REVIEWS

EDITED BY JOHN WILLIAM HARDY

Bird vocalizations. Their relations to current problems in biology and psychology. Essays presented to W. H. Thorpe.—R. A. Hinde (Ed.). 1969. Cambridge, Univ. Press. Pp. xvi + 394. Cloth. $13.50.—As its subtitle suggests, this book is a collection of research reports by different authors on various aspects of bird vocalizations. These papers were not presented at a meeting, but were written specifically for this volume. The book serves as an excellent overview of current work with bird vocalizations, a field that W. H. Thorpe pioneered.

The book is divided into six major segments: physical analysis of avian vocalizations, developmental aspects, physiological aspects, functional aspects, evolutionary aspects, and literary and aesthetic aspects. Each section is prefaced by a short explanation or overview by the editor. Part A, the physical analysis of avian vocalizations is a single paper by Peter Marler, "Tonal quality of bird sounds." It presents a spectrographic analysis of the physical characteristics responsible for the individual tonal qualities of bird vocalizations and musical instruments as perceived by the human, and presumably also, the avian ear. Marler suggests that these tonal qualities are an important part of the species specificity of bird songs, and I suspect that few field ornithologists will disagree with him. I was somewhat surprised to find in this otherwise excellent paper no mention of L. Irby Davis's very similar "Biological acoustics and the use of the sound spectrograph" (Southwestern Naturalist, 9: 118–145, 1964). Although the papers are sharply divergent in many respects, still the fact that Davis tried to illustrate many of the same tonal characteristics Marler does warrants at least passing reference.

Part B, developmental aspects, includes three papers: "Experimental studies in the ontogeny of avian vocalizations" by Masakazu Konishi and Fernando Nottebohm, "Song as a reinforcer" by Joan G. Stevenson, and "Song development in the zebra finch and other estrildid finches" by Klaus Immelmann. Konishi and Nottebohm describe the effects of acoustic isolation on song development, the nature of song learning, including what sounds are imitated and the critical period for song learning, the role of auditory feedback, and the role of proprioceptive feedback in maintaining songs after they are learned. Stevenson found that caged Chaffinches activated the playback of Chaffinch song significantly more than the playback of white noise, but they responded much more actively and positively to food than they did to Chaffinch song. Stevenson's results suggest that song acts as a stronger reinforcer for experienced birds in breeding condition than for others.

One of the most interesting results of Immelmann's work with estrildids was the discovery that the Zebra Finch shows preferences both for the father's song and for a particular tonal quality. If the two do not coincide, the father's song is likely to have the greater influence. In other respects the estrildids Immelman studied seem to be much like other passerines in the manner of song development.

Part C, physiological aspects, contains three papers: "The control of avian vocalization by the central nervous system" by Jerram Brown, "The effects of testosterone on avian vocalizations" by R. J. Andrew, and "Roles of budgerigar vocalization in the integration of breeding behaviour" by Barbara Brockway. Brown summarizes a large number of attempts, including his own, to locate areas of the brain from which vocalizations can be evoked by stimulation. Birds, like mammals, have regions in the forebrain, diencephalon, and midbrain from which vocalizations can

brain in behavior based on concepts of drives and centers is futile, and suggests that be evoked. Brown concludes that an approach to understanding the role of the what is needed now "are theories in which complexities of the dynamics of neurobehavioral systems are incorporated."

Andrew's paper is for me the most difficult to follow in the book. He attempts to construct a hypothetical model to explain the effects of testosterone on chick vocalizations. I consider Andrew's title, "The effects of testosterone on avian vocalizations," rather inappropriate in view of his statement that his article "will be concerned with the causation of changes in chick vocalizations which are induced by testosterone." The title suggests a much broader scope than this.

Brockway's paper provides a general review of her published work on budgerigar vocalizations and their role in the integration of breeding. She has added some new thoughts on the implications of some of her earlier experiments, and data from some previously unpublished experiments. As usual her data and conclusions are presented in a clear and straightforward manner, but occasionally I do find it difficult to keep track of all the abbreviations for vocalizations, and some of the conclusions would be more convincing if more figures were given in addition to the probabilities.

Part D, functional aspects, includes four papers: "Communication in canary courtship calls" by James A. Mulligan and Kenneth C. Olsen, "Duetting" by T. Hooker and B. I. Hooker (Lade), "Functions of territorial song in the White-throated Sparrow" by J. Bruce Falls, and "Embryonic communication, respiration and the synchronization of hatching" by Margaret A. Vince. Mulligan and Olsen recorded the calls given during courtship by canaries and catalogued them according to physical characteristics and context. It appears that "pure tones are used to express low excitation and distress, harsh sounds excitement and attack tendencies, and soft, short sounds the intimacies of sexual motivation."

The Hookers describe antiphonal singing of tropical African shrikes of the genus *Laniarius*. Here again the title "Duetting" seems too comprehensive for so specific a paper. The authors suggest a reinterpretation of auditory reaction times previously described by Thorpe and Lade (Mrs. Hooker). Apparently the reaction time is not so short as had been thought, and visual cues probably enhance the very rapid response. Falls also describes the results of recent field studies of the White-throated Sparrow that modify somewhat the interpretation of earlier conclusions. Falls' presentation is an unusually lucid and well-reasoned discussion of some fascinating field experiments concerning the components of song that make possible species and individual recognition.

One of the most interesting and one of the best written papers in the collection is that by Vince, which brings together the data from a series of research papers published separately. Although they are produced by lung action, the phenomena of embryonic communication, respiration, and the synchronization of hatching just barely fall within the category of "vocalizations," but they round out very nicely the scope of topics included within this volume.

Part E, evolutionary aspects, consists of three papers: "Functional and ecological aspects of vocalization in weaver-birds" by John Hurrell Crook, "Vocal characters and avian systematics" by Wesley E. Lanyon, and "Geographic variation in bird vocalizations" by Gerhard Thielcke. In the first paper of this section Crook compares the calls and displays of ploceine weavers, and finds considerable variation in the behavioral contexts in which the vocalizations occur in different species. He also concludes that "the evolution of song patterns in the subfamily is only loosely

linked to that of patterns of visual communication within the contrasting types of social organization found in the different Afro-Asian biome types."

Lanyon expresses the opinion that the most promising role for vocal characters in avian systematics is in "problem groups" that show little morphological differentiation and in which vocal characters may permit discrimination between species. He also suggests that vocal characters may reveal close relationship between species that might not be evident on the basis of morphology alone. Thielcke's very interesting discussion of geographic variation in bird song deals with an area of study that has not received much attention until recently, and which is likely to become a very active field.

Part F, literary and aesthetic aspects, includes two papers: "Aspects of the evolution of man's appreciation of bird song" by Edward A. Armstrong, and "The aesthetic content of bird song" by Joan Hall-Craggs. Armstrong reviews the references to bird song in human literature and traces man's changing attitude toward birds and their vocalizations. Hall-Craggs shows parallels between the form of human music and the organization of bird song, including rhythm and repetition.

As is usually true of symposium volumes and other such multi-authored books, the styles of the various writers differ greatly. In moving from one paper to the next the change of style may be pleasant or jarring. Variety may be the spice of life, but sometimes too much seasoning detracts from the dish. At some places in this book I had to read for several pages before adjusting to the change in writing.

Not only are the styles of the writers different, but the general scope of the papers is quite diverse. Jerram Brown, for example, contributed what amounts to a general review of the literature on the control of avian vocalizations by the central nervous system. The very next paper by R. J. Andrew is an entirely different sort, a description of a rather limited individual research project.

Most of the work described in the book has been published elsewhere, but those interested in this area of ornithology will find it convenient to have all the material together. Much of the earlier material, too, has been reworked and reinterpreted in the light of more recent experiments and observations. Many of the papers cited are not readily available to English-speaking workers—the articles by Immelmann and Thielcke are good examples. Immelmann's work with cross rearing of young estrildids and Thielcke's work with geographic variation in song are particularly important because the lines of research they present have been very little followed by by American students.

The differences in viewpoint and in terminology that a collection such as this brings out indicate that the study of bird vocalizations is still in a dynamic state, and that it has not yet reached the point where widespread agreement on the definition or usage of descriptive terms is possible. We all realize that such differences exist, but still it is startling to see them in print in such close juxtaposition. For example, Mulligan and Olsen use the word "figure" to mean any sound producing a continuous tracing on an audiospectrograph in place of the, to my way of thinking, misused word "note." Yet "note" is used by Konishi and Nottebohm and by Thielcke. Attitudes also differ in regard to the naming of calls. Mulligan and Olsen suggest that the classification and naming of behavior patterns is of critical importance because it can so easily lead to unconscious bias in subsequent study; they carefully avoid naming the calls, but give them numbers instead and later place them in their most frequent context. Crook on the other hand immediately names his calls, claiming that "this is a more convenient procedure than classification purely on a basis of the physical properties of the sounds." I would certainly agree with

Crook that it is a more convenient procedure, but I also agree with Mulligan and Olsen that it is not a safe procedure to start off with. Too often contextual names given in the past have later been proved incorrect. One other disagreement of this sort occurs: Thielcke disputes Marler's 1960 interpretation of character displacement in the mainland Chiffchaff song where it is sympatric with the Willow Warbler. Hall-Craggs, on the other hand, cites Marler's interpretation to support one of her points concerning the rhythmic organization of song.

I found few typographical errors in the book, and most of them are rather obvious and of little consequence. All in all I would say that this is a very valuable contribution. It does not represent the full range of current research in bird vocalizations, but it is a good sample. I hope the books on sale are better bound than the review copy sent me, the front cover of which is about to break off.—WILLIAM L. THOMPSON.

Principles of systematic zoology.—Ernst Mayr. 1969. New York, McGraw-Hill Book Co. Pp. xi + 428, 9 × 6 in. Cloth. $12.50.—With the modern changes in and proliferation of systematic zoology's forefronts, fewer and fewer students seem to be recruited to the ranks of the classical phylogenetic detective, despite the continuing need for such specialists for many animal groups. Students naturally tend towards inspired leadership and creative excitement and, when confronted with the choice between the classical arena and a rapidly developing new field with new methodology, few are content to do things in the way of their elders. Superimpose the modern trend of the natural sciences towards rigorous mathematical objectivity and it is clear that any defense of classical methodology must be inspired and creative indeed if it is to overcome its natural handicaps and attract the attention of young systematists.

Written by the author of previous zoological classics, "Principles of systematic zoology" appears at a time of great debate among systematists and change in their methodology. Unfortunately the book will disappoint those who are looking for refreshing synthesis and projection of modern crosscurrents. Despite the new title, this book is essentially a revision of the 1953 volume, "Methods and principles of systematic zoology" by Mayr, Linsley and Usinger. About 90 per cent of the book is updated text, incorporating much of the recent literature. Discussions of problems at the species level are shortened with frequent references to Mayr's 1963 book, "Animal species and evolution." Mayr has also greatly condensed the sections on quantitative procedures and methods of illustration, in deference to recent texts by other authors.

The publication in 1964 of the revised International Code of Zoological Nomenclature has facilitated a much improved revision of the third part (entitled Zoological Nomenclature) of the 1953 text. Instead of many chapters and over one-fourth of the book, the new part 3 comprises less than a fifth of the text and is divided into a reprinted version of the revised code with some preliminary remarks (Chapter 12) and Mayr's interpretation of the Code (Chapter 13). This reprinting of the Code is not intended as a substitute for the real thing, for it excludes the Appendices, Official Glossary, and Official Index. Nevertheless it conveniently provides a condensed version of the Code's main elements, and for Mayr's purposes greatly simplifies the subsequent interpretations. Some taxonomists will doubtless differ with Mayr on specific interpretations of the Code, but the value of this section as a basic zoological reference will stand.

Mayr's defense of "evolutionary taxonomy" appeared several years ago (Syst. Zool.,

14: 73–97, 1965) and is reiterated in this book. Despite the inadequacies of classifications based on phyletic weighting, Mayr reaffirms their superiority over other systems, in terms of total information content and retrievability as well as theoretical basis. Numerical phenetics is discarded as a revival of nominalism, cladists are reminded at length of the many fallacies in their arguments, and the need for weighted computerized procedures is stressed.

In the first 197 pages of "Principles of systematic zoology" Mayr gives no hint of potential value in modern methodology. Then suddenly at the beginning of Chapter 10 appears an optimistic outlook that would dull all but the most intent criticism. "The new interest in methodology, aroused by . . . the numerical pheneticists is likely to produce eventually as much of an advance on the level of macrotaxonomy as the new systematics did on the species level." (p. 198) Later (p. 211) he concludes "It is too early to pass final judgment on the phenetic method. . . . The ultimate answer will almost surely be a combination of classical and new computer methods. Nevertheless we owe the numerical taxonomists a debt of gratitude for developing new methods and for trying to find out which would give the most informative results."

Despite this outlook, Mayr has chosen not to include more than a very abbreviated presentation of numerical methodology itself or in Mayr's words, "a most elementary introduction to a complex field" (p. 203), and the interested reader is referred instead to "Principles of numerical taxonomy" (1963) by Sokal and Sneath as well as many specific papers by other authors. In fact, brief mention (p. 204) of the analysis of data matrices is about the only "introduction" provided, and yet considerably more space is devoted to the care and amassing of biological collections, a subject that has been well-discussed in the past and that has not changed appreciably. While this will disappoint many readers, Mayr apparently concluded in his planning that adequate coverage of the field would be beyond the scope of the book. He also recognized that in view of the field's rapid current changes, any attempt to cover modern methodology would probably be obsolete in a few years. Reference elsewhere for existing methodology may have been a wise move on Mayr's part, but in doing so he lost his chance to convert a revision into a much needed, exciting new book.

Most of the *new* material in "Principles of systematic zoology" is concentrated in the sections on taxonomic theory (Chapter 4) and the procedure of classifying (Chapter 10). These chapters deserve the careful consideration of all systematists but, in my opinion, are poorly organized and presented. The reader becomes increasingly conscious of repetition that seriously undermines the material's coherence and effectiveness. The source of the trouble lies primarily in the attempted and admittedly difficult separation of taxonomic theory and procedure, together with the intervention of five other chapters. Dramatically illustrating this particular problem are the nearly identical paragraphs summarizing Chapter 4 (p. 86) and a subsection of Chapter 10 (p. 225). Most of Chapter 10 (exclusive of section 10.7—Presentation of a Classification) is more principle than method and would be much better placed in Part I where its content could be properly coordinated with Chapter 4. Additionally, in terms of overall organization, the book's utility would be greatly enhanced if pheneticism and cladism were treated separately and comprehensively before the development of an integrated evolutionary taxonomy and its methodology. As it is, student reading on particular topics will be difficult to select.

If reference citations can be used as a guide to the general level of accuracy, minor errors in "Principles of systematic zoology" appear at a frequency of approximately

10 per cent; the dates of 2 out of 20 arbitrarily selected text references were inconsistent with the bibliographic citation. Also, figure references are inconveniently listed separately at the end of the bibliography. Certainly the most conspicuous oversight is the figure (Figure 6.1) on page 109 illustrating kingfisher specimens hanging by their bills.

In conclusion, "Principles of systematic zoology" is a cautiously updated text that will be an invaluable reference for modern systematists. It is very likely the definitive classical statement. Its thorough but abbreviated coverage of recent literature makes it an important directive review and its retrospective approach lays the theoretical foundations for the development of sound future classifications of all kinds. What remains is the need for a synthesis of the new and the old that will attract the attention of the young systematist.—FRANK B. GILL.

Las aves Sudamericanas.—Claës Chr. Olrog. 1968 [released by publisher September 1969]. Tucumán, Argentina, Fundación-Instituto "Miguel Lillo." 505 pp., 73 col. pls., 5½ × 7 in. $10.00 (U. S. currency).—Renowned as the "bird continent," South America has an avifauna of roughly 3,000 species. Although a few good books on the birds of individual countries or of areas within countries are available, even these contain color illustrations of only a selected representation of the included species. An attempt by a single person to produce a field guide to cover definitively a continent that possesses over one third of the world's birds is truly a staggering task. This book, the first of a two-volume series, deals with all the nonpasserine species of South America and adjacent islands and offers in its 73 color plates an illustration of virtually every species.

Although the text is in Spanish, Olrog furnishes English names, usually those selected by Eugene Eisenmann, as well as a Spanish-English glossary, to aid the English-speaking user. The book aims not only to help those already knowledgeable about birds but also hopefully to stimulate interest on the part of others, especially in South America, where popular literature on the avifauna is generally poor or not available at all. The first section of the book presents a general discussion of ornithology, including taxonomy, internal and external morphology, ecology, and distribution. Following this material is a section on the zoogeography of South America and a discussion of the five major continental life-zones—tropical, subtropical, temperate, Andean (including Patagonia), and oceanic. Under the zones the various habitats found in each are treated. The last section preceding the species accounts concerns conservation and outlines six steps that should be taken by the governments of the various countries to preserve their remaining bird life.

A paragraph or two introduces each family and characterizes it as a group. Individual accounts of each included species follow. These are numbered serially throughout the book, and each account begins with the South American vernacular name, the English vernacular name, and the scientific name. The plates are put in a single section at the end of the book and are also numbered serially. The plate number, as well as the species number, appears after the scientific name. The first subsection, identification (I.), gives the total length of the bird in millimeters and the field characters, including coloration and any other distinctive morphological features, and, if the sexes are not alike, a description of the differences. A second subsection, recognition and habitat (R. y h.), tells how the species being described can be distinguished from other species with which it might be confused and briefly indicates the habitat and any diagnostic or interesting habits. The last subsection, distribution (D.), gives the range of the bird in South America and a brief résumé of its extra-

continental range. On maps of the continent, including islands such as the Galápagos and Trinidad and that part of the Antarctic adjacent to South America, a bold line generally delimits the range of each species. If the bird is a migrant within or to the continent, a dotted line marks the extent of its migratory penetration and an arrow indicates the direction from which it comes.

The author has certainly crowded a great amount of information into this volume, but the constant appearance of small errors is often annoying. Though necessarily general, the maps are one of the more useful features and not only will help the student in the field, but also will serve as a quick reference for the researcher. Gross errors in ranges are infrequent, but some that I noted were the omission of Peru from the distribution of *Sarkidiornis melanotos* and *Ramphastos culminatus,* and the statement that *Phaethornis stuarti* occurs in western Peru. One might also conclude from the map that *Speotyto cunicularia* occurs in the wet Amazonian forests, as the entire continent is included in its mapped range with no statement about its habitat preference. Spelling errors are few, but one finds *Campophilus* for *Campephilus* on the legend to plate 73, Great Homed Owl for Great Horned Owl on the legend of plate 47, and *Opisthocoemus* for *Opisthocomus* on page 169. Occasionally the number under a figure on a plate does not match the number by the name on the legend. Examples are 578 instead of 595 under the figure of *Ara spixi,* and 669 instead of 699 under the figure for *Amazona farinosa.* The family discussions are sometimes defective or ambiguous. On page 36 under Tinamidae the last paragraph begins "The family, which is exclusively neotropical, contains 41 species, all South American." One does not know if the author means that they all occur in South America, which they do, or that they are all strictly South American, which they are not. On page 97 we find at the end of the discussion on Anatidae the statement that "Of the 126 species 43 inhabit South America, of these 36 nest while only 6 are migratory." If one counts the number of species described, there are 46! The account for Cathartidae (p. 114) says, "The family is exclusively American and of the 6 species, 5 inhabit South America." However, the text lists 6 species, which is the correct number known from the continent. I hope that in future editions of this volume, and in the second volume, the material will be carefully checked. Any book that may serve to stimulate interest in the fauna of South America among the people of that continent should be as accurate as possible.

I do not know how the author determined what he would use as a guide to the selection of South American vernacular names, but I am pleased to see that he tried in most cases to use indigenous names rather than those that refer to Old World birds. The standardization of names for a continent having two major spoken languages is indeed a difficult task.

As an illustrator of birds I feel that I must comment on the color plates, which are of utmost importance in any book that has bird identification as its main objective. That the author is not an accomplished artist is immediately obvious. The reproduction in my copy, however, is very poor and makes the illustrations even more difficult to judge. Many of the colors, at least as they have been reproduced, are incorrect and will surely lead most people astray on even a common species. The violet, instead of gray, neck on the Great Blue Heron, the yellow-ochre, instead of ivory, underparts of the Capped Heron, the red, instead of blue-gray, casques on the Helmeted Curassows, and the garishly colored large tinamous are only a few of the examples. The author seems to have tried to base his illustrations on pattern and color, and thus he has, unfortunately, depicted birds that have softly blending hues by blocks of color as bright and sharply delimited as those of certain parrots. Care-

less rendering of spotted, streaked, or barred plumage makes the plates of small spotted tinamous, screech owls, and others difficult to use. On the other hand, certain of the plates, especially those of hummingbirds, are fairly well executed. Although poor as compared to those being prepared by many present-day illustrators, the pictures as a whole are still useful and definitely add to the book. The groups of birds to be covered in the second volume of the series will present the user with far more difficult problems of identification, and the author will need not only to prepare the plates with the greatest of care but also to make certain that they are reproduced as well as possible.—JOHN P. O'NEILL.

Finding the birds in western Mexico, a guide to the states of Sonora, Sinaloa, and Nayarit.—Peter Alden; col. pls. by John O'Neill. 1969. Tucson, Univ. Arizona Press. Pp. 138, 10 black and white photos., 9 col. pls., 17 maps, 7 × 10 in. Paper. $6.50.—The author has led bird-watching trips to western Mexico since 1960, and from this extensive background of field experience has produced a most useful little book for both the amateur and professional ornithologist who contemplates field work in western Mexico. Although it is accurate in detail, it is directed more towards the amateur bird watcher than the professional ornithologist. Essentially the book strives to provide accurate information on certain bird finding locations, local road and weather conditions, and likely bird species to be found. It does not purport to serve as a field guide to identification, however, the 9 plates by O'Neill which are of good artistic quality and well reproduced by the printer, and the 28 locality bird lists will go far to aid identification of unfamiliar birds. The plates illustrate 89 species (which the author incorrectly contends "illustrate the majority of Mexican species found in Sonora, Sinaloa, and Nayarit") of the 496 species discussed or listed in the book. Although no formal descriptions of species are included, this book, together with the meager few other works on Mexican birds will enable most field ornithologists to solve most identification problems in western Mexico.

The initial chapter sets the stage for the potential traveler to western Mexico by briefly noting the general topography, climate, and vegetation of the region together with some very useful hints regarding safety, insects, poisonous plants and animals, and travel. Some general remarks on lodgings are included, but they are not intended to do more than suggest that adequate facilities are available throughout the region included in the book. General tourist information regarding specifics of food, dietary precautions, money exchange, lodging, and the like have been excluded since more complete information on these rapidly changing conditions is better available elsewhere. The main substance of the book consists of detailed description of 37 trips (9 in Sonora, 12 in Sinaloa, and 16 in Nayarit) and side trips, maps of 17 trip routes, and 28 bird lists from selected birding areas and routes. Each selected trip reads like a travel guide and contains specific road directions, landmarks, turnoffs, towns, and commentaries on the birds most likely to be seen en route. Notes on where to look for specific birds as well as correlated road and weather information should prove most valuable to the bird-finder. Comments on the vegetation and topography are woven into the fabric of the trip descriptions. The fact that much of the road and landmark information may be outdated in a few years detracts little from the usefulness of the book, as expected changes of this sort in Mexico may not be as frequent as in the United States. Even with eventual road changes, general areas and specific localities may in time be reached by other routes. The 17 route maps are excellent, for they are large, clear, and easily readable (as is the general body of the text). The "frequented bird-watching stops" are indicated in blue and

the paved and secondary routes are clearly shown. Even hiking trails are included where necessary. The 28 bird lists represent the results of the author's own field experiences in those 28 localities and each list is annotated so as to inform the user as to whether each species was abundantly encountered (seen on 75–100% of the trips there), commonly encountered (seen on 50–75% of the trips there), occasionally encountered (seen on 25–50% of the trips there), rarely encountered (seen on 1–25% of the trips there), or accidental. The author correctly asserts that these statistics may not accurately reflect the actual status of most species.

Three appendices provide a list of suggested readings on birds as well as vegetational zones in Mexico, a systematic list (based upon the Fifth Ed. of "The A.O.U. Check-list of North American birds" and "The species of Middle American birds" by Eugene Eisenmann) of the 496 species (roughly one-half of the number known to occur in Mexico) discussed in the book, and an accounting to four Christmas Bird Censuses taken at San Blas, Nayarit from 1964–67. Also included are a complete index of place names and an index of common English bird names.

This attractive book should prove most useful to those who wish to find birds in western Mexico and it is a welcome addition to the all too meager information on Mexican birds.—ARNOLD SMALL.

A bird-bander's guide to determination of age and sex of selected species. —Merrill Wood. 1969. University Park, Pennsylvania, Coll. Agr., Pennsylvania State Univ. 182 pp. $3.00.—This book is largely a reprinting of old lore from Forbush (1929) and Roberts (1955), with considerable recent information added. As this combination has inherent value and the book will doubtless be welcomed with delight by many banders, a reviewer may pause long and cheerlessly before declaring that much of this new publication seems to require revision.

Throughout the book the needs of modern research have been soft-pedaled. An undemanding, unscholarly introduction is followed by keys that too often prove incomplete, or oversimplified and misleading. The book covers 160 species, with the keys said to have been designed for primary use in the northeastern United States; but nowhere in the book is that area defined, nor information supplied on what may not be applicable to populations outside the area, wherever that may be.

The more reliable sexing and aging methods known to ornithologists, and employed today by most serious banders, include laparotomy, which yields a direct view of the gonads, and "cranidermotomy"—the making of a minute incision in the skin of the head, through which the relative ossification of the skull can be readily discerned. These techniques are not mentioned in this book, much less described and analyzed as to their merits and hazards. The only "skulling" method the author discusses—wet and spread the plumage and peer through the skin—is as he admits often unreliable even when employed by skilled and experienced workers. Feather development, patterns and sequences of molt, and details of pterylography also are ignored, though an understanding of these matters is of the greatest value to a student of age and sex determination. At the very least literature references to surgical techniques, molt, and pterylography should have been, yet are not, offered.

The tendency of this volume to shun many important topics leads to complete silence on the subjects of age and sex determinations of nestlings, despite the numerous papers reporting the day-to-day age characteristics of developing young (see for example, Hanson and Kossack, 1957).

Dr. Wood, who has handled 20,000 living and about 3,000 dead specimens, includes in the keys some ten original observations, all of interest, but few bearing directly

on sex and age determination, and none framed in a precise context. For example, we are told that 80 per cent of Ovenbirds have a wing length of 69–79 mm, that birds measuring 68 mm or less are females, and those measuring 80 mm or more are males. We are not told whether these figures refer to both fall specimens in fresh plumage and spring specimens in worn plumage.

Wing chord measurements are given in over 30 keys as the chief means of distinguishing between the sexes and between species. To be valid, wing chord measurements demand that the longest primary in the wing be both present and reasonably fresh; if it is absent or badly worn, chord length usually will be misleading, and it can be misleading in any event, owing to discrepancies that may exist between chord length in living specimens on the one hand and in museum skins on the other (see Vepsalainen, 1968); and of course most published wing chord data stem from skins. Unfortunately no part of this general problem is pointed out in this new guide, nor do the keys indicate which primary is most critical in a given series.

Another serious fault, if only because novices will rely on the book, is the failure to characterize species according to the total number of functional primaries in the wing. Should a bander not know whether a certain specimen is a 9-primaried or 10-primaried species, he may easily misinterpret wing formulae by assuming, for example, the 9th primary to be the 10th.

Still another shortcoming is that the keys sometimes needlessly neglect to provide more than one set of alternative clues to age and sex. The author might have informed his readers, for example, that juvenal woodpeckers ordinarily have a much larger 10th primary than immatures and adults. As wing molt in woodpeckers is descending, the large juvenal 10th remains in the wing until near the time of completion of the first prebasic (postjuvenal) molt. Thus juvenals of such species as Downy and Hairy Woodpeckers, in which females of all ages display quite similar plumage, may usually be told at a glance from specimens in every other age class.

Relatively few outright errors mar most of the keys the reviewer examined (about half the total), though *Empidonax* flycatchers, *Oporornis* wood warblers (except Kentucky), and the American Redstart are thoroughly misappraised. The keys to *Empidonax* are based not on the best available study (Phillips et al., 1966), but on a previous, less felicitous effort. Though Wood does encourage readers to consult the above-cited work, seemingly he himself has not. Consequently among many other inaccuracies pertaining to this genus, he reports wrongly that postbreeding Yellow-bellied Flycatchers and Acadian Flycatchers delay the prebasic (annual) molt until after departing the United States. The special key dealing with identification of the species of *Empidonax* is totally unacceptable.

In respect to *Oporornis,* the keys inaccurately maintain that no overlap exists in the wing lengths of Mourning and Connecticut Warblers, that in Mourning Warblers the 9th primary is *always* longer than the 6th (the reverse is usually true, *contra* Ridgway, 1909: 622; see Lanyon and Bull, 1967), and that spring Mourning Warblers always lack an eyering (Lanyon and Bull, 1967). As for the American Redstart, the key fails to take into account the femalelike plumage of first year males.

Other points on which this volume errs or offers incomplete or questionable information include: 1) Incubation in the Brown Thrasher. *Contra* Wood, males as well as females incubate, as first shown by Erwin (1935), then pointed out by Bent (1948) and recently confirmed by observations at the Kalbfleisch Field Research Station of the American Museum of Natural History, Huntington, New York (W. E. Lanyon, pers. comm.). 2) First prebasic molt in White-eyed Vireos. Dwight

(1900) believed some specimens replace their remiges during this molt. Forbush (1929) and Bent (1950) thought Dwight wrong, but juvenals with molting primaries exist (the reviewer has seen several such specimens), so the matter seems best specified as unsettled. 3) First prebasic molt in Orchard Orioles. Wood follows Forbush and other authors in indicating that this molt involves only body feathers and coverts and occurs on the breeding grounds. Probably that is true for northern breeding populations, but in some other populations the young of the year may migrate in juvenal plumage and subsequently pass through a complete molt involving both the wing and tail (see Dickey and van Rossem, 1938; Bent, 1958). 4) Characterization of the terms alula, wing bars, rectrices, and remiges. The first three of these are described imperfectly, the last is misdefined.

Species not treated in this book include all loons, grebes, procellariiforms, pelecaniforms, anseriforms, galliforms, ciconiiforms, gruiforms, all but one charadriiform, most hawks and owls, and for some unstated reason, the House Sparrow and Blue Grosbeak. The average page in this volume, incidently, is about 75 per cent blank, which means roughly 120 pages in excess of need were expended to issue the printed contents.—WILLIAM G. GEORGE.

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The Bobwhite Quail: its life and management.—Walter Rosene, Jr. Foreword by Durward L. Allen. 1969. New Brunswick, New Jersey, Rutgers Univ. Press. 418 pp. Cloth. $20.00—The similarity of the title to that of Herbert L. Stoddard's masterpiece of 1931 is most apparent. For two such volumes on a single species to have resulted from study in much the same region is probably unprecedented, and under the circumstances one must admire Rosene's courage and confidence in producing this publication. The book is organized into five major sections: Bobwhites Past and Present, Quail Habits and Requirements, Population Accounting, Improving Environment, and Dividends—Now and Later; these are presented in 19 chapters, followed by 35 pages of appendices. This organization reflects an acceptable attempt to present the Bobwhite and its management from the historical phase through the present, into the future. While the book is an authoritative document, its style of presentation will cause it to have its greatest appeal among nonbiologists. Its generally creditable presentation of facts results not only from the author's 20 or more years of study but also the work of others, which he has utilized extensively in the text.

Although the author critically reviewed much literature on the Bobwhite and faithfully document this, the emphasis in the book is on the southern United States where most of Rosene's quail studies took place. His opinions and philosophy are evident throughout the book, but they are most obvious in the last two chapters where quail hunting now and in the future is rationalized. His optimism for the future of the Bobwhite in the south can not be shared by most others elsewhere because land use trends continue to expedite a decline in quail numbers. Further, I am not encouraged that the "big business" of farming anywhere and the trend in mono-agriculture will allow for much effort in diversionary activities, such as the incorporation of quail management practices in the interest of a return from hunting fees. It seems apparent that if man's need for food and fiber increases, opportunities to manage even southern forests for other than maximum production of trees will diminish; hence what is good for quail may not be acceptable timber management practice. Probably the author's optimism for management reflects the current possibilities for large plantation interests and some company holdings; beyond this opportunity may be very limited.

There is wordiness throughout much of the book but this, plus the author's very personal treatment at selected points, will probably appeal to its general readership. References identified by number and listed at the end of each chapter rather than consolidated at the end of the book are disturbing, but this may reflect my personal bias. Generally the appendices could have been adapted for use in the main text. Some looseness is evident in the use of data and the incorporation of personal experience and philosophy. And the book is the unfortunate victim of a $20 price. However it is enjoyable reading, and I strongly recommend it to those interested in wildlife, especially to the quail hunter. The professional biologist will find it a useful reference.—W. D. KLIMSTRA.

The mystery of animal migration.—Matthieu Ricard. 1969. New York, Hill and Wang Publishers. Pp. xi + 209. (Translated from Ricard, 1968, Les Migrations Animales.) Cloth. $5.95.—This book provides a fairly concise, popularized account of animal migrations. The phylogenetic spectrum spanned by the book is broad, covering everything from locust invasions to blue whale migrations, from the schooling of tuna to the stampeding of bison. But the majority of the book is devoted

to the migrations of birds, and especially to descriptions of the routes and distances covered by different species.

The translator has done a commendable job and the book is eminently readable. Many tangential "tidbits" of natural history and physiology are woven into the book's framework. Ricard even keeps up with today's demands for "relevancy" by making strong pleas for man to curb his wanton destruction of wildlife and natural habitat.

Yet, for all its readability, the book is disappointing from a scientific standpoint. While the author is moderately up-to-date in his overall coverage, he is uncritical in his acceptance of all published material as being factual. As a result, certain segments of the book are exaggerated, while others are in error. Further, Ricard repeatedly falls into the ethological pitfall of the 1950s by "explaining" both the adaptive significance of migration and the navigational mechanisms employed as being part of a migration "instinct."

Where specific adaptive mechanisms are proposed, they leave much to be desired. For example, we are told that hundreds of thousands of lemmings "relentlessly" throw themselves into the ocean and that this "collective suicide" is a self-regulating mechanism by which harmony (with food supply) is once more restored" (p. 19). Similarly we are told that bird migation has evolved primarily *to be a source of mortality* (emphasis mine), thereby insuring that breeding populations and food resources are kept in balance. A specific example in which migration functions to remove the excess population is seen in the garden warbler, *Sylvia borin,* "which, having crossed the Sahara, does not stop in the rich parts of Angola but presses on further southward to the deserts of Namib where life is much more harsh." Reason: "if garden warblers remained in Angola they would soon multiply and become too abundant for the resources" (p. 193).

Statements of this sort that out-Wynne-Edwardize Wynne-Edwards are frustrating, to say the least. Further, the reader has no chance to check on Ricard's interpretations since specific references are never given. The sole exceptions occur in figure captions where the author and, occasionally, the year of a reference are given; however, no complete citation of these references is given anywhere in the book.

"The mystery of animal migration" must be evaluated in terms of its anticipated audience. For the interested high school student or the occasional birder, the book provides a stimulating account of an important aspect of animal behavior. For the serious ornithologist, it is lacking in scientific precision, up-to-dateness, and accuracy.—STEPHEN T. EMLEN.

Common birds.—Salim Ali and Laeeq Futehally. 1967. New Delhi, National Book Trust, India. Pp. x + 113, 97 col. pls., 8⅜ × 5¾ in. 15 rupees. Available from India Book House (NY) Ltd., 11 West 42nd Street, New York, New York 10036. Cloth, $7.50. Paper, $6.00.

Common Indian birds, a picture album.—Salim Ali and Laeeq Futehally. 1968. New Delhi, National Book Trust, India. Pp. iv + 2 + 51, 101 col. pls., 8⅜ × 11⅛ in. 15 rupees. Available from India Book House (NY) Ltd., 11 West 42nd Street, New York, New York 10036. Cloth, $8.50. Paper, $6.00.—"Common birds" is one of an encyclopaedic series titled "India—the land and the people," written by experts to be "easily understandable by the ordinary educated reader." The slim, slightly over pocket-size volume presents a selection of 102 species, each of which is illustrated in a half page color plate and discussed in about 300 words. The

aspects covered for each species include English, Latin and Hindi names, description emphasizing field diagnosis, habitat (but not range since most are widespread), habits, food, calls and breeding. Related species are discussed briefly (but not illustrated) approximately doubling the number of species covered.

Four short chapters precede the main body of the text. A four page introduction dwells tediously on classification. A history of Indian ornithology emphasizing exploration and museum study by systematists leads logically into a discussion of the need for study of the habits of living birds by birdwatchers. Short chapters on reproduction and migration contrast how much is known about the former and how much remains to be learned about the latter.

The species accounts are well-written and informative for the amateur but the text is of little use to the specialist because so many more detailed and comprehensive books on Indian birds are available, including several by the senior author. The illustrations are adequate for an identification book of this sort but, with the exception of some by J. P. Irani, which are aesthetically pleasing, they are amateurish.

All in all this is a worthwhile contribution to help Indians know and appreciate their common birds and to assist visiting amateurs during short birdwatching visits to the country. The price for the product seems steep for one spoiled by Golden and Peterson guide values.

"Common Indian birds, a picture album," presents in larger format, the same 97 plates plus four additional ones, an abridged, but still tedious classification introduction, and an approximate 60-word vignette on each species. Twenty of the species names are slightly to strongly altered from the earlier volume, and one, mislabeled "Common Swallow," is really a Red-rumped Swallow. Since the pictures were not the strong point of the smaller format book, they do not justify purchase of this album for the same (paper) or higher (cloth) price.—GEORGE E. WATSON.

ALSO RECEIVED

Wildlife management techniques.—Robert H. Giles (Ed.). 1969. Third Ed., revised. Wildlife Society. 526 pp., numerous figs., 8½ × 11¼ in. $10.00.—This work originated in 1960 as a text depicting techniques useful to wildlife biologists. It contains methodology for studying and managing populations of game animals. Many of the techniques described are directly applicable to nongame species and give the book broad usefulness. The second edition in 1963 established the precedent of including new and improved techniques as they became available. The Wildlife Society has continued this trend in the third edition. For example, the book now has sections on the latest in the use of computers, radioisotopes, radar, and radio-location telemetry in wildlife management. The result is an even bigger and better product than before. Future editions will undoubtedly continue this trend toward improvement and perhaps eventually achieve editor Giles' ambition: namely, that they will deal in depth with the management of man as a part of the total process of wildlife management.—M. L. M.

An extensive bibliography of falconry, eagles, hawks, falcons and other diurnal birds of prey. Part 2, hawks and miscellaneous; part 3, falcons and ospreys.—Richard R. Olendorff and Sharon E. Olendorff. 1970. Publ. by the senior author. Part 2, 79–168 pp; Part 3, 169–244 pp., each with 2 drawings, paper covers, stapled, offset printed, 8½ × 11 in. Available from the authors, Aggie Village 7-D, Fort Collins, Colorado 80521. $3.00 ea.—Part 1 has been noticed previously (Auk, 87: 371, 1969). These two parts complete the work, which was undertaken

at the authors' own expense. A valuable reference for the contemporary student of the birds of prey, this bibliography would be even more useful if foreign literature could have been better covered and if a subject index could have been included. As previously noted, some annotation of the references would also have been helpful. Perhaps a future addition (for which grant funds might be sought) can be constructed along these lines.—J. W. H.

Birds in western Colorado.—William A. Davis. 1969. No publ. data. 61 pp., 15 tables, 5½ × 8½ in. Available from the Historical Museum and Institute of Western Colorado, 4th and Ute, Grand Junction, Colorado 81501. Paper. $1.75.—The main body of this booklet is an annotated checklist. The 15 tables list bird species down the side and the months across the top. Therein, bars of varying thickness and dots indicate the occurrence and abundance of each species throughout the year. There are also descriptions of the general topography of the area, and a section entitled "Trips and Special Birds," that give details for visiting and birding in such places as Black Canyon of the Gunnison National Monument, The Grand Mesa, and De Beque Canyon, and directions for finding Black Swifts, ptarmigan, and many other forms.—J. W. H.

Birds in our lives.—Alfred Stefferud and Arnold L. Nelson (Ed.). 1970. New York, Arco Publ. Co., Inc. Pp. xiv + 447, illus. Library binding, $9.00; paperback, $5.95.—This is a reprint of parts of the excellent Fish and Wildlife Service publication of 1966 (not reviewed in Auk). To reduce the size of the volume by 114 pages Arco has left out the most pertinent and timely essay in the original government printing, Roland Clement's forceful "Mark what you leave," as well as fourteen other fine chapters. They have also carefully reprinted every error in the remainder—typographical and factual.

Putting out an abridged edition without marking it as such is misleading the public. Arco is asking just as much for their hardbound, chopped-up version as the federal government did for its complete publication. Although the paperback edition sells for one-third less, it is still no bargain. I suggest that anyone interested in owning "Birds in our lives" read my review in Bird-Banding (38: 167–169, 1967) and order an unmutilated version from the Superintendent of Documents, Washington, D. C.—ELIZABETH S. AUSTIN.

The best nature writing of Joseph Wood Krutch.—Joseph Wood Krutch. 1970. New York, William Morrow & Co., Inc. 384 pp., 11 black-and-white drawings by Lydia Rosier. $8.50.—Joseph Wood Krutch himself selected the 34 essays republished in this book. Stimulating and entertaining reading they leave one with the distinct feeling that man does not own the universe and may not be a part of it at all if he does not become more unselfish and less demanding. Mr. Krutch is a gifted essayist and gives one the impression of sound judgment and sensitive perception. I do wish he had told us how he decided which of his many essays were his "best" nature writing. I wonder if a panel of biologists and literary critics would have made the same choice?—ELIZABETH S. AUSTIN.