followed that of Masatomi and Kitagawa (1975, J. Faculty Sci., Hokkaido Univ. 19: 834) to encourage standardization of descriptive terminology of crane behavior. Vocalizations are thoroughly described in the 10 pages of Chapter 3. Figure 11 (p. 30) illustrates the tracheal and sternal anatomy of 7 species of cranes, and the other figures and tables add to the chapter. Tracheosternal development is well described.

Johnsgard has thoroughly reviewed, primarily in tabular form, most information presently available on population dynamics; however, the crane ecology portion of Chapter 4 is brief, involving less than 3 pages. When discussing survival of Sandhill Cranes (*G. canadensis*) based on banding data, Johnsgard does not mention in Tables 10–12 that the majority of these recoveries were from Lesser and Canadian Sandhill Cranes (*G. c. canadensis* and *G. c. rowani*), both currently hunted subspecies. He states on pages 40 and 42 "... 200 banding recoveries provides a reasonably good basis for establishing a life table and tentative estimates of annual mortality rates for this species." The other 4 subspecies of Sandhill Cranes are not hunted to any extent, and consequently the life table presented in Table 12 (p. 41) should not be applied to all wild Sandhill Cranes.

The chapter on Comparative reproductive biology is concise, with most data presented in 7 tables. Chapter 6 (Aviculture and hybridization) emphasizes aviculture; less than a page is devoted to hybridization. The chapter includes a brief history of crane aviculture and a thorough discussion on aviculture techniques. Chapter 7 contains 10 pages and deals with those crane species that presently are classified as threatened or endangered. Discussed are the Whooping (*G. americana*), Siberian, Japanese (*G. japonensis*), Hooded (*G. monacha*), White-naped (*G. vipio*), Wattled (*Bugeranus carunculatus*), and Black-necked (*G. nigricollis*) cranes. In addition, rare and endangered subspecies are discussed. In the text (p. 64) it is stated that 2,800 Hooded Cranes existed in the late 1970's; however, in Table 31 (p. 65) Hooded Cranes are shown numbering 3,266–3,962 as the winter population between 1977 and 1979.

Section II contains species accounts and begins with Crowned Cranes (*Balearica pavonina*) and ends with

the Eurasian Crane (*G. grus*). Each account begins with a brief statement on vernacular names, the species' range, a list of subspecies (providing subspecies exist) and their ranges, measurements, and weights. Description and Identification are the first subtopics, followed by major sections on Distribution and habitats, Foods and foraging behavior, Migrations and movements, General biology, Breeding biology, Recruitment rates, Population status and conservation, and Evolutionary relationships. Distribution maps are included for each species' account. A particularly helpful feature of the book is the map of Eurasia (p. 129), which shows most localities and political entities mentioned in the text. Eight species of cranes occur in Eurasia, an area that might be unfamiliar to many readers of this book. Colored photographs (many of captive individuals) of all crane species are included. The photographs of the Blue (*Anthropoides paradisea*), Sandhill, Whooping, and Eurasian cranes are excellent. The only improvement would have been a colored photo of an adult Hooded Crane instead of the juvenile in photo 22. Also included are 24 black-and-white photographs. Many of the line drawings that preface each species' account appear out of proportion and lack professional finish.

The publishers apparently omitted a major portion of the Hooded Crane account (p. 212). Except for the discussion on Interspecific interaction, the entire General biology portion is missing. Under *G. rubicunda* (p. 141), the English name is given as Australian Crane; elsewhere in the text, however, the species is referred to as Brolga, and why *G. grus* is called Eurasian Crane instead of Common Crane is not explained. Other than these minor problems, most species' accounts are orderly and well written, and few typographical errors were noted.

Being most familiar with the Sandhill Crane, I examined this account more closely than the others. This was the longest account (13 pages), because studies have been completed on the six subspecies. Only a few minor typos, deletions, and errors were noted. On page 171, *G. c. tabida* (of the westernmost breeding populations) winters in western Arizona, which was not mentioned. The Canadian Sandhill Crane was described in 1965, not 1973. On page 175, Routt, Moffat, and Jackson counties are in northwestern Colorado, not northwestern Montana as stated on the text. On page 177 under Wintering range and habitats, about 20,000–23,000 Lesser Sandhill Cranes winter especially in Merced County, California, not in San Joaquin County. Finally, on page 179 under Migration and movements, Lewis 1949a should be Lewis 1979a.

It is difficult to find serious fault with this useful book. Considering Walkinshaw's monograph also was titled "Cranes of the World," one wonders why a new title was not used in this case. However, Johnsgard has assembled most of the information presently available on all crane species and has presented it

in a very readable form. Considering the volume of bird books recently published by this author, I was amazed at the excellence and quality of this work. The wealth of information contained in the monograph should make it a valuable addition to the library of anyone interested in birds in general or cranes in particular. All academic and museum libraries should obtain a copy, as the book represents a valuable summation of what is presently known about a unique family of birds.—CARROLL D. LITTLEFIELD.

The Herring Gull and its egg. Part II, The responsiveness to egg-features.—G. P. Baerends and R. H. Drent (Eds.). 1982. Behaviour 82(1-4): xiii + 416 pp., 17 plates, 74 text figures. E. J. Brill, Publishers.—On occasion in science, as in the arts, a major work encapsulating the spirit of an earlier time arises and is presented to the world only after the fashions of that earlier time have given way to those of a later age. Such would appear to be true of this second volume of "The Herring Gull and its Egg." The origins of this multiauthored work date back to the 1930's and 1940's, when the studies and theorizing of Konrad Lorenz and Niko Tinbergen gave rise to a classical ethology, replete with its own terminology of releasers, sign stimuli, super releasers, innate releasing mechanisms (IRM), and heterogenous summation, all aptly described in Tinbergen's "The Study of Instinct" (1955). Of the various study methods developed by early ethologists, the use of models to tease apart the relevant stimulus cues to which animals respond stands out as perhaps one of their main contributions. Of major relevance to ornithological literature was Tinbergen's classic, "The Herring Gull's World" (1953), which began the analysis of the relevant cues provided to a parent Herring Gull by its eggs. The present volume, based on research conducted primarily during the 1950's, extends and refines these earlier gull studies. It is an outstanding legacy of the approach to animal behavior developed by the early ethologists, and one can only lament that it was not possible for it to have been published some 25 yr earlier, when it would have had a greater impact for ethologists and ornithologists alike.

The work is organized into five major sections. Most sections are further subdivided into chapters, often with authorship changing from chapter to chapter. Most sections are sufficiently complete that a reader interested in a particular aspect of the study need not read the whole to obtain at least the main findings of relevance.

¹ For Volume I, see Behaviour Supplement XVII (1970).

For ornithologists, Section I, dealing with the external morphology of the egg, is perhaps the most relevant. Methods and descriptive results of egg size, shape, color, and speckling pattern are treated in detail. Results of current interest include measurable differences found in successive eggs within a clutch, and greater variability between than within clutches.

Section II, with 7 chapters, describes the main experiments analyzing visual stimuli eliciting retrieval of eggs placed just outside of the nest. Using a standardized design involving simultaneous choice tests between two eggs, the important aspects of size, shape, color, and speckling pattern were examined. Not surprisingly, gulls preferred larger-than-normal eggs, as previously shown for some other ground-nesting birds, thus providing another example interpretable as a "supernormal" stimulus. In contrast, the "normal" egg shape was preferred over any abnormal shapes employed. Supernormality was again present for color, in that green eggs, very unlike the natural color, elicited the strongest retrieval. Red eggs were least effective. The size and number of speckles on an egg also were relevant. Section II then continues with a motivational analysis of the previous experiments. In keeping with the "causal" analyses of classical ethology, the results are related to the interactions of antagonistic and hierarchical behavior systems, in this case the tendency to incubate and to escape from the experimental situation at the nest. This section concludes with a consideration of how the various egg cues are processed. The concept of "heterogenous summation," where the value of each feature acts independently of the others, is considered to be applicable.

Section III deals briefly with responses other than egg retrieval. The egg stimuli eliciting settling on the clutch were found not to differ appreciably from those eliciting egg retrieval, whereas the cues eliciting pecking and eating of eggs that were placed off the home territory tended to be different. For egg eating, red was the most effective color. Interestingly, when conditioning was ruled out in follow-up laboratory studies of feeding preferences, the color preference again more closely resembled that found for egg retrieval. An important omission in Section III is experiments to show how conditioning with food might have accounted for the natural feeding or pecking preference for red-colored eggs.

Section IV considers the role of experience on incubation responses. Incubation experience with plain-colored eggs did not reverse the normal preference for speckled eggs in retrieval tests. When dummy eggs with normally preferred colors or speckle patterns were experimentally pegged beside the nest so they could not be retrieved, a preference developed for initially nonpreferred eggs that were free to be rolled back into the nest. Herring Gulls are clearly able to learn aspects of their eggs, but the evidence overall suggests that they do not do so under normal

incubation situations. Some tantalizing observations of a gull evidently preferring its own eggs over the differently colored eggs of another gull are presented, but unfortunately are not sufficiently complete to warrant any firm conclusion about individual egg recognition.

Section V is devoted to a lengthy (118 pp., 7 chapters) general discussion, beginning with a review of relevant literature. Over a wide range of Larid species, the color red emerges as perhaps the most consistent, being generally of low effectiveness for incubation responses and of high effectiveness for feeding and pecking responses by the chicks. The second chapter of this section then sets out to deal with the adaptiveness of the stimulus-response correlations found in the earlier experimental section, but quickly returns to causal interpretations of the results. The considerable space in this section devoted to causation of the red/blue pecking preference in the young gull seems somewhat out of place in a study of adult responses to egg stimuli. The likely cryptic function of speckled egg patterns, and the probable enhanced viability of larger eggs, is briefly noted, then the causal mechanisms of the relevant receptor systems again are considered. While the causal mechanisms are of interest, and highly relevant to an examination of presumed IRMs, it is unfortunate that this part of the discussion is mixed in with material on adaptiveness of the responses.

Chapter 3 of the discussion is an interesting but admittedly inconclusive comment on the possibility that the stimuli found to be most effective in eliciting responses when first presented also would be most effective in learning contexts. The discussion then develops a complicated flow-diagram model to explain the results obtained for egg retrieval (Chapter 4) and compares it with the IRM concept of Lorenz (Chapter 5). The results for Herring Gulls are seen to be more compatible with a modernized version of the Innate Releasing Mechanism developed by Schleidt in 1962, incorporating experience (IRME) into the ontogeny of the egg-recognition mechanism. The concept of supernormality (Chapter 6) and (Chapter 7) other models previously advanced to explain how animals make decisions when faced with alternative stimulus patterns are then considered, but significant new insights fail to emerge.

This large monograph has at least some sections that will be of interest to ornithologists. The results sections, particularly those dealing with egg characteristics and responses to them, would presumably be consulted by anyone seriously interested in problems of egg recognition in any avian taxon. Most of the material covered in the overly long and somewhat fragmented discussion will be of interest primarily to historians and current-day practitioners of what might be called neoclassical ethology. Whether the material and approach presented in this work will help to provide a basis for a renewed interest in

classical ethology by ornithologists and others, or will be seen as an example of a once valuable but now largely dated approach that must give way to the more recent fashions of behavioral ecology, socio-biology, and neuroethology, must await the verdict of history.—ROGER M. EVANS.

The secular ark. Studies in the history of biogeography.—Janet Browne. 1983. New Haven, Connecticut, Yale University Press. x + 273 pp. ISBN 0-300-02460-6.—Biogeography lies at the intersection of many biological disciplines. Systematics, in particular, has been most concerned with biogeographic theory and methodology, but one could also claim that thinking about biotic distribution also has invigorated, and expanded, the content of ecology. Likewise, we have long known that the core question of evolutionary biology—the origin of species—cannot be solved without a deep understanding of the spatial history of populations and taxa. Thus, space, along with time and form (in its broadest interpretation), are the conceptual cornerstones of historical biology, in any of its various guises.

Janet Browne's book is a history of biogeography covering the period up to the last quarter of the 19th century. Although it makes scant mention of contemporary controversies, biologists with an interest in biogeography will profit from reading this book simply because it reveals the ways in which many current ideas about biotic distribution have developed.

Biogeographic analysis began within the context of a creationist worldview. A literal interpretation of the Bible held sway among many scientists and natural historians until the end of the 19th century, and the influences of that interpretation have extended to the present day (and not just in the writings of recent creationists). Thus, the notion of a center of origin and dispersal from that center to produce cosmopolitanism arose from the widely accepted religious belief that all species dispersed from Mount Ararat following the so-called Flood. As Browne notes (p. 10): "Literal-minded natural philosophers therefore were obliged to explain how animals had arrived at their final destination. And this, in a sense, marks the first beginnings of the study of geographic dispersal."

Through the 18th and 19th centuries, more and more organisms were discovered and described. That not all could fit into the Ark forced a reevaluation of distributional data, and before long the concept of multiple "centers of creation" supplanted the single center of Mount Ararat. The proposition of dispersal from a localized center did not change, but these new data led to another concept, namely that a flora or fauna could be considered as *endemic* to a restricted area: taxa were not found to be distributed willy-nilly across the globe. Areas of endemism, or biotic

provinces, therefore, forced these workers to ask where species came from and why they were distributed in the ways they were.

Two biologists, in particular, helped create the science of biogeography. In Germany, Alexander von Humboldt (1769–1859) compared the composition of floras with the geographical distribution of physical parameters such as atmospheric pressure (he coined the term *isobar*) and minimum and maximum temperatures. He concluded that physical conditions were the prime determinants of distribution. Likewise, the Swiss botanist Augustin de Candolle (1778–1841) stressed this same relationship but added a biological dimension: there is a "struggle for existence" with individual plants competing for space and light. Darwin's view of the evolutionary process was no accident: he learned his botanical geography from Candolle's *Essai élémentaire de géographie botanique* (1820).

Throughout the first half of the 19th century, biogeography became a science of patterns: provinces were demarcated and compared, diversity gradients were described. The causal history of these patterns began to emerge from the study of fossil assemblages and earth history; if organisms and geology changed, then so too must have distributional patterns. The earth became, to use Browne's metaphor, a chessboard. Perhaps the most important problem to arise during this period was that of disjunct species or varieties. How could these be explained? Given the Biblical literalism still evident in the times, disjuncts clearly suggested multiple centers of creation. But for those seeking a naturalistic explanation, disjunct species directed attention to the possibility of an evolutionary origin in a way that few other observations could.

Focusing on the disjunct distributions of alpine-boreal floras across much of Europe, the eminent geologist Edward Forbes (1815–1854) proposed that a continent-wide subsidence during the Pleistocene, accompanied by extremely cold conditions, permitted the northern flora to become widely distributed via dispersal. At the end of the Pleistocene, he postulated, uplift and a return to less severe climatic conditions fragmented these floras and isolated them on high mountains. Forbes's hypothesis was important because multiple centers of creation were no longer necessary: widely accepted geological processes could account for the disjunct biotas via vicariance, or fragmentation. Seen from a modern perspective, these same kinds of explanations also do away with the need to invoke long-distance dispersal across a static (or quasi-static) landscape to explain disjunct patterns.

Darwin had developed, but not yet published, many of the same ideas as Forbes. Yet, Darwin, like many of his contemporaries, seemed to emphasize dispersalist explanations. Combined with his notion of competition and "survival of the fittest" as mechanisms of change, dispersal explained the presumed move-

ments of biotas from the north to the south (*à la* many contemporary dispersalist biogeographers). Indeed, Browne develops a more interesting and provocative thesis. English biogeographers, including Joseph Hooker, A. R. Wallace, Forbes, and Darwin, functioned in the political, economic, and social atmosphere of Victorian England, and within this worldview northern peoples (read, Europeans) were considered to be superior to their counterparts to the south. This superiority or dominance, both cultural and intellectual, was said to result from the highly competitive nature of northern societies and their environment, and such a view was directly extrapolated to include the northern biota as a whole. Thus, plants and animals of the north were considered more competitive and therefore stronger; thus dispersal into southern biotas was taken to be much more common (and likely) than in the reverse direction.

Browne does not pursue this connection between the social setting of the science and the hypotheses—in this case, biogeographic—that emerged from it in much detail. But given that other historians also have implicated such connections elsewhere within 19th-century biology (e.g. the reliance of Darwinism on economic theories), more attention to this influence might be fruitful for understanding the origin and development of biological ideas, many of which are still acceptable to large numbers of biologists.

Browne's book is interesting, and important, because it gives a reader insight into the origins of one's own thinking. Perhaps she can be faulted for not relating this history to contemporary developments in biogeography, but then that could be the subject of a separate book. This review has touched on only a few of the themes that are developed in some detail. What is surprising is that many of the questions investigated by these earlier workers still are not answered satisfactorily even today. Browne's exemplary historical analysis helps us to appreciate just how far we have to go.—JOEL CRACRAFT.

Iowa birds.—James J. Dinsmore, Thomas H. Kent, Darwin Koenig, Peter C. Petersen, and Dean M. Roosa. 1984. Ames, Iowa, The Iowa State University Press. 356 pp., 49 black-and-white photographs, 132 distributional maps. ISBN 0-8138-0206-7. Cloth, \$27.95.—Five of Iowa's ornithologists and/or birders have teamed up to produce that state's latest annotated checklist. It could be considered the "fourth edition," preceded by Anderson (1907), DuMont (1933), and Brown (1971). These authors regard the Iowa State List to be 362 species of which 276 are regular, 16 casual, 62 accidental, 6 extirpated, and 2 extinct. They also discuss 12 hypothetical and 26 other unacceptable species. The treatment of each species is fairly consistent, even though species groups were divided among the various authors. For each species the fol-

lowing is covered (if applicable): status, habitat, spring and fall migration, summer, winter, comment, and reference. The simplified distributional maps show many records at a glance. The arrangement of the species follows the Thirty-fourth Supplement to the American Ornithologists' Union Check-list of North American Birds (1982).

The status, although precise, is somewhat confusing, because it is defined 4 ways: 1) categories of occurrence (divided into 5 terms), 2) frequency (divided into 4 terms), 3) seasonal occurrence (divided into 4 terms), and 4) firmness of data (divided into 8 terms). Most of these are self-explanatory, although the authors admit the frequency terms are difficult to apply. Each frequency term represents numbers, e.g. common = 6-49 (birds) per day or 25-249 (birds) per season. These numbers do not seem to be correlated in the text and apparently were not based on data in most cases. It seems that such vague terms should not represent precise numbers. Under categories of occurrence the term accidental is applied somewhat differently than usual, and another term, e.g. occasional, would have fit better. The firmness of data—evidence of occurrence by specimens, photographs, or sight records—is discussed at length but is cryptic in the species accounts. One has to keep flipping back to see that Class III is a species documented by a sight record or that Class V is a possibly accurate record. It would have been better to spell it out in the species accounts. All records were screened by the Iowa Ornithological Records Committee, of which 4 of the 5 authors are members.

Habitat given is usually general, although in some cases it is quite specific. It is stated, and rightly so, for only regular and casual occurring species.

Generalized times of occurrence are given with three specific migration dates for early and late dates for spring and fall. Like most checklists, more information is presented for uncommon and rare than common species. Summer and winter seasonal data are mostly from Breeding Bird Surveys and Christmas Bird Counts.

Comments vary widely—there was a special effort to expand vagrant synopsis to include records from surrounding states so that a more rounded picture emerges. This should be especially interesting to birders. Also discussed under comments are nomenclature, aides to identification, large counts, reasons for increases or declines, and areas for further study. Pertinent references are listed after each species and also at the back of the book. In the appendices is also a list of all the species by categories of occurrence, a list of the year when the species was first detected, a gazetteer, and the index.

At the beginning of the checklist are sections on Iowa's climate, geography, and natural regions and how they are related to bird distribution. Other sections include "Breeding and Endangered Species," which were combined because only species that breed

in the state were considered for endangered status. Two other sections, "History of Iowa Ornithology" and "The State List," should have been combined because they cover much of the same ground.

The photographs, for the most part, are not pertinent. The ones that document records such as White-faced Ibis and Prairie Warbler should be included, but others do not add anything to the work.

It is the "nature of the beast" that checklists are obsolete as soon as they arrive. Bird numbers and species are in dynamic fluctuation, and birders and ornithologists are adding new species to the state list and finding out new things about the "old" birds. Updates of state checklists are becoming more and more frequent. In such cases, the price of almost \$30.00 seems high, and maybe the authors should have considered a cheaper version.

Even with a few drawbacks, it is difficult to imagine any serious Iowan or Middle Western birder or student of bird distribution without a copy of this book.—H. DAVID BOHLEN.

Perspectives in ornithology.—Alan H. Brush and George A. Clark, Jr. (Eds.). 1983. New York and Cambridge, Cambridge University Press. x + 560 pp., many text figures. ISBN 0-521-24857-4. \$29.95.—A pluralistic organization like the American Ornithologists' Union has a number of traditions, some of which are conspicuously valuable. One such is the regular assessment of the health and well-being and of the future prospects of ornithology, which has been undertaken in a variety of ways. The most illuminating has been the periodic production of review volumes concerned with the status of scholarly studies of bird biology. These have appeared in 1933 (Chapman and Palmer, *50 Years' Progress Of American Ornithology*, Lancaster, Pennsylvania, Amer. Ornithol. Union), 1955 (Wolfson, *Recent Studies in Avian Biology*, Urbana, Univ. Illinois Press), and, recently, 1983 (*Perspectives*). The current volume already has achieved a critical success, something I am able to report here as a result of signing on to do this review late in the going; it is, moreover, a significant historical document.

Other reviews and notices of this book, and Ernst Mayr in the Introduction to the volume as well, have noted the high quality of the book and have suggested that the topical content of "Perspectives" provides the basis for this quality, as well as for its being a landmark volume. However, an examination of the three volumes shows no great topical departure of "Perspectives" from either "Progress" or "Studies." In fact, both "Progress" (5) and "Studies" (5) have more unique topics than "Perspectives" (3). Even so, I agree with my colleagues that "Perspectives" has a novel flavor that makes it much more compelling reading than its predecessors.

I suggest that it is not in the nominal subject matter but in how and why what is said that makes "Perspectives" distinctive. The study of mating systems and of cooperative breeding, for example, are aspects of avian breeding biology, and their subject matter today is an extension of what appeared in reviews of territoriality and life history 28 and 50 yr before; but in 1983 it sounds much more like science than it did earlier. It is this sound that is new, and it is a result of a relatively recent concern among avian biologists with process rather than with pattern and of a shift to deductive science; it is a sign that the science is beginning to mature.

Pursuing the same line in a different context, Professor Mayr (pp. 2ff) notes the following recent changes in ornithology: (1) a "... shift from straight description to a concern with causal analysis," (2) the "... termination of the isolation of ornithology from other biological disciplines," (3) the "... professionalization of ornithology," and, (4) the "... bridging of the gap between biological disciplines." He notes these changes to have occurred especially over the past 20 yr and concludes that ornithology is a vastly different science from what it was because of these changes. The changes permeate "Perspectives."

The earlier volumes show that the ornithology of the past tended to be heavily inductive, reaching generalization and narrative explanation from examination of observations of individuals and isolated samples. The data also were inconsistently theory-laden and directed toward documenting patterns in nature. The notions of examining a hypothesis or of testing a prediction, or even of making a prediction, were not generally employed. Replication of work ordinarily was not attempted, and not only because it was difficult to fund a repetition. In contrast, some ornithology today is, and much in the future will be, deductive and concerned with process—the evolutionary background, developmental history, adaptive significance, and proximate causes of the phenomena under examination. Hypothesis testing surely will become standard in most parts of the field. The literature prior to 1940 will become ever more neglected.

Some of us ultimately may not like the new ornithology all that much, for even though most of us still work with whole organisms, the successes in the field are owing increasingly to reductionist approaches. Thus, advances in understanding avian foraging behavior are being made by *behaviorists* (who work with birds), and studies on speciation in birds are being pursued by *systematists* and *biochemists* (who work with birds). Reductionism is found not only at the level of what is examined—restriction fragments of DNA or isolated subsets of foraging behavior—and in how the examination occurs—relative fit of experimental results to a priori models—but also in the advent of true specialists, who may well no longer be ornithologists.

For the record, the contents of the volume are: Introduction (E. Mayr), Captive birds and conservation (W. Conway), Research collections in ornithology—a reaffirmation (J. C. Barlow and N. J. Flood), On the study of avian mating systems (D. W. Mock; S. Lenington), Cooperative breeding strategies among birds (S. T. Emlen and S. L. Vehrencamp; J. D. Ligon; I. Rowley), Ecological energetics: what are the questions? (G. E. Walsberg; W. A. Calder III), Perspectives in optimal foraging (J. R. Krebs, D. W. Stephens, and W. J. Sutherland; J. P. Myers), Biochemical studies of microevolutionary processes (G. F. Barrowclough; J. Avise), Organization of the avian genome (G. F. Shields), The origin and early radiation of birds (L. D. Martin; D. W. Steadman; P. V. Rich), Avian community ecology: an iconoclastic view (J. A. Wiens; J. R. Karr), Biogeography: the unification and maturation of a science (D. Simberloff; J. Cracraft; D. M. Power), Bird song learning: theme and variations (P. J. B. Slater; L. F. Baptista; D. E. Kroodsmma), and Bird navigation (C. Walcott and A. J. Lednor; K. P. Able).

The book is well made, satisfactorily standing up to heavy use by graduate students in my spring literature seminar, and production errors are few. It is an elegant statement of the current status of ornithology as biological science, and everyone associated with its appearance should be congratulated for a job well done. The book belongs in all libraries that maintain reasonable scope in biology and on the shelves of all who are interested in animal biology, especially those who are active in research and teaching.—RICHARD F. JOHNSTON.

Birds of prey of Britain and Europe.—Ian Wallace. 1983. Oxford University Press. viii + 86 pp., 32 color plates. \$17.95.—This book appears to be designed as a miniature tea-table book for British chauvinists who live in efficiency apartments. As the title indicates, this work includes not only those species endemic to Britain, but also those shared with Europe. I am not certain where such species as the Bateleur (*Terathopius ecaudatus*, p. 38) and the Amur Falcon (*Falco amurensis*, p. 68) fit into this schedule.

The book is simply a vehicle to present the color plates from Cramp and Simmons (Eds.), "Handbook of the Birds of Europe, the Middle East, and North Africa: The Birds of the Western Palearctic" (1980), without the encumbrance of a real text. The paintings are by Ian Willis and the quality is quite variable. In my opinion, his illustrations of perched raptors range from barely adequate to good; on some I find the proportions to be wrong and the color reproduction untrue, and the paintings simply fail to convey the appearance of a live bird. The depictions of raptors in flight are excellent and are the best color illustrations available for Europe.

The text consists of an introduction of 20 pages

that offers little to a serious ornithologist and yet is too much of a compilation of esoterica to be of interest to the ordinary bird-watcher, e.g. "The Falconidae [have] . . . notably a fused spine [in the thorax], false teeth on each cutting edge of the upper mandible . . ." The remaining text merely faces each plate, rarely filling the page, and emphasizes identification, thus suggesting that one should take one's tea table into the field.

If you wish a field guide for the identification of European birds of prey, buy R. F. Porter, I. Willis (the same), S. Christensen, and B. P. Nielsen, "Flight Identification of European Raptors" (1981, Carlton, England, T. and A. D. Poyser). Porter et al. is by far the best field guide to raptors available for any part of the world; its sole deficiency is lack of color plates. This lack could have been remedied by the inclusion of the appropriate illustrations from Wallace. It is a pity that the realities of the world of publishing prevented this possibility.—HELMUT C. MUELLER.

The return of the sea eagle.—John A. Love. 1983. Cambridge and New York, Cambridge University Press. 277 pp., 85 figures (including photos), maps, tables. £15. **Ørnens dagbog.** (The eagle's diary; Nagtoragdlop uvdorsitai.)—Gunnar Rønn. 1977. Grønlandske Forlag. 77 pp., photos. \$45.00.—The White-tailed Sea Eagle (*Haliaeetus albicilla*), once common along the coasts of the British Isles, was extirpated there by the early years of the last century. An attempt to reintroduce it was made in the 1960's on Fair Isle. Only 3 eagles were successfully released; 2 of these disappeared, and the third found an easy food source, nestling Fulmars, but became so saturated with the oil these petrels cough up that it could no longer fly.

In 1975 Dr. Ian Newton and others started a more extensive introduction plan, centered on the isle of Rhum in the Hebrides. The young eagles come from Norway, where Dr. Johan Willgoth, author of a book-length report on this species, has provided full cooperation. Ten or more eagles have been secured and introduced to the wild almost every year. As of 1983 a substantial number, some now paired and fully adult, live on Rhum, on nearby islands, and on the mainland of Scotland. There is every reason to think the project will succeed, though as yet the 2 or 3 pairs that have built nests, for one reason or another, have not produced independent offspring. All this is narrated in detail by Mr. Love, who resides on the island and directs the project. A gifted artist as well as photographer, his book is well illustrated and fully documented. Beyond what the title suggests, this is an in-depth study of the Erne (to use the old Anglo-Saxon name for this eagle). Now that it is known to nest on United States soil (Attu Island), this close cousin of the Bald Eagle will receive increased atten-

tion, and Mr. Love's treatise should find a wide audience in America as well as Europe.

Mr. Rønn's greatly over-priced little book is a day-by-day account of efforts to save an immature White-tailed Sea Eagle felled by gunshot. The locale is Greenland. Some of the photos are of interest. A plea is made for conservation of the species, and to spread the word as widely as possible the brief text is set forth in Danish, "Greenlandic" (Eskimo), and English. Fortunately, the eagle recovered, was banded, and released.—DEAN AMADON.

Hormones and behavior in higher vertebrates.—

J. Balthazart, E. Pröve, and R. Gilles (Eds.). 1983. Berlin, Heidelberg, New York, and Tokyo, Springer-Verlag. xii + 489 pp.—It is well known that ornithologists have made major contributions to the field of ethology, but it also should be pointed out that investigations on avian species have played a key role in the emergence of the discipline of behavioral endocrinology. In many respects birds are ideal subjects because many species are diurnal, conspicuous, abundant, and easily maintained in captivity, whereas many mammalian species traditionally used as subjects for investigations on behavioral endocrinology tend to be nocturnal, secretive, or both. Adkins-Regan also points out additional reasons for using birds as subjects. For example, reproductive behavior in aves is mediated primarily by visual and auditory modalities whereas in mammals there is often a strong olfactory component that is difficult for the investigator to control. Therefore, it is perhaps not surprising that investigations in behavioral endocrinology that use birds as experimental models are frequent and thus are the subjects of approximately half of the papers in this volume.

Over the past 20 yr great advances have been made from the pioneering studies in which behavior was recorded after ablation of endocrine glands, and after the hormones were replaced by injections, etc. Current areas of research include investigations of hormone-receptor distribution in the central nervous system, influences of hormones on neurotransmitters, and the ontogeny of hormone-behavior interrelationships. These advances and the current state-of-the-art are summarized in this book by a wide variety of authors, many of whom are noted authorities in their field.

The volume is a compilation of the proceedings of a conference held at Bielefeld, Federal Republic of Germany, in September 1983, and sponsored by the European Society for Comparative Physiology and Biochemistry. The chapters are arranged into 5 themes as follows.

The first section contains 9 chapters addressing problems of brain mechanisms of hormone action in mammals. These reports highlight the effects of mi-

nute hormone implants into discrete areas of the brain, the importance of cytosolic receptors for steroid hormones, effects of hormones on neurotransmitters, and changes in responsiveness to hormonal influences during the day, or during, for example, estrous cycles. These topics focus primarily on sexual and maternal behavior, although two contributions summarize recent investigations on the effects of endorphins, adrenocorticotrophic hormone, and monoamines on integrative behavior and grooming. Despite this emphasis on the biochemistry and pharmacology of hormone-behavior relationships, Barfield and his associates point out that it still is not known how biochemical changes at a particular site in the brain (e.g. a nucleus) influence molecular components of neurons and their functions that underlie behavior. As this field becomes more and more molecular, exciting new advances can be expected in the near future.

Section II contains six contributions on sexual differentiation during development and rhythmic cycles of reproductive activity. Again the emphasis is primarily on mammals, with one paper on birds. It is now quite clear that testosterone and estradiol can organize neural circuits neonatally into a male or female brain. These influences early in life also can modify neuroendocrine rhythms associated with reproduction. Perhaps one of the most surprising findings in this field is the demonstration that intrauterine position of a fetus is correlated with degree of sexual differentiation of behavior. The female fetus apparently can secrete large quantities of a steroid that can be converted to androgen or estrogen in the periphery. Thus males can be demasculinized to varying degrees if they develop next to a female *in utero*.

The third section comprises six articles, four of which are on birds, that discuss peripheral metabolism of the steroid hormone testosterone in relation to behavioral changes. In virtually all target cells studied to date, testosterone is metabolized to estradiol, or a reduced metabolite. In some species conversion of testosterone to estradiol, or indeed estradiol itself, is crucial for the expression of reproductive behavior in males (see chapter by Harding). In other cases reduction of testosterone to 5 α -dihydrotestosterone is important for biological action, and, curiously, conversion to 5 β -dihydrotestosterone appears to be a deactivation shunt. Indeed, changes in activity of enzymes that regulate metabolism of testosterone now appear to have an important role during development and during behavioral transitions within a reproductive cycle.

Section IV focuses on endocrine cycles and is the most comparative, with three articles on mammals, four on birds, and one on reptiles. Endocrine cycles are diverse and cover environmental influences on male-female interactions, control of sexual behavior, development, onset of puberty, and aging. There is

a most useful review on prolactin and avian reproductive cycles by Goldsmith, who compares changes in prolactin levels in blood with cycles of parental behavior in species with altricial vs. precocial young. A chapter by Silverin on the field-endocrinology of *Ficedula hypoleuca* may also be of interest to many readers of *The Auk*. Finally, Crews gives a fascinating account of the control of sexual behavior of the male garter snake. In males of this species testosterone may act neonatally to organize brain mechanisms concerned with sexual behavior, but in the adult it is change in temperature that activates mating behavior and not necessarily testosterone. Crews's investigations of behavioral endocrinology in reptiles continue to challenge current dogma, and exciting developments can be expected in the future.

The final section is devoted entirely to avian behavior. These six papers, plus those in section IV, will be of primary interest to ornithologists. The contributions in this part deal with feedback controls in various endocrine states, including self-feedback; hormonal influences on central mechanisms of vocal behavior in avian species that do not show vocal learning; relationships of male aggressive behavior and mate-guarding (or defense of paternity); interval timers and biparental care; attention, distractibility, and memory formation; and finally, general reproductive behavior.

In general, I find this volume to be a well-balanced and well-organized compendium covering many of the current and exciting new concepts of behavioral endocrinology in higher vertebrates. It should be noted, however, that this is not an introductory text and thus will be of major interest to those readers with an extensive basic knowledge in this field, rather than for the general ornithologist. Nevertheless, all institutions should have a copy in their library for reference purposes because behavioral endocrinology is beginning to interface with behavioral ecology, and it is likely that further advances will accrue in the next few years.—JOHN C. WINGFIELD.

The marine ecology of birds in the Ross Sea, Antarctica.—David G. Ainley, Edmund F. O'Connor, and Robert J. Boekelheide. 1984. Amer. Ornithol. Union, Ornithol. Monogr. No. 32. x + 97 pp., 42 figures (mostly maps), 20 tables, 5 appendices. ISBN 0-943610-39-7. Order from Frank R. Moore, Assistant to the Treasurer A.O.U., Department of Biology, University of Southern Mississippi, Southern Station Box 5018, Hattiesburg, Mississippi 39406. \$9.00 prepaid (\$8.00 to A.O.U. members).—Although the Ross Sea encompasses only about one-tenth of the circumference of Antarctica, it includes the world's southernmost (and coldest) waters and the ornithologically important coastline of Victoria Land as well as the Ross Ice Shelf and King Edward VII Peninsula. With the publica-

tion of this monograph knowledge of its bird life takes a great leap forward.

The authors have used carefully controlled transects made from icebreakers over several years to build a picture of the summer distribution of seabirds in the Ross Sea and the adjacent sector of the South Pacific, as far north as the Antarctic Convergence. The census data are presented in the form of species accounts and maps for the early and late antarctic summer (coverage being less thorough in the latter). The maps generally show only the smoothed transect data, but extrapolated density distribution maps are drawn for some abundant species.

Even with such relatively good census data, conclusions retain some subjectivity. One may question, for instance, whether the data in Maps 23 and 24 really show that "By late January and February, a large proportion of the Antarctic Petrel population had shifted away from slope waters toward the northeast," because the area where a subsidiary concentration was found in late summer was barely visited in early summer.

In some cases the data are used to make the first meaningful estimates of population sizes for species that cannot be readily counted at their breeding sites. In early summer, for instance, there are thought to be 5.0 million Antarctic Petrels and 1.6 million Snow Petrels in the Ross Sea. In biomass terms, however, these species are overshadowed by the Emperor and Adélie penguins, with 309 thousand and 2.4 million individuals respectively, that between them account for 82% of the bird biomass in the Ross Sea. Overall density of birds is estimated at 16.3/km² and biomass at 39.5 kg/km². Within the Ross Sea, however, there are gross variations in density. The virtual absence of birds from the Ross Sea continental shelf, except in the west in the pack ice along the coast of Victoria Land, contrasts with their abundance along the northern edge of the shelf, and is especially striking in view of the major phytoplankton bloom that occurs over most of the shelf in summer.

The authors found that the entire population of most high-latitude species contracted somewhat toward their breeding areas during the breeding season. For some species this information, supplemented by data on molt and on the breeding condition of collected birds, is used to assess how far breeding birds travel from the colonies for food. The range of the Adélie Penguin, for instance, is only about 140 km, and highest densities of Snow Petrels occur within 350 km of known nesting sites.

In addition to valuable observations on feeding behavior, information is presented on stomach contents of about 135 birds collected at sea during the cruises. In assessing the relative importance of crustaceans, squid, and fish in the diet, the authors make the dubious decision to ignore differential digestion and to consider each item as equal, whether found in esophagus, proventriculus, or gizzard. They argue that

analysis of items in the proventriculus alone underestimates squid consumption, apparently on the grounds that gizzards contain many squid beaks but proventriculi relatively few. This seems logically unsound (the bias surely must be least closest to the point of entry), and because studies on whales suggest that squid beaks are extremely resistant to digestion there is a danger of grossly overestimating the importance of squid in the diets.

Nevertheless, the authors' data support previous suggestions that in antarctic waters only a few prey species make major contributions to the diets of seabirds. Among the Crustacea *Euphausia superba* was the major prey in oceanic waters and over the continental slope, but was replaced by *E. crystallorophias* in shelf waters; the vast majority of fish eaten were the Nototheniid *Pleuragramma antarcticum*, and only two species of squid were important in the diets. Accordingly, diet overlap among species feeding at the same place generally was high. The authors are inclined to the view that squid and fish play a more important part in the diets of antarctic seabirds than previously has been recognized and that summer food abundance may not be a limiting factor for high-latitude antarctic bird populations.

The authors start their synthesis with the statement that three distinct communities of species were recognizable in their study area, but I found that the more I looked at the data, the less real these communities appeared. For instance, the most numerous members of the "high latitude and pack ice community" (Emperor and Adélie penguins, Antarctic and Snow petrels) all had very distinct areas of concentration, while Wilson's Storm-Petrel, which like the Antarctic Petrel was densest in early summer south of the pack, was excluded as a major member of this community on the grounds of its preference for open water. Although the allotment of species to a small number of "communities" renders discussion simpler, the authors' own careful analyses suggest that the distributions of antarctic seabirds are independently related to a set of physical and biological factors, including the distribution of pack ice and open water, together with the location of suitable breeding sites.

The authors have broad knowledge of the ecology of antarctic waters, and it is a matter for some regret that they have not taken the opportunity to present a more coherent account of the marine ecosystem of which the birds form a part, and so to help the ornithological reader to make better sense of the observed patterns of avian distribution. Basic oceanographic data are provided (surface temperatures, salinities, and ice cover, together with some profiles), but there is only the briefest sketch of the circulation in the Ross Sea and an inadequate bathymetric map. Information on patterns of marine production and the biology of prey species is scattered throughout the text and is tantalizingly fragmentary. However,

although an attempt to integrate more fully the ornithological and marine biological data would have been worthwhile, it must be admitted that a good deal of crucial information simply is not available. For example, the Antarctic Slope Front (described by Ainley and Jacobs 1981, *Deep-Sea Res.* 28A: 1173) seems to exert a major influence on the distribution of many seabird species; the authors give depth profiles showing the physical nature of the frontal zone, but information on zooplankton and nekton in the area is lacking, so that they are unable to describe the frontal zone in biological terms and so to explain why it is attractive to the birds.

Overall, this monograph represents an outstanding contribution to antarctic ornithology, which will be of interest to anyone concerned with seabirds or marine ecology.—N. PHILIP ASHMOLE.

Population ecology of the Bobwhite.—J. L. Roseberry and W. D. Klimstra. 1984. Carbondale, Illinois, The Southern Illinois University Press. xvii + 259 pp., 23 photos, 45 figures, 28 tables, 12 appendices. ISBN 0-8093-1116-X. \$25.00.—The results and conclusions of Roseberry and Klimstra's definitive book represent an important, major contribution to the understanding of the population ecology of Bobwhite, and are drawn from the longest continuous study (1950–1980) of a local North American game-bird population.

The study focuses on an unmanaged Bobwhite population subjected to hunting on a 627-ha site in southern Illinois. Seasonal distribution and abundance of Bobwhite were determined by direct counts. Although the precision of these counts cannot be evaluated—the counts were not replicated—the authors believe census errors seldom exceeded 15%. During the course of the study, nesting ecology, hunting pressure and harvest, land-use changes, and weather conditions (to include several of the most severe winters in recorded weather history) were recorded.

The value and importance of this book lies most obviously in the length and continuity of the study. The authors contend (and rightly so) that it is only from the perspective of long-term studies that the response of Bobwhite to land-use changes, management practices, and hunting can be evaluated. Less immediately obvious (but no less important than the length and continuity of the study) is the outstanding ability of the authors to weave the results of this study with general population theory into a framework of Bobwhite population ecology. Within this framework, the authors evaluate, and in some instances challenge, certain "established" concepts of Bobwhite population ecology, such as inversivity, thresholds of security, and annual surpluses. The authors' findings do confirm two "established" con-

cepts regarding sport hunting: the perception of wildlife as a harvestable crop and the compensatory nature of populations. Data presented in this study demonstrate little evidence to suggest that variable harvesting significantly affects annual population fluctuations nor that continued harvesting depresses Bobwhite densities. Further, the authors state that continued harvests actually stimulate productivity by maintaining breeding densities at a lower, more productive level on the population growth curve.

The authors document that Bobwhite numbers oscillated at 8-10-yr intervals, typical of the "10-year wildlife cycle." The authors present a thorough review of theories published to account for cyclic phenomena. Using simulation-modeling, the authors documented that the closest temporal relationship existed between annual Bobwhite densities and the nodal lunar cycle, although the authors could not entirely rule out the effect of severe winter weather. The possible biological significance and evolutionary basis for population cycles is outlined, although the authors themselves admit that many important questions remain unanswered. Among the most important: What is (are) the causal pathway(s) by which individuals receive external cues (i.e. moonlight), and how are population parameters and attributes affected?

The book follows a well-developed progression from an introduction and description of the study area and the habitat needs of Bobwhite (Chapters 1-3), to an examination of nonhunting mortality and recruitment (Chapters 4-5). Chapters 6-8 deal with an examination of the short-term fluctuations and long-term trends of Bobwhite and address how the concepts of carrying capacity, hunting mortality, and population regulation affected observed Bobwhite densities. In the epilogue (Chapter 9), the authors eloquently summarize the study's findings and project—on the basis of what has been learned—the impact of continued land-use changes on Bobwhite. A notable feature of this book is the clear, concise writing style and the manner in which the reader is introduced to material presented in each chapter. Characteristically, there is a smooth transition from an introduction of the subject matter (with a thorough yet judicious use of the literature) to the authors' findings. These findings are presented clearly and concisely in the text and—where appropriate—tables, figures, and supporting statistical analysis also are presented. Both an author and subject index proved to be helpful in locating specific passages.

This book, as intended by the authors, is designed primarily for the wildlife biologist and general population ecologist. For those pursuing research or those who have an interest in the population dynamics of upland game birds, this book will be an important addition to personal reference collections. Also, the book is "must reading" for senior-level undergraduate or graduate-level population-ecology courses and

should be an important addition to university and institutional libraries. For those involved in population-dynamics studies outside the sphere of traditional "game" species, this book offers a useful review of population-ecology tenets and an excellent example of application or rejection of these tenets with regard to an exploited species. This book—as the authors intended—is not a handbook for management nor an encyclopedia of quail biology.

Indeed, the junior author's response to a query, made at the onset of this study, whether another quail project might be "plowing old ground" was prophetic. His response—"... hopefully it will be with greater depth and straighter furrows"—has certainly been born out by the information and conclusions "turned over" in this book. The "furrow" is straight, setting an example for others to emulate.—STEVEN M. BYERS.

Marine birds of the southeastern United States and Gulf of Mexico. Part I, Gaviiformes through Pelecaniformes.—Roger B. Clapp, Richard C. Banks, Deborah Morgan-Jacobs, and Wayne A. Hoffman. 1982. Museum Section, U.S. Fish and Wildlife Service, National Museum of Natural History, Washington, D.C. 20560. xi + 638 pp. FWS/OBS-82/01. No price given. **Marine birds of the southeastern United States and Gulf of Mexico. Part II, Anseriformes.**—Roger B. Clapp, Deborah Morgan-Jacobs, and Richard C. Banks. 1982. Museum Section, U.S. Fish and Wildlife Service, National Museum of Natural History, Washington, D.C. 20560. xiii + 492 pp. FWS/OBS-82/20. No price given. **Marine birds of the southeastern United States and Gulf of Mexico. Part III, Charadriiformes.**—Roger B. Clapp, Deborah Morgan-Jacobs, and Richard C. Banks. 1983. Museum Section, U.S. Fish and Wildlife Service, National Museum of Natural History, Washington, D.C. 20560. xvi + 854 pp. FWS/OBS-83/30. No price given.—The purpose of these three reports is to summarize the status of marine birds in the area and to document the potential effects on them of the development of petroleum resources along the outer continental shelf of the southeastern United States. To achieve their objective, the authors compiled data from 87 scientific journals on 39 species in Part I, 41 species in Part II, and 22 species in Part III.

Each volume first details the study area, which incorporates habitats and climates of the coastal and offshore waters of the southeastern United States from the northern border of North Carolina to the Mexican border of Texas. Following this are explanatory notes on the arrangement and content of the individual annotated species accounts. Topics covered include general distribution (world and North America), specific distribution in the study area by state (with maps), feeding behavior, egg-laying, clutch sizes, incubation periods, reproductive success, mor-

tality factors, and the species' susceptibility to oil pollution. Information on the effects of oil on each species was obtained from world reports, although the authors stress occurrences within the study area. To ascertain the susceptibility of each species to oil pollution, the authors used King and Sanger's "Oil vulnerability index for marine oriented birds" [1979. Pp. 227-239 in Conservation of marine birds of northern North America (J. C. Bartonek and D. N. Nettleship, Eds.), U.S. Fish and Wildl. Serv., Wildl. Res. Rept. 11]. For the species where such information was available, data are given on the numbers of birds affected and the extent of mortality caused directly from oiling. An index number is assigned that is not necessarily restricted to the vulnerability within the study area but also applies to other parts of the annual range.

The amount of biological information given varies significantly from species to species both in quantity and quality. For example, the Canada Goose (*Branta canadensis*) is covered in one page of text in Part II whereas the Herring Gull (*Larus argentatus*) is given 33 pages of text in Part III, although both species have been studied extensively. Surely it is as important to protect Canada Geese as it is Herring Gulls. The authors admit that many of the waterfowl species are among the best-studied birds, but for some reason they simply give summary statements.

After each species account is a bibliography that lists, by year, publications that provided data on the topics covered in the text. This is a valuable list because it provides the relevant literature back to the early 1900's. I didn't take the time to count the bibliographic references for each species, but for two of my favorite ones, the Ross' Goose (*Chen rossii*) and the Ring-billed Gull (*L. delawarensis*), there are 53 references (1940-1980) and 276 references (1907-1983) respectively; a valuable compendium indeed, with a total of over 10,000 citations in the three volumes.

The information in these volumes is specifically directed to the U.S. Bureau of Land Management to help it identify which aspects of outer continental-shelf development might endanger the welfare of marine bird populations and to allow managers to implement procedures that will minimize damage to birds during the development of energy resources. In the section entitled "Recommendations for future research," the authors present what they think is necessary regarding the acquisition of data on species status, breeding biology, distribution, and the effects of oil so that the appropriate personnel will be able to make proper decisions to ensure the maintenance of healthy environments for the birds.

These volumes offer a virtual gold mine of biological information on 102 species of marine birds. There are in all 169 tables and 71 maps to augment the text. The letter-size format, single-spaced typescript, and sturdy soft-cover binding render each volume easy to read and refer to often without the danger of dis-

integration. The authors are to be complimented on the completion of what must have been a long and laborious task that effectively brings all these useful data together. These volumes should be on the reference shelves of all concerned with the biology and management of marine birds.—JOHN P. RYDER.

Distributions of Oklahoma birds.—D. Scott Wood and Gary D. Schnell. 1984. Norman, Oklahoma, University of Oklahoma Press. xxxi + 209 pp. ISBN 0-8061-1887-3. \$14.95.—The numerous published works dedicated to bird distributions is testimony to the interest generated in this topic by professional researchers and amateur bird enthusiasts alike. Distributions are important to many questions dealing with topics of research in biogeography and population dynamics, and most certainly with the conservation of birds. In addition, because many birds are highly mobile, the thrill of finding bird species at extralimital localities has made birding an increasingly popular and sophisticated hobby.

"Distributions of Oklahoma Birds" is a compendium of maps, 1 per species, indicating for each of the 77 Oklahoma counties whether at least 1 specimen or specific sight record of a species has been recorded. Status, abundance, and temporal occurrence (at a resolution of 10-day increments) are indicated below each map with a bar graph and summary codes. This is the first publication where temporal changes in abundance for Oklahoma bird species have been depicted.

Oklahoma has a midcontinental location. Substantial changes in habitat occur from the pine forests and cypress swamps of the southeastern portion to the mesquite grasslands of the southwestern portion, and to the short-grass plains and mesas of the panhandle; this provides a dramatic contrast against which to plot bird distributions. The meeting of eastern and western avifaunas is well depicted in a number of bird distributions, such as those of the essentially eastern Pileated Woodpecker and Northern Parula and the mostly western Chihuahuan Raven and Cassin's Sparrow. The blending of east and west can be seen by comparing among many others.

Many ornithologists, natural resource professionals, amateur birders, and others will find the graphic presentation most useful in assimilating the general patterns of bird distributions and temporal occurrences. One also can gain a quick assessment of the distributions of available specimens, making this book valuable to many museums. Because Oklahoma has a relatively low density of ornithologists and bird observers relative to many other states, it is a place where an individual can contribute significantly to the knowledge of bird distributions. In this regard, the book also directs individuals to the areas in Oklahoma for which occurrences of bird species have not

been well represented. Even many common species are not completely documented throughout the state.

The book has a number of shortcomings. While the available data are insufficient for more detailed analyses, information is lost in the graphic summary of bird records. No text accompanies any except for an example map, so the reader is left to her/his own interpretations. A data point for a county is the same whether only one occurrence of a species has been documented or daily occurrence is expected. The status and abundance for a species represents the most stable or most common category for at least some part of the state. The dramatic changes in habitat that occur across Oklahoma, the inherent mobility of birds, the gaps in documented records, partial changes in seasonal statuses, etc. make it difficult to evaluate a number of the distributions.

For example, the Turkey Vulture is recorded from all but 2 counties and given status as a permanent resident that is common from March through November and uncommon from December through February. This summary, however, masks the withdrawal of the species from all but southeastern and (locally) south-central Oklahoma during the winter. Parallel seasonal problems occur for species such as the Ferruginous Hawk, Prairie Falcon, Horned Lark, and Lark Bunting, among others.

As another example, the Bushtit is given as a common permanent resident recorded from 5 counties (4 in northwestern Oklahoma). While it is in fact common in the mesa country of the westernmost county, only 5 records document the remaining 4 counties. A number of other species have similar interpretational problems. In this regard, the book could have been enhanced by reducing the size of the maps and adding short textual comments and interpretations of the distributions. The book is best used in conjunction with supplementary information such as that of G. M. Sutton (1974, *A check-list of Oklahoma birds*, Stovall Mus. of Sci. and Hist.) and does complement such a source.

A second shortcoming is the paucity of literature searched. The authors utilized specimen records, the extensive species summaries of George M. Sutton, and the field notes of a number of observers; yet, only five published sources were searched along with the Christmas Bird Count data published in Audubon Field Notes and American Birds from 1948 to 1977. Users interested in more complete information for particular species' distributions must still search the pertinent literature.

Some inconsistencies exist. Erratic seasonal occurrences are shown as short individual blocks on the bar graphs in most cases, yet continuous bars depict other seasonally erratic occurrences. Examples are Osprey in summer and winter and Brewer's Sparrow in summer. Townsend's Solitaire is assigned a general status of uncommon, yet its temporal abundance on the bar graph never exceeds the rare status.

Errors are more difficult to detect in such a work. In checking county-specimen data points against specimens in the Stovall Museum of Science and History at the University of Oklahoma for 6 common emberizines, I found only 3 omissions; 158 data points were recorded. In checking for omissions for 5 seldom-recorded species from the summaries of George M. Sutton used by the authors, I found 4 omissions; 63 data points were recorded. The omissions in this sample amount to about 4% of the potential county data points. Considering that nearly 14,000 data points are plotted, however, these omissions have only a minor impact on the general presentation.

While the book has a few weaknesses, the general patterns of bird distributions are still well represented. The graphics are clear, and the style of the graphics might well be imitated by other workers developing distributional guides. The current A.O.U. names and order of species are used. Most individuals—amateur and professional alike—with an interest in Oklahoma birds will find this book the first and, perhaps, most-used reference source to Oklahoma bird distributions. For community libraries in Oklahoma and adjacent states, it is a worthy and inexpensive addition. References to specimen information might make it useful to museum libraries. Those with a need or interest in more complete summaries will be somewhat disappointed with the treatment but will still find it a quick reference. Many birders in Oklahoma may use the book as an enjoyably indispensable field companion.—JOSEPH A. GRZYBOWSKI.

Ornithology books in the library of Trinity College, Hartford: including the library of Ostrom Enders.—Prepared by Viola Breit et al. 1983. Hartford, Connecticut, Trinity College Associates. 270 pp. \$35.00.—Ostrom Enders recently gave to the Watkinson Library at his alma mater, Trinity College, his natural-history library of about 6,000 volumes, mostly ornithological. He provided for their cataloging and for the preparation of this beautifully printed catalog of the library's total ornithological holdings (about 5,000 titles), published in a limited edition of 1,500 numbered copies. According to the foreword, the gift places the Watkinson Library "among the larger and more important depositories of ornithological materials in America." This alphabetical listing by author presents standard bibliographic information for each title. A few entries have short notes. Viola Breit's preparation of this work is meticulous and error free.

This ornithological bibliography joins other catalogs of books on birds, such as Zimmer's "Catalogue of the Edward E. Ayer Ornithological Library" (1926) and Ripley's "Ornithological Books in the Yale University Library" (1961). The most recent of these is

Mengel's "Catalogue of the Ellis Collection of Ornithological Books" (1972).

With the establishment of computer cataloging in all major libraries allowing access to records by several points, a printed list of holdings is no longer as useful as it once was. Mengel's work, like Zimmer's, on the other hand, is a comprehensive bibliography including copious notes, useful annotations, and critical judgments. The published portion of Mengel's catalog covers only up through the D's.

The Trinity College list is available and does include some books not found in the Ellis Collection. For example, the first record, C. J. Aagaard's "The Common Birds of Bangkok" (1930), does not appear in Ellis. Whereas Mengel's compendium will be standard in all academic and research libraries, this volume is recommended for purchase only by institutions and individuals with very strong interests in ornithology.—CAROLYN DICKERMAN.

Island biogeography in the Sea of Cortéz.—Ted J. Case and Martin L. Cody (Eds.). 1983. Berkeley, California, University of California Press. xii + 508 pp., 11 black-and-white plates, 83 text figures. ISBN 0-520-04799-0. \$55.00.—The recorded history of the 1,200-km peninsula of Baja California began in 1533 when a sailing ship, dispatched by Hernán Cortéz and commanded by mutineers who had murdered their captain, reached the cape region. Some of the crew themselves eventually were killed by natives at a place now called La Paz. The survivors returned with their discovery, and five years later Francisco de Ulloa confirmed that Baja California was in fact a peninsula by sailing north to the head of the gulf, which he named the Sea of Cortéz. Henceforth, the Baja peninsula and the islands in the Gulf of California became established cartographic features.

The earliest written account known of the flora and fauna was transmitted by Jesuits in 1757. Serious collecting did not really begin until the mid-19th century, however, when an obscure Russian botanist, I. G. Voznesenskii, accompanied a Russian expedition from Alaska to Isla Carmen to purchase salt. By the late 1800's the United States National Museum (Smithsonian Institution) was actively engaged in the exploration of Baja California, as was the California Academy of Sciences. The San Diego Natural History Museum also became a center for Baja California research and operated the Vermillion Sea Field Station at Bahía de los Angeles during the 1960's. Indeed, in the 140 yr since Voznesenskii made his plant collections, the Baja peninsula and the islands in the Gulf of California have been studied by individuals from institutions around the world.

Yet in spite of the relatively long history of exploration, the fauna and flora of the peninsula, and especially that of the gulf islands, are still incompletely

known. Checklists are reasonably thorough for some vertebrate groups such as mammals, but new records for birds certainly can be expected, and the list of plant species should lengthen as well. Field conditions in the gulf are demanding, and transport to and from the 34 principal islands and satellites is not always easy to come by. The gulf itself is from 100 to 200 km wide, the climate varying from subtropical to warm temperate. Most of the islands can be characterized as hot and dry; they range from mere rocks barely supporting herb-stage vegetation to the large (over 1,200 km²) and topographically diverse Isla Tiburón.

In 1977 a symposium on the Sea of Cortéz was held in Los Angeles, the highlights of which comprise this book edited by Case and Cody. The book is divided into three parts. The first, entitled "The Physical Scene," begins with an informative and enjoyable chapter by George E. Lindsay on the history of exploration. Two other papers follow that deal with the geology of the islands and physical oceanography. Of these, the former is a bit brief to be of much use in reconstructing past insular and mainland biotas. We are given a sketch of the gulf's tectonic origin, which began in the Miocene, and the subsequent volcanic or continental derivation of the islands, many of which did not become isolated until the Holocene.

Part II is a discussion of the flora and vertebrate fauna presented in 9 chapters, the last being a synthesis by the editors. Easily the most useful section of the book is Part III, a 156-page compilation of appendices from the collective chapters. Here are excellent floral lists and comments by Reid Moran, distributions of rocky-shore fishes by Donald Thomson and Matthew R. Gilligan, and range maps of mainland and derivative island populations of mammals by Timothy E. Lawlor. The distributional list of reptiles is an update of that of Soulé and Sloan (1966, *Trans. San Diego Soc. Nat. Hist.* 14: 137), but it suffers from the authoritarian practice of including nomenclatural changes that are neither appropriately designated nor discussed, there being only a reference to expectant publications that justify the taxonomy used.

The distribution of the islands' land birds is given in two tables within the text. There is a table each for the northern and the southern islands, a reflection of habitat differences so that species could be ranked by occurrence from north to south. In some instances several species are lumped under a single vernacular, such as "Aerial feeders" for the swifts and swallows. Of the 25 species listed for the southern islands, at least 20 of them also appear on the northern-island list. Combining the two may have eliminated some confusion and redundancy while still allowing readers to note, for example, that Xantus' Hummingbird (*Hylocharis xantusii*) is restricted to the islands of Isla San José and Isla Cerralvo and that

Black-throated Sparrows (*Amphispiza bilineata*) seem to diminish north of Isla San Marcos. In any case, but for a few moderately differentiated races, there is no apparent endemism among species of land birds on the gulf islands. The islands support populations mainly derived from the closest mainland—the peninsula itself or the Sonoran desert to the east. Cody acknowledges that the lists of island land birds probably are incomplete. In fact, many occurrences are based only on site records, and taxonomic problems assuredly exist (e.g. gnatcatchers) that would further obscure distributional patterns. Similar caveats also might be extended to the list of 46 species of migrant and wintering land birds, as well as to the list of 15 raptors, owls, and goatsuckers. For seabirds, Daniel Anderson includes 22 species known to breed on the islands and 29 other “mainland-breeding species that are associated with the gulf,” these also being found elsewhere in temperate or tropical environs.

Information on distributions often is placed alongside other data such as species-area and density statistics. Indeed, the predominant theme of the book is an application of MacArthur and Wilson corollaries of island biogeography. The editors had encouraged the contributors to address “a consistent set of topics” in the hope of avoiding the shortcomings of other symposia volumes that often lack theme and unity. Equilibrium theory does have its detractors, and the results here are sufficiently equivocal to support their criticism. Perhaps in anticipation, Anderson cautions in his chapter that too little is known about the seabirds to permit more than the most casual generalizations.

That extinction is presumed to have occurred on some islands supports the assumption that islands generally are either supersaturated or underrepresented with respect to species number. In the absence of a fossil record, the conjecture enjoys impunity. Actually, the ambiguity derived from these and similar ecological models of island biogeography might be eliminated with proper reference to both history and phylogeny. In this book, only Murphy’s chapter on reptile origins and Lawlor’s on mammals are headed in that direction.

Supposedly, the islands in the Sea of Cortéz are in fairly pristine condition, although Conrad Bahre’s chapter on human impact shows that some disturbance has occurred. Guano mining on certain islands and the introduction of *Rattus* on others have adversely affected seabird colonies, and probably reptiles and small mammals as well. Then there is the prehistoric exploitation of the gulf by Seri Indians—yet to be fully assessed. We now know that humans have had a very negative impact on small islands elsewhere in the world, and that ecological models of island biogeography that assume a modern insular fauna is intact are likely to yield conclusions having little bearing on natural processes (Olson and

James 1982, *Science* 217: 663; Steadman et al. 1984, *Proc. Natl. Acad. Sci.* 81: 4448).

The book is a useful compendium on the flora, vertebrates, and pertinent literature of the Sea of Cortéz. It will provide a point of reference for the serious investigator and a general overview for someone with passing interest in Baja California. The price is not especially persuasive for a run on personal copies, but most libraries could be convinced to place it on the shelf.—GREGORY K. PREGILL.

The Audubon Society master guide to birding.—John Farrand, Jr. (Ed.). 1983. New York, Alfred A. Knopf. 3 volumes (447, 398, and 399 pp.), 1,245 color photographs, 193 paintings, 422 drawings. ISBN 0-394-53382-8. \$41.85.—Birding is now a serious sport, avocation, and even profession. An army of birders takes to the field every weekend laden with appropriate tools for spotting, viewing, and identifying their quarry. Their identification skills vary widely from those of novices to those of a new group of skilled masters whose ability to identify the previously unidentifiable would astound previous generations. The breadth and size of this army has generated a challenging and increasingly lucrative market for guides to the identification of North American birds.

“The Master Guide to Birding” attempts to capture one end of the spectrum of possibilities by providing “the most complete, up-to-date, and useful field guide ever devised.” With this unabashed preface, the writers of “The Master Guide” clearly do not intend to duplicate the deficiencies of its unfortunate predecessor, the “Audubon Society Field Guide to North American Birds,” despite the fact that photographs are the principal medium of illustration in both. For “The Master Guide,” 61 experts authored 835 species accounts or special essays.

At the outset we should point out that this review departs from the norm of a single author’s opinions. Just as production of “The Master Guide” drew upon a suite of experts, we have field tested “The Master Guide” ourselves, used it with an ornithology class, and organized group discussions by birders associated with our institution, including members of the Delaware Valley Ornithological Club (DVOC). This review then is to some extent a summary of comments made by the audience for whom, we believe, the book was intended.

The first, most fundamental, and most predictable question about the book is whether photographs serve their purpose well. The debate about the values and weaknesses of photographs for field guides certainly will continue (see *Auk* 95: 201). We admit a biased interest in discovering the ornithological values of photographs. Among the conspicuous and inherent

weaknesses of photos are reduced options for arrangement of illustrations. The difficulty of direct comparisons of similar species, a natural result of photograph layout constraints, is the most serious flaw of "The Master Guide"'s design. Relative sizes of species, in particular, are lost in photographic illustration. Indeed, all illustrations in "The Master Guide" are scaled deliberately to the same size.

Good photographs readily capture subtle or rich hues and tones of eye, bill, and other soft-part colors, although these are also within the reach of a conscientious artist. Photographs are capable of portraying subtleties of posture and gestalt, the visual feel of a bird that artist renderings so often miss, especially when the artist is not really familiar with the species in life and must pack a lot of them side by side onto a small plate. Third, and perhaps most important, many birders truly believe that photographs portray a bird as it "is," not as an artist thought it "should be." As a case in point, our ornithology-class students regularly requested "The Master Guide" to see what the bird "really" looked like, and then nodded their heads in satisfaction. The powers of photographic illustration, however, lie in the selection process, because photographs also can mislead.

On the whole, photographs emerge in the book as a surprisingly powerful medium for illustration of field guides. The quality and variety of photographs now available is staggering. No longer is an editor severely constrained by poor resources. John Farrand and other Chanticleer editors have in fact compiled a remarkable set of photographs for this book. As a whole, they are well chosen for uniformity of poses and illustration of field marks. Some are clearly flawed—out of focus, oddly posed, or off correct color. All swifts and swallows are sitting, and all hummingbirds are hovering, alas. Generally speaking, however, the book avoids truly misleading photographs, and even those that are "off" usually illustrate critical field marks.

We were surprised that Farrand was not able to find photographs of a first-year Iceland Gull in flight, a swimming cormorant, or a Pine Warbler, for example. They certainly exist—John K. Terres has a good Pine Warbler photograph in his "Encyclopedia of Birds." Where photographs could not be obtained under, we hear, severe time constraints, painted illustrations were commissioned to 9 well-known artists. Most of these are excellent, and the artists are to be commended for trying (successfully on the whole) to depict their birds in poses and situations of the photographs. A minority of the paintings, such as that of the juvenile Little Gull, fail to capture true appearances.

Supplementing the photographs also are reduced half-tone insets of the same illustrations with bright red arrows pointing out the key field marks, "Peterson style," with a simple written list of distinctive

features. In our opinion, these are a creative and effective part of the book design that should prove useful, once one gets used to them. They provide a quick, easy summary of the field marks.

Unlike its predecessor, "The Master Guide" is organized taxonomically according to the new A.O.U. gospel rather than by color, thank Bokonon, and to the best of our knowledge no Old World orioles hide cryptically among New World icterids. Neither we nor the DVOC have discovered any errors of identification. The closest we come relates to Carolina and Black-capped chickadees, which one reader thought might be wrong, but the rest of us sided with Farrand's choice. A Semipalmated Sandpiper shows a remarkably long bill, but the problems of using bill length to differentiate this species from Western Sandpipers are notorious. Perhaps the point was being made explicitly?

The text, too, is remarkably free of errors. Typos are virtually nonexistent. Farrand is to be commended on the level of accuracy and proofing achieved in this complex book.

The text generally is excellent. The subtle tricks used by experts for identification abound and in general exceed in quality those in the "National Geographic Society Field Guide to the Birds of North America," for example. One of the rare lapses was the failure to mention the key field mark for an immature Gray Hawk—the creamy-white rump band.

Rather serious drawbacks must be noted in the format of the book. The text itself is unbalanced in the length devoted to different species, apparently following awkwardly the amount of space devoted to the selection of photographs. Little text is provided for Worm-eating Warblers, for example, whereas three times as much is provided for the Cerulean Warbler. Most annoying is the frequent splitting of photos of the same species between pages, with inconspicuous identification labels for those relegated to the top of the second page. The type face is small and quite hard to read, and the extensive use of blue print to introduce each family is unfortunate.

The minute maps are another weak point. "The worst of all the field guides" was a comment that drew broad agreement from the DVOC. Only breeding and wintering ranges north of the Rio Grande are shown, which artificially truncates distributions of many species. Migration routes are not shown. State lines are included only rarely, making it difficult to keep one's bearings, but perhaps this protects the map makers from inadvertent violation of official state bird lists. The color coding system of the National Geographic guide was considered by all to be a superior design, and the content of the maps in Peterson's new "Eastern Guide" got the most favorable votes.

"The Master Guide"'s main rival now is the National Geographic guide. Both attempt to accommo-

date the reference needs of skilled experts. Gull plumage enthusiasts find "The Master Guide" inadequate. So will those interested in the identification of 4 subspecies of Grasshopper Sparrows, portrayed in the National Geographic guide. (That's going a bit too far in our view.) "The Master Guide" is more cautious and warns readers about the difficulty of identifying certain species, which we consider wise. The National Geographic guide gives a feeling of unerring ability. Generally speaking, we feel the text and specification of field marks is better in "The Master Guide" than in the National Geographic guide. Conversely, the plates of National Geographic facilitate comparisons, and the layout, typeface, and maps of this guide are superior.

We emphasize, however, that neither of these guides is the right choice for the beginner. Peterson's "Field Guide to Eastern Birds" continues to hold first place in that regard—for one side of the country.

A weighty three volumes is the greatest handicap of "The Master Guide." It is all or none. One cannot simply take a single volume to the field because of the way taxa are split up. In that critical moment, which volume do you grab to see the chickadees or gulls? Land birds are divided between Vols. 2 and 3, Charadriiformes between 1 and 2. We predict that it usually will be left at home or in the car, not carried through the fields.

At nearly three times the price of the National Geographic guide, it cannot be our recommendation for "Best Buy." Not one person in the DVOC audience of 44 persons voted for "The Master Guide" as their first preference if they were allowed only a single guide and money was no constraint. As a secondary reference, however, most agreed it will be invaluable.

Our criticisms are minor. "The Master Guide" is an outstanding achievement and, in our opinion, rates as a major contribution to the ornithological literature. Most serious birders will want a copy. Perhaps someone in each birding party will be energetic enough to carry them along. Instructors of ornithology classes and workshops will find it an excellent teaching tool, and many beginners will buy it just because of the irresistible appeal of photographs. Community as well as college libraries will find this a desirable addition to their holdings. In sum, John Farrand has taken a bold and successful step in the use of photographs for ornithology, and we applaud his accomplishment.—FRANK B. GILL, J. P. MYERS, ROBERT S. RIDGELY, AND MARK B. ROBBINS.

Redwings.—Robert Nero. 1984. Washington, D.C., Smithsonian Institution Press. 160 pp. ISBN 87474-676-0.—In this short, well-illustrated book, Robert Nero gives a personal account of his research on Redwings, much of it dating from his thesis project done in Madison, Wisconsin over 30 yr ago. Its prime pur-

pose is to provide a more intimate feeling about the activities both of the birds and of a researcher into their lives. The intended audience is the educated lay reader. The book opens with a general introduction to the family Icteridae and a description of the Wingra Study Marsh in Madison, followed by chapters devoted to territorial behavior, courtship and mating, nests and nesting, experiments with nest moving, adult-young relationships, and blackbird behavior between breeding seasons. The book ends with some observations on economic interactions between blackbirds and people. The text is punctuated by extensive quotes from the author's field notes that record his original observations and reactions to them. This material gives the reader a good understanding of the dynamics of blackbirds in Wingra Marsh, but not enough comparative material is given to provide an adequate picture of Redwing breeding ecology in other conditions and in other parts of its extensive range.

Because Nero does not attempt to provide a scientific analysis of current theories of mating relationships, territorial behavior, and parental investment, "Redwings" is not a good source for current ideas and concepts about these topics. Also absent from the treatment is a discussion of breeding-season foods of Redwings, a subject that has been extensively studied during the past two decades. As a result, discussions of several of these topics are dated and, hence, not suitable as introductions for college and university students. This does not detract, however, from the book's utility to its intended audience. Indeed, the personal style of the writing could well function to stimulate readers to consult the recent literature.

The book is well designed, has very few typographical errors, and is enriched by line drawings by James Carson and both colored and black-and-white photographs. There are a few errors of fact. Female Redwings do not inevitably get redder with age, cowbird parasitism on Redwings is now very heavy in many parts of North America, and many female birds, including Redwings, do sing. Finally, contrary to the statement in the Preface, I was an undergraduate, not a graduate, student at the University of Wisconsin when I first came to know Robert Nero. I am pleased to have successfully mimicked my older colleagues.

In general the book achieves its intended goals and should provide enjoyable and informative reading for a broad audience of people who would like to know more about one of the most conspicuous and best known of North American birds.—GORDON H. ORIANI.

Dictionary of the environment.—Michael Allaby. 1983. Second Edition. New York University Press. 529 pp. ISBN 0-8147-0582-0. \$50.00.—The growth in

environmental concerns and the interdisciplinary vocabulary that often is required to deal with those concerns has precipitated publication of a number of environmental dictionaries. This second edition of Allaby's "Dictionary of the Environment" is one of the largest. Like the others that I have seen, initial enthusiasm wanes upon closer scrutiny. Definitions of unfamiliar words seem appealing, but more familiar terms and concepts seem to be less clear, even in error. We are told, for example, that swifts "are able to roost on the wing," (p. 35) and that kingfishers are a "family of brightly coloured, hole-nesting birds which dive for fish" (p. 16). The first seems impossible, and many Old World kingfishers feed on terrestrial arthropods.

Many ecological concepts also are muddled, even more than is normal for ecologists. Niche diversification is defined as alpha diversity, which is defined as "diversity resulting from competition between species that reduces the variation within particular species as they become more precisely adapted to the niches they occupy" (p. 19). Few persons knowledgeable about the subject would agree that competition is the sole determinant of alpha diversity. Native persons would, I suspect, not be helped by that definition.

Disciplinary jargon often does little to help the user of the dictionary. I felt I understood coriolis force (not a force at all in fact) until I read "force at right angles to the velocity relative to the Earth experienced by a moving body when referred to coordinates fixed to the Earth" (p. 129). None of these examples instills confidence in the definitions of unfamiliar words. Combining price considerations with the problems illustrated here, I shall continue to seek clearer definitions from more narrowly focused disciplinary sources and use this environmental dictionary cautiously.—JAMES R. KARR.

The native forest birds of Guam.—J. Mark Jenkins. 1983. Amer. Ornithol. Union, Ornithol. Monogr. No. 31. x + 61 pp., color frontispiece, 6 color plates, 24 figures, 6 tables, 2 appendices. \$9.00 (\$7.00 to A.O.U. members).—A Victorian historian offered the following definition of the word "discovery": "first observation by a European gentleman, preferably an Englishman." By this definition it is doubtful whether the colorful history of Guam really can be considered to start with the arrival of Magellan and his starving, scorbutic crew in 1521. Magellan named Guam and nearby Rota "Islas de Ladrones" (Isles of Thieves) because of his experiences with the island residents, the Chamorros. Their ancestors, the first human settlers of Guam, had come several millenia previously from Asia and therefore had even less right to claim pride of discovery in the Victorian sense. Eventually the Chamorros were conquered by Span-

iards, who were conquered in 1898 by Americans, who were conquered in 1941 by Japanese.

To most Americans today, Guam conjures up memories of the Pacific war: the destruction of Japan's First Air Fleet on Guam in June 1944, leading not only to the suicide of Admiral Nagumo, the victor of Pearl Harbor, but also to the resignation of Prime Minister Tojo and his cabinet; the American reconquest of Guam in July 1944; and the capture on Guam nearly 30 yr later of the last Japanese soldier, the sole survivor of a group that had remained hidden in the rain forests of this 45 × 13-km island for decades. Among those who failed to detect this soldier were Guam Department of Agriculture biologists, who began surveys of Guam birds in 1961. J. Mark Jenkins continued these surveys as a staff member of the department's Division of Aquatic and Wildlife Resources (DAWR) during 1978 and 1979. In this monograph he summarizes available information on the native forest birds of Guam. The result is the most detailed published study of birds for any Micronesian island. The monograph also deserves to receive wider interest because it documents a dramatic event: the near-total destruction of an avifauna without corresponding destruction of its habitat.

Guam is a humid, tropical, forested island consisting of a northern plateau of coralline limestone joined to a mountainous, volcanic, southern half. The birds of Guam and the other Marianas islands are a mixture of forms from Asia, the Philippines, New Guinea, and Polynesia. By the time that Jenkins's fieldwork began in 1978, the Guam populations of 4 bird species already had been eliminated: the Micronesian Megapode (*Megapodius laperouse*), exterminated by egg collecting in the 19th century; and the Marianas Mallard (*Anas oustaleti*), White-browed Rail (*Porzana cinereus micronesiae*), and Nightingale Reed-warbler (*Acrocephalus l. luscimia*), victims of wetland drainage and development in the 1960's and early 1970's. This left for study 12 native forest species, of which 11 are discussed in this monograph and 1 [the Guam Rail (*Rallus owstoni*)] was discussed by the author elsewhere (Jenkins 1979, Condor 81: 404). The other birds of Guam are listed and considered briefly: 1 surviving native wetland species, an endemic race of the Common Gallinule (*Gallinula chloropus*), now much rarer than formerly; the Reef Heron (*Egretta sacra*); 4 breeding seabirds; 7 introduced species; and 53 migrants or vagrants, mainly waders, but also some ducks, raptors, seabirds, and 1 passerine.

The surviving 12 native forest species belong to 12 different genera and 10 families. All but 1 are endemics of Guam or the Marianas: 2 species endemic to Guam, 1 to Guam plus Rota, 2 to the Marianas; and 3 subspecies endemic to Guam, 3 to the Marianas. All have declined considerably in numbers in the past 2 decades, 4 nearly to the point of extinction. The most striking feature of present distributions of the native forest birds is that they are mostly confined to northern Guam: 9 species strictly so, and more than half

of those virtually confined to the northern coastal cliffs and a small adjacent area of the northern plateau! The author reports that DAWR biologists who were carrying out roadside counts of Guam birds along several routes discontinued the southern route in 1975 due to a lack of birds.

The present low numbers and restricted distributions of the native forest birds contrast with five different indications of their former distribution and abundance. First, previous observers described all 12 species as distributed over both southern and northern Guam. Second, observers earlier in this century reported 11 of the 12 as common or abundant. Third, DAWR censuses demonstrate in detail how several of these species disappeared from the south in the 1960's. Fourth, at least 4 of the species now in serious decline on Guam are more common or even abundant on nearby Rota. Finally, a more distant control for Guam is the Solomon Island of Rennell, which resembles northern Guam in being an uplifted coral plateau but has escaped most of the changes that war and civilization brought to Guam. Because the same groups of birds tend to be good colonists throughout the Pacific, Rennell has independently acquired an avifauna resembling Guam's, including representatives of 10 of Guam's 12 genera and 4 of its super-species. In 1976 I found that most of the Rennell representatives were still common to abundant. To anyone familiar with the abundance of white-eyes (*Zosterops*), fantails (*Rhipidura*), swiftlets (*Collocalia*), broad-billed flycatchers (*Myiagra*), and myzomelid honeyeaters (*Myzomela*) on Rennell and other Pacific islands, the possibility that island endemics of these genera might be rarities is incredible. It is as if a New York City resident were to be told that House Sparrows are on the verge of extinction in New York, a group of 5 European Starlings was reported last October near Times Square, and Rock Doves are precariously hanging on in a few blocks on the East Side between 52nd and 53rd streets, but that Blue Jays can still be found (albeit in low numbers) throughout the northwest portion of Central Park.

What caused this catastrophe? Jenkins mentions four possibilities:

1) Habitat destruction. Wetland drainage and development undoubtedly helped do in Guam's wetland birds, but forest destruction seems unlikely to be a major explanation for the declines of the forest birds. Guam's southern half, which now approximates an ornithological desert for native species other than the Yellow Bittern, still has extensive areas of native forests. Ironically, northern Guam, where these species survive, has undergone more development than southern Guam. It strains one's credulity to imagine that forests large enough to conceal and support Japanese soldiers for several decades after 1945 were not large enough to act as a refuge for flycatchers and white-eyes.

2) Introduced predators. Historically predator-free, Guam now supports three species of rats, a monitor

lizard, a snake, and feral dogs, cats, and pigs. It takes only the mention of Lord Howe Island, Stephens Island, and Big South Cape Island to remind ornithologists what the arrival of cats and rats can do to a native avifauna within one year. Unfortunately for the applicability of the predator theory to Guam, all of these predators except the snake were already common on Guam by the 1890's and probably long before, while the native forest birds did not crash until the 1960's.

3) Introduced diseases. Avian malaria probably has contributed to exterminating most native Hawaiian birds at elevations below the malaria ceiling (Warner 1968, *Condor* 70: 101). Jenkins mentions no specific evidence for a role of disease on Guam, but he points out that the success of 7 introduced species in the face of declines of the native avifauna is suggestive.

4) Pesticides. The U.S. military sprayed, dusted, and fogged DDT weekly on Guam, especially on the rivers and streams of southern Guam, during and after the Second World War. Today the chemicals are different, but the military continues to use them for pest control. Farmers in southern Guam applied large amounts of DDT throughout the 1960's, and Guam developers as well as farmers are still spreading pesticides today. Guano from nesting caves of the Guam swiftlet is contaminated by DDE, with the highest concentrations in the top layer of guano. The widespread application of insecticides in the 1960's could well explain the crashes of native insectivores in the 1960's. It is not obvious, though, how this hypothesis would account for the crashes of Guam's two native pigeons, both of them being frugivores, nor for the abundance of the introduced insectivorous drongo *Dicrurus macrocercus*, now the most abundant bird of Guam.

What of the future of Guam's birds? The remnant populations lie mainly within the boundaries of a U.S. air force base. Certainly, essential steps are that the use of insecticides and herbicides be discontinued, that no new facilities or alterations be undertaken in the area occupied by the remnant populations, and that detailed studies of Guam native birds be started, as Jenkins suggests. One has to be skeptical, however, that these steps will suffice to halt the declines of populations living in a poisoned environment. In view of the distinct possibility that measures to save native birds on Guam will fail for some taxa, it would be imprudent not to make a start simultaneously on captive-breeding programs and transplantation programs.

Who are the potential readers of this monograph? Specialists interested in tropical southwest Pacific land birds will want to familiarize themselves with Jenkins's summaries of habitat preference, foraging behavior, diet, social behavior, nesting, and voice for Guam species. More generally, conservation biologists may come to cite the monograph as a classic horror story. This sober technical account extends the chronicle of Guam's colorful history to encompass

not only the ghosts of Magellan, Nagumo, and the last soldier of the Pacific war, but also the ghosts of an avifauna.—JARED M. DIAMOND.

Sexual selection, lek and arena behavior, and sexual size dimorphism to birds.—Robert B. Payne. 1984. Amer. Ornithol. Union, Ornithol. Monogr. No. 33, vii + 52 pp., 12 text figures. ISBN 0-943610-40-0. \$8.00 (\$6.50 to A.O.U. members).—Sexual selection has been controversial ever since the idea was put forward, and the term coined, by Darwin in 1871. The main phenomenon that the theory seeks to explain, sexual dimorphism, is so diverse that it would be a daunting task for any one person to try to master and marshal all the significant facts. To offer an all-embracing theory seeking to account for all aspects of sexual dimorphism, even in a limited group such as birds, is clearly out of the question in the present state of knowledge. Many of the best biological theoreticians, from R. A. Fisher downwards, have tackled the problem, but our understanding of it has made only limited headway since Darwin wrote. For birds, which have always been at the center of the controversy, especially those with extreme sexual dimorphism and elaborate displays, a few of the difficulties are: that there is still very little evidence of female choice in Darwin's original sense (choice of the most beautiful or most striking males); that, nevertheless, male ornamentation is often visually extremely subtle, i.e. *prima facie* likely to be the result of very exact discrimination by the responding individual; that, in some groups at least, the same or very similar displays are directed at rival males and at females, so that by observation it is difficult to tell whether the response of females or of rival males is the main selective factor; that in some of the best-studied lek species females apparently do not exercise any choice but simply mate with the dominant male(s); and that in birds in which sexual selection is most likely to be occurring—as judged by their social system and the breeding opportunities of individual males—there is great diversity in dimorphism, ranging from virtual similarity between the sexes to extreme differences in size and appearance.

In this quite short monograph (30 pages of text, 14½ pages of tables and figures, 7½ pages of references) Payne devotes most of his attention (two-thirds of the text) to one aspect of sexual selection in birds, its relationship to sexual size dimorphism. This inevitably results in very brief treatment of the intimately related phenomenon of plumage dimorphism. Before tackling his main theme he deals with two preliminary points. First, he discusses ways of estimating the intensity of sexual selection in a species or population, and decides on an index, I_m , suggested by Wade and Arnold (1980, *Anim. Behav.* 28: 446). I_m is the ratio of the variance in the number of mates/male to the square of the mean number of mates (in

the population concerned). Sexual selection may be expected to operate most strongly when I_m is high, i.e. when different males have very different mating successes. Payne has been able to assemble data from 36 studies involving 25 species, from which values of I_m can be derived, and they show, as would be expected, that "males in lekking and arena species are more variable in mating success than are monogamous birds and more variable than birds with low levels of polygyny." He then examines the much less extensive data for females (7 species from the same group of 25, but including only 1 arena species) and shows that variation in breeding success is lower in females than in males, which indicates that sexual selection may be expected to operate more strongly on males than on females.

The second point to be discussed occupies only 3 pages. This short section aims to discuss the crucial question, "Is sexual selection brought about directly by females choosing the males with the [most?] elaborate characters, or by the competitive success of males?" But in fact Payne hardly discusses the first of these two alternatives, and the second (competition between males) only briefly. More space is devoted to the question of "alternative strategies," i.e. male strategies that do not involve aggression or display but that nevertheless result in successful mating; but apart from the unique case of the "satellite" male Ruffs (*Philomachus pugnax*), there seems to be no convincing evidence that such alternative strategies exist in lek or arena species. Possible alternative strategies that are briefly mentioned seem to be nothing more than the activities of immature or subadult males that are in the process of acquiring or attempting to acquire an established position in the male hierarchy. Payne concludes that "the scarcity to date of observations of matings by males in subadult plumage suggests that the alternative strategies are not important, in general, and that the elaborate bright colors and large sizes of male lek birds are often an evolutionary result of social competition." This section, as the above-quoted passage with its several qualifications indicates, is inconclusive, and being somewhat off the main line of argument of the paper, could have been omitted without much loss.

In the most substantial section, on size relationships, Payne examines sexual size dimorphism, as measured by the ratio of male-to-female winglength, in relation to female winglength, in the 16 bird families or subfamilies in which some form of lek or arena display has been reported. In 8 of these groups there is a rather clear correlation between the two parameters; that is, in the larger species males are relatively longer-winged (compared to females) than in the smaller species. If weight were used instead of winglength, the increase in the male: female ratio with increasing size would be even more striking. In 4 of the groups, bustards, calidrine sandpipers, hummingbirds, and manakins (and perhaps in 2 or 3 others, though the scatter of points on the graphs sug-

gests caution), the interesting fact emerges that in the smallest species males are actually slightly shorter-winged than females, and this is associated with very active, mainly or partly aerial displays by the males. I find it very difficult, however, to accept the suggested explanation (earlier put forward by Maynard Smith and Lande) that the correlation between female size and sexual size dimorphism is due to a correlated response in females to genes sexually selected in males. This would imply, for example, that in the cotingas umbrellabirds and bellbirds are large because female as well as male size has been pushed up as a result of sexual selection. Surely this is putting the cart before the horse. It makes more ecological sense to suppose that the bellbirds' primary adaptation, to which one must attribute their overall size and their unusually large gape size, is for taking large fruits, and that umbrellabirds, like the other large but much less sexually dimorphic fruit-crows *Pyroderus* and *Perissocephalus* (to which umbrellabirds seem fairly closely related), have also become adapted to exploit a feeding niche (large fruits, large invertebrates, and small vertebrates) that demands an even larger body size. The large differences in male and female size in bellbirds and umbrellabirds would, admittedly, remain to be explained.

It would be unrealistic to expect a limited analysis such as this to provide startling new insights. The material is intractable, mainly because of its extreme diversity. To the known diversity of present-day avian ecology and behavior one must add the unknown diversity of past evolutionary histories, possible genetic constraints on morphology and behavior, and "stochastic processes," that useful catch-all, baffling to the uninitiated—could we not use the generally intelligible word "random"?—which says that chance events, in principle inexplicable, have also played a part. In the face of this complexity Payne at times seems to argue round and round a point, at the expense of a single, clearly developed line of argument, so that in the end one is puzzled to know what has been established and what is merely suggested as likely or possible. Thus on page 42 the definite statement is made (in the discussion of sexual size dimorphism), "First, males are larger than females due to sexual selection even in monogamous birds." Later, on page 43, after further discussion of sexual size dimorphism, the conclusion is reached that "Therefore, it seems likely that sexual size dimorphism is mainly the result of sexual selection." There is, admittedly, a distinction implied by the "mainly," between the part played by sexual selection and by other possible advantages or disadvantages associated with large size; but the presentation of the argument, here and elsewhere, could have been sharper.

There is no doubt that a broad survey of one aspect of sexual selection, of the kind undertaken by Payne, has value in bringing together relevant information that otherwise would be widely scattered (in this case especially data on breeding success and sexual size

dimorphism) and in bringing particular problems into focus. But when a lot of data are assembled, many of them at second hand, it is not easy to treat them critically and give them the right emphasis. Thus I detected a few minor errors of fact or interpretation with regard to the cotingas and manakins (e.g. in *Ilicura* males the primaries do not have thickened shafts; in *Manacus* females the primaries are not like those of males). On the other hand, a small number of facts and observations are of major significance but are not always easy to pick out from among others much less important. For instance, the observations indicating that female Capercaillie (*Tetrao urogallus*) prefer to mate with the best fighters among the males are highly significant, as is Andersson's experimental finding that male Jackson's Whydahs (*Euplectes jacksoni*) whose tails were experimentally lengthened gained more mates than control males, and those with shortened tails fewer, but that the status of the experimental males with respect to other males was not altered. The inference is that intermale competition accounts for the large size of male Capercaillie, whereas in Jackson's Whydah female choice is the main selective factor.

It is easy to be critical, and much harder to be constructive. If our understanding of sexual selection is to be much advanced, I believe that it will be by a combination of long-term field observation linked with experimentation. For small species, such as manakins, aviary experimentation may be the most likely means of advance. One could, for example, expose female manakins to male displays, experimentally altered if necessary, of their own and related species, in order to study such things as the genetic basis of the female response, or the female's ability to discriminate between subtly different displays or ornamentation. My prediction is that female choice will be demonstrated as an important factor, perhaps the most important, in many species that show extreme sexual dimorphism in plumage, especially those with "exploded" leks. In the classic case of the Great Argus Pheasant (*Argusianus argus*), for example, it is hard to avoid this conclusion. From Davison's work, cited by Payne, it seems that males compete vocally, by uttering very loud calls out of sight of one another. The extraordinary display, in which the eye-spots on the huge secondary feathers radiate out from a central point—the hole between the two wings, through which the male's eye stares out—seems on present evidence to be something that normally only the female sees. The Peacock (*Pavo muticus*) displays its equally amazing train to females, but fighting males, it seems, approach one another and attack laterally from the rear. Manakins perform parts of their repertoire briefly to rival males, but the full repertoire is reserved for visiting females. Evidence of this kind is still largely at the anecdotal stage; but if substantiated it is crucially important.

These criticisms do not alter the fact that Payne has made a significant contribution to the study of

sexual size dimorphism in birds. This monograph is, perhaps, too specialized in content and approach to appeal to the general reader; but for anyone concerned with avian social systems and their evolution it is a very useful addition to the literature.—DAVID W. SNOW.

Enjoying ornithology. A celebration of fifty years of the British Trust for Ornithology, 1933-1988.—

Ronald Hickling (Ed.). T & A Poyser (Buteo Books, P.O. Box 481, Vermillion, South Dakota 57069). 296 pp., 29 black-and-white drawings, 39 figures, 19 tables. ISBN 0-85661-036-4. \$30.00—The role of the amateur in North American ornithology has been a favorite and sometimes heated topic of discussion for most of this century, but little has been undertaken to organize it, guide it, or maximize for science its enormous potential. To address this question, a conference was convened in February 1978 at Ithaca, New York, sponsored by the National Audubon Society and the Laboratory of Ornithology of Cornell University, aided by a grant from the Mellon Foundation. For 2 days a gathering of leading professionals and amateurs involved in cooperative ornithology presented and discussed their major interests and the overall question of whether a continent-wide entity should be established to foster amateur efforts. Representatives of the U.S. Fish & Wildlife Service, the Canadian Wildlife Service, the AOU, WOS, COS, National Audubon Society, Smithsonian Institution, the Cornell Lab, the bird observatories, and other national groups took part. The featured speaker travelled from Britain: J. M. McMeeking spoke on the role of the amateur in British ornithology, and the part played by the British Trust for Ornithology. Those present were fascinated to learn how the BTO was structured and how it functioned to promulgate, promote, and publish ornithology by amateurs. McMeeking's report acted as both inspiration and catalyst. A Steering Committee was elected to plan such an organization in North America, with a subcommittee charged with writing proposals for enabling grants. The Proceedings of the conference were published by the cosponsors in 1979, and then all was silence.

The sad tale of the most recent effort in this cause is summarized here because the book under review, "Enjoying ornithology," could serve as a textbook for the successful involvement of the amateur in serious bird study. Edited by Ronald Hickling, it is a collection of narrative expositions, well written and edited, by a score of authors, each a principal in some phase of BTO endeavor. Considered as a whole, it is both a history of the BTO from its shaky, tentative beginnings in 1933 and a record of solid achievement in research and conservation, organization, and publication. The BTO could, from this presentation, serve

as a model for a similar, or at least derivative, ATO for this continent.

The book, attractively illustrated and printed, has a rather sneaky title. A first impression might suggest another mass-market pot boiler aimed at the birding neophyte. But this title's subtle message to the amateur is "there is real *enjoyment* in participating in organized field work with a scientific aim. Not just birding. Not just list-chasing. But *ornithology*." The opening paragraph of D. A. Ratcliffe's foreword summarizes the theme: "This book depicts the development of British ornithology during the twentieth century, as a science, a hobby, and a key element in nature conservation practice. The role of the British Trust for Ornithology has involved all three aspects. In particular it has been the means of capitalizing on the field work of energetic and dedicated amateur birdwatchers, and welding together much of their effort in a coordinated form that has greatly advanced the science of ornithology." Two historical chapters follow: earlier days by one of the founders, E. M. Nicholson, and the most recent 32 yr by R. Spencer, a leading "ringer." Then, under the general heading of The Trust in Action, follow the first eight of 23 chapters on the activities of the Trust and their results to date. Among these are studies of the population dynamics of common birds of woodland and farmland, a waterways bird survey, the nest record card scheme (with 22,000 nest cards submitted annually and a marvelous analysis of the breeding species, their average number of broods, clutch sizes, incubation periods, and fledging periods), a review of the species distribution mapping and atlassing projects, which resulted in the enormously influential—in North America and elsewhere—"Atlas of the breeding birds of Britain and Ireland (1976)," the enquiry into the birds of estuaries, the garden bird feeding survey (veddy, veddy British!), and the national register of ornithological sites. In the last, sites are classified as A1, of international importance; A, national importance; B, regional importance; C, county importance; and D, local importance, together providing a national inventory.

In the section entitled "Our changing avifauna" chapters discuss, with maps and tables, some of the distributional and population changes within the British Isles: species that have declined over 1933-1983, changes of range, changes in behavior patterns, and changes to the British list—120 additions since 1902, of which 55 are probably of North American origin, including [sic] Slate-coloured Junco, Greater Yellow Legs, Black and White Warbler, Olive-backed Thrush—unusual lapses in an otherwise well-proof-read book. The section on Movements and Migration dwells predictably on the findings produced by ringing, with a selection of species maps illustrating Britain-Africa, Britain-southern Europe, autumn and winter movements, pelagic movements, Ireland-England movements, and eruptions. The history of the bird observatories follows, and the uses of radar

and the influence of weather on migration are summarized. Two more sections complete the text, the story of BTO's involvement in and association with conservation and sister organizations and a section of seven reports on pollution, problems, and pests. A postscript on the future of the BTO is followed by a lengthy bibliography (200+ citations) and 12 tables illustrating how the fieldwork of amateurs results in meaningful data on a variety of topics.

Overall, this is a fascinating progress report of an organization that has successfully pursued its avowed aim—of encouraging well-planned field studies by volunteer amateurs, with valid and valuable published results, and a bonus of birdwatcher enjoyment. Praise for this book need not be taken as criticism of the American way. Britain has more dedicated birdwatchers per hectare than most parts of our continent; children learn their birds before they lose faith in Father Christmas. There, large-scale surveys can be more easily controlled and completed. But we are doing many of the same kinds of studies. American amateurs are plunging into breeding bird atlasing with a vengeance. In banding, Christmas Bird Counts, Breeding Bird Surveys and Censuses, Winter Bird-Population Studies, colonial nest records, nest record cards, raptor migration studies, seabird studies, and radar work, we are producing mountains of data and—alas—molehills of analysis. Read "Enjoying ornithology" and consider what a BTO-type organization on this side of the Atlantic might accomplish!—ROBERT S. ARBIB, JR.

A field guide to the birds of Japan.—Joseph A. Massey, Shogo Matsui, and six others. Illustrated by Shinji Takano. 1982. Published by the Wild Bird Society of Japan. 336 pp., 140 color plates, 499 distribution maps, 12 black-and-white photographs. ISBN 4-931150-04-7. \$25.00 plus shipping from ABA Sales, P.O. Box 4335, Austin, Texas 78765, or Los Angeles Audubon Society, 7377 Santa Monica Blvd., California 90046.—As a guide to field identification of birds in Japan, I find this book both wonderful and frustrating. Besides being a comparatively good field guide, after several years of working with six texts in two languages, it is wonderful to have an English text combined with illustrations of all 537 species known to occur in Japan. This is the first complete guide to the birds of Japan with these features, and the Wild Bird Society of Japan is to be congratulated for making it available. On the other hand, the book can be frustrating, in small part because of factual errors and nomenclature, in large part because there is not always sufficient information for an identification, something true of any field guide.

The book is convenient to take into the field, and after 2 yr of constant use, my copy has proven quite sturdy. The plasticized, water-resistant, hardbound cover has developed a curious rash of small bubbles,

but its integrity remains, and the book is easier found in the dark. Distribution maps and text, including field marks, voice description, comments about similar species, habitat and status in Japan, are opposite color plates that use the Peterson method to point out salient features of the species. Despite eight different authors, the text is remarkably consistent, thanks mostly to the capable editing by Jane Washburn Robinson. It is interesting that a Japanese-language guide, released by the WBSJ at the same time and featuring the same color plates, has a text written solely by Shinji Takano. Takano's plates are nicely laid out, informative, and generally of good quality. Most species are shown in several distinct plumages and in flight. In this respect, the guide is excellent. The last section of the guide describes 28 good birding sites. These include places like Arasaki, where a five-crane day is possible. The descriptions and directions are brief, but will at least get an interested person to the general area. Two other, more detailed, site guides are in preparation.

Basically, I consider this guide to be an absolute boon and am pleased to use it. But there are some problems. Before starting the negative part of my criticism, I should point out my limitations. My field experience in Japan has been restricted to Okinawa, and I've seen less than 60% of the birds in the guide, in Japan or elsewhere. The English names below are from the field guide unless contrary to A.O.U. standards, in which case the A.O.U. name is given first and the guide name follows in parentheses.

Reversal of the breeding and winter range for Arctic (Pacific) Loon and Wandering Tattler are the most serious outright errors I've found. The rest of the problems fall into two broad categories—potentially confusing information or lack of information altogether. To begin the litany:

1) The range for some shorebirds, buntings, tits and a few others show diagonal lines, the meaning of which is not clear. Either the bird's status is uncertain or it occurs sporadically. This is not explained.

2) Three species of albatross are shown to breed in Japan, but they do so in winter, a fact explained only in the text.

3) Some escaped cage birds such as Scaly-breasted Munia have established stable breeding populations; others, like the Budgerigar, have not. No differentiation is made. More escaped species could have been included; for example, White-rumped Munia is apparently becoming established on Okinawa and single odd Psittacids such as White Cockatoo are not infrequent.

4) Recent fieldwork has elevated Black-backed Wagtail (*Motacilla lugens*) to full-species status, a treatment accepted by the A.O.U. The guide considers this the most common "subspecies" of White Wagtail (*M. alba*) to occur in Japan. Ryukyu Scops-Owl (*Otus elegans*), occurring in the Ryukyu Islands, has been separated from Oriental Scops-Owl (*O. sumia*), which occurs in Northern Japan. Both are treated as *O. scops*

in this book. In the same vein, "Pacific" Loon (*Gavia pacifica*) is considered distinct from Arctic Loon (*G. artica*).

5) A high percentage of English names differ from those found in other texts covering the region. As a result, it is necessary to refer to scientific names to establish synonymy, an instructive but time-consuming process.

As mentioned above, the great majority of the illustrations are clear and useful; however, a few are partially misleading and may actually hamper identification. I've mainly noticed the following:

1) The bill-color of at least five species is partially erroneous. Roseate Terns on Okinawa have wholly red bills in the breeding season. White-phase Eastern Reef Herons may have yellow bills while breeding, but the rest of the year their bills are gray with variable yellow mottling. Pryer's Woodpeckers have pale-yellow bills or pale-gray bills lighter than the illustration. Immature Little Grebes have light-yellow bills with a bit of darker mottling in winter.

2) Shorebird leg-color, sometimes crucial for identification, is more variable than described. For instance, Greenshanks can have pale-yellow legs. Mongolian Plovers and Greater Sand Plovers in basic plumage show considerable overlap of leg color, as do Little Ringed and Snowy plovers. Consulting other sources for this information is advisable.

3) The reddish-brown or rust plumage colors for some birds may be too dark or too orange. I assume this is a printing error. Extremes may be seen in the Red-throated Pipit, Chinese Grosbeak, and Barred Buttonquail. Subtle but important plumage-color differences between Black Noddy and Brown Noddy, and Bridled Tern and Spectacled Tern, are not emphasized. Bridled Terns, for example, may appear more brown in the field. The Eurasian Skylark is depicted as having a rusty shoulder patch, a mark I've yet to see. Finally, the Bush Warbler illustration shows a dark-brown bird. Based on birds and photos I've seen, none of the subspecies looks this dark; in fact, the bird more resembles the *Phylloscopus* warblers in overall color pattern.

As the accipiter and wagtail plates demonstrate, "A field guide to the birds of Japan" does a relatively good job of presenting distinct and seasonal morphs, subspecies, and juvenal plumages. Ironically, birds "accidental" to Japan (the Japanese term translates as "lost bird"), birds that seem invariably to show up in odd plumages, do not get the full treatment. It would be nice if they did. A more inclusive portrayal of plumages would also be helpful for some shorebirds, Brown-eared Bulbul, Bush Warbler, Narcissus Flycatcher, and Japanese White-eye. Further, half the snipes, shrikes in some plumages, several pipits, and most *Phylloscopus* warblers cannot be identified accurately using this book. These are tough groups and sufficient identification information is not given or, in some cases, is not known.

My biggest gripe, in terms of "missing" informa-

tion (particularly since much of it is known), is the consistent lack of song or call descriptions. Some excellent songsters such as Ruddy Kingfisher, Red-capped Green Pigeon, and Blue Rock Thrush are passed over entirely. More important, the voice descriptions are inadequate for birds more frequently heard than seen (e.g. Ruddy Kingfisher, owls, and rails), and for species in which calls can separate similar species (e.g. plovers, snipes, stints, and pipits). I hope these will be included in future editions.

In a revision, I would like to see range maps showing only Japan. Although interesting, the extent (most of East Asia) and resulting scale of the current maps make it difficult to pinpoint exact distributions in Japan. The range of pelagic birds off the shores of Japan and the distribution of migrants might also be included. Finally, more text space should be devoted to separating similar species—ostensibly the main point of a field guide in the first place.

Ornithologists interested in the avifauna of Asia will want this book and it will be a useful addition to the reference shelves of museums, where a picture can easily (but not always) be worth a thousand words. University libraries should obtain a copy; someone will use it and the price is reasonable. The guide should be considered essential for birders and other bird-oriented folk traveling to Japan. In addition, it will augment available field identification material for the Philippines, Taiwan, China, Korea, and the U.S.S.R. ("Bird Sunny Sakhalin!"). The guide may even help identify Asian strays in the U.S.A.—DOUG MCWHIRTER.

Birding in Ohio.—Tom Thomson. 1983. Bloomington, Indiana, Indiana University Press. xi + 256 pp. ISBN 0-253-10735-0. \$15.00.—This addition to an ever-growing series of birding books is not, in my opinion, one of the better representatives of the genre. Thomson's book contains two major portions, descriptions of 203 localities and accounts of species recorded from Ohio. Additional pages list addresses of birding and natural history organizations, telephone numbers for rare bird alerts, a bibliography, and a (crucial) index.

Locality accounts are subdivided into three sections: a northern tier of lake counties, the unglaciated eastern and southern counties, and the remaining western and central counties. With only a slight rearrangement, and by ignoring county boundaries, Thomson might have presented the more natural groupings of a northern lake zone, the southeastern hill-country, the western till-plains, and the glaciated highlands.

Each section begins with two or three large maps showing the general distribution of the locations. Smaller "vicinity" maps are scattered through the accounts. Each locality account begins with a paragraph of directions for driving to the site. However,

the directions are sufficiently brief and the maps sufficiently lacking detail that most readers will find a good road map almost a necessity. Further, some of the directions depend on potentially ephemeral landmarks (e.g. specific commercial signs). At least one site, White City Park in Cleveland, has been closed for birding. The descriptions indicate local vegetation, whether insect spray or special clothing is needed, and usually (but not always; e.g. Stebbins Gulch requires permission from Holden Arboretum) whether or not permission is necessary to enter. Most of the accounts then continue with a list of species one might expect to see. The list would benefit markedly from additional notation of the probability of seeing each species. For instance, the account for Greenlawn Cemetery in Columbus contains a list of "in passage species" that includes Double-crested Cormorant, Little Blue Heron, and Tundra Swan. These are not noted as rare, as is done for some species in other accounts, but I suspect that such a sighting would be cause for a report on Thomson's local Dial-a-Bird service.

Most of the localities appear to be formally designated parks, preserves, cemeteries, etc. near urban centers. On the one hand, such places are those most likely to be used by the usual birder who, in Ohio, probably dwells in a city. Yet the listing of more "informal" sites constitutes one of the book's major contributions. For instance, a newcomer interested in birding in central Ohio would surely explore the greenbelt parks around Columbus, but, unless told, would be unlikely to discover Overbrook Drive in the heart of residential Columbus or the Ross-Pickaway County Line Road, a short drive south.

In general, the locality accounts do provide a good idea of where to go in Ohio to find birds. The importance of the different sites can be estimated by the length of the description and the accompanying bird list.

As the first section tells which birds may be seen at a given locality, I expected the species accounts to indicate which sites to visit to see the specific species, but they do not. Rather, each account indicates the abundance and seasonal occurrence of the species and whether it has nested in Ohio, then reports the maximum observed number of the species for Ohio, the locality of the sighting and, if known, the name of the reporter (e.g. 63,104 Herring Gulls on Toledo's 1975 Christmas Bird Count). I am not sure of the use of such trivia, except it does indicate at least one place the species has been seen. Although many of the accounts do mention the general portions of the state in which the species may be found, Thomson does not indicate which localities he would recommend to an individual wishing to see a given species. The best one can do is to use the index to determine the pages on which the species of interest is mentioned. Although the index has clearly been designed for such use, even this tactic is not always fruitful. For instance, the species account for Bank Swallow states,

"Uncommon to very common migrant, common to abundant around nesting colonies in 31 scattered counties. Most numerous in northern Ohio." The index referred me to five locales, none of which seemed to have a colony, although American Aggregates Quarry "is a sure place to find Bank Swallows" in season. Similarly, an individual wishing to learn where to find winter raptors would have to read many accounts before learning that Ross-Pickaway County Line Road is probably the best site. In short, the species accounts are not adequately cross-referenced to the locality descriptions, nor are the locality descriptions cross-referenced by habitat. The absence of such cross-references markedly reduces the utility of the book.

"Birding in Ohio" is appropriate for community and school libraries throughout the state. It is sure to be welcomed into the homes of many of Ohio's birders. It will prove especially useful to those who wish to find new places to bird or to determine what might be seen at a specific site. I expect to use it extensively in this manner, but it will be of much less use to those interested in finding specific species or even specific habitats. Those individuals will have to make extensive use of the index.—ABBOT S. GAUNT.

The birds of the Balearics.—David A. Bannerman and W. Mary Bannerman. 1983. London, Croom Helm. Distributed in U.S.A. by Tanager Books Inc. viii + 230 pp., 12 color plates, 48 black-and-white illustrations. ISBN 0-88072-022-0. \$45.00.—This is the last in David Bannerman's series of sumptuous monographs on the birds of Mediterranean and North Atlantic islands. These have included books on the birds of Cyprus (1958, 1971), the Canary Islands (1963), Madeira (1965), the Azores (1966), the Cape Verde Islands (1968), and Malta (1976), not to mention 12 volumes on the birds of the British Isles (1953–1963). This book on the birds of the Balearic Islands in the western Mediterranean was started in 1977, when Bannerman was already 90 yr old, but his eyesight failed in 1978 and he died in 1979. The book has been completed by his widow, Mary Bannerman, and by the publishers.

As a result of this history, the book has a number of limitations. The authors apparently visited the islands only twice and did not review any museum collections, so the book is based on published sources and limited correspondence. The bibliography is incomplete, including only five general references dated after 1971. There is no description of the islands, their history, land-use, ecology, or conservation problems, and there is only one inadequate map. The authors refer approvingly to Juan Mayol Serra's book "Els Aucells de les Balears," published in the Mallorquin language in 1978, and to the work of the Grup Balear de Ornitologia and its bulletin *Aegyptius*, but material from this source is cited only through 1978. The authors write disparagingly of the streams of

visiting bird-watchers from northern Europe, whom they regard more as a menace to the avifauna than as a potential source of information.

Most of the book is devoted to accounts of the 287 species recorded in the islands. These accounts occupy, on average, about two-thirds of a page per species, about half of which is devoted to general accounts of the species and the remainder to information on occurrence and status in the Balearics. These accounts reflect Dr. Bannerman's interests in taxonomy, history, and personalia. Specific local information on most species (especially passerines) in the islands is quite sketchy, but the book includes useful accounts of several local specialties, including *Puffinus puffinus mauretanicus*, *Phalacrocorax [aristotelis] desmarestii*, *Aegyptius monachus*, *Falco eleonora*, and *Larus audouinii*. The last three of these accounts are translated from articles in *Aegyptius*. The book has 12 color plates and a number of monochrome illustrations in various media by Donald Watson. These give attractive and accurate portrayals of the distinctive birds of the islands and of their scenic settings, although the color plates in the review copy appear somewhat washed-out and too red.

Despite the incomplete bibliography, this book is a useful compilation of historical data on the birds of an ornithologically neglected group of islands. It will be a useful reference for all visitors to the islands who are not already fluent in Mallorquin. Regrettably, however, it has to be said that it does not maintain the scholarly standards established by Bannerman's earlier historical monographs on island birds.—I. C. T. NISBET.

Birds of the Mediterranean and Alps.—L. Jons-son. 1982. (Edited by M. Beaman and J. Robertson, translated from Swedish by R. Littleboy.) 160 pp., 76 color plates, 42 colored drawings, 148 distribution maps. London, Croom Helm Ltd., Tanager Books Inc. ISBN 0-88072-023-9. \$12.50.—This field guide, part V of a series covering major European bird habitats (lake, river, marsh, and field; sea and coast; wood, park, and garden; mountain regions), describes more than 262 species breeding not only in the Mediterranean and Alps but in Central, North, and Southeast Europe, in the Middle East (especially Turkey), and North Africa. Special emphasis is given 141 bird species (10 alpine, 66 Mediterranean, 45 African, ca. 20 Palaearctic species), which are included both in text and plates. The colored figures, a speciality and peculiarity of the book, model birds in a pastel-like form against a sparse but impressively characterized habitat (see p. 60—*Alectoris graeca*, *A. chukar*, *Lagopus mutus*; p. 92—*Merops apiaster*, *M. superciliosus*). Different behavioral postures (standing, running, flying, feeding, comfort movements, or combinations of several of these) are emphasized. Special examples of the "beautiful" bird image—only rarely spotted in the field in this photographic brilliance—are *Oenanthe hispanica* (p. 6),

Pterocles orientalis and *P. alchata* (p. 83), or *Tichodroma muraria* (p. 143). Here, and in several other parts of the book, they are getting close to the ideal of any bird observer of comprehending the new bird. The decisive features needed to identify the observed species, however, must be picked up from the rather short text on the opposite side of the color plate (see birds of prey, pp. 48–59). Color composition, quality, differences and even fine nuances (especially in form and order of feathers such as coverts, wing, body, or tail-feathers) are admirable examples of the artist's intuition and are, even in the small-sized format of the plates (12 × 19.8 cm), nearly perfect illustrations (see bird portraits of shrikes, p. 111). Indeed, the bird paintings are the highlights of the book and surpass any other field-guide standard of the European or North American market, at least as far as I know.

The bird species set subjectively apart from the migrating or overwintering west Palaearctic birds (especially those of the boreal and arctic zone; see Anatidae or Charadriiformes) are only shortly mentioned. Several of the species portrayed on pp. 70–73 [e.g. Laridae, Turdidae (here *Turdus iliacus*, *T. philomelos*, *T. pilaris*), Fringillidae (see *Fringilla coelebs*, *F. montifringilla*, *Carduelis carduelis*)], however, are nevertheless the typical summer (breeding) species of the Mediterranean and Alps. In case of the birds originating from the middle and north of the Continent, we have to use any standard European field guide; illustrations of these species are lacking, and the few text notes (mostly names) are of no help.

Depending on the level of detail being applied for review, there are several inaccuracies in the color plates (e.g. pale or overcolored species names, male-female symbols hardly readable; see herons on p. 27). Some species are of inappropriate sizes (see pp. 70–71: *Charadrius alexandrinus* more or less double the size of *Crocethia alba* or *Calidris alpina*; p. 72: *Philomachus pugnax* male 1½ times greater than *Tringa nebularia*; p. 91: swifts). Sometimes the text and figured birds differ (e.g. p. 111, juvenile birds of *Lanius senator* and *L. nubicus*). At times coloration is misleading (e.g. p. 150, *Serinus serinus* with white instead of yellowish flanks). Some plates are really packed with birds (pp. 54–55, birds of prey).

The text and map information are rather abbreviated. As a rule, the description is restricted to feathering and body features important for identification, to sketched habitats or simply places of occurrence, to expressions of calls and songs by vocally written imitations, and to remarks on migratory behavior, dates of migration, feeding, size (how are measurements taken?), and, sometimes, wing length. The "normal" distribution maps fail to pinpoint isolated populations or species with endemic occurrence (e.g. *Sitta whiteheadi* on Corsica).

Whoever is favoring the artist's view of birds and looking for additional tips to identify bird species will be fully satisfied with this part of the European bird fauna.—HANS OELKE.

Birds of the Wadden Sea.—C. J. Smith and W. J. Wolf (Eds.). 1981. Rotterdam, A. A. Balkema. 308 pp. \$16.00.—The Wadden Sea is the shallow coastal expanse of water that borders western Denmark and the northern parts of the Federal Republic of Germany and of the Netherlands. It is circumscribed by a series of islands of various sizes—including Texel and Heliogoland—and sand banks. Three important rivers flow into the Wadden Sea (Emms, Weser, and Elbe) in addition to a large number of smaller ones, which makes the area one of the largest estuarine systems in Europe. The entire area is subjected to tidal movements with an amplitude of 1–4 m. These physical characteristics make the region one of the most important for shorebirds in Europe. This report (Number 6) is coauthored by 18 persons including the editors, and is divided into seven parts. It is unfortunate that the 5 previous reports are not listed anywhere in the present one as they may be of interest.

In the first part "Conclusions and recommendations" (pp. 5–8), which one would expect to find at the end of the report, it is indicated that the Wadden Sea "is highly important for birds breeding in an area that reaches from Ellesmere Island in Canada to the west to the Taymyr Peninsula in Central Siberia in the east." The authors claim that over 3 million birds may be counted in the area in late summer, and give approximate population percentages for several species that occur in the Wadden Sea region. In all cases, they recommend more research. The introduction is in the second chapter. It deals with general comments on the area, its importance to migrants, the origin of the migrants, and the three objectives of the report: "occurrence of birds," "inter-relationships between species," and "threats to the bird populations." Chapter 3, "Ecological data on bird species of the Wadden Sea," is the largest portion of the report (pp. 14–270). Thirty-two of "the most important bird species occurring in the Wadden Sea" are treated in detail as follows: names of the species (English, Latin, Danish, German, and Dutch); distribution (breeding range, migration routes, wintering areas, molting areas); annual cycle (migration, molt, weight changes, numbers); population size (numbers per area); food (food composition, feeding activities, total food consumption); and a list of references. Each section may have maps, diagrams, graphs, or tables to present information concisely. A pleasant, slightly stylized drawing accompanies each species account. The amount of material presented in the report varies much from species to species but in most it is very extensive and is for the most part original. The authors have thoroughly surveyed the existing literature and made reference to it appropriately. The information presented here appears to be very accurate and will certainly be of great use to anyone interested in populations, various aspects of migrations, conservation, and management. To summarize such a mass of information so concisely is a major

accomplishment on the part of the authors and editors.

The next chapters deal with the following topics: habitat selection and competition in wading birds (Chap. 4), the importance of the Wadden Sea for estuarine birds (Chap. 5), production of biomass by invertebrates and consumption by birds in the Dutch Wadden Sea area (Chap. 6), and threats to the birds of the Wadden Sea (Chap. 7). All these parts are packed with new information. I found Chapter 6 particularly interesting in that more problems are raised than answers provided.

This report is generally carefully edited, although I found a number of typos. It is attractively and concisely presented. The editors and authors are to be congratulated for a fine job and it is a pleasure to recommend this report to all those interested in Palearctic shorebirds and aquatic birds found in the Wadden Sea area.—HENRI OUELLET.

Owls of Europe.—Heimo Mikkola. 1983. Calton, Great Britain, T. & A. D. Poyser. 397 pp., 8 color plates, 42 text figures, 69 tables. ISBN 0-85661-034-8. £16.80.—This book contains a review, mainly of the ecology, of the 13 owl species that breed in Europe. Of these, seven also breed in North America. In addition four species occurring in the Mediterranean outside Europe are dealt with more briefly (on about five pages each). Mikkola's review covers an extensive literature (up to 1981, about 800 references).

In part I of the book the author introduces owls to the reader by briefly describing taxonomy, anatomy, senses, and pellets, pointing out unique features of this group of birds. In part II each species is described, with separate sections for morphology, field identification, voice, behavior, food, breeding biology, and distribution. Most species are treated on 10–20 pages, with an emphasis on the species Mikkola has studied himself. For example, 35 pages are devoted to the Great Grey Owl.

Perhaps the most interesting and original part of the book are the concluding chapters, where Mikkola discusses ecological relationships among European owls. In five chapters, sexual dimorphism, interspecific aggression, predator-prey interactions, niche overlap, and conservation are discussed, mainly based on the extensive and valuable tables at the end of the book. About one-third of the tables contain previously unpublished data.

Recently, "Handbuch der Vögel Mitteleuropas" (Glutz and Bauer 1980, Band 9, Akademische Verlagsgesellschaft, Wiesbaden) dealt with about the same species of owls at similar length as Mikkola. In "Handbuch," information is comparatively more extensive regarding distribution in central Europe, morphology, and also partly for voice. "Owls of Europe" is stronger on distribution outside central Europe, with maps depicting world distribution and

with more detailed maps for Europe. Surprisingly, Mikkola does not seem to have followed the most recent and accurate distribution maps in the recent Swedish checklist (published 1978). Compared with "Handbuch," "Owls of Europe" has more detailed information on diets, especially in the nonbreeding season, as well as the advantage of the comparative discussion. Here, Mikkola has some interesting points. He considers competition between owl species to occur mainly as interference rather than exploitation. The high food overlap between species in the breeding season, however, does not exclude the possibility of exploitation competition in the nonbreeding season or in low-food years, when data about the food of owls are unfortunately rarely collected. I found Mikkola's view that interspecific predation limits the local distribution of some smaller owl species well worth considering, although the evidence is still circumstantial.

Mikkola establishes a positive correlation between body weight and the reversed sexual size dimorphism among European owls. He advances the hypothesis that the female is larger than the male in order to produce adequate heat for incubation and to compensate for heat loss. More such evolutionary interpretations would have made the book still more thought-provoking.

This is an attractive book with good color plates by Ian Willis and a collection of black-and-white photographs of all species treated. It is probably the best book available at present about owls. I recommend that all universities, museums, and owl enthusiasts buy this book. Researchers interested in competition and predation can also find much useful information in this book.—SVEN G. NILSSON.

Vögel in der Kulturlandschaft.—Einhard Bezzel. 1982. Stuttgart, West Germany, Eugen Ulmer Verlag. 352 pp. DM 88.—This volume provides an excellent discussion of avian ecology in densely populated regions of central Europe. The author successfully tackled the tremendous task of reviewing the large body of literature (over 900 citations) dealing with this 1.44 million-km² area. The results of Bezzel's efforts provides the reader with a good impression of the status and dynamics of the area's bird communities.

Bezzel's broad definition of "Kulturlandschaft" encompasses urban and agricultural areas as well as man-altered forests and water. As a result, almost all of the central European landscape is covered by this term. The associated definitions are given in Chapter 1. In Chapter 2, the author describes the characteristic types of landscape, the varying degrees of human influence, and the historical changes in man's use of the land. Thirteen biotype-complexes are distinguishable after centuries of human impact. Following a short introduction to basic ecological terminology (Chapter 3), Bezzel provides brief

descriptions of the ecological requirements of 275 bird species that breed in this extensive area and of 50 additional species that are only transients. About 50% of the species found in this area are migrants, more than 50% feed exclusively on arthropods, and up to 80% have a sizeable proportion of arthropods in their diet. Extreme dietary specialization appears rare. About 50% of the breeding species are small (less than 125 g body weight) and 40% regularly or occasionally build their nests on the ground.

Chapters 5 and 6 are devoted to long-term and short-term population changes. In an excellent historical reconstruction, the author shows that the early cultivation of the land initially increased the number of breeding species by creating new types of environments (i.e. changing portions of dense forests into extensively used greenland and farmland and resulting in more edge habitat). At the beginning of the nineteenth century, this trend began to change, and during the last 150 yr there has been only one species moving in for every two species lost from the area. The rate of species disappearance accelerated recently. Initially more large nonpasserine birds disappeared, but recently there have been indications that populations of passerines also are declining. The reasons for these changes are diverse, and frequently a combination of different factors is involved. General patterns of population changes as well as specific examples are discussed.

Short-term fluctuations in population sizes have been considerable, amounting to perhaps 40%. The various ecological factors responsible for these changes, especially man's interference with natural succession, are discussed.

Species diversity is discussed in Chapter 7. General ecological relationships, such as the effect of area size and characteristics of the landscape on species abundance, are discussed. Mathematical formulae are presented for purposes such as characterizing regions as being "high" or "low" in species number and diversity and estimating the minimum area for a bird community. These latter considerations are of fundamental importance for many activities aimed at the conservation and protection of birds and their habitats.

The relationships between population size and bird distribution in various environments are discussed in Chapter 8. As a rule, the population density of rare and abundant species differs by a factor of 10. Large population size is more common in passerine than in nonpasserine birds. Generally, wide-ranging species are most abundant, but there are noteworthy exceptions. A description of the main biotypes in central Europe and their associated avifaunas are presented in Chapter 9. The final chapter deals with applied aspects of ornithology, including interesting comments on the possible contributions of ornithological research to political decision-making as it pertains to environmental design and management.

The author intended to write a book suitable as a

textbook for avian ecology classes at the university level while also providing information necessary for nonprofessionals who study birds and engage in environmental conservation and bird protection. The book admirably achieves this goal and should prove valuable to both audiences. It is a particularly useful source of information for researchers working on European bird communities. Hopefully, it will stimu-

late similar works for other parts of the world. Because of its detailed presentation and discussion of the various interactions of birds and man, it will be a valuable addition to college libraries and public libraries. Its usefulness in North America, however, may be limited, as it is written in German.—WOLFGANG WILTSCHKO.

ALSO RECEIVED

A pictorial guide to the birds of the Indian subcontinent.—Salim Ali and S. Dillon Ripley. 1983. Oxford, Oxford University Press. 177 pp., 106 plates (73 colored, 33 black-and-white) by John Henry Dick. ISBN 19-561634-0. 120 Rs.—This is the most comprehensive pictorial guide to the birds of this part of the world. The term "subcontinent" includes all of India south of the Himalayas—the peninsular and continental portions as well as the northeastern extension into China and Burma. It also includes Pakistan, Nepal, Bhutan, Bangladesh, and Sri Lanka. The plates depict 1,241 species and are said to include *all* of the species reported from this area. A few extralimital species also are included. The species are arranged systematically by family on the plates and in many cases male, female, and juvenile plumages are shown. Prior to this volume, the most complete guide to the birds of this area was the 10-volume set by Ali and Ripley ("Handbook of the Birds of India and Pakistan," 1969–1974). Relatively little information is given about the species shown in the plates. The text provides a short paragraph describing each of the families and a list of the species covered and the plate numbers. A page facing each plate devotes a few lines to each species and lists common and scientific names, size of each species, general habitat preferences, range, and elevation where found.

The plates seem variable with respect to the quality of the color reproduction. This may be the result of attempts to keep the price at a minimum. The sponsors of the publication intend it to be a nonprofit undertaking, thereby assuring its widest possible distribution among low- and middle-income groups and among government and private scientific, cultural, and educational institutions.

This volume is a must for anyone desiring a single pictorial guide to the extremely interesting and diversified avifauna of this part of the world.—W.E.S.

A field guide to birds of the USSR.—V. E. Flint, R. L. Boehme, Y. V. Kostin, and A. A. Kuznetsov; translated by Natalia Bourso-Leland. 1984. Princeton, New Jersey, Princeton University Press. xxxvi + 353 pp., 71 text figures, 303 maps, 48 color plates. ISBN 0-691-08244-8. \$65.00.—The USSR is a large and tre-

mendously varied republic, containing a wide range of topography and habitats. It thus contains a large variety of birds; approximately 750 species have been recorded within the area, and 728 of these are treated in this book. The volume is a translation of the Russian edition that was published in 1968 and rapidly went out of print. Updated information has been added on some of the species, and Professor Flint has included a new introduction to this English edition. A translator's introduction provides helpful advice on bird-watching in the USSR, which is not quite like that in many countries due to restrictions on travel and tightly structured tourist itineraries.

Flint's introduction reviews the general life zones that occur in the area covered by the book—eastern Europe through Asia and the Arctic to India. For each zone, he notes some of the major bird species that are of special interest. The introduction also describes the five most interesting birding regions of the USSR, and indicates some of the species to expect or search for in each. Flint concludes with some instructions on the use of the guide in identification and definitions of some terms, accompanied by drawings.

The main body of the book is the species accounts. Each account gives English, transliterated Russian, and scientific names, key fieldmarks, a description of habits (breeding, behavior, ecology, vocalizations, food habits), range (accompanied by a map), and notes on similar species. Numerous additional drawings are included to point out nest characteristics, diagnostic identification differences between species, and so on. Most of the species are illustrated in the color plates. The book is well-indexed, and includes a cross-reference list (prepared by Peter Alden) that presents the species in text sequence and gives for each the scientific name, English name (and alternatives), and map and plate numbers.

The book is clear, detailed, handsome, well produced, and informative. The color plates, while crowded, are well executed. The maps are especially helpful, although in some cases it is rather difficult to see the actual range, especially for coastal species. Anyone planning to travel in the USSR should take along this volume, and should study it carefully ahead of time.—JOHN A. WIENS.

Birds of the world in philately.—Beverly S. Ridgely and Gustavs E. Eglajs. 1984. American Topical Association (5014 West Center Street, Milwaukee, Wisconsin 53210). 252 pp., 17 halftone illustrations. Paper, \$14.00.—Many of us who are professional or amateur ornithologists take more than passing interest in birds that appear on stamps, but for some this is a serious hobby: avian philately. This volume presents checklists of stamps illustrating identifiable (and real) birds, arranged by bird species (following the classification of Moroney, Bock, and Farrand) and by the countries issuing the stamps. Through 1981 some 1,682 species of the world's birds had appeared on stamps, so a listing such as this is essential for anyone contemplating developing or maintaining a serious topical collection. The taxonomic listing states the country, catalog number, year of issue, face value, and an indication of the relative importance of the bird in the design and whether or not it is printed in color. The listing by countries indicates the family and species numbers, the catalog number of the stamp, its year of issue and value, and the most widely used English name of the bird portrayed. The introductory comments provide suggestions on arranging collections in various ways that may lead to some fresh insights about both birds and stamps. For those who enjoy watching birds on stamps as well as in nature, this book is a must!—J.A.W.

Oklahoma ornithology. An annotated bibliography.—Joseph A. Grzybowski and Gary D. Schnell. 1984. Norman, Oklahoma, University of Oklahoma Press. xv + 175 pp. \$19.95.—Oklahoma is an avifaunally diverse state, a consequence of the merging of elements from the east, southeast, Great Plains, southwest, and west. Its birds have received considerable study, and this volume lists over 1,500 citations to works appearing through mid-1983. The bibliography is unusually complete, containing not only customary references from the primary journals and books, but citations of various dissertations and reports of agencies, environmental assessment projects, the IBP, and so on. Each citation is accompanied by a brief annotation indicating its scope and subject matter and by a series of key words. The references are cross-listed by these key words and by avian families in appendices. It is a useful, well-produced book

that will be quite helpful to anyone with interests in the birds of Oklahoma or of this region.—J.A.W.

The Audubon Society field guide to the natural places of the northeast. Vol. 1, Coastal.—Stephen Kulik, Pete Salmansohn, Matthew Schmidt, and Heidi Welch. 1984. New York, Pantheon Books. xviii + 432 pp. ISBN 0-394-72281-7. \$9.95. **Vol. 2, Inland.**—Stephen Kulik, Pete Salmansohn, Matthew Schmidt, and Heidi Welch. 1984. New York, Pantheon Books. xviii + 425 pp. ISBN 0-394-72282-5. \$9.95. **The Audubon Society field guide to the natural places of the mid-Atlantic states. Vol. 1, Coastal.**—Susannah Lawrence. 1984. New York, Pantheon Books. xviii + 341 pp. ISBN 0-394-72279-5. \$9.95. **Vol. 2, Inland.**—Susannah Lawrence and Barbara Gross. 1984. New York, Pantheon Books. xxi + 404 pp. ISBN 0-394-72280-9. \$9.95.—Just as reading a good cookbook is sometimes as enjoyable as eating the meal, perusing the first four volumes of this new Audubon Society series is almost like visiting the places they describe. Together, these books provide an interesting, detailed introduction to over 400 places in the northeast and mid-Atlantic states. Each guide is divided into sections based upon natural geographical areas. A short overview of the geological and ecological history of an area, together with an analysis of man's impact upon its vegetation and wildlife, is presented at the beginning of each section. The sections are divided into chapters, each of which gives a wealth of information about the particular place of interest: easy-to-follow instructions on how to get there by car, a small topographic map, an analysis of the length and difficulty of trails, a list of nearby camping and recreational facilities, and a description of the flora and fauna. The detail in which the geology, ecology, and history of each place is explained is of a sort rarely encountered in guides to the outdoors and enables the reader to get an idea not only of what he might expect to see but of why it is there and how it works. As a westerner used to hiking trails with rather breathtaking elevational gains, I was a bit disconcerted to find no scale given on the topo maps and some of the distances given in hours rather than miles, but, indeed, the terrain of the East is gentler, making such information less essential. The books are well written, affordable, and convenient, but, more important, they inspire one to visit the area to see the places for oneself.—JEAN FERNER.