ORNITHOLOGICAL LITERATURE

THE BIRDS OF THE BAHAMAS. By P. G. C. Brudenell-Bruce. Taplinger, New York, 1975: 142 pp., 4 color and 9 black-and-white plates, 2 maps. $10.95.—The first thing that confronts a reviewer of this book is the title. Apparently the American publisher decided that a field guide to "The Birds of New Providence and the Bahama Islands," the title of the British edition, would sell better under the broader designation. Accordingly, although this book is printed in England and to all intents *is* the British edition (complete with British spellings), the dust jacket cover, end flaps, and title page of the "American edition" have been changed. Taplinger did not go to the expense of altering the title on the book spine (*under* the dust jacket, from a purchaser's viewpoint) or on the half title page; these still declare it to be "The Birds of New Providence and the Bahama Islands." And so it is.

A field guide to Bahamian birds has long been needed. The only other recent book on the subject is so poor as to be useless. Therefore, until the present guide appeared, one had to carry both North American and Bond's West Indies guides to identify birds seen in the Bahamas. Now one still has to carry a North American guide, but Brudenell-Bruce's book weighs less than Bond's and is limited to the Bahamian fauna. It includes all the species recorded in the Bahamas (206, plus 69 accidentals), but illustrates only 31 native land birds in color and another 61 species in black-and-white. The remaining 111 species are referenced by plate number to Peterson's eastern guide. Apparently by error, illustration references to 3 species are omitted; all 3 are available in Peterson.

The book focuses on the birds of New Providence both because that island is by far the best known ornithologically, and because the author could draw on his own experiences during the 4½ years he lived there. New Providence is a small island, with only 1.3% of the land area of the country. Nevertheless, it has over 60% of the human population, the capital city of Nassau, and a busy tourist trade. From the Bahamian point of view, Nassau/New Providence are of paramount importance—hence the custom of collectively calling all the other islands the "Out Islands" (or, more recently, the "Family Islands") even though they make up 98.7% of the total land area. The Bahamas contains approximately 17 major islands and some 700 smaller ones. Ornithologically, New Providence is both typical and atypical of the country. It is one of the 4 northern islands to contain pine forest. It also receives more rainfall than do the southern islands, and is not subject to the extreme drying effects of the southern trade winds. New Providence is by far the most disturbed island in the Bahamas, but it may also be the most diverse in terms of numbers of habitat types. It has more cleared land, flowering gardens, and large trees (other than pines) than do the others. Approximately 222 species of birds have been recorded there—with only an additional 53 known from all the rest of the country. Of the New Providence species, 40 are year-round residents, 9 are summer breeders, 70 are winter visitors, 71 are passage migrants only, and 32 have been listed as vagrants.

The text arrangement and nomenclature follow the AOU Check-list and Bond. Each species account begins with the English language name (occasionally supplemented with older, British, or local synonyms) and the scientific name. The body of most accounts is divided into: status (first on New Providence, then in the Out Islands); description and habits; voice; and nest. The thoroughness of each account is heavily influenced by Brudenell-Bruce's experience with the species. The treatment of birds he knows well is generally excellent, filled with useful, often new, information. If a species does not

occur on New Providence, however, it is too often given short shrift. For example, the interesting and rare endemics that are found only on other islands: the Cuban Parrot, *Amazona leucocephala bahamensis*, rates only 4 lines (and those partly inaccurate); the Black-cowled Oriole, *Icterus dominicensis northropi*, another 4 lines (vs. the New Providence passage migrant *Icterus galbula* with 14 lines); and the West Indian Red-bellied Woodpecker, *Melanerpes superciliaris* (3 endemic subspecies), only 6 lines. Even the national bird, the American Flamingo (*Phoenicopterus ruber*), is granted only 9 lines, heavily devoted to explaining that it can be seen on New Providence only in captivity. Thus the author not only skimps on Bahamian specialties, but also generally ignores the fact that many are conservation/protection problems. Of the endemics listed above, only the oriole is not a "Red Data Book" bird.

As Brudenell-Bruce has visited only 4 other islands for brief periods, most of the information on Out Islands species is drawn from the experience of others, notably from James Bond's writings and records obtained from C. Russell Mason. Granted that many of these islands are poorly known ornithologically, more information is available than the author found. Even in the references he used, he sometimes missed pertinent information. For instance, he states that the Bobwhite is not found in the Out Islands, yet Bond (at least as early as 1961) gives it as also introduced on Andros and Eleuthera. From personal experience I know it is doing well on Andros. The author curiously ignores Rock Doves (which I have seen at least on New Providence, Eleuthera, and Great Exuma), but he includes Starlings and House Sparrows as well as more exotic introductions such as White-bellied Doves (*Leptotila jamaicensis*) and 2 species of grassquit (*Tiaris*).

In a field guide it is never possible to cite references for all records, but I wonder on what authority the author suggests that the Northern Mockingbird (*Mimus polyglottos*) might not occur on Crooked Island (I saw it there in March 1976). The author's lack of experience outside New Providence also shows in some of his species descriptions. No one familiar with the *Melanerpes* in the field would italicize *red belly* as an important field mark. The upper border of the face mask on Bahama Yellowthroats (*Geothlypis rostrata*) is only lightly washed with yellow in some individuals, and is a poor field character. The wintering North American race of Yellow-throated Warbler (*Dendroica dominica*) is described (as having white underparts), but not the distinctive endemic race (with yellow underparts) on Grand Bahama and Abaco; nor is the reader aided by the black-and-white illustration.

The plates by Hermann Heinzel range from good to excellent. Some of the species that apparently were unfamiliar to the artist look a bit wooden, but most are good field guide renditions. I noticed, however, a few errors: for example, the *Melanerpes* woodpecker is far too white on the head and underparts; and the Bananaquit (*Coereba flaveola*) lacks its distinctive red mouth corners. Interestingly, the Bahama Yellowthroat male was painted with a gray-blue-white mask border, while the plate caption states it is "Distinguished from Common Yellowthroat by . . . yellowish upper border to mask . . .," and the Greater Antillean Bullfinch (*Loxigilla violacea*) plumages are marked ♂ and ♀ on the plate, but adult and immature (correct) in the caption.

This book clearly has drawbacks, especially as a guide to the Bahamas as a whole. Many of the descriptions are too brief, especially of birds that are not illustrated, absolutely requiring the supplementation of a North American guide. My main objection, however, lies with the too-brief accounts of many of the native species—the sort of material not easily found elsewhere and surely to be expected in a guide to a limited avifauna. Certainly the resulting book is slim enough that much more text could have been included.

On the positive side, the author has done a generally competent job on New Providence birds, and has included several useful features such as local common names, appendices with details of accidental records and song periods of 9 breeding species, and a good index. The book is well bound—my copy has had hard use in the field and is still in fine condition—especially for an English binding. But mostly this guide is, at last, a field book limited to Bahama birds—a relief after years of picking through Bond's guide which, excellent as it is, covers a much larger fauna.—MARY H. CLENCH.

ORNITHOLOGICAL GAZETTEER OF ECUADOR. By Raymond A. Paynter, Jr., and Melvin A. Traylor, Jr. Museum of Comparative Zoology, Cambridge, Mass. and Field Museum of Natural History, Chicago, Ill., 1977: viii + 151 pp., 2 maps, paperbound. $5.00. Order from Bird Dept., Mus. Comp. Zool., Harvard Univ., Cambridge, Mass. 02138 *or* Bird Division, Field Mus. Nat. Hist., Chicago, Ill. 60605.—This is the second in a series of gazetteers of Neotropical localities where birds have been collected or observed. With a few exceptions, the format of the first (Bolivia) gazetteer has been maintained (for review, see Wilson Bulletin 88:679–680, 1976). The bibliography of the Bolivian volume listed only publications cited in the text, but nevertheless amounted to what the authors had described as "virtually a complete bibliography of Bolivian ornithology." Paynter and Traylor, in their new volume, have tried to assemble "a complete list of all publications concerned primarily with Ecuadorian birds (exclusive of the Galápagos), not merely those that have been cited in the gazetteer." I need hardly say that this bibliography of 198 titles will be invaluable to workers on South American birds, and the authors are to be congratulated for their decision to augment the list of references cited.

Paynter and Traylor explain that preparation of a gazetteer for Ecuador was vastly more difficult than was true for Bolivia. The literature pertaining specifically to Bolivia is relatively small, and only a few museums have significant collections from that country. Ecuador, on the other hand, has a long and complicated history of ornithological exploration, much of it by professional collectors who sent birds by the tens of thousands to museums and private collections around the world. Label data from many of these specimens are inadequate or misleading. The authors' introduction goes into some detail as to specific problems encountered in trying to verify itineraries and localities.

An innovation is a second map (in addition to that showing major political subdivisions and rivers) of Ecuador on which all collecting sites (and a few observation sites) have been dotted—the only other information on the map is the 1000 meter contour. "This should help the zoogeographer to decide whether a gap in a distribution may be of biological significance or whether it may merely reflect the absence of collectors." The map certainly calls attention to those portions of Ecuador that have been relatively neglected, notably the Amazonian east and the northwest, in contrast to the heavily collected high Andes in the vicinity of Quito.

The authors have done such an important service to Neotropical ornithology that a reviewer must seem to be a cranky ingrate for wanting even more. Yet the gazetteer could have been substantially more complete and its accuracy improved had the authors followed the suggestion made in my earlier review, and circulated a preliminary copy among museums with major holdings in Ecuadorian birds. The amount of additional work that would have fallen on the shoulders of the authors themselves would have been minimal. For example, there are nine localities listed as "not located" that are cited only from publications of J. T. Zimmer of the American Museum of Natural History. During a visit to that museum, I was able to solve six of these problems in less than an

hour. As Paynter and Traylor suspected, some of these were typographical errors or were mistranscribed from labels by Zimmer: "Guapiles" and "Guapilo" for Guápulo, and "Lonambo" for Conambo, for example. "Río Yamisa," which they could not locate, is "Rio Yamasa" on the specimen label. This spelling is not in the gazetteer, but the label data also include the altitude, date, and collector's name, which might have helped to identify this locality. The authors were unable to find "Chitoque," a locality listed by Zimmer for *Tangara nigroviridis consobrina*. By looking up the cited specimen, I was able to determine from the label that Chitoque is or was on the Alamor-Guachanama trail, Prov. de Loja, at an altitude of 57 feet, and that the specimen had been taken by Cherrie and Gill on 13 September 1921. I have been assured by ornithologists at the American Museum that they would have been delighted to provide this kind of information had the authors so requested.

Carnegie Museum of Natural History has relatively few birds from Ecuador. Most of these were obtained by exchange from the Moore Laboratory of Zoology, Occidental College. In checking the collecting localities represented in our Moore material, I found ten that are not listed at all by Paynter and Traylor, and supplementary information (such as alternative spellings and extensions of collectors' itineraries) for 19 more. Although I have not discussed this with staff members of the Moore Laboratory, I have no doubt that they would have been happy to cooperate in this important project by consulting the itineraries and maps of Robert T. Moore that are housed at Occidental, thus filling in some significant gaps in the gazetteer.

The Bolivian and Ecuadorian gazetteers will be extremely valuable assets to the working libraries of students of Neotropical birds, as will, I am sure, additional volumes in this series. Again I urge the authors to take the time (I see no reason why there should be critical publication deadlines for works like these) to circulate copies of future manuscripts among those of us who might be in a position to help make the gazetteers even more nearly complete. Few ornithologists of my acquaintance would begrudge the time needed to assist such a worthwhile project in view of the tremendous effort already made by the authors.—KENNETH C. PARKES.

MAINTENANCE BEHAVIOR AND COMMUNICATION IN THE BROWN PELICAN. By Ralph W. Schreiber. Ornithological Monographs No. 22, 1977: 78 pp., 38 figures. $6.00 ($5.00 to A.O.U. members).—This highly detailed description of Brown Pelican colony behavior is the first full ethogram for any pelican, and will doubtlessly become the basis for comparison with other species in the family. Schreiber's presentation is well organized, thorough, and usually very clear. The rather scanty extant literature on other pelicans is integrated throughout.

A major drawback for anyone other than a pelican worker is that the monograph is boring to read. Few readers will care to plod through 34 pages of raw descriptions of comfort activities, and the "communication" half is not much more exciting. Schreiber's carefully worded descriptions of motor patterns are frequently interspersed with lengthy quotations from his own field notes, as if they were a special source that must be quoted verbatim. Only rarely is the reader's perserverance rewarded with an eyebrow-raising anecdote (for example, if a male pelican drops a stick while flying back to the nest he usually completes the elaborate Nest Material Presentation anyway). The monograph contains little quantification, mostly just the statement of how many times Schreiber observed a particular behavior in the field.

Considering that Schreiber has spent several years doing the field work (his diligence and care are apparent on every page), I was disappointed in the monograph on two counts. First I felt that Ornithological Monographs got stuck with the driest material from a very holistic field study. (Schreiber notes on page 1 that his data on nesting cycles, population fluctuations, age-class composition, reproductive success, and plumage characteristics will be published elsewhere. His data on chick growth patterns, feeding behavior, pesticides, and population history have already been published.) I wonder if the monograph series might not have rated something beyond raw ethological description. Secondly I felt that Schreiber could have posed some more fundamental (and interesting) evolutionary questions about the behavior he described. For example, he explains that Brown Pelicans have remarkably sluggish social lives. They use only 5 displays and generally keep things very simple. By contrast, many other colonial birds, some of which nested in the study colonies near the pelicans, have highly complex social interactions. *Why* are the pelicans so simple? How can they accomplish the many tasks of pair-formation and successful reproduction with only 5 signals? Schreiber is probably the only person in the world sufficiently knowledgeable about pelicans to intelligently ponder such matters and his speculations could have been provocative.

The paper begins with maintenance behavior (shaking, stretching, scratching, preening, bathing, locomotion, and thermoregulation) because some of these motor patterns have been modified by evolution as social signals. Then comes a brief transitional section on "Attack and Escape" before the concluding "Social Behavior." The generally lucid descriptions are profusely illustrated with 270 mediocre line drawings, including 30 of preening and 10 more of a comfort activity called "glottis exposure." Do we *need* 10 illustrations of "glottis exposure?" There are no photographs, though many of the drawings were derived from original photos and a few are even called "photos" in the text (p. 61).

The volume is reasonably free of editing errors though "flys" and "uropygeal" were found. Display names are capitalized in accordance with Moynihan's established convention and then the word *display* is redundantly tacked on (e.g., Bowing display). The caption for figure 25 is nonsensical. On page 36 an apparent error in paragraph organization implies that courting male pelicans may go as long as 3 weeks without food! (If this is not an error then it deserves considerably more explanation!) Elsewhere the description slips occasionally into vagueness (e.g., we are informed that the Upright is often maintained ". . . for some time"). One popular but unfortunate descriptive trick that Schreiber uses repeatedly is the concept of behavioral "intensity." This is a nonterm referring to variability in the broadest sense. We read about high- and low-intensity display performances, high- and low-intensity courtship activity, etc. In "high-intensity Bowing," for example, the pelican's head is held below foot level while in "low-intensity Bowing" the head is above foot level. There is also some suggestion that the bird is somehow more excited when it is involved in "high-intensity" behavior. Schreiber also uses the word in its general sense ("intense eye contact") which makes things even more confusing. It seems paradoxical that the concept of "intensity" should have such sustained popularity among ethologists who generally credit themselves with using only descriptive terminology. Schreiber could as easily have subdivided the variability observed in Bowing into "high-neck" and "low-neck" descriptive categories.

Perhaps a more crucial problem is that Schreiber frequently overstates his evidence. At times this could have been avoided by the editorial insertion of a qualifying adverb (e.g., "probably" or "apparently") that would have softened the sentence's tone. Elsewhere he seems to have overstepped the limits of scientific prudence, as in the following generalization: ". . . the subtle and highly variable differences in context in which the

displays are performed and received modifies these messages, and thus each encodes different precise probabilities of further action" (p. 72). This is an attractive working hypothesis—being the basic premise of W. John Smith's message-meaning approach—but it is not *fact*. Schreiber gives no evidence to support even the broadest outlines of the claim, much less to demonstrate "precise probabilities."

My last complaint concerns the widespread opinion that pair-formation in many monogamous species can be justly characterized as a "female-choice" system. Schreiber shares this view as shown by his statement that ". . . mate selection is accomplished by the female, who selects the male" (p. 37). It is true that in many colonial birds, including pelicans and herons, the males take fixed positions and display while females move about as if "shopping" among them. Outwardly it *looks* as if females do the choosing and the males are merely passive merchandise. The theoretical implication is that natural selection acts only on the females despite the fact that these males make enormous parental investments. Actually, of course, males are very choosy about their mates; a preference they show by driving away (or ignoring) any females they wish to reject. Schreiber's own observations confirm this view just 3 sentences after the female-choice statement: ". . . some females are not allowed on the perch, and frequently a female will be allowed onto the perch but then is kept off the nest site. In these cases pair bonding does not occur." As evolutionary theory would predict, both sexes choose carefully. The lengthy courtship is clearly a period of *mutual* assessment.

In conclusion I should like to stress the strengths of this paper because it does provide remarkably detailed information on Brown Pelican behavior. I expect Schreiber's collective works to become the starting place for an exciting comparative literature on the ecology and behavior of pelicans. His work may become to the Pelecanidae what Bryan Nelson's Gannet study was to the Sulidae. Its tedium does not detract from its value as a reference work, though it will probably not attract a wide readership.—DOUGLAS W. MOCK.

ALBERTA BIRDS, 1961–1970, WITH PARTICULAR REFERENCE TO MIGRATION. By Thomas S. Sadler and M. Timothy Myres. Occasional Paper No. 1, Provincial Museum of Alberta, Natural History Section, Edmonton, Alberta, Canada, 1976: 314 pp., 1 map. $3.25.—This work summarizes many bird observations by 225 observers in various parts of Alberta and taken from the published literature. Major justification for the book is to "provide basic data for subsequent analysis by . . . students of the migratory behaviour of particular groups of Alberta birds." The main part of the work is 233 pages of "species records and summaries, 1961–1970." Each entry begins with a brief summary of the decade's records on migration, distribution, breeding records and population status and trends. Records are then listed by year in a telegraphic style, with each entry prefaced by an alphabetical code identifying the kind of observation it is, i.e. spring arrival, peak numbers recorded in migration, and so on. The observations usually include the number of birds seen, date, locality, and the observer or source of the data.

Occasional comments show, for example, that the spring of 1967 was particularly harsh for migrants as indicated by the following observations: a Pygmy Owl was found "frozen to death in a blizzard" in April, the Tree Sparrow migration was "interrupted by a mid-April snow-storm" and in late April about 1000 Lapland Longspurs were seen "in the shelter of a barn during a snow-storm." Some observations are also of ecological interest as, for example, the observation of very high nesting densities of Short-eared Owl in the Calgary area in 1969 because of a high spring vole population.

Several short sections precede the species list. There is an Introduction, a tabulation of the bird highlights of the decade, and a brief section on birds and main weather events of the decade. The latter section and the Introduction are attributed to the junior author. There is also a section listing the place names mentioned in the text with references to a map of Alberta by which they can be located. Another section lists the dates of the Sundays in the decade, and finally a section explains the symbols used in the species accounts.

The contributors to the volume are listed immediately after the species accounts. Then follows a bibliography of 259 publications concerned with Alberta birds in the decade covered by the book. Separate indexes to scientific names and English common names conclude the work.

The book discusses 341 species. These include confirmation of the historic presence of the Passenger Pigeon in Alberta, the recent so-far-successful establishment of Wild Turkey, and a recent unsuccessful release of Chukar. Other first occurrences in the decade were Cattle Egret, Ruff, Black-necked Stilt, Band-tailed Pigeon, Yellow-billed Cuckoo, and Scarlet Tanager. Of more significance are changes in the status of some species, such as the continued decline of the White Pelican and the Peregrine, and the apparent decline of the Burrowing Owl. The Black-crowned Night Heron, Cinnamon Teal, White-breasted Nuthatch, and Yellow-headed Blackbird are regarded as increasing, while such species as the Cooper Hawk, Blue Jay, and Herring Gull are reported to be more widespread than previously.

Considering the authors' stated objectives this work is fairly successful. It does provide many records of arrivals, departures, flock sizes, breeding records, and distribution data. Students of Alberta bird populations will find this a very useful source of such information. However, I would have liked to see more analysis of the data, more effective presentation of climate data, and more discussion of the interactions of birds and climate. Had this been done the work would be a more important contribution than it is.

The book seems free of minor typographical errors, but there is a major problem with the indexes. The page references in the scientific and vernacular indexes are all incorrect although they agree with each other. The publishers should correct this error as soon as possible. The last four items in the Table of Contents are also incorrect.

I recommend this book to anyone interested in the birds of Western Canada. It may be purchased from: The Bookshop, Provincial Museum of Alberta, Edmonton, Alberta, Canada, T5N 0M6.—WILLIAM J. MAHER.

BIRD POPULATIONS OF ASPEN FORESTS IN WESTERN NORTH AMERICA. By J. A. Douglas Flack. Ornithological Monographs No. 19, 1976: viii + 97 pp. $7.50 ($6.00 to A.O.U. members). (Obtainable from Glen E. Woolfenden, Department of Biology, University of South Florida, Tampa, Florida 33620.)—Aspen forests in western North America constitute a physiognomically distinctive community, somewhat isolated from other broad-leaved vegetation types. In this important study the avifauna of this community is examined through the strip censusing of 41 plots, each in a homogeneous aspen forest. Two visits were made to each plot, the area censused in most cases being 12.5 acres. The stands censused fall into 2 regional groupings, western montane (27 plots) and prairie parkland at lower elevations in Canada. Aspen forests of the 2 regions, which are disjunct in Montana, differ in that summer nights in the parkland are warmer, and summer moisture greater, contributing to faster growth, greater incidence of diseases and shorter life spans

of the trees there. Undergrowth usually is more dense in the parkland forests which have experienced more disturbance in pre-settlement time. In contrast, the montane stands tend to be mixed in their age composition.

The population data are minimal but the relative values are used to probe significant ecological and evolutionary questions. Species composition and total numbers are considered in relation to many vegetational parameters that relate to the birds' habitat requirements. Such responses are analyzed further by the grouping of species into 5 nesting guilds to which species are assigned by the positions of their nests. This categorization points to regional differences in the representation of certain groupings, such as a paucity of cavity-dependent nesters in the parkland. Although there are fewer species and individuals in the montane stands, bird species diversity (Shannon-Wiener function) in both regions appears greater than expected on the basis of foliage profile features. Size, spacing and health of the trees emerge as other factors contributing to bird species diversity.

Species compositional differences between the two regions receive considerable attention. Twenty aspen-dwelling species are considered restrictedly montane, 24 occur only in the parkland and 24 are shared. The greater number of species in the parklands is attributed to the proximity of a larger pool of prospective colonizers of aspen stands in the eastern deciduous forests. Representation of species derived from that source decreases progressively southward in montane aspens. In the absence of 10 species found in such timber farther north, species diversity in aspen forests in Arizona is maintained by such characteristic conifer forest species as the Evening Grosbeak and Western Bluebird.

The last example points to a considerable contrast in the avifaunas of the 2 regions that is only partially borne out in a schematic summarization of "Geographic Replacement of Morphologically Similar Species" (Table 5). Here, species of minor occurrence (= frequency), such as the Western Tanager, are not distinguished from those that are widespread and/or numerous. In a succeeding table the species are ranked according to their importance regionally. Table 5 would have been more meaningful had the relative importance of the species included been denoted by size or boldness of type. The contrast between the avifaunas of the 2 regions is diminished further by the omission of other species (such as the Broad-winged Hawk, which lacks a counterpart in montane aspen).

With reference to ecological equivalence, I question the author's view (p. 64) that the more rigorous montane climate does not limit species composition. Several western forms equivalent to or conspecific with parkland inhabitants appear confined to levels below the aspen belt in the central Rocky Mountains (Bullock's Oriole, Gray Catbird) or they reach greatest abundance at lower elevations (Brown-headed Cowbird). The role of the elevational difference is conceded indirectly by Flack in his discussion of foothill aspen stands in Alberta as being faunistically and climatically intermediate (p. 77).

The topics discussed above demonstrate the emphasis placed upon historical factors, many of which (e.g., routes of colonization) are elusive. Ecological questions, however, receive at least equal attention. Attempts are made to explain abundance or absences on the basis of vegetational features, and the question of saturation in this community is weighed carefully.

The success of Flack's study derives from the application of relative abundance values based upon standard censuses by one investigator to comparisons of broad geographic scope, and from a thorough integration of his findings with a diverse literature. Many of the questions raised, such as fluctuations in populations of widely distributed species, can be answered only by long-term studies that should be undertaken by resident naturalists.

The reader's task would have been aided by the provision of a map showing the extent

of the parkland in relation to other vegetation types. Membership in the seven somewhat subsidiary foraging guilds might have been coded in the nesting guild lists. The few proofreading lapses (even "Red-bellied Sapsucker") do not hinder the reader's understanding. However, these criticisms detract but little from an informative and thought-provoking monograph.—KEITH L. DIXON.

WATCHING BIRDS. By Roger F. Pasquier. Houghton-Mifflin Co., Boston, 1977: 301 pp., 100+ black and white drawings by Margaret La Farge. $10.00.—"*Watching Birds* is . . . intended to unite the bird watcher's perception of specific details with the environmentalist's awareness of general truths" (p. viii). This handsome elementary ornithology book is dedicated to the amateur birdwatcher who wishes to advance beyond the mere "life list" stage of his hobby and expand his understanding of most aspects of bird biology, including the relationships of birds to each other and to their environment. Any non-professional ornithologist could profit from reading this book, which is mercifully free of jargon and which sticks to basic facts about birds. This volume would serve as a high school ornithology text, or for a reference to supplement the library of a bird aficionado. Chapters cover such aspects of avian biology as Origin, Evolution and Speciation (Chap. 3), various aspects of anatomy and locomotion (Chaps. 4 and 6), Behavior (Chaps. 5, 7, 8, 10, 11), and Zoogeography (Chaps. 10 and 12). Also included are discussions on conservation, general birdwatching, and an overview of current progress in ornithology (Chaps. 1, 13, 14, 15).

By and large the text is quite enjoyable and complete. Occasionally, some statements smack of dogma (e.g. "In every case the individuals that are going to survive and reproduce will be those best adapted to their niche . . ." p. 27), and the discussion of speciation (p. 28) is superficial. But there is little sense in cluttering up a very basic and readable text with current and sometimes confusing problem areas of biology.

Mr. Pasquier has a feel for birds, and his text imparts this delight of the subject matter to the reader. Reading it could mark a turning point in the life of those birders whose major thrill is hunting down and checking off a new trophy on their lists. New observations of behavior of familiar species can be as exciting as, and certainly more enlightening than, the hunt involving pad and pencil.

The illustrations by Margaret La Farge are superb, both scientifically and aesthetically. They are well chosen and delightful. Both the author and artist would likely agree with Thoreau who said, "The wood thrush is a more modern philosopher than Plato and Aristotle. They are now dogma, but he preaches the doctrine of this hour." Their book reflects such thinking and I recommend it to anyone who loves birdwatching, and, more importantly, birds.—MICHAEL A. MARES.

A GUIDE TO BIRD FINDING EAST OF THE MISSISSIPPI, Second Edition. By Olin Sewall Pettingill, Jr., illus. by George Miksch Sutton. Oxford University Press, New York, 1977: xxvii + 689 pp. $15.95.—The standard guide to finding birds in the eastern United States has been revised to take into account changes in distribution, changes in habitat, and to provide new travel directions resulting from an expanded road network, especially the interstate highway system. For each of the 26 eastern states the major birding localities are listed, and for each there are instructions for reaching it, a brief description of the

habitats, and comments on the kinds of birds to be found there at various times of the year.—R.J.R.

SUMMER BIRDS OF THE SAN JUAN VALLEY, NEW MEXICO. By Carl Gregory Schmitt. New Mexico Ornithological Society Publication No. 4, 1976: 22 pp., no price given.—An annotated list of about 147 species observed during the summers of 1971 and 1972, with comments on numbers, breeding status, and habitats.—R.J.R.

PLUVIANELLUS SOCIALIS: BIOLOGY, ECOLOGY AND RELATIONSHIPS OF AN ENIGMATIC PATAGONIAN SHOREBIRD. By Joseph R. Jehl, Jr. Trans. San Diego Soc. Nat. Hist., 18 (3): 25–74, 1975. 28 figs., 3 tables.—In recent years there have been a number of studies on the ecology and behavior of shorebirds, many dealing with social organization. However, a clear picture of the evolution of social systems within a group is only possible once the behavior, ecology, and taxonomy of many species is described. Although not complete, such baseline information exists for shorebirds and the task at hand is to add basic information on key species. *Pluvianellus socialis* is such a species and Jehl has provided an excellent description of its behavior and ecology. This paper concerns such topics as habitat and distribution, vocalizations, pre-nesting and nesting behavior, growth and care of the young, foraging and feeding behavior, molts and plumages, and systematic relationships.

Jehl studied *Pluvianellus* on its wintering grounds in 1971 and 1972 and on its breeding grounds in 1973. The total population, which may not exceed 1000 individuals, breeds along lakes from the Rio Grande (Tierra del Fuego) north along the southeastern coast of Patagonia to Puerto Deseado. It winters along the coast from the Strait of Magellan to the Valdes Peninsula. *Pluvianellus* has been considered a plover, but Jehl, whose knowledge of shorebird taxonomy is considerable, suggests from his observations that "its relationships are far less obvious."

Pluvianellus returns to the breeding grounds in early September and begins breeding up to several weeks before other Fuegian shorebirds. The chicks hatch before most North American migrants arrive. The birds nest on the shores of shallow ponds, lagoons, and lakes in the steppe region of northern Tierra del Fuego and southern Patagonia. They nest along brackish and fresh water lakes, but not along streams, rivers, or the ocean. Obvious requisites are beaches of intermixed small stones and mud with adjacent stretches of open shoreline. The number of pairs at a lake was limited by the amount of suitable habitat and the presence of other shorebirds, but not by the size of the lake.

Due to the arrival time of the investigator, information on pair formation and territory acquisition are omitted. However, renesting by one pair allowed Jehl to describe this phase qualitatively. *Pluvianellus* defends linear territories of 300 to 500 m along the shoreline. The complicated territorial defense displays, described with diagrams and photographs, involve the members of a pair acting as a unit as is typical of oystercatchers and plovers. Territorial clashes increase in frequency and intensity as the chicks become more mobile. Although Jehl's descriptions of these clashes provide an excellent qualitative picture of the behaviors involved, quantitative data are necessarily lacking on daily and seasonal variations since the rarity of the species in general, and the small number of pairs on any one lake make it difficult to quantify the behavior described.

Nests, located 0.7 to 25 m from water in fully exposed situations, were excavated by digging and lined with small bits of gravel. *Pluvianellus* lays 2 eggs, but only one chick

is actually raised. Egg laying occurred from 4 September to 17 November. Both sexes incubate. Jehl observed no exchange displays and no distraction displays by adults incubating or caring for chicks.

Jehl notes that the young chicks are less agile than plover or sandpiper chicks of the same age. The 2 eggs hatch 8–14 h apart, and the chicks leave the nest the day after hatching. The slight age difference results in the success of only the older chick; the 5 families over 3 days of age observed by Jehl included only 1 chick. Both sexes feed the young by regurgitation as well as with food carried in the bill. Parental feeding is "extremely unusual in the Charadrii, and the use of the crop to regurgitate differentiates it from all other shorebirds." Chicks obtain all their food from their parents for the first 2 weeks, then begin to forage for themselves. During this dependency period chicks remain concealed and depend on their coloration for protection. Jehl concludes from the growth pattern that *Pluvianellus* chicks fledge at a much higher weight than that of similarly sized shorebirds that forage for their own food.

Pluvianellus' foraging and feeding behavior parallels that of turnstones. It is apparently the only Charadriiform bird that digs for food.

Wintering behavior is also described. The species' winter requirements are intertidal rocky areas and debris covered sandy beaches on which to feed. The species is uncommon and irregularly distributed along the Patagonian coast. In contrast to its breeding season behavior, the species avoided the water's edge in winter and fed in flocks with other shorebirds.

The concluding section on systematic relationships lists the aspects of *Pluvianellus*' morphology and behavior that differ from the usual plover condition: turnstone-like body, short stout legs and blunt claws, foraging pattern which includes digging, territorial defense behavior involving the pair acting as a unit, complex pre-copulatory and scrape displays, courtship feeding, small eggs, clutch size of 2, rearing of only 1 chick, absence of distraction displays, semi-precocial chicks, slow chick growth, prolonged dependence of chicks, unique natal down color, parental feeding of chick, and apparent dove-like drinking behavior. After an excellent discussion of the problem, Jehl concludes that the species should be in a new monotypic family Pluvianellidae.

In general, the problem is clearly defined, the paper is succinctly written, and the diagrams and photographs are clear and contribute to the descriptions. This first detailed study on *Pluvianellus* provides excellent descriptive data on breeding and nonbreeding behavior so necessary for the comparative approach to shorebird behavior.—JOANNA BURGER.

BIRDS OF THE ANTARCTIC AND SUB-ANTARCTIC. By George E. Watson, in collaboration with J. Phillip Angle and Peter C. Harper, illus. by Bob Hines. American Geophysical Union, Washington, D.C., 1975: 350 pp., 11 color plates, 55 black-and-white illustrations, 51 range maps, 11 numbered text figures, 7 tables, hardbound. $15.00.—This is the most unusual book review that I have written, because long before the book's release, I was asked by George A. Llano of the National Science Foundation to field test the original manuscript in the Weddell Sea off Antarctica. In late December of 1972 I boarded the Coast Guard Icebreaker *USCGC Glacier* at the American base McMurdo by the Ross Sea. The voyage that followed took a course nearly 180 degrees around the Antarctic continent, including a northward thrust to southern South America and a southward one that penetrated pack ice deep within the Weddell Sea. My travelling companion was S. D. MacDonald of the National Museum of Canada. He was especially

valuable to the project because of his keen eyes and exceptional ability at identifying objects far off.

MacDonald and I are experienced birders, and have often worked as a team in the High Arctic, but we were totally inexperienced at identifying southern sea birds. Up to the time the *Glacier* broke free of the pack ice in the Ross Sea and entered the open ocean, neither of us had seen an albatross or the many petrels and storm-petrels that cover these southern waters. We were truly in a good position to test Watson's descriptions and Bob Hines' illustrations.

Many people have had important input in the production of the handbook. Foremost among these was George Llano, who thought not only in terms of a handbook of birds to serve the growing number of people visiting far southern places, but of a series of handbooks covering various biological disciplines for these areas. With the financial backing of the National Science Foundation and continued assistance by Llano, the handbook on birds became a reality. The selection of George Watson as author was a very good choice. He, J. Phillip Angle and others had earlier finished an important scientific work entitled "Birds of the Antarctic and Subantarctic," edited by Vivian Bushnell and published in 1971 by the American Geographical Society as Antarctic Map Folio Series 14. No doubt this work formed the skeletal structure of the present handbook.

At the beginning of our voyage, MacDonald and I experienced difficulty in identifying southern sea birds, especially prions and immature albatrosses, but by and large things went well. The manuscript and illustrations were indispensable, really a tremendous aid, and there is no question in our minds that we would have been severely handicapped without them. We caught some inconsistencies, a few errors or oversights, and pointed out a number of troublesome areas dealing mostly with at-sea identifications. Hopefully, our efforts produced a better handbook.

As good as the text and illustrations are, there still remain shortcomings that only too soon became apparent to the user. There is to my knowledge no easy method for separating at a distance Antarctic Terns in first-year plumage from either young or old Arctic Terns in winter plumage, especially in areas where both species occur. This point really struck home as I recently observed a number of experienced birders aboard the *Lindblad Explorer* chalk up Arctic Terns when in fact they were seeing immature Antarctic Terns. I knew this to be the case for I had learned by experience that immature Antarctic Terns often associate with adults at or near the breeding colonies, as were the birds observed by the *Lindblad* birders.

The void between research and publication is always a hopeless matter. Months before publication of the handbook we had new information on terns and skuas that should have been included, but there is no stopping the publication machinery once set in motion. How I wanted to tell artist Bob Hines not to use large pupils in the eyes of his penguins, for even in fairly poor light the pupils of most penguins seen by us appeared as pinpoints, giving the penguin its colorful but blank, pupilless appearing eye.

Be as it may, the handbook contains a wealth of useful information. Included in this durable pocket-size book, in addition to species descriptions and much life history information, are accounts of the geography and environments of the southern lands and seas, including climate, vegetation, record taking, preserving and shipping specimens, conservation, and specially protected areas. The distribution maps and tables are very useful. The references are extensive and the index complete. All these many facets, really an amazing assemblage of material for a small size book, are logically arranged and written in a clear, succinct manner.

The black-and-white illustrations play their role well, but it is the color plates that one will return to time and again throughout one's voyage. Composites showing many birds in flight are a difficult, dreary proposition for any artist. Bob Hines is to be congratulated for pulling it off as well as he has, for his was an especially tough assignment with so many birds with similar shapes and colors.

Perhaps the most pertinent question that can be asked of a work of this kind is, "who will be able to use it effectively?" On this point there is little doubt that almost any experienced birder, professional or non-professional, will be able to do so. For the inexperienced person it may be a different matter. From the start it was hoped that the handbook could be used effectively by non-birders, even highly trained scientists, in making records during voyages when an ornithologist or bird watcher was not present. But a good friend, an expert on invertebrates, confided that it took more than the handbook to enable her to identify sea birds accurately. She discussed the need for large, highly demonstrative illustrations (preferably color *plus* black/white prints *plus* line drawings and written descriptions) of each species in different conformations, which could be mounted (for instant comparison) on the bridge and the pilot house. If such identification sheets were available to relevent ships' personnel, perhaps more realistic bird censuses could be taken. This is a big order to be sure. Maybe for these special cases the only solution is a short course in bird watching along with the handbook. But whether best for the experienced or inexperienced, the handbook nevertheless is indispensable for anyone contemplating observations of far southern birds at land or at sea.—David F. Parmelee.

Penguins, Past and Present, Here and There. By George Gaylord Simpson. Yale Univ. Press, New Haven and London, 1976: xii + 150 pp., 10 color and 24 black-and-white photographs, 9 maps. $10.00.—In 1933, George Simpson and his party made a collection of fossil mammals in Patagonia and incidentally accumulated the best collection of fossil penguin bones of its time. Unable to find an ornithologist willing to study the collection, Simpson took up the cudgel himself and published his well-known monograph on fossil penguins in 1946. Since then he has continued his studies of fossils and has seen most of the living species in the wild as well. His infatuation with penguins inspired him to write this book "for adults who do not necessarily know much about penguins but for whom there is nothing that they do not really want to know." With such readership an author is presumed relieved of the necessity of commanding attention by irresistible prose.

The first chapter on the earliest accounts of penguins is nevertheless sprightly and almost irresistible. The next chapter on naming penguins begins in the same vein but it becomes more pedantic and ends with a discussion of each species' scientific name. Subsequent chapters continue as competent accounts of general features of penguin biology, fossil penguins, distribution and speciation of extant penguins, breeding behavior and ecology, and exploitation of penguins by man. Except for occasional light touches, however, this major portion of the book is likely to lose readers who want more than just facts. Unfortunately, neither the black-and-white, nor the color photographs are exceptional, and the distribution maps are sometimes difficult to interpret.

Dr. Simpson's book provides broad coverage of penguins for the layman. It falls short of Pettingill's "Another Penguin Summer," however, in presenting "the singular charm of penguins."—Richard L. Zusi.

PARENT BIRDS AND THEIR YOUNG. By Alexander F. Skutch. Univ. of Texas Press, Austin, 1976: xviii + 503 pp., 116 plates, 18 tables, 19 figs. $27.50.—In this large volume, Skutch presents his synthesis of the reproductive activities of birds and the characteristics of young birds, bringing together a wealth of useful facts and his evolutionary interpretations of the major patterns. The facts are drawn from over 40 years of painstaking observations in the New World Tropics and from an extensive literature survey.

The text is divided into 34 chapters, each covering one topic. These are arranged as follows: pair formation and mating systems (3 chapters), territoriality (1), timing of nesting (2), nest form, materials, construction, and maintenance (4), egg size and color (1), incubation patterns (5), hatching process (1), developmental state at hatching (1), parental care of nestlings (4), nestling interactions (1), fledging, care and education of fledglings (4), inter- and intraspecific helpers (2), nests as dormitories (1), concealment and direct defense of the nest (2), reproductive rate and its regulation (2).

Skutch set himself the formidable task of preparing a comprehensive, yet detailed, treatment of reproduction to satisfy the amateur naturalist as well as the professional investigator. He has succeeded rather well, largely because his mastery of the written language makes for an eminently lucid style, readable by most laymen, and because the examples discussed are interesting. Some of my favorite sections are the accounts of manakin behavior on the lek, megapode habits, procedures whereby non-incubating males learn that their offspring have hatched and require feeding, and birds feeding nestlings of other species. For the investigator, the book will be valuable chiefly for the sheer mass of facts arranged for easy comparison among birds, and for the 18 tables. These include data on age at first breeding, nesting periodicity of seabirds, incubation patterns and duration, feeding rates, nesting success, and clutch size. The figures are well chosen to illustrate points in the text (except that I could find no text reference to fig. 19). The 116 black-and-white photographs are of generally good quality and appropriate to the discussion at hand, but many could have been omitted. In the text, species are identified by common name and alternate common names and scientific names are given in the index at the end of the book. Common names do not always follow American use, e.g. Common Bluebird for *Sialia sialis*.

The text is nearly error-free; I found only 2 typographical errors and 1 factual mistake (using a linear instead of a logarithmic model to calculate daily rates of nest loss from overall nest mortality). Nevertheless, the objective scientist may find fault with some of the concepts expressed, as that "birds often sing from pure ebullience or joyousness . . . and females sitting in the nest sometimes hum little ditties expressive of contentment" (p. 336), and that "those (birds) that maintain their population with the smallest reproductive effort, are the truly efficient species. They enjoy the longest, and doubtless most satisfying, lives" (p. 376). It must be pointed out that many of Skutch's evolutionary interpretations do not jibe with currently accepted views on the nature of natural selection. In particular, Skutch fails to provide a plausible selective mechanism when he argues that because species in stable environments produce only enough young to replace annual losses, despite being able to feed additional offspring, they are limiting their reproductive rate to avoid depleting their resources.

In summary, in spite of some questionable interpretations, *Parent Birds and Their Young* is easy to read, well-organized and factual, and, especially for the amateur, may serve to alert observers to phenomena worth recording.—SUSAN C. WHITE-SCHULER.

BIRD SOUNDS. By Gerhard A. Thielcke. University of Michigan Press, Ann Arbor, 1976: 190 pp. (First Published as *Vogelstimmen*, Springer-Verlag, 1970.) $2.95 (paper), $6.95 (cloth).—This book, written in semi-popular style, begins with a chapter on methods of analysis of avian acoustic signals, comparing the oscilloscope and the sound spectrograph as research tools. Thereafter are chapters on vocal versus mechanical sounds, neuroanatomical studies, functions of calls vs. songs, ontogeny of vocalizations, vocalizations and speciation, evolution of sounds, annual and diurnal cycles, and finally bird sounds and music.

The translator has retained the German word "strophe" throughout the text, but the term appears to have two different meanings. On page 3 it is stated that: "Several strophes are called a song." Presumably then, "strophe" is equivalent to the term "phrase" of other investigators. Thereafter, however, strophe appears to signify "song types" or "themes," e.g. when discussing songs of Marsh Tits and treecreepers (pp. 35 and 36). Breeding season (Brutperiode) is referred to as "brooding period" throughout. "Clutch" (Gelege) was translated as "egg-lay" (p. 69), and "altricial" appears as "insessorial" (p. 65). "Sibling species" appears as "twin species" (p. 137) and "domestic cockerels" (pp. 164 and 165) has become "turkey cockerels." But these are not serious; all-in-all the translator has done an excellent job.

The author states (p. 96) that: "The ability to learn song begins around the thirtieth day of life in song birds." This is contradicted on p. 115 in which he informs us that White-crowned Sparrows, captured at 30 days of age and then isolated, sang their home dialect the following spring. Marler has refined these data further (J. Comp. Physiol. Psychol., Mongr. 71(2), 1970).

In the chapter on sound-production (p. 26) the author informs us that the interplay of sound-production and breathing is an unsolved problem, and that surely birds must inhale and exhale as they sing. Recent attempts to tackle this question have been summarized by Gaunt et al. (Condor 78:208–223, 1976). In the section on antiphonal singing, the author asks (p. 45) whether or not duetting is correlated with pair-contact in dense vegetation or with nocturnality when pairs are visually separated. Recent surveys by Payne (Ostrich Suppl. 9:125–146, 1971) and Kunkel (Z. Tierpsychol. 34:265–307, 1974) indicate that duetting is most often found in birds with long-term pair bonds, and not necessarily in areas of poor visibility. Indeed, Kunkel points out that duetting is often associated with elaborate visual displays during which singing pairs are very close to each other.

The author also asks (p. 117) how a new dialect can come to exist. Several authors have tried to provide answers to this. Field studies (Payne, Ornithol. Monogr. 11, 1973; Lemon, Condor 77:385–406, 1975; Baptista, Univ. Calif. Publ. Zool. 105:1–52, 1975) on song variation in natural populations indicate that song learning is an imperfect process. Due either to copy errors, or in Lemon's view, and improvisational process that he calls "drift," new themes or variants of existing themes continue to emerge. Given geographical isolation, oral tradition, the accumulation of copy errors (or Lemon's "drift"), new dialects may eventually devolop.

The chapter on "sound parasitism" (pp. 155–159) summarizes Nicolai's studies on viduine brood parasitism on estrildid finches, in which he suggested that each viduine parasitizes and mimics songs of only one host. Payne (Auk 93:25–38, 1976) has cautioned that the one-host-one-parasite theory is good in only some parts of Africa. In other areas (e.g. in West Africa) one viduine form may mimic as many as four different firefinch hosts.

My comments are not meant as criticisms of the author's work, but merely indicate the popularity of the field and the speed at which new data are being accumulated. The author has brought together a fine review of the field up to 1970. Especially notable are his chapters on functions of calls, functions of songs, evolution of species, and evolution of sounds, in which he summarizes many important studies from the German literature. The latter include his own extensive work on geographical variation and ontogeny of vocalizations, and playback experiments with treecreepers (*Certhia* spp.), tits (*Parus* spp.) and other species that will, I am sure, stimulate others to exciting research. "Bird Sounds" is definitely a *must* for students of ethology, systematics, and avian bioacoustics. The price is right to boot!—Luis F. Baptista.

Song Dialects and Demes in Sedentary Populations of the White-Crowned Sparrow (*Zonotrichia leucophrys nuttalli*). By Luis F. Baptista. University of California Publications in Zoology, Vol. 105. University of California Press, Berkeley, Los Angeles and London, 1975: 52 pp., 25 plates. $4.00—In his introduction Baptista speaks of the White-crowned Sparrow as the white rat of the ornithological world. Certainly insofar as vocalizations are concerned it is among the most thoroughly studied of all birds, providing some of the most complete documentation now available on song variation within and among wild populations. The work described here extends and amplifies previous studies by Marler and Tamura (Condor 64:368–377, 1962; Science 146:1483–1486, 1964) as well as previously reported studies by Baptista himself (Z. Tierpsychol. 34:147–171, 1974).

As a basic framework for his investigation, Baptista asks the following questions: (1) does gene flow occur between demes, as indicated by song characteristics?; (2) what occurs in contact zones between neighboring demes?; (3) what barriers exist between populations?; (4) how large is a dialect group?; and (5) what are the effects of visiting migrants on the songs of local populations? The study included various localities in the San Francisco Bay area and extended from April 1968 through July 1971. Based on an analysis of over 2400 song spectrograms of over 400 birds it was found that there is not one single song theme in each area, but rather a dominant motif or "dialect" with a number of minor variations in song.

Song variants were not found randomly dispersed throughout the populations, but were clumped, forming a number of subdialect areas within each dialect region. Although most individuals sang only one theme each, a few sang from two to four. Some birds were apparently "misimprinted" with songs sung by wintering migrants belonging to the subspecies *pugetensis*.

Dialect or "theme" areas varied in size from the rather small Brooks Island and adjacent mainland to the much larger Berkeley area. Some populations were separated by ecological barriers, and their song themes thus developed in isolation. Others seem to be separated only by distance. The mosaic distribution of subdialect groups and dialects in a continuum points to a population structure of genetically semi-isolated neighborhoods. Between contiguous dialect areas Baptista found a narrow mixed zone of song themes. Many individuals within this zone maintain their separate and distinct dialect forms, while some sing a mixture of the 2 in a repertoire of more than one song pattern, or a single song containing elements of the two separate dialects.

Most of the publication is taken up by the description of song characteristics of the various San Francisco Bay area populations sampled, and therein lies its main strength. The remarkably thorough documentation of song characteristics of the birds throughout

this topographically and ecologically complex area provides the basic data upon which to begin to understand the distribution and dynamics of song dialects. The amount of work involved in the analysis of the recording is enormous, although Baptista does not mention it.

Perhaps the greatest weakness in the paper is the author's failure to nail down solidly the answers to the questions he asked at the beginning. Most of them are answered, more or less, but some, such as question number 4, are left pretty much up to the reader to figure out for himself. There are some grammatical and spelling lapses that indicate a lack of thorough editing. On the whole, however, this publication provides a remarkable record of song variation within and between adjacent populations of the White-crowned Sparrow (*Zonotricha leucophrys nuttalli*), and is a very important contribution to the literature on song dialects.—WILLIAM L. THOMPSON.

SOCIAL ORGANIZATION AND BEHAVIOR OF THE ACORN WOODPECKER IN CENTRAL COASTAL CALIFORNIA. By Michael H. MacRoberts and Barbara R. MacRoberts. Ornithological Monographs No. 21, American Ornithologists Union, 1976: viii + 115 pp., 39 figs., 13 tables. $7.50.—The Acorn Woodpecker (*Melanerpes formicivorus*) is a fascinating species because of its unusual social system. At least in California, the birds live in permanent groups of up to 12 or more individuals of both sexes and all ages. In the fall the groups communally harvest, store and defend caches of acorns, which are their major food. In spring the colonies breed as units, with most or all members helping to incubate and feed 1 or (rarely) 2 broods of young. These facts about Acorn Woodpecker natural history were discovered long ago, but no comprehensive studies were undertaken using marked birds to determine such important aspects as the genealogical relationships among group members, the amount of movement between groups, or even who lays eggs fertilized by whom. With the current flurry of interest in group and kin selection, and "sociobiology" in general, it is not surprising that several such studies are now in various stages of completion. This is the first to reach publication.

The study was conducted at The Hastings Natural History Reservation above the Carmel Valley in California. This is prime Acorn Woodpecker habitat because of the abundance and diversity of oaks present (6 species and 5 hybrids grow on the reservation). Most of the fieldwork was carried out between October, 1971, and August, 1974; 149 birds were individually color-banded and 60 groups were studied, 32 intensively enough to appear in an appendix describing their individual histories. Extensive observations were made from blinds. The authors did not include a methods section and we do not know exactly how many hours of observation were involved. Also, no mention is made of techniques for capturing birds. This is unfortunate, since Acorn Woodpeckers are notoriously elusive and anyone who captures 149 of them has learned something useful.

The monograph is well-written and a pleasure to read. Following introductory remarks and a description of habitats occupied, the MacRoberts' discuss the all-important topic of group composition. They found that group size varied from 2 to 15, with a mean between 5 and 6; all groups had both male and female members, and sex ratios were about equal. Most recruitment to groups was by reproduction, although 9 individuals, mostly adults, were observed to move from one known group to another; some 87 birds disappeared during the course of the study, unknown proportions dying or moving off the reservation. The MacRoberts' write in their summary (p. 82) that "the Acorn Woodpecker is a sedentary species," and that "each group maintains a year-round, all-purpose territory." This picture of extreme stability appears true only to a degree. For

example, of the 32 groups discussed in detail in an appendix, 19 either appeared on the reservation from unknown areas, left the reservation for unknown areas, or made documented moves on the reservation during the study. In some cases these moves were attributable to acorn crop failures.

Acorn Woodpeckers, acting as groups, vigorously defend their territories against intra- and interspecific intruders. In a species that caches immense quantities of food, the defense of that food supply becomes a major operation. The MacRoberts' were fortunate to be able to document several inter-group conflicts that resulted in complete or partial displacement of one colony by another. In no cases did smaller groups displace larger ones. There also is a highly significant figure showing a strong positive correlation between group size and territory size. These observations suggest that one reason for the evolution of group living in this species may be the advantages gained in defense of food resources.

The reproductive effort of Acorn Woodpeckers at the Hastings Reservation was very low—between 0.2 and 0.3 young per adult per year. Many groups failed to breed at all in any given year. The MacRoberts' were unable to explain this phenomenon, although it seems perhaps consistent with a strongly K-selected life history strategy. Indeed, the authors note that Acorn Woodpeckers on their study area live at high, relatively stable population densities. In most years food supplies are good and populations remain at or near carrying capacity. Young stay with their groups, presumably because there is no place for them to go and because there is little or no chance for them to breed on their own. Even though groups may move, they appear to do so as intact units.

In this environment, and if the colonies are made up of related individuals, K and kin selection will be powerful forces shaping the social system of the species. It may not be that simple. One would predict that small groups might breed more than large ones, since recruitment would be both possible (more "room" for additional birds) and advantageous (more efficient defense of territories). However, the MacRoberts' data show, if anything, that it was the small groups that more often failed to breed. As the authors observe (p. 71), "the exact genetic relationship among group members was not known in most cases." Their data suggest that most recruitment to groups occurs via reproduction, but in order to say anything conclusive about kin selection or group selection it would be necessary to learn what happened to those 87 individuals that disappeared during the course of the study.

The social behavior of Acorn Woodpeckers appears very complex, and is not fully described in this study. There is a long appendix on visual and vocal displays, with high-quality audiospectrograms. The vocal repertoire is large and the function of many calls remains unclear because of the variety of situations in which they occur. The Acorn Woodpecker almost certainly evolved from a non-social melanerpine relative, but the MacRoberts' make no attempt to compare the displays and vocalizations of their species with those of close relatives. This should be done, because it could provide an excellent example of the ways in which display behaviors evolve to fit a new social system. The authors found that dominance hierarchies exist within groups, males and older birds being dominant; but there is no discussion of the role of calls or displays in the maintenance of these hierarchies. In several instances, adults excluded young of the year from acorn stores, but did not expel them from the territory. The young either fed on secondary stores, or were rationed acorns by the adults. The significance of this behavior remains obscure.

Much remains to be learned about the Acorn Woodpecker. We still do not know which group members are parents and which are helpers during nesting. Long-term studies

will be necessary to determine genealogical relationships among group members. The question of population regulation remains unanswered, and we still have no clear idea why certain groups breed while others do not. These comments are intended not as criticisms but as encouragement for further work. The MacRoberts' have written an excellent account based on an intensive and highly successful three-year field effort. In so doing they have made by far the most significant contribution to date toward an understanding of this remarkable species.—CARL E. BOCK.

THE HABITAT GUIDE TO BIRDING. By Thomas P. McElroy, Jr., Albert A. Knopf, New York, 1974: xvi + 257 pp. $8.95.—This book is far more than its title implies. It is really a text which, in addition to habitats, touches on such wide-ranging subjects as moonwatching (bird migration at night), choice of binoculars and spotting scopes, their use and care, precautions and clothing for different habitats, and tips on leading bird trips. It briefly discusses feeding stations and choice of bird food. It takes up the subject of bird communities and the niches filled by various species in the same habitat.

There are numerous drawings by Matthew Kalmenoff, almost all of which I found very pleasing. Some readers will not like the physical make-up of the book. The text covers a little over half of each 8 inch × 9 inch page, leaving a 3½ inch margin for the artist's illustrations. However, on some pages this margin is blank, and it seems a waste of space, although the author suggests using this space for notes or sketches, thus personalizing the reader's copy. There are no labels under the species drawings, and one must turn to a "Guide to the Illustrations" in the front if one cannot identify the bird or scene depicted. Therefore a beginner might well be confused when reading about the meadowlark and Killdeer, with an unlabelled drawing of a Horned Lark beside the text. In one place there are drawings of foot adaptations, but with no accompanying discussion. However, in most cases, text and illustrations are adjacent.

In a book which deals with a great variety of topics, the author has done a very good job of leading from one subject into the next. His bird categories are interesting and often unique. For example, in his chapter on common birds of country roadsides, he divides them into wire-sitters, fence-post-sitters, road-kill scavengers and "others." His descriptions and explanations of the stages of development of marshes and swamps, the eventual domination of old fields by forests, and the effect of such plant successions on bird life, I found excellent.

As the author himself points out, this book will be a source of help to the amateur and the experienced birder alike. I strongly recommend that the reader note carefully his early chapter called "Some suggestions for using this book." It should be read more than once. There is a species index and a good bibliography. The book is limited to the eastern half of the continent, and I hope that someday there will be a similar one for the west.—SALLY HOYT SPOFFORD.