

Special Review

JOHNSGARD, BELLROSE, PALMER ON NORTH AMERICAN WATERFOWL

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Waterfowl of North America.—Paul A. Johnsgard. 1975. Bloomington & London, Indiana University Press. Pp. xiii + 575, 45 maps, 64 drawings, 1 color plate, 32 color photos, 96 black-and-white photos. \$25.00. **Ducks, geese and swans of North America.**—Frank C. Bellrose. 1976. Harrisburg, Pennsylvania, Stackpole Books. A Wildlife Management Institute book sponsored jointly with the Illinois Natural History Survey. Pp. 543. 57 maps, 36 drawings, 36 color plates, 57 figures, 1 black-and-white photo. \$12.95. **Handbook of North American Birds.**—Ralph S. Palmer (Ed.). 1976. New Haven and London, Yale University Press. Sponsored by American Ornithologists' Union and New York State Museum and Science Service. Vol. 2 Waterfowl (part 1): Pp. xi + 521. 31 maps, 53 drawings, 4 color plates. \$30.00. Vol. 3 Waterfowl (part 2): Pp. vii + 560. 22 maps, 50 drawings, 4 color plates. \$30.00.—The last major compendium on biology and distribution of North American waterfowl, "The ducks, geese and swans of North America" by F. H. Kortright, was published in 1943. That volume sold thousands of copies to students, hunters, and ornithologists. But few groups of birds have had more intensive study during the past 30 years and, however valuable, Kortright's volume has been out of date for some time. Suddenly, the buyer interested in waterfowl has the choice of three up-to-date books covering the biology and conservation of this group. The volume by Bellrose is an official update of Kortright's book—but only the color plates make it identifiable. Several authors assisted or contributed chapters. Johnsgard's book is a one-man effort that aims for a similar market among gift buyers and hunters. Volumes 2 and 3 of the Handbook of North American Birds (referred to here as Palmer) are typical ornithological handbooks based on contributions of numerous authors (including the author of this review), edited and updated by Palmer who deserves the credit for the volumes. They are comparable in scope to volumes 2 and 3 of the "Handbook of the birds of Middle Europe" (1968, 1969).

In general, the binding, paper quality, and general appearance of the volumes is reflected by the price. Bellrose is perhaps the most modern in design, printing, and figures, but its low price was made possible by the use of T. M. Shortt's original color plates from Kortright. It also has the smallest print in the main text, but the titles on certain figures are so large that they exceed in size the initial titles on the species accounts. The price of \$60.00 for two volumes of the Handbook will deter many buyers, but their quality is good. A reprinting of volume 1 of the Handbook also sells for \$30.00.

All three works are similar and traditional in approach with relatively brief introductions followed by species accounts. Introductory material is greatest in Bellrose with 73 pages in chapters dealing with classification, disease, identification, and migration by Bellrose, plumage (by M. W. Weller), conservation (by G. C. Sanderson), and hunting regulations (by A. S. Hawkins). Johnsgard has 30 pages in three chapters: biology, distribution and migration, and hunting and recreation. Palmer has 14 pages devoted to the book's approach and to a discussion of the family Anatidae.

The species accounts in the three works differ in subject titles and in the order in which information is presented, but each covers similar material. In general, Johnsgard presents broad statements of previously published summaries, Palmer gives many examples of published and sometimes unpublished data, and Bellrose presents original or unpublished observations from various sources, including many items cited only by the observer's name. More detailed coverage of each species is responsible for the two volumes of the Handbook. For example, the account of the Canada Goose (*Branta canadensis*) occupies 52 pages of small

print in Palmer, 24 of fine print in Bellrose, and 16 of large type in Johnsgard. Accounts of the Mallard (*Anas platyrhynchos*) are 35, 15, and 13 pages, respectively.

Bellrose preserves some of the Kortright format in the treatment of each species, giving English and scientific names, followed by the section called "vital statistics." Measurements are given in inches and pounds for a lay audience. In the case of the Canada Goose, the identity of the first page is confused by vital statistics so extensive that they form a full page table. A section on identification is followed by considerations of population status, distribution, migration behavior, breeding, postbreeding season, and food habits. Graphs show the chronology of migration by area in spring and fall, based on an average of three years of data gathered on Federal waterfowl refuges.

Only Johnsgard's species accounts give the author and date of the scientific name. A brief discussion of range and subspecies is followed by linear measurements (metric) and weights (both pounds and grams), lengthy sections on identification, then sections on age and sex criteria, distribution and habitat, general biology (including food, sociality, density, and territoriality), and social and sexual behavior—sometimes overlapping with one of two previous sections.

Palmer's treatment is unique in giving a brief description first with conspicuous characteristics and some average measurements in inches and weights in pounds (later given in metric units). Then, lengthy and highly original description of plumages follow, using the Humphrey and Parkes (1959, *Auk* 76: 1–31) system. There also are sections on field identification, voice, habitat, distribution, migration, banding status (statistics on numbers of birds and banded birds recovered), reproduction, survival, habits, and food.

All three works utilize tribes for grouping genera rather than subfamilies following Delacour and Mayr (1945, *Wilson Bull.* 57: 3–55), Delacour (1954–64, *The waterfowl of the world*, Vols. 1–4) and Johnsgard (1965, *Handbook of waterfowl behavior*). Only Johnsgard sectionalizes the species accounts with brief discussions of characteristics common to the tribes—a very helpful feature of this volume. However the discussion on Cairinini, being the first in the subfamily Anatinae, loses its orientation and concentrates on the larger taxonomic unit. Palmer reviews the tribes in a terse but excellent discussion at the beginning of the species accounts; Bellrose outlines the tribes briefly in his introductory chapter on classification, and is the only author to present a traditional "family tree."

Scientific names generally agree with the A.O.U. Check-list (1957) and the 1973 Supplement, but all use *Anser* rather than *Chen* for the Snow Goose (*A. caerulesens*), and *Cygnus* rather than *Olor* for the American swans. Palmer differs most in taxonomic treatment. He uses the tribe Somaterini for eiders placed between dabblers (Anatini) and inland divers (Aythyini), following Delacour (1954, vol. 1). Palmer also places the perching ducks (Cairinini) between Aythyini and the sea ducks (Mergini), whereas Bellrose follows Johnsgard (1965) in the traditional association of eiders with the Mergini, and in the placement of Cairinini before Anatini.

Considerable variations occur in handling of smaller taxonomic categories. Johnsgard treats the Trumpeter Swan as a race (*buccinator*) of the Whooper Swan (*C. c. cygnus*) following Delacour (1954, vol. 1), and retains *Cygnus columbianus* for the Whistling Swan (along with *C. c. bewickii* and *C. c. jankowskii*) whereas he pooled all the northern swans except the Mute (*C. olor*) as subspecies of *C. cygnus* in his 1974 paper (*Wildfowl* 25: 155–161). Palmer regards *C. buccinator* as specifically distinct from *C. cygnus* and as superspecies, but accepts Whistling and Bewick's swans as subspecies, cleverly giving them the title Tundra Swan to avoid favoring one English name over the other. Bellrose does not consider the Eurasian forms.

Palmer differs most in handling of the races of the Canada Goose. Whereas Johnsgard follows the 12 subspecies outlined in Delacour (1954, vol. 1) (including *B. c. asiatica* subsequently dropped by Delacour in 1964, Vol. 4 as synonymous with *B. c. minima*), Bellrose drops *B. c. asiatica* for a total of 11. Palmer, however, not only drops *B. c. asiatica* but pools *B. c. moffitti* with *B. c. maxima* (using the English name Giant Canada Goose), *B. c. taverneri*

with *B. c. parvipes* (Lesser Canada Goose), and *B. c. fulva* with *B. c. occidentalis* (Dusky Canada Goose) for a total of eight subspecies. Johnsgard expresses concern on the haphazard transplanting of subspecies and the modification of habitats that have influenced distributional patterns and identity of these subspecies on the wintering areas.

The Mallard complex is treated differently in all three works, reflecting the variation in handling of semispecies. Johnsgard treats the Mexican, Mottled and Florida ducks as Mallard subspecies (*A. p. diazi*, *A. p. maculosa* and *A. p. fulvigula*, respectively) and terms them "Southern Mallards" in a separate account. Bellrose also treats the Mexican Duck as a subspecies of Mallard while citing the conclusion by Aldrich and Baer (1970, *Wilson Bull.* 82: 63-73) that it should have species status. He treats the Mottled Duck as a subspecies (*A. f. maculosa*) of the Florida Duck *A. f. fulvigula*. Palmer treats Mexican Duck and Mottled Duck as full species (*A. diazi* and *A. fulvigula*), and figures two populations of the latter without terming them separate races, following Phillips (1923, *Natural history of the ducks*, vol. 1). The Black Duck (*Anas rupripes*) is treated as a full species in all works in spite of zonal interbreeding with Mallards and the suggestion by Johnsgard (1961, *Auk* 78: 2-43) that *A. rupripes* should not be considered a distinct species.

English names vary markedly. Palmer uses Eurasian Wigeon (*Anas penelope*) rather than European Wigeon of Bellrose and Johnsgard (all drop the "d" as advised in the 32nd Supplement but some also drop it in the plant name), Tundra Swan for Whistling and Bewick's swans, and prefixes Black Duck with "American." Bellrose often uses English names for subspecies, possibly because of Kortright's earlier use and also because of their regional importance to hunters. Separate accounts are given for Tule Goose (*Anser albifrons gambelli*), Mexican Duck, and Eurasian Green-winged Teal (*Anas c. crecca*). Palmer uses White-cheeked Pintail (*Anas bahamensis*) following Meyer De Schauensee (1966, *The species of birds of South America and their distribution*) whereas Johnsgard sticks to the more familiar name, Bahama Pintail.

In addition to the species that regularly breed in North America north of Mexico, all three treat Mute Swan, Barnacle Goose (*Branta leucopsis*), European Wigeon, Baikal Teal (*Anas formosa*) and Tufted Duck (*Aythya fuligula*). Johnsgard and Palmer also include species accounts for Muscovy Duck (*Cairina moschata*) of Mexico, White-cheeked Pintail, Falcated Teal (*Anas falcata*), Garganey (*Anas querquedula*), Cuban or Black-billed Whistling Duck (*Dendrocygna arborea*), and Smew (*Mergus albellus*). Only Palmer includes sections on Common Pochard (*Aythya ferina*), Baer's Pochard (*A. baeri*), Bean Goose (*Anser fabilis*), Red-breasted Goose (*Branta ruficollis*), Spot-billed Duck (*Anas poecilorhyncha*), Ruddy Sheld-Duck (*Tadorna ferruginea*), and Common Sheld-Duck (*T. tadorna*) (the later three are mentioned in tribal reviews by Johnsgard), making the total species covered in Palmer 63 compared to 55 species or subspecies accounts each in Bellrose and Johnsgard. In most cases, accounts for accidentals or introductions are abbreviated compared to native species and often lack distribution maps, but Johnsgard's section on the Mute Swan (*Cygnus olor*) covers eight pages compared to ten for the Trumpeter Swan. In all cases, accidentals are considered in taxonomic order rather than in separate sections.

Information in several species accounts is especially new and worthy of note. Johnsgard presents extensive unpublished data on Masked Ducks gathered by Dale Crider in Argentina. He reports that birds are able to take off vertically by virtue of propulsion gained while the duck is under water. The first significant data on nest sites and clutch sizes also are provided. On another subject, Palmer provides a detailed analysis of the plumage cycle of the Oldsquaw that may at last resolve the debate that has waged for years. He reports that the species does have three rather than two plumage cycles per year in both sexes: Alternate, Basic, and Supplemental. This and other new interpretations of plumage cycles of females make it clear that Palmer has reopened a fascinating area of avian morphology.

Both Johnsgard and Bellrose have keys for species identification that may prove useful to laymen. The six-page key in Johnsgard is based on various morphological features whereas

that in Bellrose is a wing key based on one by the U.S. Fish and Wildlife Service. Unfortunately, the latter is reproduced on one page with figures of such small size that it will be difficult to use. Johnsgard has a brief, useful chapter at the end of the book giving derivations of scientific names (as found under each species account in Kortright's original volume). Bellrose lists all geographic names used in the text in an appendix but does not provide geographic locations for them. Bellrose has a very useful series of tables in the appendix that detail waterfowl habitat by area and state.

Discussions of sex and age rightfully refer more to the importance of such data rather than to the techniques of determination. Bellrose, for example, makes the important observation that disparate sex ratios in ducks are related to the chronology of pairing, with a higher percentage of males in those species that pair nearer to nesting time. References to methodology in all three works emphasize plumage differences, especially wings, where they occur. While differences in wing characters are excellent for most ducks, they work less well for geese. Cloacal characters of the Canada Goose are discussed in great detail by Johnsgard but without the benefit of a general discussion to place this in perspective. Moreover, his common reference to the necessity of internal examination for sex identification causes confusion elsewhere. His statement on male Masked Ducks may lead casual readers to believe that this is the only species in which cloacal examination can be used to determine sex.

Good-to-excellent distribution maps are characteristic of all three works. Those in Bellrose are unique and dramatic, including population density as well as distribution. Some show migration "corridors" according to density based on a composite of data on migratory and wintering populations, radar observations, and band-recovery information. On some maps, wintering populations are given in units as precise as 10,000. Some will find these maps difficult to interpret, but they are unique among such maps in bird books. Two maps are given for Wood Duck (*Aix carolinensis*), Mallard, and Black Duck to clarify data on migration routes between breeding and wintering ranges, and for Lesser Snow Goose (*Anser c. caerulescens*) to separate fall and spring migration. The complex races of the Canada Goose require three maps. Palmer's maps also are good and use some of Bellrose's (1968, Illinois Nat. Hist. Surv. Biol. Notes No. 61) published data on corridors. In comparison, Johnsgard's maps show breeding and wintering distributions on full-sized maps of North America (even when ranges are minute geographic areas of the whole).

The overall image and usefulness of these books is much influenced by the illustrations. While Kortright's color plates (by T. M. Shortt) were long a major selling point of that book, retention of these plates undoubtedly put some serious constraints on the author because these plates often bear English names and show only certain plumages. A substitute plate by F. C. Bellrose, Jr. to correct an error has very poor color. Shortt's pen-and-ink sketches also were reused, but both color and black and white are less well reproduced than in Kortright's original volume. Most are, however, scientifically good illustrations. Johnsgard's book contains a color frontispiece of Labrador Ducks (*Camptorhynchus labradorius*) by Peter Scott which is unique, but it is not one of his best works. The major illustrations are 16 pages of color photographs, and numerous black-and-white photos. Most are good; a few show the effect of magnification, but they are quite effective. The black-and-white photos often are presented in pairs showing two views of each species. Most seem to be from captive birds. Johnsgard's pen-and-ink drawings are most difficult to assess and vary tremendously in quality. They are very detailed and rather flat-looking drawings compared to the free-style sketches in the other works. They appear to be photo-based, judging from some of the postures and problems of proportional size of various individuals. The stress on dressing up this volume for gift sales is reflected in the fact that duplicate illustrations are common in both photos and drawings. The Handbook volumes are the most artistic of the three works. They have 8 color plates, 4 of selected species by Robert Mengel, 3 of ducklings by Coleen Nelson, and 1 of Wood Duck plumages by Ralph Palmer. All are well-reproduced on high quality paper, and most are good scientifically and attractive artistically. Mengel's pen-and-ink sketches form the most

delightful artwork in all three works. A few are weak scientifically with bill proportions off and postures questionable, but the general effect is pleasing.

An important contribution of these volumes is the superb listing of up-to-date literature on waterfowl. Palmer cites nearly 1900 works including classical and current works from both North America and Eurasia. Bellrose cites nearly 900 books, papers, and many theses and other difficult-to-find references. Johnsgard's list approaches 600 and, while less current, is a well-balanced reflection of publications in the field. To save space, Palmer eliminated titles for journal articles, author's initials except where essential for identification, and spacing between citations.

Typographical errors are most prominent in Bellrose. A few are serious but are easily detected by the reader. Writing styles differ considerably as the contributors to the Handbook were told to use telegraphic style and, as editor, Palmer adhered closely to brevity except where he criticizes current waterfowl terminology. Johnsgard and Bellrose use more standard prose, with Bellrose being the most terse. Ideas are less-well organized in Johnsgard, but some parts achieve poetic expression of appreciation of waterfowl not possible in the more concise discussions.

Of the three somewhat overlapping approaches, Johnsgard is perhaps the best-balanced but the least innovative. Bellrose provides unique information on migration and populations but some readers will feel that these dominate the species accounts. Palmer has lengthy plumage descriptions not found in the other two, great detail on most topics and greater reference to Eurasian literature. Each of these volumes is different, and each will appeal to a different audience. Johnsgard's volume should appeal to buyers searching for gifts for the person interested in general natural history, but it will not satisfy advanced students or professionals. Bellrose's revision of Kortright is a "sure winner" in terms of meeting the general needs of students, hunters, wildlife biologists, and ornithologists—at a reasonable price. The Handbook volumes are essential to all serious ornithologists and waterfowl biologists.—*Department of Entomology, Fisheries, & Wildlife, Univ. of Minnesota, St. Paul, Minn. 55108.*

REVIEWS

EDITED BY WALTER BOCK

Group selection in predator-prey communities.—Michael E. Gilpin. 1975. Monographs in Population Biology No. 9, Princeton, N.J., Princeton University Press. Pp. xiii + 109, illus. Cloth, \$10.50; paper, \$4.95.—The efficacy of group selection in producing evolutionary change has been hotly debated for more than a decade. The resulting view seems to be an often begrudging admittance that group selection *can* occur, but requires such restrictive conditions that it is unlikely to be of much importance. Gilpin's model seems to suggest that group selection may play a more central role in evolution than we have previously admitted, at least under the conditions he imposes.

Gilpin develops a mathematical model of individual and group selection in predator-prey "communities" (actually only a pair of populations). The predator population is monophagous for the single prey population, and its effectiveness at prey capture is governed by a single pair of alleles. Fixation of the allele for maximum prey capture efficiency causes overexploitation of prey within a habitat patch, leading to the extinction of the group of predators in that patch. The other allele confers reduced cropping efficiency, and thus should be expected to be reduced in frequency through individual selection; but as groups with a high frequency of this allele are less likely to suffer extinction, the low-efficiency trait should eventually come to predominate. Gilpin does a splendid job of presenting his model, leading us through the mathematics, graphical and computer simulation analyses, and sensitivity tests and extensions of the model in effortless prose. It is indeed refreshing to find a model so thoroughly explained, with all of its seeming limitations and assumptions laid bare.

But despite Gilpin's efforts to blend realism into his model, the approach is fraught with biological oversimplifications. While predators are permitted to move between patches and possess genes (at least

one locus), the poor prey are inert; they are invariable, have no behavior or motility, and can really do little except reproduce or become extinct. Most of the sensitivity tests that confirm the robustness of the model predictions are biologically trivial, while the tests that heighten the biological realism of conditions generally weaken the influence of group selection. The statements that directly mention birds (p. 99) are biologically naive: ". . . birds usually live out their lives where they are raised," for example. "Birds also have local traditions and song dialects," he continues, "that make it hard, if not impossible, for an outsider to join a group and breed. These behaviors may have evolved out of some need to preserve local adaptations." This is pure bunk. Gilpin admits that bird populations do not specifically meet the assumptions of his model. "They are not confined to patches; it is not difficult for them to move between patches; they do not depend on a single prey species." Fine. But then Gilpin manages some salvation: ". . . nonetheless, it is likely that bird populations do meet the assumptions of the group selection model in some generic sense." He does not elaborate.

Gilpin does demonstrate that under a rather restrictive set of conditions group selection may play an evolutionary role, leading to the fixation of traits that are not advantageous to individuals. The critical question, which is not really addressed, is how often such conditions occur. Has Gilpin given us yet another model of how nature *might possibly* work, or something actually appropriate to real world situations? Unfortunately, I think the former more likely.—JOHN A. WIENS.

Avian speciation in tropical South America.—J. Haffer. 1974. Publ. Nuttall Ornithol. Club No. 14, Cambridge, Massachusetts. 390 pp., illus. \$19.00; **Avifauna of northwestern Colombia, South America.**—J. Haffer. 1975. Bonner zoologische Monographien No. 7, Bonn, Zoologisches Forschungsinstitut und Museum A. Koenig. 182 pp., illus. 35 D.M.; **The dispersal centers of terrestrial vertebrates in the neotropical realm.**—P. Müller. 1973. Biogeographica, vol. 2, The Hague, Dr. W. Junk B.V. Publishers. 244 pp., illus. 65 Dutch guilders.—In the past few years a series of studies on the zoogeography of South American biota have been published. Besides the three monographs above are various multi-authored books: the two-volume "Biogeography and Ecology in South America" (which I reviewed in 1970, Quart. Rev. Biol. 45: 105), the symposium on "Geo-ecology of the mountainous regions of the tropical Americas," the volume on "Tropical forest ecosystems in Africa and South America: a comparative review," vol. 3 in the series "Biologie de l'Amérique australe," and "Evolution, mammals, and southern continents." In these publications ornithologists will find chapters or papers of interest for their zoogeographical studies.

This avalanche of relatively synthetic literature can be considered as a sign of greater maturity of zoogeographic endeavors in the South American realm. Biologists are no longer afraid of the tremendous diversity in species or of the complexity in distribution patterns exhibited by South American biota and try to make sense out of them. This trend is surely a good one. However, as I have had the dubious privilege of reading all the volumes mentioned above—a formidable number of pages—I must state boldly that the results of these attempts at synthesis are far from being uniformly good or even interesting. Many authors who wrote chapters in these books have rehashed their earlier "ideas" not for the better I am afraid, whereas others have simply written bad prose because, I suspect, they do not know enough about South America, do not understand the biogeography of their favorite organisms, or else have a poor grasp of biogeographic principles.

I began reading the works of Haffer and Müller with a bias in their favor. Haffer lived in Colombia between 1957 and 1967, made numerous field trips during those years (as he explains in his "Avifauna of northwestern Colombia," an area which is in a way his private ornithological hunting ground), and published a series of excellent papers on speciation in South American birds prior to his Nuttall Club and Bonn monographs. From 1964 to 1967 Müller made several lengthy trips to various parts of South America, primarily to collect data on the distribution and taxonomy of reptiles and amphibians, but he also amassed information on other groups of vertebrates including birds. His knowledge of the literature pertaining to South American biota is impressive. Haffer is a geologist as well as ornithologist, a rather precious dual citizenship for a biogeographer. Müller is a true geographer besides being also a biologist. Both authors are therefore exceptionally well qualified to deal with their subjects.

At the outset let me point to a fundamental difference in training in the dialectics of zoogeography and evolution of these two workers: Haffer is a student of Ernst Mayr's views on allopatric speciation, and espouses fully Mayr's ideas about superspecies, whereas Müller is steeped in the zoogeographic world view of his mentor de Lattin. We should thus expect a substantially distinct point of departure for zoogeographical syntheses, but in fact we observe a remarkable similarity in the first methodological

step. The differences at this stage lie only in the material; Haffer treats about 300 species of tropical South American birds, while Müller analyzes the distribution of apparently all species of terrestrial vertebrates of the Neotropical Region, several thousands in all.

From analyses of selected groups of birds Haffer attempts to reconstruct past zoogeographic events in South America, especially the tropical rain forests. "By superimposing outline maps of the ranges of species in a given region, centers of distribution or core areas (*Arealkerne*, *Kernareale*) are recognized which all member species inhabit. If no major geographic shifts or other disturbances have occurred, the centers of origin of the species considered may be located somewhere within the present core areas or, in simple cases, the core areas themselves may represent the differentiation centers from which radial expansion has taken place" (p. 64). Haffer then goes on to describe, with lists of species as buttressing evidence, five Trans-Andean and six Cis-Andean centers in tropical South America.

Müller reasons as follows: "Dispersal centers can be worked out by plotting the breeding ranges of species and subspecies on a map of the region under investigation (de Lattin 1957). The individual ranges overlap in 'areas of congruence' or 'nuclear areas' ('*Arealkerne*' of Reinig 1937, 1950). It is our first task to ascertain regions where an unusually large number of ranges overlap, for these are what we call dispersal centres" (p. 3). Müller then goes on to describe 40 such centers in tropical America and temperate South America.

Both Haffer and Müller therefore show a strong belief in the reality of some sort of a center, the outline of which is deduced after plotting ranges of species distributions and looking for congruences. One should thus expect that a map with all species ranges plotted on it should look somewhat like a topographic map, with some sort of relief, and contour lines indicating lines of equal species ranges. The troughs would, one presumes, be where the boundaries between centers are drawn. The existence of these centers and troughs is not clear from Haffer's Nuttall Club monograph or from Müller's book but it is a bit clearer in Haffer's paper on the avifauna of northwestern Colombia. I cannot help the uneasy feeling creeping in that Haffer's and Müller's centers are ill-defined things, since one is hard put reconstructing them from their writings or their maps. The whole procedure of center description, especially in Müller's work, seems typological and is not satisfactory. I am not saying that areas of higher and lower relief of congruence in species ranges do not exist, but that the notion that they do exist, and furthermore that they exist here and there, is offered by Haffer and Müller as observed facts, a way of thinking that I object to. I contend that this sort of zoogeography belongs in the era of regionalism, and that if we want progress in our science, we should for a time make *tabula rasa* and think on new ground.

After describing centers the two authors differ sharply; Haffer loses interest in centers and turns his attention instead to the "population structure" of species (*sensu* Mayr, Ibis, 1959). He makes a special effort to detect and analyze secondary contact zones between taxa at or near the level of species (pp. 77-108). These 30-odd meaty pages should have been Chapter 5 (Chapters 1-4 being introductory). The intervening sections (pp. 11-71) are a medley of things that actually distract the reader from following Haffer's arguments (this material should either have been omitted or have been relegated to appendices); this is unfortunate, for it is not clear how he progresses from centers to secondary contact zones. Similarly, after having reached the end of discussion of these zones (p. 108), the reader is once again lulled to distraction by material that is to a considerable extent irrelevant to the passage from secondary zones to the reconstruction of the all-important refugia (16 in the lowlands, some extra ones in the mountains). The exact dialectical transitions from centers to secondary contact zones and from the latter to refuges unfortunately are not clear enough. This is indeed a pity, for Haffer's important contribution to South American biogeography and speciation surely lies in two areas: first his careful documentation of secondary contact zones (his best work in my opinion), and second, his interesting hypotheses about the presence and fluctuations in time of the refugia in which speciation took place in the Pleistocene.

Here I should like to suggest that pp. 179-344 of the Nuttall Club monograph, speciation patterns in toucans and jacamars, does not belong in the book, and should have been published separately elsewhere: it adds to the cost of the book and reduces its use to nonornithologists. This section of the book is, however, of great ornithological interest and presents many details of value to ornithologists who study South American birds.

In summary, Haffer's views appear disjointly organized around three themes, obviously connected in his mind, although this does not come across well to the reader: core areas, secondary contacts, and refugia. He published the same ideas before in a superb paper in *Science* (1969) and in another excellent paper in *Bonner zoologische Beiträge* (1974). It is more instructive to read these two papers than the monographs, and I was disappointed especially by the Nuttall Club publication, because of its redundancy with previously published material and its lack of intellectual force stemming in large part from its lack of internal consistency and poor organization.

Returning to Müller's book, we see that much of it is actually a rather dull, often poorly thought out description of his forty centers (pp. 10–165). The remainder is a generally rather rambling, at times interesting discussion of a variety of topics, all connected to centers although the thread is thin (subspeciation, vegetation fluctuations in the Pleistocene, dispersal of montane forest fauna, etc.). Müller apparently is content with having shown that the centers exist, and having listed elements that must belong to one rather than another. Yet there are ideas to be picked in his monograph, and interestingly they overlap to a large degree with Haffer's. One puts down these monographs with the impression that there is something to the centers after all, but one is very hard put saying what it is. Moreover, the study of secondary contact zones is certainly most rewarding and should be extended to taxa other than those Haffer himself studied. Although the notion of refuges has certainly an intriguing possibility, their conceptual basis and practical application must still be carefully worked out.

This leads me to expressing my major criticism of both Haffer and Müller, which is that these authors are not sufficiently critical of the pitfalls of their chosen methodology. Haffer can easily be accused of adducing only evidence in favor of his views on the location, number, and boundaries of centers and refuges and to ignore contrary evidence (in fact I have heard zoogeographers state this criticism in discussions). How does he obtain his sample of "50% of the forest bird fauna" (pp. 7 and 65)? No sampling technique or methodology is given. What are the biases inherent in his choice of "selected" species of birds, 300 in all? No indication is given. Insofar as Müller's methods go, it is incorrect to say, as Haffer does (p. 6) that Müller "based his conclusions mostly on a *statistical treatment* of published distributional data." There is nothing statistical in Müller's book. The fact that he appears to use many more species than does Haffer, and vertebrates other than birds as well, does not render him immune to methodological bias, but Müller does not state his sources of potential bias any more than Haffer. I could never be certain of just how many species Müller considered to be elements of a given center, or how much congruence really exists (I would say often rather little, if I judge by the numerous confusing congruence range maps).

In spite of all the foregoing, and perhaps contrarily to what readers of this review might think, I wish to conclude it by saying that both Haffer and Müller have things to say about the biogeography of South America to which all of us ought to listen. Haffer's work, in particular, is important for biogeographers in its focus on interesting questions and in its attempt to provide answers for them. The A.O.U. recently awarded the Brewster Medal to Haffer in recognition of his outstanding contribution to South American ornithology (1976, Auk 93: 161). These three works taken together constitute important steps in our quest to understand the complex biogeography of South America and should be studied carefully by anyone interested in this subject.—FRANÇOIS VUILLEUMIER.

The Birds of Iran.—Compiled and edited by D. A. Scott, H. M. Hamadani, and A. Adhami Mirhosseyni, in collaboration with personnel of the Iran Department of the Environment, Tehran. 1975. 410 pp., color plates, color maps, index of Latin names. No price given.—Iran is a country almost two-and-a-half times the size of Texas, or three times the area of France. It extends from near 40° N in the northwestern corner to almost 25° N in the southeast, and stretches from Turkey and Iraq in the west to Afghanistan and Pakistan in the east. In this huge territory habitats vary from the absolute desert of Dasht-e-Lut to the moist beech forests on the Caspian slopes of the Elborz, and climates range from the steaming Persian Gulf to the permanent snow of Damavend at 5654 m. About 490 species of birds occur in Iran, about 350 of which seem to breed there regularly. By comparison about 480 species occur in Western Europe as covered by various field guides, an area about four times as large as Iran.

Until recently Iranian birds were known chiefly through several rich collections of skins, some of which are deposited at The American Museum of Natural History, where they were studied thoroughly by Charles Vaurie in preparation for his "The Birds of the Palearctic Fauna." Only a scattering of papers resulting from fieldwork on the biology, distribution, ecology, and migration of Iranian birds has been published. No up-to-date list of the bird species found in Iran has been available for some time now.

The publication of "The Birds of Iran" thus constitutes, in the words of E. Firouz, Director of the Department and author of the Introduction, "an important landmark in the development of wildlife consciousness in Iran." Indeed, I would say that this field guide is a landmark in Palearctic ornithology in that it is the first one to appear, with full color illustrations of birds and range maps, produced by and in a Middle Eastern country. The fact that it is entirely written in Persian is also noteworthy, although to be sure this diminishes its value to all non-Iranians, for rare are those of us fortunate enough to *read* that language! Alas, I cannot admit to fluency in Persian, hence my review of this book is limited to what the work can offer the reader who, like myself, is illiterate in that language but either has been in Iran or is interested in its birdlife.

The introductory section (pp. 5–22) appears to be borrowed entirely from the same section in Peterson, Mountfort, and Hollom's Field Guide, with identical line drawings. The main text (pp. 23–355) includes descriptions and range indications of 458 species, following Vaurie's treatment (but I did not check this in detail). A short account of each family is followed by species accounts, each species being numbered consecutively in Persian numerals. The species names are given in Latin, Persian, English, and French. The numbers for each species are again found, together with only the Persian names, on the color plates, which are scattered throughout the text. The color plates are reproduced, with permission, from either Bruun and Singer's "The Hamlyn Guide to Birds of Britain and Europe," or Hüe and Etchécopar's "Les Oiseaux du Proche et du Moyen Orient." Some plates are a composite from birds illustrated in both these works, yet others (e.g. several *Oenanthe* on p. 292) appear to have been prepared specifically for this book. After the main text follow a list of accidentals (pp. 356–358) and a list of hypothetical species.

The range maps (pp. 362–390) are numbered from 1 to 343, and correspond to the distribution of only one species each. The only caption to the maps is the species name in Persian and a number. Pink indicates summer breeding, purple permanent residency, and blue winter visitor status.

Pages 399–410 contain (in English this time) an Introduction, Acknowledgments, a "Note to Foreign Users" (p. 405), and the all-important "Latin Index" (pp. 400–404).

For the non-Persian reader this book is helpful because (1) it is a complete specific check-list of the birds of Iran, (2) it maps the distribution of 343 species (even though the maps are schematic they are quite legible and complement harmoniously those in Hüe and Etchécopar's book), and (3) it apparently illustrates in color all the 458 species given in the main text.

The major drawbacks of the book are two. First and foremost, the Latin names of species are neither given on the color plates nor in the map captions. Furthermore the numbers assigned to species in the text (1–458) are not the same as those of the species on the maps (1–343). It is thus necessary to refer constantly when consulting the book to the numbering system used in the text/plates on the one hand, and to the system "Latin Index"/map number on the other. All this confusion, and risks of errors as well, could most easily be avoided in a future edition by putting Latin names below the Persian names on each plate and on each map caption, and by adopting the same numbering system for the species in the text, plates, and maps.

The second drawback is the absence of bibliographic references to even the most basic papers and books on Persian birds or on birds from the Middle East. Even a small list would show the Iranian reader what has been published earlier in languages other than his own, and perhaps incite him to look up other works after his appetite has been whetted by this attractive field guide.

The book is handsomely produced, bound in cloth, and printed on good paper. Given the difficulties of reproduction mentioned in the Introductory section the plates are generally good, though not of course of the standard of the originals. Even though I did not have a chance to use my copy in the field, so far it has withstood well rather rough handling. This book does honor to the Iran Department of Conservation. I hope that its publication will have the desired effect of furthering interest in conservation and study of Iranian birds.—FRANÇOIS VUILLEUMIER.

A field guide to the birds of Galapagos.—Michael Harris. Dated 1974, published 1975. New York, Taplinger Publishing Co., Inc. 160 pp., 4 col. pls., 8 black-and-white pls. and 73 line drawings by Barry Kent MacKay. \$10.95.—This small book is the first of its kind to deal exclusively and summarily with field identification, voice, food, breeding, and distribution of 121 species of birds recorded in the Galápagos Islands and from surrounding waters. Between its hard covers are descriptions of 57 species of "residents" (including 28 endemics), 29 species of "regular migrants," and 35 species of "accidentals."

Because the birdlife of Galápagos constitutes the principal macrofaunal component of the islands and their primary natural history attraction, it was inevitable that a "popular" guide to the birds of the region should make its appearance. The author is well qualified to write such a treatise, having carried out several years of ornithological research in the archipelago.

Although much information derives directly from the author's own field experience, particularly as it relates to seabirds, most of the contents stems from the published works of Harry S. Swarth (1931, Avifauna of the Galapagos Islands, Occ. Pap. California Acad. Sci. No. 18), Robert I. Bowman, David Lack, Raymond Lévêque, J. Bryan Nelson, and David and Barbara Snow, all of which are fully acknowledged. Surely an oversight is the absence of any reference to R. C. Murphy's classical two-volume work (1936, Oceanic birds of South America), which is probably the richest summary of information on Galápagos seabirds and their oceanographic setting.

In the 50 pages preceding the species accounts we find a number of informative sketches, mostly thumbnail in character, covering a broad spectrum of topics, including instructions on how to use the

book, species checklist, history of Galápagos ornithology, climate, vegetation zones and associated birds, factors affecting the occurrence and distribution of species on islands, breeding seasons, ecology, avifaunal changes and conservation problems, migrants, and brief descriptions of the areas most frequently visited by tour groups and the birds most likely to be seen.

In considering Harris' book, a reviewer is compelled to compare it with the famous regional field guides to birds by Roger Peterson. Over 67% of the species considered in Harris' guide are described and illustrated in Peterson's "A Field Guide to Western Birds," 2nd ed., rev. (1961). The remainder of the avifauna includes a smattering of southern hemisphere petrels, a tropical heron, rail, plover, and cuckoo, plus the ever fascinating Galápagos endemics, including the penguin, albatross, cormorant, flamingo, pintail, hawk, two gulls, dove, martin, four mockingbirds, and 13 species of Darwin's finches. Field identification problems exist only for the petrels and some of the finches, and these are dealt with satisfactorily.

This reviewer was initially struck by the inadequacies of the illustrations. Keeping in mind that this is a "field guide," the numerous line drawings, although artistically and technically well executed, are rather unsatisfactory for three reasons: (1) closely related species are all too often not assembled on the same page, (2) when grouped, species are not similarly positioned as to profile or stance, e.g. three species of booby on p. 72, and (3) where color would be helpful, it is lacking, e.g. seabirds on Plate 2. As claimed on the cover jacket, it is true that "many of the illustrations, by the Canadian artist Barry MacKay, are the first ever published for some species," but it is obvious with reference to the watercolor renderings that being "first" may be a far cry from being best. Here appearing in illustrative form for the first time are the two mockingbirds, martin, lava gull, large-billed flycatcher, dark-billed cuckoo, and possibly the lava and striated herons.

Through a more economical layout, including size reduction of distribution maps, consolidation of widely scattered illustrations, and elimination of blank space totaling about 20 pages, a field guide of brochure size and cost could have resulted. A better quality of paper that is more resistant to wear, soiling, and moisture, in conjunction with soft pliable covers, would have been more practical. The lack of pagination, except page 6, for the first 14 pages, no titles or numbers for four tables, lack of places named in the text on the endcover maps (e.g. Caleta Black, etc.) and unlabeled tourist stops such as Punta Suarez, Hood Island, and peak elevations of the major islands are minor problems that greater editorial flexibility and scrutiny could have circumvented. Proper accenting of Spanish names is often wanting, such as the acute accent on the second "a" of Galápagos, which is almost traditionally mispronounced by British travelers. Spelling errors are relatively few in number, but the caption for Plate 11 "2a" is curious. Portions of the third paragraph on page 36 stand out as grossly ungrammatical.

Since MacArthur and Wilson first proposed their theory of "Island Biogeography" it has been increasingly popular to reexamine insular biotas, particularly avifaunas, for evidence of extinction and recent colonization. Harris has done this elsewhere (Condor 75: 265-278) and his conclusions there have been used again here. I believe Harris has misconstrued the data on one-of-a-kind specimen records, which are best considered as "stragglers." Harris has no basis in fact to write that "The changes in the birds of the islands . . . makes gloomy reading." He has largely contrived to make it appear that way, and if we compare the ecological devastation wrought by man in the Galápagos with that of Hawaii or other oceanic islands, I think that a reading of the record of past and present occurrences of birds in the Galápagos, as poor as that may be, is truly heartening! And we can rejoice in the successful cooperative efforts of the Government of Ecuador and the Charles Darwin Foundation for the Galápagos Isles in bringing effective environmental protection to these "Enchanted Islands." My reading of the bird records suggests that no species has become extinct, although certain island populations have been lost forever, such as *Geospiza difficilis* on Santa Cruz Island, and *Nesomimus trifasciatus* on Floreana Island, among others. Harris also suggests that the Paint-billed Crake (*Neocrex erythrops*), which I collected in the Galápagos for the first time in 1953, is a "recent colonizer." There is really no basis for such an assumption. The higher regions of several islands harboring this species have come under scrutiny only in recent decades, and as rails are notoriously secretive and reluctant to fly, this species was simply overlooked. I linger on this matter because island "modelers" are tempted to use such data, often uncritically, and employ it to suit their own ends (cf. Johnson 1972, Condor 74: 295-315). Finally, I think it is unwise to put too much reliance on the claims of resident farmers to the effect that there have been major changes in the weather cycles of Galápagos, especially as there are marked local vagaries (due to the "El Nino" phenomenon), and human contact with the islands is so recent that perspective on short-term versus long-term climatic fluctuations, is often myopic! The only avian species that might faithfully be considered a recent colonist is the cattle egret, first reported in the islands about 1964, a local manifestation of the species' world-wide range expansion.

Regarding the Galápagos Finches, Harris' treatment thereof is pretty much a summary of the points of view and details of fact originally set forth by his late mentor, David Lack, including his phylogenetic tree and taxonomy (including the rejection of the genus *Cactospiza* for the two species of tool-using finch).

Numerous unclear or misleading statements occur throughout the text. For example, on the dust-jacket we read: "Among other interesting birds, many of which can be seen in intermediate as well as final stages of evolution, are the sparrow-like Darwin's Finches." Harris' claim that the Cactus Finch (*Geospiza scandens*) is "replaced by the Large Cactus Finch (*Geospiza conirostris*) on Culpepper" is simply untrue. I spent 2 days atop this island during the height of the breeding season in January 1964, and the most common ground finch to be found was *Geospiza difficilis* in addition to the Warbler Finch (*Certhidea Olivacea*). *Geospiza conirostris* was totally absent. Harris' statement appears to be based wholly on a few puzzling specimens of *G. conirostris* taken at tide-line by early collectors, and these should best be treated as vagrants. Presently it is definitely not a breeder as claimed on page 147. Concerning the Mangrove Finch, the unnumbered and untitled table on page 35 fails to mention that this species (*Cactospiza heliobates*) like its congener the Woodpecker Finch (*Cactospiza pallida*) also is a tool-user.

Vocalizations are presented in onomatopoeic notation with varying degrees of success. No mention is made of the "recognition call"—a throaty "who"—of the penguin, so often heard at anchorages off Fernandina and Isabella islands during the breeding season. We must assume that the Red-footed Booby is mute as nothing is said about its calls, although Nelson ("Islands of Birds," 1968: 68) gives a rather full description, including sexual dimorphism for this species. And no student of birds, whether a tyro or an experienced ornithologist, could fail to be impressed by the extraordinary sounds, accompanying movements and gular pouch inflation of the courting male frigatebirds. Harris describes only one vocalization, namely a rapid series of "tchuk-tchuk" notes. To state that the Lava Gull's voice is "typically gull-like" is quite unhelpful. In an area comparatively depauperate of gulls, the call of this species is always the subject of lively conversation and prompted William Beebe to describe it aptly and colorfully as "rollicking peals of laughter."

In summary, this book is adequate for its intended purpose, namely a field guide to identification, but one might have hoped for a more functional if not more glamorous production, befitting the available information on the avifauna and its historical locale.—ROBERT I. BOWMAN.

A guide to the birds of Panama.—Robert S. Ridgely. 1976. Princeton, Princeton University Press. xv + 394 pp., 32 color plates and over 50 line drawings by John A. Gwynne, Jr. \$15.00.—This guide should provide a tremendous stimulus for research on neotropical birds. It should ultimately make a firm contribution toward the conservation of neotropical birds by reducing the time necessary to become familiar with them in the field. Ridgely learned Panamanian birds the hard way, but was fortunate, as were many others, to become friends with Eugene Eisenmann. Eisenmann's unpublished "Diagnostic list of Panamanian birds" and his generous sharing of his vast knowledge of Panamanian birds formed a guideline for Bob Ridgely's book.

The book is aimed at field identification but its scope is much broader: it is more a "handbook" than a "guide." The introduction contains a short history of ornithology in Panama followed by a concise description of climate and its potential effects on both birds and birdwatchers. Rainy and dry season patterns are described for various Panamanian regions. This is followed by a short chapter entitled "Migration and local movements" that could easily be expanded and rewritten as a scientific contribution in its own right. Three tables list regular nonbreeding migrants (127 species), rare nonbreeding migrants (33 species), and pelagic visitants (13 species; transpose Lincoln's Sparrow and Least Storm-petrel). The most interesting feature here is a short section on "local movements" of some Panamanian breeding species that points up how little is known about the unstable tropics.

Next, a five-page conservation chapter: a bleak outlook, as if the main text were prefaced by an obituary for many of the species it contains. The new road-squatter, invasion-denuded landscape syndrome, so prevalent in Latin America, is outlined. Sound guidelines are then presented for potential and crucial Panamanian reserves to save as many species as possible from the inimical effects of a high human population growth rate and general disregard for conservation.

The main text is organized like the Peterson guides and I felt a sense of familiarity. Each species account contains "Description," "Similar species," "Status and distribution," "Habits," and "Range," subheadings. When taxonomy is in doubt or ancillary information is pertinent, a detailed "Notes" section follows. Wetmore's family sequence and Eisenmann's "Species of Middle American birds" species sequence are followed. The English names in this book and the Peterson and Chalif "Field guide to Mexican birds" are

consistent, following Eisenmann with the modifications made in Meyer de Schauensee's South American books.

The descriptions and differentiation of similar species are exceptionally detailed, with strong emphasis on field identification. The most distinctive "Field marks" are italicized to facilitate rapid field identification. These are also presented on the figure legends of the plates.

One naturally turns to the "small green birds," otherwise known as flycatchers, to check a tropical guide's usefulness in field identification. The "Birds of Panama" passes this test admirably. The color plates contain large, accurate illustrations of these small birds. The field marks are conspicuous when pointed out in the text and excellent habitat and voice descriptions are provided. Suddenly small size and dull plumage are overcome and the small flycatcher group becomes interesting instead of a confusing confounded enigma.

The habitat statement that begins the "Status and distribution" section should be very useful to ecologists as well as bird identifiers. This and the "Habits" section contain a wealth of information that makes this book valuable to tropical ornithologists. Voice descriptions are given for most species and are valuable to identify species in dense tropical habitats. In some cases, voice may be the usual clue to the presence of timid species or enable one to record more accurately the species composition in a canopy mixed-species flock.

The color plates depict 523 species averaging 16 species per plate. The birds are drawn to a larger scale than in most field guides, an aspect that appeals to the eye and adds to the ease of identification. The arrangement of birds is pleasing with various postures and perch substrates adding interest. The birds appear to be in subdued light and somewhat outlined on some plates, but they are accurate and reflect field characters defined in the text.

The book contains two appendices that increase its scope and usefulness. A 16-page "Finding birds in Panama" describes in detail 26 accessible and outstanding birding areas scattered throughout the country. The other appendix, "Additional Species of Southern Middle America," lists resident species found from Costa Rica north through Nicaragua to Honduras that are not known to occur in Panama. For species that occur in this region that are not described in either the Peterson and Chalif Mexican bird guide or in the main text of "A Guide to the Birds of Panama," a brief description is given.

In total some 900 species are described in the Panama book. As a result of the appendix, with the Peterson and Chalif guide and this book, it should be possible to recognize all Middle American birds that can be identified in the field.

Keep this book protected from rain in the field, for it seems particularly vulnerable to water damage, but buy it. The book represents a true "labor of love" for both author and artist for all royalties are to go to the International Council for Bird Preservation U.S. Section for Conservation in Panama. Thus, in purchasing "A Guide to the Birds of Panama" you will gain a wealth of knowledge and contribute toward the much needed conservation of the birds it describes.—EUGENE S. MORTON.

Minnesota Birds/Where, When, and How Many.—Janet C. Green and Robert B. Janssen. 1975. Minneapolis, University of Minnesota Press. Pp. xviii + 217. One color plate by W. J. Breckenridge + 20 black-and-white photographs + 106 maps. \$9.75.—This first updating of our knowledge of the birds of Minnesota since Roberts in 1931 was well worth the wait. The authors are locally recognized as leading authorities on Minnesota birds and are highly regarded for their field skills and discrimination in screening records. The book clearly reflects the level of their expertise and gives one the confidence that this is as accurate a presentation as possible of the status of Minnesota birds through 1970 (through 1973 for casual and accidental species).

The introductory material explains contents, nomenclature, and terminology and describes the geography and ecology of Minnesota. Each species account includes information on status, abundance, migration, and breeding. All descriptive terms are precisely defined. Maps are included for species whose range boundary cuts across Minnesota. The book has three useful summary appendices on status, breeding distribution, and primary seasonal occurrence, and concludes with a bibliography and a species index.

Even though the book is of high quality and is probably a standard against which future state bird books will be compared, a couple of minor additions would have made it a little easier to use. For example, the authors' detailed definitions of terminology cover almost five pages; a summary page or table would have made it easier to refresh one's memory when using the species accounts. A second addition that would be helpful are maps of the breeding ranges for several species (e.g. Eastern Meadowlark) that do not breed throughout Minnesota even though they do not reach their geographical limit within the

state. The breeding distribution of these species is well described in the text, but maps would still have been helpful.

Persons interested in a more detailed review of this book are referred to the one by Kim Eckert (1976, *Loon* 48: 44-46), who is probably second only to Green and Janssen in knowledge of distribution and occurrence of Minnesota birds.—NORMAN L. FORD.

The Audubon Society book of wild birds.—Les Line and Franklin Russell. 1976. New York, Harry N. Abrams, Inc. 292 pp., 286 color photographs. Cloth, 9½ × 12½ in. \$35.00.—This big, heavy book is primarily a picture book with a large-type text. But what a picture book—in my opinion the best collection of color photographs and reproduction of these that I have ever seen. The text is completely nontechnical and light weight, written in simple narrative style. The chapters group birds of at least loosely similar habits and habitats, and no attempt is made to be comprehensive. For example the first chapter entitled "Wildfowl in the Millions" treats ducks, geese, swans, screamers, and loons, while another chapter entitled "Wings near the shore" deals with terns, gulls, skimmers, and jaegers, the content of each being more or less governed by the photographs chosen. The photographs have separate italic commentary, with sometimes a group of small pictures being covered by a collective commentary. No gross errors leapt at me from the pages, although such random summarization as the writing represents is bound to contain errors of omission and oversimplification. Sixty-six different photographers have contributed to the superb illustrations. Some of the photos are vivid and detailed in their perfection (see the incredible portrait of a Hyacinth Macaw), and others are imaginative in their abstraction (a dusty group of feeding vultures and a bustard running before a brush fire). I find only one annoying defect, and it is acceptable. Some photos are full double-page, spanning the seam. This works when the bird is largely on one page or the other (as with the bustard), but an unfortunate number of these find the seam cutting across the bird's head (as with a flying jaeger) or body, destroying the full effect of the photo. Printed reproduction of color photographs has come a long way, and this book is the state of the art.—JOHN WILLIAM HARDY.

State laws as they pertain to scientific collecting permits.—M. Houston McGaugh and Hugh H. Genoways. 1976. *Museology*, Texas Tech University, No. 2. Pp. 81. \$2.00.—This is a valuable source of information for those who must use specimens of plant and animal material in their research or educational work. For ornithologists it fills a gap in the information on state regulations pertaining to use of birds for scientific and educational purposes, appearing in *The Auk* 92 (3 Suppl): 1A-27A, 1975. In McGaugh and Genoways' paper pertinent information on plant and animal collecting and transportation regulation is given for each of the 50 states alphabetically arranged. It is organized usefully under such headings as: (1) Requirements and Regulations, (2) Protected Species, (3) Rare and Endangered Species, (4) Game Animals, (5) General Notes. In a discussion section interesting and sensible concepts are advanced regarding the need for collecting the better to understand presumed endangered species, the need for more scientific input in issuing permits, and more attention to publicizing new regulations beyond the governmental "registers." The report tends to be critical of regulating agencies for lack of understanding and appreciation of needs of scientists. Although it suggests that more open communication might be beneficial, it might have urged more forcefully that scientists initiate communication with the agencies and attempt to understand their public relations problems to bring about a more cooperative attitude on both sides. The report should serve as a useful basis for developing such potentially productive dialogue.—JOHN W. ALDRICH, *Chairman, A.O.U. Committee on Scientific and Educational Use of Birds.*

Gulls, a social history.—Frank Graham, Jr. 1975. New York, Random House. Pp. vi + 179, illus. \$8.95; **Spirit of survival, a natural and personal history of terns.**—John Hay. 1974. New York, E.P. Dutton & Co., Inc. Pp. x + 175, illus. \$8.95.—Graham's book on gulls is a popular account of some of the more interesting recent studies of gulls, particularly in New England. Its purpose is to introduce the layman to current field research. The author's approach is that gulls have evolved to contend with a naturally unpredictable environment and that the adaptability that this necessitates has made them well suited to take advantage of the environmental modifications caused by man. The chapters on 19th century depredations in gull colonies by eggers and plume collectors, the subsequent protection and population recovery, and the more recent population explosion with the increasing availability of food from human refuse are particularly well done.

Mr. Hay's book is, by contrast, a personal and poetic view of the yearly cycle in the life of terns. He traveled extensively, visiting tern colonies in Europe and America, and the book includes both his esthetic appreciation of their beauty, his admiration for their struggle to survive the encroachment of man on their breeding areas, and factual knowledge acquired through his researches and visits to colonies. It is well-written and often evocative, very much in the tradition of his earlier books.—MARY LECROY.

ALSO RECEIVED

The birds of John Burroughs, keeping a sharp lookout.—Jack Kligerman (Ed.). 1976. New York, Hawthorne Books, Inc. Pp. 240, illus. by Louis Agassiz Fuertes and a photograph of John Burroughs. \$3.95.—Every once in a while a book of the past is reprinted not just because it is at last in public domain and will probably sell but because it is one of the best of its kind and should not remain forever forgotten. Such a book is this collection of Burroughs' essays. I wish I could have the pleasure of reading it for the first time all over again and would recommend it as leisure-time reading to anyone with an appreciation of birds and nature.—ELIZABETH S. AUSTIN.

Birds of prey of Wisconsin.—Frances Hamerstrom. 1972. Madison, Wisconsin, Department of Natural Resources. Pp. 65, illus. by Elva Paulson. No price given.—This excellent paperback packs a great deal of pertinent and accurate information into limited space. Anyone writing regional reports for the general public would profit by using this booklet as a model. The Department of Natural Resources of the State of Wisconsin is to be commended for making such information available to the state's citizens.—ELIZABETH S. AUSTIN.

OBITUARY

RICHARD ARCHBOLD, 1907–1976: explorer, world traveler, aviator, mountain climber, naturalist, and patron of natural history studies. He was educated chiefly at private schools. Richard came early under the influence of Herbert Stoddard who lived near his family's plantation near Thomasville, Georgia. While at school near Tuscon, Arizona he became fascinated with primitive travel in the desert wilderness.

In 1928, through the good offices of Dr. L. C. Sanford, a trustee of the American Museum of Natural History in New York, Richard was invited to participate in a proposed French-British-American zoological expedition to Madagascar (1929–1931) to which his family contributed generously. This was under the general leadership of the noted French ornithologist, M. J. Delacour. Richard was responsible for the mammal collecting and study.

Once the expedition was well started Delacour and his assistant went on to Indochina as planned. Soon after this the death of Richard's father called Richard home and both bird and mammal collecting was continued by two bird men until 1931.

Richard then became interested in the Indo-Australian region and planned a series of expeditions to New Guinea. The first, with specialists collecting mammals, birds, and plants, was to southeast New Guinea (1933–34) working from sea level to Alpine tundra using conventional equipment, pack animals, and carriers.

After this experience, Archbold became interested in using airplanes for expedition transport into unexplored areas and portable radios for communication between camps. The working out of plans and special equipment occupied much of his attention. The second New Guinea expedition, 1936–37 was planned for the extensive lowlands of south New Guinea (the Fly River area) and the mountains of the central divide to the north utilizing both plane and radio. A mammalogist was added to the biological field staff which also included an ornithologist and a botanist. The loss of the plane at anchor in a sudden tropical storm curtailed field work to the extensive Fly River lowlands and travel to boat and raft.

The third expedition (1938–39) to New Guinea was to explore the country from the north coast lowlands to the top of the Snow Mountains, with a series of camps in between. This was in Netherlands New Guinea and the expedition became international with the Netherland Indies providing a military escort under a captain, a forester, and an entomologist, and also recruited a crew of Dyacks from Borneo for expedition porters.