REVIEWS

EDITED BY JOHN WILLIAM HARDY

Life histories of North American cardinals, grosbeaks, buntings, towhees, finches, sparrows, and allies.—Arthur Cleveland Bent and Collaborators. 1968. Washington, D. C., U. S. Natl. Mus., Bull. 237. Pp. i–xxvii + 1–602 + pls. 1–32 (part 1), i–xi + 603–1248 + pls. 33–67 (part 2), and i–viii + 1249–1889 + pls. 68–78 (part 3), 3 color frontispieces. $8.25.—The completion of an ornithological series as important as the Bent Life Histories is an exciting event. Here is a series of 21 volumes, spanning a history of nearly 60 years from inception to completion, containing over 9,500 text pages of information about North American birds, largely the work of one man—who was not professionally an ornithologist. One cannot well review the final number of such a series without considering the series as a whole and that volume relative to the rest of the series, when the authorship of the last is different and varied.

Arthur Cleveland Bent, in 1910, undertook the task of completing the work of Major Charles E. Bendire on the nests and eggs of North American birds. Bent soon saw the necessity of expanding the scope of the project into complete life history studies. He worked on the series for approximately one-half his life, for some 45 years, and saw twenty volumes completed, although the last completed was not yet published when he died. Wendell Taber, whom Bent had asked to carry on the work, saw that volume through the press and took steps toward completing the last and largest volume, in part by enlisting the aid of other ornithologists, before his death in 1960. Oliver L. Austin, Jr. then assumed the responsibility of finishing the job, and succeeded admirably in coordinating the work of many, adding much of his own, and producing a volume of which Bent would be proud. Austin's introduction to the three-part volume on the Fringillidae gives a good account of the history of the series and in itself serves as a worthy review of the book it introduces.

How does one judge the value of the Bent Life Histories of North American birds? The price set on the early volumes, long out of print, by book dealers and bibliophiles certainly does not tell us anything about the merit of the contents. Perhaps the fact that Dover Publications has seen fit to reprint the entire series is a better indication of the demand for, and thus the value of, Bent's efforts. Even more to the point is the extent to which the series is used, by both professional and amateur.

For many species of birds—for a shameful number, in fact—the life history account prepared by Bent is the most recent or the only summary of information available; this is as true for birds covered in the earliest volumes as for those in the more modern ones. It is no wonder that the Bent series is a starting point, or a beginning reference point, for most contemporary research programs dealing with North American birds. If a question about food, courtship, or some other aspect of avian biology arises, a common reaction is to look to see what Bent said about it. The comments made by Bent, or the references given by him, have saved countless searches through the older literature. The series is cited with great frequency and regularity in present day ornithological writing—a quick check through recent volumes of The Auk and The Wilson Bulletin reveals an average of 1.5 citations to the Bent series in each number of these journals. This constant consultation and repeated reference to Bent certainly reveals the great value of the series.

This is not to say that the Bent series represents the ultimate in ornithology. No denial can be made of the fact that the entire set of life histories is out of date. The references given by Bent are not always accurate, and require careful verification.

There is little or nothing on physiology, orientation, or behavior in the modern sense. It is not a place to look for information about molt. Many of the titles are cumbersome, and some are ambiguous or misleading. Many of the photographs are not particularly valuable, and some are not even very good. The breakdown of the accounts by subspecies leads to repetition and fractionating of information, and is especially annoying when the old racial subdivisions are no longer recognized. This breakdown, too, may be misleading for the unwary as it tends to emphasize supposed differences of minor actual importance. But these are not so much criticisms of Bent and his work as they are indications of the state of knowledge and of the biological concepts in the time in which he began his work and in which, indeed, he completed most of it.

As the conclusion of the series, the present volume, which covers the family Fringillidae, is very close to its predecessors in content, style, and format. In general the 5th (1957) edition of the A.O.U. Check-list was followed for scientific nomenclature, but common names for subspecies were taken from the 4th (1932) edition, with some modifications. An important innovation is the grouping of several subspecies, in highly variable forms such as the Song and Fox Sparrows, into a single account. This procedure could have been followed with good effect in many other species as well, but I suppose one must be careful with new ideas when completing another's work.

Although Bent relied heavily on his colleagues for information, the great majority of the species accounts in his volumes were his own writing. This volume differs in that only a few accounts are his, most having been written by others. There are several consequences of this, not the least of which is a great variability in emphasis, quality, and authority of the accounts. Probably in this respect as much has been gained as was lost. Although the accounts were written in, or edited into, Bent's style of writing, they lack the flavor of Bent's own writing. Introductory portions of the accounts too often seem stilted, flat, and impersonal, lacking the warmth and feeling of Bent's flowing prose. Perhaps this, too, is a reflection of the difference in time, and of the more "scientific" attitude of the present. To that extent, we have lost.

It takes but little imagination to realize the many difficulties that Oliver Austin, Jr., faced in producing the final volume in this set. The mass of manuscript and the volume of verbiage with which he had to contend were far greater than the 1,890 printed pages that we see in the result. There were over 100 contributors, each undoubtedly with his own version of Bent's style and perhaps often with contradictory bits of information. Many of the accounts were old, some dating back to 1949, and were in need of modernization. Most of the "criticisms" that I shall make of this volume are actually unavoidable consequences of the nature of Austin's task.

The work is in three parts, but the covers bear no indication of what each part includes. A complete table of contents covering all three parts appears in part 1, but parts 2 and 3 each contain only a listing of their own contents. With repetitive use one will soon learn where the splits occur, so that selection of the appropriate part from the shelf will be no major problem. The Literature Cited is found at the end of part 3 only. This means that part 3 must also be at hand when one is studying an account in part 1 or 2. As annoying and awkward as this is, I really see no feasible way by which the situation could have been avoided.

Referring to individual accounts in this volume proves to be awkward, and will probably provide a good number of editorial headaches over the years. The accounts are headed by the scientific name, followed by the vernacular on the next line. What, if anything, constitutes the title of an account? In a bibliographic citation, is Bent et al. listed as author, or should it be, for example, Linsdale *in* Bent et al.? I hope that

we may have an editorial dictum on this point, hopefully covering all major journals, in the near future.

As noted above, the accounts were written over a long period of years. It is extremely unfortunate that at least an approximate date of completion was not included for each section. To update an account, or to find out what's new, where do we begin a literature search?

Some attempt was made to update the older accounts, but this apparently was directed mainly toward the distribution sections. This has resulted in some contradictions in the sections of the accounts. For example, we learn on page 263 that the Newfoundland Purple Finch "has not been detected with certainty outside Newfoundland" but that it is "casual in Illinois." There are other similar discrepancies. Even more unfortunate is the lack of updating in the accounts completed by Bent himself. For example, nothing is said of the modern status of the Guadalupe House Finch, even though Howell and Cade (Condor, 56: 283, 1954) discussed this form. Similarly, the status of McGregor's House Finch, from the San Benito Islands off Baja California, is not mentioned although its extinction has been forecast for 40 years and the prediction seems to have come true (see Banks, Trans. San Diego Soc. Nat. Hist., 13: 182, 1964).

Some idea of the general age of the accounts may be obtained from an inspection of the literature citations, a section of 111 pages. Of the more than 2,000 references, only about 150 are from 1960 or later years, and only 25 are from 1964 or later. One cannot expect a work of this magnitude and of this scope to be completely up to date, but it is a shame to have essentially lost the eight years just prior to publication.

I have said little about content. I have not, admittedly, read each account in this volume, and I do not intend to search for and pick at each detail of misinformation or every questionable fact. Such errors must be there, as they are in every book and as they are in the earlier volumes of the Bent series. These are best noted and discussed by future authorities on the species concerned. Many will get this volume merely to complete their sets, and not worry about the contents. Those interested in the contents will, hopefully, be intelligent enough to interpret them properly.

Finally, a word about color plates. Each of the three parts in the Fringillid volume was to have a color frontispiece. For part 1 this is a photograph of the male Lazuli Bunting at the nest; for part 2, a painting by Arthur Singer of adult and juvenile Dusky Seaside Sparrows; and for part 3, a painting by John A. Ruthven of the subspecies of Smith's Longspur. Singer's contribution, in my opinion, is by far the best and the most worthwhile. Smith's Longspur was a poor choice for a color plate, for the "subspecific" variation in that bird is apparently of a seasonal rather than geographic nature, a fact that came to light as the volume was in press and when it was too late to do anything about the plate.

Unfortunately, not all parts of every volume have the color frontispieces, and this is a story in itself. Dover Publications, Inc., planned to use the plates in its reprint edition of this volume, and generously agreed to supply the Smithsonian Institution with copies for the original run. While the number requested by the Smithsonian was sufficient for the copies needed by the Institution, it was not great enough to provide plates for extra copies printed for distribution by the Government Printing Office. As the plates were inserted at the time of binding, and the parts were assembled into sets, random mixing took place which resulted in some sets having all the plates, some none, and some with various combinations. Because the number of plates available is less than the number of copies printed, there is no way that this situation can be remedied.—RICHARD C. BANKS.

Bird guide of Thailand.—Boonsong Lekagul. 1968. Bangkok, The Association for the Conservation of Wildlife, 4 Old Custom House Lane, Bangrak. 272 pp., 78 col. pls., 9 black and white pls., 1 line drawing, 1 col. map, 6 photos, 5 × 7½ in. $7.50 (foreign orders please add $1.00 for mailing).—This book is the spare-time work of one man, a busy M.D. and the outstanding naturalist and conservationist of his country. Dr. Boonsong wrote the text, painted the pictures with poster paints, took the photographs, and herded them all through a local non-English-speaking printing press. Compare the jacket painting of pittas, rendered by a newer process, with the same plate inside, page 127, and you will see the problem encountered in color reproduction.

The scientific basis of "Bird guide of Thailand" is Dr. Boonsong's own collection, which has been worked up by Mr. Kitti and the various experts acknowledged, including Herbert Deignan, whose nomenclature of the 1963 "Checklist of the birds of Thailand" is followed. The book's purpose is to educate the young people of Thailand to recognize and thus appreciate their own magnificent wildlife that survives in the few remaining forests. Their culture holds the jungle as something to be cut down and its avifauna to be captured and eaten or destroyed.

Though covering the 830 full species that occur in Thailand, the compact guide fits in your pocket. Symbols for abundance, status, and occurrence (explained inside the jacket and on pp. 151, 153, 249) make the plates nearly self-sufficient. A frontispiece portrays the newly-discovered White-eyed River Martin (*Pseudochelidon sirintarae* Kitti), followed by Dillon Ripley's introduction and Dr. Boonsong's preface, both emphasizing conservation. A colored map of vegetation and zoogeographic regions of Thailand precedes references, a glossary of English terms explained in Thai, a Thai introduction, illustrated bird topography, and some photographs of living birds. Plates and species text take up the remaining 252 pages, exclusive of terminal indices in Thai and in English. There are from 9 to 30 birds per color plate. Those on a given plate are drawn to the same scale, in natural positions, and facing the same way to facilitate comparisons. Portraits of the 13 species of barbets, heads only, all on one page, are especially good.

Text for each full species compresses into 5 to 8 lines a serial number corresponding to the plate, English name, genus, and species, Thai name (mostly coined) in Thai letters, the same in phonetic English, an expression of size, length in centimeters, distinguishing features (referring to the inevitable Peterson "pins" sticking into the pictures, which fortunately come near or right opposite the text), comparisons and call notes for some, seasonal status if not resident, distribution by zoogeographic sections of the country, and habitat.

Anxious to avoid and to correct errors, and with no pretense at infallibility, Dr. Boonsong added some Golden-backed Woodpeckers to the final plate in order to get their malar patterns right. After the plates were set up, Ben King found about 40 and Mr. Kitti 2 additional species in the country, necessitating extra color plates and text in the back of the book. Most of these discoveries are reported here for the first time.

"Bird guide of Thailand" is the *only* regional book in southeast Asia, besides the excellent volumes of Bertram Smythies on Borneo and Burma, that provides a reasonable expectation of identifying the entire avifauna of a country—except possibly some of the immature hawks. The staggering deficiencies of previous literature, ranging from outmoded nomenclature to excessive lumping and downright piracy from "Fauna of India" made it necessary on field trips for King and Marshall to carry a whole library centering around Smythies, Stuart-Baker, Deignan, Shaw,

LaTouche, Ripley, Kobayashi, and Cheng. Now Dr. Boonsong's book makes it unnecessary to carry this library right into the field, and "Bird guide of Thailand" fulfills its role as a field identification manual. I contend that it becomes also a major zoogeographic work of reference, purely without conscious design of the author. Here we find for the first time in Thailand ornithology 1) an accounting for the vast difference in scientific nomenclature between Deignan's 1945 and 1963 volumes (Birds of northern Thailand, and the check-list), 2) flesh clothing the bare bones of the Deignan check-list, 3) a complete listing of the birds of the country, 4) use of realistic zoogeographic regions, and 5) provision (briefly) of ecologic and distributional information tempered by field acquaintance with the birds.—JOE MARSHALL.

Birds of South Vietnam.—Philip Wildash. 1968. Rutland, Vermont and Tokyo, Japan, Charles E. Tuttle Co. 234 pp., 25 pls., 22 line drawings, 1 map, 6⅛ × 8⅝ in. $7.50.—Amid the current turmoil in South Vietnam a field guide to the birds of that country has been written and illustrated by Philip Wildash. This book covers the 586 species found in South Vietnam and includes 206 of them in color. This is the first book in English covering the Vietnamese avifauna and will certainly lighten the load of anyone attempting to transport the massive four volumes of Delacour and Jabouille's "Les Oiseaux de L'Indochine Française" (1931). The present work does not pretend to supplant the earlier treatise, which is now an envied collector's item, but only to serve as a field identification guide for this area.

The book begins with a foreword by Jean Delacour, a preface, several pages on the geography and history of ornithology in Vietnam, and 17 pages of the systematic list (79 families). A line drawing of a "typical bird" is then given. The 193 pages of the main text are followed by sections on terminology and bibliography.

The entire text is remarkably free of typographical errors. The plates are sharp, have excellent colors, and are well-placed in the text. The map (p. 15) should have included the 3,000- and 6,000-foot contour lines to indicate better the major divisions in both the topography and the avifauna. The "systematic" sequence is actually alphabetic by genus and species in most of the families. In some cases this throws similar (= related?) species far apart in the larger genera, but the reader is usually given some indication of the possible confusion. This list also serves as the index, as each species is numbered there, in the text, and at any illustration.

Each species is given a relatively brief but basically complete treatment: Habits, Distribution, and Identification. By far the biggest failing of this field guide is the lack of size or scale in the text or on the plates. This will be disturbing to many people using the book. Only one species (Little Grebe, p. 35) has the size stated, and it is the only member of its family in Vietnam. The plates appear to be redrawn from the plates of "Les Oiseaux de L'Indochine Française" and show good detail. However, not having all the birds on the same plate to the same scale will contribute to field recognition problems. The Barn Owl and the Bay Owl (pl. XIII) are nearly reversed in relative sizes, for example. Occasionally proportions of some of the birds are wrong: narrow wings on the boobies (p. 37), shortened bills on the curlews (pl. VI), and small tails on the Red-whiskered and Blue-eyed Bulbuls (pl. XX). The descriptions seem adequate, but several confusing sets of species are not well differentiated. The swiftlets (*Collocalia*) are definitely difficult to distinguish apart, yet little is stated concerning how hard it is to do so. A significant systematic error was the placing of the genera *Eudynamys*, *Phoenicophaeus*, *Centropus*, and *Carpococcyx* in the subfamily Cuculinae within the main text.

As Wildash states in the preface, this book may help to stir new interest in South Vietnam's avifauna. South Vietnam has many endemics and very little is known

about their biology. Fortunately the present war is not being fought much in the forests of the higher mountains where most of the endemics are found.

However limited, Philip Wildash's book is a much needed and usable field guide on an ornithologically important and little-known area. It should prove helpful to those in South Vietnam and nearby areas in identifying the avifauna and, consequently, a better understanding of them should result. I only regret that this guide was not published earlier so that I could have tested it in the field.—JAY M. SHEPPARD.

Relationships in the Charadrii (shorebirds): a taxonomic study based on color patterns of the downy young.—Joseph R. Jehl, Jr. 1968. Memoir 3, San Diego Soc. Nat. Hist. Pp. 1–54, 31 figs., frontispiece. Paper. $3.50.—The last decade has seen a resurgence of interest in the evolutionary and phylogenetic relationships within the shorebird suborder Charadrii. Jehl's study of plumage patterns of the downy young not only provides evidence from a source that has not previously been fully exploited for the Charadrii, but represents a very comprehensive coverage of the group. The author had access to specimens, descriptions, and/or photographs of downy plumage for 162 of the 201 shorebird species, representing 53 of 56 genera.

In this paper, the rationale for using downy plumage characteristics in shorebird taxonomy is well considered. It is based on the argument that certain features of the downy plumage are conservative and are not the result of environmental selection. This is not true for all aspects of the downy plumage, as feather hue, for example, in these ground-nesting waders is strongly related to the color of the nesting substrate. Nor are such characters as feather structure or patterns of individual feathers shown to be of taxonomic value, as they exhibit little variation throughout the group. A feature that does exhibit sufficient variation, and which may be subject to the least adaptive modification, is the (color) pattern of the downy plumage. Jehl makes a convincing case for using this character in shorebird taxonomy with the following evidence: 1) the plumage patterns of downy shorebirds are by and large unique to this group and are not found in allied groups; 2) there is little variation within species, genera, and sometimes even higher categories; 3) the patterns are similar in closely related genera; 4) the patterns of closely related species occurring in different habitats are similar, and 5) the patterns of distantly related species in the same habitat are different. Thus, a good case is made for using downy plumage patterns of shorebirds to suggest phylogenetic relationships.

Jehl's analysis of the results of his study in comparison with other available data appears sound. His conclusions concerning the relationships among the Charadrii represent to this reviewer a significant advance over most other current phylogenetic schemes. Basically Jehl supports the relationships and taxonomic arrangement of Peters (Check-list of birds of the world, vol. 2, Cambridge, Massachusetts, Harvard Univ. Press, 1934), which in turn contrasts with and in some cases clearly illustrates some of the inadequacies of certain other schemes, particularly that used in the most recent (fifth Ed.) American Ornithologists' Union Check-list of North American birds (1957). Take, for example, certain features of Jehl's treatment of the Scolopacidae. He makes the following conclusions based mostly on downy plumage comparisons: 1) the snipe differ sufficiently from the scolopacine group to justify placing them in a separate subfamily, the Gallinagoninae. 2) *Limosa* and *Limnodromus* are not closely allied to the Calidridinae as indicated by the A.O.U. Check-list (1957), but *Limosa* is more closely related to *Numenius*. He places both of these in the tribe Numenini of the subfamily Tringinae, and groups *Limnodromus* with the snipe in the subfamily Gallinagoninae (these designations are consistent with behavioral data for these

genera, Holmes, pers. observ.). 3) Arenarinae does not belong in the family Charadriidae but is probably derived from tringine stock, confirming Peters' opinion (1934) and disagreeing with that of the A.O.U. Check-list (1957). 4) The Surfbird (*Aphriza*) is actually a calidridine sandpiper (this receiving further substantiation from behavioral evidence, MacLean, pers. comm.). 5) The phalaropes have their closest affinities to the tringine group rather than with the Recurvirostridae and thus are given subfamily status in the Scolopacidae. These examples demonstrate some of the serious discrepancies that exist among currently accepted phylogenetic schemes and that are raised by Jehl's downy plumage comparisons. Furthermore, they illustrate very clearly the need for additional information, from morphological, biochemical, behavioral, ecological and other sources, to clarify and/or confirm more accurately the phylogenetic relationships. Such data are particularly required in those groups in which the downy patterns are not sufficiently distinct to suggest taxonomic affinities, e.g. in the families Dromadidae, Thinocoridae, and Chionididae, and even more importantly at the lower taxonomic levels, as among the genera in the Glareolidae.

By way of criticism, I found the use of "color" and "color pattern" of the downy plumage rather confusing, although as one reads the paper the difference becomes clear. The experiments on the adaptive nature of some downy plumage patterns on different substrates (p. 8–9) were not very extensive or conclusive, and their inclusion adds little to the paper, other than to point out that this subject was considered. In a number of places in the text, references, without literature citations, are made to the habitat, behavior, or some other characteristic of a particular species or group. It is difficult to tell if all of these come from Jehl's personal experience, which may be true in some, but probably not in all, cases. For one example, he refers (p. 39) to *Calidris bairdii* and *C. fuscicollis* as tending "to nest in wet marshes." While this is true for the *fuscicollis, bairdii* usually nests in rather dry, well-drained, and sparsely vegetated habitats, which in some cases may be long distances from a wet marsh. Even where marshes are nearby, young *bairdii* usually remain on the drier, more exposed regions of the tundra (Holmes, pers. observ.). One last point is that Jehl occasionally enters into speculation on topics that are not directly related to his main theme, e.g. the discussion (p. 31) of the evolution of burrow nesting in the Crab Plovers; such diversions do not add significantly to the points he is trying to make and their inclusion is of dubious value.

In spite of such minor criticisms, this is a stimulating and well executed study, which provides a finely documented, revised and probably more accurate phylogenetic scheme for the Charadrii than has been previously proposed. This paper will undoubtedly serve to stimulate future work on shorebirds and to focus attention on those groups that are in particular need of study. In these and other respects, Jehl's study represents a substantial and important contribution to our understanding of shorebird biology and evolution.—RICHARD T. HOLMES.

Ecological adaptations for breeding in birds.—David Lack. 1968. London, Methuen and Co., Ltd. Pp. xii + 409, illus. by Robert Gillmor, 9½ × 6½ in. Cloth. 84 shillings (distributed in U. S. by Barnes and Noble, Inc., 105 Fifth Avenue, New York, New York 10003, $15.00).—This book should be required reading for anyone interested in the breeding biology of birds. For years bird watchers and ornithologists the world over have been collecting data on egg size, clutch size, incubation period, growth rate, weight, distance between nests, nature of pair-bond, and so on of birds. This collection of facts was (and is) directed not by theory but by the passions of the investigators. To be sure, meaningful theory could not develop until a sufficient amount of apparently unimportant and unrelated data had been collected. Also

natural history theory has been developing slowly under Lack's leadership. His new book will stimulate further research by providing a challenging theoretical framework for almost all phases of the breeding biology of birds.

To establish a firm base for theory, Lack undertook the formidable job of reviewing and synthesizing the world's ornithological literature. The interpretive portion of the book is in two parts, the first dealing with the adaptive significance of nesting dispersion and the pair-bond, the second with clutch size, egg size, and growth rate. The details on which discussion is based are presented in 18 appendices. There is a 28-page list of references. Gillmor's excellent drawings illustrate some of Lack's points. The scope of this work is awe-inspiring. I can present here only the major conclusions: Natural selection is responsible for the evolution of adaptations. The main environmental selection pressures have been availability of food and predation. Most species breed solitarily, reducing the conspicuousness of nests and thereby reducing predation. Sometimes solitary nesting may facilitate inconspicuous hunting or feeding near the nest. Colonial nesting of species in predator-safe sites enhances feeding in flocks. An intermediate category, loose colonies (e.g. gull colonies), is presumably a compromise between reducing predation by dispersing the nests and taking advantage of feeding in flocks. Most species are monogamous with a 50:50 sex ratio. While polygynous, polyandrous, or promiscuous species are mainly vegetarian, the reverse is not true: some graminivorous and frugivorous species are monogamous. Not unexpectedly, clutch size corresponds to that size from which most young are raised on the average and is limited by the amount of food the parents can collect. Clutch size in species in which young feed themselves is probably determined by the average amount of food available to the laying female and by the size of the egg. Growth rates are probably related to the average amount of food available to the young. Incubation periods are correlated with fledging periods, probably because selection for a shorter incubation period or for a shorter fledging period is most easily effected by modifying the growth rate.

The theoretical argument Lack presents in Part 1 is somewhat tenuous. Most frustrating is the absence of definitions. Lack's (1954: 264) earlier definition of dispersion is "non-random distribution . . . characteristic of both solitary and gregarious species, the difference being that in solitary species the individuals are spaced out and in gregarious species the flocks or colonies [are spaced out]." This is quite different from the usage of both American and English ecologists (e.g. Odum, 1959: 214; Southwood, 1966: 24). Actually dispersion in this book seems to mean simply the relative distances between nests or individuals—the individuals of gregarious (colonial) species nest close together, those of solitary species nest far apart. No doubt the difference between solitary nesters and colonial nesters is clear to all readers, but what about the intermediate categories, such as "loose colonies," the ambiguity of which is illustrated by the statement (p. 102), "the Lapwing *V. vanellus*, though usually solitary, sometimes nests in groups with the nests of individual pairs 10 to 50 metres apart. It is hard to know whether to regard such groups as loose colonies, or as solitary pairs at an unusually high density." Sometimes an intermediate category is created for species for which the data do not fit the typical pattern of the group. For instance, nearly all Passerinae nest in colonies but in a few species the nests are far apart. These latter, according to Lack (p. 43), are neither solitary nesters nor loose colonies but really breed in a "group of dispersed nests." Again, because the dull species of birds of paradise are monogamous and solitary and a few brightly colored species display in leks, other brightly colored species that display solitarily are thought to form "dispersed leks" because the birds are within earshot of each other (p. 33). This may be

so, but typically territorial birds (e.g. Song Sparrows, *Melospiza melodia*) also nest within earshot of each other. Another intermediate type is "grouped territories," used to describe groups of birds that have small territories (p. 38). Coupling the ambiguity of the terms with the lack of data on predation or food availability, I think we should consider the arguments and conclusions of Part 1 as "models" of what might be rather than a description and explanation of what is.

I am disappointed that Lack does not discuss the evolution of territory size for there seems to be a continuum of territory sizes from very large in "solitary" species to very small in "colonial" species. Lack (p. 146) dismisses the problem of territory size along with its possible relation to food supply as having been recently reviewed by him (1966) and as a problem that is "linked with another problem outside the scope of this book, namely the factors regulating population density." But is the problem of the evolution of territory size irrelevant to understanding nesting dispersion? Consider the colonial Gannet *Morus bassana* and the solitary Song Sparrow. Within the geographic range of each species, the dispersion of individuals is "clumped" (Odum, 1959), no doubt a function of the distribution of breeding habitat. Within each clump the dispersion of individuals in each species is "uniform," a result of territorial behavior (see Nelson (1965) for the Gannet, and Nice (1937) for the Song Sparrow). It seems possible that the "colonial" nesting of the Gannet and the "solitary" nesting of the Song Sparrow may result from selection for territories of different sizes. A discussion would have been useful.

Part 2 is more straightforword than Part 1 as the ornithological data, e.g. clutch size, egg size, growth rate, are clear-cut. Their relationships with food availability and predation are still largely intuitive. Part 2 seems to suffer more than Part 1 from proofreading errors. Briefly, consider only Chapter 21. Coulson and White 1956–61, Simmons 1965, and Snow 1967 are three citations not found in the references. Several citations appear differently in the reference list: Roberts 1940b is 1940 in the references; Niethammer 1938–42 is 1937–42; Peters and Müller 1951 is Peters and Miller; Schönwetter 1959–66 is 1960–66; Austin 1956 is Austin, O. L. and O. L. (Jr.); and Ashmole 1963b is 1963a. A reference on page 263 to Table 22 should be to Table 26. One wonders whether the numbers in the many tables were as poorly proofread.

Lack sometimes refers to his 1966 book as authority. The one case I checked turned out to be misleading. "Lack, 1966" is cited (p. 7) to support the fact that the Herring Gull *Larus argentatus* can at present raise more than three young. The actual reference should have been to Vermeer's (1963) work with the Glaucous-winged Gull *Larus glaucescens*, which Lack (1966: 247) regards as a race of *argentatus*.

In any work of this scope any critic can cite papers that he feels should have been included. Nevertheless, an unfortunate miss is Woolfenden's (1956) paper on the Seaside and Sharp-tailed Sparrows (*Ammospiza maritima* and *A. caudacuta*). The Sharp-tailed Sparrow is promiscuous and insectivorous, a fact requiring modification of the statement (p. 32), "All the passerine species which are regularly promiscuous eat fruit. . . ."

These negative comments should not be blown out of proportion in judging Lack's latest contribution. "Ecological adaptations for breeding in birds" is the outstanding book on the biology of living birds and will remain so for a long time to come. His challenging and stimulating interpretations will guide further research on the many aspects of avian breeding biology. This book must be read and reread, studied and restudied by anyone planning to do serious research in this field. If you do not already have a copy, order one now!—BERTRAM G. MURRAY, JR.

LITERATURE CITED

LACK, D. 1954. The natural regulation of animal numbers. Oxford, Clarendon Press.

LACK, D. 1966. Population studies of birds. Oxford, Clarendon Press.

NELSON, J. B. 1965. The behaviour of the Gannet. Brit. Birds, 58: 233–288.

NICE, M. M. 1937. Studies in the life history of the Song Sparrow. Trans. Linnaean Soc. New York, 4: 1–246.

ODUM, E. P. 1959. Fundamentals of ecology. Philadelphia, W. B. Saunders Co.

SOUTHWOOD, T. R. E. 1966. Ecological methods. London, Methuen and Co.

VERMEER, K. 1963. The breeding ecology of the Glaucous-winged Gull (*Larus glaucescens*) on Mandarte Island, B. C. Occ. Pap., Brit. Columbia Prov. Mus., 13: 1–104.

WOOLFENDEN, G. E. 1956. Comparative breeding behavior of *Ammospiza caudacuta* and *A. maritima*. Univ. Kansas Publ. Mus. Nat. Hist., 10: 47–75.

ALSO RECEIVED

The preservation of natural history specimens. Vol. 2, vertebrates, botany, geology.—R. Wagstraffe and J. H. Fidler (Eds. and compilers). 1968. New York, Philosophical Library. 404 pp., 150 figs. No price given.—This is the second volume of this compendium, the first volume of which dealt with invertebrate animals and was published in 1955. It is comprehensive and detailed, and informs the student without previous collecting experience what to record, how to prepare and label his specimens. It also tells the experienced individual about new and better techniques, even to considering such museum techniques as the treatment of brittle study skins with rubber latex.

The part of immediate interest to readers of the Auk is the chapter dealing with birds (pp. 39–74). This begins with measuring, and although it is recognized that avian taxonomers take their measurements from dried skins, the account proceeds to tell how to take them from fresh, unskinned birds as well, utilizing such obsolete dimensions as total length and wing expanse, both of which vary with the degree of stretching. The procedure described and illustrated for skinning and making-up study specimens is fully considered, and is followed by instructions for labelling and wrapping, drying, and storing specimens, methods of blowing eggs, and of preserving and padding nests so they keep their shape. Judging by the section on birds, it would seem that all the areas covered by the compilers are well worked out.

Following the special sections on plants and fossils are seven appendices dealing with instruments, preservatives, labels, storage containers, general maintenance of installed collections, photographic records, microscopy, and even of first aid measures. The book is well indexed.—HERBERT FRIEDMAN.

Communication in the animal world.—William F. Evans. 1968. New York, Thomas Y. Crowell Company. Pp. x + 182, numerous unnumbered text figs. and black and white photos, 6 × 8½ in. $5.95.—The author is assistant professor of biology at Little Rock University, Arkansas. Although he states in the foreword that he wrote the book with the general reader, student, and scientist in mind, most students, and certainly all biologists, will find this no more than a superficial discussion of the subject. Though the researches from which the author draws his material were scientific and done on specific organisms, Evans chooses to refer to these sources very

generally, without formal text citation (there *is* a terminal bibliography), usually without scientific names, and often by vague general names of the organisms being discussed. This can lead to confusion. In the chapter on birds, "blackbirds" in one paragraph refers to some (unstated) icterid species, while in the next sentence it presumably refers to *Turdus merula*. Although I noted a few factual inaccuracies (the work avoids blunt reference to facts), a few of the generalizations are misleading or confusing. For example (p. 88) *contra* the stated generalization, quite a few birds have been found able, during the critical learning period, to learn to imitate accurately the voices of wholly unrelated species (cf. Lanyon and Tavolga, Animal sounds and communication, A.I.B.S. Publ., no. 7: 342, 1960). On p. 78 the following statement occurs: "The songs of birds of the same species are often found to differ between groups far removed from each other. The song of the chaffinch in South Africa, for instance, differs markedly from that of the New Zealand species." The book is not recommended to readers of this journal.—J.W.H.

Birds of the Toledo area.—Lou Campbell. 1968. The Toledo Blade Co., vii + 330 pp., numerous text drawings, 5¼ × 7¾ in. No price given.—This thoroughly annotated account will be of interest mainly to field students living in northern Ohio and southern Michigan within a few hundred miles of Toledo. It is not a field guide but consists primarily of a detailed summarization of the status, change in status, abundance, and movements of all species of birds known to occur in the area. For each species it gives migration dates, typical nesting dates and data, and habitat. This is prefaced by a sentence or two stating diagnostic field identification characteristics. Preceding the species accounts 35 pages are devoted to a preface, physical geography of the area, bird habitats, migration lanes, general scope, treatment of species, seasonal changes in bird life, history of bird life in the Toledo area, and how to identify birds. Much of this information will be of interest and value to the biologically oriented student. The Baltimore Oriole of the cover, though feathered like an oriole, is simply not an icterid in "facial" features, and similar faults in portrayal can be seen in other illustrations in the text. As in the field around Toledo one would need a field guide to accompany Campbell's work, the illustrations are of little utility, although they might help sell the book.—J.W.H.

Collected papers in honor of Lyndon Lane Hargrave.—A. H. Schroeder (Ed.). 1968. Pap. Archaeol. Soc. New Mexico, no. 1: vi + 170.—Ten authors contributed diverse articles to this collection, ranging in subject matter from a biography of Hargrave and prehistoric death customs to birds. The ornithological papers are "Birds and feathers in documents relating to Indians of the Southwest" (A. H. Schroeder); "Limb measurements of the extinct vulture, *Coragyps occidentalis*; with a description of a new subspecies" (H. Howard); "The instability of the distribution of land birds in the southwest" (A. R. Phillips); "A hairy woodpecker from Petrified Forest National Park, Arizona" (N. G. Messinger). The editing is of a rather *laissez-faire* variety with authors being allowed to ramble on. Misspellings and typographical errors are prevalent. Allan Phillips continues to swat busily at his contemporaries and predecessors whose interests relate to his and goes rather far afield to do it too, considering the title of his paper.—J.W.H.