

REVIEWS

EDITED BY WALTER BOCK

Bird sounds and their meaning.—Rosemary Jellis. 1978. London, BBC. 256 pp., with 12-inch 33½ rpm disc. Book \$10.50, record \$6.00.—This book grew out of one of a series of enthusiastically received radio programs, produced by the British Broadcasting Corporation, with which Rosemary Jellis and Terry Gompertz were associated. Planned by both Gompertz and Jellis, the book was written by Jellis alone because of the death of Gompertz. Accomplished amateur ornithologists, they spent many years observing and studying the social behavior, biology, and particularly the communication system of the Great Tit. The work, although less technical and detailed, is very much in the tradition of the English natural historians, such as Elliot Howard and Edward Armstrong.

The titles of the chapters suggest the tone and feeling of the book: Listening to birds; The communication system; The sounds birds make; Songs; Moods and events; The early stages; Dialects; Individual recognition; Far away and long ago; Copies and counterfeits; Airs and variations; How and why? A supplementary section defines the more important terms used for the components of song, acoustical features and processes, and taxonomic categories. Another, on notating bird song, outlines a simple and effective procedure for use without a tape recorder. There is a short review of the present state of knowledge (or lack of it) regarding how birds' vocal systems work, plus chapter references, suggestions for further reading, and a survey of the more prominent commercially available sound recordings.

Nearly all of the important questions involving song that have intrigued students of animal behavior, communication, speciation, development, and social organization are explored. Jellis does not attempt to cite or review the majority of the research reports that fill the scientific journals. Rather, she focuses on some of the most insightful and significant studies that have been carried out in the last 15 yr or so, with the chapter references providing access to the wider literature.

One of the reasons Rosemary Jellis' book is so appealing is that she couples her solid grounding in the scientific literature with an intimate knowledge of the Great Tit and other species of birds that inhabit the gardens of her country home in the south of England. She has related analyses and interpretations of questions reported in the technical behavioral and ornithological literature to the everyday events she and Terry Gompertz observed and studied for many years, infusing them with an unusual freshness and understanding.

In "Far away and long ago," a typical chapter, Jellis discusses the role of song in speciation and how some aspects of the process can be unraveled by comparative analysis of the songs of modern species. She first reviews the relatively uncomplicated story of two sibling species, the Willow Warbler and the Chiffchaff, analyzed by Gerhard Thielcke and K. L. Linsenmair in the 1960's. Next, the more complex problems of the Palearctic Willow Tit-Alpine Tit and Nearctic Black-capped Chickadee-Carolina Chickadee species pairs are discussed. Then the problems represented by the ring of subspecies that compose *Parus major*, the Great Tit of the Palearctic, are examined. Most of the reviewed studies of these birds are those of Thielcke and Hans Lohrl and their associates. In addition, however, the experiments of Terry Gompertz, dealing with song recognition by two captive-reared Great Tit subspecies from the opposite ends of the species' range, are summarized.

Audiospectrographs of typical songs and calls are used to illustrate this and other chapters. Recordings of these sounds are included on an accompanying 12-inch LP disc. The recordings not only allow the reader/listener to hear the sounds, but also provide an opportunity to become more familiar with and better able to interpret audiospectrograms.

The book is clearly directed toward British and European readers. The majority of the studies reviewed are of Old World species, notable exceptions being the review of aspects of Nice's Song Sparrow work (in the chapter on Individual Recognition) and Robert Lemon's research with Cardinals (in the chapter on Dialects). However, many of the studies reviewed are of members of the genus *Parus*, the tits and chickadees. Since various species of this genus are familiar to nearly all North Americans, the book will not seem to most readers to be about exotic birds.

Rosemary Jellis has produced the best general introduction yet to the subject of bird sounds. Written with grace and clarity, combining scholarship with detailed field experience, and accompanied by a phonograph disc that illustrates the sounds discussed and pictured in audiospectrographs, the book will be both useful and pleasurable to experienced amateur observers, to ornithologists and biologists from a variety of specializations, and to anyone wishing an introduction to this branch of the study of animal behavior.—JAMES L. GULLEDGE.

Caste and ecology in the social insects.—George F. Oster and Edward O. Wilson. 1978. Monographs in Population Biology No. 12. Princeton, New Jersey, Princeton University Press. Pp. xv + 352, illus. Cloth, \$20.00; paper, \$7.50.—Social organization and behavior are topics of considerable current interest among biologists, only partly because of the recent faddish development of sociobiology and kin selection. Social organization reaches its most extreme development among the eusocial insects, where social roles may be differentiated among physically discrete and often fixed castes. In this book, Oster and Wilson aim to develop the beginnings of a unifying theoretical framework for caste systems among insects, founding their approach upon the premise that further natural history studies of these systems are “likely to be slow and inefficient unless guided by a simultaneously developing theory.” While their treatment does incorporate a good deal of basic ecological and ethological information about various social insects, the emphasis is upon the development of mathematical models of the social systems and the selective forces presumed to have guided their evolution. The models are firmly rooted in optimization procedures, and Oster and Wilson take considerable pains to document exactly how they are using such procedures, both operationally and philosophically. Optimization modeling has been quite fashionable in ecology and population biology over the past decade, and often it has been used as if the models provided an accurate image of nature. Natural selection is an optimization process, some argue, and thus if we construct an optimization model whose predictions adhere to the behavior of the natural system, the features that have been optimized in the model operations must in fact be the same as those presumably optimized by natural selection: the system is thus understood. Oster and Wilson use optimization modeling in a different, and I think more appropriate, manner. “The prudent course,” they note, “is to regard optimization models as provisional guides to further empirical research, and not necessarily as the key to deeper laws of nature.” Optimization models thus act as guides to intelligent research, not as explanations of nature by analogy.

Of course not all insects are social: Oster and Wilson argue that, in order for social organization to evolve, the activities of the social group must be more productive than the summed efforts of an equivalent number of solitary individuals. This is facilitated by the ability of a structured colony to carry on a variety of activities concurrently, through role differentiation, rather than sequentially, as a solitary individual must. Still, only 13 phyletic lines among the arthropods have developed eusociality, and the vast majority of the hundreds of thousands of species of insects and other arthropods are entirely solitary. Oster and Wilson propose that two features have led these groups to pass over the “eusociality threshold”: in hymenopterans, the haploidy-diploidy form of sex determination has produced asymmetric degrees of relatedness among individuals, shifting the advantage to rearing sisters instead of one’s own offspring, while in termites the need to exchange symbiotic, cellulose-digesting flagellates by anal feeding seems to have set the stage for their tight social organization. Caste and division of labor are thus the foundation of colonial organization in thousands of species of ants, termites, social wasps, and social bees, yet relatively rarely is it accompanied by actual physical polymorphism of the castes: of the 263 living ant genera, for example, only 44 contain species that display any prominent polymorphism within the worker caste. Much of Oster and Wilson’s treatment is devoted to developing preliminary ideas of why this might be so. The optimization models they develop relate caste development, role differentiation, and polymorphism to the spatial and temporal distribution of food items, the size distribution of the prey, the overall availability of the prey items (including prey defense mechanisms), and the constraints imposed by competitors and predators.

Birds possess neither of the attributes that has enabled several arthropod groups to evolve past the eusociality threshold, so one might easily conclude that this book, while perhaps interesting, has little to offer avian behavioral ecologists. Not so! Studies of breeding systems of birds, ranging from solitary pairs (or less) to an increasingly diverse array of variations on the communality theme, beg for a broad theoretical synthesis that really considers a variety of potentially contributing factors rather than just someone’s favorite mechanism. Oster and Wilson’s treatment provides insights, and a breadth of synthesis, that students of bird sociality would do well to study. But there are also more explicit points of relevance of the book. Oster and Wilson propose constructing “ethograms” to evaluate the task efficiency of a caste, which in turn is central to the formulation of meaningful optimization models of colony operation. The ethograms rely on information on the behavioral repertoire of a caste, the time distributions spent in various acts, and the transition probabilities linking individual behavior acts: this is the sort of information that some ornithologists have been gathering in time-activity budget studies, and its use by Oster and Wilson in this context points up the critical need to undertake such quantitative behavioral studies over a range of bird species expressing different forms of breeding (or perhaps even non-breeding) sociality.

One must admire Oster and Wilson for taking on such a formidable integrative challenge. There are,

of course, faults and inadequacies in their approach, many (but not all) of which they point out. But they have provided a solid theoretical framework for future studies of arthropod eusociality. Perhaps this work will inspire some avian behavioral ecologist to undertake a synthesis of comparable elegance of social breeding systems in birds.—JOHN A. WIENS.

The birds of East Africa. Vol. 1. *Ploceidae*-I.—V. G. L. van Someren. 1975 (date 1973 inside book is incorrect). Sarasota, Florida, Allyn Museum of Entomology. 93 color plates with cover sheets. \$60.00 (also \$100.00 for autographed copy and \$6.00 for 16-plate fascicle). (Available from A. C. Allyn, 3701 Bay Shore Rd., Sarasota, Florida 33580.)—This is the first of some 15 volumes of the birds of East Africa, supposed to have been completed within 2 yr (we have seen no others), containing the late V. G. L. van Someren's portrayals of the birds of that region. This first volume includes some 65 species, depicted in 93 plates, including the Ploceinae, Plocepasserinae, Bubalornithinae, and some Viduinae. The illustrations are the major contribution of the book, for the text is limited to a short paragraph or so in the center of the fine covering sheet for each plate, one-third of a page introducing the "*Ploceidae*," and a two-page forward by A. L. Rand.

Dr. van Someren is a diligent observer, and his renderings of the birds of East Africa in this volume broaden our perspective of this outstanding naturalist. His birds generally are lifelike and the color production is good—it is refreshing to see the eye colors rendered so accurately. Some plates were finished hastily, as dark colors at times are not fully brushed in. Often both sexes are figured, and some species (e.g. *Ploceus cucullatus*, *Euplectes ardens*) are represented in several plates depicting different races or variant plumages. All birds are shown with aspects of their habitat (tree branches, reeds, etc.), and sometimes nests are figured in the background. Several species or races are duplicated on successive plates, in different poses, each plate of a pair bearing identical writeups (e.g. plates 17 and 18, 58 and 59). The text must be regarded as "window-dressing" for the plates; although the information is useful, it is skimpy (usually about five to seven lines of text per plate).

Despite the attractiveness of its color plates, the cost and brevity of the volume's text will restrict its sales to those who feel they must have every new, well-illustrated bird book that appears. Users are sure to be dismayed at the bird names encountered, for the scientific names often are outdated and van Someren's English names are cumbersome and uniquely his own. For example, *Ploceus capitalis dimidiatus*, the "Olive-back, Black-headed Swamp Weaver" and *P. capitalis dichrocephalus*, the "Northern, Black Rufous-headed Olive Back Weaver" (respectively plates 21 and 22) are subspecies of the same species, the Yellow-backed Weaver (*Ploceus melanocephalus*). This example merely suggests the inconsistencies among names and punctuation that should have been treated uniformly by the editors, who are at fault in not providing (in parentheses or in an index) up-to-date names to aid those using the book. We found over a dozen errors in spelling of English and scientific names. The volume could be more of a tribute to van Someren if its editors had seen fit to match the quality of the color plates with modern captions and better editing of the text. Perhaps they can so direct their efforts in preparing future volumes of this series, if it is to continue.—LESTER L. SHORT AND JENNIFER F. M. HORNE.

The Sulidae: Gannets and boobies¹.—J. Bryan Nelson. 1978. Oxford, University of Aberdeen Study Series Number 154, Oxford University Press. xi + 1,012 pp. Illustrated by John Busby, 14 color and 18 black-and-white plates, 135 tables, 404 figures (many illustrations), 19 appendices (including "Fossil Boobies and Gannets" by C. J. O. Harrison, and "Pollution and the Sulidae" by W. R. P. Bourne, J. A. Bogan, and S. Wanless). Cloth. \$98.50.—Bryan Nelson is a wonderfully productive biologist and this monograph summarizes almost two decades of dedicated work on this family of birds. For each of the nine species the book is divided into large sections on nomenclature, morphology, molt, breeding distribution and populational aspects, ecology, and behavior. The final chapter, "The Sulids Compared," is the most useful in the book and should be studied by all ornithologists. Each species account is well indexed and good summaries are provided. The student generally interested in this fascinating family of birds should concentrate on these summaries and the final chapter and not try to plow through the separate species accounts. I found the best parts of this book the sections on behavior, whether or not I agree with the interpretive methods, and this is where Nelson is at his strongest. His theories on breeding biology are less satisfactory to me, although his discussions are extremely stimulating.

¹ See the author's response to this review on p. 649.

Bryan Nelson is obviously enamored with Gannets and the Bass Rock. He has compiled a fantastic amount of information in this book, but much of it is difficult to read. Especially so for the historical populations of the Gannet, with which the work starts. In any book of this magnitude and complexity finding fault is easy, but since that is a purpose of a review I will point out some problems I found.

Complexity is implied in a book with this mass of words, and the ideas frequently get lost in the verbage. The possibility for errors is great and yet this text is amazingly free of typos, but it should be Appendix 17, not 15, on line 10, p. 76. I believe the layout is orderly, but the discursive writing style makes retrieving much of the data difficult. In fact, I found the writing style "tedious." Lines 16-21 on p. 101 are a good example of the verbose writing style clouding information throughout the text. I find Nelson's earlier published papers on sulids a better source of information than this book, perhaps because they are shorter and more terse.

To me the sulids are fascinating, and I have some experience with several species, yet I found this book almost overwhelming. It is not a book to be read but rather is a reference. However, as a reference from which to gather ideas and plan studies, many of the facts should be looked at very carefully, primarily because of the small sample sizes involved and the lack of long-term studies. For, other than the Gannet work, none of Nelson's studies has lasted more than one season, which may be sufficient to gather behavioral data but not breeding biology data.

Nelson references other people's work but not his own, which would have added importantly to the scientific usefulness of the book. For instance, Figure 40(F) and Table 8 originally appeared in *Ibis* (1966, 108: 610 and 611), although I cannot find that reference in this section of the book. One bothersome habit of Nelson's is his use of dogmatic statements, such as that regarding the correspondence between Red-footed Booby and Great Frigatebird distribution: "Since the latter is in no way beneficial to the booby, but the reverse, the association is to be explained by the frigate following the booby." Obviously, data are needed on this subject and the student should be encouraged to follow up such fascinating topics rather than being stopped at the onset.

Table 11 (p. 97) illustrates Nelson's disregard for sample sizes, ranges, and variability around a mean, and his total reliance on the mean. I do not believe that a weight variation is actually shown in relation to the breeding cycle, as purported on Table 12, p. 100. Certainly mean weight changes in the order of 100 g in a 3,000-g species are marginally significant. Numerous examples of the lack of statistical analysis exist, but Table 94 (p. 664), Figure 363 (p. 826), and Figure 367 (p. 830) are most glaring.

Human disturbance factors are well considered in the Gannet studies (p. 105) and that section should be examined by all students of bird breeding biology. However, these biases do not seem to have been considered in the Red-footed Booby studies on the Galapagos, either here or in the original publications. Also, in discussing "low" reproductive success of the Gannet on Bonaventure Island, Nelson does not consider differences in human disturbance, but states that the "combination of chilling and a high concentration of toxic chemicals was responsible." No reference is given; we should be able to check the original paper for the data presented and the methodology used in deriving them for such an important conclusion.

I believe that Nelson's studies of growth in the Gannet (when food apparently was super-abundant), immediately followed by a study of the Red-footed Booby under severe food stress, for less than one season, has greatly influenced his comparative growth analyses, and that this subject needs much further study. The lack of reference to Ricklefs' growth papers is amazing. The two growth curves on p. 96, Figures 41 (a and b), really are impossible to compare because of the different abscissa scales, and should have been redrawn in a comparable manner.

The discussion of errors in census work is very good and must be heeded in any future studies of bird populations. I find the discussion of Gannet population dynamics unsatisfying. Nelson says that immigration to the Bempton colony from the Bass Rock is proven (p. 70) but it is not until p. 135 that we learn that this statement was based on three color-banded birds. Early in this section Nelson says that population estimates in Gannet colonies may be in error by 20-30% (p. 25, line 9), yet he gives a rate of population increase of over 3% as due to immigration (p. 26) and says that 3% is the intrinsic rate of increase. This to me has not been shown, and is not explained until a footnote to Figure 54 (p. 134). I believe colonies should be expected to fluctuate naturally from year to year and that food supply near the individual islands could determine the numbers breeding in any one colony in a given year; immigration is thus not necessary to explain these changes (p. 36-37). On p. 23, it is unclear if the figure of 155,500 is the number of individual Gannets in Ireland or the number of pairs, as in the rest of the paragraph. On p. 65 and following, I do not understand how, if all the colonies are increasing in numbers, immigration seems to work to explain a population increase in any one colony. There simply is too much speculation in the population sections of this book.

The idea of "spheres of influence" as a means of a colony attracting immigrants is an extremely

interesting suggestion (p. 70) and merits further study, as do many of the suggestions in this text. Nelson believes in the behavioral aspects of colony growth, and these data should be independently interpreted using Lack's hypotheses in light of food availability, which apparently is unlimited in the case of the Gannet.

Confusion exists on p. 106 regarding fledging success. No references to the original papers are included here so it is difficult to check on the details. In the first sentence, fledging and breeding success are equated. On line 9, breeding success is defined as number fledged from eggs laid. On line 12 fledging success but not breeding success is given, and on line 15 fledging success is defined as young fledged from eggs hatched. And on p. 108, breeding success is again defined as young fledged from eggs laid. These two paragraphs clearly point out the need for clarification and definition of terms when planning studies and when presenting results so that accurate comparative data can be obtained. Obviously, using these definitions, none of the data are comparable.

To say that the well-marked soft part color variation is "unlikely" to have any adaptive significance (p. 817), other than from differences in pigments in foods, and the speculation on p. 818 regarding the retention of long immature feathers on the back of the head leave me unsatisfied.

The whole subject of plumages demands careful study. I suggest that the black-and-white flash pattern visible as the boobies turn during diving-plunging may be important in social enhancement, rather than just the brilliant white colors of the Red-foots. The plumage ratios of the Red-footed Boobies in the extensive collection of the American Museum of Natural History give a very different picture of regional variation than that presented by Nelson. Of the 130 specimens from the "western Pacific," the predominate form is the white-tailed gray morph rather than the "mainly white morph," as Nelson states (p. 662). In the Line Islands of the central Pacific, "all birds" are not white morphs (p. 662), and in fact white morphs do not even predominate on Christmas Island. Examination and consideration of museum material would have greatly strengthened the data base for the book. For instance, few egg size measurements are included for any species, and a reasonable sample of these would have been a valuable addition.

Nelson attributes the tree-nesting habits of Red-footed Boobies as the method of sharing islands with its two "tropicopolitan" (= pantropical?) (p. 668) congeners (Brown and White boobies). Perhaps differences in feeding areas (see Diamond 1978, *Amer. Natur.* 112: 215-223) and food (see Schreiber and Hensley 1976, *Pacific Science* 30: 241-248) are also part of the explanation.

Some miscellaneous comments, many of an editorial nature: Figure 4 is an excellent use of photographs, but what is the meaning of "fully adult" on the bottom of the page? How can one be partially adult? In Figure 14 it is unclear on which island the cliffs are located. In relation to numbering the figures, some are multiples: Figure 4 has parts A-G, all on the same page. In Figure 375 there are 1-20 parts, on p. 852-857. Consistent use of subscripts and numbering would have been more satisfying, and an editor should have noted this. On Figure 375 an extremely valuable addition would be the museum specimen numbers. The ages of the immature stages are a subject for further study. The lack of consistency in use of common names in the captions of the figure and "ditto" on Figure 375 (16) should have been changed by an editor.

I would find the exact latitude and longitude for each colony useful, rather than the rather crude large-scale maps. What is an "extremely nutritious" fish (p. 22, 6 lines from bottom)? Are they really more nutritious than other fish, or just more abundant? It would be nice to see the sonograms showing that young recognize their parents (p. 19, bottom). The measurements in Table 12 are presumably from free-living birds and the sample seems rather small to me. Museum collections certainly could have been an additional source of information on several of these parameters. On p. 11, the reference to an albino chick is given as (Ailsa, 1973) which is an island and a year of observation, not a reference. Ailsa is also referred to as Ailsa Craig in the accompanying tables, and I assume this is the same place. There is apparently no caption for the two photos on p. 39. On p. 19, in relation to molt and energy, we are referred to p. 174, but I cannot find anything relevant on that page. Surely Nelson means that with increased bill size, the attendant muscle development gives greater gripping power, and this power does not come merely from the bigger bill alone (p. 17). On p. 28 it says "Kennedy (1961). . . gave one pair, but elsewhere gave two" but no reference is given for the elsewhere. I doubt if the "Gannets first true plumage differs from that of the adult more than in any other British seabird" (p. 10). What about the Herring Gull? The color reproduction of plates 1-14 in my copies of this book did not warrant publication and certainly at this price the color should have been perfect. The black-and-white reproduction throughout the text is generally excellent. The photos and fine Busby drawings are valuable additions to the text. The photo of the author on the dust jacket does not show Bryan to best advantage. It would have been stimulating to see as much of him as we were treated to of June Nelson in "Galapagos, Island of Birds."

This is a momentous publication that will receive much further attention in the years to come. Nelson's

conclusions on the biology of the Sulidae deserve extensive review, for he has succeeded in providing a thorough review of the biology of this family. A small data base exists for all sulids except the gannets. Nelson has summarized the available data and presents all his ideas and arguments, but the discursive writing style makes retrieval of the ideas difficult. The available data are in tables and figures. Due to the lack of long-term study of individual birds for any species, further studies are essential. Study of museum study skins and eggs should be included, along with at-sea observations. This book is the state of the art of the sulids in the mid-1970's, and the ideas presented here could keep a whole graduate school busy for generations. It is unfortunate that a university press published this book at a cost of \$100.00. Nelson should publish his summary pages, and especially pp. 809-1,012 of this book, at a reasonable cost so that his valuable conclusions would be available to all ornithologists.—RALPH SCHREIBER.

Relationships of the superorders Alectoromorphae and Charadriomorphae (Aves): a comparative study of the avian hand.—Boris C. Stegmann. 1978. Publ. Nuttall Ornithol. Club, No. 17. 119 pp., 37 figs.—The late Boris Stegmann presents this study as “. . . a descriptive comparison, as well as a study of the functional anatomy, of the manus of the wing of those birds grouped together by Gadow (1891-1893) as the Alectoromorphae, one of the four great subgroups of carinate birds.” I believe Professor Stegmann accomplished these goals, and in doing so has provided us with a high quality study that will prove stimulating not only to the avian systematist, but to the student of bird flight as well. In the forward to this work, Walter Bock nicely summarizes Stegmann's earlier studies in avian systematics. Bock points out that Stegmann clearly recognized that different types of comparative evidence are of varying value for treating taxonomic hypotheses, but that their value may be clarified by a functional/ecological study of the characters. Though the functional and ecological data reviewed in this study are minimal, Professor Stegmann is careful to emphasize the interrelationship of a species' natural history to its wing structure. Discussions of the delayed growth of the distal primaries of a small musophagid species as related to the young's climbing behavior long before it can fly, and the influence of wing use for both flight and swimming among the alcid, come to mind. The thoughts expressed concerning the influence of habit and/or habitat on manus structure provide much food for thought for students of biological adaptation.

The orders studied in this work include Tinamiformes, Gruiformes, Galliformes, Cuculiformes, Opisthocorniformes, Charadriiformes, Columbiformes and Psittaciformes. Professor Stegmann was able to examine the anatomy of the hand of numerous species representing 31 families by developing a technique for the study of dried museum skins. The wing of these study skins could be softened such that the muscles (when present), tendons, and select ligaments were readily available for dissection. Eighteen muscles of the carpometacarpus and digits are recognized, and with the exception of three are named as in George and Berger (1966). For each group studied, its geographical distribution and some relevant behavioral and ecological information is presented before the detailed anatomy of the bones, muscles, and major ligaments is described. Each anatomical treatise is followed by a discussion section in which the morphological features are analyzed in the light of the species' flight habits and/or evolutionary position. The decision as to whether a feature is primitive or advanced is central to the phylogenetic conclusions reached here. Professor Stegmann considers the Tinamiformes to be primitive.

Major taxonomic conclusions of this study include: 1) the division of Gadow's Legion Alectoromorphae into two superorders, the Alectoromorphae (Tinamiformes, Cariamae, Psophiae, Galliformes, Opisthocorniformes, Cuculiformes) and the Charadriomorphae (Gruiformes, Charadriiformes, Columbiformes, Psittaciformes), 2) the removal of Gadow's Cuculiformes from his Legion Coraciomorphae to his Alectoromorphae, and 3) the division of Gadow's Cuculiformes to the Cuculiformes and Psittaciformes. Professor Stegmann also concludes that the Tinamiformes belong at the base of the Alectoromorphae, the Rallidae belong at the base of the Charadriomorphae, and the Charadrii (Limicolae) should be considered the central group of the Charadriiformes. I believe this volume to be a solid contribution to avian systematics and morphology. I highly recommend it to students of either discipline.—G. E. GOSLOW, JR.

Biologists and their world.—Keir B. Sterling (Ed.). 1978. New York, Arno Press. Reprint series, 55 books in 77 volumes.—Following the publication of their first reprint series in natural history—“Natural sciences in America” (see *Auk* 93: 860-861, 1976, for a review)—Arno Press and Keir Sterling started work on a second series with a broader geographical and chronological scope. This series includes

a number of books published by Europeans in addition to Americans, and starts with the books by John Ray on a synopsis of quadrupedal animals and serpents (1693) and a synopsis of birds and fish (1713) and by Willughby on the history of fish (1685) and extends to Forbush's "Birds of Massachusetts" (1925-9) and Hume's "Ornithologists of the United States Army Medical Corps" (1942). Most of the books reprinted in this series date from the 19th century or are biographies of 19th-century naturalists. The series includes nine anthologies and two books published for the first time. The anthologies and some other volumes have a short introduction.

These volumes have been reproduced by offset from the best copies available; most, but not all, are clear and easy to read. If the book is reduced in format size, this change is mentioned, but without specifying the amount of reduction. All illustrations are reproduced in black-and-white. The prices of the volumes are reasonable. Each volume (in a few cases, sets of 2 or 3 volumes) may be purchased separately.

The central aim of this reprint series is to provide volumes important to students interested in the history of natural history. With this aim in mind, and knowing the volumes published in the first series, the choice of the ornithological volumes is excellent. These works include Buffon's "The history of singing birds," and Ray's "Synopsis Methodica Avium & Piscium" among the early works, Altum's "Der Vogel und sein Leben" (which is poorly reproduced and very difficult to read) and Howard's "Territory in bird life" of general life history, Forbush's "Birds of Massachusetts," Grinnell's "An account of the mammals and birds of the lower Colorado Valley," Hume's "Ornithologists of the United States Army Medical Corps," and an anthology of Chapman's "Essays in South American ornithogeography." Many of the volumes are landmark works in their areas of ornithology and would be of interest to most ornithologists.

The two original volumes are works on "Ernest Thompson Seton" by J. H. Wadland and on "Spencer Fullerton Baird and the U.S. Fish Commission" by D. C. Allard, Jr. The series also includes Seton's autobiography "Trail of an Artist-Naturalist."

It is not possible to review this series or individual works because most of the books are classics. The anthology of Chapman's papers on South American ornithogeography is extremely valuable in bringing together these important but no longer available papers on avian distribution. Howard's "Territory in bird life" is a classic that should be read by all ornithologists. Forbush's "Birds of Massachusetts" has long been considered the yardstick against which all state bird books are measured. It is unfortunate that the Fuertes plates could not have been reproduced in color.

A detailed descriptive brochure of "Biologists and their world" is available from Arno Press (3 Park Ave, New York, New York 10016). I urge anyone interested in any of the works mentioned to write for this brochure of this reprint series, and also of "Natural Sciences in America."—WALTER J. BOCK.

An atlas of speciation in African non-passerine birds.—D. W. Snow (Ed.). 1978. London, Trustees of the British Museum (Natural History). vii + 390 pp., 391 maps. £42.50.—The present volume is the completion of the task of mapping the distributions of the species of African birds, initiated by Hall and Moreau in their 1970 Atlas of speciation in African passerine birds (reviewed in *Auk*, 88: 682-684, 1971). It is enormously welcome, for we now have available the breeding avifauna of the Ethiopian region in its entirety, mapped and analyzed to the superspecies level. These volumes together provide a solid foundation for the study of the continuing evolution of a continental avifauna, and point out the many problems in interspecific relationships that remain to be solved. The ornithological world owes a debt to David Snow for initiating the volume on non-passerine birds and seeing it through to a successful conclusion.

Included in this volume are all breeding non-passerine birds except those whose ranges are wholly or primarily marine. The islands of the Gulf of Guinea and the coastal East African islands are considered to be "African," but taxa found on Madagascar are included only if they are conspecific with or members of superspecies or species-groups of African forms. The format is identical with that of the passerine volume. Localities for each species are plotted on maps that have as a background the major vegetation zones, and as much as possible the members of superspecies and species-groups are on the same maps. Where a species or other member of a superspecies or species-group occurs outside of Africa, the extra-limital range is shown on inset maps. The text to each map characterizes the included species, discusses their ecology and ranges, and pinpoints the areas of contact between them, and the remaining problems to be solved about their relationships. Informative as the maps are by themselves they must be studied in conjunction with the text, not only because of the information therein, but because some species are grouped for convenience, and their presence on the same map does not indicate relationship. At the end of each family there is a concise summary of the African data and of the relations with extra-limital

members of the family. The basic classification followed is White's (1965, A revised check list of African non-passerine birds, Lusaka, Zambia), but this has been thoroughly up-dated in the light of recent research, and all changes from White's list are carefully documented.

As stated by Snow in his Introduction, the atlases were designed to give a background to the evolution of African birds by grouping related species on one map. The natural taxonomic unit for this is the superspecies, a group of species immediately descended from a common ancestor and nearly or completely allopatric. The term species-group is employed for groups of related species that do not qualify as superspecies because of more or less wide geographical overlap between members of the group. The distinction between superspecies and species-groups is frequently as difficult as between species, semi-species or subspecies, and the final decision must depend upon the judgment of the authors. In the passerine volume, with essentially only a single author, Pat Hall, there was no trouble in assuring a consistent treatment. However, among the non-passerines, where 10 other authors contributed 18 of the 48 families, there is a risk of uneven recognition of superspecies or species-groups. It is a tribute to Snow's skill as an editor that the treatment is remarkably uniform throughout. There will always be decisions with which individual reviewers will take exception, but I found none in which the author's reasons were not carefully stated in the text.

With such a wealth of data, it is difficult to single out examples for special comment. Of most interest to me were the number of superspecies composed of a forest and a savanna species. This situation is most evident in the difficult family Indicatoridae, but examples also occur in *Accipiter* and *Poicephalus*. Recent studies by Moreau in Africa and Haffer in South America have postulated that late Pleistocene speciation has been related to the fragmentation of uniform habitats by changing climates and allopatric speciation within these fragments. This of course leads to the members of the superspecies replacing each other in similar habitats, and considering the vast majority of superspecies that show this type of distribution, it is almost certainly the correct explanation. How species pairs evolved in strikingly different habitats is a problem for further study.

These atlases are not only a must for any student of evolution or speciation, but are a mine of inspiration for any field student. Anyone with a serious interest in African birds should have them available.—MELVIN A. TRAYLOR.

The birds of South Dakota.—Check List Committee of the South Dakota Ornithologists' Union, Byron E. Harrell (Ed.). 1978. Vermillion, South Dakota Ornithologists' Union. 311 pp., 1 color pl., 43 black-and-white photos, 54 line drawings, 3 maps. \$10.—The publication of this book greatly increases accessibility to a wealth of bird distribution data from the little-known northern Great Plains. The checklist committee of the SDOU is to be congratulated on completion of this long-awaited project.

The book begins with an introduction describing the physiography, vegetation, and climate of South Dakota. Some readers will be surprised by the fact that the state varies in altitude from 292 to 2,207 m and in vegetation from eastern deciduous forest to alpine meadow. Bird distribution follows this amazing vegetative diversity, with such eastern species as Whip-poor-will (*Caprimulgus vociferus*) and Wood Thrush (*Hylocichla mustelina*) breeding at one end of the state, and typically western species such as Dipper (*Cinclus mexicanus*) and Lewis' Woodpecker (*Melanerpes lewis*) at the opposite end. Also included in the introduction are a description of how human settlement changed the South Dakota environment, a brief ornithological history of the state, and an annotated summary of the state's bird life.

The bulk of the book is the "Check List," a species-by-species account of the 377 South Dakota birds. Of these, 308 are considered regular (67 primarily from the Missouri River east and 34 primarily to the west), 39 casual (17 east and 3 west), 17 accidental (11 east and 2 west), and 6 of uncertain status (1 east and 5 west). Six others are extinct or extirpated. Three former species have been reintroduced, and seven non-native species have been introduced. Each year about 205 species breed and 92 winter in the state.

In each species account is a statement of status (with references), habitat, spring migration (normal, earliest, and latest dates), fall migration (normal, earliest, and latest dates), and summer. A range map is included for each species. The range maps are the book's most outstanding feature, showing major physiographic regions and indicating breeding, migration, and wintering range, as well as isolated record locations. Indices for persons, localities, and species greatly enhance this book's usefulness. Literature citation is extensive.

The production of this book is not particularly good. Photographs are largely out of focus. Most line drawings reproduced acceptably, but a number did not. The paper cover will not last, and the color photo on it is of poor quality. In a few cases species were given full status on what I consider questionable

documentation. It is unfortunate that "ERRATA" noted on p. 310 were not corrected before publication. Additional errors were not numerous.

Overall, this book marks a significant landmark in South Dakota ornithology. Its price is modest, its contribution significant. It contains a wealth of information, and is easy to use. I strongly recommend it to both amateur and professional students of northern Great Plains ornithology.—LEWIS W. ORING.

The behavioral significance of color.—E. H. Burtt, Jr. (Ed.). 1979. New York, Garland STPM Press. xiv + 456 pp. 86 figures. \$27.50.—This book is the proceedings of a symposium held at the meeting of the Animal Behavior Society in 1977. The title is a bit misleading; only 3 of the 9 chapters have significant behavioral content, and 1 of these deals with extra-retinal photoreception and circadian rhythms. Birds figure importantly in only two chapters; a reader interested only in feathered bipeds had best look elsewhere. Symposium presentations usually fall into one of two categories: a rehash of an author's work, usually better read in the original, or an undergraduate-level summary of a subject, frequently better presented in a good textbook. Exceptions are rare; occasionally a symposium participant produces a synthesis really worth reading, and infrequently a presentation contains considerable material not yet in print. In my opinion, this volume lacks exceptional syntheses, but two chapters do contain a quantity of previously unpublished material. The best of the two is by Burtt and is an attempt to show how physical factors influence the coloration of warblers. This work will soon be available in expanded form (Nuttall Ornithol. Club Publ.) and it is perhaps unfair to make some obvious criticisms of Burtt's admirably brief chapter. Burtt notes that abrasion of plumage is greater on some parts of the body because of more rapid air flow and turbulence. This leads to predictions that melanins would be more prevalent on the dorsal surface, wing tips, the lateral and trailing edges of the tail, and the lateral surfaces of the medial rectrices. These predictions are met in most warblers, but it is obvious that countershading (which is not listed in the index!) and the concealment of conspicuous marks, except when used in displays, constitute other viable explanations for these distributions of pigment. Burtt made elegant spectrometric measurements of 22 body regions of the various species of warblers. This laborious and careful procedure provides quantitative, physical evidence for what is largely obvious to the eye.

Hailman's chapter on environmental light and conspicuous colors offers some unpublished, but admittedly very preliminary, physical measurements of the color and amount of light existing in various habitats. These few measurements largely confirm the obvious with limited but quantitative data. The information in the remainder of the chapter, and indeed, in much of the book, is largely available in Hailman's book "Optical signals" (1977, Indiana Univ. Press). This is not surprising, as about half of the participants in the symposium are associates or former students of Hailman.

Each of the four sections of the book concludes with remarks from one or two discussants plus questions from the floor and answers from participants. Most of this should have been deleted. The book is printed from a photocopy of the typescript and is unattractive and hard on the eyes. A few of the figures were drawn and lettered freehand by someone lacking artistic ability. I found very few typographical errors; the text appears to have been edited carefully. For those interested in what Tracy (one of the discussants) termed the "evolutiono-engineering approach" to the functions of color, I suggest Hailman's book. For those interested in behavior, I suggest any of several evolutionary-oriented textbooks in animal behavior. For Burtt's work on warblers, I look forward to the appearance of his monograph.—HELMUT C. MUELLER.

The life and lore of the bird. In nature, art, myth and literature.—Edward A. Armstrong. 1975. New York, Crown Publ. 272 pp. 256 illus. in color and black-and-white. \$15.95.—The author of this handsomely produced, superbly illustrated volume, Edward A. Armstrong, recently deceased, was a retired vicar of the Church of England, who during his active career pursued the well-established tradition of the "parson-naturalist" so often found in England ever since the days of Gilbert White in the latter part of the eighteenth century. He published much on birds (bird song, bird behavior, the wren, etc.), on literature, particularly Shakespeare, and on the folklore and mythology of birds. The present book is, in a sense, a bringing together of his many interests, and presents many facets of the long and often intimate relationship between savage and civilized man and the birds about him. This relationship included such diverse interests as sport, falconry, pigeon racing, cock-fighting, cormorant fishing (in the

Orient), and birds as pets, down to the present-day fad of bird-watching merely for pleasure, with no urge to learn anything specific in many cases.

In his introductory chapter, the antiquity of man's fascination with birds, illustrated copiously (as are all the chapters), takes us back to prehistoric rock carvings or engravings, bark paintings, ancient Egyptian wall murals, old Greek coins and medallions, late (Pompeian) Roman wall decorations, and Minoan goldsmiths' work. Then, curiously enough, the author departs from this approach to his subject to give us a brief account of the evolution of birds, certainly far antedating any human relationship and of only tangential interest to his main discussion. This is followed by a chapter on "Flight, Song, and Dance," ostensibly because these are the chief types of activities of birds that have, over the ages, commended them to human interest and appreciation, and thus to anthropomorphized interpretation—an obvious basis from which mankind then proceeded to use avian forms directly or as symbols in myth, in magic, and in prophecy.

Armstrong's wide reading and prolonged preoccupation with his subject then is brought to bear on the outstanding birds of myth and fable, such as the phoenix; the thunderbird; the roc; the so largely imaginary *gerahav*, still defying identification with any "real" bird, that layed its huge eggs in the depths of the ocean, watched them continually from the surface, and then, when they hatched, led the chicks to shore; the barnacle goose; the Chinese crested love pheasant (quite other than the phoenix that became part of Occidental lore); and legendary birds of gigantic stature. From these creatures he then turns to a discussion of birds used in sport and recreation, and to "Birds Friendly, Decorative and Useful"—homing and carrier pigeons, birds as pets, "talking" birds (parrots, mynahs, etc.), and to the cult of cage birds as home ornaments and sources of pleasure, and finally to birds and eggs as a human resource—a background of the rise of poultry-husbandry.

This account is followed by one on the use of feathers in human adornment—Indian headdresses, millinery ornaments, Hawaiian feather blankets, and even such purely utilitarian uses as down stuffing for pillows. This prolonged and extensive use of birds by all human societies and cultures necessarily resulted in considerable destruction of wild birdlife, which introduces the next chapter on endangered birds and the struggle, often too late, to save them. Here are recorded the well-known story of the Dodo, the Great Auk, Passenger Pigeon, Ivory-billed Woodpecker, Carolina Parakeet, Whooping Crane, and California Condor, among others.

As if to enhance the argument for salvaging currently threatened species of birds, two chapters are devoted to the age and complexity of man's interest in birds in general; one on birds in art, from cave paintings at Lascaux, bird images, paintings, rock engravings of ancient, even pre-historic civilizations, medieval tapestries and paintings, Panamanian Indian molas, oriental and Egyptian pictures, and eventually down to illustrated bird books; and a similar broad coverage of birds in literature, from Egyptian hieroglyphics to late medieval and renaissance writings and later poetry dealing with these feathered creatures. The last chapter presents a series of short selections of "Great Writings about Birds," by such authors as Alexander von Humboldt, Alexander Wilson, John James Audubon, Charles Darwin, William H. Hudson, William Beebe, Konrad Lorenz, and 10 or more others.

Throughout, Armstrong has been world-wide in his selection of birds, of art or literature, and has brought it all together in a very attractive book designed to give the reader some of the joy that he got all his life from his interest in birds. The book makes no pretense at profundity of scholarship or novelty of interpretation, but it will give much to the reader less familiar with the material than was the late Edward A. Armstrong.—HERBERT FRIEDMANN.

Lories and lorikeets.—Rosemary Low. 1977. New York, Van Nostrand Reinhold Company. 180 pp., 21 color photographs, 1 in black-and-white. \$18.95.—This attractive book concentrates on the brush-tongued parrots (*Loriinae*) kept in captivity. The author is an experienced bird keeper and breeder who is specialized in parrots and who has published many articles on keeping and breeding parrots in addition to a book "The parrots of South America" (1972, John Gifford LTD., England). In the first chapter, she points out with great skill the particular characteristics of the lories, which distinguish them sharply from the rest of the parrot family. Lories are not suited to be kept as pets in cages, notwithstanding that they are easily tamed and may learn to imitate sounds extremely well. They are social birds with a strong pair-bond, and their food consists naturally of pollen, nectar, and fruit, which results in liquid droppings. But even if they are kept in aviaries, their care is much more demanding than that for the seed-eating parrot species. However, any aviculturist who undertakes to keep lories will be well rewarded, for the lories are the most active and playful among the parrots; their social behavior is complex and readily observable, and they are relatively easily bred.

In the introductory chapters a wealth of valuable and important information is given, such as the sizes of aviaries and nesting boxes for various species, where to put the food and water dishes, recipes for the nectar substitute, on hand-rearing and the most frequent diseases, etc. I find only two things I disagree with. Firstly, the author holds the opinion that seeds are an unsuitable food for the larger lorries as opposed to the smaller ones (p. 20). My experience has been that, given the choice, all the lorries and especially the larger species (*Lorius*, *Trichoglossus*, *Eos*, etc.) always take seeds in addition to fruit and man-made "nectar," although the amount of seeds eaten may vary from day to day. Especially during the rearing of young, most lorries feed heavily on seeds. Secondly, the author suggests hand-rearing of the young as a useful means "to produce far more young lorries than would otherwise be possible It is possible that the project could become commercially viable . . ." (p. 31). As hand-reared parrots, almost as a rule, become imprinted on their human foster parents and only rarely mate later with a conspecific or even rear young, this method would serve nothing but to produce just one generation of "delightful pets." Hand-rearing is and should remain an emergency measure to save weak or neglected nestlings and precautions should be taken to aid the socialization of the fledgling with its own kind, such as rearing at least two nestlings at the same time, feeding the nestling while leaving it in the nest-box, or even—if one is lucky enough to have an additional good breeding pair—putting the nestling to foster parents of a similar species or genus.

The remaining 140 pages deal with the systematic account of all the species and subspecies of the Loriinae. Special attention is given to the description of the plumage (without measurements) and to the detection of sexual differences of the plumage. As the majority of the lorries are sexually monomorphic, I have checked the given specifications on sexual differences for all species with the collection of the AMNH and I had to conclude that these are absolutely not reliable to determine the sex of a specimen. The avicultural history (status, imports, breeding successes, etc.) of each species is extensively traced. With few exceptions, however, the non-English publications and reports from continental Europe have not been included. This is unfortunate, because the aviculture in this part of the world has been extremely active and successful.

To complete the book, we find a "Guide to the identification of the subspecies of *Trichoglossus haematodus*," an index, an appendix of English, French, German and Dutch names, and a distribution map. The bibliography lists some selected books and articles. Unfortunately, most of the references are only cited within the text and not listed in the bibliography.

This well-written book with its excellent photographs is very useful for aviculturists. It is not meant for ornithologists interested in the biology or systematics of this fascinating parrot group, although they may find some information (e.g. incubation and nestling time), that is not available from field works.—DOMINIQUE G. HOMBERGER.

Type specimens of birds in the American Museum of Natural History. Part 2. Otididae . . . Picidae.—James C. Greenway, Jr. 1978. Bull. Amer. Mus. Nat. Hist., vol. 161 (1):1–306. \$20.45.—With this bulletin, Mr. Greenway completes the nonpasserine segment of the catalogue of the avian types in the A.M.N.H. (see Auk 93: 197–198, 1976, for a review of Part 1). The present section is twice the size of Part 1, containing 1,454 types compared with 703 in the first, for a total of 2,157 nonpasserine types. Of the types here included, about 40% are synonyms, compared to 50% in Part 1. A brief introduction provides information on several hummingbird collections, a list of 14 specimens previously considered to be valid types (see below), and a list of corrections to Part 1. The format is the same as that used in the first part, with the arrangement of taxa following Peters. Each type is listed under the original name; hence the sequence of headings does not always appear to follow any order. An index of original and current names of each taxa permits easy finding of each type. The original name and current taxonomic status of each type are given with citations, followed by the catalogue number of the type, a brief statement of the history of the type specimen, and any pertinent information about the status of the name or of the taxon.

Two nomenclatural subtleties should be mentioned because the discussion by Greenway could be misinterpreted. Type specimens are not designated for genera (p. 3); the generic type is a species (Art. 68). More interesting is the status of names based on "artifacts," as is the case for several hummingbirds and a plover in which the type specimen is a composite created from parts of two species (e.g. the head of one species attached to the body of another), or on unsuspected hybrids. Although the taxon is not valid, a careful reading of the Code—Art 17 (2)—indicates that these names are available. (To be sure,

the intent of this article is for types, such as fossils, in which parts of several taxa are inadvertently confused in the type, not for a deliberately created artifact. But the wording used in the Code does not permit a distinction between these two cases.) Thus, some of the 14 names discussed by Mr. Greenway on pages 4-8 are still available, and hence the specimens to which they are attached must be regarded as valid types.

Mr. Greenway and all other members of the Department of Ornithology involved in this project are to be congratulated for their painstaking care in this important nomenclatural task.—WALTER J. BOCK.

Ducks, geese, and swans of the world.—Paul A. Johnsgard. 1978. Lincoln, Univ. Nebraska Press. xxiii + 404 pp. 59 color photographs, 132 maps, and numerous black-and-white drawings by the author. \$35.00.—Paul Johnsgard has drawn upon his vast knowledge and experience of the Anatidae to write this outstanding systematic review of the waterfowl. Faced with the wealth of volumes on the waterfowl, Johnsgard had to decide what to include and what to omit in this single-volume summary. He wisely decided to exclude much of the excellent detailed mensural data, taxonomic synonymies, and avicultural material available in Delacour's *The Waterfowl of the World*, details of molts and plumages, and much of the behavioral material that he presented in earlier works. Moreover, he decided to arrange the material by species to avoid extensive repetition in separate subspecies accounts. I am in close agreement with all of his decisions, with the exception of including "Identification and field marks." This information is readily available in books such as Scott's "Key to the Wildfowl," and the space used could have been used to expand the other sections. The accounts for each species are well balanced, without excessive citations, yet the interested reader should be able to verify most important factual material. Distributional maps are clear, but little is said about details of migration. The species accounts, in my opinion, provide a good overview of the taxonomy, biology, and status of each species.

The color photographs are excellent, but I do not feel that they add significantly to the book. I especially liked the drawings by Johnsgard, which are most attractive and provide a good feel for the species, and I believe that they add greatly to the book.

The main omission of this book is a summary of the biology of each major group (subfamilies and tribes). Such an account would have provided a good overview of the groups of waterfowl as well as a foundation for a discussion of the evolutionary radiation of the family. A nice analysis is presented of the classification of the family, together with a phylogenetic tree, but this section whets the appetite for a fuller discussion of the adaptive radiation of the waterfowl.

Johnsgard is an excellent writer and artist as well as a keen student of waterfowl behavior, which makes reading this book a real pleasure. In addition, the University of Nebraska Press devoted real care and skill to the layout and production of the book. A number of volumes on waterfowl have been published over the last decade. But Johnsgard's "Ducks, geese, and swans of the world" is the one that can be recommended for all ornithologists, professional and amateur, who wish to have an excellent, single-volume survey of the waterfowl.—WALTER J. BOCK.

ALSO RECEIVED

Working bibliography of owls of the world.—Richard J. Clark, Dwight G. Smith, and Leon H. Kelso. 1978. NWF Scientific/Technical Series No. 1. Washington, D.C., National Wildlife Federation. Pp. xiv + 391. \$9.00 **Working bibliography of the Bald Eagle.**—Jeffrey L. Lincer, William S. Clark, and Maurice N. LeFranc, Jr. 1979. NWF Scientific/Technical Series No. 2. Washington, D.C., National Wildlife Federation. Pp. xi + 219, 25 p. appendix. \$9.00. [Both available from National Wildlife Federation, 1412 Sixteenth St., N.W., Washington, D.C. 20036; add \$0.85 handling charge per order.]—These two books represent the culmination of substantial team efforts under the auspices of the Raptor Information Center of the National Wildlife Federation. They aim to gather together pertinent literature references dealing with owls and Bald Eagles, respectively. Most of each book is devoted to listings of the literature citations (over 6,500 for the owls, 2,000 for the Bald Eagle). In the owl volume, the citations are then cross-referenced by genus, by genus according to geographic locations, and by genus according to subject matter (anatomy, behavior, ecology, physiology, taxonomy, conservation, distribution, and general). One chapter reviews the taxonomic and distributional status of owls of the world, and another gives the common names of owls in over 60 languages. The eagle volume contains a chapter reviewing the historical and current status of the Bald Eagle in North America, and cross-

references the citations in a lengthy permuted listing of keywords. An appendix defines and clarifies the keywords used in the listing.

While it is inevitable that undertakings of this sort will omit some references, the scope and organization of each are such that they must be regarded as fundamental bibliographic resources for anyone interested in raptors. I wish that I worked with species that merited this sort of effort.—J.A.W.

Upland birds of northeastern New Guinea.—Bruce McP. Beehler. 1978. Wau Ecology Institute (P. O. Box 77, Wau, Papua New Guinea), Handbook no. 4. \$8.50.—This small, soft-cover book is a well-designed and executed first attempt at a field guide to New Guinea birds. As such it will be much in demand. It covers Morobe Province in northeastern Papua New Guinea above 500 m, and discusses over 300 species, more than two-thirds of the species breeding in Papua New Guinea. There is at the beginning a list of families with an outline drawing of a representative of each and a brief description of the family; a description of the avian community zones and a list of birds likely to be encountered in each zone follows. In these lists the abundance is indicated by the kind of type face used, a useful innovation.

In the species accounts a first attempt is made to give field marks of New Guinea birds. This must have been an enormous task, and it is generally successful. The descriptions are somewhat uneven, varying from an almost complete description of the bird to a listing of diagnostic characters only, but the descriptions are brief and the field marks indicated by italics. It should prove very workable in the field. An added asset is the mention of immatures when they differ strikingly from adults.

There are 10 plates, 5 of them in color, and 16 line drawings. The color printing in my copy is of variable quality, but the plates and drawings together should make identification easier for those unfamiliar with New Guinea birds.

English names are given and are, for the most part, good choices from among the available names. Beehler has coined very few new ones. I agree with him that scientific names are more useful and just as easy for the newcomer to learn.

There seem to be relatively few errors and misspellings. One that should be mentioned is that the description of the female *Paradisaea minor* fails to mention the yellow on head and nape extending onto the back and the unique white throat and abdomen.

Anyone going to New Guinea for the first time must have this book, and I recommend they read Beehler's short paragraph on etiquette on pp. 4–5. The book will prove extremely useful to anyone interested in New Guinea birds, and I hope an expanded version is soon forthcoming.—MARY LECROY.

Birds in Papua New Guinea.—Brian J. Coates. 1977. Port Moresby, Robert Brown & Associates Pty. Ltd. 179 color photographs plus line drawings. No price given.—This is a popular account mentioning some 200 species. The text is brief and general. There are photographs in color of 139 species, some taken in the wild and some in captivity in naturalistic surroundings. The quality of the photographs and of the printing varies greatly from plate to plate, and some are marred by being very dark or off-register, or both. Nevertheless, the photos are of much interest, particularly a series of a displaying Magnificent Bird of Paradise, the nests of several species, and photos of a number of rarities. There is an index, but it is virtually useless as the pages are unnumbered! In summary, the publisher has carelessly put together a volume of photographs for which Mr. Coates is to be commended.—MARY LECROY.

Grands Échassiers Gallinacés Râles d'Europe [Wading birds, Galliformes, and rails of Europe].—Paul G eroudet. 1978. Neuch atel-Lausanne-Paris, Delachaux et Niestl e. 419 pp., 32 color plates, 63 black-and-white photographs, many text sketches. No price given. (In French).—In this book the natural history, habits, and distribution of the wading birds (herons, storks, ibises, and flamingos), gallinaceous birds, and rails, cranes, and bustards occurring in Europe between the Mediterranean and Lapland are described. A sound work, richly illustrated with nicely-done color plates by Paul Barruel.—J.A.W.

Annotated checklist of the birds of Ceylon (Sri Lanka).—W. W. A. Phillips. 1978. Revised edition. Colombo, The Wildlife and Nature Protection Society of Sri Lanka in association with the Ceylon Bird Club. 93 pp., 2 pages of black-and-white photographs, 2 maps. Paperback. Sri Lanka Rupees, Rs. 40. (Obtainable from: Wildlife and Nature Protection Society of Ceylon, Chatiya Rd., Marine Drive, Fort, Colombo, Sri Lanka.)—This is a very useful compilation of the 427 species and subspecies of birds found in Sri Lanka. The species accounts are brief but full of information, containing: scientific,

English, Sinhala, and Tamil names; original description citation; status in terms of time of year, numbers, and breeding; and distribution in terms of geography, altitude, and habitat. Nomenclature and order of species follow Ripley's "A Synopsis of the Birds of India and Pakistan" (1961, Bombay Natural History Society). Introductory material discusses climatic zones and migration patterns, and lists endemic species and recent additions to the Sri Lanka list. I noted one probable error (also present in Ali and Ripley, "Handbook of the Birds of India and Pakistan")—Phillips states that *Phylloscopus magnirostris* stays "in the upper foliage of tall trees." My experience with this species in Burma, Himalayas (breeding Kashmir and Himachal Pradesh), and Sri Lanka (all identifications based on voice) is that it is confined to the lower story of forest and second-growth (0–5 m). The binding of my copy is poor. Well-written, informative, and serviceable, this checklist is an excellent addition to the ornithology of Sri Lanka.—BEN KING.

Cien Aves de El Salvador.—Walter A. Thurber. 1978. Ministerio de Educación, Dirección de Publicaciones, San Salvador, El Salvador, Centro América. xxxv + 100 pp., over 170 color photos, maps. Published in hard cover and paperback. Price not stated.—The author, a former professor at Cornell University and affiliated with its Laboratory of Ornithology, first visited El Salvador in 1966 and now resides there, devoting his time to studying birds through photography, banding, and sound recording. This book, with text in both Spanish and English, contains photographs of 100 species, mostly beautifully reproduced. In many cases there are also smaller photographs of nests, female, immature, or seasonal plumage, and for migrants from the north usually a distribution map. Opposite each full-page illustration is a short, readable account indicating the habitat in El Salvador and some notable feature of behavior, often in relation to nesting or vocalization. Preliminary chapters outline the history of ornithology in El Salvador, some major aspects of bird biology, how to enjoy, attract and study birds, and the need for bird protection and habitat conservation; a valuable bibliography (from 1904) of publications dealing with El Salvador birds is appended. This popular work, intended to promote interest by Salvadoreans and visitors to their small, densely populated country, has been handsomely printed on good paper and is a credit to the Ministry of Education. Available in hardcover from Cornell Laboratory of Ornithology, Ithaca, New York 14853, at \$16 plus \$1 postage.—E. EISENMANN.

Las Aves del Uruguay.—M. E. J. Gore and A.R.M. Gepp. 1978. Mosca Hnos., Montevideo, Uruguay. (In U.S. available from I.C.B.P. Pan-American Section, c/o American Museum of Natural History, Dept. of Ornithology, New York, N. Y. 10024. 283 pp., 48 photographic plates (20 in color). \$22.00.—This book, in Spanish, covers the identification of the 376 bird species recorded from the South American republic of Uruguay. Latitudinally within the temperate zone, Uruguay lies between southeastern Brazil and northeastern Argentina, bordered by the Atlantic Ocean and the Uruguay-La Plata river system. As both authors are amateurs, the main aim of the book is identification; in addition to succinct diagnoses of field characters, some 100 species are illustrated, chiefly by photographs taken by Mr. Gord, a British diplomat who was stationed in Uruguay for several years and who prepared the first drafts of the book. Mr. Gepp, a Uruguayan businessman, added material and photographs, translated the draft into Spanish, and saw the work through the press. To facilitate its use by English-speaking readers, English names (based on Meyer de Schauensee) are given, a page translates the Spanish words used for description, habitat, and status, and a fuller Spanish-English glossary is appended. The arrangement is convenient, with adequate subheadings. After giving the scientific, local Spanish, and English names and the general distribution of the species, a brief paragraph on identification follows, and others on habitat and status in Uruguay. Sometimes notes are added on recent observations or even taxonomic data. Preliminary chapters describe habitats, migration, the history of Uruguayan ornithology, and the problems of conservation in Uruguay. At the end there is an extensive bibliography that runs to 1975, and separate indexes of scientific and Spanish names. The book should prove useful to students not only in Uruguay but in the adjacent parts of the neighboring countries; it is hoped that interest in birds and their protection will be stimulated.

Major financing for publication was provided by the Pan-American and United States Sections of the International Council for Bird Preservation; royalties will go for conservation and ornithology in South America, for the authors contributed their services as a labor of love.—E. EISENMANN.

The birds of Ecuador and the Galapagos Archipelago.—T. Y. Butler. 1979. Ramphastos Agency, Box 1091, Portsmouth, New Hampshire 03801. 25 illus. (4 in color), 2 maps. \$5.50 (postpaid)

in U.S.A.).—Subtitled “A checklist of all the birds known in Ecuador and the Galapagos Archipelago and a guide to help locate and see them,” this is a completely revised and greatly improved list of bird species known from mainland Ecuador, plus a separate checklist of those from the Galapagos. The mainland list, after English and scientific names (based chiefly on Meyer de Schauensee), indicates frequency of observation in seven altitudinal zones in the western and eastern parts of the country; for the Pacific lowlands, occurrence in coastal and arid subhabitats is also noted. In addition, a letter indicates whether the species has been observed in one or more of three recommended “birding” localities, and a number refers to a publication containing an illustration or sound recording of the species. The Galapagos list indicates the nesting status of breeding species on each of 11 major islands, and for migrants and wanderers mentions in general terms their status for the Archipelago as a whole. Introductory sections include suggestions as to localities good for bird conservation, methods of reaching them, and accommodations available for visitors, as well as a page of useful literature references. This paperback can be recommended to those planning to visit Ecuador and wishing to see a variety of the more than 1,400 bird species recorded.—E. EISENMANN.

Pigeons and doves of the world.—Derek Goodwin. 1977 (1970). Second ed. Ithaca, Cornell Univ. Press (Brit. Mus. (Nat. Hist.), Publ. No. 663). vi + 446 pp. \$27.50.—The title page is so worded that it gives the impression that this edition of Goodwin’s “Pigeons and doves of the world” is a new one published in 1977, perhaps with corrections and new information. But upon a closer examination, the only new thing in this book is the title page, which has been pasted onto the stub of the original title page. This volume is the second edition of this work published in 1970. The immediate question is how should this book be cited—1970 British Museum or 1977 Cornell University Press? I have no clear answer, but would suggest the former because this reflects when this edition appeared.

The introduction provides no information on the extent of the changes in the second edition compared to the first (see Auk 86: 151–152, 1969, for a review). A comparison with the first edition reveals little change, most of which is the addition of new life history data. Little can be added to the earlier review by N. E. Collias, which covers this volume well. I would emphasize that I found the general introduction to the family and the introductory sections to genera and generic groups to be excellent overviews.—W. J. B.

Keith County journal.—John Janovy, Jr. 1978. New York, St. Martin’s Press. Pp. xi + 210, illus. \$8.95.—John Janovy is a parasitologist by training, but this book reveals him also as an artist and perceptive observer of the large and small nuances of nature. His topic is the prairie country of Keith County, in western Nebraska, and the cast of characters is large and diverse: snails, termites, cow pies, marsh wrens, Steve Fretwell, curlews, George Sutton, killifish, swallows, and an assortment of parasites. Janovy writes of these creatures, and the people who know them, in a rambling style that weaves science, woody lore, politics, social commentary, and elements of prairie culture into images that are sometimes brilliant and profound, sometimes dull and, to me, unfathomable. At times Janovy seems to have overindulged in symbolism, and his writing becomes disjointed and jumbled, and it’s difficult to see where it’s all going. Often, however, the prose is flowing, and reaches down to convey feelings about nature that go beyond the boundaries of commonplace observation. Part of the charm of his writing, where it is good, is that it is not scientifically precise and objective (and thus impersonal), nor is it always grammatically pure (split infinitives and the like). But this can be overdone, and is here and there, producing a book that is really quite uneven in both its natural history and its inspirational qualities.

Underlying a lot of Janovy’s book is a real feeling about why (or whether) we really do science, and what can be missed if we pursue it too diligently. Perhaps what makes many ornithologists (and apparently some parasitologists) different from “real” scientists are their feelings about nature. They study nature to understand it, of course, but they often study to feel and experience nature, also. Janovy shows us that such feelings are perhaps the foundation of “real” science.—J.A.W.

Sveriges fåglar.—Sveriges Ornitologiska Förening (SOF). 1978. Sveriges Ornitologiska Förening, Runebergsg. 8, 114 29 Stockholm, tfn 08/21 05 08, Sweden. 268 pp., many line drawings and range maps. Paper. No price given. [In Swedish].—This check-list of Swedish birds, prepared by the Swedish Ornithological Association (SOF), provides a current summarization of the distributional status of birds recorded in Sweden through 1975 (with some more recent records appended as well). Range maps indicate

general distributional patterns of each species, and in addition a long table summarizes the status of each species in each of 25 geographical units in Sweden; this table should be especially useful to those whose Swedish is rusty.—J.A.W.

The researcher's field notebook.—John Steele. 1979. Available from Researcher's Field Notebook, P.O. Box 731, Philomath, Oregon 97370. \$7.50.—For years I have looked for a field notebook that could withstand the elements and my abuse, was convenient to carry about in the field, and contained some of the sorts of information that I should remember but never can. This little (11 × 17 cm, ca. 250 pp.) notebook seems perfect. The paper is not only waterproof, but saltwater-proof; it's spiral-bound so it opens flat; and it's protected by firm yet lightweight plastic covers. The section for taking notes is conveniently lined, and each page contains spaces for heading information. Eleven pages of appendices contain a table of random numbers, formulae for converting between English and metric units and for calculating the areas of various shapes, a table for squares and square roots, a table for converting between Fahrenheit and centigrade temperature scales, a chart for calculating wind chill (just what you need to know on a cold day in the field!), a listing of the Beaufort wind scale, centimeter and inch measuring scales, a space for listing important names and numbers, and a set of clip-out labels (waterproof) for tagging specimens. For those who are interested in preserving their field observations, it seems well worth the price.—J.A.W.

The sunbirds of South Africa. Also the sugarbirds, the white-eyes and the spotted creepers.—C. J. Skead. 1967. South African Book Fund, Cape Town (newly available from ISBS, Forest Grove, Oregon 97116). 356 pp. \$29.00.—This book has been reviewed earlier (*Auk* 85: 330–331, 1968); notice is given here to the fact that it is now available in the U.S.A. through ISBS. It is of interest to note that since the publication of this volume, the systematic positions of two of the most interesting genera discussed—*Promerops* and *Salpornis*—are still unresolved.—W.J.B.

Joseph Grinnell's philosophy of nature: selected writings of a western naturalist.—Alden H. Miller (Ed.). (1943). 1968 reprint. Freeport, New York, Books for Libraries Press (available from Arno Press, N.Y.). xv + 237 pp. \$17.50.—One of my warmly remembered pleasures in my undergraduate education was when I purchased and read this volume of selected papers of Joseph Grinnell (see *Auk* 60: 458, 1943, for a review). These papers, published originally over a period from 1903 to 1936, represent the spectrum of Grinnell's interest and include many ideas that are as fresh today as when they first appeared. Grinnell was not only an outstanding ornithologist, but one of the founders of evolutionary ecology. He is one of the discoverers of the concepts of the niche and of competition between species. Unfortunately, he has not received proper credit for his role in the development of evolutionary ecology, mainly because most of Grinnell's general ideas were embedded in specialized papers. Grinnell never published a general book on his ideas on ecology and evolution. He was at work on a volume, "Geography and evolution," at the time of his death. This collection of Grinnell's papers serves as a substitute, and an excellent one. A discussion of geographical speciation of chickadees (1904) is presented in basically modern form, and several papers discuss barriers and dispersal as they effect distribution, the effect of selection on populations of *Passer* (e.g. in Death Valley, 1919), and matters of current ethical interest to ornithologists such as "Conserve the collector" (1915) and "The museum conscience" (1922). Yet this volume does not exhaust the important papers written by Grinnell; the reader should consult the bibliography in *The Condor* (1940, 42: 19–34) and look behind the titles.

This reprint is well produced with the only change being the figure of the Rosy Finch, which is printed in black-and-white, not color. I recommend it strongly to all ornithologists who were not fortunate enough to obtain and read this volume when it first appeared in 1943. I will note, without comment, that the still extant dust cover of my original edition gives the price as \$2.00.—W.J.B.

Certain aspects of the functional anatomy of the feeding apparatus of some picarian group of birds.—U. M. Rawal. 1978. Ahmedabad, India, Thesis Publication Series 14, Gujarat University. 163 pp. Rs 10.00.—This volume summarizes the morphological studies of Rawal on the feeding apparatus of an avian superordinal group—the Picariae—advocated by W. K. Gregory (*Evolution Emerging*, 1950), which includes the Columbiformes, Psittaciformes, Cuculiformes, Apodiformes, Strig-

iformes, Coraciiformes, and Piciformes; the anatomy of seven species is described. Unfortunately, this analysis is not successful because the morphological descriptions are not sufficiently detailed and the figures are inadequate. Anyone using this work should be warned that a number of errors exist in the descriptions and in the functional conclusions. Although a synonymy of muscle names is given (pp. 66–71), the homologies of some of the muscles are not easy to ascertain because the names used by George and Berger (*Avian Myology*), by Fiedler, Starck, and Barnikal (jaw muscles), and by Engels (tongue muscles) are not included. Typographical errors and poor typesetting abound and interfere with reading the text.—W.J.B.

A birdwatcher's guide to the eastern United States.—Alice M. Geffen. 1978. Woodbury, New York, Barron's. Pp. vi + 346. Paper. \$6.95—This paperback provides a guide to the parks, forests, and natural preserves in the 26 states east of the Mississippi River, with brief summaries of areas, directions on how to reach them, telephone numbers, information on facilities, etc. Each state is introduced with a map locating areas covered and a summary, including general references and information, of the natural areas and bird life of that state. The coverage is remarkably complete, based on a check of New York City and other areas well known to me. The author is to be congratulated for her thorough and thoughtful compilation. Although she mentions birds that can be found in most of the areas described, this book does not serve the function of Pettingill's "Guide to bird finding" and similar books. It does, however, provide a wealth of information on the natural areas in the eastern United States to anyone interested in natural history, not only the birdwatcher. I can recommend this book highly to anyone wishing to know where to find birds, or natural areas, in their travels east of the Mississippi.—W.J.B.

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