REVIEWS

EDITED BY WALTER BOCK

Species relationships in the avian genus *Aimophila*.—Larry L. Wolf. 1977. American Ornithologists' Union, Ornithological Monographs No. 23. viii + 220 pp., 17 text figures + 10 plates, long-play phono disc album. $12.00.—Although there is general agreement as to what constitutes a species, the author points out that genera are more subjective taxa, set up as "aids in categorizing species, to facilitate study of their biology, and to further show their possible evolutionary pathways." Lack, for example, placed the Galapagos Finches into four genera, each based on habitat or foraging position within the habitat during the breeding season. Bowman later studied radiation in the same group and used common feeding adaptation to define his genus.

The New World emberizine genus *Aimophila* was thought by various taxonomists to consist of an unnatural assemblage of birds, possibly of diverse phylogenetic stock. The genus (*fide* Hellmayr) occurs primarily north of Panama. Based on number of species, Wolf believes the center of distribution of the genus to be central Mexico. Twelve species are treated in his monograph. Following Joe Marshall's admonition to study "all standpoints of their biology before generic realignment," Wolf conducted detailed studies of the morphology, natural history and behavior of these birds, seeking characters to justify membership in the group and elucidating relationships of members of the group to each other.

The author views the evolution of bird genera as the "radiation of ecologic units." He thus divides the genus into three groups based on habitat type. The *Haemophila* group, consisting of five species—*A. ruficauda, A. sumicrasti, A. humeralis, A. mystaclis,* and *A. carpalis*—inhabit lowland thorn scrub forest of western Mexico and the Pacific lowlands of Central America. His *ruficeps* complex, including *A. ruficeps, A. rufescens,* and *A. nostosticta*, includes birds of pine-oak woodland in Mexico and Central America. His *botterii* complex, including *A. aestivalis, A. botterii,* and *A. cassinii,* contains inhabitants of weedy, open country of Middle America and the United States. A twelfth species, *A. quinquestriata,* is treated separately because of peculiarities of adult and juvenile plumage and vocalizations. This is the only species limited to middle elevations (240–1,850 m), where it inhabits primarily tropical deciduous woodland. The author believes that its affinities are probably with *Melozone*.

Wolf looked for and found differences in vocalizations characterizing his three groups. Primary songs of the *Haemophila* group tend to be simpler in structure (consisting of monotonous trills) than songs in the other groups. Songs in other groups are more complex, but the *botterii* group may be distinguished from the others by the common occurrence of whistle figures in their songs. The recordings that accompany the monograph are of good quality and of great help in understanding the author's descriptions, especially in appreciating his remarks on song of *A. botterii*. The illustrations of the primary song of *A. botterri* (Plate 9) contain no whistles, and thus do not illustrate an important taxonomic character. It would have been better if Wolf had illustrated instead a selection or selections of songs from cut 32 of the recording to make his point. It's a pity also that the record made no mention of which cuts were illustrated. Although the descriptions are adequate for the purposes, it would have been nice if complexity of pattern were quantified by presenting repetition indices (number of figures divided by number of kinds of figures), which I think would have lent strength to the arguments. Simpler songs should have higher repetition indices. Wolf (p. 123) agrees with Borror but disagrees with Phillips, who reported songs of *Amphispiza bilineata* as similar to those of *Aimophila quinquestriata,* a character used by Phillips as evidence for merging *Amphispiza* in *Aimophila*. The detailed study by Heckenlively (1970, Condor 72: 24–37) on songs of *Amphispiza bilineata* appears to support Wolf's observations.

Variation in the nature of the pair reunion duet was another character used by Wolf to distinguish the groups. The *ruficeps* group used a chatter call distinct from primary song in duet display. Wolf had no information for *A. notosticta,* but, J. W. Hardy (Condor 81, in press) has since confirmed the presence of such a vocalization in that species. The *botterii* complex was distinguished from the others in having very simplified duet vocalizations, consisting of rapidly repeated alarm notes. I had difficulty in distinguishing the contributions of the male versus the female in the duet displays in the author's spectrograms. It might have been better if Wolf had presented tracings of spectrograms of male versus female figures, using black versus clear for each sex's contribution.

Wolf (p. 126) goes on to discuss the adaptive significance of duetting, suggesting factors such as long term pair bond, arid environment, sexual monomorphism, year-long territoriality, and relatively dense habitat as resulting in selection for these displays. Kunkel (1974, Z. Tierpsychol. 34: 265–307) would probably agree with Wolf in all except the last—dense habitat. Kunkel surveyed duetting in many tropical species, pointing out that duet displays often occur with pairs in visual contact, and often involving

special plumage patterns, colors, and movements. Wolf's observations (p. 47) that: (i) in at least three species (*A. ruficauda, A. humeralis, A. mystacalis*) duetting is accompanied by displays at close quarters, displaying head patterns to advantage; and (ii) in at least four other species (*A. mystacalis, A. sumichrasti, A. ruficeps, A. rufescens*) duetting takes place when pairs come together (pair reunion), seem to support Kunkel and negate the importance of dense habitat in selecting for duetting in these forms.

Wolf also separates the *Haemophila* group from the others on the basis of their strikingly colored or patterned plumage. He suggests (p. 197) a negative correlation between song complexity and brightness or complexity of plumage pattern. In the *Haemophila* group, in his view, visual communication takes precedence over vocal communication. Farabough (1977, Abstract, AOU meeting, Berkeley, California and in litt.) has called attention to differing levels of sociality in monogamous species that may be expressed, for example, in frequent versus occasional duetting displays, variation on intrapair distances during this display, precision in timing of duets, or percentage of time females participate in territorial defence. Could brightness or boldness of plumage pattern in *Aimophila* also be correlated with the form and frequency of their duetting displays? We need carefully quantified data on this most interesting aspect of *Aimophila* biology.

Wolf's treatment of the adaptive significance of tarsal lengths is confusing. In discussing *A. notostica*, he suggests (p. 158) that hopping species should have short tarsi and running (= fast walking) species should have long tarsi. Later (p. 175) he calls attention to the long legs of *A. ruficeps* in comparison with other members of the genus, but discusses this species no further. However, in his general biology section, he indicates that the primary form of locomotion in nine forms was by hopping. Only one species—*A. ruficeps*—usually *walked* while foraging on the ground (p. 88). Further on (p. 159) he suggests that most *Aimophila* move by walking, and that little differential selection on tarsal length has been exercised by mode of terrestrial locomotion.

Clearly, none of my criticisms are serious. This was an enormous project. Wolf's intention (p. 207) to provide "a background for future work on generic classification of fringillids and a possible theoretical framework for generic classification" was certainly successful. I, for one, learned much about emberizine taxonomy and biology.—LUIS F. BAPTISTA.

Shorebirds in marine environments.—Frank A. Pitelka (Ed.). 1979. Cooper Ornithological Society, Studies in Avian Biology 2. Pp. viii + 261. $8.00.—The advent of large-scale oil and gas exploration in arctic North America brought with it publicity, fears for, and study of northern fauna. Environmental assessments were and are being made over large areas, resulting in efforts to lessen damage to the breeding grounds of caribou, northern waterfowl, and arctic shorebirds. For shorebirds, however, areas critical for maintenance of healthy populations lie not only in the arctic, but along thousands of miles of coastline utilized during the 9–10-month nonbreeding season. This volume, constituting the proceedings of the Pacific Seabird Group's Shorebird Symposium (6–7 January 1977) at Asilomar, California, addresses the ecology and behavior of shorebirds on migration and in wintering areas. While only one short paper deals directly with the state of habitat preservation, 12 of 21 discuss management implications of their findings and speculations. Most of the remaining papers present basic data of obvious management value such as year-round censuses, habitat utilization, and feeding ecology. The result is a volume that holds a great deal of value for wetland managers as well as biologists interested in such topics as foraging strategies, territoriality, migration, and community ecology.

The volume opens with Pitelka's overview of seasonal shifts in the latitudinal distributions of shorebirds along the Pacific coast (from Cape Horn to Barrow). While concentrated at high latitudes during the breeding season, North American species fan out over the entire coastline during the rest of the year. Pitelka stresses the importance of investigation and monitoring of populations on an international basis, as has been done successfully in Europe and Africa. Research of the type stressed by Pitelka was presented by Prater, in his paper entitled "Shorebird Census Studies in Britain." This work presents an enviable model for North American workers. For 5 yr, monthly shorebird censuses were taken at virtually every estuary in Britain (Prater acknowledges the efforts of "about 2000 observers and banders"). While such a feat would be difficult over the entire Pacific coast, it is clear that shorebird population study is a western European specialty.

The remaining 19 papers may be classified primarily as follows: physiology (1), feeding ecology (4), winter territoriality (1), habitat utilization (3), descriptions and censuses of local areas (5), migration patterns (3), geographical surveys (1), and habitat preservation (1).

The paper by Myers *et al.*, on winter territoriality is of special import to all interested in animal spacing and foraging systems. The authors describe and document the occurrence of winter territoriality in a

widespread group of shorebirds, and compare the general behavioral repertoire used to maintain it with those displays used in the maintenance of breeding territories. Winter (presumably feeding) territories are smaller, not restricted to one sex, and not continuously advertised. The displays used in their maintenance "appear to be specialized for the non-breeding context of high density, constant proximity, and good visibility." The authors note a large amount of variability in the proportion of a species that behaves territorially, and suggest that this proportion itself may be a part of the dynamics determining the profitability of territorial behavior. Due to their high visibility, shorebirds clearly offer excellent opportunities for comparing territorial behavior serving different adaptive functions.

Among the feeding ecology papers, mention should be made of Goss-Custard's summary of prey choice by Redshanks (*Tringa totanus*). The paper brings together previously published analyses, and relates the results to foraging theory. Models of maximization of profitability predict well the birds' foraging location with respect to prey density and choice of within species prey size, but fail to agree with prey choice by the birds when two prey types are present. Goss-Custard estimates that net caloric intake could have been 2–3 times higher if Redshanks had switched from small amphipods to larger polychaete worms at observed prey densities. He discusses why the birds might stick with the smaller prey item, but does not totally resolve the matter.

While the volume is heavily oriented toward field studies, the three papers dealing with migratory patterns make good use of museum material. Jehl's paper on the autumn migration of Baird's Sandpipers (*Calidris bairdii*), based entirely upon museum specimens, suggests an unsuspected difference between adult and juvenile routes. Adults collected in the United States and southern Canada come exclusively from the northern Great Plains, while juveniles are found from coast to coast. Jehl goes on to propose a long direct flight from the northern plains to the northern Andes, analogous to the transoceanic flights of other shorebirds off the northeast Atlantic coast and to that proposed for Alaskan Dunlin (*C. alpina*) by Gill and Jorgensen in this volume.

If such a flight occurs, it adds a new dimension to shorebird migration. Previously documented long-distance flights are aided by tail winds. A southeasterly flight from northern Mexico to southern Peru would cross trade winds, albeit light ones, blowing from the east and southeast that would impede the birds' progress. Jehl supports his hypothesis on the basis of weights of migrants in the U.S. and the scarcity of specimens from Central America. Consistent with Jehl's hypothesis, Smith and Stiles in this volume report no Baird's Sandpipers in their 2½-yr shorebird study on the northeastern cost of Costa Rica.

The second migration paper is Harrington and Morrison's study of Semipalmated Sandpiper (*C. pusilla*) migration. This paper utilizes small numbers of museum specimens and massive amounts of field data to demonstrate that a cline in bill length present on the breeding grounds persists as the birds move southeast during fall migration. They also document measurable differences between spring and fall at particular locations. Analysis of the bill lengths and their associated variances allow determination of the origins and routes taken by different breeding populations. While dense reading in spots, the paper constructs a compelling picture of the migratory pattern of this species. The morphometric approach used, common in Europe, deserves more attention from North American workers.

Senner's paper on spring migration of Dunlin and Western Sandpipers (*C. mauri*) also combines field and museum data, this time on weights, to provide a contrasting view of spring migratory strategies in the two species. This paper and one by Isleib stress the importance of the Copper and Bering River deltas in southern Alaska as staging areas for millions of spring-migrating shorebirds.

Concern for the migratory and wintering habitat of shorebirds has a sound historical basis. The massive decline in shorebird populations in the 19th century and the probable extinction of the Eskimo Curlew (*Numenius borealis*) were accomplished without large scale disturbance of breeding habitat. Findings presented here with regard to migratory and wintering site fidelity, habitat specificity, the need for feeding and roost sites, etc. put such events in perspective. The care authors of this volume have taken to relate research findings to the welfare of their study subjects is laudable. This is especially important at a time when scientific efforts are threatened, both by a need for fiscal justification and by the declining availability of suitable study populations.

A review of this volume would not be complete without calling attention to its editor. Frank Pitelka has pioneered the study of arctic shorebirds for nearly 30 yr. Much of what we know about shorebird biology today is a direct result of his efforts and those of his students. In organizing this symposium, Pitelka has again proven himself a pioneer by focusing attention on the serious problems and exciting research opportunities that nonbreeding shorebirds face and yield. "Shorebirds in marine environments" is a tribute to Pitelka's continuing leadership in the field of shorebird biology.—LEWIS W. ORING and DAVID B. LANK.

First in the field: America's pioneering naturalists—Robert Elman. 1977. New York, Mason Charter. xx + 231 pp. 19 black-and-white illus. $12.50; **Natural history in America: from Mark Catesby to Rachel Carson.**—Wayne Hanley. 1977. New York, A Demeter Press Book/Quandrangle-New York Times Book Co. xii + 339 pp. 16 color plates, 12 black-and-white illus. $14.95; **A species of eternity.**—Joseph Kastner. 1977. New York, Alfred Knopf. xiv + 350 pp. 20 color plates, 72 black-and-white illus. $15.00.—These books are popular biographical treatments of the development of American natural history from colonial times to the recent past. They vary in scope and in depth of analysis. Elman and Hanley bring the story down to the 20th century, while Kastner has chosen to deal with events only through the 1860's.

Elman, a writer on nature and conservation matters, selectively covers pioneering naturalists from John Bannister, Thomas Morton, and John Lawson in the 16th and 17th centuries through Catesby, the Bartrams (father and son), Alexander Wilson, Audubon, Bachman, Agassiz the elder, and John Wesley Powell. He concludes with John Burroughs, who he admits is an exception to his "pioneering" criterion. While not a scientific pioneer, Burroughs "dramatized and popularized the natural world without resorting to the sham of the romanticists." Elman also considers Burroughs an appropriate subject because he was an effective publicist for the conservation ethic, which is now "burning in the public consciousness and conscience with greater intensity than ever." Elman ultimately justifies his choices of subjects by stating that an effort of this kind must be "a very personal book." He also takes time to defend those who hunt or fish for survival, scientific purposes, or sport, arguing in the latter case that most men understand their predatory tendencies but find that they learn much about wildlife in the process.

There is much here about birds, bird collecting, and bird artistry, particularly in the chapters that deal with Catesby, the Bartrams, Wilson, and Audubon and Bachman. Elman writes well, depending mainly upon a host of secondary materials, most of which are listed in the bibliography. While there is little here that is new, Elman's book makes an excellent introduction for those who are coming to the subject for the first time. His accounts of his subjects are balanced, and he discusses their shortcomings and weaknesses as well as their contributions.

Hanley's book offers both more and less than Elman's. He covers many more individual naturalists, but admits at the outset that his "is not a profound volume." Short biographical snippets by Hanley, who is an editor for the Massachusetts Audubon Society, are interspersed with passages selected from the writings of his protagonists, of whom there are nearly 30, while numbers of others make briefer appearances. The color plates are well chosen, and Hanley's connecting passages in the text are informative and often sprightly, but the book has several major deficiencies—it lacks both bibliography and index, so that the neophyte who wants to pursue an individual further knows not where to turn next.

Bird men abound in this book, beginning with Catesby and continuing on with Wilson, Audubon, Bachman, Nuttall, Rafinesque, Coues, and Fuertes, though many others whose career had something to do with birds receive passing mention. Hanley's book makes a good introduction to the literature for beginners, although serious students of the history of American natural science will want and need to delve much more deeply in the original sources.

Joseph Kastner, a former editor of *Life* magazine, has written a very readable popular account of American naturalists ranging from Cadwallader Colden and Alexander Garden down to Spencer Fullerton Baird and Asa Gray, although detailed coverage of the careers of the latter two does not extend much beyond the 1860's. Kastner's title is taken from a comment made by Peter Collinson, an 18th century Quaker merchant and plant collector, who was largely responsible for initiating exchanges of plants and seeds with American botanists. Collinson suggested that the naturalists of that period achieved a species of eternity when new forms of wildlife and plants were named in their honor, a privilege that was largely reserved to Linnaeus during the latter's lifetime.

Kastner gives some attention to the exchanges of specimens and notes between Americans and Europeans before the Revolution, to the role played by Linnaeus and his student Peter Kalm, and the visit of the latter to the colonies between 1748 and 1751. Also included are Jefferson, who stood up to and refuted Buffon when the latter claimed that American mammals were inferior in size and less hardy than comparable European types, and the New Yorker Samuel Latham Mitchill, who had such diversified interests that he was referred to as a "chaos of knowledge." Catesby, Wilson, and Audubon are given extensive coverage, as is the work of Charles Willson Peale and the museum he created in Philadelphia. Several lesser known women naturalists, such as Jane Colden and Elizabeth Pinckney, are also discussed.

The interrelationships of those who concentrated on birds, their coworkers, and other lesser known colleagues are explored in considerable detail, in part because Kastner is covering a shorter time period in greater depth. The volume is well illustrated, and there are seven pages of references in smaller print.

The index is quite helpful. The popular names of the 42 genera of birds mentioned in the text are among the items listed.

All three books make entertaining reading, and none precisely duplicates the coverage of the others.—KEIR B. STERLING.

The Gannet.—Bryan Nelson. 1978. Vermillion, South Dakota, Buteo Books. First published in 1978 by T. & A. D. Poyser Ltd., Berkhamsted, England. 336 pp. Illustrations by John Busby, 62 figures (many illustrations), 32 tables, 32 black-and-white plates. Cloth. $25.00—This book provides an excellent, if somewhat anthropomorphic, introduction to the Sulidae and summary of the known data on the Gannet (*Sula bassana*). It seems unusual for a scientist to write two books on the same subject and have them appear in the same year published by three publishers. However, such publications invite comparison as well as needing review (see review of "The Sulidae," 1978, J. Bryan Nelson, Oxford; Auk 96: 634—637, 1979).

This book stands well by itself. Bryan Nelson is THE student of this family and his work will stand as an example for all seabird ornithologists. Apparently published for the interested amateur, the book serves that purpose well. The chapters deal with morphology, numbers and distribution, breeding behavior, ecology, the Gannet at sea (really migration and band recoveries), the other Sulidae (Pelecaniformes only very briefly), and the Gannet and man. The chapter on numbers and distribution seems excessive for the audience and much is repeated in "The Sulidae" in more detail, yet some interesting aspects are found only in this book (see portions on the Bempton colony, for instance). The other chapters give fine summaries of information.

The John Busby drawings here are excellent and add importantly to the popularizing of this text. I suspect that the drawings reproduced here were, in fact, the rough sketches for "The Sulidae," where many of them appear in more finished form. Numerous instances of repetition exist between the two books. A comparison of, for instance, the summaries of breeding ecology on pp. 195–198 here with pp. 157–158 of "The Sulidae," clearly indicates the similarity of the books. Additionally, compare Fig. 15d (p. 100) and Fig. 21 (p. 129) here with Fig. 83 (p. 192) and Fig. 88 (p. 205) in "The Sulidae." The photos in this text are excellent, many of which are repeated in "The Sulidae." Number 6 is especially interesting since it is a reverse image of the Sule Stack of Fig. 9 (p. 42) in "The Sulidae." What is the correct orientation? Most of the figures are likewise repeats from "The Sulidae." I checked the first 30 and only 4 are new. The book concludes with several excellent tables, many again from "The Sulidae" but with some additional data presented here.

This book was apparently written before "The Sulidae." On p. 58 it is noted that the "latest count" is 482 nests in 1974, but on p. 35 of "The Sulidae" the "latest count" was 432 nests in 1976. Perhaps one or both are typos, as the reference given for the 1974 count is a paper by Young listed with a 1968 publication date in the references.

Nelson tends to make dogmatic statements when, in fact, he should be somewhat cautious and encourage further studies. For instance, on p. 306, Table 18, many assumptions are presented as the "gospel." I trust that Nelson is continuing the studies which will provide the data for accuracy beyond these assumptions.

The concluding literature cited section provides a new methodology, including the "references," an "annotated select bibliography," and a "bibliography."

This book should be welcome to those who cannot afford "The Sulidae," and it does provide a good short summary. I believe that both books are necessary for a complete understanding of the state of the sulid art in the mid-1970s. While Nelson has performed a tremondous service in summarizing all his knowledge in these publications, the reader must remember that the last word has not been written, or the last interpretation formed, on the gannets and boobies. Hopefully, Bryan Nelson will continue to make his major contributions to our understanding of this family and marine ornithology.—RALPH W. SCHREIBER.

Systematics of smaller Asian night birds based on voice.—Joe T. Marshall. 1978. Ornithological Monographs No. 25. v + 55 pp., black-and-white frontispiece, 3 appendices, 16 plates, 3 tables, 33⅓ rpm phonodisc supplement. Paper cover. $7.00.—Depending upon the historical setting, night birds have been perceived as everything from demons to gods. Owls in particular have always personified a

detachment from man and a closeness with the wild. Such views, coupled with the recent "back to nature" surge, have probably been one of the main catalysts responsible for the recent plethora of books on owls. Most of these books, however, have been popular rehashes of old and often erroneous notions. It is for this reason that I awaited with keen interest the publication of Marshall's monograph on Asian night birds. For within its pages, I expected that one would find not only an interesting account of owls, but also a window of new and much needed data by which to glimpse the little known owls of Asia. To a large extent Marshall's monograph fulfills many of these expectations. Much of what may be useful in this work, however, will probably suffer from what I consider its rather unconventional organization and disregard for standard scientific methodology.

The monograph begins with a frontispiece of *Otus icterorchynchus,* title page, and Table of Contents. Following this is a 2-page Introduction containing one paragraph describing Marshall's reasons for undertaking this study, a 4-line paragraph explaining what he did and how he did it, and 11 short, numbered paragraphs *summarizing* his results. From here the text immediately embarks on a "sort-of" discussion section in which Marshall discusses the genus *Otus* (both Old and New World screech owls) and conjectures as to the status of those species and subspecies listed by Peters (1940, Checklist of birds of the world, Vol. 4. Cambridge, Harvard Univ. Press) for which he has data. Taxa are recognized and discussed by Marshall as he believes they exist in nature, with no in-text comparisons as to how they are listed by Peters or Delacour (1941, Zoologica 26: 133–142). Five groups for scops owl species are proposed and the basic coloration, feather patterning, and characteristics of measurable external morphology, behavior, geographic distribution, and vocalizations shared by most members of each group are discussed. Each member of the respective groups is then described in varying detail. For most members, this includes a description of the taxon's coloration, measurable external characters, vocal behavior, geographic distribution, habitat, and a listing of specimens examined.

After the section on *Otus,* a half-page description of the biology of *Batrachostomus* is presented along with a key to its taxa. The key is based primarily on features of external morphology and geographic location. Marshall then presents a key to southeastern Asian members of the Family Caprimulgidae, but excludes any discussion of their general biology. Acknowledgments, Summary, and Literature Cited sections trail after the main body of the text and are themselves followed by appendices that list abbreviations used, suggested ammendments to Peters' checklist, and a very useful listing of trivial names of scops owls and the respective species accounts under which they are discussed. Starting on p. 39, there are: a map showing localities visited by the author; a few photos of owls; and drawings of feathers from the back and flank of some individuals of various populations of *Otus,* the feet and its feathering in some scops owls, and wing-tip shape in scops owls of known and unknown affinity. Following these figures are 10 pages of plates illustrating audio-spectrograms of song from those representatives of *Otus, Batrachostomus, Eurostopodus,* and *Caprimulgus* for which Marshall has secured tape recordings. Ending the monograph are three tables that list the occurrence of *magicus*-style ventral pattern on island populations of *Otus*; weight and wing-chord length of *Otus* taxa; and weight, wing-chord length, and tail length in frogmouths.

The monoaural phonodisc, produced by the Bioacoustic Archive of the Florida State University Museum, Gainesville, contains many cuts of vocalizations from 30 species and/or subspecies of *Otus* and 17 caprimulgiforms. Each cut represents a portion of the original tape from which the audiospectrograms shown in the plates were produced. The face of the dust cover bears a color print of *Batrachostomus cornutus* and the back a summary of the monograph plus a numbered listing of each cut by species and/or subspecies. For most cuts this includes information on whether or not playback was used to provoke singing, location, tape reel number, date and time of recording, recordist, and habitat. Most of the recordings were collected by the author, but 13 species or subspecies are represented by the recording efforts and equipment of others.

Using voice as the sole character by which to discern affinities, Marshall follows the suggestion of Weyden (1975, Ardea 63: 65–77), and divides *Otus* into New World and Old World groups by possession of complex song with 4 notes/s and simple song with fewer than 4 notes/s, respectively. New World screech owls are further divided into four groups, and Old World scops owls are separated into five groups. Realignment of species and subspecies is too complex to discuss here, but the net result of Marshall's efforts is a massive reduction in the number of taxa in comparison with the taxonomies of Peters or Delacour. Using that evidence offered by the author, Marshall's efforts seem to have been largely successful. His classification aligns species in a manner that appears both realistic and natural. However, use of but a single taxonomic character has not been without some curious effects. Hooting *O. flammeolus* is aligned with the scops owls, and the African *O. leucotis* is grouped with New World screech owls. Lumping of owls that are widely separated geographically also occurs, and seems to be a

remote possibility in some instances. But, considering the long history of the family and its predisposition to colonize, some aspects of strigid taxonomy may always be guesswork. Not all may agree with Marshall's classification (after hearing the phonodisc, I would have lumped *O. trichopsis* with *O. sunia*), but he should be congratulated for tackling such a formidable problem.

Unfortunately, evaluation of the quality of such a work must focus not only on its conclusions but on the methodology used to gather the data from which the conclusions stem. One must ask: Are the techniques sound? Are the results repeatable? Is the reasoning clear and based upon scientific precepts? And do the conclusions follow from a logical, unbiased analysis of the data? If any of these aspects of a study are questionable, then the scientific merit of the entire study is questionable, regardless of the work's apparent contribution or the eminence of its author. Most would not argue with the statement that Dr. Marshall knows *Otus* better than anyone else, and I would agree with most of his taxonomic revisions when based upon the data he has supplied. However, it seems that much of what has been concluded, if done so based solely on what is presented in this monograph, is founded upon "bad science."

By and large there is no Methods section by which one can meter the quality of data collection. Readers are left totally ignorant of Marshall's field methods other than "I would listen for their territorial songs, record them on a tape recorder, then attempt to glimpse the singer. I studied museum specimens also . . ." (p. 1). No mention is ever made as to the model of tape recorder or microphones used during recording sessions. Also, mention is not made as to what tape speed was used, whether a parabolic reflector was used, and what make and model of audiospectrograph produced the audiospectrograms. Such omissions greatly lessen the possibility of these results being repeated or compared with other works. Personally, I do not believe that Dr. Marshall would use inferior equipment or slow tape speeds, but such queries bear particular relevance because 13 of the 56 taxa were recorded by persons other than the author. And although virtually nothing is done with these recordings in a quantitative way, what if someone wishes to use samples of these tapes to quantify aspects of temporal or frequency parameters in the future? They seem to me like a museum skin with no data. All audiospectrograms were produced such that frequency is illustrated on a logarithmic scale. Although this is not the place to argue the merit of this practice, I wish to note that except for Marshall's publication on *Pipilo* (1964, Condor 66: 347–356), the entirety of the voluminous literature on bird vocalizations is illustrated in linear scale. For justification of a log format, readers are referred to Marshall (1977, Auk 94: 150–152), where one finds barely one page of discussion offering a rationale for the use of logarithmic scale. Recently Hall-Craggs (1979, Condor 81: 185–192) has argued a case for log display of frequency, but evidence still seems short that this methodology allows for more accurate assessment of those quantitative parameters of sounds with which scientists are most concerned. Again, this work is rendered incomparable with earlier published studies of owl vocalizations. It is common practice to perform playback experiments broadcasting the recorded song of one bird of a taxon to another bird or group of individuals to ascertain affiliations. Marshall, however, thinking that the status of many of the species he was studying was so precarious, states that playback tests became "frills" and gave way to "anguished efforts at identification" (p. 1). I contend that performance of playback tests would have relieved much of this anguish by supplying much needed data concerning the affiliation of the owls, which after all was the main concern of the study.

Although the title indicates this to be a classification based upon voice, much of the text is given over to description and comparison of morphologic characters such as patterning of feathers, feather coloration, wing shape, extent of tarsal feathering, etc. to support the author's contentions. However, there is virtually no quantative analysis of most characters (except for SD and range for lengths and weights). Plates 3A, 3B, and 4 illustrate patterning of feathers and size of foot and its feathering, respectively; characters that Marshall uses to help categorize taxa. But these illustrations are based upon only one bird in each taxon, with little discussion of the variation present within the taxons. Actually there is no statistical treatment of data anywhere within the pages of this monograph! In an historical perspective, it seems ironic to me that after chiding the scientific community about the use of old museum specimens, which regrettably turn brown in museums and therefore "teach us nothing about nature," and skins from anything other than a freshly molted *Otus* (Marshall 1967, Monogr. West. Found. Vert. Zool. No. 1), Marshall used ancient holotype and syntype specimens for gathering data concerning feather patterning and coloration. If what he proposed about old skins was true in 1967, can we trust conclusions proposed in this work that are partially based on the use of old skins?

Areas of suspect quality in this monograph are in no way exhausted by these examples. As one reads this work there are many places one would like to ask the author, Why? Why were the only recordings you had for *O. flammeolus* "faint" (p. 5). This is an easy bird to record and common over much of its range. Why were species such as *O. sagittatus* (p. 4) or *O. longicornis* (p. 27), for which there are no recordings of song, included in this analysis? Why, if there are nine specimens of *O. angilinae* (p. 27),

did he examine only one of these? Why use a recording taken from a captive bird in Bolivia that was taken in Zaire? Throughout the text the genus name *Otus* is both spelled out fully and abbreviated (*O.*) at the beginning and within sentences in a totally random manner. The many such apparent failings of this work seem more a result of editorial shortcomings than anything else. It is the responsibility of the editorial staff (listed on p. ii of the monograph) to ask such questions and see to it that they are properly addressed, and to insist on concise statements delineating methods and results. Descriptions of the major groups (Old World, New World, and the nine subgroups) lack a complete accounting of those parameters of song that presumably bind the component species together. Some groups are described only by morphologic characters (e.g. *Scops* and *Manadensis*), and to gain any sort of feel for song similarity among group members one must ferret through the entire work and phonodisc. Something similar to a key based on voice should have been an integral component of the monograph.

The style of writing throughout the text seems overly dogmatic and excessively punctuated with exclamation points, giving one the impression that this is to compensate for a lucid presentation of comparative data. And, although one may sympathize with the author's obvious frustration over the rapid demise of the tropics (see pages 1, 32–33), this is taken to such extreme in the Summary, with statements such as "diversity is indeed the goal of evolution . . ." (p. 32) and "without tropical forests the world becomes an inhospitable desert characterized by raging extremes of temperature and alternations between catastrophic drought and floods" (p. 33), that one begins to question the entire logic and scientific precepts which guided the author and editorial staff. Diversity may be one result of evolution but evolution has no goal. As for global weather patterns, some credit ought also to be given phenomena such as solar radiation, global wind currents, and Coriolis effect.

The phonodisc itself, narrated by Dr. Marshall, is of excellent acoustic quality, but here again editorial shortcomings are evident. The cover jacket bears a photo of *Batrachostomus cornutus,* misspelled *Bratrachostomus* (a puzzling choice considering the main thrust of the work is *Otus*). In all, the quality of the record is well worth the price of the monograph. And to me, this may be the most salient aspect of my review. For although Marshall may be correct in most of his taxonomic revisions, and there is indeed a wealth of information among its pages useful to taxonomists, the text appears to have been hurriedly compiled and edited solely as a vehicle for publishing the record.—DENNIS J. MARTIN.

The imperative call. A naturalist's quest in temperate and tropical America.—Alexander F. Skutch. 1979 (1980). Gainesville, University Presses of Florida. x + 331 pp., photos, maps. $20.00.—Nobody can even begin to compare with Alexander Skutch in his contribution to knowledge of neotropical bird behavior. For some 45 years he has lived in Costa Rica on a farm he carved out mature forest, devoting himself chiefly to the study of the rich avifauna and publishing a series of papers on the reproductive habits of the birds, distinguished both by scientific merit and literary quality. His numerous publications are listed in an appendix to a previous book "A Naturalist in Costa Rica" (1971). The present book reviews his earlier life from his birth in Baltimore, Maryland in 1904 to his decision to settle in Costa Rica in 1935.

As stated in the foreword, this is a book on natural history rather than an autobiography. Although the first few chapters tell about his schooling and boyhood interest in the out-of-doors, and a little about his parents, Skutch does not even give his birthday nor his mother's maiden name, and he is silent about his youthful social or emotional life, except as it bears on his attitudes toward nature. Considering Skutch's exceptional distinction as a naturalist and his long isolation in the tropics, there is understandable curiosity about him as a human being. His writings have long made clear his deep objection to killing; this has converted him into a vegetarian. Yet his intolerance of animals that prey on birds, which has caused him to kill snakes and very rarely raptors, has seemed a philosophical inconsistency to some of his admirers. In this book he explains his obligation to protect the birds he attracts to his feeding trays and those whose nesting he is studying. In matters of emotion inconsistency is human.

Skutch's writing is literary; his style in vocabulary, sentence structure, the avoidance of colloquialisms and vulgarity seems Edwardian, rather than current American—not at all the sort of language to which the French refer when they advertise a translation as "traduit de l'Américain." Skutch paints vividly emotive yet accurate pictures of neotropical habitats and their wildlife. Trained as a botanist, his discussion of plants, especially of the banana (the subject of his Ph.D. thesis), is notably interesting. Having been born in Panama, I was pleased to learn that it was while Skutch was doing research on the banana plant on the Changuinola Lagoon in western Panama that, impressed by the rich avifauna, he began to study neotropical birds intensively. Later he visited Barro Colorado Island in the Panama Canal Zone several times. This book also treats of Skutch's stay in Jamaica (his first trip to tropical America), a canoe

trip down the Ohio River with another young botanist, and his work in Honduras and later in Guatemala, where while making botanical collections he devoted much time to studying birds. He decided to settle in Guatemala, but annoyance with his treatment by the immigration authorities caused him to go instead to Costa Rica.

What this book contains on birds is mainly a sketch of what impressed the author most at the time he visited each area. There are some nuggets of previously unpublished information, but his avian data are mainly to be found in more detail in his numerous scientific papers. I therefore enjoyed his observations on other fields of natural history and the sometimes wry comments on human behavior. He mentions that while people of Euopean ancestry seem to take readily to backpacking, the physically strong blacks of Jamaica objected to burdens on their backs but gracefully balanced heavy objects on their heads.

When Skutch told his father of his plan to settle in Central America to study birds, with no expectation of income beyond that obtained through botanical collecting, his father remarked that of the shiftless men he had known none had died of starvation. The author's philosophy and the flavor of the book can be tasted from the following quotation:

"Birds, as I have said, are among the most beautiful of living things, and their lives, or at least those of the less fierce and ravenous kinds, are nearly always beautiful, as a whole and in their details . . . . Certainly, for our survival, we need to know about many things that are dry, unpleasant, or revolting. But so many brilliant minds, supported by wealthy institutions, are dedicated to these investigations, that it can do no great harm if a few 'world losers and world forsakers' devote themselves to the pursuit of the beautiful truths that enrich us spiritually even if they contribute nothing to our survival in a competitive world."—E. EISENMANN.

(Editors note: Dr. Skutch dedicated this book to Eugene Eisenmann with the statement "who generously shares his vast knowledge of Neotropical ornithology with all who seek his help."—W.J.B.)

My world of birds: memoirs of an ornithologist.—George J. Wallace. 1979. Ardmore, Pennsylvania, Dorrance & Company. xii + 345 pp., 75 black-and-white photos. $10.00.—

"Great quietness lends cathedral awe,
A beauty that we felt and saw.
Rare birds, tall trees, and brilliant flowers
Made minutes of our too few hours."

This verse, taken from the Wallace family's Christmas poem that was written in 1956 after a sabbatical year in Colombia, even today captures the essence of this book. The subtitle, "memoirs," is most appropriate because it is "a narrative of personal experiences" of the author in more than a half-century of field ornithology.

Now Professor Emeritus of Zoology at Michigan State University, the author shares with his readers a living testimonial of those instances from his own life when, as a field ornithologist, he steps away from the everyday to experience once again that "birds have been my main obsession." He accomplishes this initially by drawing from his formative years on the family farm in north-central Vermont, his academic training at the University of Michigan, his professional career first as a park naturalist and then as an academician, and lastly in a retrospective analysis from the perspective of his retirement. A most important source for his narrative almost certainly must come from his field notes, recorded in an "aluminum-covered, relatively water-proofed notebook with removable pages—[which] has been with me, and used, on six continents" (since 1928, I might add!).

Having been one of his students, and in fact having been introduced to ornithology by that association, I naturally have certain sections from this part that appeal to me because they so clearly reflect George Wallace himself. Among my favorites are those on "Vermont, Mt. Mansfield, and 'Bicknell's Thrush'" (his doctoral program, of course); "Pleasant Valley Sanctuary and the Berkshires" (his tenure as a professional field naturalist and ornithologist); and the chapter on his 30 years at Michigan State University as well as that on Michigan bird life (for obvious reasons).

Those ornithologists who have had the privilege to travel nationally and internationally in a quest for birds in the field will most certainly enjoy the similar delights and frustrations that Wallace faced in his travels. Throughout these chapters he very effectively weaves into a narrative of tourist-type activities the equally (perhaps more?) important observations on local birdlife. Some of this is done with gentle humor, as in his recollection of a trip to the Aransas refuge in search of Whopping Cranes. At the end of each of three chapters that describe three major international trips (to India, Nepal, and Ceylon; to

East Africa; and to Australia and New Zealand), he appends an annotated systematic list of species that were identified in the field. This is *not* a matter of self-aggrandizement: somehow I had the feeling that every bird listed there brought back some fond memory for the author.

Finally, I cannot pass up the opportunity to offer a rebuttal to the following self-effacing comments (humorous, in context). At the time that his study of "Bicknell's Thrush" was published, few people outside New England knew that this subspecies of the Gray-cheeked Thrush even existed. Now that the A.O.U. Check-list no longer includes subspecific names, "this leaves me in the humiliating position of claiming to be a world authority on a bird not recognized by the A.O.U." I would answer that on the basis of his textbook (now in its third edition) and now his memoirs, he is assured a continuing place in American ornithology. For $10, why not buy the book yourself to enjoy the simple pleasures that one person has received from 50 years in field ornithology.—JAMES C. VANDEN BERGE.

ALSO RECEIVED

Beyond the spring: Cordelia Stanwood of Birdsacre.—Chandler S. Richmond. 1978. Lamoine, Maine, Latona Press. xv + 150 pp. 59 black-and-white illus. $7.95 (paperbound—a limited $14.95 hardbound edition is out of print).—Cordelia Johnson Stanwood (1865–1958) was born in Maine, the daughter of a sea captain and his wife, and at 15 went to Providence, Rhode Island, there to live with an aunt while attending the public schools. After a year of teacher training school, she began a teaching and administrative career in the Providence school system, which lasted until 1893. Following a course in the Normal Arts School in Boston, she continued her teaching career in various parts of New England and New York, mainly as a drawing instructor, until 1904, when she suffered a nervous breakdown and returned to her family home. There in 1905, at the age of 40, she began the study of natural history, principally of birds, to which she added bird photography after 1916.

She never married, and after her mother's death in 1932, lived alone. It was she who named her house and the surrounding 40 acres "Birdsacre." Here she became, over the years, an authority on the nesting habits of nearly one hundred species of birds, information that she recorded in notebooks and an extensive collection of photographs.

For many years, Stanwood contributed articles and photos to a variety of publications, including The Auk, The Wilson Bulletin, Bird Lore, and Nature magazine. Some of her notes and pictures also appeared in Forbush's "Birds of Massachusetts and other New England states" and Arthur Cleveland Bent's "Life Histories of North American Birds."

Stanwood supported herself into old age by making and selling woven baskets and other handicrafts, though her final years had to be spent in a nursing home.

Richmond is also a former teacher who organized the Stanwood Wildlife Foundation, with Stanwood's house (now restored) as its headquarters. The house is now operated as a museum. His account is sensitively handled and is well illustrated with family photographs and a number of Stanwood's own bird photos taken over a number of years.—KEIR B. STERLING.

Las Aves de Caza de Panamá.—Eustorgio Méndez. 1979. Privately published. 290 pp., 41 line drawings, 2 maps. Paper. $9.50 (including postage; available from author, Apartado Postal 2827, Panama 3, Panama).—A useful account in Spanish of the game birds of the Republic of Panama, including all tinamous, ducks, cracids, phasianids, and pigeons. The book is valuable far beyond the geographic area covered. The author points out that some species discussed are too rare or too small to be properly considered game birds, but that for convenience all Panamanian species of the included families are treated. Preliminary chapters discuss method of treatment, conservation, ecology (with a map of vegetation zones), and migration routes of ducks from temperate North America (with map). Each family is briefly discussed, followed by treatment in considerable detail of the individual species, almost all of which are illustrated by rather pleasing, while sometimes slightly stiff, drawings by the author. In addition to a preferred Spanish name, common names are used locally or by Panamanian Amerinds, or elsewhere in Latin America, are listed. For each species there is a diagnosis, description, measurements, weights, information on behavior, status and distribution in Panama, general range, and often taxonomic notes. The book is appropriately dedicated to the late Alexander Wetmore, with whom the author was associated in the field for a number of years.—E. EISENMANN.

The birdhouse book. Building houses, feeders, and baths.—Don McNeil. 1979. Seattle, Washington, Pacific Search Press. 112 pp., illus. $8.95.—This helpful volume contains a considerable amount of information about attracting birds. Not only are the plans for construction of houses for various species, feeders, baths, or devices to ward off predators or competitors complete and easily followed, but numerous hints about how to attract birds without unnecessarily upsetting their natural way of living are provided. A nice volume for the backyard enthusiast.—J.A.W.

Red data book. Volume 2: Aves. (Second revised edition).—Warren B. King (compiler). 1978 (Part 1), 1979 (Part 2). International Union for the Conservation of Nature and Natural Resources, Morges, Switzerland. Looseleaf pages in binder. $30.00, $35.00.—The Red Data Book is well known to all ornithologists and needs no review. This edition has been in preparation since 1974 and replaces the first edition published in 1966. Part one includes 199 taxa and part two 238 taxa; taxa are species and subspecies. A total of 95 taxa included in the first edition are excluded from the second for a variety of reasons; the reasons for individual species are not mentioned. No reason exists for publication of species sheets in part 1 or part 2 other than when they were completed; the user must thus rearrange them with the help of a systematic list of threatened taxa (Preamble 5, Part 2); a set of labeled sheets for orders is included. Classification follows Peters' "Check-List" and Morony, Bock, and Farrand's "Reference List."

The only real lack that I can find in these volumes is a clear statement of the procedure used to decide on the status of each species and who was responsible for the decision. For example, no mention is made of the Purvian Penguin (*Spheniscus humboldti*). Yet this species is described by Roger Tory Peterson in his recent book on penguins as being in "most serious trouble" and "is high on the list of Peruvian conservationists, such as Felipe Benavides." No clear statement is made to whom one should write with additional information or corrections to this list.

An information sheet sent with the review copies states that publication plans for future editions of the Red Data Book have changed considerably. New information as updates and additions will not be issued as separate sheets on approximately 6-month intervals. Instead, future information on threatened species will be published in bound volumes. I believe that this decision is unwise because it is wasteful of paper and of funds, both of which are anti-conservation measures contrary to the goals of the IUCN and the ICBP. Hopefully this decision will be reconsidered and reversed in view of the greater flexibility and conservation of the existing system.

The Red Data Book belongs in the ornithological library of any institution concerned with avian conservation or whose work may relate to species of threatened birds. Dr. Warren B. King and his associates are to be congratulated for an important job well done.

These volumes can be ordered from IUCN, Red Data Book, Avenue du Mont Blanc, CH-1196 Gland, Switzerland. Payment can be made in US dollars with the order (shipping is included) or to the IUCN account at Riggs National Bank, Dupont Circle Office, 1913 Massachusetts Ave., NW, Washington, D.C. 20036; account No. 04 07 077 297.—WALTER J. BOCK.

Penguins.—Roger Tory Peterson. 1979. Boston, Houghton Mifflin. xi + 238 pp., numerous color photographs and black-and-white drawings. $25.00.—This handsome volume, written and illustrated by Peterson, describes the life history, past and present status of the species, and the future outlook for the conservation of penguins. The book is designed for the amateur ornithologist and lay person, and provides an interesting and well-written account of this fascinating group of birds that is nicely woven into Peterson's experiences in observing them from the Galápagos Islands to the Antarctic continent. The photographs present the characteristic features of the species and give an excellent impression of penguins and the areas in which they live. The major omission is photographs of swimming penguins, which leaves the reader without a good picture of the most important part of penguins' life history and adaptations. The 137 black-and-white drawings add greatly to the attractiveness of the volume. In addition to a presentation of the life of penguins, Peterson discusses other birds found with penguins and the Northern Hemisphere "look-alikes"—the alcids. Strangely enough, no mention is made of diving petrels and the suggestion that penguins evolved from procellariiform birds via a diving petrel-like stock. A good bibliography is included, which allows interested readers to pursue their interests in a number of directions.

I found this book well balanced and interesting reading. Perhaps the most interesting and saddest thing I learned is the drastic decline of the Peruvian Penguin resulting from the mining of guano on the islands off the Peruvian coast. These penguins dug their nest burrows in the thick beds of guano, and

were left without a suitable nesting area when the guano was mined to the bare rocks. Peterson states that the Peruvian Penguin may be the species of this family in the most serious trouble.

"Penguins" provides an excellent overview to this family of birds and I can recommend it highly to anyone who wishes to obtain a good introduction to this intriguing group.—WALTER J. BOCK.

Physiology of movements—Biomechanics.—Werner Nachtigall, Ed. 1977. Fortschritt der Zoologie, vol. 24 (2–3). Stuttgart, Gustav Fischer Verlag. xii + 352 pp. $101.60.—This is the proceedings of a symposium, arranged by Professor Nachtigall and held at the University of Mainz in October 1976, that dealt with the general problem of biomechanics of movement. Most of the papers discuss swimming or flight, but the book also contains several other valuable reviews: Professor Alexander (Univ. Leeds) has a short but interesting historical review of animal mechanics. Professor Kummer (Univ. Köln) reviews the analysis of mechanical stress on the mammalian skeleton, summarizing the huge amount of research done by Pauwels and himself that is not generally well-known to English-speaking workers. Paul Bühler (Univ. Stuttgart-Hohenheim) presents a paper on comparative kinesis of vertebrate jaws (both the upper and lower) with a classification and discussion of the diverse types.

Of most direct importance to ornithologists are six papers on avian flight plus several on flight in insects. These papers, by Bilo, Nachtigall, Hummel, Oehme, Dathe, Csicáky, Rüppell, and Stork and their associates, provide a summary of their ideas on avian flight as well as references to their earlier papers. All of these papers on avian flight are in English. For the past decade, the center for studies on avian flight has been in Germany, but the results of this work have scarcely penetrated into the English literature. In the paper by Pennycuick on "Mechanics of flight" (Avian Biology, Vol. V), only one paper by Nachtigall is cited. Berger and Hart, in their paper on "Physiology and energetics of flight" (Avian Biology, Vol. IV), cite several papers by Oehme and by Rüppell. Thus, this symposium provides a good introduction to the important work being done on avian flight in Germany and to the recent papers.

The greatest disadvantage of this volume is its price, which is outrageous even for a book published in Germany. The price of $102.00 for a 350-page volume places this work out of the reach of almost all individuals and many libraries. The result will be that the valuable contributions of this symposium will be lost for many workers who would profit from the information and ideas contained in it. Although I can recommend the contents of this symposium volume to ornithologists interested in avian flight, I cannot recommend purchase of this work because of the price.—WALTER J. BOCK.

Die Waldschnepfe.—Heribert Kalchreuter. 1979. Verlag Dieter Hoffmann, Mainz. 158 pp. $11.00.—In this monograph Dr. Kalchreuter summarizes the knowledge on the biology, hunting, and conservation of the European Woodcock (*Scholopax rusticola*), based on the literature and his own studies of almost 10 years. Although all aspects of the natural history of the Woodcock are covered, emphasis is given to the analysis of the breeding and wintering habitat, population size and its recent change, migration, and population dynamics; the last two topics are based largely on banding data. Some comparisons are made with the American Woodcock.

The last chapter is devoted to hunting of woodcocks and conservation problems. One serious problem is habitat destruction, but even greater ones lie in the regulation of hunting. A number of European countries still permit spring hunting and bag limits vary greatly. Dr. Kalchreuter's book summarizes much that is known about the European Woodcock, especially as it relates to management and conservation. Hopefully it will contribute to solving the current controversy in Germany and other countries on hunting regulations and preservation of this species.—W.J.B.

Mr. Peale's museum: Charles William Peale and the first popular museum of natural science and art.—Charles Coleman Sellers. 1980. New York, The Barra Foundation and W. W. Norton. xiv + 370 pp., 13 color plates, 125 black-and-white illustrations. $14.95.—Charles Coleman Sellers, long-time librarian at Dickison College and a descendant of Peale's, spent many years recording the activities of his famous ancestor, which led to the publication of a biography in 1939. The revised edition, which appeared in 1969, won the Bancroft Prize in 1970. The present volume represents the work of nearly a decade, and Sellers was also at work on an exhibition of Peale's work (which is to appear in New York's Metropolitan Museum in 1981) at the time of his death in late January.

Sellers' book tells of Peale's efforts to create and maintain the nation's first popular yet scientifically based natural history museum, which opened in 1786 and continued on to the time of the Mexican War.

Primarily an artist, Peale originated the practice of providing painted backgrounds for the cases of mounted birds, mammals, and reptiles that he placed on exhibition, each of which was provided with a placard indicating its common and Latin names according to the Linnaean system. He enlisted many members of his family (more than a dozen children and three wives) in the enterprise, and many of the children became capable artists and museum managers in their own right.

Peale wanted the expense of running his museum to be assumed by the Federal government, and it might have become our national museum in the early 19th century had not Jefferson seen insuperable constitutional objections to the idea. Peale designed his museum for the general public as well as the scientific community of his day. Most of Lewis and Clark's specimens from their great western expedition came to him, as did odd specimens from such luminaries as Franklin, Washington, and Jefferson. Peale himself gave several series of public lectures on birds and mammals in 1799–1800, based upon and illustrated with both live and stuffed specimens from his collections, probably the first attempt by an American to summarize what was then known about the avian and mammalian fauna of the world. A number of books by other naturalists were based in large part upon their study of Peale's specimens.

For years, visitors wandered through the collections, which were housed in the famous Long Room on the second floor of Independence Hall. For a short time, branches of the Museum were operated by Peale's sons in New York and Baltimore, but fiscal problems and changing public tastes brought all of these operations to an end two decades after the founder's death in 1847. Nevertheless, Peale must be credited with having initiated many innovations later incorporated into larger and more successful museums. Sellers' tale is well and sensitively told, and the numerous illustrations do much to enhance the text. Read in conjunction with his earlier biography of Peale, one gets a comprehensive picture of a unique American and an unusual museum.—KEIR B. STERLING.

Audubon.—John Chancellor. 1978. New York, Viking. 224 pp., many black-and-white and color illustrations. $17.95.—Chancellor is an English antiquarian bookseller and publisher who has previously written an illustrated biography of Darwin. This volume is a well-illustrated and lively account of Audubon's life, based for the most part on the standard secondary sources, which breaks no new ground but which offers a briefer introduction to anyone unfamiliar with the subject than do the more detailed studies done by Herrick, Alice Ford, and others. Chancellor offers a balanced assessment of Audubon and his career, being careful to show both his good and his negative qualities. Many photographs, excellent color plates, and other black-and-white illustrations are found on just about every other page. Handsomely printed in England, the book is well designed and bound, but will offer very little to the professional ornithologist.—KEIR B. STERLING.

Freeze-drying biological specimens: a laboratory manual.—Rolland O. Hower. 1979. Washington, D.C., Smithsonian Institution Press. 196 pp., 145 figs., 14 tables. $25.00.—As the title states, this volume is a manual of freeze-drying techniques for biological specimens, animals and plants, from large whole animals to protozoa and cells. The needed equipment is described together with their specifications and operation. The general technique is presented, together with special problems presented by material of diverse taxa of organisms and anatomical material. A number of figures and tables summarize technical data and drying rates for different biological materials. The book is clearly written, and anyone interested in using freeze-drying techniques should be able to learn the basic methods with ease.

Freeze-drying techniques have been used mainly for the preparation of specimens for exhibit. It has great advantages because the specimen can be placed in the desired position while soft and then becomes fixed in this position as the specimen dries. Its use could save considerable time and expense in the preparation of exhibits in natural history museums. Freeze-dry methods, however, have broader applications that must still be developed and tested. They could be used for the preparation of study specimens, especially delicate organisms or individuals that may have spoiled so that usual preparation would be difficult or impossible. Birds with slipping feathers are hard to skin by conventional means, but these could be prepared as study skins by freeze-dry methods. Moreover, these methods may be valuable to instructors for the preparation of display material for morphological and other courses. Preservation of dissected specimens for demonstrations in comparative anatomy courses is difficult and messy if by fluid fixing and storage techniques, but might be possible by freeze-dry techniques.

I can recommend freeze-dry techniques and Mr. Hower's useful volume to anyone who wishes to try alternate methods for the preparation and preservation of biological material for study or display.—W.J.B.

All about finches and other seed-eating birds.—Ian Harman and M. M. Vriends. 1978. Neptune, New Jersey, T.F.H. Publications. 224 pp., many photographs and drawings. $9.95.—This work on the keeping and breeding of seed-eating passerine birds is designed especially for the beginner. The first 70 pages are devoted to general information about the care and keeping of finches; the rest of the book describes many of the commonly kept species of seed-eating passerine birds with specific comments on their care. This volume was originally written for British bird keepers and makes no mention of U.S. laws on importation of foreign birds and keeping of native species.—W.J.B.

To a young bird artist: letters from Louis Agassiz Fuertes to George Miksch Sutton.—George Miksch Sutton. 1979. Norman, University of Oklahoma Press. ix + 147 pp. $9.95.—In February of 1915, the 17-yr-old George Miksch Sutton, whose father was then teaching at Bethany College in West Virginia, wrote Louis Agassiz Fuertes asking for his advice on bird painting as a career, and thus began an exchange of letters in which Fuertes imparted much useful advice about the subject to the younger man. Sutton has now printed the letters, together with a good deal of background information concerning both men in a book that makes for entertaining reading. Despite the many demands upon his time, Fuertes managed to send Sutton a number of detailed critiques about the latter's work, and in the summer of 1916 he invited the young college freshman to join him and his family for part of the summer. This gave Sutton an opportunity to observe Fuertes at work, and to take advantage of a most effective if informal tutorial arrangement. Fuertes set up a tent for Sutton on the shore of Lake Cayuga at Sheldrake Point, since his summer place had no room for guests, and there Sutton passed the time very productively. Fuertes continued to encourage Sutton's career in painting and teaching until his tragic death in the summer of 1927. The Fuertes drawings (and Sutton's) are delightful, and the entire book provides some interesting vignettes of the two bird artists at different stages of their careers.—KEIR B. STERLING.

A guide to North American waterfowl.—Paul A. Johnsgard. 1979. Bloomington, University of Indiana Press. 274 pp., many photographs, drawings and maps, $15.95.—This book is an abridgement of Johnsgard's earlier "Waterfowl of North America" and is designed primarily for people who are interested in waterfowl but do not need the detailed treatment in that work. The book has a brief (12-page) introduction to the biology of waterfowl followed by accounts for each species occurring in North America. These species accounts are generally 3–4 pages long plus a page map showing breeding and wintering ranges. Each account gives vernacular names, range, subspecies, identification (in the hand and in the field), and natural history. The last is divided into habitats and food, social behavior, reproductive biology, and conservation.

With the exception of the color photographs, which I do not find necessary, I find no fault with what is included in this volume. My criticism is with what is not included. The introductory section on the general biology of the family could have been expanded and improved at the expense of the color plates. Discussion should have included some of the interesting taxonomic problems, such as why the Blue and Snow geese are included in one species, details on the characteristics of the races of the Canada Geese, why the "Southern Mallards" are included in the Mallard, and why the Black Duck should be included in the Mallard. Analyses of these examples would provide a nice commentary on problems of evolution and taxonomy. The other lack is omission of migration data, such as major pathways for each species, that could have been included on the map.

This book is directed toward the amateur ornithologist and general lay person, and to the beginner among this group. Although a number of books exist on the biology of the Anatidae, both of the world and of North America, there is a lack of a good introductory volume on the biology of this family for the general lay person. My hesitation in recommending this book is that I feel that the format chosen by Johnsgard is not well suited for this purpose. Use of individual species accounts provides an idea of the natural history of each species, but fails to give an overview of the biology of the whole group.—WALTER J. BOCK.

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