REVIEWS

EDITED BY JOHN WILLIAM HARDY

Parallel variation in North and Middle American Screech-owls.—Joe T. Marshall, Jr. 1967. Western Found. Vertebrate Zool., Monogr. no. 1. Pp. ii + 72, frontis. (color photo), 12 × 9 in. Paper. Order from the Foundation, 1100 Glendon Ave., Los Angeles, California 90024. $3.50.—Birds of the night have held a particular fascination for a small body of ornithologists, specialists whose day really has its beginning at nightfall. Perhaps the most indefatigable of these investigators is the author of this slender volume, who brings to us in an engaging but somewhat hurried fashion some results of the first three decades of his studies.

Marshall has achieved a considerable understanding of the evolutionary relationships and ecology of screech-owls through personal acquaintance with the habits and vocalizations of these birds in widely separated areas. The result is a firmer delineation of species than was possible heretofore. The author emphasizes the importance of cryptic coloration and pattern in the lives of these owls. The resemblance of the plumage to the color and texture of bark provides concealment that is enhanced by behavioral responses, such as immobility and, presumably, selection of individual daytime roosts. Regional differences in coloration are most evident for a brief period following the annual molt, and selection by predators is envisioned as particularly severe at this time, when population levels of the owls and of their predators are greatest. The red phase, which recurs in several species, appears adaptive for concealment against foliage in broad-leaved woodlands. The author acknowledges these interpretations as extensions of views advanced earlier by Hasbrouck and by Miller and Miller.

In his systematic treatment Marshall deals with seven species of *Otus*, only four of which he considers in detail. These are the Common Screech-owl, *O. asio*, characteristically found in open-floored woodlands, the Whiskered Screech-owl, *O. trichopsis*, of denser, temperate woodlands principally to the south of the United States, the Flammulated Owl, *O. flammeolus*, of montane pine forests, and the Vermiculated Screech-owl, *O. guatemalae*, of dense tropical woodlands. Three Middle American species with which the author had no field acquaintance (*choliba*, *barbarus*, and *clarkii*) receive only brief mention. His principal concern is with *Otus asio*; 16 pages and 14 of 31 plates are devoted primarily to the forms of this complex that exist within the area of the A.O.U. Check-list. This is the only species whose range is mapped. He divides this complex into four incipient species, the Asio and Kennicottii groups (of races) of eastern and western North America, respectively, and the allopatric Seductus and Cooperi groups of the tropical lowlands of western Mexico. Since limited hybridization occurs between populations of the first two along the Rio Grande, all four groups are treated as subspecies of *Otus asio*. The author demonstrates that the ranges of the eastern and western groups do not meet elsewhere during the breeding season. The Seductus and Cooperi groups are linked to the western (Kennicottii) screech-owls by the temporal characteristics of their vocalizations, and are listed prior to the races comprising the Asio group.

The taxonomic characters stressed are the ground color and pattern of the interscapular and middle flank feathers. Patterns typical of these feathers for the seven species and most of the races referred to are illustrated with pencil sketches. Additionally there are photographs of the dorsal and ventral aspects of most of the forms of the four widespread species. Marshall's concept of geographic race is considerably

more restrictive than that of most authors, approaching that in his synopsis of song sparrows (Auk, 81: 448, 1964). Within the area of the A.O.U. Check-list he admits seven races of the western group that are 100 per cent separable from one another in plumage characters, and, correspondingly, five in the Asio group. This disposition stands in contrast to 20 named forms in Peters' Check-list (1940) and 18 of the A.O.U. Check-list (1957), excluding *O. a. suttoni*, now judged to reach the United States. Racial taxonomy of the other species is simplified accordingly, and no races of *O. flameolus* at the 100 per cent level of separation are recognized. Within the range of a given species the metropolis of each of the completely separable races is indicated, and gradients in characters are stressed without the drawing of precise, arbitrary distributional boundaries. Intermediate races that are recognizable at a "conventional" level are listed for the convenience of museum curators. Trends in geographic variation in plumage characters of the several species are described with meticulous care. Variation in mensural characters is not well-documented, but promise of such presentation in a future paper is given. Comments on type specimens suggest some reasons for the surfeit of names in the species under consideration.

The existence of striking similarities in the plumages of screech-owls of separate species of the same region is a central theme of this paper. These similarities are found in coloration and in relative coarseness of pattern, and they exist even where the populations concerned are separted by altitude or zone in the same region. Examples include *O. asio* and *trichopsis* of Arizona and the southern end of the Mexican Plateau, and *trichopsis* and *guatemalae* in northeastern Mexico and in Chiapas. Further trends are evident in the parallel development of fineness of pattern southeastward in Middle America. Regrettably these parallels in pattern are not documented by additional photographs that would permit direct comparisons. The parallels are less evident in other traits, for in *O. trichopsis* "geographic and sexual variation in wing chord and weight are imperceptible" (p. 21), whereas in the Kennicottii and Asio groups of Common Screech-owls size decreases from north to south, a trend reversed in *O. guatemalae*. Weights are disproportionately high in comparison to wing length in the Common Screech-owls (*seductus*, *cooperi*) of tropical Mexico.

Throughout these discussions is reflected an appreciation of ecologic problems, as in the consideration of species differences in size of foot (adaptive significance poorly understood), habitat occupancy and gaps in distribution, responses to man-made changes, and the concurrence of congeneric species. The author finds no support for character displacement, and he minimizes competitive interactions, although admitting that they might be of significance with critical reduction in food supply. His statement that "in the normal life of the coexisting *Otus* . . . they have behaved as if they were oblivious of each others' existence" is less positive than that in his earlier study (Pacific Coast Avifauna, no. 32: 61, 76, 1957), in which he suggested that *trichopsis* prevented *asio* from reaching normal densities in some areas where their breeding territories overlapped.

Specific distinctiveness in vocalizations in screech-owls is achieved by differences in the timing of songs rather than in pitch or quality. Common and Whiskered Screech-owls deliver both primary (territorial) and secondary (intrapair dueting) songs, whereas the other widespread species lack a distinctive song for the latter function. The author uses these vocalizations judiciously in defining species limits, and he presents spectrographic evidence for considering *O. asio* and *O. flammeolus* distinct from their Eurasian counterparts, *O. bakkamoena* and *O. scops*. The inclusion of *vermiculatus* of Central and South America in *O. guatemalae* is not supported to the same degree. Playback experiments (not described in detail) and field observa-

tions indicated that differences in songs were not effective in preventing the hybridization of *O. a. suttoni* and *O. a. mccallii* where their ranges overlap for a distance of 120 miles below the Big Bend of the Rio Grande. The songs in the zone of sympatry are as distinctive as they are elsewhere in the ranges of the forms concerned (Marshall, pers. comm.).

On the basis of resemblances in plumage and in vocalizations *Otus trichopsis* is postulated to be a small-footed derivative of the Kennicottii group of Common Screech-owls that became adapted through smaller size to living in denser woodlands at higher altitudes. In this interpretation the roles of ecologic and behavioral factors are emphasized equally, and comparisons are drawn to the evolutionary processes in the brown towhees of the *Pipilo fuscus—crissalis—aberti* complex.

The specimen material and the behavioral observations on which this study is based are difficult to obtain, and we are indebted to Marshall and to those whose help he acknowledges for their considerable efforts. While I am in general agreement with Marshall's interpretations, I wish he had presented additional supporting details. The work would have been more useful had the systematic treatment been less casual. Although synopses and lists of synonyms are presented, type localities and citations to original descriptions are not. For example no clue is given to the nomenclatural history of one of the incipient species, *O. seductus*, other than the name of the authority. Only by consulting a number of references did I realize the extent to which Marshall has clarified our understanding of the relationships of the Mexican forms of this difficult group. The lack of reference to figures and plates supporting specific statements was a source of annoyance to me, as was the inconsistent pattern of citation to the literature both in the text and in the terminal bibliography. These are minor shortcomings of this substantial contribution, and we look forward to additional reports of Marshall's investigations of this group.—KEITH L. DIXON.

The behavior of Bicolored Antbirds.—Edwin O. Willis. 1967. Univ. California Publ. Zool., 79: 1–132, text figs., tables, 3 pls. $3.50.—This monograph is the result of an intensive field study of the Bicolored Antbird, *Gymnopithys bicolor*, primarily on Barro Colorado Island in the Panama Canal Zone, and secondarily in other parts of Panama and in Costa Rica and Colombia. The description of behavior includes information on intraspecific relationships, interactions with other species, and the very important association with swarms of army ants that this species follows. The study is thorough, the methods followed seem rigorous, including the color-banding of 109 individuals, and the discussion is stimulating, bearing on basic problems in behavior and ecology where appropriate.

In the body of the text are 9 tables and 21 figures, plus additional tables in the appendices, and sonograms at the end of the volume describing vocalizations of this and associated species. The figures are generally well-executed in scale and clarity, and the volume has been fairly well proofread.

Feather postures are important components of displays. The author commendably extends the method used by Brown (Univ. California Publ. Zool., 60: 223–328, 1964, omitted from the reference list) of estimating angular changes in feather erection to describe feather postures on different parts of the body. This method is used in place of Morris's (Behaviour, 9: 75–113, 1956) earlier categories. Often no quantitative measure of erection is used, feather areas being described as fluffed. From description and figures this term seems to cover both fluffed and ruffled, *sensu* Morris. It would have been better to have adhered to his nomenclature where a more accurate measure is not practical.

No reference is made to Andrew's classic paper (Behaviour, 10: 179–204, 1956) in the discussion of possible phylogenetic (and ecological) significance of different kinds of tail movement. A comparison of his categories with those in the present paper could have made an interesting discussion even more useful.

The author considers that Brown and Hunsperger's (Anim. Behav., 11: 439–448, 1963) critique of motivational conflict theory may make such an analysis of behavior seem superfluous. Rowell's (Anim. Behav., 12: 535–537, 1964) strong criticism of that paper, or neurophysiological studies that tend to support this type of analysis, should also be mentioned, in order to draw attention to the still controversial nature of the topic.

Form and context analysis is often used in attempts to discover the origin of display components, to provide evidence about the causal basis of a display, and to elucidate display function. In the present paper Tinbergen's form analysis is applied to a study of motivational conflict underlying agonistic displays. It is concluded that although "mixed displays" may be typical for gulls and many other birds, they are rare in Bicolored Antbirds, the displays of which are "pure in form." It is not clear to me whether this distinction is based on the derivation of display components or on conflict in motivation underlying the display. These two kinds of interpretation are based on different assumptions and should be considered separately. This section might well have been expanded.

Two types of agonistic behavior are suggested: the "cybernetic" type characteristic of Bicolored Antbirds, and the "militaristic" type found in gulls. In the former "aggressive and attack behavior lead to positive feedback in the opponent, away from or past the standard posture to high intensities of aggression or submission; submissive or escape behavior leads to negative feedback, toward the standard posture." In the militaristic type "attack behavior leads to attack, or to escape by the opponent; escape behavior leads to escape; and mixed behavior gives mixed results." Under given conditions responses of Bicolored Antbirds and gulls certainly differ, but these two types of agonistic behavior do not seem mutually exclusive.

The loose territoriality of Bicolored Antbirds, in which intruders are not effectively excluded, permits both spacing out of nesting pairs (the advantages and disadvantages of this are discussed) and at the same time allows efficient utilization of a moving food source—invertebrates flushed by nomadic army ant swarms. The consequences of loose territoriality, and of the dominance relationship among Bicolored Antbirds at swarms, on the agonistic repertory of the species are discussed. Comparison of territoriality in related species of antbirds with the degree of specialization in following army ants suggests a derivation of loose territoriality from the classical territoriality more common among passerines.

A "dominance reversal" definition of territory is offered, modifying Emlen's (*Ibis*, 99: 352, 1957) definition to read: "a space in which one animal or group generally dominates others which become dominant elsewhere." The dominance reversal concept has the advantages of including cases where a distinct boundary may not obtain, emphasizing the dynamic nature of territories, and stressing the complementary roles of dominance and subordinance in effecting such a system.

The author combines keen insight and good field work with attention to basic questions upon which his data bear. The result is an important contribution to our understanding of the Formicariidae and of neotropical ornithology. Unfortunately the anthropomorphic style of much of the description detracts from the impact that a study of this nature should have.—D. W. Dunham.

Life histories of Central American highland birds.—Alexander F. Skutch. 1967. Nuttall Ornithol. Club, Publ. no. 7. Pp. i–iv + 213, 6 figs, 6 × 9 in. Cloth. Order from the Club, c/o Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts 02138. $6.00.—These brief reports on the nesting and other behavior of 39 species of highland birds, studied mainly in Guatemala and Costa Rica, make available another useful fragment of Alexander Skutch's 40 years of studies of neotropical birds. The reports on the Green Violet-ear (*Colibri coruscans*), White-ruffed Manakin (*Corapipo leucorrhoa*), Mountain Elaenia (*Elaenia frantzii*), and Common Bush-Tanager (*Chlorospingus ophthalmicus*) are fairly long; others are less complete, down to slightly over a page for the Black-throated Jay (*Cyanolyca pumilo*). Not all the birds he has studied above 3,500 feet elevation are included here, for at least 25 such species are scattered through the first two volumes of his "Life histories of Central American birds" (Pacific Coast Avifauna, no. 31, 1954; no. 34, 1960) and the forthcoming third volume will add others. As still other reports on montane birds are scattered elsewhere, a bibliography by species of all the birds he has reported on would be useful.

As in previous reports, Skutch concentrates on observations at a few nests of each species after brief descriptions of its appearance, range, altitude, habitat, general behavior, and voice. An introductory chapter discusses the places visited, weather, migration, and the low number of species at high elevations in Central America, though with few attempts at correlations or statistical analyses. He and others have regretted that his studying many species precluded more intensive studies of each one. Still, Cole (Quart. Rev. Biol., 29: 103, 1954) and others have pointed out that no aspect of the life history of an animal is likely to be without evolutionary or ecological significance, and both Skutch's introductory statements and his nesting reports suggest many significant questions.

His comments on the cold and storms during the rainy season in the highlands may surprise those who think the dry season is the winter of the tropics. In the Guatemalan highlands Skutch found that the main nesting was sandwiched in a few weeks between the clear but frosty nights of March and the cold rains of June; several young died in late nests. Ecologists who regard the climate of the tropical highlands about as constant as that in the lowlands will need this reminder that a storm or clear weather that is pleasantly cooling in the lowlands may stress nestlings or adults or destroy their food supply in the highlands.

Correlated with the rigorous climate, Skutch found a surprising number of migrants even if one excludes wintering species from North America, which are generally more common in the tropical highlands than in the lowlands. Seven of 36 breeding species in this book are altitudinal or latitudinal migrants. He notes that at least 7 of 89 breeding species on the Sierra de Tecpam in Guatemala and 16 of 132 at Montaña Azul in Costa Rica are migratory. One wonders if the lower number in Guatemala, instead of in Costa Rica where one expects a few migrants, is a result of competition from North American migrants that preempt niches local migrants might otherwise take.

Skutch does not discuss flocking patterns among nonmigratory highland species, but a brief analysis of his data suggests some questions. A few of the nonmigratory highland species flock with their own species and wander locally, but the majority join interspecific flocks and stay in their nesting areas. Among the few birds that remain by themselves during the nonbreeding months are hummingbirds and the well-named solitaires, also several flycatchers. To me the fact that these and other species of flycatchers rarely join interspecific flocks suggests that the flock members do not flush much food for each other but gather for other reasons; the main alterna-

tive to the flushing or "food" hypothesis is the "predation" hypothesis that birds get protection by banding together.

Although Skutch's introductory descriptions generally have esthetic or heuristic value, he sometimes adds comments that he must know are hyperbole. Surely the "whole purpose" of the existence of the Spotted Barbtail (*Premnoplex brunnescens*) cannot be its unique nest, no matter how delighted Skutch was to find it. The comments introducing this thought about the otherwise deficient "character" of the Barbtail (and by implication all forest birds with narrow foraging niches), although based on observations, probably give a misleading picture. Ovenbirds and woodcreepers do seem to have few calls and behavior patterns, and more research is needed to see why. The one species I have studied intensively, the Plain-brown Woodcreeper (*Dendrocincla fuliginosa*), probably has few because it is basically solitary in its peripheral niche over swarms of army ants. Other forest-dwelling species, such as antbirds, are full of lively behavior patterns once one spends time studying them and overcomes their initial timidity. Birds of the open perhaps tend to be initially more attractive to man partly because they are easy to see and find, partly because he is moderately familiar with them, and partly because they more often have bright colors or striking songs that are superfluous in the permanently mated and settled birds of the deep forest.

The main parts of Skutch's reports, on nesting, often suggest other questions when correlated and analyzed. Do sheltered or domed nests, moderately frequently used in the highlands, protect the young from predators or from the storms that kill young in open nests, such as one of the Chestnut-capped Brush-Finch, *Atlapetes brunneinucha*, in this book? If so, is the labor of building a domed nest or the difficulty of finding enclosed sites the reason that 20 out of 34 highland species in this book build open nests, while only 7 build domed nests, 5 take sheltered niches, and 2 nest in tree holes? Two species that nest in niches (the Flame-throated Warbler, *Vermivora gutturalis*, and the Common Bush-tanager, *Chlorospingus ophthalmicus*) nest from the ground to the treetops, an unusual range unless sites are limited at any one level.

Crook (Behav. Suppl., 10, 1964) noted that weaver birds of savannahs have larger clutches than those of forests, and Lack (Ecological adaptations for breeding in birds, London, Methuen, 1968) gives other examples supporting this contention. The data Skutch presents (1 species with a clutch of one, 18 with two, 9 with 3, and 1 with four) suggest a similar trend—deep-forest species in the highlands generally lay fewer eggs than do "edge" species. In the warblers (*Basileuterus* spp.) and bush-finches (*Pezopetes*, *Pselliophorus*, *Atlapetes*), the species of continuous forest lay one or two eggs and the scrub or woodland species lay three. The Lesser Goldfinch (*Spinus psaltria*) of open country lays four eggs and the Yellow-bellied Siskin (*S. xanthogaster*) of the forest edge lays three. Predation may be greater on the nests of deep-forest birds, as the Snows have noted (Wilson Bull., 75: 27, 1963), but the birds of edge situations may be exploiting superabundant foods more than the forest species. Comparisons of feeding and survival rates of adults and young, at and away from the nests, would be interesting in these and other genera that span several habitats.

It is surprising that the female incubates alone in 18 of 22 of Skutch's highland birds. Both sexes take care of nests in the antbirds, woodcreepers, puffbirds, and trogons that dominate lowland forest-interior habitats. In contrast the males of hummingbirds, warblers, tanagers, and finches of high altitudes and of the manakins, cotingas, and flycatchers of secondary woodland or forest edges typically give the female less help building the nest or incubating or feeding young. Do the variable, island-like, montane and open to patchy habitats offer the female such an abundance of food

that it matters little whether the male helps her at the nest or not? Fruit and nectar eaters are birds of especially patchy habitats that often have polygamous or "lek" types of mating. Some of the flycatchers that show lek behavior and do not help the female, such as the Scaly-crested Pygmy-Flycatcher (*Lophotriccus pileatus*) of this book, were probably, before man created second growth, restricted to streams or local patches of dense growth around treefalls, landslides, or hilltops—all variable habitats with few competing species and probably with food surpluses. By contrast the ant-following antbirds I have studied in lowland Panama distribute their territories evenly, suggesting a more diffuse food supply that two birds cooperating at the nest can utilize more successfully than one. As Smith (Ecol. Monogr., 38: 31, 1968) has calculated for squirrels, it may be better in areas of localized food for the female and young alone to deplete the food supply near the nest without the male's help, if the food he consumes locally results in both parents having to travel long distances to the next patch. It would be interesting to see how far lone females go to feed themselves and young compared to cooperating pairs in related species.

One hopes Skutch or others will eventually publish bibliographies and tabulate these and other data he has scattered through his various reports, all of which are valuable introductory references but somewhat cumbersome to extract data from. General articles on what Skutch has found about the role of altitudinal migration and correlations between habitat and nest construction, clutch size, or social systems, would also be most interesting to workers on tropical birds.—Edwin O. Willis.

Galapagos: islands of birds.—Bryan Nelson. 1968. London, Longmans, Green and Co., Ltd. 338 pp., 57 photos, numerous line drawings and 1 map, 6 × 9 in. 50 shillings.—Bryan Nelson, an ethologist trained by Tinbergen, has specialized in seabird behavior, and in particular that of the family Sulidae. He began with the North Atlantic Gannet at that classic site, Bass Rock. Then in a complete shift of locale, he and his wife left for a year of field work in the Galapagos Islands. No less than 7 months of this period were spent on the little, waterless, desperately hot island of Tower. Precariously dependent upon a finicky solar still for drinking water, and unable to risk fishing outside the shallow bay at their doorstep (or tent-flap), they were subjected to severe physical and psychological stresses as they studied the world's largest colony of Red-footed Boobies (*Sula sula*) and smaller numbers of White Boobies (*S. dactylactra*) and Great Frigate-birds (*Fregata minor*).

Nelson's book seems to me a masterpiece of semipopular natural history writing. The sulids are a remarkably varied family as regards behavior. Nelson describes this in the several species in great detail; he analyzes the evolution and significance of the behavior where it can be explained and sets forth the problems where information is not yet adequate to do so. For example, the young gannet is fed copiously and loss of nestlings is low; but when the young scale down into the blue Atlantic, too heavy even to fly for days thereafter, they are entirely on their own, and several die for every one that finally masters the intricate pattern of diving for fish. "Blue water" (offshore) feeding tropical boobies are just the opposite; food is often scarce, sometimes so much so that eggs are abandoned wholesale, and sometimes a very high percentage of the chicks starve. But once fledged, mortality is low; the juvenals return to the nest site to be fed occasionally by their parents until, in the case of the Red-footed Booby, they are 8 months of age. Chapters on the Galapagos Albatross and on the Great Frigate-bird, whose mating and nesting habits prove to be as bizarre as it is structurally, round out the picture, along with a chapter or two on expedition things in general.

One finds very little to quibble with in this book. I would hardly regard the skuas as a southern family, since all four of the species in the family occur in the north, only the Great Skua (one or two species) having reached the southern hemisphere as nesting birds. I also thought the discussion of population regulation, especially in the albatross, a bit fuzzy in places. We cannot, of course, know why Hood Island supports roughly 3,000 and not 300 or 30,000 pairs of Waved Albatrosses, but it is not difficult to provide a theoretical background as to how the population may be limited to some more or less constant size. A year or two later, during a wet year, hordes of mosquitoes prevented the albatrosses from nesting at all (R. T. Peterson). On a few questions one would have welcomed the author's opinions, even if no more than that. Why does this albatross nest *only* on little Hood Island? And what possible selective reasons are there for the rather pronounced superiority of size in the female of various kinds of boobies, but not in the gannet?—D. AMADON.

Frank M. Chapman in Florida/his journals and letters.—Compiled and edited by Elizabeth S. Austin. 1967. Gainesville, Univ. Florida Press. Pp. vii + 228, illus., 6 × 9¼ in. $7.95.—As I read this book, I kept thinking: what a *good* job Mrs. Austin has done with this material. For it is, indeed, a highly competent and imaginative compilation of (often fragmentary) journals, letters, and collateral material. The result is a coherent and very readable account of some of Chapman's trips to Florida. Even more interesting, it affords an excellent picture of that state when it was a relatively untouched and wild area.

In 1886 at the age of 22, Frank M. Chapman made his first trip to Florida, accompanying his mother for a 6-month stay in Gainesville. Mrs. Austin presents a convincing argument that "FMC" suffered serious respiratory illnesses in his early years, and that the many winters spent in mild climates were not only helpful to his ornithological studies, but also necessary to his health. During that first winter in Gainesville he made a collection of 581 specimens and recorded a total of 149 species in the area. These were the foundation for his first major scientific publication: "A list of the birds observed at Gainesville, Florida" which appeared in the Auk in 1888. In the years following, Chapman spent many months at his mother's permanent winter home in Gainesville and took trips to other parts of Florida to collect for the American Museum of Natural History. The accounts of his field work from 1886 to 1890 in Gainesville, and especially his trips to Micco on the Indian River and down the Suwannee River to the Gulf of Mexico, take up more than half the book. They are by far the most interesting pages to read, offering both a picture of FMC as a sometimes serious, sometimes exuberant young man, and vivid descriptions of early and wild Florida.

From the letters and journals of William Brewster, Mrs. Austin has pieced together an excellent account of the trip he and Chapman made down the Suwannee River in 1890. It affords an illuminating description of that almost primeval area, with its fauna virtually intact. During FMC's early days in Florida the state was still largely wilderness, the only major avifaunal changes being the decimation of herons and larids by plume hunters, and the disappearance of the Carolina Parakeet. Changes since the turn of the century have, of course, been extensive. In the final chapter, Dr. O. L. Austin, Jr., the author's husband, has made a detailed comparison between the birds FMC recorded during the 1880s and those now found in the Gainesville area. In a 38-page annotated list he has documented the changes from Chapman's original list,

and recorded 93 species added by later workers. Of these additions, probably only four were common in 1886. It is indicative of Chapman's acumen that, even at age 22 and in a new faunal area for a single winter-spring season, he missed so little.

The last half of the book consists of journal excerpts, letters, and collateral material dealing with Chapman's later years in Florida. They are often frustratingly fragmentary, being tag ends of trips about which FMC himself had published. Mrs. Austin has also included newspaper clippings and other material gleaned from a variety of sources, illustrating FMC's career, the effect Florida had upon it, and especially his efforts at bird conservation in the state. The book concludes with Chapman's journals written in Miami from 1932 to 1934. These, primarily notes on the birds of his garden, offer an interesting contrast between the eager young ornithologist of the early journals, and the now mature scientist. The book ends with an 11-page bibliography of FMC's published writings and a short index.

The only real disappointment in the book is the sparseness of illustrations. Reproductions of several hand-written letters (such as one from a very young T. Gilbert Pearson growing up near Gainesville), sketches, and cartoons are particularly interesting. Most of the four pages of photographs are appropriate, but I wish more could have been included, even if it meant reusing some of the pertinent ones in FMC's own books. I also wish that the publisher had seen fit to aid the non-Floridian reader with an early map of the state. Those familiar with the area would have welcomed the addition of Chapman's collecting localities (along with a date and scale) to the endpaper topographic map of early Gainesville.

The only other quibble I have with this book is that it simply isn't long enough! To keep within the scope of Chapman's unpublished writings in Florida, it obviously has been necessary to cut off sequences where they extended into previously published material, or where they were ended, rather in midair, by Chapman himself. As a result, the reader is occasionally left with tantalizing bits that I wish could have been enlarged to finish out the episodes. As it is, however, Mrs. Austin has done a beautiful job of collecting these fragments into a readable whole. She has annotated and knit them into a fascinating story without in the least intruding upon Chapman's writings. It is only a compliment to her and to Frank Chapman that one wishes there were more between these particular covers.—MARY HEIMERDINGER CLENCH.

Waterfowl in Australia.—Harry Frith. 1968. Honolulu, East-West Center Press. 328 pp., 5 col. pls., 32 photos, 39 maps and figures, 6½ × 9½ in. $10.00.—Few continents have a more fascinating group of waterfowl than does Australia. There are only 19 native breeding species, and most taxonomists place the 6 endemic forms in monotypic genera. Little has been known of any of these species, and the present volume therefore has been eagerly awaited. Although this work covers a wide range of information, it is essentially a one-man effort. Frith, Chief of the Division of Wildlife Research of the Commonwealth Scientific and Industrial Research Organization, has studied most Australian species in their major habitats. Recently he has directed the research efforts of co-workers who continue to contribute a vast amount of knowledge on the biology of Australian waterfowl.

The general plan of the book is a comparatively brief (43-page) review of the taxonomy, general habits, breeding biology, habitat relationships and conservation of Australian waterfowl. Much of the data reported in this section are based on work previously published by Frith. Pertinent comments relate Australian waterfowl to those of the world, and they demonstrate an excellent knowledge of the subject. A

section on field identification contains drawings of ducks on the water and in flight; these are crude by Frith's own evaluation, but they are functional. Many readers will feel that the approach in this section is a profitable one which could have been expanded.

The bulk of the book (ca. 275 pp.) is devoted to species accounts. The 19 life histories of major species average 13 pages each; the 2 on stragglers and 2 on exotics average 4 pages each. All accounts are arranged taxonomically, basically following Delacour (Waterfowl of the world, 4 vols., 1954–64) except that the Freckled Duck (*Stictonetta naevosa*) is considered in a separate tribe, stictonettini of the Anserinae, and the Chestnut Teal (*Anas castanea*) is regarded as conspecific with *Anas aucklandica* of New Zealand. The former judgment is based on Frith's own work, the latter on work in New Zealand; both seem reasonable assumptions. Frith also follows Woolfenden (Postcranial osteology of the waterfowl, 1961) in recognizing a separate tribe, Cygnini, for the swans.

Some of the species accounts seem long, but it must be remembered that the biology of most of these species has been little known and that these are definitive summaries. Here, as in the entire book, the author makes a point of clarifying what is and what isn't known. References are by number—an inconvenience to the scientist but a pleasure for the many laymen who will find the book extremely useful. Some readers will prefer more complete documentation of statements. The distribution maps are well done, although the use of the same symbols for different purposes on different maps is somewhat confusing. Where pertinent, maps include New Zealand, New Guinea, and Asia.

Accounts include the following categories for most species: References (= nomenclatural history), Other Names (= vernacular names in Australia and elsewhere), Description (by age and sex), Size, Voice, Routine (= general habits), Relationships (= taxonomic review which includes waterfowl of the world), Field Recognition (sometimes long but more meaningful here than being overly specific in the general section), Habitat, Distribution and Movements (often based on excellent banding data), Food and Feeding (often reporting detailed results of research), Breeding (age, chronology and environmental relationships), Nest, Eggs, Clutch, Incubation, Development of Young, Status, and Source of Data.

Vernacular names are a problem everywhere and Frith obviously had difficulty finding names that would be acceptable on his own continent, much less finding ones acceptable around the world. Names like Hardhead for the Australian White-eye (*Aythya australis*) or Burdekin for the Radjah Shelduck (*Tadorna radjah*) infer nothing of the birds' taxonomic affinities. Descriptions are by general color terms. Size is shown by means of large samples, but no measures of dispersion are provided. Measurements of "wingspread" and "length" will be of value mainly to sportsmen, but weight, "bill," and wing measurements also are given. Sonograms are presented for most species—a "first" for any book on ducks. Comments on vocal behavior aid the reader in understanding visual rendition of sounds.

Northern hemisphere readers will find numerous items of special interest called to their attention. Most Australian waterfowl are "nomadic" rather than migratory, and movements are water- and food-related. Breeding of most species is induced by water levels, rather than by light cycles as in the north. In spite of the desert conditions, many species are tree-hole nesters and several utilize ground burrows or rock shelters. The eclipse plumage occurs in several species, and the definitions and use of that term create some confusion. The Blue-billed Duck (*Oxyura australis*) is reported to have a complete prenuptial molt involving the wings and tail. In several

species females clearly exceed males in size, a situation that seems rare among waterfowl. Some conservation problems there resemble those of the U. S. A.; for example, the impact of irrigation in drying the seasonally-flooded marshes that constitute the major breeding areas. Another problem common to many countries, but not well appreciated in the U. S. A., is that harvest and conservation programs are state rather than nationally controlled. This could create serious problems in establishing policies and balancing utilization of this resource.

Illustrations are interspersed throughout the text. The five color plates by Betty Temple Watts illustrate all species and brighten the book. They are fresh, bold and, although a few postures and eye positions may be questioned, generally good. The only apparent error is the illustration in Plate V of *Aythya australis* which overemphasizes the eyeline. Some of the ducklings in the same plate seem to be of different ages. The Freckled Duck duckling probably is figured here in color for the first time.

The photographs, mostly by Ederic Slater but with some by Frith, complement the book nicely. They include a few portraits of single birds, but generally they show flocks and habitat and give the reader a real feeling for the Australian waterfowl scene. The shots of ducks underwater are the best I have seen, and show the ducks' use of the nictitating membrane and the lateral action of the feet during diving. Placement of photos near related text material could have been better.

In general the style is readable and clear, but some sentences are rather long and complex and a number of statements are anthropomorphic. No book of this scope goes to press without a few errors. Minimum-maximum wing measurements of *Aythya australis* have been transposed on page 244. There are a few misspellings and a few misplaced commas. The type is large and readable, the binding is adequate, but the paper is somewhat soft. Considering the many illustrations, the book is a good buy at $10.00.

Many North Americans will consider this book the "Kortright" (Ducks, geese and swans of North America, 1942) of Australian Waterfowl—but it represents mostly original work, personal experience with nearly every species and habitat, and is the product of a dedicated career in search of ways to conserve Australian waterfowl. No waterfowl specialist or enthusiast will want to be without it; most ornithologists will find it a significant and attractive addition to their library—MILTON W. WELLER.

ALSO RECEIVED

Common bird songs.—Donald J. Borror. 1967. New York, Dover Publications, Inc. 12-inch, 33⅓ rpm monophonic recording; supplementary 27-page booklet inserted in recording sleeve, illustrated with numerous drawings. $2.50.—Borror is one of the pioneers in bird song recording, and one of the first biologists in this country to use recordings in biological research and to perform spectrographic analysis with the sonograph. This recording deals with 60 species characteristic of eastern North America. For the majority of these he presents several vocal variants from different individual birds, rather than merely the presumed most characteristic sound produced by each species. The booklet treats 54 species, mostly passerines of deciduous forests of eastern North America; it gives a nontechnical description and discussion of each vocalization to be heard of 11 species (with two or three variants for three species), and a table showing locality and month in which songs were recorded.

The recording, made largely for the commercial popular market, has more sci-

entific value than many such recordings because of the attention given to variation in song of the treated species. Nevertheless I am hopeful that in the near future, we shall see forthcoming on records extensive treatments of the vocabularies of species with emphasis placed on context of each vocalization as seen by the recordist, and accompanied by notes on time of day, weather, habitat, and other pertinent factors. I am also hopeful that more records dealing with specific groups (such as the currently available Ontario Federation recordings of finches and warblers) on a comparative basis will soon become available either on tape or disc. Our growing numbers of serious amateur ornithologists, many of whom now carry recorders and recordings into the field to tape voices of birds and attract shy species with playbacks, should form a healthy market for scientifically oriented long-play records of this type; the bioacoustically oriented scientist stands to gain much in the process.—J. W. H.

A contribution to the ornithology of Zambia.—C. W. Benson and M. P. S. Irwin. 1968. Oxford Univ. Press (for National Museums of Zambia), Zambia Mus. Paper no. 1. 139 pp., 6 × 9 in. $5.00.—This is an extensive contribution, modestly presented as a preliminary paper in anticipation of a complete work on the birds of Zambia, now in process of compilation by the two authors together with R. K. Brooke. It treats some 240 species of birds, presenting new information and other details, which it is felt it would be impracticable to include, except by brief reference, in the projected volume. By far the greatest part of the new information here presented stems from field work from 1962 to 1965, largely in western Zambia. Being a mass of discrete data on each of the birds included, the present paper does not lend itself to convenient summarizing, but it is and will remain an important "source" book even after the more ambitious volume is issued. The present one should be in the working library of all students of African ornithology. As the first in a series of Zambia Museum Papers, it supersedes the Occasional Papers of the Livingstone Museum.—HERBERT FRIEDMANN.

The pictorial encyclopedia of birds.—J. Hanzak. 1967. U. S. Ed. New York, Crown Publ., Inc. 582 pp., 1,075 black and white photos, 45 col. pls., 6¼ × 9 in. $10.00.—This book was originally published in Czechoslovakia. The present English language edition is edited by Bruce Campbell (who also provides a Foreword) with Ned R. Boyajian as American consultant. According to the dust jacket, nearly 1,000 species representing every major group of birds are discussed. Campbell's foreword consists mainly of an elementary discussion of bird classification and the taxonomic system. There follows a 14-page introduction which includes brief summaries of reptilian affinities, the fossil record and geologic history of birds, their anatomy, physiological peculiarities, reproductive characteristics, general behavior, nests, eggs, parental care, young, flight, geographic and ecological distribution, migration, and number of living species. The main body of the work is, I estimate, about 75 per cent photographs, 25 per cent text. The book seems intended for the same audience and purpose as Gilliard's "Living birds of the world" (1962) but its textual material is more tersely presented and slightly more oriented toward brief discussions of selected species, rather than containing summaries of families or other taxonomic groups. The work shows some emphasis on Old World species but is surprisingly well-balanced in this respect except in the passerine families. This is not a criticism, and as a matter of fact, the average American amateur ornithologist to whom the work will have the greatest appeal might wish to have the book as his mainstay encyclopedia, in

order to become more familiar with the many Old World forms. In a brief perusal, I discovered no glaring errors in the presentation of biological facts or theories. The photographs for the most part seem to be of wild birds in their native haunts. A few are obviously aviary birds (see parrots, hornbills, pigeons, hawks, for example) and still fewer are of mounted specimens. Some of the latter are justified (the extinct Huia) while others are not only unjustified but are detractive (Quetzal, Squirrel Cuckoo). A few photos are obviously retouched (Great Bird-of-paradise) while others have a stark, grainy, journalistic informality. Yet, the majority of the illustrations are good and a few are outstanding. Among the latter are those of the Hawk Owl (p. 367), Song Thrush (pl. 32), and Common Dipper (p. 458). The volume is printed on heavy, nonglossy paper in small type (about an 8 point) and is sturdily bound in cloth. It is one of the best foreign imports among general and semipopular works on birds that I have seen recently.—J. W. H.

An extensive bibliography on falconry, eagles, hawks, falcons, and other birds of prey. Part 1, falconry and eagles.—Richard R. Olendorff and Sharon E. Olendorff. Published by the authors. 78 pp., 2 drawings, paper covers, stapled, offset printed, 8½ × 11 in. Available from the authors, Aggie Village 7-D, Fort Collins, Colorado 80521. $4.00.—A labor of love, displaying considerable diligence and bibliographic scholarship, this listing of 2,348 titles comprising part 1 should be a valuable addition to any ornithological library. Its author-imposed limitations are as follows: it will be restricted to works on falconry in the English language, exclude titles on vultures, condors, caracaras, kites, and diurnal owls, and will generally ignore information in works dealing with birds on a broader scale than the birds of prey. Scanning the entries I find notices from the standard journals, falconry newsletters and magazines, newspapers, and many organs one would not often think to look in for pertinent information on the subject (e.g. the Metropolitan Museum of Art Bulletin). Titles span hundreds of years, from the early classical literature through 1967. Citations are basic, not including information on illustrations, source of availability, or other descriptive and critical annotation. Nor is the work divided into subcategories of falconry or into taxonomic units, etc. Annotation and categorization would increase the usefulness of the work, and the authors might consider such emendation for future parts.—J. W. H.

Penguins/the birds with flippers.—Elizabeth S. Austin. 1968. New York, Random House. 83 pp., numerous black and white photos, 6¾ × 9¼ in. $1.95.—This book is written for children of, I would judge, about ages 9 to 15. Set in large type and set forth in simple but uncloying prose, it is an entertaining summary of the natural history of penguins and man's encounters with them in his exploration of the Antarctic. All 15 living species of the order are discussed and the author is successful in achieving a balance between the good-humored nontechnical approach needed for young people and the scientific accuracy we now expect in nature books for a juvenile audience. Mrs. Austin has had no personal field experience with penguins and duly acknowledges her husband Dr. Oliver Austin's experiences in Antarctica, the writings of Murphy, Pettingill, Penney, Prevost, et al. and the advice of William Sladen and her colleagues at the University of Florida as sources for her writings. —J. W. H.