

REVIEWS

EDITED BY M. ROSS LEIN AND BRUCE M. BEEHLER

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 AOU.—Eds.

A Monograph of Endangered Parrots.—Tony Silva. 1989. Pickering, Ontario, Canada, Silvio Mattacchione and Co. xviii + 356 pp., 26 color plates, 15 b&w drawings, 51 range maps, 1 text figure. ISBN 0-9692640-4-6. Remarque edition (24 copies), \$2,000; collector's edition (200 copies), \$1,000; subscriber's edition (2,000 copies), \$125.—This large-format monograph treats, with few exceptions, all the parrot species listed as endangered worldwide in Appendix 1 of CITES (Convention on International Trade in Endangered Species) or in the Red Data Book of the IUCN (International Union for Conservation of Nature and Natural Resources). The perspective is largely personal and that of an aviculturist (the author is Curator of Birds at the Loro Parque aviaries in Tenerife), but Silva also attempts with some success to integrate avicultural information with information available from the relatively few field biological studies that have been conducted on endangered psittacines. Of necessity, much of the information is anecdotal and amounts to little more than second-hand opinions of unknown validity from persons with some experience with the species in captivity or in the wild. This is not so much a criticism of this book, as it is a criticism of the relative neglect with which parrots have been regarded by serious ornithologists. The stigma these birds have suffered, perhaps a result of their prominence as cage birds, is regrettable, as they are among the most intriguing of wild birds. As a group they include more endangered forms than just about any other major avian family.

The book is divided into 16 chapters. The first four treat pressures on parrot populations, reintroduction, husbandry, and hand-rearing. The last 12 treat major groups of endangered parrots. Chapter 1 is focused on Brazil and its loss of habitats through various economic and political factors, and includes general comments on pressures from the pet trade. Chapter 2 presents a relatively negative assessment of the potentials of reintroduction as a conservation technique. However, very few reintroductions have been attempted to date, and the potentials of this technique have hardly been tested. Chapter 3 presents details on husbandry methods for parrots. It touches on the problems of disease, but gives little flavor of the seriousness of the disease problems that plague many captive-breeding efforts. Chapter 4, on hand-rearing, extols the virtues of hand-reared birds for aviculture, but does not discuss the deficiencies of hand-reared birds for reintroduction into wild environments—

something we have found to be of overriding importance in attempting to reestablish Thick-billed Parrots (*Rhynchopsitta pachyrhyncha*) in Arizona.

The chapters on parrot groups are divided into Lories and Lorikeets; Fig Parrots; *Psephotus* and *Neophe-ma* Parrots; *Pezoporus*, *Geopsittacus*, and *Strigops* Parrots; *Cyanoramphus* Parakeets; *Eunymphicus* Parakeets; *Coracopsis* Parrots; African Parrots; *Psittacula* Parakeets; Macaws, Conures, and *Rhynchopsitta* Parrots; Parrotlets; and *Amazona* Parrots. Each species is treated in detail, including sections on alternative names, etymology, physical description, distribution, habitat, status, general notes, feeding, nesting, eggs, calls, flight, aviary notes, and conservation measures. The individual species accounts vary greatly in comprehensiveness, mostly as a function of varying quality of source materials. To his credit Silva has attempted to observe a large fraction of the species in the field, and he offers interesting personal experiences and previously unpublished personal communications from other observers that significantly expand existing information on some species.

The 51 endangered species (or subspecies) treated range from the incredible flightless Kakapo (*Strigops habroptilus*) of New Zealand, the only known lekking parrot, to various macaws and amazon parrots of the New World. These species represent a substantial fraction of the more than 330 species of psittacines recognized worldwide by Forshaw, and the number of threatened species is growing with extreme rapidity. Not considered are the many species that are already extinct (for example, probably more than half the original psittacines of the West Indies).

The pressures on parrots from mankind are diverse and severe. They range from habitat destruction and direct hunting for food to persecution as crop pests and exploitation for the pet trade and aviculture. As a group, parrots tend to be especially vulnerable to such stresses because of their gregarious and noisy habits, and their tendency to nest in hollow trees. Even if gross habitat destruction is not a major stress factor for all species, the process of harvest for the pet trade often involves permanent destruction of nest sites and progressive impoverishment of habitats.

As an aviculturist, Silva confronts the inherent tensions between aviculture and conservation with much more candor than many previous authors in his field. Clearly the extravagant prices paid by aviculturists and other parrot fanciers for some of the rarer forms

have been the major source of stress on their remnant wild populations, leading even to extinction in the wild for some forms, such as Spix's Macaw (*Cyanopsitta spixii*). The Hyacinth Macaw (*Anodorhynchus hyacinthinus*) is now being removed rapidly from the wild, at a rate of roughly 1,000 individuals per year from a population estimated at only 2,500–5,000 individuals (see Munn et al. 1989/1990, Audubon Wildlife Report: 404–419). This species will almost surely follow Spix's Macaw within a decade, unless extraordinary measures are implemented to reverse current trends. The same stresses have affected many other species, for example Glaucous Macaw (*Anodorhynchus glaucus*) and Lear's Macaw (*Anodorhynchus leari*), which are much closer to extinction than the Hyacinth Macaw.

Silva's treatment of these problems is forthright, and he does not offer the formula solution of captive breeding for every species. Nevertheless, for many species he does espouse the traditional rationalization of aviculturists that their captive breeding efforts represent the only hope of salvation because of irreversible loss of habitats. This approach sidesteps the fact that many of the endangered forms are not stressed mainly by habitat loss and are not truly dependent on virgin habitats. In fact, many can exist in partially or thoroughly disturbed areas, so long as they are not persecuted or overexploited (witness the substantial feral populations of amazons and other psittacines in urban environments of our southern states). Further, Silva fails to acknowledge that members of the avicultural community have traditionally had great difficulty cooperating among themselves in executing comprehensive captive breeding efforts. The numbers of failed attempts to achieve self-sustaining captive populations are considerable, as detailed in part in the pages of this book. And in the end, the species saved "forever" by aviculture will ultimately not be the original species, because of genetic and behavioral changes that result from an unavoidable strong selection for the captive environment inherent in this approach. Given a moderate number of generations, many species preserved in captivity will be beyond reestablishment in the wild, and will be able to exist only as domesticated forms. If our goal is wild populations, captive breeding can only be a temporary emergency solution. It is not the panacea that many enthusiasts claim.

Nevertheless, many aviculturists view species as fully saved only if they are held in permanent captive populations. For some, the idea of reintroduction of captives to the wild is still an alien—even repellent—concept, or at most one to be utilized only to rationalize the immediate taking or holding of birds from the wild for commercial or avocational captive breeding efforts. The record of private aviculture with respect to deliberate efforts to reestablish wild parrot populations from captivity is notable only for its non-existence.

One of the major weaknesses of this book is a failure to explore in any depth many of the alternative means that exist for conservation of parrot populations (endangered or nonendangered). For example, the considerable success achieved recently by Paul Butler in motivating islanders of the Lesser Antilles to revere and preserve their endangered parrots is not discussed. The parrots of these islands are not threatened primarily by habitat loss or intrinsic biological problems, but by human depredations of various sorts. Education promises to be a much more effective conservation approach than captive breeding for these species. Similarly excluded are the potentials for ecotourism to promote conservation of some of the more spectacular species through economic benefits to local communities, an approach being actively pursued with several macaw species by Charles Munn in Peru. Finally, the potentials of controlled and sustained harvest of wild populations for economic good as well as conservation get almost no attention. The emphasis is on aviculture, despite the many drawbacks and poor record of accomplishment of this approach in general.

As is inevitable in any book of this nature and length that is dependent primarily on secondary sources, misinformation creeps in here and there. For the Puerto Rican Parrot (*Amazona vittata*), the species I am most familiar with, the number of errors and misinterpretations is especially high. For example, Silva alleges an astounding 66.5% first-year mortality rate of nestling Puerto Rican Parrots fostered from captivity into wild nests (an error apparently resulting from a confusion between mortality rates and survival rates). He then draws the ominous, but unwarranted, conclusion that the species cannot be introduced into wild nests with adequate success. In fact, survival of fostered nestlings has been indistinguishable from survival of totally wild-raised nestlings and has been far more favorable than Silva claims (for details, see Snyder et al. 1987, *The Parrots of Luquillo*, Western Foundation of Vert. Zoology).

Silva also excoriates the Puerto Rican Parrot program for not beginning replacement-clutching of captives in a timely fashion. Here again, his facts are confused. This technique was initiated in the same year (1979) that the first Puerto Rican Parrot chick was produced at the aviary. Before then, it is questionable that it might have done much to increase production of chicks.

Among the most extraordinary of Silva's confusions about the Puerto Rican Parrot program is his attempt to correlate levels of fertility in the wild population with numbers of field personnel in the program. No such correlation exists.

He also reiterates the commonly expressed belief of aviculturists that captive-production of Puerto Rican Parrots over the years would have been enhanced greatly if birds held at the government-run aviary had been in the care of private aviculturists. Produc-

tion of Puerto Rican Parrots in captivity has indeed been much less than hoped for, but surrogate Hispaniolan Parrots (*Amazona ventralis*) held at the same aviary and bred with the same techniques have been quite productive from the start, a fact that should urge some caution in concluding that the techniques or personnel have been primarily at fault. Moreover, the relatively poor production of captive Puerto Rican Parrots has not shown any improvement in the most recent years, during which an acknowledged expert parrot breeder drawn from private aviculture has been running the captive-breeding program. These data suggest that the Puerto Rican Parrot just may be intrinsically refractory to successful breeding in captivity. Though there clearly are differences in the abilities of different people to induce captive parrots to breed, the "magic wand" of private aviculture has yet to be demonstrated in any convincing way with this species. The main resistance factor to good success in captive breeding of the Puerto Rican Parrot has not been low production of eggs, but low fertility of eggs, the causes of which are still unclear, but may not necessarily be correctable.

Finally, Silva regards with dismay—much more moderate in tone than that of Low (1984, *Endangered Parrots*, Blandford Press)—the 1982 efforts of Jim Wiley to investigate release methods of captive Hispaniolan Parrots to the wild. As a participant in Wiley's efforts, and as a direct observer of the benefits in understanding that resulted from these efforts (see Snyder et al. 1987: 268–269), I find it difficult to understand the avicultural community's recurrent criticism of the fact that some mortalities of birds occurred during these efforts. In fact, the only way to establish how critical various features of release methodology are is through experiments that vary these features. One anticipates that some birds may be lost in such experimentation, but that their difficulties, if studied closely, will be one of the main ways in which crucial understanding can be gained. The Hispaniolan Parrot release experiments were successful in narrowing down which aspects of release were most important, and some of the released birds did make successful transitions to the wild. Many of the specific results of the experiments were surprising and would not have been learned without the experiments. Because of the results obtained, releases of Puerto Rican Parrots can now be made with less risk of mortality. It is important to emphasize that the Hispaniolan Parrots used in the release experiments were raised specifically for this purpose and that the Hispaniolan Parrot is not an endangered species. To confuse the surrogate with the endangered species (the Puerto Rican Parrot) is a basic conceptual error that has no place in serious conservation.

The plates in "A Monograph of Endangered Parrots," all pastels and drawings by Gracia Bennish, vary in quality. Some, such as the Red-spectacled Parrot (*Amazona pretrei*) and the Grand Cayman Parrot

(*Amazona leucocephala caymenensis*), are quite attractive; others are stiff and two-dimensional. Birds are uniformly presented without natural backgrounds, most species are not illustrated engaging in natural activities, and many are rendered as head-only portraits. They project an avicultural rather than naturalistic orientation. The plate of the St. Vincent Parrot (*Amazona guildingii*) in flight (on the cover and on page 313) looks much like it was derived from a harshly lit flash photograph of a partially wing-clipped bird. Those seeking more naturalistic illustrations of the species may prefer Cooper's plates in Forshaw's "Parrots of the World."

Unfortunately, typographical, grammatical, and factual errors occur frequently in "A Monograph of Endangered Parrots," and the author's quirky and sometimes self-contradictory writing style frequently leads to a need to reread sentences and paragraphs to be sure of meaning. Nevertheless, although these problems make for slow reading and I found much that I disagreed with in the author's conclusions, I still enjoyed reading the book and still found many positive values in his presentations.

With prices ranging from \$125 to \$2,000 per copy, "A Monograph of Endangered Parrots" is obviously not aimed at the general public or the ornithological community. It is a book primarily for affluent aviculturists and book collectors. While it offers some useful and interesting information on endangered parrots not found in other sources, the strong avicultural bias and the stiff price will probably not appeal to most ornithologists. For those of us dealing specifically with studies of endangered parrots, it is a work of importance, but will be questionably worth the price. Most will probably wait for the availability of second-hand copies or will trudge off to the copy machine with a library copy. The new (third) edition of Forshaw's "Parrots of the World" (available through the same publisher) is a much more accurate, aesthetically pleasing, and generally useful treatise on parrots and is much more economical at \$69.95 (including postage and handling).—NOEL SNYDER.

Florida's Birds.—Herbert W. Kale II and David S. Maehr. 1990. Sarasota, Florida, Pineapple Press, Inc. 288 pp., 14 habitat photographs, 55 color plates of birds. ISBN 0-910923-67-1. Cloth, \$26.95. 0-910923-68-X. Paper, \$19.95.—Touted as the "first comprehensive reference and guidebook" in 35 years, this book, nonetheless, has been "written for the resident or winter visitor to identify the state's most commonly seen birds." Considering the level of anticipated readers, especially welcome chapters include those on sick, injured, and orphaned birds, attracting and feeding birds, and bird conservation.

Illustrations often set the first and lasting impression of a bird book. The choice and reproduction of habitat photographs in "Florida's Birds" are conspic-

uously uneven. One habitat scene is sharp with a clear deep blue sky, whereas another is out-of-register or pale, and others heavily tinted in green or brown. The color plates of birds frequently suffer from the careless selection of background mats and size reductions. Outlines of the American White Pelican, Wood Stork, and Roseate Spoonbill are simply lost into the light, creamy white background. Even more annoying is the choice of size reduction on the same page: Ruddy Duck larger than the Muscovy, Roseate Spoonbill larger than a Wood Stork, Carolina Chickadee larger than a Tufted Titmouse, Tundra Swan and Canada Goose of the same size, and many others. The transposition of labels for Sharp-shinned and Cooper's hawks will certainly cause problems in identification. And I can see no useful purpose in illustrating and discussing the Ivory-billed Woodpecker (complete with a calendar purporting to show the reader in which months it breeds in the state), which is described in the text as "probably extinct." The artist's renditions of waterfowl, plovers, and woodpeckers are his best.

Judicious editing would have improved the quality of the text greatly. Typographical errors are numerous (e.g. *speces*, occurrence, *sparvarius*, *vermivorous*, *Helminthes*, *erythrogenus*, and *leucophrus*). Erroneous and ambiguous statements include "half of Florida is virtually covered with pine flatlands," "equally at home in water and air, the Anhinga . . .," "two rounded eggs usually are laid during winter," "spring birds are seen occasionally in April and May," and syndactyly is described as the front three toes more or less joined. What reader would want to know that Marsh Wrens eat an occasional snail, that Caspian Terns eat mullet and menhaden whereas other tern species simply catch "fish," or that young House Sparrows "during nesting" are fed insects? Much repetition is found between wordy text descriptions of occurrences and the crisp calendars accompanying color plates.

Somewhat standardized species accounts are a strength of the book. In each, the authors indicate abbreviated but useful information on distinctive field marks, distribution and habitat preference, aspects of breeding, behavior, vocalizations, and foods. All this information will be a selling point to those who want to identify the state's most commonly seen birds. But this same audience will be perplexed when they try to distinguish among the *Empidonax* flycatchers, the "peep sandpipers," and the difficult and hard-to-find wintering sparrows.

"Florida's Birds" is an interesting mixture of non-technical and incomplete technical information. Perhaps it will appeal to the intended audience in Florida. However, the many world-renowned ornithologists and experienced nonprofessionals in the state still yearn for a real book on the birds of Florida, one of the quality of Howell's 1932 classic.—DAVID W. JOHNSTON.

Speciation and Its Consequences.—Daniel Otte and John A. Endler (Eds.). 1989. Sunderland, Massachusetts, Sinauer Associates, Inc. 679 pp., 115 black and white illustrations. ISBN-0-87893-658-0. Paper, \$29.95. ISBN 0-87893-657-2. Cloth, \$50.00.—This dense volume represents the views of 37 individuals who participated in a 1987 symposium on the subject of speciation at the Academy of Natural Sciences in Philadelphia. The 25 chapters were classified *ex post facto* into six parts plus a conclusion, beginning with "Concepts of Species" and ending with "Evolutionary Consequences of Speciation." The three chapters in the "Concepts of Species" put one in the mood for controversy and intellectual upheaval: Templeton's chapter suggests that the biological or "isolation" species concept (BSC) tends to exclude asexual organisms from consideration, confounding the goal of a unifying theory of pattern and process of speciation. Templeton's genetic "cohesion" concept is an attempt to extend the principle of the BSC to encompass non-sexually reproducing organisms. In the next chapter Cracraft rejects the BSC in all its permutations, noting that the origin of reproductive isolation is simply a by-product of divergence, although it is an almost inevitable eventual outcome of this divergence; the divergent characters are flags marking historical units (lineages). To conclude the first part, Gareth Nelson spurns the subject of speciation as a non-issue and chooses to pursue the rather persuasive and intellectually challenging argument that species are no different from higher taxa in a historical, ontological sense.

Cracraft notes (p. 29) that "most botanists, and an increasing number of zoologists, have chosen to abandon the BSC." This view is certainly not borne out in the rest of the volume, which deals almost exclusively with the BSC. There appears to be no particular taxon bias in these papers to account for this position, at least within the general groups of big plants and big animals. The study organisms representing the interests of the other participants include plants, insects, fish, mammals, salamanders, lizards, and birds. In most of the papers in parts 2-5, acceptance of the BSC was implicit; in only one of these (Patton and Smith) was an operational species concept made explicit—a genetic isolation form of the BSC. Chapters 20-24 deal with large-scale evolutionary patterns ("tempo and mode") or community patterns (Ricklefs). The authors (Lynch, Futuyma, Larson) have evidently thought about the species concept to which they adhere (the BSC) and actively rather than passively support it. Only Futuyma, however, acknowledges even tacitly that there are any alternatives.

By approaching the issue of species and their formation from this perspective, we have devised increasingly more sophisticated means of studying reproductive isolation. We have learned more about hybrid zones and their dynamics (Hewitt; Harrison and Rand; Wake et al.; Butlin). We have enhanced

our understanding of the cytogenetics of hybridization and of why the outcome of hybridization events are not sexually symmetrical (Coyne and Orr), and we have contributed to a body of genetic literature that may enhance or facilitate conservation efforts (Ryder et al.). We understand more about population structure (Barton; Barrett; Patton and Smith), about the geographic element in the origin of reproductive isolation (Tauber and Tauber; Diehl and Bush; Wilson), and about the potential role of natural selection in promoting (or discouraging) divergence within (Wilson; Vrijenhoek) or among (Otte) populations. We have obtained much information on anagenesis (Roughgarden and Pacala, and most other chapters), whether we choose to label it speciation or a consequence thereof (see Larson's chapter). We have acquired fascinating natural history data: Gill employs what is usually a fruitless endeavor, namely the search for key innovations, to explain speciosity of orchids. Paradoxically the most striking feature of orchids, namely deceptive pollination syndromes, suggests that this group should actually be depauperate.

This volume could more accurately be entitled "The origin of reproductive isolation and its consequences." The questions of what speciation is and why it is interesting are assumed here, and if asked explicitly most of the contributors (if logical thinkers as their papers indicate) would probably affirm an interest in the maintenance of diversity. The origin of diversity is closely linked to reproductive isolation which is the usual means of its preservation. It is likely that if Joel Cracraft were to attempt to study the "speciation" process as well as the pattern, he might well do so (sometimes) in the same manner as many other authors in this volume. But he would do so with a different hierarchy of questions in mind. He would begin with a nested pattern of character novelties that suggested a historical relationship among the organisms that bear them. The units that these organisms comprise would be termed species, and the process(es) that resulted in this pattern would be called speciation. The origin of this diversity may carry with it the origin of reproductive isolation. In this case the study of reproductive isolation would be related to the origin of species. Practically, and possibly theoretically, the study of speciation in sympatry could be identical for the BSC and the phylogenetic alternative Cracraft and others espouse, as in Grant and Grant's excellent exploration of the empirical data that pertains to sympatric speciation in *Geospiza conirostris*. It should be clear from this brief discussion that adopting alternative species concepts does not render the study of reproductive isolation uninteresting. The phenomenon is unquestionably important for organismic diversification, but it is not necessarily the whole story.

The research summarized in this book is uniformly excellent, and impossible to review adequately. Therefore I will lapse (again) into the expression of

unbridled opinion. In a sense this book is disappointing in that most of the authors subsequent to Part I make numerous assumptions about species and speciation but do not ask themselves what these phenomena are and why they are important. This is both surprising and inexcusable, given the climate of increasing debate on the issue. The sting of this disappointment is somewhat soothed by Endler's concluding chapter, a recognition of the diversity of opinion about what speciation is and the variety of purposes that species concepts in general might serve. My disgruntlement on this particular subject is by no means to diminish the enormous value of the work presented in Otte and Endler's volume. The book clearly represents the state of the art, and—at less than 4-1/2 cents per page in paperback—it is a bargain. I recommend it to everyone interested in evolutionary biology.—MARY C. MCKITRICK.

Biodiversity and Conservation in the Caribbean: Profiles of Selected Islands.—Timothy H. Johnson. 1988. Cambridge, United Kingdom, International Council for Bird Preservation. xvii + 144 pp., ISBN 0-946888-14-0. (Available from ICBP, 32 Cambridge Road, Girton, Cambridge CB3 0PJ, UK.) £7.80.—In 1982, ICBP concluded that gaining up-to-date information on the status of island-endemic bird species was the first step towards their successful conservation. This volume is ICBP's first contribution towards that goal. It summarizes the results of their data-gathering on endemic species of all flora and fauna, on ecosystems, and on the conservation infrastructure of selected Caribbean islands so that action can be directed towards the conservation of biological diversity. The key word is "selected" islands. The International Council for Bird Preservation has targeted islands smaller than 20,000 km² that have at least one single-island endemic bird species. Two large Caribbean islands, Cuba and Hispaniola, are excluded because of their size, even though both have several species of single-island endemics. Many smaller islands that lack an endemic bird are excluded, even though some of these islands may face serious conservation problems. The profiles themselves do not go into great depth on the specific conservation measures needed to preserve these birds. The title of the book is true to its content. The profiles provide important information on biological diversity and conservation, but in summarized form so that it is readily accessible. If this is the aim of this book, then including only islands with single-island endemic birds ignores too many islands that face equally important conservation problems. As an example, the Bahamas are excluded even though habitat loss may be an important component in conservation of Neotropical migrants, especially Kirtland's Warbler. Whether or not the book achieves its stated goal, it does provide

the best summaries available for those islands that are included.

Each profile has seven major sections. The first, "Biodiversity and conservation summary," is a tabularized summary of information on island and regional endemics, including mammals, birds, reptiles, amphibians, fish, invertebrates, and plants. Summaries of the extent, uniqueness, and security of the major ecosystems are preceded by a short list of priority needs for conservation action. General information on the island's demography, economy, customs, and government is followed by synopses of geological origins, climate, and vegetation. This is basic information that is readily available elsewhere, but it is pertinent to conservation action and handy in its summarized form. The author tends to overuse acronyms and the book often reads like a government document. Most acronyms are explained in an appendix in the front of the book, but several are not. "Important flora and fauna" deals with the same groups in the first summary section with greater depth. Information on a species' habitat requirements and both its and the habitat's status is given with reference to all recent surveys. Summaries of introductions that have had a negative impact on native flora and fauna, and known and presumed extinctions since 1600, are included. The next section catalogs the extent, status, trends, and major impacts of both terrestrial and marine ecosystems. The final two sections may be the most important. "Conservation infrastructure" lists the conventions to which the island's government adheres, recent conservation legislation, reserves and protected areas, and national conservation organizations. "Conservation action" follows with lists of environmentally oriented education programs and any recent surveys and research undertaken. The two final lists propel this volume forward into the realm of activism. The first cites survey needs to fill in the gaps in our existing knowledge. The second aims specific recommendations at governmental and nongovernmental organizations to strengthen the infrastructure to improve conservation action. This list provides important focal points for future conservation action.

This book is not necessarily entertaining, but as a compendium of information compiled from a variety of sources, it is not meant to be. Nor is the information always complete. Individuals with experience on any of these islands will often be familiar with details that were beyond what the author could glean from existing literature. However, a final reference section—invaluable for anyone needing more details—provides information on most of the source materials used. For anyone with research interests in the Caribbean, whether there is a conservation application or not, this volume provides important and uniquely summarized information and, as such, would be a valuable addition to any university or personal library.—REED BOWMAN.

The Avian Egg: Chemistry and Biology.—R. W. Burley and D. V. Vadehra. 1989. New York, John Wiley & Sons. iii + 472 pp., 165 text figures. ISBN 0-471-84995-2. \$85.00—The goal of this book was to review and update the information gathered on eggs since the publication in 1949 of "The Avian Egg" by A. L. and A. J. Romanoff. The result is a clearly written, well-illustrated, concise, and largely accurate review of the literature, although few references are more recent than 1987. The book mimics its predecessor in both its broad title and narrow coverage. The subject matter is almost exclusively limited to chicken eggs. Eggs of starlings, emus, hummingbirds, and a few other nonchicken birds make cameo appearances. As a result, ornithologists may find this book less useful than might agriculturalists, poultry breeders, and food technologists. The emphasis on chicken eggs results from decades of research by food scientists and embryologists. Although the lack of detail on other birds results in large part from the lack of data, much more information than the authors cite is available on certain topics, such as gas exchange. Ornithologists could use this book as a stimulus to extend the techniques applied to and proven on chicken eggs to gather comparative data on eggs of other birds.

The emphasis on chicken eggs occasionally leads to blanket statements that are not applicable to eggs of all other species or that do not convey properly the amount of variation known to exist among avian eggs. An example of the latter problem is found in a statement that eggs lose 15% of their initial mass as water vapor during incubation. This value is solely a "grand" average and actual values vary between 10 and 23% among species. Knowledge of the variation in water loss among species during natural incubation is important for zoo keepers and others that attempt to artificially incubate eggs of endangered or rare species because poor hatchability can result from incubator humidities that promote inadequate or excessive rates of water loss. Another problem is that error limits and sample sizes were not included with averages presented in tables. This prevents an eyeball assessment of whether differences among means are significant.

The book concentrates on structure, function, and synthesis of the shell, shell membranes, albumen and yolk. Certain important mysteries (such as how the numbers and sizes of pores in the shell are determined, how oxidation of unsaturated lipids in the yolk is prevented during incubation, and how various albumen proteins function) are currently unresolved. But knowledge has progressed markedly in recent years on topics such as the identification of albumen proteins, their amino acid sequences, the chromosomal location and arrangement of genes controlling their synthesis, and probable hormonal mechanisms for activation of these genes. Yolk proteins and lipids have likewise received intensive attention.

Other chapters deal with the microbiology of eggs (salmonella carried in eggs can kill you), process-induced changes in eggs (freezing damages them), diet-induced changes in eggs (too bad—feeding the hen reduced levels of cholesterol does not lower the cholesterol content of eggs), the role of eggs in human nutrition (yes, they are nutritious), and technological nonfood uses of eggs (eggs are used in manufacture of leather, paint, cosmetics, and other products). The book even deals with common myths about eggs, such as whether brown eggs are more nutritious than white ones, and whether eating raw eggs enhances virility (in men only, I presume). You will have to read the book to find out the answers.—CYNTHIA CAREY.

Flight Strategies of Migrating Hawks.—Paul Kerlinger. 1989. Chicago, Illinois, University of Chicago Press. xv + 375 pp., 77 text figures. ISBN 0-226-43167-5. Cloth, \$60.00. ISBN 0-226-43167-3. Paper, \$19.95.—The “gray” science of hawk migration had its heyday in the 1930s and 1940s when massive migrations of raptors were discovered at several sites around the world. With a few notable exceptions, scientific inquiries into the process of hawk migration stagnated; the same types of data were gathered, mostly hawk counts, and the same speculations were recapitulated year after year. The excitement of exploring the mystery of avian migration shifted to passerines, especially in the 1960s and 1970s. The study of raptor migration was mostly relegated to the amateur and has been largely ignored by much of the ornithological community.

This volume by Paul Kerlinger is his bid to understand the migration of hawks and to elevate these efforts to respectable science. The work focuses heavily on Kerlinger’s own studies on migration, but integrates successfully studies by other authors and workers that deal with other types of flying machines (butterflies to aircraft). For the most part, his analysis is thoughtful, scholarly, and readable. Rather than a rehash of previously reported ideas, Kerlinger extends his previous research into a provocative and comprehensive theory of hawk migration.

The book begins with an explanation of why traditional hawk-count data are of limited value in understanding the migrations of hawks, and a justification of the decision to deemphasize this literature throughout the volume. This theme turns up time and time again, but the tone seems to vacillate between an encouraging apology and biting criticism. This wavering attitude towards hawk watching and hawk counting apparently reflects Kerlinger’s own indecision on the worth of these efforts. To me, however, the volume clearly implies that amateur hawk watchers have much to offer towards advancing the understanding of hawk migration through “direct visual techniques” ancillary to simply counting hawks. Birders and others interested in hawk migration

should take up Kerlinger’s challenge, and use their time to test some of the many ideas proposed in the volume.

Introductory chapters ease the reader into the basics of hawk migration by defining terms, describing general patterns, and discussing primary techniques. Chapter 4, which characterizes the structure of the atmosphere, is particularly informative. Kerlinger spent considerable time deciphering current atmospheric research and applying these findings to the problem of migration. The important message of this chapter is that atmospheric flow is incredibly complex, and difficult to measure and quantify. This, of course, makes the attempt to explain the behavior of soaring migrants a difficult task.

Kerlinger’s analysis is based heavily on aerodynamic principles developed by Colin Pennycuik and others. The constraints of morphology and flight-performance perspective are crucial and often overlooked by researchers that study behavioral or ecological aspects of ornithology. In this regard, chapters 5 and 6 on flight mechanics (theory and empirical research) provide a useful introduction. Some of this section, however, is difficult to get through and the discussion is highly speculative in parts. The aerodynamic aspects of flight provide much of the basis for Kerlinger’s more comprehensive theory of hawk migration. Although this is an important strength of the volume, Kerlinger uses this paradigm at the expense of other, possibly equally important, factors that may influence migration strategies.

For instance, Kerlinger continually emphasizes that, based on flight mechanics theory, an important objective of migrants is *rapid* efficient progress. I suggest that social and ecological factors may override or alter this objective, and the interplay between these factors may vary between spring and autumn migration. Thus, simply relying on flight mechanics as the primary underlying paradigm for explaining flight strategies may be misleading. It is quite conceivable that the objectives for spring and autumn movement are different. I suspect that fast progress in spring could provide advantages to breeding hawks seeking quality breeding space; efficient migration might be sacrificed for speed. Alternatively, the primary goal of autumn migrants is survival, and slow progress might be favored to allow effective use of habitats and prey resources en route to a winter destination. Kerlinger mentions that such ecological and social factors are potentially important in shaping migration strategies, but argues that they could not be integrated into his theory at this time because these influences were not understood adequately. I do not totally agree with his assessment, and I feel that he could have better explored the ramifications of select ecological and social influences.

Chapters 7 through 12 provide the core of Kerlinger’s thesis on migration. He reviews first much of his previous radar studies on hawk migration, and

compares and contrasts the work of others. These refreshing overviews are saturated with new ideas. His reviews are thorough and constructive. If anything, Kerlinger tends to shy away from criticizing the work of others; instead, he accepts conflicting findings as both possibly correct (depending on the differing circumstances). Kerlinger strongly denounces "wind drift" as an important influence of hawk migration. Then he reformulates the idea that wind influences the routes of migrating hawks into the "optimal use of wind hypothesis." Thus, tacitly he acknowledges, to some extent, that wind orientation ("drift") affects migratory strategy.

Throughout the volume readers should recognize that much of the data presented were collected at flatland or coastal situations. Yet Kerlinger implies that his results and conclusions can explain behaviors and patterns of birds migrating along ridges. This may not always be a fair assumption. For example, "noonday lulls" in the number of migrants observed do not occur at Hawk Mountain (pers. obs.); thus midday biases in detecting visible migrants at some ridge locations may not be as severe as Kerlinger suggests.

The portions of the book that discuss flocking and water-crossing behavior of migrating hawks are excellent syntheses of Kerlinger's previous work. As elsewhere in the volume, potential weaknesses of his own research were often identified, and many suggestions are made for future studies.

Chapter 11 discusses the selection of optimal flight speed based on aerodynamic considerations. Many of these ideas have not been published elsewhere and have not been subject to previous peer review. This section is based primarily on theoretical considerations and was more difficult to grasp. Empirical data used to test predictions were derived from a number of diverse sources and limited to a handful of measurements in some cases. In my estimation, this is the weakest part of the book, and perhaps it could have been organized or dealt with more effectively.

The final two sections of the book are highly speculative and provocative. Here Kerlinger develops his synthetic theory to explain hawk migration and exposes a plethora of specific predictions on how hawks might behave under different circumstances. These chapters are thought-provoking and eminently readable. Heuristically this analysis illustrates the task of migration for a soaring bird is a complex problem based on a multitude of decisions. This presentation also emphasizes the problems facing a scientist who strives to understand the migrations of hawks. This final section is a daring exposé and challenge to both the amateur and professional student of migration. Much of the basis of Kerlinger's theory is undeniably speculative. His gutsy presentation provides the first reasonable framework for the study of migration in hawks, and I believe the book will revitalize scientific inquiry in this area.

The volume is well edited and errors are difficult

to find. For the most part illustrations are helpful, but many are obviously computer generated. Several graphs and tables could have been improved with closer attention to detail.

Kerlinger's book represents a vital contribution to science. I came away with a number of new insights. Every ornithologist should read this book and students of raptors should study it from cover to cover. No serious natural history or university library should be without a copy.—JAMES C. BEDNARZ.

Ecology and Conservation of Grassland Birds.—Paul D. Goriup (Ed.). 1988. Cambridge, United Kingdom, International Council for Bird Preservation, Tech. Publ. No. 7. vii + 250 pp. ISBN 0-946888-11-6. £17.00. (Available from ICBP: 32 Cambridge Rd., Girton, Cambridge CB3 0PJ, UK).—The objective of this book was to "draw together experts from all regions of the world to review the available information on the ecology and conservation of grassland birds." In this pursuit the editor has done a commendable job. Goriup put together 20 chapters written by 28 authors from 15 countries. Each chapter covers conservation problems in a particular biogeographic region or country, and most chapters are written by experts from the country under review. This is truly an international effort. The book covers the major grassland and steppe regions of the world, with two glaring exceptions: the steppes of eastern Europe and Russia, which was missing because the experts in these areas could not prepare contributions, and the grasslands of eastern and southern Africa, whose absence was not explained.

The chapters vary greatly in the detail of coverage of particular regions and the usefulness of the information. The first two chapters provide detailed overviews of conservation priorities in Canada (by McNicholl) and the United States (by Knopf). McNicholl gives an extensive review of the literature, detailed reviews of each grassland species listed as threatened in Canada, and short summaries on the distribution and potential threats to every grassland bird species in Canada. Knopf covers only the true grasslands of the United States (omitting the shrub steppe) and focuses on several rare or threatened species. He concludes with a list of specific conservation actions that are needed to help shape policy in the United States. Bock and Bock summarize the results of their study of the effects of grazing, fire, and exotic grasses on the bird communities of southeastern Arizona. One of the few chapters that provide data on the impact of humans on grassland bird communities, it shows that careful management of grassland reserves can greatly enhance their value to birds and other wildlife.

Four chapters devoted to South America include Brazil, Argentina, the Andean zone, and Patagonia. The need for conservation in these regions is urgent,

and most of the authors emphasize the need to respond quickly before particular habitats or species are lost. Unfortunately, the data on the abundance and distribution of most species are rather meager, which makes it difficult to evaluate trends and set conservation priorities except in extreme cases. Willis presents interesting ideas on new approaches to conservation problems in Brazil, but many of them seem farfetched. Most authors place little emphasis on the need for research on the effects of grazing and human activities on the birds in these areas. One exception is the chapter by Bucher and Nores, who both acknowledge the problem and note that this type of research is now underway in Argentina.

There are five chapters on European countries, which include Britain (and other islands, especially the Falklands), the Netherlands, Spain, Italy, and an overview of Europe, the Mideast, and North Africa. In a chapter on the grassland birds of the Netherlands, Beintema summarizes the relationship between breeding productivity and land use practices. He reviews policies that the Dutch government has adopted to maintain viable grassland bird populations in the Netherlands. This is one of the few bright spots in the book. Bourne's chapter on the impact of grazing and fire on the moor lands of Britain and other islands points out that maximizing long-term grazing productivity and bird conservation often are compatible in these environments, but ironically these practices are rarely followed.

The coverage of Africa is rather meager with a chapter by Thiollay on the raptors of the Ivory Coast, another by Wilson on the grassland birds of central Mali, and cursory coverage of northern Africa by Goriup. Thiollay's chapter provides an excellent data base on the density of raptors in the Guinean savannah and on their response to human disturbance.

Asia is covered in five chapters: two on India, and one each on Pakistan, Bangladesh, and China. Rahmani provides an excellent discussion of the threats to several rare grassland bird species in India. The chapter by Majumdar and Brahmachari on grassland bird communities in India adds little to Rahmani's chapter and could have been left out with little loss. The chapters by Mian (Pakistan), Khan (Bangladesh), and Hsu (China) point out the poor state of knowledge of the grassland birds of these areas. Most of the data on trends in abundance of birds in Pakistan come from the impressions of hunters and trappers. Hsu provides a very brief overview of the situation in China and cites no references, although he states that research is currently underway on steppe habitats in China.

The final chapter by Fitzherbert and Baker-Gabb gives an excellent discussion of threats to endangered grassland species in Australia and New Zealand, and it includes detailed maps of recent sightings of each species in Australia.

"Ecology and Conservation of Grassland Birds"

provides a timely and sobering view on the state of the world's grasslands and the birds that depend on them. It should be in the collection of every major library, and on the shelf of every range manager and professional interested in bird conservation.—T. LUKE GEORGE.

Peregrine Falcon Populations, Their Management and Recovery.—Tom J. Cade, James H. Enderson, Carl G. Thelander, and Clayton M. White (Eds.). 1988. Boise, Idaho, The Peregrine Fund, Inc. xviii + 949 pp., 68 black-and-white plates, 1 color plate, 100 text figures. ISBN 0-9619839-0-6. \$39.00. (Available through Buteo Books).—This volume is a sequel to the now classic "Peregrine Falcon Populations, Their Biology and Decline," which appeared in 1969 and launched a highly productive era of conservation studies, not only of the Peregrine (*Falco peregrinus*) but also of numerous other raptor species. The 1969 volume, edited by Joseph J. Hickey, summarized presentations at a 1965 conference in Madison, Wisconsin, during which the extent of a massive postwar decline of the Peregrine, both in North America and Europe, first became evident. At that time, causes of the decline were not yet clear, although there were suspicions that contamination of the species with persistent organochlorine pesticides might be a major stress.

The 1988 volume summarizes much of what has transpired in Peregrine investigations since the Madison conference. Based primarily on a 1985 symposium held in Sacramento, California (but also including several papers prepared subsequently), it spans contributions from more than 100 authors. The topics range from recent status surveys to essays on mechanisms of population regulation. Individual papers are organized into 11 sections: keynote addresses; status of Peregrine populations since 1965 in North America; status of Peregrine populations since 1965 in Europe; status of Peregrines in other parts of the world; DDT and other chemical problems; migration and banding studies; captive propagation, reintroduction, and management; dynamics and ecology of Peregrine populations; geographic variation in Peregrine populations; humanity and the Peregrine; and summary and conclusions. Emphasis is given to documentation of a very convincing recovery of many populations that were close to extinction at the time of the 1965 conference. In essence the book serves as a celebration of the many fine efforts to study and conserve the species in a remarkable international mobilization of two decades' duration.

The book covers so much ground that attempting a full review of all aspects is impractical. Instead, I think it is more worthwhile first to call attention to a number of papers that are especially valuable, and then to concentrate on certain focal topics of the book that are especially significant.

Joseph Hickey's keynote address highlights in a most engaging way the early history of intensive efforts to conserve the species, a history in which he played a most crucial role and for which he has gained the special affection of raptor biologists and conservationists worldwide. Other keynote addresses by Derek Ratcliffe and Morlan Nelson provide equally fascinating historical perspectives.

Of the presentations on biology and ecology, I found most informative Jean-Marc Thiollay's study of Peregrine-prey interactions in Tunisia, and the papers by Ian Newton and Grainger Hunt on population regulation. Summaries of recent conservation efforts in the eastern United States and Canada by John Barclay and Richard Fyfe are also of great interest, while the migration studies of Prescott Ward et al. include a wealth of new data.

Probably the topic of most general importance is the reexamination of the causes of the decline in the 1950s and 1960s contained in contributions by Ian Newton, Ian Nisbet, David Peakall, Lloyd Kiff, Robert Risebrough, and the editors. In popular view, the decline of the Peregrine has become the prime example of population dysfunction caused by DDT (more specifically its persistent metabolite DDE). The once-startling revelations by Derek Ratcliffe, Joe Hickey, and Dan Anderson of DDE-induced eggshell thinning and breakage have now been so thoroughly documented in so many raptors that they are no longer controversial. The causal relationship of such effects to population declines of these birds has become conventional wisdom, to be challenged only with some trepidation. Yet the primacy of DDE in the post-war woes of the Peregrine and other raptors has now indeed been challenged. The strength of the challenge is reflected by the considerable space and the involved arguments devoted to the subject in this book.

Most North American raptor biologists first became aware of a serious questioning of conventional assumptions about DDE's effects on raptor populations at the International Council for Bird Preservation conference on birds of prey held in Thessaloniki, Greece, in 1982. At that session, Ian Newton pointed out that in his studies and in studies of Derek Ratcliffe, the declines of the Peregrine and European Sparrowhawk (*Accipiter nisus*) in Great Britain showed a much closer relationship to use of dieldrin (HEOD) and other cyclodiene pesticides than they did to use of DDT. While severe eggshell thinning and breakage were seen in both species immediately after the advent of DDT (DDE) in the mid-1940s, no significant population declines were apparent until the late 1950s, immediately after dieldrin came into use. In fact, the number of breeding pairs of Peregrines actually increased until the late 1950s (following cessation of wartime persecution of the species as a threat to carrier pigeons). Usage of dieldrin and DDT declined in Great Britain during the 1960s (dieldrin faster than DDT), and recovery of both species began in the late

1960s and early 1970s. With the Sparrowhawk it was especially clear that the geographical pattern of recovery closely matched that of the reduction in use of dieldrin and that recovery took place in spite of continued high levels of DDE-induced eggshell thinning and breakage.

Dieldrin is not known to cause eggshell thinning or breakage or to cause other reproductive problems, but its effects on wildlife are potentially great, as it is lethal to many vertebrates at extremely low concentrations. Laboratory studies have shown that for some birds it is more than 100 times as toxic as DDT. Some Peregrines and Sparrowhawks were indeed picked up dead of apparent dieldrin poisoning during the declines, and it is a fair assumption that they might have been only a tiny fraction of those that actually died of such poisoning. So while the effects of DDE on Peregrines were much easier to study than those of dieldrin (because they were mainly sublethal effects), a case can be made that these effects might not have been as important as those of dieldrin, and not just in Britain but in North America as well.

One is reminded of the situation recently documented for the California Condor (*Gymnogyps californianus*). Here a major mortality factor and cause of decline, lead poisoning, had been overlooked simply because studies had not been carried out in such a way that they might have detected it. The importance of lead poisoning did not emerge until the very end of the wild population's existence, when radiotelemetry finally allowed efficient recovery of dead and dying condors.

No widespread radiotelemetry studies of Peregrines were conducted during the postwar declines, and very little was learned directly about what, if any, mortality factors might have been involved. Instead, especially in North America attention quickly became focused on reproductive factors and DDE, once DDE's reproductive effects became known. Once a plausible culprit was in hand, the search for other culprits soon lost urgency. In fact, many studies that were performed after the original ones that implicated DDE did not consider a full range of alternative hypotheses. A significant role for DDE in the declines is not in question, but whether the effects of this substance came close to fully explaining the declines was never determined conclusively.

When the case implicating dieldrin emerged at the Thessaloniki conference, the general reaction was one of surprise and confusion. For some, including me, who had studied the effects of organochlorines on wild raptor populations, there was considerable soul-searching as to how thoroughly earlier conclusions needed to be reexamined. Many of us had detected dieldrin residues in raptor eggs but had found them fairly low in concentration—without apparent importance to reproductive performance or mortality. But we were indeed sampling survivors only, and this may have been a very biased procedure in a larger

sense. Average dieldrin levels in eggs might reveal very little about the percentage of a population receiving lethal doses, and this percentage need not be extremely high to have massive effects on population stability, especially when combined with the effects of DDE. Dieldrin's effects could easily be confused with the effects of DDE if no comprehensive effort was made to monitor rates and causes of mortality.

The soul-searching continues today, as is evident in the present volume. Nisbet's analysis of the potential involvement of dieldrin in the Peregrine declines is especially thorough. His basic conclusion is that this substance may have been important in North America and Britain. Conclusive evidence is lacking, but in both regions there was heavy use of dieldrin (and its precursor aldrin), some Peregrines were found dead of dieldrin poisoning, and many populations declined with sufficient speed to strongly suggest something beyond reproductive problems.

Presentations by Risebrough, Peakall, Kiff, and the editors continue to favor a primary role for DDE, based in part on an impressive worldwide linkage between degree of eggshell thinning and severity of population declines. However, because patterns of dieldrin use have generally been correlated with patterns of DDT use, it seems possible that equally good or better linkages may exist between dieldrin exposure and population declines or between combinations of DDE/dieldrin exposure and population declines (comprehensive data to test such relationships have not been assembled).

Risebrough and Peakall also develop demographic models to determine if rapid declines could result from DDE contamination alone. Although these models represent a great advance over earlier models, the results seem inconclusive. With annual adult mortality set at 16.7–20.0%, first-year mortality set at 66.7%, and productivity set at a DDE-stressed level of 0.3 young per pair, the Risebrough-Peakall models predict a rate of population decline quite similar to the crash actually observed in eastern North America. However, dropping adult mortality slightly to 15% and first-year mortality to 50% would sufficiently delay the decline that it no longer would resemble what was observed. Evidently the effects of DDE-lowered productivity depend crucially on what mortality rates characterize a population.

Unfortunately, there is little reliable information to suggest what mortality rates might be considered "normal" for the Peregrine, although various authors in this volume present mortality rate determinations. Newton and Mearns, for example, found an annual adult loss rate very close to 10%, based on retrapping of marked breeders in a recovering population in Scotland. Using similar methods, Enderson and Craig found 16% annual adult mortality for a depressed but relatively stable (because of releases?) Colorado population. Ambrose and Riddle found somewhat higher (23%) adult mortality for a recovering Alaskan pop-

ulation, again by similar methods. All these determinations were in fact maximum estimates because of the potential confounding of undetected dispersion with mortality. Enderson and Craig, for example, estimated that true annual adult mortality for their Colorado population might have been in the range of 10–15%. Moreover, all these determinations may have included greater or lesser amounts of "nonnormal" (i.e. human-caused, including pesticides) mortality.

Although Risebrough and Peakall suggest that the crash of the Peregrine in eastern North America might plausibly have been due to DDE-lowered productivity alone, the 16.7–20.0% adult mortality rate necessary to achieve this result in their models may have included at the outset a substantial component of excess mortality. In fact, if "normal" adult mortality is on the order of 10% in many regions (a reasonable possibility, judging from the above data), one could conclude that there may have been a near doubling of normal adult mortality rates during the crash years (mortality that could be attributed, at least in part, to dieldrin). Likewise, the estimate of 67% first-year mortality used by Risebrough and Peakall may have included substantial excess mortality, judging from the data of Newton and Mearns. These latter researchers calculated a total of only 56% mortality of Scottish Peregrines through their first *two* years.

Unfortunately, the amount of credible data on mortality rates of Peregrines is still too small to allow safe generalizations (most mortality-rate calculations based on general band-recovery data are highly suspect), and unfortunately there is no good direct documentation as to what dieldrin was actually doing to wild raptor populations in the 1950s and 1960s. Excess mortality in those years could have been produced in part by factors other than dieldrin (including DDE, despite its relatively low toxicity). So while the circumstantial evidence for an important role for dieldrin is considerable, both for North America and Britain, exactly what happened to the Peregrines of that era may never be known. Crucial data on rates and causes of mortality were never collected. Very likely, both DDT and dieldrin contributed to the declines, and their relative importances probably varied from place to place and year to year.

Uncertainties about causes of the Peregrine's decline are not limited to debates over dieldrin versus DDE. In fact, although they receive little consideration in the present volume, certain populations were in decline before either DDE or dieldrin appeared on the scene. For example, James Rice documented in the earlier volume a precipitous pre-DDT decline of the population in Pennsylvania and New Jersey. Between 1939 and the mid-1940s nearly one third of the nesting pairs in this population disappeared, an effect that Rice attributed primarily to human disturbance, especially by falconers. He attributed earlier declines mainly to egg collectors. Whatever the full causes

were, they must have been factors other than DDE and dieldrin in those years. Furthermore, in examining Rice's territory desertion curve, one is impressed that there is no sign of a sudden acceleration in abandonments with the advent of the DDT era, just a steady linear continuation (with some minor annual variations) of the steep downward trend already in progress! Yet aspects of the demise of this Peregrine population are still repeatedly regarded as examples of the effects of DDE alone, as if the causes of the pre-DDT decline suddenly became inoperative with the advent of DDT.

The contributions of various positive influences to recovery of the Peregrine are also somewhat uncertain. There can be no reasonable doubt that the phase-out of both DDT and dieldrin (and other organochlorines) was highly beneficial to many populations. This should not lead us to forget the contributions of reductions in shooting and falconry, or the contributions of population enhancement by the reintroduction programs documented in this book. Large scale releases of captive-bred Peregrines have been carried out in many regions in North America and Europe, and have succeeded both in urban and more natural settings.

How crucial have reintroduction programs been for overall recovery? Many populations, such as those of Great Britain, Arizona, and arctic Alaska, have already recovered almost fully without such programs. It is further reasonable to suppose that populations such as these could eventually serve as source populations for natural reestablishment of other populations. Nevertheless, few observers would deny that recovery in many regions was speeded greatly by release programs, and that certain populations that were wiped out (eastern United States, East Germany) or are still under heavy pesticide stress (southern California) owe their very existence to such programs.

Moreover, those who discount the value of release programs often fail to appreciate the enormous benefits of these programs in terms of public education and training of personnel for future conservation battles, probably the most important values of the programs in the long run. The hundreds of alumni of the Peregrine efforts will occupy roles of influence in wildlife conservation for many decades. Those who have led the efforts—Tom Cade, Richard Fyfe, James Enderson, Brian Walton, and many others—deserve special commendation for their efforts in an overall sense and especially for their perseverance in spite of many political discouragements and at times actual harassment from governmental and other officials.

"Peregrine Falcon Populations, their Management and Recovery" is a valuable book, makes intensely interesting reading, and will undoubtedly serve as a major reference for raptor and conservation biologists for many years. Failings of the book are minor and few. The most noticeable is an uncomfortable tendency for the editors to append their own opinions

to presentations without providing authors with an opportunity for rebuttal or further discussion. In addition, the reader is occasionally left without an opportunity to hear a full exposition of all sides of an argument. In particular, responses by Ian Newton and Derek Ratcliffe to the points raised on the dieldrin-DDE debate by Risebrough, Peakall, and the editors would have been most appropriate and would surely have enhanced the value of the book significantly.

Finally, it is worth noting, as was pointed out in the conference summary by Nisbet, that despite the massive investment of resources in Peregrine research and conservation in the past two decades, and despite a massive number of publications dealing with this species (more than 1,500 titles), there are still substantial gaps in our knowledge of its basic biology. For example, basic Peregrine demography is still little understood, and virtually no data on growth rates of nestlings have been published. Little has yet appeared on biological aspects of the release programs—for example, survival rates of released birds, their dispersal from release sites to breeding sites, or the comparative success in establishment of different racial stocks in various areas. Now that many populations of the species have clearly emerged from a severely threatened condition, it seems appropriate for Peregrine studies to evolve from a long-standing emphasis on status surveys and eggshell thinning to an emphasis on a variety of biological questions that have as yet received little attention.—NOEL F. R. SNYDER.

Waterfowl in Winter.—Milton W. Weller, Ed. 1988. Minneapolis, Minnesota, University of Minnesota Press. xx + 624 pp., 96 text figures. ISBN 0-8166-1570-5. Cloth, \$49.50. ISBN 0-8166-1571-3. Paper, \$19.95.—It comes as something of a surprise to a European waterfowl researcher to learn in the opening paper of this book that basic wintering waterfowl biology in the New World is poorly known. It is all the more surprising when 47 contributions follow which clearly show this not to be the case! In Europe, we have a great deal of information relating to wintering wildfowl, but until recently lacked access to major breeding areas. This is in considerable contrast with the experience in North America, where the emphasis has always been on the study of breeding stocks.

This work is extremely impressive and is the result of a symposium held in Galveston, Texas, in January 1985, the distillation of more than 100 paper and poster presentations on the broad subject of waterfowl during the nonbreeding season. The symposium was one of the largest gatherings of North American waterfowl biologists, ecologists, and managers this century, and there was never any doubt that the work that was to be presented there would be of considerable moment.

The papers are organized into topics, namely Reproductive and social behavior; Activity budgets; Community and feeding ecology; Weights, molts and condition; Habitat resources and selection; New habitats and habitat management; Harvest, distribution, and population status; and Habitat loss, toxins, and disease. These areas include a good balance of state-of-the-art research, the interesting and the unusual. Some articles fall a little below the standard of the majority. One feature I particularly appreciated was that reports of workshop sessions follow papers. These reports neatly summarize research to date, offer up-to-date reviews, and recommend future lines of investigation. Such a synthesis of views by acknowledged leaders in the field should be a compulsory feature of symposia proceedings, as long as contributions can balance inspiration with succinctness!

The social behavior section opens with two excellent papers on the cohesion and pair-bond dynamics in Barnacle Geese (*Branta leucopsis*) and the implications for mating strategies and breeding success. Stuart Paulus extends his studies of pairing chronology to the Mottled Duck (*Anas fulvigula*) in Louisiana wetlands, and Denis Raveling and James Johnson suggest that the advantages of feeding in large, densely packed flocks on low-quality forage offset the advantages of maintaining close family associations in Cackling Geese (*Branta canadensis minima*).

The activity budgets section opens with a review by Stuart Paulus, which covers the subject comprehensively and draws on more European works than many of the other areas of research. With many common European duck species feeding partly or wholly during hours of darkness, an overview of the need for nocturnal budgets from Jorde and Owen also underlines the lack of data in this area from the New World, again contrasting the extensive works of Tamisier and co-workers from this side of the Atlantic.

The massive analysis of winter duck communities in the Lower Colorado Valley by Anderson and Ohmart is impressive, but disappointing in its simplistic analysis of such a large database. Surely there are many more adventurous multivariate techniques to be used in such situations, both to summarize and hypothesize. The analysis of Canvasback (*Aythya valisineria*) feeding ecology in the Upper Mississippi is impressive. The 5 million bird/day feeding that depends on the performance of two plant species presents conservation management problems, with considerable opportunities for catastrophic declines of dependent waterfowl stocks.

To the European observer, the North American waterfowl biologist is most comfortable in an analysis of carcasses; and the section on weights, molt, and condition offers full rein! Most of the analyses are extensions of the present knowledge of cycles in some measure of condition, but I enjoyed the novel approach of Ringelman who uses condition indices of captured birds to support the hypothesis that severe

weather alters the habitat distribution of subordinate individuals.

The session on habitat resource and selection offers a considerable change of pace. It takes a much more descriptive approach to examinations of waterfowl use of forested southern wetlands and duck food production in clearings in such wetlands. Tietje and Teer's analysis shows that Shoveler (*Anas clypeata*) habitat quality was greater in freshwater wetlands than saline, and that this was reflected in the condition of individuals that used the two habitats. Incredibly, this trend was reversed during the cold winter of 1983/1984 apparently because of ingestion of cold-stunned fish in saline habitats, while food resource quality of freshwater wetlands declined. With the impact of cold weather of high interest in Europe at present, it is fascinating to read of the effects of cold weather on the distribution, flock organization, and structure, which clearly influence our ability to adequately and consistently census populations at a time when data related to distribution and abundance may be crucial to management planning.

We in Britain are very conscious of the role played by gravel abstraction and the creation of hydroelectric and drinking-water reservoirs in providing waterfowl habitat. It is therefore of great interest to learn of the effects of artificial feeding in park-type habitats on the expansion of the Mallard (*Anas platyrhynchos*) in the northeastern United States. The use of catfish-rearing ponds and floodwater impoundments by wintering waterfowl has changed in the southern United States, where once forested wetlands must have hosted very different wintering waterfowl communities. Waterfowl managers must read the sections on the effectiveness of monocotyledonous crop species to provide adequate forage for crayfish and wintering waterfowl. New ideas for the management of brackish impoundments for wintering duck species will also be of interest.

The section on population and distribution opens with a "first" analysis of Neotropical banding recoveries. The highlight would appear to be a gap in our knowledge of more southerly wintering species. Perhaps the waterfowl biologists have something to learn from the recent work on New World shorebirds here! Papers on site fidelity, changes in staging behavior and status, population declines and increases follow. Descriptions of the harvest dynamics of central valley California round off the session, but it is the workshop discussion which is most disquieting from a conservation and management standpoint. The plight of many Alaskan geese is well-known, but the chilling reductions in numbers of Cackling, Pacific White-fronts (*Anser albifrons frontalis*), Emperor Geese (*Chen canagica*) and Brant (*Branta bernicla nigricans*) without adequate data to define the factors responsible are clearly of great concern. This seems all the more depressing when the discussion leads into the final session on habitat loss, toxins and disease. All these fac-

tors erode the dwindling waterfowl stock. Case studies of habitat loss and pollutant contamination from Texas and the persistence of ingested lead shot in the Upper Gulf Coast in spite of implementation of steel shot are extremely worrying. Perhaps it is merely the fact that the book ends with these rather depressing subjects, but amid all the impressive contributions, the reader is left wondering if there is any hope for the future of North America's wintering waterfowl! Clearly there is hope, and enormous progress. However, it is sometimes hard to find very much new in the way of ideas for protecting, through conservation management, the present waterfowl stocks of the continent.

With such a combined might of minds, this volume is without doubt essential for all university and museum libraries with an interest in wildfowl. It is without doubt the best "access to tools" volume for all waterfowl biologists and managers. My only grouse is the three-year time lag between the symposium and the publication of the proceedings. However, the copies lying around the research department here at Slimbridge are all extremely dog-eared through continuous use, and the wait was clearly worthwhile.—A. D. Fox.

Ospreys: A Natural and Unnatural History.—Alan F. Poole. 1989. Cambridge, United Kingdom, Cambridge University Press. xviii + 246 pp., 92 text figures, 21 text tables, 10 appendices (figures and tables). ISBN 0-521-30623-X. Cloth, \$27.95.—The Osprey (*Pandion haliaetus*) is now arguably the world's best known bird of prey. The DDT-related Osprey population crash in the northeastern United States resulted in an unparalleled amount of research during the last 20 years. In 1969, when I published my first paper on Ospreys in *The Auk*, there were only three or four osprey papers of consequence in the United States, plus an important paper on Swedish Ospreys, which hardly compares to the nearly 300 papers (the great majority dealing with Ospreys) cited by Poole in his book. Based on his detailed investigations in eastern North America and the literature from throughout the world, Poole wrote a book with perfect timing. A synthesis of the massive literature on this species was needed, and judging from the biological soundness, completeness, and clear writing style, Poole was the proper person to write the book. Of course it is one aim to prepare a synthesis but, in addition, Poole carefully points out potential biases in data, gaps in information, and needs for further research. The book is both informative, and points out research problems for the next generation of Osprey investigators.

The book consists of 11 chapters that have come to be fairly standard for species accounts including phylogeny and classification, distribution, migration, diet and foraging ecology, breeding behavior, breeding

rates, population regulation, threats, and management. Poole concludes by highlighting the two well known population studies in Scotland and New England.

The history of Osprey populations, present distribution, and abundance are reviewed in detail. In fact, the literature was sufficient for a worldwide estimate of 25,000 to 30,000 breeding pairs, but information from some locations was weak. About 70% of the pairs nest in North America and the Caribbean. Two other major strongholds are Scandinavia (10–12%) and the USSR (8–20%). The best chapters cover the observational data from Poole's own intensive research (some of it unpublished) during the nesting season. He addresses questions like why young pairs produce fewer young, and what percent of Ospreys survive to breed in relation to their own hatching date. Ospreys hatched early in the nesting season were three times more likely to return as breeders than those hatched late in the nesting season. To obtain these data required a color-marked population and many hours of field observations over many years. Poole argues that the lack of nest sites has been the key constraint on most populations studied.

Shorter dispersal distances were reported for young from New England with its relatively continuous breeding populations, as opposed to Sweden where nesting sites were more scattered. Two implications of the relatively short dispersal distance in New England are indicated: (1) population change is usually the result of local production (during the DDT era, the New England population declined, and the large population in Chesapeake Bay probably contributed few immigrants to the declining population); and (2) the species' ability to pioneer suitable habitat outside the present breeding range is weak (several "hacking" projects are underway to reintroduce Osprey into portions of their former range). Poole notes that it took more than 40 years to recolonize Scotland from Sweden (only 600 km away). The age at first breeding is some of the most difficult data to obtain. In a low-density population Poole reports 3.6 years as the mean age of first breeding. In Chesapeake Bay, where it is now difficult for an Osprey to find suitable nest sites, the mean age is 5.7 years. The discussion of these findings, including the improved breeding success on artificial structures, is the most interesting part of the book.

Poole points out that the key to understanding human disturbance was the extent to which Ospreys became habituated. Suburban Ospreys exposed to relatively continuous human activity from the time they arrived and started building nests produced quite well, whereas sporadic human disturbance caused some reproductive problems. Poole uses 14 pages to discuss the impact of DDT and other pollutants on populations. He concludes that DDT *threatened* only a few populations in the northeastern and midwestern United States by thinning eggshells and killing em-

bryos. These populations are now recovering. Other pollutants like dieldrin and mercury had more local impacts.

The book is remarkably free of typographical errors. I found only two (table 4.1 and figure 9.10). The line drawings by Margaret LaFarge improve the overall attractiveness of the book and introduce each chapter. Books on Ospreys have been rare, and it was surprising that the last book published (Brown, P. 1979. *Scottish Ospreys: From Extinction to Survival*. Heinemann, London, xvii + 190 pp.), though non-technical, failed to be cited for additional background information. The Scottish population was one of the special case histories reviewed in chapter 11.

Poole's book is excellent and the above minor criticisms, and the somewhat corny title, are not serious detractors. It will certainly find its way into the libraries of raptor specialists. The unique and rather complete information, which is not available for other North American birds of prey, makes it useful for all professional ornithologists. In spite of the large amount of scientific information encapsulated in the book, it is highly readable, and the layman also has much to gain from it. I consider the price reasonable.—CHARLES J. HENNY.

Handbook of the Birds of Europe, the Middle East and North Africa. The birds of the Western Palearctic. Volume V: Tyrant Flycatchers to Thrushes.—Stanley Cramp, Chief Editor. 1988. Oxford, New York, Oxford University Press. 1,063 pp., 84 color plates, 11 figures and numerous (unnumbered) text figures (maps, voice sonograms, sketches of display postures, and annual cycles), indices to scientific, English, French, and German names. ISBN 0-19-857508-4. \$175.00.—After reading, consulting, comparing, checking, and mentally criticizing this huge book, I realized that there is no way that an honest reviewer can truly review "The Birds of the Western Palearctic," edited by Stanley Cramp. First, this volume is the fifth of a projected seven-volume set, so a review of Volume V, by itself, cannot reflect the reviewer's overall appraisal of the entire project. Second, even the most conscientious of reviewers—and hopefully I belong in this category—cannot really *read* 1,063 pages of text printed mostly in small type where the entries list facts rather than describe them in complete sentences. In fact, such a book cannot be read, and it is probably not meant to be read but instead to be consulted, used, reused, and finally digested in the context of actual work on the birds described. A reference book can be judged only after years of use. And third, a single person can hardly dare to analyze critically a massive piece of work produced by a large team of knowledgeable editors, writers, artists, and consultants, all of them excellent ornithologists laboring under the supervision of a competent Chief Editor. In spite of this impossible challenge, I ac-

cepted the task. I am writing this piece in an office overlooking Central Park in New York City, rather than in Spain, Sweden, or Syria. To make matters worse my field research has been mostly in South America. Nevertheless I am more familiar with the avifauna of the Western Palearctic than with any other I have studied firsthand as a professional ornithologist. I grew up with the Western Palearctic avifauna, and I have returned to it many times. I have visited the region from the Canary Islands to Egypt and Turkey, and from the Mediterranean basin to the Baltic Sea. I have kept up with many European ornithologists and their work, and I have reviewed two previous volumes of the "Handbook" (Volume II, *Q. Rev. Biol.* 56: 83, and Volume III, *Q. Rev. Biol.* 59: 338).

The general scope of the series was described competently by H. Ouellet in his review of Volume I (*Auk* 99: 807). I will also skip certain specific kinds of criticisms (for instance about the general accuracy and completeness of coverage of individual species). This was performed well by W. H. Drury in his review of Volume III (*Auk* 102: 428). I take it for granted that readers of *The Auk* already know what the "Handbook" is about and have read, or can read again, the two excellent reviews cited above. My review will attempt to look at the project as a whole and to assess the general value of books such as the "Handbook of the Birds of Europe." Although the series is still incomplete, it is well past the halfway mark, and one can obtain a fairly accurate picture of the entire endeavor. I will thus do what I claimed earlier ought not to be done, but what fun is there if one cannot once in a while take a risk?

The avifauna of the western Palearctic Region has been studied intensely for many years. Some of the keenest ornithologists of all time have worked on all or part of it, and a few of them have produced splendid syntheses of the taxonomy, distribution, molt, breeding biology, migration, habitat preferences, and other features of the region's avian species. To place the "Handbook" in some perspective consider some of its precursors.

H. E. Dresser's "A Manual of Palearctic Birds," more than 900 pages, was published in London by its author in two parts in 1902-1903, and contained descriptions of the taxa, their geographical ranges, and some other details. It is rarely cited. And who bothers to consult or cite E. Hartert's masterpiece (Charles Vaurie's word) "Die Vögel der paläarktischen Fauna," subtitled "Systematische Übersicht der in Europa, Nord-Asien und der Mittelmeerregion vorkommenden Arten?" This extraordinary work, published in Berlin between 1910 and 1922, ran into 2,328 pages. It was completed by the publication of a "Nachtrag" in 1923 and an "Ergänzungsband" in 1932-1938 (with F. Steinbacher). Hartert was curator of birds of the huge Rothschild collection in Tring, had collected himself in remote areas of the Palearctic, and had at

his disposal the most complete collection of Palearctic birds ever amassed. This collection, now at the American Museum in New York, permitted Vaurie to carry out his comprehensive systematic studies, culminating in his two-volume classic "The Birds of the Palearctic Fauna, A Systematic Reference," the "Passeriformes" (1959, 762 pp.) and the "Non-Passeriformes" (1965, 763 pp.), both published in London. I consider Hartert's and Vaurie's books to be the cornerstones of modern Palearctic ornithology.

Yet in the postwar development of ornithological research in western Europe and the Soviet Union, a series of mammoth undertakings wedge themselves between the great systematic syntheses just cited. Written largely within a linguistic or nationalistic context, these handbooks were usually the result of collaborative efforts carried out under the editorship of one or a few ornithologists, and involved large numbers of correspondents or junior co-authors, whose contributions were integrated in the whole project. To English language ornithologists, the best known of these efforts is of course the "Witherby," or "Handbook of British Birds," published in London during the Second World War between 1938 and 1941, and edited by H. F. Witherby, F. C. R. Jourdain, N. F. Ticehurst, and B. W. Tucker. (Incidentally, the "Handbook's" predecessor was H. F. Witherby's own "A Practical Handbook of British Birds," published in 18 parts between 1919 and 1924.) For Swedish-speaking ornithologists the key handbook was probably K. Curry-Lindahl's "Våra Fåglar i Norden," four volumes published in Stockholm from 1959 to 1963. For French-speaking Europeans the "Géroutet" became the bible. It first appeared as the six-volume series "La Vie des Oiseaux" (1940-1957), and was completed by the publication of new editions and, more recently, by totally new volumes. This richly illustrated and highly readable handbook has had an enormous impact on the growth of ornithology in francophone Europe. In the Russian language, the handbook was G. P. Dement'ev and G. P. Gladkov's "Ptitsy Sovetskogo Soyuza," six volumes published by Sovetskaya Nauka in Moscow between 1951 and 1954. An English language translation of this impressive work, "Birds of the Soviet Union," is available thanks to the Israel Program for Scientific Translations in Jerusalem (published in six volumes between 1968 and 1970). As Dement'ev and Gladkov indicate in the Introduction to Volume I (page 2 of the English translation) "The present authors have undertaken to provide readers with an exhaustive treatise incorporating all available information on the birds of the entire Soviet Union." And finally, German-language ornithologists became totally dependent upon G. Niethammer's "Handbuch der deutschen Vogelkunde," a three-volume masterwork published in Leipzig from 1937 to 1942 (as the Witherby, during the war).

When I learned ornithology in western Europe between 1953 and 1960, the handbooks used as the ref-

erence texts, in central Europe at least, were the Gérardet, the Witherby, and the Niethammer. The Hartert was consulted once in a while, and the Dement'ev and Gladkov was only looked at (maps, illustrations). Unfortunately none of us read Russian, and the English translation had not come out yet. The impact of Vaurie's systematic revisions had not yet been felt fully because his work had only appeared piecemeal in *American Museum Novitates* (Systematic Notes on Palearctic Birds, 53 papers published between 1953 and 1964).

Such is (part of) the background to the "Handbook of the Birds of Europe" edited by Cramp. To those of us nourished in the tradition of the three "greats" (Witherby-Géroutet-Niethammer), the Cramp can be judged only by reference to them. From what I see as the antecedents of this handbook, I note that, apparently at least, Cramp's "Handbook" views itself (Introduction to Volume I, page 1) only or entirely as the successor to Witherby's "Handbook," albeit with a less insular and British connotation, because it includes the entire Western Palearctic. Cramp's "Handbook" does not see itself as the heir, as well, of the important handbooks that preceded it in other languages. This may be a trifling point to an American but to a Central or continental European reader, this seems strange. Even more interesting is the fact that, when Volume I of Cramp's "Handbook" appeared (1977), no fewer than six volumes of a stunning new German-language "Handbuch der Vögel Mitteleuropas" had been published, edited at first by K. M. Bauer and U. N. Glutz von Blotzheim, and later chiefly by Glutz von Blotzheim (from now on, the Glutz "Handbuch"). Whereas Cramp was Witherby's successor, Glutz was Niethammer's. (Volume 1 of Glutz was reviewed [Auk 85: 522] by W. Bock and Volume 7 [Auk 95: 615] by E. Mayr. Both reviews should be consulted for details about the Glutz series.)

So now, in 1990, we have two handbooks for western Europe, both encyclopedic and authoritative. The present generation of European ornithologists, instead of being weaned on the Niethammer-Géroutet-Witherby trio, will depend on the Glutz-Cramp duo. Reviews of Cramp must include reference to Glutz, for these two are the handbooks nowadays. Eleven volumes (of a total of 14 planned) of the Glutz have appeared, and five (of seven) of the Cramp. Both have gone way beyond childhood diseases and are in healthy middle age.

Although both the Cramp and the Glutz have roots in specific earlier handbooks, neither of them can truly be compared with their forefathers. Both Glutz and Cramp have gone so far beyond Niethammer and Witherby that comparisons between generations become meaningless. I am not implying that the Glutz is better than the Niethammer or that the Cramp is better than the Witherby. The difference between these two generations lies in the volume of information unavailable to Niethammer or Witherby synthesized

by Glutz and by Cramp. The early volumes were outstanding when they appeared, and they remain outstanding today but have been superseded. Thus the only way to gauge Cramp's "Handbook" is to compare it with Glutz's "Handbuch." I will do this at two levels. For detailed comparisons of a single taxon, I will examine how Cramp and Glutz deal with the genus *Anthus* (especially with the species *A. pratensis*). *Anthus* is dealt with in Glutz's volume 10 (part II), published in 1985, only three years prior to Cramp's volume V. Then I will discuss some general features of both handbooks.

Anthus is a genus with fascinating problems. Species are often difficult to tell apart. *Anthus* comprises both allopatric groups of related taxa and sympatric groups of similar taxa. There are island endemics as well as forms confined to high mountains or the sea-coasts. There are forms that show long distance migration, and others that have far more restricted movements. Some groups of taxa have enormous ranges across the Palearctic and beyond, whereas others are largely restricted in their distribution. Besides the Palearctic species, others are found in other parts of the world.

By and large, the *Anthus* accounts in both the Glutz and Cramp volumes are static, and convey little of the potential biological excitement of the genus. The introduction to the genus is more informative in Glutz, and is accompanied by a useful key, a feature absent in Cramp. There are eight color plates of various pipit species in Cramp, none in Glutz. The distribution maps in Cramp are probably more useful to the general reader than those in Glutz, in part because they include the entire range of the species, in part because they are in color, and in part because they have latitudes and longitudes, a feature lacking in Glutz. Two species treated by Cramp (*berthelotii* and *similis*) are not in Glutz because of greater geographic coverage in Cramp. There are taxonomic differences. The American *rubescens* is considered a species in Glutz, a subspecies of *spinoletta* in Cramp. *Anthus richardi* is a full species in Glutz, a subspecies of *novaeseelandiae* in Cramp. These differences are minor, but a nontaxonomist might have trouble figuring out why they are there at all.

For an even more detailed comparison consider *Anthus pratensis*, the Meadow Pipit, a common species in the Western Palearctic. Both Glutz and Cramp treat in about equal detail topics such as habitat preference, movements, and food. The section on population density in Glutz (Bestand, Bestandsentwicklung) has no equivalent in Cramp, although the latter also has a section called population. Glutz reviews scattered literature on breeding density on different habitats in various parts of the range of *A. pratensis*, whereas Cramp merely summarizes approximate totals from various census work. The section on distribution in central Europe in Glutz has no equivalent in Cramp. The reference citations for *A. pratensis* are found at

the end of this species' entry in Glutz, a very useful feature. All references in Cramp are at the end of the book, and almost illegible because of the microscopic size of the type. The sections on movements in both books are extensive, but the emphasis in each treatment is different. Although the sections on food are about equally detailed in both handbooks, Glutz is more specific, and includes precise accounts of food items in various habitats. The section called field characters in Cramp is too long to be useful as such (one wants to turn to a field guide instead). The concise field characters section in Glutz is more helpful for field workers. The sections on vocalizations are detailed in both volumes, and about equally complete.

A comparison of the treatment of *Anthus* in general, and of *A. pratensis* specifically, in Glutz and in Cramp, reveals much overlap between the two handbooks. Yet sufficient differences in detail and emphasis exist that, in order to get a full picture, one clearly needs to consult both books. Overall, the treatment is more carefully edited and better presented in Glutz than in Cramp (maps aside), which makes the Glutz easier to read and to consult.

I turn now to a general comparison of the two handbooks. The Glutz, written in German, is less easily accessible to general readers than the Cramp. For instance, a Japanese ornithologist interested in birds that are found at the other end of the Palearctic region is more likely to read English than German, and to turn to Cramp than to Glutz. There will be fewer volumes in the complete Cramp than in the complete Glutz, an advantage in my opinion, but this is partially compensated for by the fact that Glutz is more readable than Cramp. I cannot really see an amateur wishing to read the Cramp volumes for pleasure, whereas this is clearly more likely for the Glutz. The older volumes of the G eroudet-Niethammer-Witherby era are easier to consult and to read because there are fewer volumes, and the entry for each species is more concise. Indeed the G eroudet is a pleasure to read. Thanks to this feature, this book certainly attracted many amateurs to bird study, whereas I doubt that this was the case (or as much so) for the other two older handbooks. In this regard, the new generation of handbooks would appear to repel rather than encourage amateurs, but this is only speculation.

The numerous color plates and color maps are an attractive feature of the Cramp volumes. Some ornithologists are likely to acquire Cramp for the iconography alone. The Glutz has many black-and-white drawings of birds in various postures and displays. This compensates for the very small number of color illustrations. The much greater geographic coverage in the Cramp volumes is an asset, but on the other hand the very detailed treatment in Glutz of central Europe allows one to see how much information is really available in the local literature, and thus how much is known on the birds of this part of the world. Again, more species are included in the Cramp be-

cause of the greater geographic coverage. One may wonder about the inclusion of vagrants in Cramp (e.g. *Empidonax virescens*), but this is a minor point.

In a nutshell, both handbooks are excellent and extremely useful, but both cover much the same ground. There is an inordinate amount of overlap. The differences between them are substantial, and the serious student of western Palearctic birds will want to have both sets at his or her disposal. One of the points made by Cramp (in the introduction to the first volume of the series, p. 1) is that such books, synthesizing as they do so much material otherwise not easily available in such digested form, should clearly "focus attention on the still considerable gaps in our information, even of common species, and on the correlations between different aspects of our knowledge, so providing a stimulus for further studies." In fact, there is so much information in both the Cramp and the Glutz volumes that it is not so easy to figure out what remains to be done. Rather the contrary, the exhaustive nature of coverage in both handbooks might suggest to many readers that little more remains to be discovered, especially about common species. The gaps are mentioned, it is true, but where this is stated, this kind of suggestion is drowned in the flood of detail.

My overall prognosis is that English-language ornithologists and others who do not read German easily will use Cramp and ignore Glutz for linguistic reasons alone. Conversely, all German readers will tend to use the Glutz volumes and ignore the Cramp set, which they may view as a slightly inferior, Glutz-inspired or Glutz-facilitated, competitive venture. Very few potential users will be able to read and fully use both sets of handbooks. This is a pity because both books have strong and weak points, and a full appreciation of our present knowledge of western Palearctic birds can only be achieved after study of both series. Together, Cramp's "Handbook" and Glutz's "Handbuch" constitute the basic reference work on western Palearctic birds. They are the indispensable tool that every ornithologist will need to consult. Their value lies in their completeness, accuracy, and wide-ranging scholarship.

In spite of some weak points in the Cramp and the Glutz volumes, both sets of books are quite outstanding. Editors, collaborators, artists, and publishers must be congratulated for handbooks that simply have made the older generation obsolete. At the time I was growing up, it seemed to me, and to many others as well, that the Witherby-Géroudet-Niethammer trio could never be superseded. But this has been done, and one can only wonder about the future. Surely, after studying these tremendous syntheses, one must ask whether anyone will ever be able to produce new works that will, in their turn, supersede the Glutz-Cramp pair. But history repeats itself. For the present, let us be grateful to Cramp and Glutz, and their collaborators, for the immense job they have already accom-

plished so well. Surely theirs is a labor of love. To keep publishing volume after volume, as Cramp and Glutz are doing at such a phenomenal rate, means to force oneself into working habits of awesome dimensions. After so many years, the end is in sight. But perhaps the last volume ought not to be the final word. Indeed, these efforts are so enormous that one might hope that an abbreviated version could ultimately be produced, perhaps in two volumes at the most. More compact, better digested, more readable, with fewer illustrations and fewer references, these abridged tomes would truly be able to point out what gaps remain in our knowledge, and where the answers to remaining questions can be sought. In the meantime I can only recommend to all students interested seriously in the birds of the western Palearctic to acquire both Cramp's "Handbook" and Glutz's "Handbuch." Realizing that the total cost of such a purchase is extremely high and that not everyone can afford such prices, all workers must request that their institutional libraries acquire the entire set of each handbook. I suggest that the editors or would-be editors of handbooks that cover other avifaunas study the Glutz and the Cramp in order to reach similar high standards for their respective regions.—FRANÇOIS VUILLEUMIER.

Return of the Whooping Crane.—Robin W. Doughty. 1989. Austin, Texas, University of Texas Press. x + 182 pp., 32 color plates, 6 maps, 7 tables. ISBN 0-292-79041-4. Cloth, \$24.95.—Fewer than 40 years ago, *Life* magazine ran an article decrying the plight of Whooping Cranes (*Grus americana*) on their wintering grounds at Aransas National Wildlife Refuge (Aransas) along the Gulf Coast. The small flock of approximately 20 birds that summered at Wood Buffalo National Park (Wood Buffalo) in Canada and wintered on the Texas coast at Aransas comprised the entire wild population of the species—a population that at the time seemed to be drifting inexorably toward extinction. Today, the Aransas/Wood Buffalo flock numbers more than 140 birds, there are more than 30 birds in captivity at the Patuxent Wildlife Research Center (Patuxent), and another 20-plus birds at the International Crane Foundation in Baraboo, Wisconsin. There are also a dozen wild birds in an experimental flock (termed the Rocky Mountain flock by Doughty) that winters at Bosque Del Apache National Wildlife Refuge (NWR) in New Mexico and summers in the mountain valleys centered on Grays Lake NWR in Idaho.

That this dramatic reversal has occurred within a few decades is due, in part, to the concerted efforts of scientists and conservationists led by the U.S. Fish and Wildlife Service and the Canadian Wildlife Service. More important, however, is the species' adamant refusal to die. Although it is seldom admitted in conservation circles, 100% of the increase in the

Aransas/Wood Buffalo flock is due to the crane's own procreative powers. Even more remarkable is the fact that this natural recovery took place even as the wild flock was called upon to provide more than 300 eggs for building the captive flock and the experimental Rocky Mountain flock. To reiterate, no egg or bird from these managed sources has ever gone back into the Aransas/Wood Buffalo population.

Robin Doughty chronicles the saga of the partial recovery of this critically endangered crane. Doughty's book is notable for the magnificent photographs of Whooping Cranes and their habitats and the exceptional 5- and 6-color maps that illustrate the bird's distribution and other pertinent facts about Whooping Cranes in North America. His text, while written in an entertaining style for a broad audience, is substantive as well.

Like its predecessor volume, Faith McNulty's "The Whooping Crane, the Bird that Defies Extinction" (1966), much of the text is an extensive chronology of key events (e.g. establishment of Aransas NWR). Where minutiae are effective in capturing the sense of continuing excitement and discovery that surround the crane's odyssey back from the brink, Doughty (like McNulty) includes day-to-day trivia (e.g. approximately 110 lines of text are devoted to the 3-day life of a single chick, Rusty). Although the book could be viewed merely as an embellished and updated sequel to McNulty's book, it is much more. McNulty dug deeply for details in weaving the fabric of the text and was unquestionably an artist with words; however, Doughty dug deeper and used not only artistic figures of speech, but also included eight poems (seven of which are his own), a sprinkling of poignant quotations from other lovers of cranes, and a scattering of religious images (e.g. LeConte's Sparrow, *Ammodramus leconteii*, becomes "a tiny rotund friar giving morning benediction"). Synergistically, these literary devices result in a work that, in places, approaches an aesthetic peregrination (i.e. the seeking of our inner self through understanding one of nature's wonders, in this case the Whooping Crane). Clearly, Doughty, like McNulty, is attempting to draw readers toward empathy with the crane and, as a result, toward developing a higher regard for the natural world.

Adults and even conservation-minded teens will appreciate the detail Doughty provides. Younger readers will enjoy a briefer account of recent developments in Whooping Crane conservation in "The Whooping Crane, A Comeback Story," a well-written and beautifully illustrated little book by Dorothy Hinshaw Patent and William Munoz (1988, New York, Ticknor and Fields. ISBN 0-89919-455-9. \$14.95).

Doughty organized his book into an Introduction, five chapters, a Conclusion, and an Epilogue. First, he provides some basic information on cranes of the world, recounts historical perceptions of cranes, and describes how scientific and wildlife management

studies are essential to efforts to protect and conserve the Whooping Crane. The first two chapters focus on the Aransas flock by describing the known history of the Whooping Crane in North America; detailing its decline over the past century from the activities of collectors, sportsmen, and farmers; describing the extinction of the nonmigratory flock that resided at White Lake, Louisiana; and relating the subsequent partial recovery of the Aransas flock to its present level. Here, Doughty quotes liberally from the 1952 Whooping Crane monograph by Robert Porter Allen and also draws much good information from Harry Oberholser's "The Bird Life of Texas."

The remaining three chapters detail specific aspects of the Whooping Crane recovery effort. A chapter on the work in Canada is concerned primarily with the observations of Whooping Crane nesting behavior and reproductive rates, the management activities at the nesting grounds in Wood Buffalo National Park, and the radio-tracking of Whooping Crane migrations. There is a description of the discussions that led to the decision to remove one egg from each two-egg clutch, either for transfer to Patuxent or to be placed under foster parent Sandhill Cranes (*Grus canadensis*) at Grays Lake NWR. Doughty has accorded the captive propagation and release programs at Patuxent a separate chapter. He describes the establishment of the captive flock of Whooping Cranes and their research surrogates, the Sandhill Cranes. He includes all aspects of captive breeding (including artificial insemination, surrogate incubation, foster parent rearing of chicks in captivity, and the recent hand-rearing developments that avoid imprinting chicks on human caretakers). He also discusses the program for releasing Sandhill Cranes in Florida and Mississippi.

Doughty chronicles the history of the Grays Lake flock in the final chapter. This flock was established by placing eggs from captive birds at Patuxent and wild birds from Canada into the nests of wild Sandhill Cranes. The sandhills hatched and raised the Whooping Crane chicks, then led them on their migration. His recounting of this episode is neither critical nor laudatory, but he discusses the high mortality rates and questionable results (only 13 birds survive from 288 eggs) from this intensive effort.

Doughty evaluates the progress of Whooping Crane recovery efforts in a section he labels Conclusion. Here he recapitulates the current work in light of the 1986 Whooping Crane Recovery Plan, considers the future of United States and Canadian cooperation, and discusses current management needs.

The Epilogue briefly describes the forthcoming efforts to establish a nonmigratory flock of Whooping Cranes in the Kissimmee Prairie region of Florida where, as for Grays Lake, there is no evidence that they previously bred. Additional flocks are, of course, justified as insurance in case of catastrophic loss of the Aransas/Wood Buffalo flock. Discussion of the

political situation that precludes reestablishing Whooping Cranes at White Lake, Louisiana, is omitted.

One appendix lists the status of the cranes of the world and another provides a brief chronology of Whooping Crane rescue efforts. Doughty also includes several pages of his notes pertaining to the chapters. Although not exhaustive, his bibliography includes more than 300 references from an exceptionally wide variety of sources: newspaper and popular accounts, refuge reports, and the scientific literature.

More than any other single species, the Whooping Crane represents man's effort to save that which is of sublime (i.e. nonutilitarian) value in the natural world. Robin Doughty has done the Whooping Crane (and himself) justice in representing this saga. This volume should be found in every ornithological library and should be read by all who are seriously interested in crane biology or in North American bird conservation.—DAVID H. ELLIS AND DWIGHT G. SMITH.

Ecology of Birds: An Australian Perspective.—Hugh A. Ford. 1989. Chipping Norton, Australia, Surrey Beatty and Sons Ltd. xvi + 288 pp., 50 tables, 39 text figures, 48 color plates. ISBN-0-949324. \$36.90.—The past decade, which witnessed a burgeoning enthusiasm in the American public for all things Australian, was also a period of unprecedented growth in the scientific understanding of Australia's spectacular avifauna. The movement of Australia to the center stage of ornithological consciousness was fueled by an outpouring of first-rate behavioral and ecological publications produced by a talented group of Australian and visiting researchers (the latter distinction is often moot, given the inordinate number of "visitors" to Australia who decide to stay permanently). The ornithological focus on Australia has sharpened in light of the revolutionary phylogenetic findings by C. Sibley, J. Ahlquist and their colleagues. It now seems highly likely that, far from being merely a spectacular evolutionary sideshow, Australia is the area of origin for some of the world's major passerine lineages. Moreover, the major groups of Australian birds are more closely related to each other than they are to superficially similar taxa on other continents. This means that, in Hugh Ford's words, "... Australia provides an almost totally independent scene in which to test the ecological hypotheses that have been generated in northern temperate regions."

With these considerations in mind, Ford's book is a welcome addition to the libraries of ecologically oriented ornithologists everywhere. The book is strongly focused on Australia, but includes information on New Guinea and New Zealand. None of the three great island systems that constitute Australasia has been adequately treated in previous textbooks on bird ecology, and Ford's book helps to fill this major gap. Considerable space is devoted to compar-

isons between ecological patterns seen in different regions of Australia. There are few comparisons with areas outside Australasia. One hopes that a future edition will be expanded to include the broader comparative context alluded to in the passage quoted above.

The book begins with a brief but useful account of the Australian continent and the origins of its birds, including a summary of relevant aspects of the phylogenetic research of Sibley and Ahlquist. Subsequent chapters cover such general topics as distribution, food and foraging behavior, community ecology, population ecology, and migration. More specialized chapters address cooperative breeding, effects of habitat destruction and modification in Australia, and the ecology of rare, endangered, and extinct birds in Australasia. Throughout, Ford presents a wealth of Australian examples, many of them documented with figures and tables. Most of these data are from previously published articles, but some new information is included. Non-Australian readers will especially welcome the copious reference citations (600+ titles are listed in the bibliography), which serve as a valuable entrée into an important and rapidly growing literature.

Ford's approach to bird ecology will strike some readers as rather descriptive, but this reflects the present status of ornithology in Australia. Ford fully acknowledges the power of experimental approaches to bird ecology, but can find relatively few Australian examples to discuss. However, field experiments are now becoming more usual in Australia, as elsewhere in the world.

I found the chapters on cooperative breeding and on mating strategies and parental behavior to be the most interesting and provocative, perhaps because it is in these aspects of their ecology that Australasian birds are most distinct from the avifaunas of other regions of the world. Ford provides a relatively even-handed review of theories that have been advanced to explain the fact that supernumerary adults help to rear the young in some bird species. Some of the theoretical background will be familiar to North American readers, as the ideas of J. Brown and S. Emlen figure prominently in Ford's discussion. Cooperative breeding is relatively rare among the world's birds, and why it should have evolved at all is by no means obvious; it is even more difficult to explain the surprising fact that perhaps one third of all Australian birds are cooperative breeders. Here is a theoretically important area of research in which Australia's birds have played, and will continue to play, a major role. Ford cautiously, and I think reasonably, comes down on the side of an ecological explanation for the evolution and maintenance of cooperative breeding. Certainly, the phenomenon seems to be commonest in climatically equitable, moderately productive environments, of which Australia has more than its share. Within Australia, the proportion of cooperatively breeding species is shown to be highest in climatically

stable regions. Ford also documents a tendency for cooperative breeding to emerge in insectivorous and nectarivorous species, but to be rare among seedeaters. Other ecological correlations are pointed out, although some of these seem rather tenuous, and none can be satisfactorily explained on the basis of current knowledge.

The supposed advantages of cooperative breeding are examined in several case studies, with some surprising results. As an example, analysis of I. Rowley's oft-cited data on cooperative nesting by the Superb Fairy-wren (*Malurus cyaneus*) shows that, although nests attended by several adults tend to produce more fledged young than nests attended only by the two parents, this differential is entirely due to a higher hatching rate for eggs in cooperatively attended nests. Post-hatching survivorship of young to fledging is essentially identical for pairs and groups, a pattern that would not be expected if the selectively important function of supernumerary adults were to provide additional food to the young. One comes away from this chapter with the unsettling perception that even what little we think we know about the origins and ecological significance of cooperative breeding is clouded by disturbing anomalies and unexplained geographic variation within and among species. Clearly, Australia will continue to provide a most favorable setting for both comparative and experimental studies of cooperative breeding.

The chapter on mating strategies and parental behavior contains a useful summary of breeding systems, again with enlightening examples from such quintessentially Australasian groups as the megapodes, lyrebirds, bowerbirds, and birds of paradise. Much of the recent ecological and behavioral research on the latter two groups has been carried out by visiting North American researchers (notably B. Beehler, G. Borgia, M. Pruett-Jones, and S. Pruett-Jones), a fact that reflects the remarkable openness exhibited by Australians, New Zealanders, and Papua-New Guineans to properly arranged research by "outsiders."

In his chapter on habitat destruction and modification in Australia, Ford suggests that the negative effects of habitat diminution and fragmentation may be offset to a degree by the new opportunities for speciation. While it is true that many bird species have benefited from human modification of the Australian landscape, I would argue that this is not the result of evolutionary changes within recently fragmented populations that are dependent on natural habitat. Ford's somewhat sanguine assessment of the reactions of birds to major modifications of their environment ignores the huge discrepancy between current rates of habitat disruption and inferred historical rates of avian speciation in Australia and elsewhere. Ford is in fact a highly committed conservationist, but I worry that his statements, even though they are softened by cautious caveats, might be too easily appropriated by the naive and the unscrupulous as ex-

cuses for inaction in the face of unprecedented rates of habitat loss.

My other criticisms are mostly minor. There are a few typos (for example, the common names of two species are misspelled in Table 45). Perhaps my most serious quibble with this otherwise well-designed book concerns the incomprehensibly obscured cover photograph of the Speckled Warbler (*Sericornis sagittatus*). This uninformative picture, which is repeated as a frontispiece, is said to epitomize our poor understanding of Australian birds. I hope that such elliptical reasoning does not gain a foothold among authors and book designers, and that future editions of Hugh Ford's excellent book will be graced by a more appropriate cover.

Finally, Surrey Beatty and Sons are to be commended for yet another example of their commitment to the publication of high-quality books dealing with Australia's natural heritage.—JAMES F. LYNCH.

American Warblers.—Douglass H. Morse. 1989. Cambridge, Massachusetts, Harvard University Press. vii + 406 pp. ISBN 0-674-03035-4. \$30.00.—It is often said that there are two types of evolutionary biologists: those who specialize on particular taxonomic groups and those who study fundamental questions across a number of taxa, focusing on the groups that are appropriate for testing particular hypotheses. A common subtext to this dichotomy is that true academic glory awaits those who are primarily concerned with underlying principles. Interest in a particular group is an atavistic obsession.

In reality, the two approaches stereotyped above are dialectically and inexorably related. After all, the study of evolution is an historical science which describes and catalogs a large number of unique events, events that are governed both by deterministic laws and chance events. To be interesting and complete, our study of nature should focus both on the unique events and the broad patterns.

Because of my own fixation on the Parulinae, it is gratifying to see that this diverse and beautiful group has inspired a book. Morse's "American Warblers" thoroughly explores the fruitful interplay between natural history, and ecological and ethological theory. This book is a series of scholarly essays on particular topics of warbler biology. In general it relies upon three sources for its insights: (1) details of warbler natural history; (2) theory that has been generated based upon observations of wood-warblers; (3) theory that, although generated from work on other groups, can be applied to extant and future observations of wood-warblers. Each chapter is a blend of varying portions of these three ingredients.

The topics covered are satisfyingly diverse, and range from biogeography, hybridization, and population dynamics to displays and foraging behavior.

Morse also includes an extensive discussion of some recent discoveries on the tropical winter ranges of the North American breeding species, as well as the known biology of resident tropical warblers. Morse directs the reader to several other books—"The Warblers of America" (L. Griscom and A. Sprunt. 1957) and "Life Histories of North American Warblers" (A. C. Bent. 1953) for species accounts. Rather than attempting to detail the biology of each species, Morse concentrates on presenting conceptual arguments that are addressed by specific studies. Morse's scholarship is impressive. Not only has he amassed most of the relevant citations pertaining to warbler biology, he has been far-ranging and open in the nature of the evidence he presents. He mines the enormous literature on this group for both novel ideas and new ways of testing old ideas. His treatment is properly critical—usually he points to new ways of testing concepts.

The topics selected and their treatment bear the strong mark of the author. It is fair to say that Morse retains a traditional perspective on such major issues as the nature of adaptation, population regulation, the role of interspecific competition, and modes of speciation. Morse revisits a number of specific topics that were the bread and butter of his bird research. Much of the book focuses on the ecology of the "spruce-woods" (i.e. boreal forest) warblers, reflecting his intimate knowledge of these species. I particularly like his perspective on ecological plasticity and stereotypy. Despite his strong conceptual stamp, Morse does an admirable job of discussing alternative explanations for observed patterns. He has gone far in integrating his work with the body of literature on warbler ecology.

It becomes apparent, as one reads the chapters, that as a "system" for testing hypotheses, wood-warblers have proven excellent for certain studies and difficult at best for others. One could quickly tally an impressive list of subjects where observations on warblers were of primary importance to the development of general concepts: resource partitioning, song repertoires, refugia, isolating mechanisms, island biogeography, etc. I personally find studies based on wood-warblers are most interesting when they take advantage of the group's taxonomic diversity coupled with its ecological homogeneity. The warbler radiation provides rich material for exploring a phylogenetically "tight" comparative approach. In contrast, it has proven difficult to study the demography of warblers or to conduct large-scale manipulations of life history parameters, such as clutch size. However, to obtain a holistic picture of the biology of wood-warblers requires the study of all facets. Generalities from other similar groups should be substituted only with tremendous caution.

This last point is underscored in the penultimate chapter on intercontinental comparisons. Morse briefly reviews the ecology of the Sylviinae in the western

Palaearctic to show that the habitat distribution and community patterns are strikingly different from the wood-warblers. It would be interesting to expand this comparison to the migratory system of the eastern Palaearctic, and perhaps this comparison would be more ecologically defensible. There is, of course, a serious hiatus of data from Siberia; but with recent events in the Soviet Union, who knows?

Although the book covers a broad spectrum of topics, there is a conspicuous absence of any discussion of ecologically relevant morphology. Warblers provide a superb opportunity to focus on the functional importance of morphological detail. On one hand, some species show fine-scale adaptation when their foraging niche deviates from the standard foliage-gleaning mode characteristic of the majority of species. Examples include the broad bill and ample rictal bristles of the American Redstart, the extended hallux of the Black-and-white Warbler, and the massive bills of the Worm-eating and Swainson's warbler. On the other hand, some species (such as the Yellow-rumped Warbler) forage in a wide variety of atypical situations (ground, aerial, sap holes, etc.) and seem to show no specific morphological adaptations. A discussion of the propensity towards morphological adaptations to foraging shifts would have proved a useful complement to the thoughtful discussions of behavioral shifts and ecological plasticity.

This book will be of great interest to academic ornithologists, particularly those with a behavioral or ecological bent. Beyond this professional audience, "American Warblers" can serve as an advanced text for birders who have taken to heart the message of "A Birders Handbook" (Ehrlich et al. 1988). The natural history details become increasingly more interesting as they are placed in a broader and more sophisticated framework. Readers interested in the ecology of migratory birds will find many topics introduced in John Terborgh's "Where Have All the Birds Gone?" treated more thoroughly in "American Warblers." For example, it is interesting to contrast the treatment of the decline of Bachman's Warbler in the two books. Terborgh concentrates on wintering-ground habitat destruction as the culprit, while Morse explores alternative hypotheses, including one proposed by Remsen focused on breeding habitat destruction.

Readers who are less familiar with academic writing or not as immersed in the details of warbler biology may have to struggle a bit with "American Warblers." Because the focus is on concepts and not on particular species or habitats, the scenery changes rapidly, and the species move in and out of the text like characters in a Russian novel. This might be avoided in future editions by a few general statements (for example, a clear and comprehensive description of the characteristics of a spruce budworm outbreak) and more generous use of summary tables (listing attributes of particular species à la Wilson's "Socio-

biology"). It might be possible to summarize many of the details in one large table to which readers can quickly turn to refresh their memories about a particular species. More attention to providing attractive graphics would also increase the general appeal of the book. "American Warblers" is an essential addition to the bookshelves of avian ecologists, and it should be made available through academic and museum libraries as well. Anyone who loves warblers will find this book both fascinating for the breadth of information presented, and thought-provoking for the myriad ideas proposed and explored. I personally would like to see a series of like books, focused on calidrine sandpipers, gulls, and other well studied taxonomic groups.—RUSSELL GREENBERG.

OTHER ITEMS OF INTEREST

No Woman Tenderfoot: Florence Merriam Bailey, Pioneer Naturalist.—Harriet Kofalk. 1989. College Station, Texas A&M University Press. xix + 225 pp., 45 illustrations. ISBN 0-89096-378-9. NPG.—The author of this delightful book gives an absorbing account of the life of "Florence," as she calls Mrs. Bailey. From 1885 throughout her long life, Florence Bailey pioneered field study of birds, fought for their conservation, wrote of her explorations of the West with her husband, Vernon Bailey, and devoted boundless energy to educating the public, especially children, about birds.

Florence was the first woman elected a Fellow of the American Ornithologists' Union. In the same year, she was awarded the Brewster Medal for her "Birds of New Mexico," published in 1928. Her chronicles of explorations of then little-known parts of North America illustrate the role, in protection of wildlife, of such naturalists as C. Hart Merriam (her brother), John Muir, John Burroughs, Ernest Thompson Seton, and the botanist Alice Eastwood. Conservationists will learn how the struggles to educate the public brought about legislation we now take for granted.

Kofalk relegates to the back of the book explanatory notes for each chapter, a complete bibliography of Florence's writings, secondary sources including mention of Mrs. Bailey by other authors, and a detailed index. The delightful story of Florence's life thus unfolds smoothly in the text, uncluttered by documentation.

The book is filled with quotations from Florence's publications. She was a good scientist, who combined rigorous observations of wild birds with highly subjective interpretations. Some ornithologists may find her anthropomorphic statements and flowery style irritating. However, I found the style refreshing.

The main thrust of Kofalk's message is clear. In the Introduction she expresses appreciation of Florence and all she stood for: "By viewing nature through Florence's eyes we can [experience] both intuitive love for the wholeness of nature and a scientific knowl-

edge of its intricate workings." And "perhaps both poet and scientist can once again share their experiences in nature for the benefit of those who seek its joy as well as its definition." Amen!

This biography is essential for museum and community libraries that emphasize field biology and conservation, for ornithologists—both professional and amateur—and for anyone who enjoys a true story, beautifully told.—BARBARA B. DEWOLFE.

[Ornithology in Croatia].—M. M. Meštrov and G. Sušić, Eds. 1988. Zagreb, Yugoslavian Academy of Sciences and Arts. 312 pp. No price given.—This volume contains 20 papers read at a special meeting of the Yugoslavian Scientific Academy on account of the 120th anniversary of Croatian ornithological research and the 86th anniversary of the Croatian Ornithological Institute. The Introduction was written by the Secretary of the Academy. A transcript of the ensuing discussion follows. Although the volume is written in Serbo-Croatian, each paper has an English summary.

Sušić renders the history and achievements of the Institute. He and Dragan Radović present a check-list of the Croatian names of the western Palearctic avifauna. E. Kletečki reports on problems of bird banding, and Jasmina Mužinić discusses migration in Croatia. Croatia occupies the north-central part of Yugoslavia, from the foothills of the Alps (Slovenia) through the northern Adriatic coast to the Danube river, and the ornithological research in these varying landscapes is treated in chapters by J. Mikuska, A. Cvitanić, and L. Gordan. M. Malez accounts for the written documentation of Croatian birds up to the 20th century. V. Malez writes about avian paleontology. B. Gjetvaj emphasizes the role of the Croatian National Museum in ornithological research. Several other authors, among them M. Meštrov, D. Kovačić, and M. Mrakovčić report about such research areas as the role of birds in fish ponds and in protected areas. One gets a complete picture of the past and present ornithological research in Croatia from this volume.—JÓZSEF MIKUSKA. (Book review translated by M. D. F. Udvardy.)

Arizona Game Birds.—David E. Brown. 1989. Tucson, Arizona, University of Arizona Press. xiv + 307 pp., 1 color plate, 74 text figures. ISBN 0-8165-1019-9. \$19.95.—The title refers not to game birds in general, but to 12 species of "upland game," that include chukar, pheasants, grouse, turkey, quails, cranes, pigeons, and doves. The author is a retired small-game supervisor in the Arizona Game and Fish Department, and he possesses a wealth of experience in wildlife research and management (and hunting) in his state.

The volume's Introduction serves to usher the reader into the species accounts that follow, with a general

treatment of topics that include taxonomy and nomenclature, identification, sex and age, history of game-bird management in Arizona to the present, and management techniques. The typical species account details distribution, habitat, life history, management history, population dynamics, and hunting.

A considerable number of special reports that tend to gather dust have accumulated in the Game and Fish Department archives. Brown has studied all the pertinent ones and has tidily synthesized them in his book, a proper boon to academic students as well as to practitioners of game research and management.

Brown writes for a general audience, yet he is the careful scientist and that aspect of the book cannot be faulted. At the close of each species account, usually labeled "hunting," is an anecdotal, personal narrative of his pursuit of the particular species with gun and, usually, dog. These narratives are especially well written and offer excellent reading.

"Arizona Game Birds" is available in hard cover only. Additional to the text figures are numerous unlabeled drawings by Arizona artist Paul Bosman. The detailed treatment of species also makes the book valuable to game managers in other states, as well as to those in Mexico.—GALE MONSON.

Atlas hnízdního rozšíření ptáků v ČSSR 1973/77. [The Atlas of Breeding Birds in Czechoslovakia].—Karel Štastný, Aladár Randík, and Karel Hudec. 1987. Academia Praha. 484 pp., 204 maps, 233 illustrations. 90.00 Kčs. (In Czech, with English summary).—This book follows closely the standard set by "The Atlas of Breeding Birds in Britain and Ireland" in both field methods and data presentation. The focus is 203 individual species accounts, each consisting of a full-page map and a narrative. The maps display breeding distribution by dots of three sizes, where size reflects the certainty of breeding record. The narratives are loaded with information on migration, habitat, vertical and horizontal distribution, population changes, and breeding densities. Total population size is given for rare or conspicuous species. For most other birds the authors avoid the risk of inaccurately estimating population size, and they present breeding densities instead. The densities were compiled from literature and are often given for different habitats and parts of the country. Such is the case, for example, with *Parus* tits, which are represented with more than 15 entries for each species.

The introductory chapters provide details of organization, field methods, data analysis, and data presentation. These details are condensed into a one-page English summary. The volume concludes with maps of past distribution of 8 species and short status reports on 21 species which were observed in Czechoslovakia but lacked a proven breeding record.

In view of the rapidly deteriorating environment

in central Europe, and in the Czech-German area in particular, a permanent record of this form will be invaluable for future comparison of bird distribution.—STANISLAV PRIBIL.

Birds of South Florida. An Interpretive Guide.—Connie Toops and William E. Dilley. 1986. Conway, Arkansas, River Road Press. 150 pp., 1 figure, 51 photographs, 2 maps. Paper, \$9.50.—Every year hundreds of people visit south Florida to see its avifauna, especially the wading birds, the Florida "specialties," and now the many species of exotics that breed in the cities and suburbs of the gold coast, which stretches from West Palm Beach south to Miami and Homestead. The authors spent several years as naturalists at Everglades National Park responding to the questions and comments of visitors, and they sensed a need for a guide to the birds of the region and their habitats. The appearance of Jim Lane's "A Birder's Guide to Florida" (1981, revised 1984, 1989; Denver, Colorado, L&P Press) was helpful to the avid, experienced birder who is usually searching for particular species, but it did not fill the need for a general guide to the various geographic regions and habitats and their avifauna for the lay public. The authors have reached their goal admirably in this publication.

The introductory chapter describes briefly Florida's unique geographic location, its climate, place in bird migration, the plume trade of the late 1800s, and the need for a conservation awareness. Chapter 2 describes the uniqueness of the south Florida landscape—wet prairies, the Everglades, pinelands, hammocks, cypress swamps, mangroves, coastal prairies, the Keys, and cities, suburbs, and agricultural lands.

Chapter 3 presents the best birding areas of the region—national parks (Everglades, Big Cypress National Preserve, Biscayne National Park, Dry Tortugas National Monument, Rookery Bay National Preserve), national wildlife refuges (Loxahatchee, Sanibel "Ding Darling"), state parks (Fakahatchee Strand State Reserve, Collier Seminole State Park), and other state and county and private preserves, including National Audubon's Corkscrew Swamp Sanctuary. Chapter 4 comprises the bulk of the text and is an annotated list of 396 species of birds that have been observed in south Florida. This list includes several accidental species seen only once or twice in south Florida some decades ago.

The final chapter is devoted to a discussion of exotic species with notes on an additional 24 species (21 parrots, 3 mynas). The authors state that the Red-crowned Parrot (*Amazona viridigenalis*) is sometimes confused with the Green-cheeked Parakeet (*Pyrrhura molinae*). Obviously, it is only the authors who are confused, because the Green-cheeked Parrot (or Amazon, not Parakeet) is another common name given to *A. viridigenalis* by J. M. Forshaw (1973, Parrots of

the World, Garden City, Doubleday & Co.), who reserved the name Red-crowned Amazon to a subspecies (*A. d. rhodocorytha*) of the Blue-cheeked Amazon (*A. dufresniana*). But confusion certainly does reign when it comes to parrot identification in Miami. Elsewhere, one is aided in the identification of parrots, especially immatures, because only one or two species are expected to occur in their native range. *Amazona* from throughout Central and South America occur in Miami, and who knows what problems in identification will arise when some of these begin to hybridize. So, readers, be forewarned. This chapter on exotics, through no fault of the authors, is incomplete. An up-to-date (if such is possible) guide to the exotic avifauna of south Florida has yet to be written.

The color photographs are of excellent quality and, overall, the traveler to south Florida with an interest in birds will find this guide a desirable companion.—HERBERT W. KALE II.

Guide to the Birds of Alaska.—Robert H. Armstrong. 1990. Bethell, Washington, Alaska Northwest Books (GTE Travel Enterprises. 342 pp., photographs and paintings. ISBN 0-88240-367-2. Paper, \$19.95.—Probably a handy guide to carry. There are 372 species illustrated by a combination of photographs and paintings (by John C. Pitcher). An additional list of accidentals brings the total species to 437. There are no range maps, but a chart of “status and distribution” accompanies each species account. The information on “habitat” and “identification” is generally brief, but concise. The page layout with titled paragraphs, charts, and pictures is busy. The pages with two species accounts or where sexual dimorphism is illustrated are quite busy.

There is good information here for the casual birder. It is reasonably complete; although with all those gull species, folks might like to have some help with the immatures. This is a third revised edition.—A.H.B.