REVIEWS

EDITED BY WILLIAM E. SOUTHERN

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

Ornitologia brasileira, uma introdução.—Helmut Sick. 1985. Brasília, DF, Brazil, Editora Universidade de Brasília. 2 vols., 827 pp., 43 plates, numerous text figures. ISBN 85-230-0087-9. Approximately $40.00.—The much-awaited (and much-delayed) *magnum opus* of Helmut Sick, Brazil's senior ornithologist, is finally out, and it should revolutionize Brazilians' access to information on their avifauna. Professional ornithologists will want the book as a valuable source of ethological, distributional, zoogeographic, and ecological data gleaned from the 8,500 pages of notes Sick has made during nearly 45 yr of fieldwork in Brazil.

The text in Portuguese, edited with great care from the original manuscript, is exceptionally well written, thanks to the exhaustive work of Luiz Pedreira Gonzaga, assisted by Dante M. Teixeira, J. Becker, H. U. Hablitzel, and L. O. Machado de Oliveira. Special cases that presented particular linguistic challenges were referred to Antônio Houaiss of the Brazilian Academy of Letters, resulting in numerous handsome neologies for the language: *redes de neblina* = mist nets; *formicar-se* = anting. Anyone with a grounding in Spanish and a good Portuguese-English dictionary should have little trouble translating the text.

"Ornitologia brasileira" begins with 116 pages of introduction and general ornithology divided into two parts: I, The country and its birds; and II, The birds. The first part is a brief summary of the climatic regimes in Brazil's immense territory and the major habitat types, illustrated with 6 maps and 15 full-page black-and-white habitat photos. The second part begins on page 27 with a discussion of morphology (10 pp.), followed by chapters on classification, nomenclature, and evolution (7), biology (vocalizations, feeding, reproduction, behavior, interspecific relations, parasites, and predation) (22), biogeography and migrations (17), common and Tupi names of Brazilian birds (2), the environment and threats to birds (7), conservation (13), and the history of Brazilian ornithology (12). Of greatest interest to most readers are the chapters on biogeography ("*Composição da avifauna brasileira*"), with its lists of Brazilian endemics and northern and southern migrants; conservation, including a list of endangered and rare species and a map of Brazil's system of biological reserves; and history. This last chapter covers the period from discovery in 1500 through about 1950 and is much more thorough than Olivério Pinto's (1979, Brasiliensia Documenta 13: 1–117) book on the topic. I would argue Sick's revisionist view (p. 107) of how Geoffroy de Saint-Hilaire acquired the Amazonian collections made from 1783 to 1791 by Rodrigues Ferreira ("the Brazilian Humboldt") for the museum in Paris: "There was no sacking [of the Lisbon Museum] at the time of the French occupation [of Portugal] by Napoleon's troops in 1808, but rather donation of the material." With the museum's patrons in exile in Rio de Janeiro, troops outside the museum gates, and Saint-Hilaire himself supervising the selection of the material to be "donated," circumstances may have made it difficult to distinguish between donations and sackings in Lisbon in 1808.

The bulk of the two volumes (574 pp.) consists of family treatments in which a general and often detailed overview of each family is followed by accounts of the individual member species, with emphasis on those best studied by Sick himself. These family treatments are the heart and soul of the book, where most of the new information is to be found. Under the tyrannids, for example, in the 10 pages preceding the individual texts are discussions of morphology and identification, sound production, habits, feeding, associations with icterids, reproduction, habitat, frequency, distribution, evolution, and migrations. In the following 23 pages are individual accounts of the 185 Brazilian tyrannids. For 80 of these species there is simple mention of their distribution and closest relatives; most are Amazonian and covered by Meyer de Schauensee and Phelps (1978, A guide to the birds of Venezuela, Princeton, New Jersey, Princeton Univ. Press), to whom Sick defers explicitly in the introduction. For the other 105 species, however, we learn total length, weight, description, voice, courtship, nesting, distribution, and other pertinent information known to the author and not covered in the family overview. These individual texts range in length from a paragraph to more than a page. An appendix with a systematic list of the birds of the city of Rio de Janeiro, a general bibliography, and indices end the work.

"Ornitologia brasileira" is well illustrated by Paul Barruel with 43 full-page plates (34 in color) arranged at the end of each volume, and numerous pen-and-ink drawings. Barruel's work is best known to American ornithologists through his illustrations for Haverschmidt's "Birds of Surinam" (1968, Edinburgh, Oliver & Boyd). The ink drawings scattered through Sick's book are especially well done, as are

the color plates of hummingbirds (Plates 20 and 21), galbulids, bucconids, and capitonids (23), and owls, caprimulgids, and nyctibiids (18). The other plates are less successful, but contain a good representation of the avifauna. I direct special criticism at the improperly proportioned *Aratinga guarouba* and the *Cyphorhinus arada* with no trace of bluish circumocular skin. The printing quality of the book in general is good, the double-column layout is attractive with little wasted space, the paper is of good quality, and the binding is solid with sewn signatures.

The book is not without its flaws, contributed by laxity on the part of the press and the start-and-stop process through which the manuscript passed during no less than 12 yr. The plates are a special point. They are oddly placed on the page, with a 2-cm lower margin, more than 5-cm upper margin, and 4 cm on either side. On the facing left page are silhouettes and a numbered key to the species illustrated with Brazilian common and Latin names. One is immediately taken aback by this strange placement and waste of paper. With more logical 2-cm margins all around, the plates could have been enlarged by 20% at no extra cost to the printer. This would have resulted in a more attractive set of illustrations, many of which suffer from over-reduction (especially tinamous, galliforms, and ciconiiforms). Color reproduction is weak on several as well, so that the Hyacinthine Macaw is Venetian blue and many browns are washed out and lifeless. The toucan plate (24) in my copy is outright faulty with a double ghosting impression of black.

The years-long process to get "Ornitologia brasileira" to press is most evident in the bibliographies and the eclectic selection of topics for the introductory chapters. The text was officially "closed" in 1982, but several references prior to that were overlooked. Some important works, such as Novaes's (1974–1978, Ornitologia do Território do Amapá, I and II, Publ. Avul. Mus. Goeldi 25: 1–121, 29: 1–75) treatise on the birds of Amapá, are not cited at all, and others cited in the text are not found in the bibliographies. I was disappointed to find no discussion of anatomy beyond an illustration of the avian skeleton, brief mention of male and female reproductive systems, ample discussion of syringes, and a few selected topics in the family treatments. If you want to know about avian development, heartbeat, adaptations to flight, and many other topics, look elsewhere. Sick's system of describing voices is a challenge to interpret, and I had to dig a long while to find the sentences of instruction buried in the discussion of vocalizations on page 55. I would like to have seen a broader interpretation of what Brazilians should learn about birds in the rest of the world. Little is mentioned on the avifauna of the globe in general, which makes it difficult for readers to put the information contained in the volumes in a broader perspective. Some information is found in the family treatments, but it too is overly abbreviated. For example, Sick introduces the Picidae as "birds almost cosmopolitan, with the Neotropics especially rich in species . . . ." The absence of picids from Australia, Madagascar, and Oceania is of profound biogeographic significance and deserves at least passing mention.

But this is a highly personal view of Brazilian ornithology constructed by its greatest master, and any criticisms are more than balanced by the unambiguous contribution represented by these two volumes. I know of no other source for such important topics as the periodic mass migrations of toucans, dozens of voices are reported for the first time, and I was frustrated to see so many of "my" range extensions scooped here. At $40 the book is expensive for most Brazilian readers, but this price represents numerous subsidies and is very cheap by Northern Hemisphere standards for a book of this size and quality. Booksellers in the U.S. probably will demand a considerably higher price. Only 2,000 copies were printed, and I predict they will sell out quickly. The impact of the book in Brazil should be great. Never before have Brazilians had access to so much accurate information on their avifauna. Sick himself witnessed the greedy destruction of Brazil's rich eastern forests, and there is much allusion to this testimony. The book should open Brazilians' eyes to their feathered compatriots, and the conservation message comes through clearly.

Sick first arrived in Brazil to do ornithological research from Germany on the eve of World War II, but was soon sent to the prison island of Ilha Grande because, as with all German nationals, he was considered a potential spy. Jail keepers do not normally allow would-be spies the luxury of binoculars, and in prison Sick was reduced to studying his lowly cellmates: termites, fleas, and bedbugs. In spite of this inauspicious beginning, he remained in Brazil after the war and became the nation's foremost ornithologist. "Ornitologia brasileira" was first conceived as a field guide, which metamorphosed into its present form over the years. The volumes are dedicated to another great German-Brazilian ornithologist, Emilie Snethlage (1868–1929). Today at 75, Sick is more active than most half his age, and he has given a splendid three-quarters-century gift to his adoptive homeland. As one of Brazil's leading literary figures, Carlos Drummond de Andrade, says in the preface: "Thank you, Professor Sick, in the name of the men, the women, and the birds of our country."—DAVID C. OREN.

Dorsal ventricular ridge. A treatise on forebrain organization in reptiles and birds.—Philip S. Ulinski. 1983. New York, John Wiley & Sons. xvi + 284 pp., 116 text figures. ISBN 0-471-87612-7. No price given.—This scholarly book is for specialists in the field of comparative neurobiology. It is written in technical language and presupposes some knowl-

edge of vertebrate central nervous system organization. Thus, it is written for the professional neuroanatomist and probably will have a limited audience outside that group of workers.

Briefly, the dorsal ventricular ridge (DVR) is an area of the telencephalon (which, with the diencephalon, forms the forebrain) found only in reptiles and birds. Embryologically, the DVR enlarges as the lateral wall of the telencephalon proper and, in reptiles at least, bulges medially into the lateral ventricles (the DVR is less well defined in birds). The DVR receives sensory input from the visual, auditory, olfactory, and somatosensory systems and then projects efferent (motor) fibers or interneurons to other areas of the brain that mediate behavioral functions.

Ulinski's treatment of this complex subject includes a basic introduction to the problem, an embryological definition of the DVR, a discussion of DVR organization in reptiles and birds, two chapters on the afferent linkages to the DVR, one chapter on the efferent connections, and a summary chapter discussing the functional role of the DVR and making comparisons to the forebrain of mammals.

Comparative neuroanatomy suffers from a dearth of data. Studies undertaken with excruciating attention to detail are required to trace neuronal pathways in even a single species, let alone many. Moreover, data on fossil taxa are understandably lacking. Add to this a general lack of appreciation of comparative analysis, and most neuroanatomists are bound to have a difficult time making historical interpretations of their data. To some extent, Ulinski's book suffers from some of these problems (basically, only four taxa are discussed: lizards, turtles, crocodiles, and birds). Ulinski claims for example, that similarity does not have a "necessary relation" to homology, and he cites the classic case of reptilian jaw bones-mammalian ear bones in support. But surely it is the observation that these sets of bones *are* similar in their developmental histories that makes us entertain the notion of homology. Ulinski further claims (p. 201) that characters lacking functional significance are "best" for phylogenetic analysis, but he really does not make much practical use of this rather dubious assertion.

These comments are not meant as a negative assessment of the book or its approach. Indeed, Ulinski has summarized a wealth of his own data and those found in a large literature, and no one interested in comparative brain function of vertebrates can afford to ignore his contribution.—JOEL CRACRAFT.

The bicentennial of John James Audubon.—Alton A. Lindsey (Ed.). 1985. Bloomington, Indiana Univ. Press. xiii + 175 pp. ISBN 0-253-10650-8. $17.70.—Although young Jean Jacques Audubon was not part of the Louisiana Purchase in 1803, he became as much part of the United States as the large tract of wilderness acquired from the King of France. He brought with him a strong French accent (part of his enduring Gallic charm), outstanding dancing, fencing and skating abilities, an interest in drawing and painting, and unbounded enthusiasm for the seemingly limitless wilderness. In the land of opportunity he was a business failure. His unique vision of the denizens of wild America, fixed forever on the pages of the double elephant portfolio, brought him lasting fame. Audubon was fascinated by the beauty, variety, and habitat of American birds and sought to represent them full size in "natural" postures. Audubon prints are much sought after by art collectors. His life and art have fascinated many biographers; his name (long anglicized to John James Audubon) has become synonymous with the conservation movement.

In this latest volume, celebrating the bicentennial of Audubon's birth (26 April 1785), six authors bring their personal views to the examination of the multifaceted Audubon and his *ouevre*. They not only consider Audubon from different points of view, summarizing facts of his life and career, but also bring novel insights to the interpretation of Audubon the artist, the man, the naturalist-ornithologist, and his encounters with wild America. Alton A. Lindsey made no attempt to unify the diverse essays. Inevitably, some duplication of facts and events occurs. But because of the authors' different orientations, this does not prevent the reader from enjoying the book.

The volume begins with Lindsey's chapter on "The Dream," a brief story of Audubon's life and aspirations. This is followed by a discussion of him as "Compleat Naturalist" (a term that also had been used for Linnaeus!) and on various types of naturalists in general. Michael Harwood's chapter deals with Audubon the ornithologist, who closely observed birds, noting their behavior and to some extent their physiology. Harwood deplores the recent fashion to "downgrade Audubon's science" and stresses the "quantity of personal fieldwork" done by Audubon, which is "unimaginable by modern standards." He calls for the reexamination of Audubon's ornithological work. Indeed, in the context of early 19th-century science his keen observations of birdlife merit increased study and reevaluation.

In a beautifully written essay, "Quill Pens," Scott Russell Saunders provides a sympathetic treatment of Audubon's writing, contrasting and comparing his colorful original prose with the tame versions that appeared in print. He places Audubon in the context of American nature writing and stresses that "it is Audubon's *personal* encounter with nature, more so than his science, that has kept his writing so pertinent, so fresh." Saunders also highlights the dangers inherent in tampering with historically important material by destroying written records and whitewashing facts. I hope that all modern ornithologists will take heed.

Robert O. Petty's chapter, "Confronting the Wil-

derness," explores early 19th-century frontier life and Audubon's adventures in wild America. Frank Levering takes another side of Audubon in the wilderness: the legends and tall tales inspired by the "Enchanted Forest," Audubon the storyteller and practical joker. Mary Durant evaluates Audubon the man, stressing his vitality, his inconsistencies of character, his attitudes toward his family and work. In this interesting chapter, "The Man Himself" becomes alive, almost a friend.

In the final four chapters Lindsey discusses such issues as hunting, conservation, the history of the conservation movement in America, and "Where to look for Audubon." The chapters on conservation, summing up important milestones in American conservation history, interspersed with Lindsey's philosophy on the environment past and present, would have been more appropriate as an epilogue or appendix. These chapters deviate from the central theme of this bicentennial volume, and while valuable in themselves, dilute the impact provided by the chapters on the complex and fascinating J. J. Audubon.

There are no Audubon pictures in this volume. Neither are they necessary. After all, we are all familiar with them. Robert Aaron Petty's lovely black-and-white illustrations greatly enhance the text and blend well with the appropriate chapters. A biochronology of Audubon's life is a useful addendum, and while I missed detailed documentation, such as footnotes, I appreciated the index.

This is a most enjoyable and useful volume. Its reasonable price will ensure that it finds its way to many private bookshelves. It is a good introduction for those not yet familiar with Audubon, and brings many new facts and considerations to the attention of those who think they "know all about" Audubon. I highly recommend it to ornithologists and naturalists interested in the history of natural history and ornithology, and to all libraries from the high school to university level.—MARIANNE GOSZTONYI AINLEY.

Coastal waders and wildfowl in winter.—P. R. Evans, J. D. Goss-Custard, and W. G. Hale (Eds.). 1984. New York, Cambridge University Press. x + 331 pp. ISBN 0-521-25928-2. Cloth. $54.50.—This book had its genesis in a 1981 meeting of European "wader" and waterfowl biologists, but it is not simply a proceedings. The book is organized into three sections that parallel the main topics of the 1981 meeting, but the editors explain that each chapter—whether it constitutes a review, an overview of long-term research, or specific research reports—was written especially for this book. The book is aimed explicitly at students of animal ecology and behavior, with an emphasis on the conservation of coastal habitats. Most of the original research data have been published elsewhere in the scientific literature. There are 19 chapters.

Part 1 examines the influence of food resources on the use of feeding areas and on the size of bird populations. Three chapters deal with waders and waterfowl. The initial chapter by Evans and Dugan examines the role of food in regulating numbers. This section deals with very basic ecological issues and deserves wide attention. In Part 2 social behavior in relation to foraging and roosting is discussed. The chapter by Ydenberg and Prins on why birds roost communally develops a general thesis, drawing examples from many avian taxa. Part 3 provides 8 geographically oriented chapters on major coastal sites used by shorebirds in the Palearctic and North Africa. Although this will be of less direct interest to North American ornithologists, Part 3 makes light reading and embraces some weighty topics such as censusing.

It is not possible to review each chapter in detail, and I mention some that I found particularly interesting or provocative. As the editors recognize, the chapters are uneven in style—some succeed as exhaustive reviews, others appear "hot-off-the-press" as current research papers with few citations. Pienkowski's chapter on energy intake is a good example of the former. Meire and Kuyken's chapter on wader distribution vs. intertidal benthic fauna is a good example of the latter. I found the chapter on clam depletion by oystercatchers and curlews by Zwarts and Wanink particularly interesting and well illustrated. Swennen's examination of the quality of oystercatcher roosting flocks at five Dutch roosts is a substantial contribution to the general topic of habitat selection as well as to the topic of roosting. Goss-Custard and Durell examine oystercatcher feeding ecology and behavior, and provide interesting data on competition and aggression. Some of the figures that show straight lines with no data points were difficult for me to interpret.

If this book has a major shortcoming, it is the wholesale neglect of the North American ornithological literature (e.g. only 5 references to papers by Myers, none to Pitelka, 1 to Jehl, 1 to Burger). As I read through I found this dissociation rather alarming. In one respect it is interesting to see how our European colleagues develop convergent theories and models without regard to our literature from North America. At first I attributed this hiatus to the lack of ready access to computerized literature retrieval (our European colleagues frequently grumble about this). But I recall that at the 1982 International Congress in Moscow many of us were astounded that in a land where the abacus still reigns, our Soviet colleagues had such a good grasp of both American and European literature. To be sure, North American ornithologists have devoted relatively less attention to shorebirds than have Europeans, but even the book's waterfowl chapters apparently find little of value in America's abundant duck and goose literature.

Overall, the book is quite successful. Many ideas

are explored and abundant data are adduced to test ideas. I think that for the general littoral ecologist, the book's value would have been strengthened by longer introductory chapters in which the editors more clearly set forth the theoretical and practical questions addressed by their writers.

The book's format is pleasing and rather free of errors. Certainly even the shorebird biologist who has amassed a wealth of reprints from both New World and Old will find the book convenient, and I imagine ecology students putting it to good use. There is a lot of value in this book, but frankly, I think that many persons—particularly graduate students who could benefit most from it—simply won't lay out $54.50. It would be a steal at half the price.—MICHAEL GOCHFELD.

The birds of Indiana.—Russell E. Mumford and Charles E. Keller. Illustrated by William Zimmerman. 1984. Bloomington, Indiana Univ. Press. xiii + 376 pp., 175 color plates. ISBN 0-253-10736-9. $75.00.—In this excellent volume Mumford and Keller provide readable species accounts, based almost entirely on data gathered in Indiana, of all the birds that occur in that state. Zimmerman portrays each in a series of beautiful and original paintings. The result is a so-called state bird book that ranks with the best in the genre. The text is addressed primarily to the nonprofessional and especially to the birdwatcher who lives in Indiana or visits the state to search for birds. Thus, the authors conclude one section of the Introduction with a sentence that sets the tone of the rest of the volume: "We hope that in this book some of our enthusiasm for birding and living in the state communicates itself to the reader." This hope is entirely fulfilled.

The Introduction consists of a brief history of previous books on Indiana birds, definitions of terms used in the book, and a very useful description of the state's physiography, vegetation, climate, and land use. This last includes a summary of changes over time and the effects of these on the distribution and numbers of birds. Indeed, running throughout the book is an interesting emphasis on history. Amos W. Butler's "Birds of Indiana" (1898) gave a good account of the situation as it was late in the 19th century, and the authors, in describing the current status of nearly every species, begin with a summary of Butler's report. In addition, since about 1950 Mumford (and more recently Keller) has persistently sought out and taken notes on conversations with older naturalists, market hunters, and others with recollections of a now remote past. Diaries and newspapers, labels on mounted bird and egg collections in county museums, and, of course, study skins in research collections—all have been consulted for the historical information that enriches the species accounts.

Each species that breeds in Indiana is depicted, with a text that is usually about one page long. Included are considerable detail on distribution, numbers, and dates of occurrence in the state, together with what is known about the species' breeding biology and occasional descriptions of interesting behavior. Almost nothing is said about plumages or about distribution outside Indiana; for these the reader is referred to the standard field guides. Similarly, material on breeding habits (e.g. nesting dates, nest sites, and clutch sizes) is restricted to data from the state. The decision to concentrate on information from Indiana seems to me a wise one. It focuses the book on presentation of facts previously unpublished and on analyses of data previously unanalyzed (e.g. Christmas Bird Censuses), and it is here that the authors make their contribution to knowledge. Published scientific studies of Indiana birds are sometimes referred to, but no systematic search of the scientific literature for Indiana material appears to have been undertaken.

Bird species that do not breed in Indiana in most cases receive somewhat shorter treatment than do breeding birds, but their dates of occurrence and distributions are presented in equal detail.

A feature of the book that I believe most readers will find enjoyable is the authors' frequent description of single episodes that captured their imaginations in the field and gave them pleasure that they still recall, e.g. the sight of courtship behavior of ducks on a fine day, or the appearance of vultures as they spread their wings at sunrise on a foggy spring morning. I thought that these short paragraphs, which introduce perhaps 10% of the species accounts, were very successful in conjuring up pleasing images. They doubtless will stimulate in many the "enthusiasm for birding" that the authors hope to arouse. Like the rest of the text, they are written in a straightforward, clear, and accurate style. In keeping with this accuracy of substance, the book contains almost no typographical or other inadvertent errors.

An Occurrence Chart following the accounts takes the form, for each species, of an open horizontal bar divided into 12 segments, one for each month. A horizontal line through the appropriate open segment(s) indicates that the species is present at that date.

Zimmerman's 175 colored illustrations are the product of 3 yr of undivided effort, a project that was made possible when a philanthropical couple agreed to underwrite the costs of the work. A member of each species is shown at its nest, in every case with a flowering plant nearby; both male and female are figured when there is substantial sexual dimorphism. All nests are depicted with clutches of eggs, except that cavity-nesting species appear at the nest entrance, and an egg of each of these species is portrayed on a final plate designed for that purpose.

Just as Mumford and Keller, with their long devotion to the study of Indiana bird distribution, were

the ideal authors to write this book, Zimmerman was the ideal choice as its artist. His national stature in his field will cause many, wherever they live, to want to own it. I am not competent to evaluate the work as art, but I found all the plates beautiful and most of the representations of birds lifelike. I asked a friend and scientific illustrator, Esta Johnston, for her appraisal of the plates, and I quote most of her written response: "beautifully delicate painting . . . reminiscent of the hand-colored lithographs of the early 19th century . . . however, a certain repetition of style that makes one wonder if they were rendered from mounted specimens, a practice that prevailed before the . . . use of photography to capture the fleeting expressions of birds in natural situations. The plant illustrations are beautiful . . . ."

This book should be included in research collections, where the original Indiana data will be useful. College libraries, especially those in the midwestern United States, will find the book useful for ornithology students, both because Indiana's birds do not differ much from those throughout the region and because the book should succeed in awakening, or furthering, an interest in birds among their students. These same arguments apply to community libraries, with their patrons of all ages. Finally, birdwatchers and all who love beautiful books will surely be drawn to Zimmerman's paintings. Incidentally, although the price of the volume has risen from $49.95 shortly after publication to $75.00, presumably even the latter figure is possible only because the publishers received numerous contributions and subsidies.—VAL NOLAN, JR.

The birds of the Republic of Panama. Part 4, Passeriformes: Hirundinidae (swallows) to Fringillidae (finches).—Alexander Wetmore, Roger F. Pasquier, and Storrs L. Olson. 1984. Washington, D.C., Smithsonian Miscellaneous Collections, vol. 150. vi + 670 pp., 1 color plate, numerous line drawings. ISBN 0-87474-956-5 (v. 4). $29.95.—This notable volume constitutes the completion of Alexander Wetmore's four-part work on the birds of Panama. Part 1 was published in 1965 (when Wetmore was 79), Part 2 in 1968, and Part 3 was published in 1972 when the author was 86. He was far along on the preparation of the final volume when his health failed, and he died on 7 December 1978. Part 4 has been completed by Roger F. Pasquier and Storrs L. Olson, an accomplishment of lasting value to all students of Middle American birds. A 3-page Introduction and Acknowledgments (written by Olson) succinctly summarizes who did what and with which material. Olson took responsibility for the systematic decisions for species not completed by Wetmore; those from the Ptilogonatidae to the end are Olson's alone, with the exception of subspecific identifications of North American migrants. For these he consulted J. W. Aldrich, M. R. Browning, and A. R. Phillips. Pasquier was responsible for the species accounts and descriptions, using Wetmore's field notes and bibliographic index and relevant subsequent publications. Because so much information on all species came from Wetmore's notes, all the accounts are written in the first person singular to conform to the style of earlier volumes. Special acknowledgment is given to the late Eugene Eisenmann, whose knowledge of Panamanian birds rivaled Wetmore's, and to R. S. Ridgely, author of "A Guide to the Birds of Panama" and a continuing student of the country's avifauna. The late W. A. Weber's drawings of many of the species are supplemented with others by Guy Tudor, who also contributed a color frontispiece of *Dacnis viguieri*. An appendix summarizes data on taxa recorded from Panama since publication of previous volumes, and there is an index of scientific, English, and Spanish names. All literature citations are included in the species accounts and not in a summarizing bibliography. A gazetteer is in preparation, to be published separately.

The general plan of the work, as originally described in the Introduction to Part 1, has been followed in all four parts. In brief, for each family there is a key to identification of the species and then the species accounts. If a species is represented in Panama by more than one subspecies, a short description and general account of the species as a whole is given first. Each subspecies, if any, is briefly characterized in comparison with others. This is followed by measurements (extremes and means) of wing, tail, culmen from base, and tarsus; these are given separately for males and females. The account continues with the status in Panama (resident, migrant, common . . . rare, etc.) and a detailed geographic range. Depending on the extent of knowledge, the rest of the account may include information on breeding times, nests, clutch size, egg measurements, incubation period, and nestling appearance and activity; there are also various behavior and natural-history notes, including range of habitats, food habits, song, taxonomic notes, historical notes, and anecdotes. When data from Panama are lacking, information from other areas such as Costa Rica often is quoted. All this is done to make the four-part work as self-sufficient as possible. Wetmore stressed from the first that an important purpose was to enable workers in the field to identify birds in the hand and also to provide as much other relevant information as possible. Although this results in duplication of much data that can be found elsewhere, it is extremely useful to have so much information on so many Middle American species and subspecies in a single set of four volumes.

Although the date of publication is 1984, Olson's Introduction is dated April 1982, and this presumably marked the completion of the authors' work on Part 4. This antedates the publication of the 6th edi-

tion (1983) of the A.O.U. Check-list, which adopted substantial modifications in the familial and subfamilial arrangements of some of the oscine groups. Whether or not the present authors would agree with those changes, it is probably appropriate that Part 4 uses the familiar Wetmore sequence and composition of families, with some exceptions that are noted and explained.

In a work of this size and scope each reviewer will surely find a number of nits to pick. Most of my criticisms are minor. There is considerable redundancy in the general description of the birds' appearance that begins each account and the more detailed description that immediately follows. Colors of unfeathered parts (bill, iris, etc.) are usually not given in the initial description where they would be most useful, but only later if at all. More typographical errors than in previous volumes seem to have escaped correction, including a conspicuous one on p. 5, where *Progne* has expanded into *Progene*.

My main criticisms, however, are still the two that I expressed in my review of Part 1 (1968, Auk 85: 150). First is the absence of maps (with one ad hoc exception). The usefulness of all four parts would be enhanced enormously by maps that showed (1) the names and locations of the provinces, the offshore islands, and geographic features frequently mentioned such as bays and major rivers; (2) land contours, especially the mountain ranges and volcanic peaks; (3) general habitats, indicating location and extent of forest, savanna, etc. On p. 567 there is a reproduction of an outline map of Panama from Olson's 1981 paper showing the ranges of races of *Sporophila americana*. It makes the complex distribution instantly clear and makes the reader wish longingly for more such graphic illustration. I recommend photocopying maps showing the features listed above and inserting them in each of the four volumes. The promised gazetteer will, of course, be a most welcome addition.

My second major criticism, so to speak, was that Wetmore's "general discussions of the avifauna," presumably including his analysis of historical and ecological factors that have determined the avifauna's composition and distribution in Panama, were "left for the end." Unfortunately, as I had feared, we will never have this from him. Let us hope that someone with a special interest and knowledge of this region can take the wealth of information that Wetmore's work has provided and attempt such a synthesis.

In summary, Part 4 and the three preceding parts are basically descriptive, not analytical, works. They thus follow a long and honorable tradition to which Wetmore was an important contributor. As such, "The Birds of the Republic of Panama" constitutes an essential reference for university and museum libraries and for the personal libraries of all those with a serious interest in the birds of the neotropical region. Pasquier and Olson and all the others who contributed to the final realization of Wetmore's goal deserve congratulations and gratitude.—THOMAS R. HOWELL.

Physiology and behaviour of the pigeon.—Michael Abs (Ed.). 1983. London and New York, Academic Press. x + 360 pp. ISBN 0-12-042950-0. $63.00.—The avian family Columbidae is highly successful, with almost 300 species distributed worldwide. Although most species occur in the tropics, the Rock Dove (*Columba livia*), of north temperate origin, has proved to be amenable to domestication, and a number of fancy breeds have been produced. From time to time some of the semidomesticated stocks have escaped captivity, or were released deliberately, and now feral populations are found in huge numbers throughout the world. Almost invariably, they survive only as commensals of man in cities and agricultural areas. This close association with man, and their proclivity for domestication and life in captivity, are without doubt major reasons for the popularity of "the pigeon" for biological research. Along with other commonly domesticated birds such as the fowl, duck, and turkey, the pigeon has contributed much to our knowledge of ornithology and biology in general. Given this central role in biological research, it is perhaps fitting that some aspects of pigeon biology be collected together as a focused monograph. Michael Abs has assembled a series of chapters by a panel whose expertise relates to physiology and behavior. The book is dedicated to the memory of Professor William T. Keeton, whose contributions to the mechanisms of orientation and homing by pigeons are legendary.

The first chapter is written by the editor and introduces certain aspects of development, with special emphasis on vocalizations and possible endocrine correlates. Although this chapter is thorough regarding current knowledge of the pigeon, there is very little overview or discussion of how development of vocalizations compares with that of other species. There follows a series of chapters on general physiology. Grimminger summarizes the morphology of the digestive tract, including a characteristic trait of the Columbidae, the crop sac. The composition of crop milk is reviewed, and many will be surprised to discover that this holocrine secretion is composed of water, proteins, and fat, and appears to be devoid of carbohydrate.

Another peculiarity of pigeons is their ability to drink without raising the beak. Among avian groups this attribute is shared only by columbids, hummingbirds, and some finches. Nutrient requirements and food choices are also discussed. It is unfortunate that no chapter addresses intermediary metabolism and its hormonal control. The high metabolic rate of avian species, especially during flight, would, in my

opinion, require at least some consideration to complete the series.

Other physiological aspects also are covered. McNabb points out that very little is known about excretory mechanisms. Currently, the evidence suggests that pigeons have modest urine-concentrating abilities compared with other avian groups such as passerines. Chadwick covers the topic of endocrinology of reproduction, which again is not remarkably different from that of other species, with the exception of the crop sac. This tissue played a pivotal role in the early research on the actions of prolactin. The epithelium of the crop sac develops rapidly in response to prolactin and provides a useful and sensitive bioassay that is still used extensively today. Two chapters by Powell cover respiration and circulation, and address the remarkable adaptations of the avian lung and air-sac system, biochemistry of avian hemoglobin, and central control mechanisms. In birds, development of these systems is complex and mostly concerned with increased oxygen requirements during flight. Powell points out the peculiarities of the system in pigeons vs. those of other avian species and mammals.

In logical sequence, the next chapters cover adaptations of the musculature of the forelimbs in relation to flight (by Aulie), and accompanying problems of thermoregulation when heat production can be prodigious (by Rautenberg).

The sections on general physiology set the stage for a further subset of chapters on sensory physiology. Wenzel summarizes the meager data on olfactory and taste senses in birds. Although the pigeon has been a major experimental subject, and although it is clear that they have olfaction and taste detection systems, the functional significance in avian species is still under debate. Similarly, the data on somatosensory systems are fragmentary (summarized by Necker). Investigations on hearing (also written by Necker) and the visual system (two chapters by Emmerton on morphology and neurophysiology), however, are much more extensive. The section on hearing gives many details on the pigeon system with useful comparisons with songbirds and mammals. Visual systems in most birds are highly developed, and the pigeon is no exception. In fact, research on this species has been prodigious, and it is now accepted that pigeons have good color vision and can detect polarized light. The latter fact may be of some significance because of their remarkable homing abilities. There is also evidence that two-dimensional pictoral stimuli can be perceived as three-dimensional objects. New and exciting advances are to be expected in this field in the future.

The chapters on sensory physiology provide useful background for the final four contributions that deal purely with behavior. Schmidt-Koenig presents an overview of the mechanisms of orientation. The pigeon has been the subject of choice for such studies, and has provided the foundation of knowledge in this field. A chapter on behavior by Goodwin takes a classical approach, providing a straight description of behavioral repertoires with an emphasis on *Columba livia*. This is hardly surprising given such a huge topic. Detailed discussions of behavior of many other species soon would result in a book-length chapter. Baptista and Abs discuss vocalizations, focusing on the Rock Dove and comparing the wild type with some fancy breeds selected for their peculiar voice. Finally, a chapter by Delius summarizes the extensive work on learning. Here, once again, we see an example of a major contribution by investigators using pigeons as subjects. Along with the laboratory rat, the pigeon is perhaps the most extensively investigated species in the study of mechanisms of learning.

This is a generally well-conceived series of chapters, with the exception of a lack of coverage for intermediary metabolism and its control. Most contributions place the investigations on pigeons in perspective with knowledge for other species. This is good because monographs of this type tend to focus more and more on the subject species, leaving the reader with no feel for the overall picture.

The book is well presented, and the illustrations are mostly of high quality. To those with a deep interest in the Columbiformes this volume is a must. For more general ornithologists, however, the price may deter most from acquiring it for their personal use. Nevertheless, institutional libraries should have a copy for reference.—JOHN C. WINGFIELD.

Marine birds: their feeding ecology and commercial fisheries relationships.—David N. Nettleship, Gerald A. Sanger, and Paul F. Springer (Eds.). 1984. Ottawa, Ontario, Special Publications, Canadian Wildlife Service. vii + 220 pp. ISBN 0-662-13311-0. Available free on a first-come, first-served basis from Distribution Section, Canadian Wildl. Serv., Dept. of Environ., Ottawa K1A 0E7, Canada.—This volume is the product of a symposium held at the eighth annual meeting of the Pacific Seabird Group in January 1982. Two objectives were identified during the organization of this symposium. The first was to bring together biologists who work on marine waterfowl and those who work on seabirds. The second objective was to present current knowledge on the interrelationships among marine birds, their prey, and the commercial fisheries industry. Toward these ends, the symposium was divided into three sections; Parts I and II dealt with the feeding ecology of marine waterfowl and seabirds, respectively, and Part III was concerned with seabird-commercial fisheries interactions.

Although feeding ecology is the subject of Parts I and II, the emphases of the two sections differ substantially. In Part I, papers on Barrow's Goldeneye

(*Bucephala islandica*), Harlequin Duck (*Histrionicus histrionicus*), Oldsquaw (*Clangula hyemalis*), White-winged Scoter (*Melanitta fusca deglandi*), and Brant (*Branta bernicla*) address the question of what each species eats, and specimens were collected from the field for gut analyses in all studies but that on Brant. Prey availability was sampled in only three of these studies, and in a fourth, it was inferred from the literature. The paper by Kiera on Brant is exceptional among these, providing estimates of grazing pressure by Brant on Alaskan North Slope coastal marshes. These papers provide basic information on the food habits of marine waterfowl, the habitats in which they feed, and how their food habits vary with season, stage of breeding, and tide cycle.

The section on seabird feeding ecology addresses a broader array of questions. Briggs confirms earlier reports that sea surface-water convergences are important for concentrating the prey of phalaropes, and he provides data suggesting that other oceanic features, including recent hydrographic conditions and proximity to upwelling centers, also are important. Chu examines the diet of Sooty Shearwaters (*Puffinus griseus*) during their nonbreeding period. Rockfish (*Sebastes* spp.) predominated in their diet throughout much of this period (May–July), but during the subsequent period of premigratory fattening they fed almost exclusively on northern anchovies (*Engraulis mordax*), which provided them with roughly three times the caloric value of rockfish per meal. Hutchinson et al. identify the volatile component of cod liver oil as important in attracting Sooty Shearwaters and Northern Fulmars (*Fulmaris glacialis*) to food. Schneider and Hunt observed significant differences in the diets of seabirds of the same species from two colonies less than 100 km apart. Most observed differences were in the proportion of birds from each colony taking a prey, not in the volume of a prey taken by successful birds. They attribute their findings to differences in the water masses around each of the colonies. Vermeer and Westrheim, and Hatch revealed changes in diet during growth of nestling Rhinoceros Auklets (*Cerorhinca monocerata*). These studies raise important questions about how, when, and where we sample the diet of breeding seabirds. They suggest the possibility that seabirds may alter their diet in response to particular physiological demands (e.g. growth, premigratory fattening).

The third section of this symposium volume includes 10 papers on seabird-prey-commercial fisheries interactions. Seven focus on the effects of the fisheries industry on seabird-prey relationships. Several general conclusions can be garnered from these papers. First, the fisheries industry has expanded faster than the scientific understanding of its resource base. Second, the species of seabirds most likely to be deleteriously affected by fisheries possess specialized feeding methods and feed on fish whose populations are being depressed by the industry. Third, the effects of reduced forage fish stocks on the population biology of seabirds and their interspecific interactions are difficult to predict. Finally, seabirds may be useful indicators of forage fish population size, and therefore useful in the management of the fisheries resource.

The final three papers in this section present data on incidental seabird mortality in gill nets. Piatt et al. estimate from band recovery, colony census, and fishing-effort data that up to 20% of the Witless Bay Common Murre (*Uria aalge*) population drowned in gill nets in 1971. More recent data indicate that net mortality now takes 3–4% of the Witless Bay murre population. Their study, as well as that of Piatt and Reddin, indicates that much of the alcid mortality was associated with netting near colonies. Carter and Sealy estimate that nearly 8% of the fall Marbled Murrelet (*Brachyramphus marmoratus*) population in Barkley Sound drowned in fishing nets. To reduce netting mortality, these authors propose that netting be prohibited in waters close to colonies during the nesting season, and that overnight netting practices be discontinued. Methods of discouraging seabirds from fishing near netted areas apparently are not known.

This collection of papers reads more like three short symposia, rather than a single symposium with a unified theme. Not having attended the meeting, I wonder how much interaction went on between marine waterfowl and seabird biologists. This detracts little from the contents of the publication, which was well produced, although slightly more than two years in the making. This publication belongs on all university library shelves, and certainly on the shelves of all marine ornithologists. Hopefully, too, it will find its way into the libraries of fisheries biologists and resource managers. No one can complain that the cost of this publication is prohibitive!—STEPHEN R. PATTON.

Pattern, mechanism, and adaptive significance of territoriality in Herring Gulls (*Larus argentatus*).—Joanna Burger. 1984. Ornithological Monographs No. 34. xii + 92 pp., 30 text figures. $9.00 ($7.00 to A.O.U. members).—This monograph is an attempt to ascertain the function(s) of territoriality in Herring Gulls. In particular, three hypotheses are proposed and evaluated: that gulls holding intermediate-sized territories should have the lowest rates of aggression, that these gulls should have the highest reproductive success, and that individuals engaging in intermediate levels of aggression should have the highest reproductive success.

Several problems are apparent with the approach. The same predictions could be drawn from entirely different theoretical frameworks: for example, habitat quality variation; correlation of success, aggression, and territory size and location with age, expe-

rience, and previous acquaintance with the neighbors; or even heterotic genetic control of aggressiveness. Thus, testing the hypotheses will not be very useful in evaluating the underlying theory. As Burger recognizes, "rates" (actually frequencies) of aggressive acts are a function both of internal aggressiveness and of provocation frequencies. More sophisticated approaches to data collection and analysis are needed to adequately separate these phenomena. A covariance analysis approach, for example, might be effective. Burger seems to have considered territoriality to be strictly the product of intraspecific selective processes. This narrow view precludes consideration of the role of territory size in the outcome of interactions with predators other than cannibalistic Herring Gulls.

Despite these weaknesses, the monograph should have provided insight into patterns, defense, and effects of territoriality in Herring Gulls. However, it is so burdened with misprints, factual errors, wrong numbers, inappropriate statistical analyses, sloppy logic, and ambiguous writing that I have no confidence I am reading what Burger intended to write. Clearly, a stronger editorial hand and much more attention to proofreading would have improved it greatly. These are serious charges, and require extensive documentation, so I will describe a variety of lapses in the preparation of the tables, figures, and text, and a number of serious problems with the statistical analyses and interpretation.

Tables 2 and 3 both purport to report primary territory sizes for the same pairs of gulls at Clam Island. In Table 2 size is reported separately for preincubation, incubation, and chick-rearing stages of the reproductive season, while in Table 3 "mean territory sizes for the entire reproductive season were computed by summing all data for each pair" (p. 18). For the 1976 data the territory size means reported for the preincubation and chick stages are above the high end of the range of territory sizes reported for the same pairs in Table 3!

The inconsistency in the number of significant digits reported in Table 9 does not preclude understanding the data, but does make the table needlessly hard to read. In Tables 28 and 29 the mean values reported are systematically erroneous, or else the footnoted captions are wrong: gulls simply cannot fledge 2.02 young per egg hatched.

Figure 24 and the top panel of Fig. 23 both purport to display numbers of chicks fledged as a function of internest distances for the same 43 pairs of gulls, but the differences in the plots (as read against the horizontal axes) are far too great to be explained as rounding error (e.g. Was the smallest nearest-neighbor distance for a pair fledging 1 young 2.1 m or was it 3.4 m? Was the difference in nearest-neighbor distance between the two smallest territories fledging 3 young a full meter or was it less than ¼ meter?). According to Fig. 25, the largest primary territory among these 43 pairs belonged to a pair fledging 1 young, and hence (from Fig. 23) with an internest distance little more than half the maximum. This magnitude of variation throws major doubt on the use of internest distances as indicators of territory size.

The statistical analyses have several major problems. Many analyses are based on combined samples of pairs observed in 1976, 1977, and 1978. Any birds appearing in the sample in 2 or more years (a likely possibility, unless the study plots were widely separated) would constitute major statistical biases. Repeatedly, Burger treats trends in the data that are unsupported by statistical determinations of significance as if they were real. Table 7 compares but does not provide statistical tests of mean distances chicks move from their nests in disturbed and undisturbed areas of the colony. The text baldly states (p. 21), "Chicks disturbed by field assistants . . . moved farther from their nests than undisturbed chicks (Table 7)". On p. 40, Burger states, "Herring Gulls responded to fewer intruders while they were incubating than while they were defending chicks." The data in Table 14 suggest this conclusion, but statistical analyses are lacking. On p. 66, a result (higher survival probability for chicks in 3-egg clutches) that was significant in only 2 of 3 years and *not* in the combined sample was discussed as if it had been demonstrated. Burger (p. 17) cites Zar 1974 and Nie et al. 1975 for the "Least Significant Intervals" method of comparing several means. I could not find this method in either source, although I did find a "Least Significant Difference" in the appropriate chapters of each. Zar mentioned the method but did not describe it, and recommended against its use. In Table 8 the 2×8 contingency table analyses of behavioral differences between gulls nesting in different habitats seem correct, but the method used for partitioning the heterogeneity found to the 8 behavioral categories is incomprehensible. The analysis of escape directions for disturbed chicks (p. 21) appears to violate the normality assumptions of the tests used.

Explanations given for the results tend to be superficial and carelessly composed. The following example is particularly egregious, but still representative (p. 69): "The approach distance of pairs (averaged over the season) was negatively correlated with the number of eggs they hatched ($r = -.46$, d.f. = 41, $P < 0.01$), but not with the number of young they fledged. Parents that fledged three young allowed intruders to get closer to their nests before they were chased (i.e., were more tolerant) than parents that fledged no young."

I suppose that ornithologists who study colonial larids will need this monograph in their libraries, but I hesitate to recommend it to anyone, and particularly not to readers unable to evaluate critically the statistics. I am relieved that I do not have a standing order for A.O.U. monographs.—WAYNE HOFFMAN.

[The breeding birds of Hungary.]—László Haraszthy (Ed.). 1984. Budapest, Natura. 245 pp., 24 color plates, 70 distribution maps. 160 florins (ca. $4–5).—Although written entirely in Hungarian, this volume is a welcome addition to the literature of ornithology. It summarizes the faunistic, phenological, and life histories of the Hungarian breeding avifauna. Between 1929 and 1984 only checklists and morphological catalogues were available from this area of central Europe. The book consists of 200 species accounts, written by a team of 30 members of the Hungarian Ornithological Society, coordinated by editor Haraszthy and overseen by the late Andrew Keve, who also wrote the preface. In addition to the personal knowledge and experience of the authors, they refer to 495 literature items, the bulk of which date from the 1970's through 1983.

The species accounts comprise the following headings: General, and breeding distribution in Hungary; Breeding habitat and phenology; Breeding biology, including the role of the sexes, nest building, nest description, clutch size, incubation period, nestling period (if any), fledging, and parental care; Food and feeding; Population size and density; Migration; and Conservational status. Each color plate includes 5 or 6 photographs of adults, often with a nest containing eggs or young, or the flight silhouette. The colors vary from very good to adequate. All of the 176 color photos were made in Hungary by local photographers. Species with no complete photograph are illustrated in color prints on the front and back end sheets of the book. The distribution maps show (by dots) those 10-km squares in which the species were found breeding during the ongoing distribution-mapping scheme of the Hungarian Ornithological Society. It is understood from the introduction that these maps are not definitive; the mapping does not yet cover the whole country. For the same reason, the distribution maps of very restricted, or conversely of very widespread, common species, have been omitted.

In addition to the faunistic data, two aspects of the species accounts would command the general attention of the non-Hungarian ornithologist. First, many southeastern species, elements of the Mediterranean or Mongolian-Mediterranean fauna, which never or only rarely nest further to the west, are included. For example, the Short-toed Lark (*Calandrella brachydactyla*) and the Collared Pratincole (*Glareola pratincola*) occur in Hungary. Second, the population estimates and the conservational status together give an idea about the status of the Hungarian breeding avifauna in this densely inhabited, agriculturally well-utilized country. The recent data provide a faint hope that the decline of wetland birds and raptors has been halted or even reversed in many cases. This is attributed to the establishment of national parks, reserves, and other protected areas; to more cautious use of biocides; and to direct protective legislation and its enforcement.

I look forward to periodic revisions, as new data no doubt will accumulate. In future editions, hopefully, there will be room for captions and summarizing tables in languages other than Hungarian, thus directly benefiting the ornithological community of the world.—MIKLOS D. F. UDVARDY.

A field guide to the warblers of Britain and Europe.—Alick Moore. Illustrated by Bryon Wright. 1983. New York, Oxford University Press. xiv + 145 pp., 32 color plates, 53 black-and-white drawings, 53 maps. ISBN 0-19-217710-9. $18.95.—The right book by the wrong people. Many European warblers are extremely difficult to identify, and although numerous articles on individual species have appeared, the idea of compressing this widely scattered material into a book is a good one. This book covers the 53 species most likely to be encountered in the "west Palearctic area," and its principal purpose is "to make the identification of warblers easier to approach and to provide some bases on which to make sound diagnoses." Unfortunately, after using this book readers are likely to be more confused than ever.

Each of the 53 species covered is given an account of about 2 pages, including a map. The maps are clear and quite large scale for a small book, and illustrate, with 4 different types of hatching or stippling, where the bird is a resident, summer breeder, migrant, and winter visitor. The text gives a brief description of world range and several lines on habitat, and continues with sections headed "Description," "In the field," "Song," and "Similar species." The 32 color plates provide ample room to illustrate each species, some of which are shown in 7–8 poses, angles, and plumages. At the end of the book is a 5-page list of references of books and articles on warblers, which shows the author has done his homework as far as research is concerned. So what went wrong?

For one thing, until I saw the illustrations in this book I had always thought of European warblers as a pretty dull bunch with mainly drab-colored plumages, but here they are shown in bright greens, yellows, reds, and pinks. All the bright colors are greatly exaggerated, and some colors are shown where there are none in life—a Dartford Warbler (*Sylvia undata*) with a blue head? A Lesser Whitethroat (*Sylvia curruca*; spelled *curraca* in the account) with pink nape and breast? Pallas' Leaf Warbler (*Phylloscopus proregulus*) a gorgeous blend of green, yellow, and orange? Not only the bright colors are wrong; those two very similar-looking species (in real life), the Olivaceous Warbler (*Hippolais pallida*) and Olive-tree Warbler (*H. olivetorum*), are shown on facing pages, the former as pale rufous, the latter as deep olive-gray, almost blackish. The text says the Olivaceous

has olive-green upperparts, the Olive-tree gray tinged with brown. Some of these errors may be due to the printer, but not all because there are within-page discrepancies. On the Cetti's Warbler (*Cettia cetti*) plate, a bird flying left is bright rufous while the bird flying right immediately below it is blackish brown. Other problems with the Cetti's Warbler plate that hold true for many other plates are: the birds are not to scale (all different sizes), most are not labeled (so you have no idea which age, sex, or season is being depicted), and shapes are often poor (the bird at bottom center has a beer belly).

The text descriptions are inadequate and often do not match the illustrations. The text for Cetti's Warbler says there is a pronounced contrast between pale feathers on undertail coverts and dark tail feathers; the illustrations show the undertail coverts as bright rufous. The Scrub Warbler (*Scotocerca inquieta*) has a dark brown tail with outer feathers edged and tipped whitish and narrow pale tips to some of the other features (this character is variable); the point is made under "Similar species" that it "lacks black subterminal tail spots of Graceful Warbler." In the illustrations, however, the Scrub Warbler is shown with a pale tail with dark subterminal spots and broad pale tips to all feathers—very like the Graceful Warbler (*Prinia gracilis*)! The crown is stated (correctly) to be strongly streaked, a point of differentiation from the less heavily marked crown of the Graceful Warbler, but is pictured as plain in one bird, faintly streaked in another.

And so on. Can anything be trusted? Yes. For some species the author has excerpted material from articles by various experts, with credit, so where you see the list of characters provided by K. Williamson, D. I. M. Wallace, and other authorities you know the material is correct. The problem is, you don't know what is expert and what is author most of the time. This is a pity because the author obviously has combed the literature and included a lot of good stuff. The book should have been written and illustrated by an author and an artist who really know the birds. It is not enough just to be a compiler. An opportunity has been missed here. There is still a need for a book on European warblers. I regret that I cannot recommend purchase of this work.—STUART KEITH.

The atlas of Australian birds.—M. Blakers, S. J. J. F. Davies, and P. N. Reilly. 1984. Melbourne, Melbourne University Press for the Royal Australasian Ornithologists Union. xlvi + 738 pp. No price given.—Over 80% of this thick book, composed of near letter-sized pages, consists of one-page species accounts. Each account includes a half-page map, a vignette of the bird, and text. The text describes the extra-Australian range, subspecies, historical range, movements, environment, factors influencing distribution, status, and abundance of each species where known. The continent and nearby islands were divided into 812 one-degree blocks. Offshore blocks were added for pelagic species. The maps depict sight records and, separately, breeding records, with different symbols for three recording rates. Uncommon and vagrant species, which total 102, are treated separately and briefly. Separate historical maps, three for each of 38 species, provide a useful added feature. Because the work was based on field observations it was necessary to combine a few species (mostly petrels and three snipes). I expect the maps will provide basic data for many biogeographic and habitat analyses.

While I was leafing through the species accounts many questions came to mind. The results section answered almost all of these. Which species was most widespread (Brown Falcon)? The top 10 are listed. Which species was the most widespread breeder (Australian Magpie-lark)? Again, the top 10 are listed. Which species were recorded most frequently throughout the continent (Australian Magpie) and in various regions? The results section provides the answers. How many species were not recorded during the 5-yr census period, 1977–1981? Apparently two, the Buff-breasted Button-Quail and the Paradise Parrot, the latter of which may be extinct. But one can scarcely expect the authors to have answered every possible question in one book.

A notable strength of this fine book is the introduction, which I urge anyone contemplating an atlas project to read as it seems to cover thoroughly the many questions and problems that arose. The authors, with the aid of thousands of observers, have done a good job. That they too were pleased is suggested by a section entitled "The Next Atlas."—GLEN E. WOOLFENDEN.

ALSO RECEIVED

Proceedings of the Fourth Nordic Ornithological Congress.—T. Stjernberg and Y. Haila (Eds.). 1984. Helsinki, Finnish Zoological Publishing Board. Reprinted from *Annales Zoologici Fennici* 21: 177–439. Distributed by The Finnish Ornithological Society, P. Rautatiekatu 13, SF-00100 Helsinki, Finland. No price given.—These eminently successful congresses started in 1974 in Finland, and now are held biannually; the previous ones were in Sweden (1977), Norway (1979), and Denmark (1981). In 1983 the Congress convened for 5 days in Joenssu, Finland with participants from the 5 Nordic countries (Denmark, Finland, Iceland, Norway, and Sweden). The Congress accepted three resolutions: "That every effort should be made to develop environmental monitoring systems based on birds, preferably with Nordic

cooperation." "That woodpecker trees ought to be protected; modern forestry tends to remove old trees that are necessary for many endangered woodpeckers, but woodpecker holes provide nesting sites to a number of other birds and also to bats." "That every effort should be made to reduce sulphur dioxide emissions in the Nordic countries because the acid rain will increasingly damage the environment, including many bird habitats."

The 41 lectures centered around 5 symposia. The Pied Flycatcher (*Ficedula hypoleuca*) provided material for 7 lectures and much discussion. Another 6 papers dealt with individually marked birds. Raptors and owls, breeding censuses, and the effect of environmental changes on bird populations were the topics of other symposia. The well-organized congress (with a day-long field trip to the thousand-lakes region of the central Finnish taiga) attracted 160 ornithologists, not only from the Nordic countries. Traveling (or vacationing) American ornithologists would do well to remember that in odd-numbered years there is an excellent ornithological event to attend in one of the charming countries of northern Europe.—MIKLOS D. F. UDVARDY.

Bibliographia ornithologica hungarica.—Jozsef Papp and Zsigmond Rethy. 1980. Bekescsaba, Hungary. 657 pp. No price given.—This extensive ornithological bibliography lists 13,032 references to ornithological subjects written by Hungarian authors, to all ornithological papers published in Hungarian reviews or books published in Hungary, and to papers on Hungarian birds by foreign authors. The references are numbered consecutively and grouped in alphabetical and chronological order. The list contains, in separate sections, reports from various departments and papers by anonymous authors. A very useful section provides a list of all the bird species with the appropriate reference numbers. Another list gives references grouped by geographic areas. The most recent references listed are from the end of 1979. This bibliography will be very useful to those working on the birds of central Europe. The authors are to be congratulated for their meticulous and sustained efforts in producing such a complete work.—HENRI OUELLET.

Biophysical aerodynamics and the natural environment.—A. J. Ward-Smith. 1985. New York, John Wiley & Sons. x + 172 pp. ISBN 0471-90436-8. $38.95.—Ward-Smith gives a clear introduction to the aerodynamic principles that describe animal flight and the behavior of other objects (e.g. raindrops, snowflakes, fruits, seeds) in air. The concepts regarding the physical properties of air and the forces of motion are developed precisely and by moving from the general to the specific. Four chapters, 2 for birds and 1 each for insects and nonavian vertebrates (bats, pterosaurs, flying fish, and various gliding forms) are devoted to the analysis of animal flight.

This delightful little volume compares favorably with Steven Vogel's recent "Life in Moving Fluids" (1983, Princeton, New Jersey, Princeton Univ. Press). Ward-Smith's approach is productive and broadens the more traditional approach to avian flight (Simkiss 1963, Bird Flight, London, Hutchinson; Pennycuick 1972, Animal Flight, London, Edward Arnold). He is careful to point out changes that developed from the experimental data accumulated recently and the newer theoretical analysis such as Rayner's (1979, J. Exp. Biol. 80: 17-54) development of vortex theory. These are easily followed as the abstract concepts of relative motion, Reynold's number, and flow fields are developed early in the text using simple systems.

The textual material requires some thought. There is a liberal use of mathematical equations, with only a few derivations. So there are some challenges; being told, for example, that a symbol in an equation can be replaced by another value, or a constant, is not necessarily enlightening when no reason is given. However, other ideas—such as the aeroelastic effects of feathers—are developed clearly. The author moves easily from theory to the "state of things in the real world," and returns. This is an exceptionally productive heuristic technique, even though the reader often feels as if the obvious has been proven.

The book offers an opportunity for the reader to really understand many of the common observations we all make on birds in flight. The appearance of "Physiological responses of birds to flight and running" by J. Brackenbury (1984, Biol. Rev. 59: 559) provides a useful, complementary source of information on flight.—A.H.B.

Colour: why the world isn't grey.—Hazel Rossotti. 1983. Princeton, New Jersey, Princeton Univ. Press. 239 pp., numerous text figures. ISBN 0-691-02386-7. Paper, $8.95. Cloth, $32.50.—Ms. Rossotti obviously undertook this project with the best of intentions. Although the product, reprinted from an earlier Pelican original, is superficial in many aspects, some points are well made. The emphasis, as expected, is on human vision and psychophysics. The coverage attempts an inclusiveness that is perhaps inappropriate to a book of this length. Consequently, there are errors (melanins are not "probably formed by a breakdown of haemoglobin"), reluctance to use appropriate technical terminology (e.g. are the "minute white granules" in human eyes, butterflies, and tropical fish all the same?), and some heavy-handed treatment of selected material (e.g. 11 pages dedicated to C.I.E. color diagrams).

Colors have a special fascination to ornithologists.

In addition to their numerous biological roles, they make birds attractive to watch. A decade of effort by D. Fox, A. E. Needham, J. Dyck, et al. has elucidated most of the mechanisms responsible for color production in the feathers and soft parts of birds. Rossotti attempts to deal with the entire range (spectrum?) of problems in producing, perceiving, and using color. She succeeds only partly in this popular presentation. Much is omitted, and other material is covered so superficially as to be useless. With no indication of material for further reference, the reader is often left with questions or insufficient information to understand thoroughly the subject.—A.H.B.

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