

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.

The condor question: captive or forever free?—David Phillips and Hugh Nash (Eds.). 1981. San Francisco, Friends of the Earth. 279 pp. \$6.95.—As impassioned as conservationists are in their concern for endangered birds, it is not surprising that strong emotional and ethical issues invariably surround species like the California Condor. As you might guess from the title, this collection of 13 essays, excerpts, and interviews is an example of the biopolitics and advocacy journalism that result; it presents the case for one side of a heated controversy over the preservation of the California Condor. On the other side of the issue are the U.S. Fish and Wildlife Service and National Audubon Society—with broad support from the scientific community, including the A.O.U.—who propose an intensive effort to rescue the condor, a species seemingly doomed unless fundamental changes in our past conservation efforts promptly halt its decline. Controversial elements of the proposed recovery effort include breeding condors in captivity and using radio-tracking to study wild birds. Debate over these limelight issues, which is the central theme of the book, has all but eclipsed the fact that the program has a much broader scope including habitat acquisitions, toxic chemical studies, education, cooperative programs, and other more traditional conservation measures. Such oversimplifications and narrow-sightedness pervade this book and are exemplified by Appendix 2, which purports to contrast present recovery efforts with an "alternative" proposed by Friends of the Earth. The alternative proposes nothing that has not already been included in existing recovery plans, and the description of these existing plans is very inaccurate, emphasizing controversial elements while ignoring most other aspects.

The biological essence of "The condor question" is whether or not the proposed recovery efforts will rescue the condor or hasten its demise. This volume includes contributions, some highly opinionated, by biologists, several of whom seem to expect the latter outcome (D. DeSante, L. Dixon, A. and P. Ehrlich, A. S. Leopold, I. McMillan, A. H. Miller, L. Sumner, and S. Wilbur). Ironically, few contributors have experience with captive breeding or radio-tracking, and in no way are these key issues given a balanced treatment. The central figure whose influence is felt throughout, however, is the late Carl B. Koford whose condor monograph (1953, Nat. Aud. Soc. Res. Rep. No. 4) is the standard life-history reference on the species. In a "slightly edited version" of an interview

shortly before his death, a terminally ill Koford comments on the condor controversy. Sadly, he contradicts many of his own published findings from 40 years earlier, gives highly inaccurate descriptions of subsequent research efforts, and perpetuates a condor mystique that is poorly based in fact.

The book is full of contradictions and misinterpretations, primarily because so few of the opinionated contributors have any meaningful first-hand experience with the condor or the techniques in question. In other cases the contributors appear poorly informed about recent developments in the condor program and bird conservation work in general. Because a nestling condor died during a nest visit by biologists in 1980, such activities are portrayed as totally unacceptable, yet regular nest visits were an integral part of Koford's fieldwork, which the book then applauds as exemplifying the best approach to studying the birds. Results of captive breeding and reintroduction programs, especially for the Peregrine Falcon, are misrepresented to strengthen the case against capturing condors. The book portrays the well-known Peregrine program as a virtual failure, whereas most conservationists consider it an outstanding success.

Providing carcasses as a supplement to the condor's existing food supply is condemned as an objectionable activity because it would "beggarize or domesticate" the birds. Yet, the best available information on the condor's diet indicates that carcasses of domestic livestock are a primary food source. Condors, therefore, already depend on us for food, but we provide it to them unwittingly, which is apparently acceptable, rather than purposefully, which for some reason is not.

Great emphasis is placed on the need to preserve "habitat" for the condor, but the unspoken truth is that no one presently knows with any confidence exactly which areas within the condor's range can be considered critical habitat, without which condors cannot survive, or whether habitat is even limiting the population. The main purpose for proposing radio-tracking is to provide as rapidly as possible information on how the far-ranging birds use their range, which areas may be critical for feeding, roosting, resting, and other aspects of condor life history. It is clearly impossible to manage the entire range of the condors for the birds' benefit. It is practical to manage only the critical areas. Preserving such critical habitats under prevailing land pressures in California and Federal spending cuts will not be easy

even if there is solid biological information to support the case. Without the types of hard evidence that radio-tracking can yield, large-scale habitat preservation or management will be difficult or impossible to accomplish.

Because California Condors have never been bred in captivity—no one has ever really tried—the book concludes that this approach is unacceptably risky. But nowhere is there an accurate summary of results of extensive recent work with Andean Condors, the closest surrogate, which have been bred repeatedly by several institutions. Not only have they been bred, but by removing eggs for artificial incubation it has been possible to induce females to lay up to three fertile eggs yearly rather than one egg every other year, as in the wild. Such a six-fold increase in fecundity is exactly what is needed to rapidly increase the perilously small California Condor population.

The book also makes little mention of results of recent research by my students and me in Peru, where seven of 11 captive-reared Andean Condors made a successful transition to wild existence and where radio-tracking of free-living condors has been highly successful. In view of this book's purpose, I think such oversights are not inadvertent. Unless California Condors are very different from Andean Condors—and there is no reason to suspect this—radio-tracking, captive breeding, and reintroduction should present no serious threats to the birds and, if successful, will enhance the condor's chances for survival.

The ethical essence of "The condor question" involves how conservationists should go about saving the condor. In view of the condor's low numbers and steady decline, whatever we decide to do must be done promptly, and it must be effective. The book argues that condors need more wilderness and less human disturbance in their range, which obviously no one concerned with the condor denies. This naturalistic approach is extended to a philosophy of "leave the condor alone" that precludes intensive management efforts to save the bird. The problem is, do you risk losing the condor while engaging in the idealistic and drawn-out crusade for more wilderness (which is certainly important in the long run) or do you take immediate steps to assure that condors will increase in numbers and survive to occupy the areas that may eventually be improved for them? The choice is not between "captive or forever free," as the book's title misleadingly implies. The choice is more likely to be between "temporarily captive and subsequently free or free now and gone tomorrow."

Unfortunately, condors do not live in a world where environmental problems are simple or quickly and rationally solved on the basis of ecological principles, the type of world to which the planners of this book cling. The real world is increasingly dominated by human activities, and solving the condor's problems will take decades, even under the best of circumstances. It may already be too late to rescue the con-

dor, regardless of the approach taken. Like Pitelka (1981, *Auk* 98: 634), some feel the effort is futile. In any event, neither the condor nor conservation efforts for other endangered species are being helped by the type of acrimony and divisive arrogance that the condor question has generated. Time is clearly running out for the California Condor; the sooner conservationists are willing to "bury the hatchet," cease producing rhetorical material like this book, and get on with the work of saving the bird, the better.—STANLEY A. TEMPLE.

The avifauna of the South Farallon Islands, California.—David F. DeSante and David G. Ainley. 1980. *Studies in Avian Biology* No. 4. v + 104 pp. Black-and-white frontispiece, 2 figs., and 13 tables. \$10.00. (Available from Allen Press, Inc., P.O. Box 368, Lawrence, Kansas 66044.)—The present paper summarizes records of occurrence of birds obtained on tiny (41 ha) Southeast Farallon Island, isolated in the Pacific Ocean 32 km from mainland central California. A permanent research station of the Point Reyes Bird Observatory was established on the South Farallon Islands in 1968. Since then, weather permitting, resident scientists and a large group of serious amateur volunteers have conducted *daily* censuses of the island and nearby waters, resulting in a unique and stunning data base of approximately 2,900 censuses covering the 8-yr period between 3 April 1968 and 2 April 1976. A total of 331 species was recorded, including 22 new state records for California. Only 20 species (12 seabirds and 8 landbirds) are known to have nested. The main data consist of sight records; relatively few specimens were taken. Most of these have been deposited in the California Academy of Sciences, San Francisco. But, because 14,052 landbirds were banded during the 8-yr period, many birds were studied in the hand.

After an introductory description of the islands and a section on terminology and methods of analysis, 51 pages are devoted to species accounts. These are followed by 38 pages of analysis and discussion. The paper concludes with a 2-page summary, acknowledgments, a list of 91 items of literature cited, and 2 pages of addenda. The latter provide details for records of 15 additional, previously unrecorded species and of 26 other species for which new seasonal or recent records were obtained during the 42-month period ending 2 October 1979, after the cutoff date for this report. Thus, the censuses continue.

In the methods section, the authors carefully discuss their terms and criteria for residence, seasonal occurrence, and relative abundance of species. Abundance was necessarily dealt with at some length, in view of the inordinate mass of records requiring analysis, and the treatment of this topic led the authors to develop a useful and apparently original scheme of abundance categories based on a logarithmic scale (to the base 3) in which increasingly finer

degrees of classification are provided for increasingly rarer classes. Others may find this system to be adaptable to their needs.

The species accounts include a statement of numerical abundance, designation of abundance class, the number of individuals banded, number of specimens, and the high count and its date for each season. Timing of occurrence is given both by means of extreme seasonal dates and by the timing of peak numbers of arriving individuals. Records obtained by others prior to the PRBO work are mentioned where appropriate. Thus, an enormous amount of information is conveniently summarized, revealing both the dramatic and the subtle differences in numbers and scheduling among species.

The authors properly emphasize the importance of the Farallones as breeding grounds for seabirds; 12 of the 17 species nesting on the Pacific Coast of California have populations on these islands. Moreover, the world's largest concentrations of breeding Ashy Storm-Petrel (*Oceanodroma homochroa*), Brandt's Cormorant (*Phalacrocorax penicillatus*), and Western Gull (*Larus occidentalis*) occur on the Farallones.

The wealth of data allow DeSante and Ainley an unequalled opportunity to search for patterns of occurrence of both the breeders and of the large visitant avifauna and to compare groups of species with different distributions and/or ecology. Important and interesting findings abound. The greatest number of individuals and of species of visitors occurs in the fall, a period when breeding seabirds are mostly absent. Most of the landbirds arriving then are nocturnally migrant species which nest in western North America and winter in the Neotropics. They begin to appear in early August and peak in numbers in September. In contrast, vagrant landbirds, originating mainly from Canada and eastern North America, show up in early September and reach peak numbers from mid-September to early October. This is the time for spectacular numbers of visitant species (122 on 27 September 1974) and of individuals (nearly 10,000 birds, mostly *Zonotrichia*, estimated on 2 October 1972). Numbers decline in late October to very low densities by late November. Few landbirds winter on the island other than Starlings (*Sturnus vulgaris*).

Spring migration is less predictable in scheduling than is the fall movement, especially in March and April when the huge numbers of seabirds begin to nest. One, or occasionally two, major waves of visiting landbirds arrive in early and/or late May, mostly of western North American breeders that winter in the Neotropics. Wilson's Warbler (*Wilsonia pusilla*) is usually the most abundant species. Vagrant landbirds first appear in mid-May but reach peak diversity during the first two weeks of June. Thus (p. 98), "There are times in early or mid-June when individuals of eastern species actually outnumber those of western species." The authors properly conclude that the staggering total of 1,723 individual vagrant land-

birds recorded in the 8-yr period is a vivid tribute to their phenomenal dispersal ability, a conclusion that once again reminds the reviewer that access to coastal islands, for all but the most sedentary species of birds, is not the problem that some biogeographic theory would have us believe.

The authors devote considerable space to discussing the community of breeding landbirds and in comparing the species composition of the Farallones with that of the avifauna of the Channel Islands off southern California. Only a handful of landbird species (eight) have found their nesting requirements met in the impoverished habitats of tiny South Farallon Island, and these are among the few species that also breed on all or most of the Channel Islands. Human disturbance has changed the populations of at least four of these species during the last 70 years. Turnover rates for landbirds, based on nine complete surveys between 1888 and 1974, are 14% to 100% with a mean turnover of 52% per mean survey interval of 11.6 yr, or 6.12% per yr. However, these figures, in common with avifaunal turnover rate figures for most other islands, are of dubious meaning and ecologic importance in view of the very small size of the nesting avifauna and its history of disturbance.

The chief weakness of the report lies in the meager number of specimens taken as verifiable evidence of occurrence for the various species. In interpreting any huge mass of records obtained by many persons for such a large and diverse avifauna, problems of accurate identification can be serious. With this point in mind, it is encouraging to note that the census-takers were not always driven to name every single bird encountered; unidentified individuals of some groups are occasionally mentioned. Nonetheless, voucher specimens in numbers far beyond the few that were taken should have been preserved as a routine part of the daily field effort. Photographs and written descriptions, no matter how elaborate and carefully taken, are feeble substitutes for specimens as documentation of occurrence. Furthermore, the essential lack of specimens for a host of geographically variable species (e.g. Rufous-sided Towhee, *Pipilo erythrophthalmus*, and Fox Sparrow, *Passerella iliaca*, among many others) means that a very significant opportunity was lost to determine the probable region of origin of many of the regular visitants and vagrants. Admittedly, a field program that included the collecting of birds would doubtless cause many volunteer workers to recoil. This problem nevertheless would be insufficient reason not to take specimens on a regular basis. Volunteers assisting in research of this sort simply must be informed of the critical need to preserve specimens for a variety of purposes, material which can be studied carefully later by specialists. After all, the majority of the small birds that visit the Farallones probably become "fishfood" after they leave the islands (L. R. Mewaldt, pers. comm.); at least some of these individ-

uals would be far more useful to science as specimens available for study for all time rather than as rotting carcasses floating among the kelp.

But this criticism should not obscure the fact that in most ways this monograph is an exceptionally fine piece of work. From an unparalleled body of records, DeSante and Ainley have conducted a remarkably thorough synthesis of information on avifaunal occurrence on an offshore island. Indeed, it may be the most complete such study ever attempted.—NED K. JOHNSON.

The birds of Sable Island, Nova Scotia.—Jan A. McLaren. 1981. Proc. Nova Scotia Inst. Sci. 31: 1–84. (Available from Nova Scotia Institute of Science, Macdonald Science Library, Dalhousie University, Halifax, Nova Scotia B3H 4J3, Canada.) 16 black-and-white plates, 1 map. \$7.50 (Can) (paper).—Sable Island is a treeless sandbar about 35 km long by 1.75 km wide located 150 km from the nearest mainland point of Nova Scotia. Recent interest in the area is based mostly on resource exploration and exploitation, although the island is known historically for its famous horses, seals, and the Ipswich Sparrow (*Passerculus sandwichensis princeps*), a large, pale, and endemic nesting subspecies of the Savannah Sparrow. This book clearly shows that Sable Island has much to offer in the form of a fascinating ornithological history and avifauna of considerable interest to natural historians, bird watchers and serious students alike. It details McLaren's ornithological records since 1967 and is the third and most complete account of the island's birdlife. In addition to annotation of the 25 species that nest or have nested there, documentation is given for 324 species that have been reported from the island, of which 236 are authenticated by specimens now in various museums (listed after each species account) and/or photographs on file at the National Museum of Natural Sciences in Ottawa.

More than just an annotated listing of species, the book presents a fascinating history of the ornithological personnel back to Andrew Le Mercier's 1753 report of the island. Other chapters deal with ornithological research on the island, habitats and where to find birds, migration phenology, and changes in the birdlife from the late 19th and 20th centuries. A useful map with place names used in the text is included along with 15 black-and-white photographs of some of the more interesting avian inhabitants.

Unfortunately the book suffers from editorial problems, to the extent that an "Errata" is included. I found other errors not mentioned on the errata sheet. For example, the Saunders (1903) citation on page 3 in the introduction is listed in the references as 1902a, and no reference is given for the James Morris (1802) report cited on the same page. Although species are listed phylogenetically, an index to English names

would have been useful for easy access to species discussed in the text.

The quality of the binding is poor. By the time I had read the book, in the comfort of my living room, many of the pages were dislodged and falling out and the spine had virtually disintegrated! I suspect that under the usual rigors of travel and fieldwork the book may not remain intact for very long. Its 23 × 15 cm dimensions render it too large for a "pocket" companion. In spite of these shortcomings, the book will be very useful to Sable Island visitors (a government permit is required to stay and work on the island) and to persons interested in comparative studies of marine island ornithology, especially in those areas for which historical documents of natural history are available. McLaren is to be commended for compiling information on the past and relatively recent ornithology of this beautiful and ecologically unique section of offshore Canada.—JOHN P. RYDER.

Animal migration.—David J. Aidley (Ed.). 1981. New York, Cambridge University Press. vii + 264 pp. \$39.95 (hardbound), \$19.95 (paper).—This volume, number 13 in the Society for Experimental Biology Seminar Series, contains 11 contributions on the migratory behavior of animals. The contributions were presented in a symposium on animal migration held in Lancaster, England in December 1979, and this book is the proceedings volume of that symposium. The first paper is by the organizer of the symposium and editor of the volume, D. J. Aidley, and it briefly considers some of the questions that are raised by the study of animal migration: What do we mean by migration? What are the movements of migrants? What factors initiate migration? How do migrants find their way? How much energy is used in migration? The answers to these questions are discussed briefly, and the chapter is an overture to the contributions that follow.

The chapter by Thomas Alerstam is on the course and timing of bird migration. Alerstam orients the reader to the constraints placed on a migrating bird by placing the reader in the position of a pilot in a light aircraft confronted with completing, in one or two months, a journey lasting 15 to 200 hours of continuous flight. The analogy works, and most readers will be prepared to follow Alerstam's excellent discussions of the complexities of avian migration. He first addresses the optimal flight speeds in migrating birds, and then examines soaring as an alternative to continuous flapping flight in migration. Fuel economy during migratory flights is discussed next, in the context of different migration strategies and different migration routes that involve everything between long sea crossings with high fuel ratios and numerous short flights with low fuel ratios. This leads to a consideration of migratory routes. Convincing

examples of birds flying close to great circle routes are presented and the role of geographical wind patterns in the evolution of migratory pathways is stressed. The timing of migratory flights in relation to weather, the altitude of flights, and the direction of flight in relation to wind are the final topics treated in the chapter. Alerstam beautifully blends theory and empiricism, and his chapter is one of the best in the volume.

A chapter on the orientation and navigation of birds is contributed by the late William T. Keeton. It is an up-dated version of his contribution published in *British Birds* (1979, 72: 451) and in the Proceedings of the XVIIth International Ornithological Congress held in West Berlin in 1978. Keeton discusses the more familiar orientational cues used by migrating birds and homing pigeons and then details the unusual sensory capabilities of birds. He concludes that no single cue so far discovered is essential, because there is so much redundancy that experienced birds can orient when only a few of the many possible cues are available. Keeton's chapter concludes with an examination of the integration of orientational cues, a topic that is currently receiving considerable research emphasis (e.g. ontogeny, conflict between cues, release-site bias).

A third chapter dealing with birds is by Raymond J. O'Connor. He compares the characteristics of migrant species with those of nonmigrant species. He postulates that general differences in life-history characteristics between the two groups are likely to reflect the influence of those factors leading to the evolution of the migratory habit in the first place. His chapter is a first attempt at this approach. O'Connor used data from farmland birds in Britain and concluded that migrant-resident differences occurred to a significant extent in three areas: 1) body size and the correlations of survival with sexual dimorphism, 2) the dependence of distribution and survival on egg productivity, and 3) the variance of year-to-year population changes. The variation in the annual population changes of residents is correlated with body weight such that interspecific differences in population changes were smallest in the larger species. From these findings a single hypothesis emerges: resident species are strongly competitive, with population density regulated by climate in winter and by density-dependent behavior in summer, and migrant species are primarily exploiters of breeding season resources under-exploited by a resident population held down by winter mortality. This hypothesis is fundamentally similar to that proposed by Herrera (1978, *Auk* 95: 496). A major weakness of O'Connor's contribution is that waterfowl, gallinaceous birds, and waders are listed under residents, but similarly sized birds are absent in the list of migrants. Thus the comparisons between residents and migrants are asymmetric from the start.

G. V. T. Matthews' contribution focuses on the

conservation of migratory birds throughout the world. The chapter covers the history of bird protection treaties between various countries, and although Matthews does a rather good job, the chapter seems a bit out of place in the volume.

The chapter by R. Robin Baker examines the migration of man and other vertebrates. Once again Baker puts forward *his* conventional terminology: year's home range, familiar area, exploration, lifetime track. Baker states "that the exploration programme is primarily the result of genetic evolution and that vertebrates are innately predisposed to carry out species-specific patterns of exploration." Baker also believes that migratory restlessness in birds reflects a predisposition to explore rather than a predisposition to migrate in the classical sense. The evidence he presents is not convincing, and I cannot agree with his views. The second part of Baker's chapter concerns human route-based navigation and its magnetic basis. He stresses that, in principle, displacement during homing experiments can be thought of as "enforced exploration." Most of the information in this section is repeated from his book, "Human navigation and the sixth sense," published in 1981. Baker says that the techniques he used in his human navigation studies are essentially the same as those used in pigeon homing studies, and the results of his experiments suggest that humans and pigeons may navigate in similar ways, both using a geomagnetic sense to find their way back to the original familiar area.

The volume also contains two works on fish migration. One examines the role of currents in the life history of migratory fish and details the "selective tidal stream transport" mechanism of fish migration in shelf areas (G. P. Arnold), and the other reviews the strategies and tactics of fish migration including routes, homing, and orientation (F. R. Harden Jones). The migration of baleen and toothed whales is treated by C. H. Lockyer and S. G. Brown. Although their chapter is well done, the shading in several illustrations has been lost in printing, making interpretation impossible in some cases. Two chapters are devoted to insect migration. T. R. E. Southwood's is a short overview of the ecological aspects, and R. J. V. Joyce's is concerned with the control of migratory pest species.

The book suffers, as do most symposium volumes, from a lack of integration, and in this instance from a lack of care in producing the volume. Several editorial errors exist. As noted earlier, Matthews' chapter deals with the conservation of migratory birds, but the running head given his chapter is "Conservation of migrant pests." Because Matthews' chapter follows Joyce's in the volume, this mistake is perhaps understandable, but it is hardly forgivable. I expect more from Cambridge University Press.—SIDNEY A. GAUTHREAUX, JR.

Instinctive navigation of birds.—Edward C. Gerrard. 1981. Scotland, The Scottish Research Group. v + 185 pp., 104 figures, 2 tables. \$12.00. (Available from Secretary, The Scottish Research Group, Skye, Scotland.)—In this short, hostile book, Gerrard claims that during the last 30 years ornithologists have produced a “plethora of ‘experimental’ evidence purporting to show that birds possess sophisticated navigational equipment.” He believes that nearly all of the experiments have suffered from bad design, and many have produced highly questionable results. His book, he offers, is one of the first attempts to subject these experiments to logical criticism, and he takes on this task with unnecessary vengeance.

Rather early in the book he stoops to name-calling. He calls Gustav Kramer “the instigator,” Franz Sauer “the planetarium manipulator,” and A. C. Perdeck “the deporter.” After rather viciously attacking the results of nearly every major investigator who has worked on the orientation and navigation of birds, Gerrard offers what he calls “a fresh approach.” He does this by dismissing all existing claims and hypotheses in the literature and assuming that migrant birds in general show a menotactic (one-sided) phototactic response whenever low-angle glare is encountered. The migrants show a telotactic (direct attraction toward) phototactic response to bright lights that do not produce glare at low angles (below 40°) or to all high-angle bright lights regardless of any glare that might be produced. Gerrard also assumes that any bright objects whose detail can be seen to be “hostile” might not attract at all (e.g. the full moon). He suggests that these behavioral responses, coupled with attraction to recognizable features (e.g. favorable habitat), can account *generally* for more or less all avian navigation and homing abilities. Of course, Gerrard feels that his hypothesis is as good as, if not better than, any that has ever been advanced, even though he claims his approach has been “devious and at times muddle-headed.”

Gerrard’s book is divided into two parts. The first is 130 pages long and contains nine chapters. Chapter 1 provides an overview of directional aids for migrating birds (phototactic sun-arc attraction, sunrise and sunset angles, low-level star movements, cloud attraction, and the effects of wind and stars on airborne movements) and a critical examination of the autumnal nocturnal flights of birds from Scandinavia toward England as recorded by Tim Myres using radar on the Shetland Islands in the early 1960’s. In Chapter 2, the shadow-casting properties of the pecten in the eyes of birds are examined in relation to menotactic responses to bright objects within 40° of the horizon, including attraction to lighthouses and gas flares in poor visibility, and the low-angle directional effects at different latitudes and seasons. Some homing experiments are critically examined and several methodological “errors” are discussed. The chapter closes with a consideration of the timekeeping of birds during migration.

Gerrard presents his new approach to the study of avian orientation and navigation in Chapter 3. He begins by recounting some orientation experiments with insects, and once again repeats his belief that “tactile [sic] responses will provide the key to the age-old mystery surrounding bird navigation *when* coupled with an imprint attachment affinity to suitable habitat (visual or audible) or to other individuals of similar species . . . plus a very good memory store for recording topographical data.” According to Gerrard, the “instinctive” behavior responsible includes: 1) phototactic escape responses, 2) visibility attraction responses, 3) menotactic responses, and 4) imprint attachment responses of various kinds. He says, “regardless of whether or not these four types of responses can or cannot explain avian navigation, it must be difficult for any ornithologist to accept that the answer might be so simple.” Gerrard’s notion of “simple” is vastly more complicated than perhaps he realizes. Unfortunately, the term instinct is still bandied about as a simple explanation for why animals do what they do, but serious biologists realize that merely applying the term really achieves nothing in the way of an explanation.

In Chapter 4, the instinctive response sequences of migrating birds are examined. Gerrard details seven different response sequences (e.g. telotactic escape response) to eight key situations (e.g. dawn diurnal migration) under 12 key conditions (e.g. in sunny conditions across unfamiliar but chartable areas) and these are summarized in a table. The numbers in the table (1, 2, 3) suggest the likely sequence of responses to the situations and conditions in question. Because of the way Gerrard has formulated his notions about orientation during migration, he at times gropes for explanations to account for other aspects of avian migration. For example, he suggests that at times of “glandular induced migration” birds must overcome imprint attachment to topographical features and attraction to suitable habitat in order to permit any movement at all. For nocturnal migrants, darkness breaks such ties, and for diurnal migrants, phototactic attraction to the sun is the “breaking force.” Gerrard believes that birds behave in such “instinctive fashions” because they are simply forced to do so, and if they do not respond correctly, they do not survive and pass on the “genetic variation.” Once again Gerrard offers an overly simplistic explanation for what is certainly a more complex phenomenon.

In Chapter 5, Gerrard uses his instinctive navigation hypothesis to account for the seasonal migration patterns of birds, and in Chapter 6, he addresses various secondary issues related to migration and offers explanations for why some species migrate while others do not and why birds migrate at different altitudes. The distribution and migration of several different species are examined in Chapter 7 in the light of Gerrard’s rules of instinctive movement, and in Chapter 8, he discusses such topics as

conservation, rarity, evolutionary clines, and the evolution of bird migration. Each of the eight chapters in the first part of the book contains a chapter summary, and Chapter 9 is devoted to general conclusions.

The second part of Gerrard's book (pp. 132-173), entitled "Bird navigation—the sterile controversy," contains three chapters. The first gives a brief historical introduction to the study of avian navigation with an emphasis on the methods of study of free-flying wild birds. The treatment, as in previous sections of the book, is highly opinionated. In the next chapter, Gerrard reviews the theories that have been developed as explanations for migratory orientation (topographical memory, drift migration, olfaction, infra-red radiation detection, radio wave detection, telepathy, magnetism, inertial navigation, and astronavigation). In the last chapter of part 2, Gerrard critically examines some of the most important experiments in avian orientation and navigation (work by Kramer, Sauer, Emlen, Matthews, Ruppell, and Perdeck), and without exception finds major flaws in experimental design, data analysis, and interpretation of results. This may be the most vitriolic chapter in the book and typifies the malicious tone of Gerrard's writing, a tone that I believe is totally unwarranted.

The book ends with two appendices (one devoted to an examination and criticism of selected feats of pigeon homing, and another that reviews the migration system of the Ascension Island green turtle), a glossary of navigational terms, a list of references (many containing the numbers of chapters where the papers are treated), a list of scientific names, and an index.

Gerrard's book is a classic example of how not to make scientific criticism. Although his message and hypothesis may be worthy of further consideration [see Katz, Y. B. and I. K. Vilks. 1981. The role of distribution of illumination in the stellar picture in a planetarium for the orientation of Redbreasts Robins (*Erithacus rubecula*) in round cages. *Zoologicheskii Zhurnal* 60(8): 1222], it is marred by his rather tasteless manner of writing. His theory of instinctive navigation is purely post hoc. He relies on the data of others when they support his notions of how birds orient and navigate, and rudely dismisses studies that have generated data contrary to his way of thinking. He has not taken the effort to test his hypothesis with one experiment. Moreover, his theory and criticisms have been developed often with confused and erroneous knowledge of bird migration, orientation, and navigation (e.g. "flocking species do not normally migrate by night"). In summary, I found the book both interesting and disgusting and believe that Gerrard has done himself a disservice in writing a book that offends the very audience that is most interested in what he has to say.—SIDNEY A. GAUTHREAU, JR.

Elliott Coues: Naturalist and frontier historian.—Paul Russell Cutright and Michael J. Brodhead. 1981. Urbana, Illinois, University of Illinois Press. xv + 509 pp., 17 figs., 1 map. \$28.50.—Elliott Coues (1842-1899) is remembered as a founder of the AOU, as a dedicated taxonomist and author of several early and authoritative keys and check-lists of North American birds that went through a number of editions, and as an indefatigable bibliographer of American and English ornithology. He was also, as this first full-length study of his career makes clear, a distinctive and eccentric character in an era when the American natural sciences sported not a few unusual and unconventional practitioners.

Trained as a physician, Coues graduated in the middle of the Civil War and began his 20-year career as an Army surgeon in the relatively quiet Arizona Territory. His military duties took up so little of his time that he was able to collect birds and other animals assiduously. Occasionally, he aroused the ire of his superiors by firing his collecting gun when hostile Indians were in the vicinity. This was not the last time he was to run afoul of higher authority. He was only one of the many proteges of Spencer F. Baird, and unquestionably one of the most outstanding ones, but he had a temperament that must often have sorely tried that overworked official.

Coues' years in the military were among his most productive, resulting not only in the *Key, Check List*, and a *Field Ornithology*, but also in *Birds of the Northwest* (1874), the first part of *Birds of the Colorado Valley* (1878), and three sections of a projected history of North American mammals, which was never completed. Much of Coues' tenure in the military was actually spent in congenial surroundings as naturalist with the Northern Boundary Survey, with the Hayden Survey, and with editing assignments in Washington. When transferred back to the Southwest in 1881, after many years in other parts of the country that he preferred, Coues abruptly left the Army, concluding that his superiors were no longer sympathetic to his natural history work. Cutright and Brodhead note that he produced no new technical monographs after leaving military service, but rather "books and articles for popular consumption or re-editions of earlier volumes." He penned approximately 40,000 short entries on natural history for the *Century Dictionary*, nearly 100 longer articles for the *Encyclopedia Britannica*, and half a dozen book-length editions of diaries or travel accounts left by early Western explorers, most with extended and detailed scientific notes.

Coues was also capable of departing from scientific orthodoxy, as when he became interested in the human soul and its capacity for evolution. He joined the Theosophical movement, then broke with it after several years bluntly and publicly, but retained an active concern with the occult until the end of his life.

Cutright and Brodhead make it clear that Coues

was probably the driving force behind the creation of the AOU, though William Brewster was perhaps the one who originally conceived the idea. In late 1882, Brewster was glum about the future of the Nuttall Ornithological Club, which he had helped organize 10 years before. With only about 15 members, many of them inactive, he considered abandoning the NOC, and thought of forming "An American Ornithologists' Union" with perhaps a dozen members. Coues had very different ideas, and the authors note that most of them were adopted when the AOU was created in September 1883. J. A. Allen, the other organizer of the AOU, was unable to attend the first meeting in New York because of illness, and Coues was made temporary chairman of the meeting rather than the self-effacing Brewster, who had expected to have that honor. Allen was made the first president of the AOU, a post not offered to Coues until nearly a decade later. The authors attribute this delay in part to unhappiness over Coues' involvement in the Theosophical controversy, although Coues' personal relationships with some other ornithologists were not of the best.

It is sometimes interesting to speculate about what might have been in history. For example, when the agency that later became the U.S. Biological Survey was organized in 1885, Coues seems to have thought that he might be named to head it, despite the fact that C. Hart Merriam, another Baird protege, had, with Baird's help, persuaded Congress to provide funds for the new agency. Coues had hounded Baird for years, asking for some kind of full-time scientific post with the federal government following his departure from the Army, but Baird supported Merriam for the Biological Survey job. Coues was better known, was Merriam's senior by more than a decade, and had a longer and more distinguished record as a productive naturalist. Baird, however, did not want to cope with Coues as a member of the small, Washington-based, federal scientific corps of that day. Coues briefly turned on Baird, who had given the younger man support and encouragement for more than 20 years, and Coues never did receive the government billet he coveted, even after Baird's death in 1887. One important consequence of this was that Coues, lacking the secure base and the resources to complete the contemplated massive history of North American mammals, turned to other enterprises, and primacy in mammalogy passed for a time to Merriam.

Cutright, who has written many distinguished biographies of naturalists over a 50-year period, and Brodhead, who has previously published sketches of Coues and other Western naturalists, have produced the definitive biography of Coues. It is clear that they have mined most, if not all, of the available sources. Their book is a substantial contribution to our understanding of the ways in which ornithology was

practiced in the late 19th century, and the authors also throw considerable light on the careers of other ornithologists and naturalists with whom Coues came in contact.

Cutright and Brodhead emphasize that the style as well as the content of Coues' writings contributed much to his standing among his contemporaries, later naturalists, and historians of science. His prose was pithy, trenchant, and often witty, and he made a point of scientific and nomenclatural accuracy. Above all, his writing was interesting and readable, and it usually appealed to specialists and amateurs alike. The authors show that Coues was brilliant, complex, and often difficult to deal with. He made many enemies among the ornithologists and other scholars of his day, and thought nothing of taking them apart both in print and in his private correspondence. On occasion, these controversies descended to the point of pettiness, because Coues was a good hater. One notable example was the notorious "Sparrow War," carried on with Thomas Mayo Brewer both before and after the latter's death in 1880. Another centered on the mild criticisms of Coues' Latin nomenclature by Augustus Chapman Merriam, an uncle of the Biological Survey Chief. Coues' personal life was often a shambles, and his marital problems caused him no little grief, yet his sang-froid in times of great stress was often remarkable.

This is a balanced portrait. Coues appears here warts and all. The authors agree that he was "erratic," and that he lacked an "equable temperament and ordered mind," yet, though he often maddened or exasperated his scientific colleagues, all but a comparative few acknowledged his leadership and contributions. Ornithologists and historians of science alike still have occasion to refer to Coues' *Key*, his *Check List*, and the four installments of his "Ornithological Bibliography." A sixth edition of the *Key* was brought out nearly 30 years after Coues' death, and as late as 1931, one authority wrote that Coues was "in many respects . . . the most brilliant writer on vertebrate zoology America has so far produced." This is an essential volume that belongs on the shelves of ornithologists who want to understand a critical and formative period in American ornithology.—KEIR B. STERLING.

Ducks, geese and swans of North America.—Frank C. Bellrose. 1980. Harrisburg, Pennsylvania, Stackpole Books. A Wildlife Management Institute book sponsored jointly with the Illinois Natural History Survey. 540 pp., 55 maps, 24 color plates, 57 figures, 1 black-and-white photo, numerous drawings. No price given.—This is the 3rd edition of the classic work "The Ducks, Geese and Swans of North America," which was first published in December 1942.

The original edition was authored by Francis C. Kortright with color plates by T. M. Shortt. An authoritative reference on North American waterfowl for many years, the book had become outdated as a result of major advances in the field of waterfowl biology. The need to update the 1st edition culminated in the publication in 1976 of a 2nd edition authored by Frank Bellrose. Readers interested in comparing features of the 1976 edition with other major recent works on North American waterfowl by P. A. Johnsgard and R. S. Palmer should read Weller (1977, *Auk* 94: 173).

Aside from the title and certain format features, the latest edition bears little resemblance to the original publication. The most notable change from the 1976 edition is in the art work. A new series of 24 color plates by Bob Hines has replaced the 36 Shortt plates of the 1st and 2nd editions. Numerous black-and-white drawings also have been added. Mr. Hines has done a masterful job of depicting adult and juvenile North American waterfowl in various plumages and in characteristic poses. Other new features include rearrangement of waterfowl on the plates so that similar forms are on the same or opposing plates, making it easier to differentiate key morphological traits. The page number of the species account is listed on each plate, adding to the book's utility as a reference. A few new waterfowl have been included on the plates (e.g. several races of Canada Geese, the Tule Goose, and Greater Snow Goose), as have additional plumages for some species. Color plates of the Barnacle Goose and Eurasian Teal have been dropped. A new brown and cream cover and fly-leaves with black-and-white drawings depicting 47 species of North American waterfowl in flight add to the book's general attractiveness.

Eight relatively brief chapters (total of 56 pages) introduce the reader to waterfowl taxonomy, plumages and molt, migration, wetland conservation, the role of hunting regulations, identification, and mortality and disease. The content of these chapters has changed only slightly from the previous edition; however, the order of Chapters 7 and 8, on identification and mortality and disease, has been reversed.

Chapter 1 identifies sources of information used in the book. In Chapter 2, waterfowl taxonomy, Bellrose describes characteristics of various waterfowl that form the basis for their taxonomic status in the family Anatidae. The classification presented in both the 2nd and 3rd editions follows Johnsgard (1965, *Handbook of waterfowl behavior*). Chapter 3 on molts and plumages of waterfowl, by Milton W. Weller, describes typical plumages and compares patterns of molt by subfamily and tribe. Ornithologists will find Chapters 2 and 3 useful as general references.

Annual spring and fall migrations (Chapter 4), phenomena that occur widely among the Class Aves, take on a special significance in the Anseriformes.

Several million Americans go afield each year to hunt or observe species in this group. Aesthetic and sporting values have also contributed to various waterfowl art forms gaining widespread appeal. Bellrose, a noted authority on waterfowl migration, stimulates further interest by his treatment of the subject in Chapter 4 and in the species accounts. To anyone who has been inspired by scenes of migrating waterfowl, the black-and-white drawings of flocks in flight that accompany many of the species accounts add a special touch. Graphs showing the chronology of migration during spring and fall in up to 18 regions of the United States assist those interested in going afield to observe waterfowl.

Chapter 5 on conservation of waterfowl, by Glen C. Sanderson, contains a thorough description of waterfowl habitats in the United States and Canada, allowing readers to improve their familiarity with the wetland resources that sustain North American waterfowl populations. The contribution of various organizations to wetland habitat preservation is also acknowledged. Readers seeking a detailed description of waterfowl-habitat relationships, however, are likely to be disappointed by the treatment given this subject in the book, as emphasis in the management techniques section is placed on artificial nest structures, propagation, and put-and-take shooting. The reader is not provided with sufficient information on the specialized needs of various waterfowl during breeding and other periods to gain a clear understanding of the role of wetlands in their life cycles and, consequently, the basis behind habitat preservation and management policies.

Chapter 6, by Arthur S. Hawkins, on the role of hunting regulations, provides a detailed description of the mechanics of the regulatory process that is followed in setting hunting seasons and in distributing the harvest. About two million Americans and 400,000+ Canadians hunt waterfowl annually and, together with biologists and naturalists, they can benefit from some familiarity with the content of this chapter. The impact of hunting on North American waterfowl populations, a subject of much interest and debate, receives limited treatment in the book. Both laymen and professionals seeking to improve their ability to identify waterfowl will find Chapter 7 on waterfowl identification useful. In addition to the color plates, which have been placed after the first page in this chapter, Fig. 8-1 (should be 7-1), a pictorial key to duck identification, has been made more legible through enlargement.

What are the primary causes of mortality in North American waterfowl populations? In Chapter 8, Bellrose cites hunting as the source of about 50% of waterfowl deaths during the year through the direct removal of about 20 million birds. Among the causes of non-hunting mortality, he identifies disease as the primary source. He supports this conclusion by stating "Because predators have difficulty in capturing

healthy adult waterfowl that are not breeding, I believe that most nonhunting losses result directly or indirectly from disease." The author follows with a detailed description of the characteristics of each of the principal diseases affecting wild waterfowl. This information is timely, as losses to disease represent a significant source of mortality in North American waterfowl populations. Nevertheless, the author probably underestimates the impact of predation on at least certain species. Extensive studies conducted on the prairie breeding grounds in North Dakota (Johnson, D. H. and A. B. Sargeant. 1977. U.S. Fish and Wildl. Serv. Wildl. Res. Rep. 6) suggest that red foxes alone take about 18% of the breeding mallard hens annually. Several other species are also preyed upon regularly during the breeding season. Recent statistics indicate that about 900,000 adult waterfowl, mostly hens, are removed from the midcontinent region annually by red foxes. Intensified agricultural development in the midcontinent region in recent times has contributed to losses by forcing predators and nesting waterfowl to coexist on small tracts of remaining cover. When losses to recruitment from predator-caused nest destruction and brood mortality are taken into account, the impact of predation looms very large and in some situations probably exceeds losses to disease by several fold.

Species accounts make up about three-quarters of the book. Information on several species has been updated, but the overall length of species accounts remains at 400 pages. Range maps have been added for the Tule Goose, Eurasian Green-winged Teal, and European Wigeon, along with drawings comparing morphological characteristics useful in identification of several closely related forms. Most species accounts begin with a listing of "vital statistics," e.g. measurements of total length, wing length, and body weight (in English units). These statistics are followed by a description of traits useful in identification, population status of the species, and its distribution, migration behavior, breeding and post-breeding characteristics, and food habits. The lengths of individual species accounts vary widely, reflecting available information. A few new references have been added to those of the previous edition, and coordinates of latitude and longitude are now listed in Appendix A for locations cited in the book.

Ornithologists will find particularly helpful the detailed and exhaustive documentation of North American waterfowl distribution, including maps with breeding and wintering ranges, primary concentration sites, and migration corridors. Data on population status and breeding traits will also be useful to many biologists.

Waterfowl are among the most-studied groups of birds and prompt much interest across a broad spectrum of American society. Bellrose has placed between the covers of this book a vast store of information appropriate to the needs of both laymen and

professionals, and I would recommend it to anyone interested in waterfowl. As changes are principally in art work and in making the book more useful for waterfowl identification, some owners of the 2nd edition may not consider the changes sufficient to warrant purchase of the latest edition. In any case, this book will be a standard reference on North American waterfowl for many years to come.—GARY L. KRAPU.

Bird Island in Antarctic waters.—David F. Parmelee. 1980. Minneapolis, University of Minnesota Press. x + 140 pp., many black-and-white photographs and drawings, 5 color photographs, 14 color plates. \$18.95.—Bird Island is a small, lonely outcrop adjacent to South Georgia, far in the South Atlantic. There, members of the British Antarctic Survey have been conducting studies of seabirds for some years. David Parmelee joined the group for a 6-week period in 1976, and this book is an account of his experiences on what his hosts call "the most remarkable island for sea birds on this earth." Little wonder. While less than 30 bird species breed on Bird Island, they are all interesting species (some spectacularly so), and their numbers are often overwhelming. Wandering Albatrosses, Blue Petrels, Skuas, South Georgia Pintails, giant petrels, Blue-eyed Shags, South Georgia Pipits, and various penguins—all are presented not only as living creatures of considerable interest and fascinating research subjects, but as individuals with special properties that are perhaps most apparent through the eyes of an artist such as Parmelee. Through clear and flowing writing and skillfully executed illustrations, Parmelee draws his readers into a real appreciation of the birds, the islands, his colleagues in the British Antarctic Survey and the "Fids" of the Falkland Island Dependencies Survey, and the excitement and adventure of doing fieldwork in such a spectacular setting.

Parmelee's objective is not to present a scientific report, but to convey a birding experience as seen through the eyes of a field biologist. Nonetheless, he slips a good deal of quite basic science and descriptions of how one does field biology into his narrative—comments on the breeding systems of the species, their taxonomy, puzzling questions of species distributions and interactions, and the like. The writing style is so engaging, however, that one scarcely notices such shifts in the action. The science, like all else in this book, is presented in a clear and fascinating manner. Consider, for example, his contrast of the different kinds of exploratory fieldwork: "The first or 'romantic' kind requires physical prowess; human strength and ingenuity are pitted against the elements. The more inhospitable the environment, the better to test one's endurance. This kind of exploration calls for physical and mental achievement under the most trying conditions: the climbing of an unscalable peak, the crossing of a crevassed ice

sheet, a solo flight into the unknown. This is field adventure that thrills the hearts of millions. . . . The second type of exploratory field work is quite different. These field workers cram as many worldly goods as humanly possible into their tents, or better still, their heated wooden huts, and write blessed little about their equipment and stores. The more comfortable and equipped they are, the better they cope with their varied research studies—which may thrill the hearts of few" (p. 20).

Parmelee's vivid photographs and sensitive paintings add much to the text, and the Minnesota Press has done a superb job of composition and production. Altogether it is an engaging, absorbing, informative, and lovely volume.—JOHN A. WIENS.

Ornithological and ecological studies in S. W. Greenland (59°46'–62°27'N Lat.).—Finn Salomonsen. 1979. København, Meddelelser om Grønland, vol. 204, no. 6. 214 pp. 5 color and 28 black-and-white photos, 43 black-and-white figures, 1 table. Paper.—History has not been kind to Erik the Red; for nearly a thousand years he has been put down as the biggest con-man of the Dark Ages. Who else could have discovered an enormous ice-cap with a few bleak mountains creeping out under its edge and named it 'Greenland'? But the country *is* green, and nowhere more so than in the fjords behind Julianehåb and Frederikshåb, at its southwestern tip. It is a subarctic (as distinct from *low* arctic) oasis, the equivalent to the northern edge of the Eurasian taiga and our Hudsonian Zone. There are green meadows in the sheltered valleys and even little birch copses, the only trees in Greenland. Erik knew good sheep country when he saw it—it was a far cry from the hardscrabble croft he had left behind in the north of Iceland—and he settled there himself. The ruins of his settlement are there to this day.

Ornithologists paid surprisingly little attention to Erik's oasis until Finn Salomonsen went there on an expedition in the summer of 1971. His findings, published in this volume, amount to a one-man symposium on various aspects of bird life in subarctic Greenland, essential reading for anyone interested in arctic ornithology. He begins with a description of the climate and vegetation of the oasis, and it is disconcerting to learn that the plants are under considerable pressure from the Greenlanders' domestic animals—sheep, cattle, horses, and even yaks—something that probably started with Erik's Norsemen. I hope that Greenland authorities will take steps to minimize this because the birch, once lost, is unlikely to grow back. This unique habitat will degenerate into the bare, rolling plains to which sheep have reduced the landscapes of Iceland and Faeroe.

Salomonsen goes on to discuss the distributions of six birds, all of which he regards as recent immigrants from the European subarctic, most by way

of Iceland, and which are more or less confined to this corner of Greenland. One, the White-tailed Sea-Eagle, probably immigrated in the warm period ca. 5,000 years BP, and has spread a little way north up the coast. (I would guess that birds like the Greenland Mallards once followed the same route, but have spread even further.) The others are very recent indeed; the Horned Grebe bred for the first time in 1977, Black-headed Gulls ca. 1970, Northern Fulmars ca. 1945, and European Redwings perhaps in the 1940s, while the Fieldfares arrived as a flock of birds storm-driven from Scandinavia in 1937—an unusually well-documented case of accidental colonization. The inclusion of Fulmars on this list is bound to start a controversy, because the birds already breed in northern Greenland. I believe Salomonsen is right in regarding their colonization of southwest Greenland and, more recently, of Newfoundland as a westerly extension of the species' expansion in the eastern Atlantic, rather than a southward expansion from Baffin Bay. But it will be very hard to prove except, perhaps, by body measurements. Of the others, the status of the two thrushes is very precarious; their Greenland populations no longer migrate and were almost wiped out in the severe winter of 1966–1967. I wonder why there are no North American passerines on this list; the easterly storm tracks that dominate the North Atlantic ought to favor them over European species. American Robins, for example, breed as far north as ca. 58°N in Labrador and I have seen stray migrants well out to sea off that coast, yet there are only six records from Greenland (Salomonsen 1981. Grønlands Fauna. København, Gyldendal).

The next chapter deals with the ecology of arctic seabird colonies, but in a novel and very interesting way. Salomonsen's theme here is not the ecology of the birds themselves, but the effects that the birds' droppings have on the flora of the colonies. This is something that has long needed investigation, and Salomonsen reviews the little that is known about it. He describes the coprophytic flora of the colonies in the Frederikshåb area—the "*Caloplaca* arch" of orange lichens characteristic of seabird colonies, the enriched flora in the areas where the rain washes the guano off the cliffs, and the mounds of vegetation that build up at the observation posts in the territories of the large gulls. He shows how the nesting habits of the birds themselves influence this process; the massive guano deposits of densely colonial species like alcids and cormorants tend to kill off the vegetation, while the more modest efforts of the dispersed species enrich it. This affects the animal life as well, by supporting a rich coprozoan microfauna, of course, but also in less direct ways, since the seeds of the enriched vegetation are important to feeding Redpolls. Clearly, the things that birds leave behind and that ornithologists regard with disgust, if at all, are a very important source of nutrients in impoverished arctic soils. A fertile new field for research.

Salomonsen completes his account of the Frederikshåb district with a list of local bird names, an inventory of the seabird colonies, and an account of seabird migrations offshore. The last is based on Salomonsen's own notes made on ships travelling up the Greenland coast ever since his first visit there in 1926, and it is a pity that most of these have never been published. I was particularly interested in his observations of the swimming migration of Thick-billed Murres immediately after the young leave the colonies. The flightless chicks, each accompanied by a parent, set off on a journey that may be as much as 1,500 km long. I had thought that they took the easy path and moved with the prevailing currents, but Salomonsen shows (p. 186) that the swimming birds are quite capable of making headway against the current if they have to. We will have to revise our ideas about the routes they follow.

In his final chapter Salomonsen leaves the Julianehåb-Frederikshåb region and describes some observations made by himself and others a little farther north at a DEW-line station out on the ice-cap at 66°05'N, 47°06'W, just south of the Arctic Circle. He was hoping to observe migration across the ice-cap, but the results were meagre, although enough to indicate that at least part of the populations of several Greenland birds do make these crossings. Since then, a team from the University of Lund has been investigating these crossings in more detail, integrating direct observations with radar data. These results should be interesting.

Finn Salomonsen has been going to Greenland for over 50 years now, and he has recently said that his health will not permit another visit. The news will sadden his many friends in Greenland and elsewhere. In that time he has earned the Greenlandic nickname 'tingmiarsiôq'—'he who studies birds'—and this interesting and many-faceted volume shows us why.—R. G. B. BROWN.

Handbook of behavioral neurobiology, volume 3: social behavior and communication.—Peter Marler and J. G. Vandenbergh (Eds.). 1979. Plenum Press, New York and London. xv + 411 pp. Figures. \$39.50.—This is the third in a series that began with sensory integration and neuropsychology, differing from those in being a book on "neurobiology" that contains no neurobiology. It is instead a collection of materials on selected aspects of animal behavior.

Of the seven chapters, two can be passed briefly as holding little interest for ornithologists. Mason's chapter on the ontogeny of social behavior is a highly conceptual essay, the points of which are not tied to specific examples, and Adler's chapter on sex and aggression is overwhelmingly focused on mammals, largely laboratory rodents.

By contrast, the chapter by Steven Green and Peter

Marler on animal communication is an extensively documented review with several new ideas woven in. They begin with the production and reception of signals, especially dealing with their directional propagation in space and design features to combat noise. (I must complain about my name being rendered "Hartman" on pages 80 and 147, especially since after this book appeared I published with a coauthor whose name really is J. Hartman.) The second major section, which discusses transformations in communication, is the most original part. For example, a referent external to the animal about which it communicates is sensed by the sender and internally transformed into what Green and Marler call "assessments," which are in turn transformed into signal outputs, and so on. They have altered the semiotic term "arbitrary" to mean "cannot be described by a generalized transformation rule" (p. 97), whereas this term usually means that the rule relating signal to referent is not reflected in the signal structure (e.g. it is not obviously iconic or indexical, although the rule may still be quite general and semantically precise). The third major section discusses the genetics and development of communication, with emphasis on bird song, and following that a heterogeneous sequence of topics that relate to the three opening parts. The authors try to distinguish between indexical signals that point out external referents from "deictic" signals that point out the addressee of communication (p. 125). However, the indexed receiver is often an external referent in simultaneous communication with other receivers, so this distinction is neither logically clean nor practically applicable except when the signal system is fully understood. In conclusion, the authors attempt to identify "new directions" in the analysis of communication: how signals are internally selected to carry their information, the description of signal variations, and the perception and effects of signals on their receivers. These topics are not new, of course, but simply adaptations of C. W. Morris' semantics, syntactics, and pragmatics.

The chapter on spacing by Peter M. Waser and R. Haven Wiley is in many ways like the communication chapter in being a broad survey with new approaches, using extensive evidence from birds. Waser and Wiley have the further merit of striving for operationally defined concepts, as evidenced immediately in defining the "activity field" as the distribution on an animal's time in space. Its "isolation field" is the time spent by the animal in a given place as a fraction of time spent there by all conspecifics, and its "aggression field" is the spatial distribution of probabilities of attack and retreat. The first of four major sections is devoted to such operational descriptions of various patterns of spacing and the second to behavioral traits that give rise to the patterns, including a useful review of the roles of the sexes in

territorial defense in monogamous passerines. Basically they find that in male-only defense, intruders of both sexes are chased, whereas when both sexes defend, their roles correlate with dimorphism. Specifically, in sexually monomorphic species both sexes defend against all intruders, but in dimorphic species the male excludes intruding males and the female intruding females. The third section is on communication, with considerable attention given to the propagation of bird song in different habitats. I believe there is undue emphasis in this and similar discussions in the literature on the simple variable of how far different sounds carry in different habitats. Waser and Wiley only touch on the equally important problem of how the information-laden properties of sound are altered during transmission. (To be fair, though, it remains difficult to assess how information might be disturbed when we do not really understand well how it is encoded.) The last section tackles the knotty problem of the evolution of spacing, chiding both Lack and Wynne-Edwards for paying insufficient attention to differences in spacing patterns among species, thereby generating an oversimplified contrast between interindividual and interdem selection. In a comparative analysis using species of Old World monkeys, Waser and Wiley try to show how resources help dictate the optimum pattern of spacing. They admit in the end that we are still a long way from understanding spacing as an evolutionary adaptation.

The chapter by John R. Krebs, again bristling with evidence from birds, is a protracted defense of "optimality" models of foraging. The titular focus of the general idea of optimality is that when an animal faces a decision, such as which way to move immediately after obtaining a food item, it is sometimes possible to predict the best decision assuming that some critical variable (e.g. number of items found per unit time) is being maximized. Krebs first considers allocation of the forager's time in different places or activities, beginning with the notion of reinforcement probabilities in operant conditioning, and then introducing field realities such as the travel time between patches of high food density and the effects of group foraging. A second major section considers optimizing of search paths in foraging and, following that, the optimal choice of prey. Two issues in the former topic receiving special attention are the role of memory in modifying search paths and the optimal time to return to an area already searched, depending upon the rate at which the food sought there is renewed. Following these two sections some specific issues are reviewed. Krebs concludes that the weight of evidence favors the notion that animals make foraging decisions so as to maximize the rate of food intake. Whether they are optimizing higher-level considerations—say, the net gain in utilizable energy from food considering the

energy expended in foraging—remains an open question.

If from the several fine essays in this volume I had to single out one for special recommendation, it would be James F. Wittenberger's chapter on the evolution of mating systems in birds and mammals. His viewpoint is that of individual selection, in which he applies cost-benefit analysis to the options of both sexes separately in attempting to account for how ecological factors ultimately determine the mating system. The familiar categories of monogamy, polygyny, polyandry, and promiscuity are here, but Wittenberger usefully decomposes these for analysis. Each is further broken down by spatial subcategories, as in distinguishing between a male with several females nesting on his territory (territorial polygyny) and a male that defends a social group of females (harem polygyny). And all but promiscuity are also cross-classified temporally, as in distinguishing females that acquire several mates at the same time (simultaneous polyandry) from those having several mates in succession (successive polyandry).

The categories may be familiar but their order of presentation is not. Wittenberger begins with polygyny, usefully correcting an ambiguity in the now well known polygyny-threshold model of Orians (based on the work of his student Verner), and then extending the theory to account for the effects of modifying variables such as the spacing patterns of females. If the empirical evidence does not yet secure the polygyny-threshold model as a general truth, it certainly puts to rest the older notion that polygyny (at least in territorial birds) is the result of imbalanced sex ratios in which females predominate. Wittenberger's careful analysis will form the springboard for all subsequent studies. Polyandry, by contrast, remains largely a patent mystery. Wittenberger wisely emphasizes Jenni's distinction between those several species in which both sexes form multiple bonds of short duration (polygynous-polyandrous systems) on the one hand, and the very rare occurrence of true polyandry on the other (documented only for Spotted Sandpipers, Tasmanian Hens, and Jacanas). Promiscuity, by contrast, is so common in the animal kingdom that only ornithologists have felt the phenomenon in need of specific explanation. The reason for this ornithological quirk lies principally in the fact that parental care is so highly evolved in birds that promiscuity arises only when females cannot take advantage of male assistance in rearing the young. Of special note in this section is Wittenberger's strong argument that Wiley's hypothesis derived from grouse has cause and effect reversed. Wiley proposed that males delay breeding longer than females because they live longer, the risks of predation being unworthy of the advantage of early breeding. However, removal of older males shows that it is they that keep the younger

males from breeding. Wittenberger also discusses modifications of Lack's hypothesis to account for smaller clutch sizes in tropical birds, and tries to deal with the puzzling aspects of lek behavior.

Finally, Wittenberger comes to monogamy, which I think he is correct in implying to be the most evolutionarily derived system. He offers five hypotheses for the evolution of monogamy and finds reasonable evidence for the first four in reviewing monogamy among birds and mammals. Although Wittenberger does not, of course, succeed in devising a final integrated theory for the evolution of mating systems, he comes as close as anyone ever has. The incisive logic, tight organization, and exceptionally clear exposition make this chapter a paragon of scientific writing.

Sandra L. Vehrencamp's chapter on individual, kin, and group selection in the evolution of sociality is a sort of updating of E. O. Wilson's 1975 classic "Sociobiology" and includes what I consider to be many of the same problems. The "sociobiologists" insist on defining evolution as occurring "when the gene frequencies in a population or species change" (p. 351). However, evolutionary data are primarily changes in phenotypic frequencies, the genetic bases of which are almost never known, and behavioral phenotypes are often transmitted by traditions rather than genes. The slippery notion of fitness "is defined here as the rate at which (an individual's) genes are propagated *relative* to the genes of other individuals in the population" (p. 353, emphasis mine), without the "population" being defined. In any case, such relative fitness may be irrelevant in an expanding population in which all genotypes are growing absolutely. The practical difficulties of measuring gene-frequency changes are recognized, so fitness is operationally redefined as "relative production of offspring, relatives, and descendants" (p. 535); but how does one "produce" relatives that are not offspring or descendants? I remain uneasy about the circumscribed thinking and implicit assumptions of "sociobiologists," and despite the elegance of models, Vehrencamp's review shows that crucial data are still sparse. Perhaps the strongest section in this chapter is the evidence for evolutionary routes to eusociality in various animal groups, based on Michener's classification (which is attributed to E. O. Wilson).

In closing, I cannot help but observe that this volume reflects the "hot" topics of behavioral ecology— foraging tactics, mating systems, and evolution of sociality—with space given to some traditional ethological topics that have stayed strong (communication and territoriality). One would expect, though, that a handbook of "behavioral neurobiology" would emphasize perception, motivational and sequential analyses of behavioral dynamics, learning, and other topics where physiological connections are stronger. Perhaps these topics are adequately treated in the

preceding volumes. In any case, this book is a document of the present and one worth reading.—JACK P. HAILMAN.

The foundations of ethology.—Konrad Z. Lorenz. 1981. New York & Wien, Springer-Verlag. xvii + 380 pp. \$21.95. **Introduction to ethology.**—Klaus Immelmann. 1980. New York, Plenum. xii + 237 pp. \$22.50.—Since its modern beginning just a few decades ago, ethology has experienced dramatic growth. The stature of this young discipline was formally recognized not long ago (1973) when Konrad Lorenz shared the Nobel Prize for Physiology and Medicine with fellow ethologists Niko Tinbergen and Karl von Frisch. In "The foundations of ethology," Lorenz expresses his fear that many animal behaviorists are in danger of forgetting their historical roots when he compares ". . . the present state of our science to a coral colony whose branches, by losing contact with their foundation, are producing quite a lot of rubble." This harsh and for the most part unfounded criticism is really not unexpected and provides the author with sufficient reason to write what amounts to a defense of traditional ethological concepts.

Lorenz opens with a brief history of his early, formative thinking before dividing the book into three major parts: Methodology, Genetically Programmed Behavior, and Adaptive Modification of Behavior. Part one is primarily an iteration of his approach to the study of behavior. Lorenz does have some success setting biology apart philosophically and methodologically from the physical sciences. An attack on reductionism is followed by an interesting discussion of purposefulness in biology. His arguments would have benefited measurably from access to Ernst Mayr's recently published synthesis, "The growth of biological thought." But I wonder if Lorenz would have taken advantage of Mayr's work? Not far into his book, the reader will realize that Lorenz often fails to take into account experimental results or theoretical positions relevant (pro and con) to his own arguments. There may be a bit of truth in his surely facetious comment "I am, admittedly, not a well-read man . . ."

Next, Lorenz focuses on the importance of observation in the study of behavior and offers the reader a detailed commentary on the attributes of gestalt perception. Ornithologists can take particular satisfaction in his vigorous defense of amateurism. Lorenz writes that ". . . it is no accident that so many of the fundamental discoveries in ethology were made within the zoological class of birds. It is one of the greatest fallacies to think that the expression *scientia amabilis* has a derogatory connotation concerning the branch of knowledge being referred to." Recall Harold Mayfield's commentary on the contribution of amateurs to the field of ornithology (1979, Auk 96:

168). The first part closes with a defense of the comparative method and a reminder that ethology arose as a young discipline from systematics.

Part two provides detailed coverage of many of the first organizing principles and concepts of ethology, e.g. the fixed-action pattern, key stimuli, IRMs, action-specific potential. While readers should find Lorenz's discussion interesting if they can get by some difficult terminology, I was frequently frustrated by his failure to acknowledge the existence of so much that has transpired since these concepts were first formulated. For example, he comments that "... very little is known about the physiologic processes which achieve the function essential for the IRM, that of filtering stimuli." I found this hard to accept. Last year the well-known work of Hubel and Wiesel was formally honored with a Nobel Prize in Physiology and Medicine. Even a cursory look through a good introductory animal behavior text verifies how far the field has progressed in this respect. I would have appreciated more a re-evaluation of the concepts Lorenz was so instrumental in formulating in light of recent advances in neuroethology.

The third part consists of six chapters that contain the most original material to be found in the book. Lorenz examines different 'types' of learning from a cybernetic perspective and provides an interesting critique of traditional learning paradigms. Unfortunately, he seems to proceed as if progress toward understanding the biological basis of learning had moved only slightly beyond Thorpe's "Learning and instinct in animals."

In the Preface, Lorenz informs the reader that "... this book is not an up-to-date textbook on ethology." He is correct. What Lorenz does offer is a highly personalized review of the foundations of a young science and a vigorous defense of some of its original concepts. Therein lies the real value of this book and the only reason I would recommend reading it. All fields of science require an historical perspective from which to view their maturation. This book does contribute to the development of such a perspective for ethology.

While I would not expect a novice to understand, much less enjoy, Lorenz's book, Immelmann's "Introduction to ethology" is an attempt to simplify inquiry into ethology, presumably at the level of a first course in animal behavior. Unfortunately, the book does not fare well when compared with other textbooks trying to do the same thing. The book's principal weaknesses stem from its brevity. Ethology is a burgeoning field that ranges from neuroethology to sociobiology. It is no wonder that authors of introductory textbooks must make some compromises in coverage. Immelmann is no exception.

The author emphasizes the principles of early ethology throughout and does so in a clear and uncluttered style. However, it is just not possible to go much further in just over 200 pages of text without

telegraphing information. Immelmann is forced to simplify or virtually ignore relatively complex and often important subject matter as a consequence. For example, the treatment of behavioral genetics barely covers the classical work and fails to introduce molecular (single-gene) behavioral genetics. Likewise, the brief coverage of the development of behavior is dominated by the nature-nurture 'dichotomy.' I also wish that the author had gone beyond earlier work in the areas of temporal organization and neuroethology. The topic of learning does receive more detailed attention, while nearly a third of this short text is allocated to an overview of social behavior. Even here much of the material seems dated. For example, the treatment of territoriality fails to mention the microeconomic theory advanced some time ago by Jeram Brown (1964, *Wilson Bull.* 76: 160).

A few other observations may interest those who contemplate purchasing a copy or adopting the text for classroom use. Figures are understandably important components of an introductory behavior textbook. I found their quality to be mediocre by comparison with other introductory texts and was mildly surprised by the absence of photographs. Also absent are review or discussion questions at the end of each topic—questions that might be helpful as study aids—and a glossary of terms. Literature references are few, organized according to topic (chapter) at the end of the text, and amount to a recommended reading list. Most references are to books and represent a nice mix of classical and more recent publications. Erich Klinghammer must be acknowledged for an excellent translation of the text from the original German.

Immelmann's textbook is a reasonably complete introduction to the earlier concepts and principles of ethology. Yet it just does not go far enough nor does it convey the dynamic quality and intellectual excitement that characterizes the study of animal behavior. Students deserve a bit more from an introductory textbook.—FRANK R. MOORE.

Fool Hen: The Spruce Grouse on the Yellow Dog Plains.—William L. Robinson. 1980. Madison, Wisconsin and London, England. University of Wisconsin Press. xviii + 221 pp. Illustrated by Deann De La Ronde Wilde. 15 figures, 25 tables, 12 photos (5 in color). \$18.50.—As ornithology becomes increasingly specialized, the gap between intelligent amateur and professional has widened. The gap is narrowed disarmingly in this sound monograph on *Canachites canadensis*, known to woodsmen as the Fool Hen.

In Chapter I, Robinson sides with his mentor, L. L. Short, a lumper. I lean the other way. In Chapter II, when he comes to his own field work on the Yellow Dog Plains, the book hits its pace. Much of the literature (bibliography: 174 titles) on related woodland grouse skilfully supplements his intensive re-

search, starting in 1965, on a 25-mi² area in Michigan. Annual cycle, habitat, food, behavior, growth, plumages, physiology, diseases, predation, ecology, annual replacement, and hunting are covered—as well as Robinson's dedicated philosophy with which I concur! The informal style, punctuated with wit, will keep birders, hunters, and outdoorsmen learning painlessly. For example, "For the first day or two the chicks' feeding efficiency is low, as they learn to discriminate ants from gravel, and black flies from their toenails."

"The Spruce Grouse, it appears, is unusual among birds. The male defends one territory and the female defends another." Individuals vary in their ability to hold territories. Almost all the adults, strong birds as well as weak, and a high proportion of the chicks were color-banded each year. Resightings are carefully evaluated.

Among the 10 species of North American grouse, the Spruce Grouse places (surprisingly) third in numbers shot. Its range in the northern coniferous forests is vast. It is in no danger of extinction, but it may need help where economic interests conflict in the southern part of its range. Where hunted, it soon learns to become a wary game bird. Robinson stresses habitat and recommends opening a limited hunting season in Michigan—sensible approaches difficult for the tender-hearted to grasp. It is often mistaken for Ruffed Grouse by hunters. The meat is delicious.

Barring a few minor faults, this is a well-designed book. The dust jacket is stunning, with a photograph of a Spruce Grouse. Keep it to protect the white, soft-napped cover that collects dirt. Many of the photographs are substandard. This is amazing, as the Fool Hen is so trusting that banders can pull it out of a tree with a noose on the end of a pole. Wilde is to be congratulated on her pen-and-ink drawings.

Writing for the professional and the public simultaneously is not easy. William Sheldon brought it off so smoothly in *The Book of the American Woodcock* (University of Massachusetts Press, 1967), that it took me years to recognize the extent of his scientific contribution. *Fool Hen: the Spruce Grouse on the Yellow Dog Plains* similarly gives full measure of scientific content attractively presented to the public. We need more books of this genre.—FRANCES HAMERSTROM.

Development of behavior in the Golden Eagle.—

David H. Ellis. 1979. —Wildlife Monographs No. 70. The Wildlife Society, 5410 Grosvenor Lane, Bethesda, Maryland 20814. 94 pp. Paper. \$3.15.—Shades of Seton Gordon! I first became aware of eagle studies through the works of this doughty Scotsman who stalked the then rare Golden Eagle in the Scottish highlands. His was primarily a photographic study with commentary on the day-to-day life of this bird.

David Ellis has a quite different approach to the study of this same species—only in North America, more specifically, in Montana. As a student of wildlife management—the basic materials for this study were presented for a doctorate in 1973—he had the goal of quantifying the many behavioral acts (ethons) of the developing Golden Eaglet.

Ellis's study covered the years 1970 to 1973 and involved 150 days spent watching nests. He entered a blind shortly before midnight and left about an hour and a half after sunset. In the blind he had binoculars, spotting scope, cameras (35 mm with telephoto lenses and super-8 movie) and an electronic device for recording behavioral activities (106 of the 150 days of observations were recorded using this device). An immense amount of data was collected which was partially summed up in this account by 82 photographs (of excellent quality), 5 drawings, 4 diagrams, and 104 graphs.

The study's primary goal was to quantify observations of each of the behavioral activities. Eighty-two ethons are described (I did not count this many; 52 are included in figure 71 and 48 are in the glossary). Oddly, some comments are made about behavioral acts of adults largely in the vicinity of the nest (referred to throughout the paper by the term eyrie). The observations are based on seven eaglets, but primarily on four—Whitey II, Blackey II, Bludgeon, and Wooley. Occasionally Blackey II is omitted and reference sometimes included George, Whitey I, and Blackey I.

The account begins with discussion of some basic problems such as identification of individuals (young were marked), disturbance of adults by the observer, general developmental patterns of feathering, and weight. In the case of weight change Ellis is quite concerned about "wild condition" but gets the same curve as for eaglets raised in the lab. He was aware of the sporadic eating habits of large young, again an observation from eagles raised in the lab (where food was presented periodically or available if wanted). He talks about dermestids in the nest but says nothing about fly larvae in the ears. One of the eaglets was ill early but recovered and left the nest (Wooley).

The behavior ethons are arranged under a number of headings: postures, look behavior, vocalizations, sleep behavior, etc. There is every effort to appear "scientific," but much of the material is descriptive. As an example of sophistry (p. 26) he states, speaking of the position of the body of the female during feeding (what has this to do with the development of behavior in the golden eagle?), "The orientation of the long axis of the adult's body (as approximated by the orientation of the axis of the wing) also changed with time. When the eaglets were very small (age = 9–19 [days]), the adult leaned forward so that her wing tips were raised 10° above the horizon (n = 10)." But enough of that.

Generally, I was able to recognize most of the ethons from my own experience and, in general, feel that Ellis has done an excellent job here. As usual for such accounts, I had the greatest difficulty with vocalizations (small recordings should be included). The 'cheep' and 'chitter' (my terms) of the small young were easy, but sounds like his "Pssa," "Skonk," and "Wonk" just did not jog my memory.

The section on ontogeny of behavior involves a large number of simple graphs showing the frequency and "strength" of the ethons over the course of their development. Seemingly out of place here is the "chronology of events" of hatching. Brooding and shading are discussed under ontogeny but not incubation. The first two grade into each other and serve different purposes.

Figures 66-70 are attempts to generalize about the ontogenetic changes of ethons. I am not sure that these are very meaningful. Figure 68 is the most important. In it Ellis has produced a number of lines that summarize all of his categories: natal ethons, cyclic ethons that drop to zero, ephemeral ethons (rise quickly to importance then disappear), adult ethons with ephemeral peaks (stretch actions appear more frequently in large young, but continue in adults), cyclic ethons that do not drop to zero, and adult ethons that, once achieved, remain constant.

The work is summarized in 185 words, the largest paragraph of which deals with the refutation of M. M. Nice's ideas about stages. Ellis found only a continuum in eagle development, as I am sure is the case for Song Sparrows too.

Although this is a good contribution to the study of bird behavior, we would wish for some comparative study. Most of the ethons described are typical of many, if not most, birds. I'm not sure that any of them are restricted to Golden Eagles. Lack of a comparative approach results in overlooking such questions as Does the wing shake precede or follow the tail shake?, or Where does the head shake fit in? The literature cited is rather scanty (72 papers); some of the citations, in terms of good taste, should have been left out. In the text, several theses with interesting remarks are cited but these are not included in the literature cited. It seems that these relatively rich thesis sources are underemployed. Although some of the spade work is done with this study, much generalizing about bird behavior still remains. I respond to this report with a human ethon, the questioning wry-grin-head-shake!—MALCOLM JOLLIE.

The birds of Manitoulin Island and adjacent islands within Manitoulin District. 2nd edition, revised.—John C. Nicholson. 1981. (Available from the author, 863 -6 Prete St., Sudbury, Ontario, Canada P3E 3X9). ix + 205 pp., Paper, \$8.00 + postage (Can).—This useful book, revised from Nicholson's original 1972 edition, is primarily intended for bird

enthusiasts in the immediate vicinity of Manitoulin Island, Ontario, the largest freshwater island in the world. More than just a list of species, it provides a fascinating introductory essay entitled, "A Testament to Birdwatching," an artfully stated rationale that will satisfy anyone who has asked him/herself or who has been asked, "Why watch birds?" This essay should be required reading for anyone embarking on the hobby of birdwatching and for those more experienced who feel the occasional need to refresh their mental vigor about their hobby.

The text details the social and ornithological history of the Manitoulin District. Two hundred and ninety-five species are given phylogenetic annotation with useful, defined relative abundance and frequency ratings that are too often omitted from such works. The species accounts remind me of the fine Bent-style volumes, complete with historical and current status and, for some species, important behavior characteristics useful in identification. There is a brief list of 25 references, most of which are directly related to the ornithology of the District. The 3-page index of English bird names is adequate and the fold-out map of Manitoulin Island and adjacent islands on the last page makes it possible to locate species and place names mentioned in the text. The book is illustrated with black-and-white sketches of birds by Kenneth Baldrige and Christopher G. Blomme. I found it enigmatic that illustrations of such species as the Burrowing Owl and Scissor-tailed Flycatcher occurred in the text and a color painting of three White Pelicans made up the front cover. These species are not common to the Manitoulin District and cannot be considered representative of the area. The text is single-spaced prestige elite type, which those without perfect vision may find rather small and tiring to read. The size of the book (21.5 × 17 cm) renders it unsuitable as a pocket guide and I doubt that the binding will survive much use, especially in the field. Numerous pages loosened from my copy before I had finished reading it.

Despite these pitfalls, the book should find a place on birdwatchers' shelves and vehicle dashboards because it is the only single publication available that considers the wide variety of avifauna from this very interesting and important region for birds in Canada.—JOHN P. RYDER.

Beached marine birds and mammals of the North American west coast: a manual for their census and identification.—David G. Ainley, Gary W. Page, Lisa T. Jones, Lynne E. Stenzel, and Ronald L. LeValley. 1980. Washington, D.C., U.S. Government Printing Office. vii + 207 pp., 37 fig. + 38 pl. Paper, \$4.75.—Periodic censuses of ocean beaches for seabird and marine mammal carcasses provide useful information about seasonal patterns of occurrence as well as evidence of the effects of disasters such as epidemics

or oil spills. At the initial organizational meeting of the Pacific Seabird Group in 1973 a working committee on beached bird censuses was formed: this manual is the final report of that committee. The bulk of the book is concerned with identification, with census methods relegated to fewer than five pages. The manual covers about 160 bird and 40 mammal species that occur in marine habitats from the Bering Strait to the tip of Baja California.

A brief introduction discussing census methods precedes the two major sections dealing with bird and mammal identification. The section on birds begins with an illustrated description of measurements used, followed by an illustrated glossary. The glossary allows volunteers without technical training or previous experience with marine birds to conduct beach censuses. Terms such as underwing, upperwing, compressed, subterminal, and down are defined. A series of keys occupies the main body of the section on birds. The first four (separated by size) classify birds to groups that are treated in separate keys. These latter keys cover loons, grebes, albatrosses, petrels (*Procellariidae* and *Hydrobatidae*), boobies, cormorants, waterfowl, shorebirds, skuas and jaegers, gulls, terns and skimmers, and alcids. Five species (White Pelican, Brown Pelican, Magnificent Frigatebird, Red-billed Tropicbird, American Coot) are identified in the initial keys and do not appear in the group keys. The keys are followed by life-sized drawings of the heads of most of the birds, and of representative feet showing various arrangements of webbing and lobes. The section on birds ends with brief species accounts describing ranges, seasonality, rarity, additional characters for identification, requests that rare species be taken to museums, and a bibliography of 29 titles. The section on marine mammals is organized similarly, except that the description of measurements and the glossary are merged, and all species are treated in a single key. The mammal bibliography (41 titles) is followed by a brief list of agencies to notify of marine mammal strandings.

Most seabirds, shorebirds, waterfowl, and mammals occurring in the region's marine habitats are covered, but a number of the casual or accidental species are excluded. Eurasian species straying to Alaska are less likely to be included than southern or eastern birds straying to California. Several species of waterfowl that occur in the region but primarily in freshwater or upland habitats (e.g. Ring-necked Duck, Hooded Merganser, Hudsonian Godwit, Buff-breasted and Solitary sandpipers) are omitted. Several of the Eurasian species omitted (Common Pochard, Wood Sandpiper, Polynesian Tattler, Ruff) are far more regular than some species included on the basis of southern records (Lesser Black-backed Gull, Little Gull, White-rumped Sandpiper). The river otter, which regularly invades marine habitats at least from Washington to south-central Alaska, is the most

obvious omission from the mammal key. The birds and mammals are keyed at least to species level in all but five cases (female and immature goldeneyes, female Blue-winged and Cinnamon teal, dowitchers, murre chicks, beaked whales).

For many species of birds and pinnipeds sex and age distinctions are included mainly where species identification is affected: where confusion is unlikely sexual distinctions usually are not given.

Most of the keys seem to be accurate and useful, but errors and inadequacies exist. In the first key (very large birds) gulls are separated by a wing measurement less than 474 mm, but Glaucous Gulls with longer wings are known (perhaps not from the Pacific?). In Key to Petrels the phrase "but if close to 33 mm then" appears to be transposed from choice 3' to choice 3. In the first couplet of Key to Waterfowl, swans and white geese are separated from all other waterfowl by white coloration and primary notching: the phrase (choice 1') "coloration largely brown or gray with a little white here or there" purports to describe all ducks and the darker geese. Drakes of several species (e.g. Common Mergansers, Buffleheads, Common Eiders, Black Scoters) hardly fit this description. At couplet 17 in Key to Marine Mammals all baleen whales other than right whales (including rorquals) are labeled "gray whales."

The Key to Gulls is the greatest disappointment in the book. The key's arrangement defies description. To identify several of the black-headed gulls it is necessary to travel both forward and backward in the key (couplet 12 can be reached only from couplet 22 but couplet 15 can be reached from couplet 5 or couplet 25). The key contains numerous errors and inconsistencies, and in many places the criteria used for separation of species are inadequate or simply wrong. Adult Slaty-backed Gulls (choice 28) are described as having a wing length greater than 420 mm, while first-year birds of the same species (choice 48') supposedly have wings less than 410 mm! The reference number is missing at choice 27 (apparently it should be 28). The characters used to separate various age-classes of Glaucous-winged and Thayer's gulls seem inadequate without reference to measurements. Some subadult plumages of several species (e.g. Slaty-backed Gull, Black-legged Kittiwake) are omitted without comment, implying that these plumages do not provide identification problems. Young Black-legged Kittiwakes with pale feet and legs are occasionally seen on the Pacific coast; what would such birds be called?

Both plates and figures consist of line drawings with typed and/or freehand captions and labels. I could find no basis in content, format, or method of reproduction for distinguishing these. The drawings are simple and attractive, and in most cases seem quite accurate. The Common Eider (pl. 17 no. 2) lacks frontal lobes and the Bar-tailed Godwit (pl. 23 no. 4) is illustrated with a longer bill than the Marbled

Godwit (are the labels switched?). I am intrigued by the fact that the dark-bellied shearwaters on Plate 6 all are shown with one more mandibular plate than the light-bellied ones. Does this character really differ between Buller's and Wedge-tailed shearwaters, and even between Pink-footed and Flesh-footed shearwaters?

The entire book, especially the Key to Gulls, would have benefited from more careful editing for content and typographical errors. Even so, the manual should be very useful to anyone encountering specimens of marine mammals or birds in western North America. The shorebird key in particular may be useful in museum work as well. The Key to Gulls should be used with great caution, if at all. The book would have been more useful in the field if it had been more sturdily produced, preferably with waterproof paper and covers: it would dissolve in a month of my use doing bird censuses on the Oregon Coast in winter.—WAYNE HOFFMAN.

Canadian Wildlife Service translations: (i) **The seabirds of Greenland** (F. Salomonsen 1967), and (ii) **Seabird resources of the Barents Sea** (M. Norderhaug, E. Brun, and G. U. Møllen 1977).—R. G. B. Brown, Translator. Dartmouth, Nova Scotia, Canadian Wildlife Service Mimeos, 133 and 103 pp.—In a translating tour de force, Dick Brown has made some important material available to English-reading marine ornithologists. He translated the seabird chapters from Salomonsen's (1967) *Fuglene på Grønland* (Copenhagen, Rhodos) from Danish and Norderhaug et al.'s (1977) *Barentshavets sjofuglessurser* (Oslo, Norsk Polarinstittut, Meddelelser Nr. 104) from Norwegian. Salomonsen argues strongly for legislation to restrict hunting at breeding areas, and as Brown indicates in the Translator's Introduction, these circumstances have been legislatively rectified via Salomonsen's influence and input. Brown points out some avifaunal changes that have been documented since 1967 in Greenland and includes a very useful list of selected references. Norderhaug et al.'s work is a comprehensive situation report intended for nonbiologist planners and contains valuable seabird and oceanographic information from a region where gaps in such knowledge are striking.

Salomonsen's work focuses on species' movements (inferred from banding data), nesting patterns, occurrence records, and descriptions that often lucidly detail flight behavior. Band recoveries are used to delineate carefully the spatial and temporal integrity during migration and dispersal of many different conspecific breeding populations and age classes. Many interesting findings emerge. Black-browed Albatrosses (*Diomedea melanophrys*) have been recorded several times in Greenland. A major proportion of young Northern Fulmars (*Fulmarus glacialis*) migrate to Newfoundland and Labrador. Two fulmar

subspecies, *glacialis* and *auduboni*, occur, the former (almost all dark morphs) on the northeast coast, the latter (almost all white morphs) on the west coast. Brown included some more recent (Salomonsen 1974, 1979) fulmar distribution maps that reveal Salomonsen's contention that recently arrived fulmar breeders in southwest Greenland and in Newfoundland and Labrador have immigrated from rapidly expanding boreal populations in the eastern Atlantic and not from more stable high arctic populations. Bill measurements and plumage morph data differentiate subspecies and can be used to verify or refute this contention; the plumage data seem to support it. Norderhaug et al. report that two fulmars banded in Norway have been recovered in Newfoundland and Labrador. These authors, however, refer to the boreal-zone fulmars of the eastern Atlantic as the *auduboni* rather than the *glacialis* subspecies.

Both works show that young European and Greenland fulmars and Black-legged Kittiwakes (*Rissa tridactyla*) winter on the Newfoundland Grand Banks, which Fisher and Tuck have referred to as a "nursery" for these seabirds. Greater Shearwaters (*Puffinus gravis*) are common transequatorial summer visitors to the Davis Strait off western Greenland; Sooty (*P. griseus*) and Manx Shearwaters (*P. puffinus*) were collectively recorded only three times. Although not breeding in Greenland, Leach's Storm-Petrels (*Oceanodroma leucorhoa*) are regular summer visitors off the west coast, where young gannets (*Morus bassanus*) occur occasionally. Banding recoveries indicate that younger kittiwakes forage farther from colonies; Salomonsen suggests that intraspecific competition may force them to peripheral areas, although it also seems possible that distant areas may be richer in prey abundance/availability and that younger, perhaps less efficient, foragers do better by making the long trip. Foraging ranges retract during the chick period (July), and it is suggested that this is caused by demands the young place on parents; it seems feasible that prey may move closer to land at this time. Most nesting kittiwakes tend to forage within 75 km of the colony—apparently shorter distances than found (c. 160 km) for British nesters by Coulson. A distinct geographic separation of the foraging ranges of kittiwakes and Arctic Terns (*Sterna paradisaea*) is revealed and interpreted as an outcome of interspecific competition for food. A few colonies of Sabine's Gulls (*Xema sabini*) are recorded in high arctic regions of Greenland, and they also "undoubtedly" nest in "as yet undiscovered breeding places" (p. 81). Ross' Gull (*Rhodostethia rosea*) is recorded nesting at Ikamiut in 1995 (1885?); Brown notes that they are now known to nest in at least two sites.

Arctic Terns show remarkable colony- and nest-site tenacity; findings very similar to Austin's earlier results with Common Terns (*Sterna hirundo*). The percentage of banded older Arctics (18–20 yr) shot increases compared with younger birds (7–14 yr; Fig.

10); Salomonsen interprets this as due to decreased vigilance among older birds; other explanation(s) involving physiological conditions also seem feasible. Greak Auks (*Pinguinus impennis*) are reported to have bred in southeast Greenland in the 16th century, and in fall/early winter young auks from Newfoundland migrated to waters of southwest Greenland. Owing to massive numbers (millions), the large harvest (estimated at 7% of the birds at Thule) of Dovekies (*Plautus alle*) taken at the breeding area by native peoples is considered to have no effect on the species population. Most Dovekies captured are immatures, strongly implicating that older ones learn to avoid being netted. It is suggested that Thule Dovekies winter off Newfoundland, while those from Spitsbergen winter off western Greenland. Dovekies exhibit strong nesting-area tenacity. Many Greenland Thick-billed Murres (*Uria lomvia*) and Atlantic Puffins (*Fratercula arctica*) also winter in Newfoundland waters, a time when many Thick-bills from Lancaster Sound (Cape Hay), Spitsbergen, Norway, Russia, and Novaya Zemlya move to southwestern Greenland.

Salomonsen estimated that hunters may take 750,000 Thick-bills per year, many being killed illegally at colonies. Older murres seem to winter farther out to sea and are therefore less subject to hunting pressure than. Since 1967 these birds have suffered drastic mortality associated with drownings in gill-nets, a situation counteracted with new fishing regulations. The Greenland translation ends informatively with some updated distribution maps from more recent Salomonsen (1974, 1979) publications. The weakest aspect of the Greenland mimeo shows up in figure reproductions, some of which, such as the small Fig. 12 (p. 108), are difficult to understand; reference to original figures may be useful to readers using this translation. This drawback is minor in weight of information provided.

Just before publication of the Barents Sea report, Einor Brun was killed in a private plane crash, and a brief overview of his professional contributions appears at the beginning of the paper. In comparison to Salomonsen, Norderhaug et al. take a more ecological perspective and begin with an informative chapter on the oceanography and marine environment of the Barents Sea and North Atlantic. Copepods, especially *Calanus finmarchicus*, are the primary food of local marine vertebrates, and the euphasiid *Thysanoessa inermis* is also a large biomass component. Seabirds also rely on crustacean amphipods, such as *Gammarus*, which inhabit littoral and ice-edge regions. Polar cod are the most important fish for seabirds, and capelin, cod, haddock, herring, and sand-lance are also important. Norderhaug et al. interestingly consider anseriformes and shorebirds—groups that owing to littoral distributions are usually not included in seabird distribution studies. A survey of marine bird colonies is presented in four geographic sections: Svalbard region, Franz Josef

Land, Novaya Zemlya, and northern Norway (and Kola Peninsula). Summaries include locations, species compositions, and sizes. Distribution maps are large and clear.

Fulmars have continued to expand ranges northwards on the Norwegian coast, and storm-petrels (*Hydrobates pelagica*, *Oceanodroma leucorhoa*) have breeding limits in northern Norway (Røst). Gannets have recently (1960, 1967) established two new colonies at Skittenskarvholmén and Skarvklakken; the former consisted of 83 breeding pairs in 1970, the latter of 145 in 1974. It is suggested (with no details) that fledgling Dovekies may swim from nesting areas even though capable of flight. In view of the vulnerability of birds on the water to oil slicks, this suggestion is worthy of further documentation and study. Large concentrations of Thick-billed Murres can be found in the Barents Sea in winter, although many Norwegian murres winter off southwest Greenland (as also indicated by Salomonsen).

Norderhaug et al. conclude with a section on population changes, which explains the drastic consequences of increases in adult as contrasted with egg chick mortality: a 10% increment in the former would need to be offset by a doubling of production to maintain current population levels. They also emphasize that owing to average lower annual production and extreme weather fluctuations, arctic seabird populations may be significantly more vulnerable to stress and mortality factors than those in more temperate ocean environments, where most information about oil pollution effects has been gathered. Weather and bird concentrations, especially water-bound molting adults and flightless fledglings, probably also lead to greater hazards of oil spills in the Arctic. Small oil spills can produce severe effects, and strict legislation regulating bilge flushing at sea are needed. The authors contend that there may be greater success in large colonies due to social stimulation and anti-predator adaptation, but do not mention that the food information available to individuals may be greater. As in Greenland, Newfoundland, and elsewhere, fishing activity (long-lines, gill-nets) is a serious source of seabird mortality. Population trends include: (i) in the past 30 yr fulmars, gannets, and Great Cormorants and Green Shags (*Phalacrocorax aristotelis*) have expanded northward; (ii) kittiwake and puffin populations appear to have maintained fairly stable levels over 15 yr; and (iii) Thick-billed and Common Murres (*Uria aalge*) and Razorbills (*Alca torda*) numbers declined steadily from 1964 to 1975—rates of decrease for Common Murres and Razorbills are estimated at 5 and 2.6% per annum. Populations of more littoral species (Razorbills, murres) are declining as those of pelagic birds expand and increase. The increase of pelagic species is related to (i) increased food availability via offal from fishing trawlers; (ii) their tendency to feed near the water's surface, making them less likely to be entrapped in

fishing gear; and (iii) lower vulnerability to hunters as compared with inshore birds. Alcid decreases are also related to long periods of swimming that increase vulnerability to surface oil. The Barents Sea report is much bulkier, although 20 pages shorter than the Greenland work, because single-sided page reproduction is used in it.

In the Author's Introduction, Salomonsen credits Brown with a careful and painstaking work, a platitude well-deserved for both translations. These two works contain much important information heretofore inaccessible to most readers, and are a must for marine ornithologists interested in North Atlantic seabirds. Their relatively inexpensive reproduction method should make them easily available to those who want them; many should. It is essential material for libraries and marine ornithologists that wish to remain informed.—W. A. MONTEVECCHI.

Arctic summer—Birds in North Norway.—Richard Vaughan. 1979. Shrewsbury, England, Anthony Nelson Ltd. 152 pp., 104 photographs. £6.25.—An important point about a book is its title. For the reader it will be natural to associate "Birds in North Norway" with a wide scope of bird species and habitats, such as the characteristic bird cliffs that are an essential element. In addition, "Arctic Summer" suggests real Arctic habitats, viz. Spitzbergen or other arctic areas.

Well, this book starts with a map telling us that the Arctic area concerned is eastern Finnmark in North Norway. And we soon understand that the topic area is limited to the Varanger Peninsula, i.e. a fragment of a rather peripheral part of the Arctic.

After this criticism the author should be given honor for his entertaining way of writing. It is evident that he has the faculty of telling about landscapes, birds, and people. In his 5 weeks in Varanger he was the whole time exceptionally lucky with the weather conditions. The help given by local ornithologists, particularly by one of them, must have been extremely valuable, both in the fieldwork and as a source of knowledge about a lot of previous observations of birds in this area.

The author is a passionate and well-known bird photographer and some of his (few) color shots are very good. However, we should have been glad to see more pictures of certain species. I particularly feel the want of many more photographs and descriptions from Syltefjord, which is the only bird cliff of any size that the author visited. Only two black-and-white photographs from this majestic and extremely interesting bird habitat are given. Just here the author had his best chance to reward the reader for travelling with him into an Arctic summer.

This "Arctic" book contains habitats such as woodland and hayfields with their birds, which are not exactly typical for the Arctic. The Varanger Pen-

insula suggests ornithological adventures and birds of fell and bog. The author has taken advantage of this in watching and photographing several waders of interest in this area.

I know that local ornithologists are concerned about the author's minute descriptions of the breeding localities of some rare bird species. Since the end of the 1960's an increasing problem has developed in large areas of North Norway (as well as in certain other areas farther south). This concerns the increasing number of bird watchers from Scandinavia as well as many other countries visiting these areas for photographing birds. In this connection, experience tells us that among such "tourists" there may be many with little knowledge of the consequences of disturbing breeding birds, as well as some taking not the slightest account of the birds when photographing them. In 1974 and later, direct robbing of eggs has occurred as a result of increasing publicity for the Finnmark area as a land for bird watchers.

The author tells us that the earlier publications about this area and its birds have been scattered and fragmentary. And he adds that in this book he "has been able to present the most detailed description of this remote area and of its bird life to date." However, the real background for the lack of such descriptions is (seen with Norwegian eyes) that many of us will not publish too many details about the rarest birds and, in this way, invite more bird-interested tourists to visit such special areas.

About 60% of the pages in this book consist of photographs; the text is not comprehensive. It is entertaining, although with no new ornithological data. A complete systematic list of nine pages gives a survey of the bird fauna on the Varanger Peninsula. This material has been mainly picked up from the existing literature, partly with the help of a local ornithologist. Finally, a literature list can help future readers and investigators. However, a rather important contribution by H. Larsen ("Fauna" 1971) is not mentioned. The book may be useful for personal and community libraries.—EDVARD K. BARTH.

Birds of the Great Plains—Breeding species and their distribution.—Paul A. Johnsgard. 1979. Lincoln, Nebraska, University of Nebraska Press. xviii + 539 pp., with numerous line drawings and tables, maps, 30 color plates, and over 300 species distribution maps. \$25.00.—This book has a very appealing format, is easy to read, and the illustrative material is well printed. Most of the color plates are good to satisfactory; several, in my opinion, are excellent. In contrast, many of the line drawings are disproportionate, often due to lack of perspective [e.g. the Yellow-billed Cuckoo (p. 187) has an oversized head and bill, and the tail is too short; the same applies to the Ruby-throated Hummingbird (p. 218); even worse are the proportions of the Red-eyed Vireo (p. 373) or Sprague's Pipit (p. 357) standing on gigantic feet].

A 22-page introductory chapter describes the geology, topography, and vegetation of that portion of the Great Plains that the author chose to treat (roughly a rectangular column including the states of North and South Dakota, Nebraska, and portions of Kansas, Oklahoma, Minnesota, Iowa, Texas, New Mexico and Colorado). This chapter also contains the scientifically most important section of the book: the statistical-descriptive treatment (including distribution maps) of the ornithogeography of this region. A series of shortcomings are apparent in this chapter. None of the distribution maps has a scale, and the same kind of dotted line is used to depict both state boundaries and the limits of the Great Plains region, making it somewhat confusing to distinguish either (especially to a nongeographer or non-North American). A map of the United States and Canada, depicting the extent of the grassland climax vegetation and the boundaries of the author's "sample" area, would have been appropriate. Actually, such a map is presented in Johnsgard's 1978 paper, "The ornithogeography of the Great Plains states," (*The Prairie Naturalist* 10: 97). Much of this paper is almost identical with the pertinent pages of this book.

While the book is centered around the distribution maps, it is also embellished with information about the breeding biology of species compiled from extant sources, with concluding chapters discussing "A guide to bird-watching localities in the Great Plains" (Appendix A) and another about abundance and breeding status of birds at selected parks and refuges in the Great Plains (Appendix B). In this latter list, abundance information is given on a 5-category scale, but the categories ("abundant," "common," etc.) are not defined and thus are of little use. I don't blame the author for the misleading statement on the jacket: "Emphasizing breeding status, or abundance, and distribution . . ." for I know by experience that authors usually have nothing to do with jacket summaries, and it may shock them as much as it shocks the reader. Yet this list gives the only information about abundance except when a species is described as "scarce" or an "accidental" breeder in the area. Johnsgard uses another way of conveying information about scarcity of occurrence: in some cases (I counted 18 of the over 300 distribution maps having this symbol), a dotted line denotes "sporadic or peripheral breeding area," as shown on his "sample hypothetical distribution map" (Fig. 7). This map serves to explain the symbols used throughout the maps in the book. The area of breeding occurrence—I presume, for he does not state it—is divided into two halves: "usual breeding-season range," and "usual residential range." A trained ornithologist guesses that the latter refers to an area where the species is a year-around resident or, in other words, its population there is not migratory. There is no explanation given in either the legend or the text, however. To add to this confusion, in the species

maps four kinds of hatchings are used for what ought to be one kind of "range" ("usual residential"). Did these symbols mean different types of "residence" in Johnsgard's original maps, or did sloppy draftsmanship go undetected? As to the accuracy of the distribution maps, I have checked samples, comparing them with recent state monographs, and the result of these checks was satisfactory. The heavy lines outlining breeding areas obviously connect marginal breeding records from the literature and thus could be criticized as inaccurate; however, such maps are common in the publications of the last 30 years in zoogeography, and they have the merit of spurring interest of local field workers to gather and publish new records correcting the inadequacies. Let us rather have gross distribution maps than no distribution maps!

The text information is presented under seven headings for each species. The first of these is breeding status, mainly describing with words what the map shows. "Breeds in suitable habitats," "infrequent breeding south of the Platte," "breeds locally," and the like are the terms conveying something about abundance to a person thoroughly familiar with the area and knowing what the suitable habitats are. In many cases the author does not seem to know it either, for in the next heading, "breeding habitat," he is relying on habitat information borrowed (often verbatim) from Robert Stewart's "Breeding birds of North Dakota" (1975). Thus the Eastern Bluebird in Stewart (p. 208) "is a forest edge species that occurs in areas where open woodland is interspersed with or adjacent to grazed or mowed grasslands. Natural habitats of this type are found along the margins of floodplains and upland deciduous forest. Corresponding habitats created by man occur commonly in residential areas and parks of towns and cities, on farmsteads, and along shelterbelts." The corresponding paragraph in Johnsgard (p. 346) reads: "The species frequents open deciduous woods, especially where interspersed with or adjacent to grasslands. Upland and floodplain forest edges, city parks and gardens, shelterbelts and farmsteads are all commonly used." (My emphasis added to both quotations.) Similar parallels characterize the habitat descriptions for other species such as Brown Thrasher or Yellow-headed Blackbird.

Nest location, clutch size, and time of breeding are treated in the next headings. The information, gathered from the literature, is scanty, but this is not the author's fault (unless the Cornell nest record files contain unutilized information?). Certainly it seems to me that the published literature is well covered, and the scantiness of the breeding data (e.g. clutch size and breeding dates *by latitude*) points to a very neglected area that should be covered by professional and amateur field workers. Johnsgard's "Great Plains" area would be ideal for this purpose, for we learn from this book that the topography slopes gently

from west to east, with essentially uninterrupted grassland habitats from north to south. Unfortunately, this book makes no attempt to point out the gaps in knowledge or the opportunities to fill them in.

The best feature of the species accounts is the "breeding biology" paragraph, in which Johnsgard skillfully assembles interesting and pertinent information about behavioral and other aspects of the summer ecology of the species treated. Yet the overall balance of these species accounts is, in my opinion, negative. The "breeding status" item is too restrictive. Here is a book in the hands of an interested person: why not give him the information about the worldwide, continentwide, etc. range of the species? In particular, why do the species accounts not state clearly the avifaunistic status and phenology of the species; i.e. if migratory, when does it arrive and leave the area, at least state by state; if nonmigratory, does it wander away after breeding? I do not blame the author of this book alone: such information is not assembled, to my knowledge, except for the species treated in the "Handbook of North American birds" and in Bellrose's version of Kortright's "Ducks, geese, and swans of North America."

Johnsgard also misses the opportunity to delve into the relationship of prairie birds with their habitats, especially their ability to adapt to man-made prairie (i.e. farmland) habitats. Even with so little natural grassland remaining, bird species characteristic of this habitat often evenly cover the Great Plains states in their breeding distribution (according to Johnsgard's maps). This point seems crucial to present to the interested reader.

Having now pointed out a series of shortcomings I am uncertain whom this neatly compiled mass of information benefits. I have a feeling, putting the book down, that it is a sort of a "guide," though not called so. Yet it cannot serve as a guide for its lack of nonbreeding birds: the other half of the avifauna (winter visitants, passage visitors, etc.) is missing! Its price, in 1980, seemed quite high, yet libraries ought to buy it for the value of the assembled references (species by species) and data. This book has been referred to as a "super-state" bird book centering on Johnsgard's home state of Nebraska. But, curiously, Nebraska is hardly mentioned in the species accounts. In spite of being Johnsgard's home base, the state seems to be unknown as far as breeding biology is concerned. I hope that this review and the "nice" book together stimulate Great Plains field workers to get on with a project of breeding bird atlas as well as with phenological observations, to fill the gaps of knowledge that became apparent upon leafing through this book.—MIKLOS D. F. UDVARDY.

Theoretical ecology: Principles and applications.—Robert M. May (Ed.). 1981 (Second edition).

Sunderland, Massachusetts, Sinauer Associates. ix + 489 pp. Cloth \$42.75, paper \$23.95.—Over the past 20 years, students of bird life have contributed substantially to the growth and development of ecological and biogeographical theory: Lack, MacArthur, Cody, Diamond, Grant, Orians, Ricklefs, Terborgh, and many others have enriched and enlivened the field. It is no accident that birds have proven a fertile source of ideas and data in ecology—they share our own habitats, operate on a spatial and temporal scale commensurate with our own, and are reasonably easy to observe. These blessings, however, carry with them the danger of creating ornithocentric theory. The natural histories of schistosomes, stemborers, mites, diatoms, dandelions, redwoods, and elephants present a variety of real dilemmas for the ecological theory of 10 years ago.

The first edition of Robert May's "Theoretical ecology," which appeared in 1976, attempted conscientiously to expand the domain and the value of the field by (1) assessment of the generality of ecological models, freeing them, where possible, from biologically parochial assumptions (chapters by May and E. R. Pianka); (2) presentation of contributions from emerging areas of ecological theory and related endeavors (life history patterns [T. R. E. Southwood], arthropod predator-prey systems [M. P. Hassell], plant-herbivore systems [G. Caughley], succession theory [H. S. Horn], sociobiology [E. O. Wilson], palaeobiology [S. J. Gould]); and (3) integration of ecological theory with human concerns (the design of natural reserves [J. M. Diamond and May], medical parasitology [J. E. Cohen], pest organisms [G. Conway]).

I have used the first edition as a text (along with other sources) in my advanced course in community ecology ever since the book first appeared. What it covered was covered well, for the most part, but it lacked integration (always a difficult challenge in an edited volume of papers), several chapters were short on the "real-world" examples that motivate the understanding of theory by nontheorists, plants were sorely neglected, and some of the "special" chapters seemed altogether *too* special.

I am delighted to report that the second edition has very largely overcome each of these difficulties. The book is well-balanced, much more thoroughly integrated, and very usefully expanded (the text is almost 50% longer). Two entirely new chapters have been added: an excellent one on populations of plants and other "modular" organisms, by J. L. Harper, and a very accessible treatment of resource economics by C. W. Clark. J. H. Lawton has joined Caughley in an expanded chapter on plant-herbivore systems. The chapter on sociobiology by Wilson has been replaced by a much more appropriate one (same title) by H. S. Horn, and Cohen's treatment of schistosomiasis has been replaced by an excellent introduction to population models of infectious disease agents by R.

M. Anderson. Every chapter held over from the first edition has been revised and brought up to date, some more thoroughly than others (Southwood's chapter on bionomic strategies and Pianka's on niche theory could have used more work). The references section comprises more than 1,000 entries, making the book a most useful scholarly source. There is an excellent index, and I found only two typographical errors in the entire book.

There are several growing points in ecological theory that might have been included or received more extensive treatment in the book: coevolution, especially of mutualistic interactions (there is currently much work on pollination and seed dispersal systems); the relations between ecology and breeding systems in plants and animals; and foraging theory. However, I am sympathetic with the problem of staking out practical boundaries for a very broad field, and these suggestions no doubt reflect my own tastes just as the book reflects May's.

Ornithologists committed to an understanding of the role of birds in biological communities will welcome this book as an up-to-date, readable account of contemporary ecological theory, both in its pure form and as applied to both natural and human-altered systems. The chapters on bionomic strategies, plant-herbivore systems, niche theory, multi-species communities, biogeography, and disease agents all contain material specifically dealing with birds. Though there are many equations in some of the chapters, not a single one need necessarily be understood mathematically to grasp the important points in the text, and in any case none requires knowledge of mathematics any more arcane than calculus.

It is most heartening to see the degree to which ecological principles and models have contributed to the understanding (and sometimes to the solution) of practical problems, from the control of crop pests and human parasites to the conservation of endangered species. The antitheoretical sentiment and field-boot chauvinism that appear from time to time among professional biologists will henceforth reveal a cultivated ignorance of the current state of the field of theoretical ecology, which has earned its place as a viable and valuable discipline.—ROBERT K. COLWELL.

Estuary birds of Britain and Ireland.—A. J. Prater. 1981. Calton, England, T. & R. Poyser. 440 pp., many maps, tables, 16 black-and-white photographs. No price given.—Estuaries and their associated mudflats and salt marshes are highly productive regions, supportive of vast numbers of migratory birds. They are also commercially valuable, thus their rapid rate of disappearance in industrialized countries. To quantify the ornithological values of British estuaries was the goal of the "Birds of Estuaries Enquiry," started in 1969 and still on-going. This book reports the results from 1969–1975.

The introductory two chapters are contributed by R. J. O'Connor. The first is an essay on estuarine ecology and considers physical and chemical conditions as well as the common plants and animals of British estuaries. If you have wondered why estuaries are so productive, or why *Spartina* marshes are not good shorebird habitat, start here. The second chapter, drawing mainly on extensive work in Europe in the past decade, is a fine review of patterns of shorebird foraging behavior.

Several other introductory chapters deal with migration patterns, "threats" to specific estuaries, and the population sizes of estuarine species throughout western Europe. The latter data are essential to interpreting the importance of specific British sites on a national or international basis. The methodology of the censuses and their potential accuracy are treated in detail.

The middle third of the book is devoted to a detailed examination of individual estuaries, the species each contains, its relative importance, and potential problems. The final third contains information on individual species. Included is information on distribution and abundance (with maps and graphs), migration patterns, probable source areas and wintering grounds, habitats, and comparative data from other areas of Europe. The surveys were conducted long enough that population trends can be analyzed. The treatment here is balanced, objective, and insightful. Most declines, as we have come to accept, can be traced to pollution, destruction of critical habitats, overharvesting, etc. But for some species (Common Goldeneye, Greater Scaup) they are due to the *clean-up* of the polluted areas (e.g. sewage outfalls) that these species prefer. The marked decrease of the Knot is paralleled by a similar decrease in Brant, and probably results from "increasing frequency of bad breeding seasons" in the central Canadian Arctic. In the latter instance, data on source areas and migration patterns are crucial to a correct interpretation. They illustrate that trends in migratory species cannot be understood from data gathered at any one locality but must incorporate data from the entire range.

This book is a mine of information. The section dealing with the specifics of estuaries will be of great value to British biologists and governmental officials, who sooner or later must draft some national scheme for preservation. To most ornithologists the book's greatest value lies in the species accounts, which can be read with profit by anyone dealing with waterfowl or shorebirds. But its most important contribution may be demonstrating that a long-term, systematic study of critical habitats is feasible and extremely valuable. The result is truly impressive, and I commend the authors for a superb job.

With this book we gain an appreciation of estuaries. Transient landforms, formed at the interface of land and sea, they are inevitably lost eventually to sedimentation and succession. To think that they can

be preserved unchanged is a Canutian illusion. To live, estuaries must change, and the geological processes that formed them must be allowed to create anew.—J. R. JEHL, JR.

ALSO RECEIVED

African handbook of birds.—C. W. Mackworth-Praed and C. H. B. Grant. **Series 1, Birds of eastern and north eastern Africa. Vol. 1.** 1957 (1980). xxxiv + 836 pp., 53 color plates, 6 black-and-white photographic plates. \$75.00; **Series 1, Birds of eastern and north eastern Africa. Vol. 2.** 1960 (1980). xi + 1,113 pp., 96 color plates, 19 black-and-white photographic plates. \$75.00; **Series 2, Birds of the southern third of Africa. Vol. 1.** 1962 (1981). xxvi + 688 pp., 38 color plates, 11 black-and-white photographic plates. \$75.00; **Series 2, Birds of the southern third of Africa. Vol. 2.** 1963 (1981). x + 747 pp., 76 color plates, 20 black-and-white photographic plates. \$75.00. London and New York, Longman.—These volumes are reprintings of the editions in the Mackworth-Praed and Grant handbook that appeared between 1957 and 1963, which have long been out of print. The original text and illustrations are reprinted without change, but short biographical notes on each of the authors have been added to each volume, and the two volumes of Series 1 each contain maps of Africa showing political subdivisions at the end of World War II and in 1979. Each species account provides information on the systematics, distinguishing characteristics, general distribution, distribution in the area covered by the volume, behavioral features, nest and eggs, recorded breeding times, foods, and calls; for most species, marginal range maps and black-and-white sketches are also given. The accounts for each family contain a general synopsis of the group in the region covered by the volume and a key to adults of the species. The quality of the illustrations varies considerably, from rather washed and faded (Series 1, Vol. 1) to clear, bright, and well-composed (Series 2).

Although none of these volumes incorporates any new information about the systematics, ecology, behavior, or distribution of African birds, they represent a fundamental reference work on the African avifauna. Those who work in the regions covered by these volumes or who have interests in African birds will welcome the reappearance of these volumes despite the absence of any revision. Unfortunately, the steep price will probably prevent the volumes from being widely available in Africa, where they might possibly do the most good. [The two volumes of Series 1 were originally reviewed in *The Auk* in 1955 (72: 307) and 1956 (73: 297); the second editions of these volumes, and the two volumes of Series 2, were apparently not reviewed in *The Auk*.]—J.A.W.

Suggested practices for raptor protection on power lines: the state of the art in 1981.—Richard R. Olen-

dorff, A. Dean Miller and Robert N. Lehman. 1981. Raptor Research Report No. 4., xiii + 111 pp. \$5.00 (available from Raptor Research Foundation, c/o Dept. of Veterinary Biology, University of Minnesota, St. Paul, Minnesota 55101).—This publication is the result of a successful liaison between ornithologists, government agencies, and the electrical power industry. It describes how to reduce electrocutions and other accidents that kill raptors, largely eagles, perching on high-voltage transmission lines. There is a bibliography and an extensive documentation of the magnitude of the problem. Technical guidelines for modifying transmission structures will be of most use to power-company engineers, but ornithologists should be aware of this publication so they can refer engineers to it if they discover a local problem with bird electrocutions that should be corrected.—STANLEY A. TEMPLE.

Birds of Oak Hammock Marsh Wildlife Management Area.—Kenneth A. Gardner. 1981. Published with assistance from the Manitoba Department of Natural Resources, Winnipeg. 172 pp., 3 maps, 16 pages of color photos, 4 black-and-white photos. (Order from Manitoba Museum of Man and Nature, Gift Shop, 190 Rupert Ave., Winnipeg, Manitoba R3B ON2) \$10.50 (Canadian currency).—Restoration of the marsh complex now known as the Oak Hammock Marsh Wildlife Management Area was undertaken in 1967. By 1974, the project encompassed 3,500 acres of restored marsh and 5,000 acres of upland habitat. Records of bird species occurrence before restoration (1935–1972) and following restoration (1974–1979) are compared. The data provided serve as further documentation of the extent to which avian species will accept managed wetlands. Transect surveys conducted in 1972 and 1974 show the significant change that occurred in species diversity (58 species in 1972; 78 in 1974) and the abundance of individuals (3,300 in 1972; 6,874 in 1974). This volume will be useful to persons interested in wetland preservation and enhancement.—W.E.S.

Pheasants in Asia 1979. Proceedings of the First International Symposium on Pheasants in Asia, Kathmandu, Nepal, 21–23 November 1979.—C. Savage, (Ed.). 1980. The World Pheasant Association, Harraton Square, Church Lane, Exning, Suffolk CB8 7HA, England. 116 pp. \$17.00.—Twenty-eight brief papers are included in this proceedings. Seven papers are devoted to the status of pheasants in Nepal, Pakistan, Malaysia, Indonesia, the Himalayas, eastern India, and Thailand; four deal with field study techniques; nine discuss a range of topics pertaining to captive breeding; and the remainder are devoted to conservation and management. A new subspecies of *Tragopan coboti* is proposed (*T. c. gungxiensis*) by Cheng Tso-Hsin. Papers contained in

this volume will be of primary interest to that select group of persons actively involved in captive-rearing of pheasants or in pheasant conservation in Asia.—W.E.S.

Birding areas in Iowa.—Peter C. Petersen, (Ed.). 1979. Iowa Ornithologists' Union, Cedar Rapids, IA. 151 pp., 37 maps, 11 illustrations. \$4.50 plus 50¢ postage (order from Mrs. Pat Layton, Librarian, 1560 Linmar Dr., Cedar Rapids, IA 52402).—This is a useful directory of recommended birding locations organized by regions within Iowa. Locality and species indices assist in selecting sites. Several authors contributed to this edited compilation and style and content varies accordingly. In most instances, useful maps are provided but a few are of marginal value (e.g. Marion County map on page 52). The A.B.A. Checklist was followed for common names listed in the index, but nomenclature and spelling used in some sections are not consistent with the index.

Putting together information of this type for an entire state is a colossal task. Without question the book will be a useful aid to Iowa birders during their travels. The guide apparently was prepared to assist the novice birder, but it should prove useful to anyone conducting field work in Iowa.

It is unfortunate that none of the authors attempted to alert the novice or experienced birder to the fact that their activities can have a disruptive effect on some species. A word of caution to Bald Eagle watchers and photographers along the Mississippi River, for example, would have been appropriate.—W.E.S.

The bird-watcher's dictionary.—Peter Weaver. 1981. Vermillion, South Dakota, Buteo Books (distributor). Calton, England, T. & A. D. Poyser (publisher). 155 pp., many drawings. \$17.50 hardbound.—The stated aim of this book is to "assemble in one place definitions of those terms and phrases which are most likely to be encountered by bird-watchers in Britain." Its format is, as the title implies, that of an alphabetical presentation of succinct definitions, with well-done drawings interspersed. Although the book is aimed at birdwatchers in Britain, it contains a fair amount of vernacular language that may be of interest to North American birders (e.g. "wader" as construed in Europe vs. North America; "twitching" as the search for rare species, especially lifers). In addition, an appendix compares British, North American, and scientific names for species common to both areas of the world. As a reference for Birds-of-the-World classes, this dictionary could provide some colorful insights into European terminology. The \$17.50 price tag seems a bit high.—LINDA KINKEL SOUTHERN.

Proceedings of the first Welder Wildlife Foundation symposium.—D. Lynn Drawe, (Ed.). 1979. Sin-

ton, Texas, Welder Wildlife Foundation. 276 pp., figures, drawings, some black-and-white prints.—This volume overviews 22 years of wildlife research conducted at or sponsored by the Welder Wildlife Foundation in south Texas. Its four main sections are Range and Plant Ecology, Deer Ecology, Avian Ecology (seven papers), and Miscellaneous Papers. The quality of papers varies as widely as the topics. For those interested in south Texas ecology, this book deserves close examination. Large blocks of a few pages are printed very lightly, but can still be read.—L.K.S.

The evolution of culture in animals.—John Tyler Bonner. 1980. Princeton, New Jersey, Princeton University Press. ix + 216 pp., illus. \$14.50.—Stimulated by a conference that considered the relation of biological evolutionary theory to social science, John Bonner has written a little book that traces the origins of human cultural capacity back into early biological evolution. Ethologists will find little that is new in the book, and although examples from birds are numerous they are treated in cursory fashion, so little of interest to bird behaviorists is included. Those further afield, however, should find the book enjoyable reading.

Culture, which is defined as the transfer of information from one individual to another by behavioral means through the processes of teaching and learning, clearly is a function of the brain. The evolution of the brain is traced up through the animal kingdom to show how one information machine, the genome, could have spawned another, the brain, through natural selection. Bonner then states that "It is only by making a clear distinction between genetical and cultural change that we shall ever be able to understand the causes and mechanisms of change in any organism capable of both cultural and genetical evolution."

Bonner's principal conclusion, conveniently stated early in the book, is that "Even though culture itself does not involve genetic inheritance, or therefore Darwinian evolution by natural selection, the ability of any animal to have culture is a direct product of such an evolutionary mechanism."

The format of the book deserves comment. The shape is weird (6 inches high, 9 inches long) and a left-hand margin of almost 3 inches seems wasteful.—GLEN E. WOOLFENDEN.

Birds of Tarrant County, Second edition.—Warren M. Pulich. 1979. Fort Worth, Texas, Branch-Smith, Inc. xii + 188 pages, pen-and-ink illustrations by Anne Marie Pulich. Paper, no price given.—Tarrant County is located in northcentral Texas, and includes metropolitan Fort Worth and surrounding areas. Warren Pulich has updated his earlier (1961) documentation of the occurrences of birds in this county, providing as well some information on habitat,

breeding, abundance, overall distribution, subspecies, and so on. A useful chart summarizes the seasonal occurrence of each of the 324 species of birds that has been recorded in the county. Although it is of extremely limited scope, this compilation should be useful to birders in northern Texas.—J.A.W.

Das große Buch vom Vogelzug.—Kai Curry-Lindahl. 1982. Berlin/Hamburg, Paul Parey. 210 pages, 40 color plates, 57 diagrams, 19 tables. 89,- DM.—This is a German-language edition of "Fåglar över Land och Hav" (Birds over land and sea), published in Sweden in 1975. It deals with bird migration, emphasizing movement patterns rather than the underlying mechanisms of navigation and the like. As I observed in noting the Swedish edition (1978, *Auk* 95: 627), an English translation would have considerable appeal. (The Swedish version was 33 pages longer than this German translation; German is apparently a more economical language.)—J.A.W.

Birds in medieval manuscripts.—Brunsdon Yapp. 1981. London, The British Library. 190 pp., 48 color plates, 60 black-and-white figures. £9.50.—Over a period of nearly a thousand years prior to the 16th century, books were inscribed by hand. Generally, these followed religious themes, and the inscriptions and the illustrations that accompanied them were often profuse and detailed. Birds appear as decorative figures rather frequently in such manuscripts, and Yapp's book is a critical evaluation of their role in most of the illuminated medieval manuscripts existing in English libraries. Yapp examined over 400 manuscripts, most of them directly, and develops his evaluation on the basis of 187 of these. The color plates, which are the highlight of the book, are from 41 manuscripts spanning the period from 698, when such work first began to appear, until 1482, when the quality and quantity of hand-illuminated manuscripts had begun to decline with the introduction of printing.

Yapp discusses the birds that appear in these manuscripts in the context of their presumed distribution at the time the manuscripts were produced. By combining this information with assessments of the accuracy of drawing and the details of behavior and posturing, he assesses the degree to which the drawings may have been based upon direct experience with living birds versus simply copied from previous manuscripts. Thus, the depiction of a crane engaged in "bill-clattering" display in a 13th century manuscript is taken as clear evidence that the illustrator had direct experience with the species, as "this display is unlikely to be forgotten by anyone who has seen it, or to be invented by anyone who has not." Many of the drawings shown in the plates are remarkably good and are probably derived from first-hand experience, while some are clearly poor copies or fabrications. Apart from the dove and eagle, which

appear frequently in a symbolic role (the Holy Ghost and St. John, respectively), the crane is the most commonly depicted bird, while the European Goldfinch is the small bird most often portrayed (perhaps because of its long history as a cage bird in England and Europe).

This is a splendidly produced, scholarly treatment of an engaging topic. The plates alone are worth the price of the book, especially if one desires a comfortable introduction to pre-Renaissance views of birds.—J. A. W.

The pet bird handbook.—Patricia Sutherland. 1981. New York, Arco Publishing, Inc. x + 149 pp. 4 color plates and 58 black-and-white photographs. \$13.95.—This is a "how to" book meant to guide the novice bird-fancier in the selection, care, feeding, taming, and training of a single pet bird. The book accomplishes this objective and might well be read by the beginners considering their first birds.

Chapter one, approximately one-fourth of the book, discusses the selection of a bird and species common in the pet trade. This chapter should be adequate to guide the astute consumer through the array of bird species commercially available and also offers tips on the selection of a healthy bird and recognition of a reputable and knowledgeable merchant. Chapter one's honesty should discourage some would-be bird fanciers from actually acquiring pets. Some mention is made of a handful of granivorous, nectivorous, frugivorous and omnivorous species in the first chapter, but the psittaciformes receive the majority of coverage throughout the book.

Sutherland assumes that a bird will be given its freedom daily within the home, and therefore she spends approximately half of the book describing the methodology and routine necessary to tame and train parrot-like species properly. Here the book is limited in scope for the owners of non-parrot-like species.

Three chapters, less than one-third of the book, deal with bird behavior and care, feeding, and hygiene. These chapters outline basic but sound procedures for the maintenance of a healthy bird and suggest solutions to problems likely to be faced by bird owners.

The author frequently refers the reader to a suggested readings section consisting of 14 books and six periodicals. Despite the book's intended audience, I doubt the usefulness of at least 20 of the 58 black-and-white photographs presented, some of which occupy an entire page.—DANIEL R. LUDWIG.

Annotated checklist of Maine birds.—Peter D. Vickery. 1978. Published by the author and the Maine Audubon Society (order from Maine Audubon Society, 118 Route One, Gilsland Farm, Falmouth, Maine 04105). 20 pp. \$1.95. **Enjoying Maine birds: An aid to finding, studying, and attracting birds in Maine.**—(Sixth Printing, Revised Edition).—Richard B. An-

derson and Irving Richardson (Eds.). Falmouth, Maine, Maine Audubon Society. 80 pp., numerous black-and-white illustrations. \$1.95 plus 35¢ postage.—The expressed purpose of each of these booklets is to provide information to Maine visitors and residents who have less than a professional interest in birds. To this end, both publications are potentially useful. Vickery's checklist is mainly a species list showing monthly levels of abundance (abundant, common, uncommon, rare but regular, very rare, and irregular) and gross habitat type(s) preferred by each species. A list of accidental and hypothetical species is also provided. The 393 species recorded in Maine as of 1978 are included in the checklist.

Vickery's checklist is a natural accompaniment for "Enjoying Maine birds" which was originally edited in 1960 by O. S. Pettingill, Jr. The latter work provides a brief discussion of the habits and breeding biology of 80 familiar Maine birds, with a black-and-white sketch for each species synopsis. The remainder of this small book is devoted to short sections on bird identification skills, outstanding places for bird-watching (14 Maine locations), a field checklist, information about migration, attracting birds, and several other topics. Both of these small paperbound books may prove useful to the amateur ornithologist beginning field work in Maine.—W. E. S.

Aves de la Republica Dominicana.—Annabelle Stockton de Dod. 1978. Santo Domingo, National Museum of Natural History. Text in Spanish. 332 pp. Black-and-white illustrations by Laura Rathe de Cambiaso, 14 color plates by José Osorio. No price given.—Forty-six years after publication of Wetmore and Swale's "Birds of Haiti and the Dominican Republic," the first avifaunistic account of the latter country has been written. The author, a native of California, has lived in the Dominican Republic since 1964. Mrs. Dod holds a degree in natural history and considers herself an amateur ornithologist and orchideologist. This monograph represents a compilation of 133 species accounts that have appeared in weekly supplements of the Dominican newspaper *El Caribe*. Each account includes an accurate drawing and description of the species, a range map, and descriptions of worldwide distribution, breeding behavior, and economic importance. Pertinent information relating to a variety of topics (e.g. evolution, natural history, public awareness of and attitudes toward a particular species, common names, origin of the scientific name) is also included in each account. Some species accounts are extended to briefly mention related but rare species. The discussions of behavior and anecdotal accounts of what the *campesinos* think or observe about their avifauna are especially interesting. Ninety-five species are depicted on color plates, which are well executed and aid in identification although some of the more vivid colors

are slightly exaggerated in the review copy. Mrs. Dod has made several important faunistic discoveries, many of which have been published by James Bond in his "Supplements to the 'Check-list of birds of the West Indies' 1956." The first detailed account of these observations is reported here (e.g. the discovery of *Turdus swalesi* on Hispaniola, the finding of a nest of *Loxia leucoptera*). The birds of eastern Hispaniola are not well known. This fact and the need for additional research are pointed out by the author. In general, I found the text to be concise and well written. Mrs. Dod should be commended for this valuable effort, which serves as an example for other foreign residents of third-world countries who likewise could use their fascinating "hobby" for the edification of the general public in bird lore and protection.—MIKLOS D. F. UDVARDY.

Handbook of the birds of India and Pakistan.—Salim Ali and S. Dillon Ripley. 1981. Volume 3 (2nd edition). New York, Oxford University Press. xvi + 327 pp., 12 color plates, maps, line drawings. \$33.00.—This is the second edition of volume 3 of the Ali-Ripley handbook series, covering stone curlews through owls. The format and coverage are as in the first edition (see Auk 89: 207, 1972), although the information on the distribution, behavior, food, and measurements of many species has been updated; five species not included in the first edition are considered in an appendix. The keys that are provided to genera and to species and subspecies within genera rely primarily upon measurements of characters of specimens. The following information (when available) is provided on each species or subspecies: systematics; local names; size (length); field characters (sometimes accompanied by a sketch or a color illustration); status, distribution, and habitat (sometimes with a general range map); migration; general habits; food (little detail); voice and calls (no sonograms); breeding; museum diagnosis (generally only literature references); measurements (wing, tail, bill, tarsus); bare part colors; and miscellaneous notes. The 12 color plates, which are quite nice, illustrate 99 species. The bibliography is slim.—J. A. W.

A glimpse into the sparkling world of our lovely hummingbirds.—Paul W. Bohn, Sr., with Mary Douglas. 1982. Rutland, Vermont, Academy Press. 32 pp., numerous color illustrations. \$17.95 (limited edition).—The pages of this small book are enhanced by the photography and prose of the author, who at the age of 79 developed a fascination for hummingbirds and photography. The antics and beauty of hummingbirds that provided therapy for Mr. Bohn are molded into a type of fairy tale that may appeal to persons in their first or second childhood. The work is presented as a vehicle for communicating the author's enthusiasm for natural phenomena and it is

not intended as a scientific treatise on humming-birds.—W. E. S.

A biographical dictionary of Rocky Mountain naturalists.—Joseph and Nesta Dunn Ewan. 1981. Boston, Dr. W. Junk, Publishers. 253 pp. \$37.50.—In 1682, La Salle appropriated from France that country east of what is now referred to as the Rocky Mountains and south of the claims of the Hudson Bay Company. This set the stage for exploration of the vast region and eventually natural history collections and descriptive writings. The authors have compiled an exhaustive guide to the writings and collections of botanists, zoologists, geologists, artists, and photographers for the period 1682–1932. The 1950 version of this work contained a roster of 798 names. Additions and corrections have been made and the current volume has been extended by about one-third. Although considerable new material was added, the authors held to the original closing date of 1932 for practical reasons. The compilation of biographical information will prove valuable to investigators requiring sources of historical information for this part of the nation.—W. E. S.

Bird of the week.—Jim Flegg. 1981. London, British Broadcasting Corporation. 111 pp., black-and-white line drawings by Robert Gillmor. Paper, £3.25.—This book contains a series of 52 short essays on common British birds, drawn from the BBC Natural History broadcasts of Jim Flegg. They are entertaining and lively vignettes, well-written, and they convey a real feeling for the birds as living organisms. Each also notes some interesting aspect of the biology or behavior of the species. Thus, for example, we learn of the importance of Wrens in leading to bird protection laws, of brood reduction in Tawny Owls, of how the oldest Swift may have flown over

4,000,000 miles during its lifetime, of the relation of Red Grouse populations to heather management, of how Arctic Terns probably see more hours of daylight per year than any other organism, of how one of the first signs of old age in a bird-watcher is an inability to hear the song of the Goldcrest, and so on. Each essay is accompanied by one of Robert Gillmor's characteristically fine and sensitive line drawings. The main appeal of this book will be to British and Europeans, to whom most of these species are familiar, but others could learn a lot from it at a modest cost, and be entertained in the process.—J. A. W.

Bibliographia ornithologica hungarica.—J. Papp and Zs. Réthy. 1981. Békéscsaba, Hungary, Békés County Edition. 657 pp. No price given.—This monumental undertaking includes over 13,000 citations of books, papers, and articles relating to ornithological research in Hungary during the last two centuries. This important publication includes a name and subject index, an English introduction, and German translation of Hungarian titles.—M. D. F. U.

Catalogue of the oological collection of the Museum in Oradea.—Thomas L. Béczy. 1981. Criş-Rivers Regional Museum, Oradea. 225 pp. No price given.—This collection contains 3,573 sets of 659 species from throughout the world. It is a remnant of a much larger collection of the Hungarian oologist L. Dobay (1873–1943) who lived in the vicinity of Oradea (now in Rumania). The catalogue is printed in English and includes data on locality and collecting date (mainly from the 1890s to the 1930s) of over 100 clutches of North American bird species that may be of interest to the taxonomist or egg-shell morphologist. The collection also contains material from what is now Soviet Asia (collected in the 1910s) and from Brazil.—M.D.F.U.