

REVIEWS

EDITED BY M. ROSS LEIN

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

Conservation of tropical forest birds.—A. W. Diamond and T. E. Lovejoy, Eds. 1985. Cambridge, England, International Council for Bird Preservation. xiv + 318 pp. ISBN 0-946888-05-1. £18.50.—Although less than a dozen bird species have been lost from North America in recent centuries, the potential loss of hundreds of species from tropical forests throughout the world is likely in the next few decades. Extinctions of birds of tropical forests will likely dwarf extinction rates that have decimated island avifaunas in the last century. A special symposium on conservation of tropical forest birds was organized at the XVII World Conference of the ICBP. The major objectives of the symposium were to promote collection and dissemination of knowledge, to identify geographic areas where birds are most at risk, and to encourage conservation of those areas most likely to ensure survival of birds. "Conservation of Tropical Forest Birds" presents the proceedings of that symposium.

Part I contains introductory chapters by A. Keast, A. W. Diamond, and F. G. Stiles. The latter, a discussion of the role of birds in the dynamics of neotropical forests, is the most informative.

The major weakness of the book, inconsistency among chapters in approach and content, becomes clear in Part II (The Neotropics). For example, "The status of forest birds in South America" by D. Snow occupies only 4 pages, while 17 pages are devoted to the "Present situation of the forest birds of Panama" by F. Delgado. The authors of these chapters and others on Colombia, southeastern Brazil, and Costa Rica express concern about the problems associated with developing conservation plans in the face of limited distributional information. Ramos provides an insightful, though brief, discussion of political, social, economic, educational, and technical problems that limit conservation of tropical forest birds.

Part III (The Paleotropics) includes 5 geographically oriented chapters: west Africa (Thiollay), east Africa (Stuart), central and southern Africa (Dowsett), western Malesia (Wells), and New Guinea (Beehler). Most discuss the geographic distribution and status of forest, including current major threats. Beehler outlines a system of bird of paradise reserves for New Guinea. His approach is to be commended because it goes beyond the simplistic island biogeographic perspective that bigger is better. More consideration should be given, however, to a plan that goes beyond a single-family focus. Wong, in the last chapter of this section, presents an analysis of bird

use of the undergrowth of virgin and selectively logged forest.

Chapters in Part IV are from a workshop held immediately before the symposium. They include a compilation of threats to tropical forest birds and a listing of critical sites for their conservation. Oddly, lists of areas in critical need of conservation occupy one page for Africa and the Neotropics combined, while the facing page is devoted to Thailand.

Colombia (Orejuela), the Albertine Rift of Africa (Prigogine), Western Samoa (Biechle and Maelzer), Australia (Buckingham), and Mexico and northern Central America (Ramos) are treated in the remaining chapters. As with the volume in general, some chapters in this group treat conservation needs, others existing programs; most mention birds or habitats at risk. One lists all forest birds (without clear definition) from the area considered.

Variation in the amount and quality of information available no doubt accounts for variation in content among chapters. Editorial efforts to develop consistent presentations among chapters, however, could have produced a volume that more precisely illustrated gaps in knowledge. No solutions to the problem of extinction are likely to be general to all geographic areas, but the lack of an integrative approach is symptomatic of the tenuous status of conservation efforts throughout the world.

Several general thoughts come to mind. Most chapters present inventory-level data, illustrating the lack of detailed knowledge about densities and dynamics of populations of tropical forest birds. Effective conservation strategies, however, depend on more than species lists. Expansion of ecological, behavioral, and evolutionary information is essential before informed conservation programs can be formulated and implemented.

Although tropical forest birds have received increased attention recently, conservationists also must work diligently to preserve birds at risk in other tropical habitats (wetlands, seashore, grasslands, etc.). Indeed, the growth of knowledge about interhabitat dynamics (patch dynamics, landscape ecology) requires this perspective if conservation programs are to be effective.

The proximate causes in the extinction of birds are conversion to agriculture, timber harvest, plantations, and hunting for food, pets, and other commercial products, but the ultimate causes are social, economic, and political inequities. All recommendations to reverse the trend must be tempered by

social, economic, and political considerations. As long as that is true, even complete biological knowledge will not ensure attainment of conservation goals. In the future, we must move forward on two fronts: seek more complete biological insight and promote conservation strategies that address social and economic needs.—JAMES R. KARR.

Utah birds: a revised checklist.—William H. Behle, Ella D. Sorensen, and Clayton M. White. 1985. *Utah Mus. Nat. Hist., Occ. Publ. No. 4*. xvi + 108 pp. ISBN 0-940378-07-8. \$6.25. **Utah birds: geographic distribution and systematics.**—William H. Behle. 1985. *Utah Mus. Nat. Hist., Occ. Publ. No. 5*. vi + 147 pp. ISBN 0-940378-06-X. No price given.—These works are part of a series of contributions on the ornithology of Utah by William Behle and his colleagues. The checklist covers the 450 bird species that have been reported to occur in that state, while the second publication describes in various detail the geographic variation in 88 species in Utah and adjacent areas. Of the two works, the checklist will certainly be more widely used and appreciated. By contrast, the publication on geographic variation will be of interest mainly to specialists. Regarding the latter, some may find this work of limited value, with its rather narrow geographic scope and traditional approach to the subject.

The checklist divides the birds of Utah into five categories, depending on the standing that a species is given in the state's avifauna. The main list contains 368 species that are presumably verified in Utah, if one counts Clark's Grebe (*Aechmophorus clarkii*) as a full species. Most of the species in this list have been verified by specimens or photographs; those that have not are the Upland Sandpiper, Tennessee Warbler, Palm Warbler, and Painted Redstart (all marked with an asterisk in the text).

The other categories of species, each in a separate section of the checklist, are "provisional species" (numbering 10), "unverified species" (18), "non-native introduced and escapees not established" (13), and "suspected misidentifications" (31). Provisional species probably occur in Utah, but they lack the degree of substantiation available for those in the main list. Unverified species have even lesser degrees of substantiation, while those that are suspected misidentifications have little or none. In terms of approach, I find these categories acceptable overall; however, I would have preferred them interleaved into a single listing.

The detail with which species are treated in the checklist varies, but most accounts in the main list deal with seasonal status, abundance, distribution, habitat use, and subspecies occurring in Utah. As with many other checklists, this one needlessly intermingles the concept of numbers (n) with that of fre-

quency of occurrence (f), i.e. in using the terms "common" (n), "uncommon" (n), "rare" (n), "irregular" (f), "casual" (f), and "accidental" (f). These two concepts can and should be treated separately, for they are not the same thing. For rare and infrequent species, the dates and citations for records are often given. Treatments of species in the other lists mainly detail records, which are extensive in some cases.

One criticism I have of the checklist is the lack of a map or gazetteer of Utah. In my view, it is unreasonable to expect the user of this work to consult another source for information on localities. In addition, the entire work could have used tighter editing for greater clarity, more hard information, and less ancillary detail. For example, I do not believe that a blow-by-blow enumeration of records is necessary to outline the expansion of the range of the Great-tailed Grackle in Utah—especially since many readers will not be familiar with the localities that are cited. In another example, tighter editing could have streamlined such ponderous passages as that for the House Wren: "Essentially a common summer resident statewide ranging from the cottonwood woodlands in valleys where it is sparse up to the coniferous forest in the mountains where the species is most common." A terser statement could have been: "Summer resident, ranging from rare in cottonwood woodlands in the valleys to common in montane coniferous forest."

In places, I detect a rather negative overtone toward certain sight records in the checklist. This approach should be avoided, for it may decrease the likelihood that a given observer will do better next time. Many observers are sensitive about their reports, not realizing how fundamentally important sight records have become in avifaunistics and other aspects of ornithology. All compilers of sight records may become impatient with how casually some records are reported, and one may be tempted to scold an observer. While one may occasionally lose control, it should not happen in print. There is nothing worse than publishing a statement that in any way impugns an observer. Judgments should be restricted to the details of what an observer reported, conveyed in nonprovocative language, and not reflect personally on the observer.

The accounts in the work on geographic variation typically begin with a literature review on subspecies of birds that may occur in Utah and its vicinity. At times this approach produces a litany of "who did what to whom," when a more direct approach would have been clearer and more concise. After this background information, Behle outlines the analytical results—including a review of characteristics used in recognizing given subspecies. The final section in a typical account lists the races ascribed to Utah, including seasonal status and distribution. Twenty-five species have subspecies mapped, while the remainder are handled only as narrative.

Other than the "litany" aspect mentioned above, my major criticism of the work on geographic variation is that the subject is approached in too traditional a fashion. Much of the emphasis is on typological treatment of such variation, with the result that forms accepted by the author may be presented as having more discrete identities than they really deserve. Geographic variation is one of the most interesting phenomena involving birds, and description of the peaks and valleys of differentiation is useful from many standpoints. It is the variation per se that is important, however, and communication of it can be hampered by the typological approach.

While these two works have imperfections, both represent important contributions to our knowledge of Utah birds. Anyone seriously interested in the subject should obtain both, and even those with a casual interest should purchase the checklist. Dr. Behle is to be congratulated for continuing to bring to fruition the many years of work that he and his associates have invested in the birds of Utah.—JOHN P. HUBBARD.

Conservation studies on raptors.—I. Newton and R. D. Chancellor (Eds.). 1985. Cambridge, England, International Council for Bird Preservation. ICBP Technical Publ. No. 5. xii + 482 pp., 103 maps, 33 charts and graphs, 5 photographs. ISBN 0-946888-06-X. £25.00 (paperback).—In 1982, the Second World Conference on Birds of Prey was held in Greece, with attendees from many parts of the world. This book presents 53 of the papers given at that conference.

The first part of the book, organized by B. U. Meyburg, concerns Mediterranean raptors. It contains 14 papers, mostly dealing with the current status of birds of prey in Egypt, France, Greece, Italy, Morocco, Portugal, Spain, and Yugoslavia. Included are reports on the status and conservation of populations of Eleonora's Falcon (*Falco eleonora*) and the breeding success and conservation management of these falcons. The distribution maps for raptors in Portugal and Morocco and for vultures in Greece are particularly useful and an important contribution to understanding the status of birds of prey in those nations.

The second part of the book, organized by J. M. Thiollay, deals with aspects of raptor study in tropical forests. There are 8 papers, including major reviews of the status of tropical forest species. Other topics include an important discussion of the status of northern Argentina's wet-forest raptors, a summary of the status and conservation of West Indian forest raptors, and birds of prey in Bangladesh and Mauritius. Collectively, these reports cover highlights of our knowledge of tropical forest birds of prey and demonstrate the huge amount of work that remains to be done to gather essential basic information on these birds before the forests are de-

stroyed. The papers also demonstrate the urgent need for raptor and wildlife conservation generally in tropical forests of the world.

The 13 papers in part three, organized by M. Fuller, deal with raptor migrations in North America, Central and South America, the Middle East, and elsewhere. I found the most interesting or informative to be those on European and Middle Eastern migrations, raptor migration in Israel and the Red Sea area, and especially Neal G. Smith's splendid study of raptor migration in Panama. The latter contains the most detailed analysis to date of the raptor flights in this part of the world and is essential reading for anybody interested in the migrations of these birds. Other papers contain new information on food carrying and crop size of migrant hawks in eastern Pennsylvania and habitat use of migrant Sharpshinned Hawks (*Accipiter striatus*) at Cape May Point, New Jersey. Various papers by other authors also appear in this section.

The Peregrine Falcon (*Falco peregrinus*), as one might expect, is not neglected. The 8 papers in part four, organized by T. J. Cade and R. Fyfe, deal almost exclusively with that species. Dr. Cade, for example, provides an excellent summary of the status of the Peregrine recovery program in the United States. Additional papers also deal with Peregrine conservation in Europe, and the 2 papers on Peregrine and other falcons in Australia are most welcome.

In part five, 9 papers include a range of raptor management and conservation topics including banding, radio tracking and telemetry, artificial feeding, captive breeding, cross fostering, and persecution. The geographic scope of these contributions is fairly global.

Part six is a summary of a workshop on the biology of vultures, presented by leading experts from various parts of the world. Both Old World and New World vultures are discussed.

It is not practical in this brief review to provide details of the many fine papers contained in this book. Nevertheless, "Conservation Studies on Raptors" is a major contribution to the global literature on birds of prey. The ICBP is to be congratulated on the publication and should be encouraged to hold similar world raptor conferences in the future, from which additional volumes of this type would be produced. I would strongly recommend, however, that a major focus of any future conference be the many vital aspects of public education regarding raptors because a broad base of public support outside the amateur and professional raptor study community is essential to the long-range success of conservation and management programs.

This book should be included in all academic, museum, and private libraries whose users exhibit a serious interest in raptors. Larger public libraries also would find the book a desirable addition to their holdings.—DONALD S. HEINTZELMAN.

Birds of the Sudbury River Valley: an historical perspective.—Richard K. Walton. 1984. Lincoln, Massachusetts, Massachusetts Audubon Society. viii + 220 pp., 1 frontispiece map, 11 photos. ISBN 0-932691-00-5. Paper, \$9.95.—This is a very important book for the ornithological community, professional biologists, and conservationists, despite the parochial title. Importance may best be indicated by briefly describing the contents.

The introduction sounds a recurrent theme of global concern, the interactions of an expanding colonial population and a native population, and the natural history of a specific area. Selection of this river valley is based on the unique (for North America) availability of written accounts—from early Eurocolonial times (ca. the 1630's) to the early 1980's.

Part I, "Land and naturalist," contains 10 brief, well-integrated chapters. These cover (1) the shift from early colonial-Amerindian subsistence farming, housing constructed of forest products, and wildlife harvesting to (with cultural adaptations and population increases) surplus-level agriculture and forest and wildlife depletion; (2) the forest loss, meadowland overuse, and population overexpansion that led to an economic slump and litigation over river and land use among mill owners, builders, and farmers; (3) the perceptive views of H. D. Thoreau, who saw population expansion and environmental depletion as upsetting the ecological balance of nature; (4) the railroads, rich extra-valley farms, and mills along the river that led to marked reductions in forests and agriculture while the population near mill sites polluted the rivers; (5) the replacement of wood by extra-valley coal and the agricultural decline that liberated land for orchards, forest regrowth, and bird repopulation, but also increased sport and market hunting, decimated wildlife, and expatriated the Wild Turkey and Passenger Pigeon; (6) William Brewster's development from youthful collector of birds to careful, respected observer-recorder and organizer of Ornithological Societies and protector of birds; (7) Ludlow Griscom's impact on public attitudes toward birds, birding, and conservation; (8) the post-World War II urbanization as affluence, automobiles, and population pressed on the valley's resources and decreased agricultural land use in favor of housing (including wetland filling), the rise of extra-valley service occupations, coupled with nearly stable and maturing forests; (9) the impact of naturalist Allen Morgan, who recognized the problems associated with the increased density of housing and land use on the welfare of the valley and joined with leading citizens to win support to conserve the land and reduce pollution; and (10) current efforts, from the early 1960's to early 1980's, to balance natural history with urbanization and appropriate land and water use.

In Part II, "Journals," the subsections are bird-topical and by season. Each section begins with a brief note on the season (late winter through spring, nest-

ing, late summer to fall, and early winter) followed by a calendar sequence of well-selected journal excerpts from (primarily) Thoreau, Brewster, Griscom, Morgan, and Walton.

Part III, "Checklist," details the author's goals for the checklist, terms and abbreviations used, and sources of records recounted (1949–1983). Bird records are presented by common and scientific names and subsumed by status, occurrence, and notes. Many checklist records were obtained by Griscom, Morgan, and Walton.

Two appendixes are included. The first is a short discussion of the best valley areas for seasonal observations, and the second is an explanation of the annual census with a table based on records (1960–1983) on the Concord (Sudbury Valley) Christmas Counts. References and an adequate index are provided.

This book's importance lies both in the fine presentation of historical, bird-journal, and checklist details and in the clear explication of the importance of a few concerned naturalists to the conservation ethic and welfare of humankind.

Except for the easily foxed, poorly footed, but nicely illustrated cover, this is a well-conceived, clearly and tersely written, well-edited, and thoughtful book. A New Englander would wish for an added chapter on the influence of C. R. Mason, the Audubon Society, and the Massachusetts Conservation Council; these, in the mid-1930's, raised the consciousness of the entire state, including the Sudbury Valley, in terms of birding, ecology, and conservation.

For substance, style, and format this is a book worthy of wide emulation. It should be on the shelf of each individual concerned with our environment and in every public library as a model for future local-area tomes.—WILLIAM B. NUTTING.

The atlas of bird distribution in New Zealand.—P. C. Bull, P. D. Gaze, and C. J. R. Robertson. 1985. Wellington, New Zealand, Ornithological Society of New Zealand. 296 pp., 16 microfiches. ISBN 0-473-00282-5. NZ\$30.00. Order from OSNZ Atlas, P.O. Box 12397, Wellington North, New Zealand.—The endemic birdlife of New Zealand is fascinating both for its uniqueness and, tragically, for the way it has declined with the advent of human colonization. The Ornithological Society of New Zealand, in collaboration with the New Zealand Wildlife Service and the Ecology Division of the Department of Scientific and Industrial Research, has produced this atlas to record the current (1969–1979) distribution of the country's bird species. This is a long-needed book as up to now this information has been unavailable under one cover. This volume is a great improvement over a provisional atlas produced in 1978.

The method used to collect information was the

same as that for similar atlases in Europe, Australia, and parts of the United States. Species lists were collected from across the country, using 10,000-yard squares from the national map grid as the geographical unit. Nineteen thousand species lists were collected from 96% of the 3,675 squares, an impressive feat that will be acknowledged by those familiar with the country's topography.

The atlas covers the distribution of 270 species of native and introduced birds. Species that are mainly pelagic are omitted. Most species are allotted two pages, one for North Island distribution and one for South Island distribution, but some rarer and non-overlapping species are combined to save space. The symbols used on the maps are rather small, and require some earnest peering at the page to distinguish among species. Each page also includes notes on habitat, breeding, the introduction of exotic species, and other snippets of ecological information. I found these small paragraphs fascinating.

Changes in distribution were apparent even during the production of this atlas. The distribution of an Australian immigrant, the Welcome Swallow (*Hirundo tahitica*), increased substantially. Therefore, the distribution for this species is shown for the periods 1969-1974 and 1975-1979.

The producers of this atlas intended to provide a database for the study of species distribution. Tables are included that describe the number of lists returned for each species and square, and the monthly distribution of observations for each species. This, the authors point out, may tell us more about the habits of ornithologists than of the birds they observe. Without a doubt New Zealanders prefer to watch birds during the summer at coastal resorts. A set of 16 microfiches is included that lists all observations for each species and for each square. For every observation, information is given on whether the species was seen or heard, an abundance estimate, and whether any breeding observations were written on the data card. There is even a key to the identification of each observer. Each card is held by the banding office of the N.Z. Wildlife Service, and application can be made to this office for information not encoded. Finally, a set of overlay maps is provided. The inclusion of all this information is intended to overcome the difficulty with using atlases as data sources, that of variable data collection.

Although the overall quality of the atlas is very good, there are a few minor problems. I found the locality maps at the beginning of the atlas rather small. Many rare birds are confined to offshore islands, but it was almost impossible to distinguish these places on the country map. Many localities mentioned in the text are not shown on the maps, especially the names of regional areas. This is confusing to non-New Zealanders.

The other complaint I have is that few of New Zealand's rarest, and thus best known, species are

included. While species like the Kakapo (*Strigops habroptilus*), the Notornis (or Takahe) (*Notornis mantelli*), Black Robin (*Petroica traversi*), Saddleback (*Philesturnus carunculatus*), and Stitchbird (*Notiomystis cincta*) have very limited distributions, they are of great interest and perhaps deserve more than a mention in the text.

The atlas pages are quarto sized and are looseleaf bound in a sturdy PVC binding. This allows the pages to be removed and moved about for easy comparisons, and for additional pages to be added as updates are made. The microfiches are held in a plastic pocket in the back. The pocket in my copy had split when I got the book, which means the microfiches will continue to fall out until I get around to repairing it.

My criticisms are only of details and detract little from the overall quality of this work. The authors have produced a book that is sturdy and compact enough to travel well. For anyone with a scientific interest in New Zealand birds, this volume is indispensable. Keen birders traveling to New Zealand also will find the atlas necessary, as the current field guide does not include distribution maps.—GRETCHEN RASCH.

British birds in their habitats.—Ron Freethy. 1985. Dover, New Hampshire, Tanager Books. 207 pp., 26 color plates, 144 text figures and pictures. ISBN 0-88072-069-7. \$25.00—This book is aimed at the beginning birdwatcher, who may own a field guide but has not found out that most birds are associated with particular habitats. The author had a good idea, as I do not know of another single-volume work on the same topic at the same level. The British Trust for Ornithology book "Bird Habitats in Britain" (by R. J. Fuller)—which I have not read—is probably directed to a much more knowledgeable audience, and would be a much better value for a professional ornithologist or a library. Freethy's book is light in content as well as style, as he tries to make his book serve as a guide to identification as well as to habitats. Nearly half the text pages are taken up with photographs or drawings of birds. Many are good portraits, and some drawings are effective in conveying what the British call the "jizz," or distinctive impression, of a species. The text for each of the 115 or so species treated individually, under 9 major habitat groupings, includes some description—often with field marks, and usually with the length in both metric and English units. Given the many field guides covering British birds in varying detail (and price), much of the space devoted to pictures and descriptions might better have been used for fuller treatments of the habitats and their bird communities. Each chapter also includes a plea to preserve birds by preserving the habitats they frequent. The information provided is sketchy and disconnected to such a degree that those who read it

are unlikely to return to it as a source. Most of the information is factually correct, despite a few over-generalizations. Freethy drew heavily on "The Atlas of Breeding Birds of Britain and Ireland" for population estimates, despite the warning by its compiler that those estimates were one of the less rigorous data sets in that excellent publication. Many other sources are quoted, but the author or printer made rather a hash of some proper names: the Worm glaciation (p. 9), Wynn-Edwards (twice) and "The Finn, Salmonsen" (pp. 74-75), Grassholme (given correctly on the next page) and Abbot's booby (p. 80), among others. Infelicitous or inaccurate items include "a true coniferous bird" (p. 48), "The parents feed (the young)" of Dunlin (p. 64), 26 g in 1 oz (p. 81), W. H. Hudson was dead long before Ruddy Ducks bred in England (p. 135), "a blue head and bill" on Ruddy Ducks (p. 137), and the implication that Peregrines breed "in a hard winter" (p. 146). The figure caption on page 29 is incomplete. The list of other books should be useful for further reading, but I missed there the early (now out-of-print) volumes of the New Naturalist series, from which I got my first introduction to British birds in their habitats.—ANTHONY J. ERSKINE.

Form and function in birds, vol. 3.—A. S. King and J. McLelland, Eds. 1985. New York, Academic Press. ISBN 0-12-407503-7. \$99.50.—The potential usefulness of a book can be judged by the number of people who want to read a chapter, check out a figure, or the like, as soon as they see the book on your desk. Based on my experience, volume 3 of "Form and Function in Birds" would make a good addition to the reference collection of any avian physiologist.

Two-thirds of this 9-chapter volume is devoted to avian sensory systems—olfaction, hearing, vision, touch, and taste. The remainder of the book covers the integument, locomotion, and the somatic nervous system. In general, the chapters are well written and represent comprehensive reviews of their subject matter. The authors have, for the most part, successfully shown the relationship between the anatomical description of various structures and their functional importance. The anatomical description, however, is usually more complete than the functional correlation. Given the great diversity among avian behaviors and habitats, there are ample opportunities to show how structural modifications relate to ecological or behavioral specializations. The publishers maintained good quality in the reproduction of diagrams and photographs. This is especially important in view of the number of photomicrographs and electron micrographs included in the volume.

Bang and Wenzel's chapter on the nasal cavity and olfactory system illustrates the complexity of what might appear, at first glance, to be relatively simple

structures. The nasal apparatus can be divided into four regions with different primary functions—nares, vestibular, respiratory, and olfactory regions. Inspiration and expiration of air for respiration are, of course, critically important for survival. There are potential difficulties associated with these processes. Inspired air must be warmed and humidified before passing to the lungs; this takes place in the vestibular region. The respiratory region deals with the problem of fighting respiratory diseases of the lower respiratory tract. A sheet of mucus moves continuously toward the pharynx, decreasing the likelihood of infectious diseases lodging in the warm moist areas of the respiratory tract. Although the broad functional significance of these areas is well described, it is unfortunate that the many structural differences in these areas among species are not put into perspective with respect to functional differences. This is in contrast to the discussion of olfaction and Cobb's "olfactory ratio." This ratio of olfactory bulb diameter to ipsilateral hemisphere diameter does appear to correlate with "habit and habitat."

Hearing is covered in two chapters. Both illustrate how sense organs can be "tuned" by specializations in the peripheral apparatus as well as specializations at the more central levels. Kuhne and Lewis describe the external and middle ear structures that channel sound to the inner ear, where it is finally encoded by nervous system. The ear openings of almost all birds are covered by auricular feathers. These feathers not only protect the ear openings but may reduce noise induced at the openings by turbulence during flight. Certain birds, most notably owls, have very complex external structures. Specialized feathers, the facial ruff, form large concave surfaces that act much like a parabolic reflector that amplifies sound as well as yielding information about its location. One of the more puzzling aural structures is the avian interaural pathway. This pathway ensures a low attenuation pathway between the middle ears for low-frequency sounds. Though this may aid in the localization of low-frequency sounds, its function has not yet been demonstrated critically. It is yet another example of how difficult it is to get reliable data on the function associated with anatomical specializations.

The description of the auditory system is extended to the inner ear by Catherine Smith. The inner ear is described in detail with the aid of clear diagrams and electron micrographs. This chapter would have been improved by suggesting the functional importance of the specializations that are described. What is the significance, for example, of the lack of intermediate hair cells in *Gallus*? Similarly, what advantages might be conferred on the Barn Owl by the unique fibrous mass located in the proximal part of its basilar membrane?

It is not feasible to cover each of the remaining chapters in detail. Suffice it to say that the remaining chapters are comprehensive and up-to-date. Martin's

chapter on the eye, Gottschaldt's chapter on somatosensory receptors, and Berkhoudt's chapter on taste receptors round out the volume, making the book indispensable as the most current, single source of information on avian sensory systems.

In a volume dealing so strongly with sensory systems, three chapters seem slightly out of place: those covering the integument, locomotory system, and somatic peripheral nerves. Each of these chapters, however, is appropriate for a book on form and function. Feathers are the perfect example of how form and function are related. The morphological differences among feathers can be clearly shown to relate to their various functions: thermal insulation vs. flight, for example.

Volume 3 of "Form and Function in Birds" is a valuable reference for those interested in avian physiology and anatomy, especially those interested in the sense organs. It would also serve as an excellent reference volume for courses stressing the comparative aspects of avian physiology. Unfortunately, the high cost would be an obstacle for purchasing by many students. In any event I expect that this will become one of the more widely read books on my bookshelf.—ANDREW MOISEFF.

Neotropical ornithology.—Paul A. Buckley, Mercedes S. Foster, Eugene S. Morton, Robert S. Ridgely, and Francine G. Buckley (Eds.). 1985. Amer. Ornithol. Union, Ornithol. Monogr. No. 36. xi + 1,041 pp., 8 color plates. ISBN 0-943610-44-3. \$70.00.—Eugene Eisenmann was born in Panama, trained at Harvard Law School, and retired from his law practice in 1956 to turn his attention to the study of birds. His contributions to neotropical ornithology went well beyond publication of his observations; indeed, he did not publish a large number of papers.

Perhaps his greatest legacy is his influence on the development of recent generations of neotropical ornithologists. In his own gentle and inimitable way he guided new students to appreciate the breadth of the discipline and to impose a level of rigor in both writing and observation. Other Eisenmann contributions included careful compilation of his and others' observations, contributions to numerous publications for which he received no direct credit, and his leadership of the A.O.U. Check-list Committee.

"Neotropical Ornithology" was conceived as a memorial volume after Eisenmann's death in 1981. Indeed, as Tom Howell says in the Introduction, "The numbers and kinds of papers in this volume speak more eloquently of his influence, his scholarship, and the personal esteem in which he was held than any introduction possibly could."

In their efforts to produce a suitable memorial volume, the editors sought to include papers covering disciplines as varied as Eisenmann's interests. The

volume contains 61 papers divided into 8 major sections, an Introduction by Thomas Howell, and an Overview by Kenneth Parkes. Papers in each of the major sections (New Taxa, 5 papers; Zoogeography and Distribution, 11; Systematics, 9; Evolution, 10; Community and Population Ecology, 10; Evolutionary and Behavioral Ecology, 8; Breeding Biology, 3; and Conservation, 5) are sequenced alphabetically by author. Some papers are creative syntheses of published information, whereas others present original data. The size of this volume (over 1,000 pages) makes a detailed review impossible. Indeed, few reviewers, including myself, are capable of evaluating the many disciplines represented here. Thus, I will call attention to selected conclusions that I found especially intriguing. One thing that struck me was that chapters in all major sections held insights useful in my own specialty (ecology).

Discovery of new taxa is at the core of biology, and the rate of discovery of new bird taxa is virtually at a standstill except in the Neotropics. Contributions to the New Taxa section name several new subspecies and a new species after Eisenmann. In addition, geographical variation in several taxa are examined.

The Zoogeography and Distribution section is a combination of descriptive and theoretical contributions that demonstrate the need for more comprehensive distributional data. Indeed, lack of such data prevents many of the evolutionary and ecological syntheses that can now be accomplished for other geographical regions. Another common theme is the dichotomy between historical/biogeographical and ecological explanations in accounting for current patterns in neotropical avifaunas. The best merger of these two approaches is provided by Haffer and Fitzpatrick on patterns of geographic variation within species of Amazonian forest birds. Cracraft, in a much less appealing analysis, examines areas of endemism in the neotropical avifauna from a historical perspective. While I agree with his primary point, i.e. that the influence of pre-Pleistocene times on avian distributions has been ignored, I had considerable problems with his methodology for defining areas of endemism. Imposition of a null-models approach as has been used in studies of the role of competition in structuring communities would, I suspect, dim the appeal of Cracraft's centers of endemism. A chapter on the birds of Andean wetlands (Fjeldsa) in this section was a welcome shift from discussion of forest avifaunas. Fjeldsa's distributional information was strong, but I found the content relating to inferences about those distributions to be less strong.

The Systematics section contains papers that use a diversity of procedures to develop understanding of evolutionary relationships among taxa. These include subspecific differentiation of the Lesser Nighthawk (Dickerman), controversial taxa such as *Diglossa* (Bock) and *Sericossypha* (Morony), phylogeny and classification of New World suboscines (Sibley and

Ahlquist), and a detailed phylogeny of the myiarchine flycatchers (Lanyon). The breadth and integration of molecular, behavioral, ecological, and morphological approaches demonstrate the dynamic nature of modern avian systematics.

The Evolution section seemed especially heterogeneous to me. I found the papers by Fitzpatrick, Grant, Jehl, Murray, and Oniki to be especially interesting. Fitzpatrick shows that morphological intermediacy characterizes most behavioral generalists. Galapagos finch demography, according to Grant, is affected more by fluctuations in precipitation than in temperature. Climatic extremes are shown to have evolutionary effects at both the population and community levels. Jehl's study of the hybrid zone between western oystercatchers is a fascinating tale of the effects of collecting on small populations, the dynamics of hybrid zones, and inferences that can be made about the biology of populations following careful analysis of historical data.

Murray argues that clutch size variation in birds cannot be understood without considering differences in survivorship schedules, ages of first and last reproduction, and number of broods raised each breeding season. His generally thought-provoking analysis follows Moreau but fails to deal with increasing evidence that the duration of postfledging parental care in tropical forest birds is long. Oniki analyzes information on nest structure and egg color. She argues that avifaunal diversity may be determined more by the diversity of nest sites available than by segregation of foraging niches. Predation seemed to be a more important determinant of nest and egg attributes than did weather.

The section on Community and Population Ecology demonstrates how far ecological studies of neotropical birds have come in the last two decades while showing how far we have to go. To their credit, few authors use species diversity indices, in sharp contrast to what might have happened 15 years ago. Aquatic birds were the focus of two chapters: Kushlan et al. on wading birds of the Florida Everglades and the Venezuelan llanos, and Willard on the piscivores of an Amazonian oxbow lake. The strengths of Kushlan et al. are a combination of modern ecological principles, quantitative analysis techniques, and considerable knowledge of the birds' natural history. They note that cyclical and random fluctuations of environmental factors and biogeographic constraints (faunal access, regional habitat mosaic) play primary roles in structuring animal communities.

Mixed-species flocks in the understory of tropical forests have been studied intensively for several decades, with less effort expended in studies of canopy flocks. Munn studied both groups and documents three major differences: understory flocks occur at higher densities (flocks/km²), canopy flocks feed on fruits and insects while undergrowth flocks are almost purely insectivorous, and understory flocks are

more aggressively territorial. Powell reviews the potential reasons for flock formation and recognizes that no single factor is responsible for this complex behavior. Stiles's paper on hummingbird communities urges caution about using a strict guild classification of hummingbirds. Ecological roles should be more realistically applied to sex-age groups or to individuals at particular times and places rather than always by species.

The section on Evolutionary and Behavioral Ecology includes important synthesis papers by Foster, and Moermond and Denslow. Helpers at the nest have been studied intensively in several avian groups in recent years. Foster discusses prenesting helping behavior, usually cooperative performances, during prenest reproductive activities such as mate attraction, courtship, and copulation. She argues graphically as well as conceptually that the short length of the pair bond is a limiting condition for prenesting helping behavior.

A detailed review of the interactions of behavior, morphology, and nutrition in the selection of fruits by frugivorous birds is provided by Moermond and Denslow. Using both recent literature and results of original research, they emphasize the constraints placed on behavior by morphology. They provide a classification of feeding behaviors for frugivores similar in concept to that of Fitzpatrick for flycatchers. Robinson's study of nest pirates in caciques shows that the rarity of pirates is essential in much the way that insect mimicry complexes depend on rarity of the mimic.

The briefest section of this volume deals with Breeding Biology, no doubt because of a major shift in ornithology toward more theoretically oriented studies. Observational life-history studies in the Neotropics are not common despite their potential to yield insight of value in a variety of theoretical contexts. For example, Mason describes his studies of the nesting biology of passerines of Buenos Aires, Argentina. Saffron Finches, a species that uses old nests of other species, have lower nesting success in Rufous Hornero nests than do Rufous Horneros in their own nests. In contrast, Saffron Finches have higher nest success when using hornero nests than when using the nests of other species. These patterns stimulate a number of theoretical questions of interest to behaviorists, ecologists, and evolutionists.

Increased knowledge of neotropical birds is especially pleasing throughout the first 970 pages of this volume. Yet, as one reads the final section on Conservation, reality shatters that euphoria. The increased number of endangered and even extinct species is especially troubling. The causes of declines and extinctions are generally well documented. Red Siskins in Venezuela (Coats and Phelps) and finches in Trinidad (French) have been decimated by the pet trade. Habitat destruction throughout the Neotropics is fueled by human greed and the fight for short-

term survival. These and other causes are easily identified, but solutions do not come so easily. We desperately need a creative synthesis to provide solutions to the decline in the integrity of the biosphere illustrated by avian extinctions.

Overall, this is an excellent volume that will repay the careful reader. In addition, its breadth and vitality ensures that nonornithologists will profit from reading it. An especially valuable editorial decision that will be useful in the future was the inclusion in many papers of tabular and appendix material (both data and species lists).

Through his cordial manner and willingness to correspond with students, Eisenmann spread the wealth of his knowledge widely. The editors of "Neotropical Ornithology" have added substantially to the spread of knowledge of neotropical birds with this volume.—JAMES R. KARR.

Theodore Roosevelt. The making of a conservationist.—Paul Russell Cutright. 1985. Urbana and Chicago, University of Illinois Press. xiii + 285 pp. ISBN 0-252-01190-2. \$27.50.—This is Dr. Cutright's second book on Theodore Roosevelt, Jr. The author, who has already explored the story of Roosevelt the naturalist, uses new sources to trace the development of young Teddie Roosevelt into a capable naturalist-conservationist.

Theodore Roosevelt's image as an adult was that of a robust outdoorsman. As a young child he was small and often sick, particularly with asthma. This did not prevent his participation in numerous field excursions and several overseas voyages, during which, as seen through excerpts from his detailed diaries and letters, he explored the natural world around him. His father, one of the founders of the American Museum of Natural History, supported his interests. He provided his young son with a gun, and introduced him to many well-known naturalists.

In addition to studying birds and mammals in the field, young Roosevelt built up his own natural history "museum." This private collection greatly improved after he began to learn taxidermy from the noted John G. Bell, erstwhile companion of J. J. Audubon. Visits to the Philadelphia Academy and the American Museum of Natural History deepened Roosevelt's interest in nature. By the time he entered Harvard University in 1876 he was a well-rounded naturalist who contemplated becoming "a scientific man of the Audubon, or Wilson, or Baird, or Coues type." This ambition was tolerated, but never encouraged by his father, who stressed that should his son become a scientist he *could do so*, provided he was convinced that he "really intensely desired to do scientific work" (p. 95).

At the end of the 19th century, scientific training at Harvard followed the German experimental tra-

dition and consisted chiefly of laboratory work. Roosevelt, who enrolled in a variety of zoology and natural history courses, was disappointed that there was no opportunity to acquire firsthand experience with living animals. Although he continued his field excursions, his interests and range of activities broadened until he became involved in nearly all aspects of college life.

By his senior year the idea of becoming a scientist was replaced by a more "practical" interest in economics, which, as opposed to science, did not require years of graduate study abroad. Natural history remained an important avocation throughout his life, however, and sustained him through many difficult periods. During the 1880's and 1890's, while beginning to make a name for himself in politics, he spent all his spare time in the Badlands of the Dakota Territory. There he wrote three books on his western experiences and developed a deep concern for the vanishing frontier and the impending destruction of large game animals.

From the late 1880's, Roosevelt's association with conservationist Dr. George Bird Grinnell and forester Gifford Pinchot had important consequences for conservation. Realizing the need for political action to preserve natural resources, Roosevelt, as Governor of New York State (1899-1901) and as President of the United States (1901-1909), made substantial efforts on behalf of wildlife and wildlife habitats. To date, however, his contributions to conservation have been largely overshadowed by his many other achievements. Dr. Cutright, with a fine sense of history, provides information about this often disregarded dimension of Roosevelt's administration.

This book on Roosevelt as conservationist should help broaden the image so many people have of him as Rough Rider, outdoorsman, and big game hunter. It is evident that he was also a well-trained scientist, and Cutright stresses that Roosevelt's African "Safari," conducted under the auspices of the Smithsonian Institution, not only contributed an important collection of birds and other animals to the U.S. National Museum, but also accumulated large amounts of data concerning the life history of African animals. A later trip to South America, under the aegis of the American Museum of Natural History, yielded a sizable collection, but was also important in its geographic exploration of the River of Doubt. Unfortunately, Roosevelt never recovered from the various tropical diseases he contracted during this expedition.

This is a carefully researched, well-written book, with a minimum of inconsistencies and typos. There are a few interesting illustrations, but I would like to have seen more, particularly photographic documentation of Roosevelt's many conservation-oriented activities.

Although the price may exclude this book from the shelves of many interested students, I recommend it

as essential for college, museum, and community libraries, and desirable for all naturalists' personal bookshelves.—MARIANNE GOSZTONYI AINLEY.

The Audubon Society guide to attracting birds.—Stephen W. Kress. Illustrations by Anne Senechal Faust. 1985. New York, Charles Scribner's Sons. xx + 377 pp. ISBN 0-684-18362-5. \$24.95.—If your first reaction to hearing that there is a new book on attracting birds is "Oh no, not another one," take a look anyway. Bird attraction, as defined in the preface, is accomplished by an enrichment of habitat through an improvement of "vegetation, natural foods, water supplies, and nest sites." Perhaps there are many of us who would like to manage our home habitat but do not know where to begin or what to do.

This book presents much more than just the methods for attracting birds. The theme throughout is that individuals can manage their immediate environment in a way that will not have a negative impact on other aspects of our natural surroundings. This management takes care, planning, and knowledge of the interrelationships involved. Methods for accomplishing this objective are presented, and this information will be of value whether you have a house lot or hundreds of acres.

The key to appreciating the kinds of information that Kress has gathered, organized, and presented so lucidly is in his preface. There he states that his goal is to pull "together most of the vast literature about bird attraction from conservation agencies and bird clubs and to assemble ample source lists for plants and bird-attracting products." He has done this not only for birds that are usually thought of as feeder birds but for various others such as hawks, owls, loons, and terns. Recent research findings are incorporated into all sections.

Kress begins by describing how to develop a plan and then proceeds step by step through landscaping for birds, including selection of the appropriate trees and shrubs and incorporation of water sources.

An impressive amount of information is packed into the chapter on plant selection. Here you will find plants appropriate for your locality wherever you live in North America as Kress has divided the continent into five major plant/animal regions. The majority of the plants recommended are native to North America. The requirements for their growth, and for attracting birds and other animals, are given. The line drawings do much to enhance this section.

The literature and source lists are appropriate both for large acreages and for backyards. There is an annotated bibliography of books and pamphlets on attracting birds and on wildlife management, which includes a listing of state and provincial publications. Contained in the appendices are lists of organizations that can supply help, mail-order sources for

plants, lists of state nurseries, and sources for bird-attracting supplies.

Yes, there is a chapter on supplemental bird feeding, and one on nesting structures. Here, as in other sections, there is narrative discussion and tables of information. Food preferences, nutritional values, seasonal variations, as well as standard information that is required by the novice bird feeder are provided. Clear, detailed plans are given for feeders and nesting structures, and advice is given concerning their placement. Predator and nuisance control for feeders and nest boxes is discussed. Suggestions from correspondents for coping with that scourge of many feeding stations, the grey squirrel, are given. There is humor in this discussion, as well as help.

This guide will be a useful acquisition for public libraries and for gardeners and birders alike. For anyone who is interested in attracting and enjoying birds, and in doing their bit to conserve and develop natural habitat, Kress has provided a concise reference shelf between two covers.—SHIRLEY S. DAVIS.

Life of the woodpecker.—Alexander F. Skutch. Illustrations by Dana Gardner. 1985. Santa Monica, California, Ibis Publications. 136 pp. ISBN 0-934797-00-5. \$49.95.—Alexander Skutch has been living in, and reporting on the avian life of, neotropical forests for over 40 years. His writings, reflecting dedication and an eye for detail, have contributed more to our current (meager) knowledge of the life histories of tropical birds than have probably those of any other living worker. In this book he has produced a non-technical treatise that focuses on the family Picidae, similar in many ways to his earlier book on hummingbirds. The book is divided into 10 chapters that consider major features of the life history of woodpeckers, including "the woodpecker family," "food, foraging, and storing," "the dwelling and the territory," "daily life," "drumming, voice, displays, and pair formation," "nesting," "the fledged young," "social life," "usurpers, parasites, and predators," and "woodpeckers and man." The style is decidedly low-key: there are no citations in the text, little discussion of technical issues, and no systematic perusal of the species of woodpeckers. In short, Skutch has attempted to produce a book of enjoyment and wonder rather than one that is probing and scientific.

As a lover of woodpeckers, my reaction to this approach is positive. Skutch is an astute observer, an excellent writer, and has organized the book in a relaxed, charming, and enjoyable fashion. The information presented and observations discussed are interesting, and references are rarely misinterpreted. Furthermore, the illustrations, painted by Dana Gardner and spread liberally throughout the book, are, at least to my taste, excellent. There is no attempt at completeness—a relatively small number of species

is illustrated—but the portraits are elegant and rendered in a naturalistic style that I find beautiful.

As an academic endeavor, there is little question but that the book does not, and indeed was not intended to, “boldly go where no man has gone before.” Yet the information is solid, and combined with Skutch’s fine writing, makes a work from which almost any ornithologist or natural historian can derive a great deal. Two shortcomings should be noted, however. First, Skutch’s access to literature is clearly limited, and the majority of literature sources (listed in a “bibliography” section in the end) are strictly ornithological journals. Consequently, there are no references to the considerable number of recent works published in such general sources as *Ecology*, *Animal Behaviour*, *Behaviour*, or *Behavioural Ecology and Sociobiology*. Second, Skutch’s approach is descriptive and often lacks a modern, evolutionary perspective and style; indeed, some of his anthropomorphic touches and anecdotes are reminiscent of some of this century’s early bird popularizers (William Leon Dawson comes to mind). It is easy to be critical of such a style, but the result is a product far more entertaining, and (at least in Skutch’s case) not necessarily less illuminating, than the standard technical journal article.

In summary, this book would be a fine addition to any coffee table or community library and would make an especially nice gift to friends and relatives. It is not cheap, but the price is reasonable and it may already be possible to obtain it at discount from some sources. I recommend it to bird enthusiasts, natural historians, and professional ornithologists who would like a well-written, produced, and illustrated book presenting good natural history on what is certainly one of the most interesting of avian families.—WALTER D. KOENIG.

OTHER ITEMS OF INTEREST

Voices of the New World thrushes.—John William Hardy and Theodore A. Parker III. 1985. Gainesville, Florida, ARA Records. Cassette tape and booklet. No price given.—This long-playing cassette tape provides the songs and calls for 66 of our 68 New World thrushes. The sounds are truly remarkable, ranging from typical “recognizable . . . bird song,” to “super-bird” song . . . strikingly like . . . human music,” to “complex songs consisting of almost unworldly sounds that could conceivably be created by bells, chimes, and . . . computer-driven machinery.” The tape is entertaining, although the audiophile who demands crisp, top-quality sounds and no distracting background noises will be disappointed. This tape contains the best of the recordings that are available, though, and I commend Hardy and Parker for their efforts in sharing this “music” of the thrushes with us.

The listener cannot help but be intrigued, for ex-

ample, by the “seemingly unending improvisational format” of two island species (*Myadestes elisabeth* and *M. genibarbis*), by the variety of songs from what is “probably the best avian mimic in the world” (*Turdus lawrencii*), and by the striking contrast between the simpler songs (as in *Sialia* spp.) and the extraordinarily complex songs (e.g. *Myadestes townsendi*). While I found disconcerting the minor inconsistencies and errors in the 24-page booklet (such as in duration of cuts or the numbering of different examples for each species), I value the tape as an exciting introduction to the sounds of a remarkable group of songsters. If the tape affects others as it did me, we may meet in the field someday while pursuing one of the more unique tropical members of this group!—DONALD E. KROODSMA.

Populations and breeding schedules of waders, Charadrii, in high arctic Greenland.—H. Meltofte. 1985. Copenhagen, Denmark, Commission for Scientific Research in Greenland. Meddelselser om Grønland, Bioscience 16: 1-44. ISBN 87-17-05237-8. No price given.—Fly me to Greenland. After reading Hans Meltofte’s monograph on the shorebirds of Greenland I not only want to go, I even feel prepared. Meltofte’s work draws eclectically upon his broad experience in Greenland and the observations of others. The result is a fine descriptive overview of phenology and population patterns of waders breeding in Greenland.

One message emerges unambiguously. Don’t go to Greenland to find Peter Mathiesson’s mecca of breeding windbirds. True, shorebirds dominate the avifauna, but on land there isn’t much else. Breeding densities run as low as one-hundredth the densities observed in northern Alaska.

Anyone working on arctic shorebirds will profit from this publication, if only for the monumental reference list. There would appear to be more references relevant to Greenland waders per bird on the land mass than for any other major geographic area. Meltofte infuses his text with useful correlative analyses, attempting to interpret some of the basic patterns in phenology and geographic variation in density. Not all these are successful, but they will surely provoke others working in the Arctic to follow up.—J. P. MYERS.

Families of birds.—O. L. Austin, Jr., and A. Singer. 1985. Racine, Wisconsin, Golden Press/Western Publishing Company. 200 pp. ISBN 0-307-13669-8. \$7.95.—This is an enlarged edition of the 1971 volume. By comparison, while the page count in the new version is the same, page size is expanded by approximately 25% and the cost has increased four-

fold. Four figures have been removed from the cover and do not appear elsewhere in the book.

This "guide to classification" has been updated to conform with the 6th edition of the A.O.U. Check-list. Consequently, there have been some adjustments by moving figures and text material, but I found no changes in either. The same source material is listed under "More Information."

This little volume, despite notoriously short-lived binding, is helpful. It is a good beginning for newcomers to ornithology.—A.H.B.

Birds of New York State.—John Bull. 1986. Ithaca, New York, Cornell University Press. 720 pp., 82 figures, 167 maps, appendices. ISBN 0-8014-1897-6, \$49.50 (cloth); ISBN 0-8014-9314-5, \$24.95 (paper).—This is a reissue of the original volume, plus a supplement that appeared in 1976. It was reviewed previously by S. F. Eaton (1975, *Auk* 92: 830). This is not a field guide but an extensive compilation of the distribution, breeding records, and occurrence of over 400 species in New York. The original contribution, of more than 60 years of records, remains. Some of the information has been superseded by the recently revised A.O.U. Check-list, but as a source for comparative information on population and environmental changes it is unexcelled.—A.H.B.

Vertebrate flight: a bibliography.—Jeremy M. V. Rayner. 1985. Bristol, England, University of Bristol Press. ix + 182 pp. ISBN 0-86292-202-X. Paper, \$9.75.—An alphabetical listing of approximately 2,500 references to work on vertebrate flight. It is supplemented by a subject and taxonomic index that uses a coded method of retrieval.

The subjects included are astounding, and Rayner tends to be broad and thorough in his coverage. The book is current through September 1985, yet covers sources prior to 1850. All aspects of flight are included, from biochemistry through design, energetics, and evolution—even underwater "flight."

This collection is invaluable to researchers, students, authors, and reviewers.—A.H.B.

Physiological strategies in avian biology.—J. G. Phillips, P. J. Butler, and P. J. Sharp. 1985. New York, Methuen, Inc. (Published in the United Kingdom by Blackie & Son, Glasgow, Scotland.) vi + 218 pp. ISBN 0-412-00921-8. Cloth, \$39.95; paper, \$19.95.—This is a brief, but clear, introduction to the physiological processes of birds that account for their ecological success. In 7 chapters the authors cover locomotion, migration and orientation, thermoregulation, osmoregulation, and reproduction. A comparative approach is used. Because the organization emphasizes processes, there is a successful integration of systems physiology, cellular and biochemical mechanisms, and natural history. A unique final chapter considers "Applied Aspects." This includes domestication, intensive farming, and pollution.

The authors prepared this book for undergraduates. It is short and lacks the documentation of an advanced or professional text. It covers most basic design problems in birds, however, and relates the avian machinery to the important environmental challenges. It is an excellent, accessible introduction.—A.H.B.

The birds of Oman.—Michael Gallagher and Martin W. Woodcock. 1985. London, Quartet Books, Ltd. 310 pp., 120 plates. ISBN 0-7043-2582-9. £35.00.—Oman is a sultanate on the eastern portion of the Arabian Peninsula whose population is estimated at 1–2 million. It is oil rich and Islamic. It has been visited sporadically by Europeans for over 200 yr, but the avifauna was poorly known. The present sultan was enthroned in 1970, and modern development began in 1975. The landscape is stark and the climate strongly seasonal. The authors acknowledge the occurrence of 372 species, and include migrants and seabirds.

An English edition of this volume (published in 1980) was reviewed previously (1981, *Auk* 98: 648). This is now an Arabic language edition with some minor changes, a different cover illustration and frontisplate, and what appear to be somewhat shortened species accounts. There are slight, but noticeable, differences in the intensity of the color-plate reproductions.—A.H.B.