

ORNITHOLOGICAL LITERATURE

AVIAN BIOLOGY, Volume II. Edited by Donald S. Farner and James R. King. Academic Press, New York and London, 1972:xxiii + 612 pp., many diagrams, charts, and photographs. \$34.00.—The second volume of this series covers several anatomical and physiological systems with the same high standards established in the initial volume. Topics covered are the integument, patterns of molt, control of molt, the blood vascular, respiratory, digestive, and excretory systems, nutrition, and intermediary metabolism. A sampling of these chapters shows that the individual authors and editors have maintained the general policy of presenting a “balanced account of avian biology at the beginning of the 1970’s.” Systematic and nomenclatural matters remain under the editorship of Kenneth Parkes and follow the same standards established in volume one.

The chapters are not designed to be encyclopedic treatments of each subject, but rather a discussion of important topics plus an introduction and guide to the literature. I examined each chapter with particular inquiries in mind, and felt that in most cases answers could be found in the cited references—if they were not available in the text itself. Areas of ignorance, however, are not always clearly pointed out. The chapters on nutrition and on intermediary metabolism are essentially treatises on the domestic chicken. This reflects the state of our knowledge of these aspects of avian biology and hopefully will stimulate comparative investigations of them. Nevertheless, these chapters are of less direct usefulness to ornithologists than the other chapters.

Peter Stettenheim’s excellent chapter on the integument is overshadowed by the superb monograph, previously written by Lucas and Stettenheim on the same subject (cited in the bibliography). The discussion of the avian lung/air sac system and mechanism of breathing must be reassessed in light of the recent monograph on this subject by H-R. Duncker (*Ergebn. Anat. Entwickl.*, 45, 1971); unfortunately Duncker’s papers appeared too late to be included in the bibliography.

I would like to emphasize the value of this volume in obtaining information and literature references on subjects that seem unrelated to the chapter titles. I found a good discussion of Herbst’s corpuscles and a reference to staining methods for elastic fibers, both topics of immediate interest to me, in unexpected places. Hence, this book should be perused carefully, even if one is not interested at the moment in the subject matter of the individual chapters.

The main handicap of this volume is its cost, which may well place it beyond the reach of many ornithologists. Yet, *Avian Biology* will be a valuable reference work for any serious student of birds; in spite of the expense of the entire set, I recommend strongly that it be given high priority in the book budget of every ornithologist.—
WALTER J. BOCK.

AVIFAUNA OF THE EASTERN HIGHLANDS OF NEW GUINEA. By Jared M. Diamond. Publications of the Nuttall Ornithological Club, No. 12, Cambridge, Mass. 1972: vii + 438 pp., 42 figs., 19 tables, and 4 maps. \$15.00. (Obtainable from the Nuttall Ornithological Club, c/o Museum of Comparative Zoology, Harvard Univ., Cambridge, Mass. 02138.)—This monograph is one of the most important contributions to knowledge of New Guinean birds in the past several decades. Although incorporating data from avifaunal papers published on the eastern highlands since the World War II, the treatise

is based mainly on original work carried out on two expeditions in the Karimui and Okapa areas south and east of Goroka in 1964 and 1966. Information presented deals with a summary of Diamond's and other previous ornithological explorations in the region; and an in-depth discussion of the distribution patterns, ecological characteristics, altitudinal distribution, zoogeographical relationships of the regional avifauna, the composition of the forest, non-forest, and non-breeding migrant bird faunas, and the environment and breeding seasons. An extensive annotated list is provided of all species recorded, covering taxonomic affinities, breeding, ecological distribution, voice, native name, and details of specimens collected.

The great strengths of this monograph are its thoughtful and provocative views on the evolution of distribution patterns and subspecies and species groups in the New Guinean highlands, its clear and often original account of ecological sorting mechanisms operating for montane birds in the region, and its wealth of field information on all species recorded. Diamond's theory of speciation in montane New Guinea invokes sequences of historic population disjunctions, recontact of populations, competition and extinction of one competitive form by another. In explaining the patchiness of distribution—one of the most disconcerting phenomena of the New Guinean avifauna—the author also has new and well-reasoned ideas. However, these may not necessarily apply generally to all montane populations, the disjunctions of some of which may merely reflect success or failure in recolonizing mountain massifs during periods of altitudinal life-zone expansion in Pleistocene times.

The account of ecological sorting mechanisms is well-contrived, for it comprehensively covers spatial aspects (altitude, habitat, vertical distribution within the forest stratum, and allopatry), food and foraging differences, and temporal (seasonal) segregation. Such studies are obviously the author's forte; his elucidation of correlations between the age structure of montane populations and altitude is new knowledge. The striking and varied effects of altitude on the distribution of the avifauna are strongly emphasized, justifiably so. Limits and transitions in altitudinal distribution are interpreted in terms of interspecific competition. Unfortunately, the historic significance of concomitant vegetation transitions is not fully appreciated here. The fact is that the primary limits and transitions in bird distribution, graphically shown on the diagrams on pages 58–65, do coincide at 3800–4500 feet with a marked floristic (if not structural) change in rain forests throughout New Guinea. In this broad correlation between the altitudinal ranges of birds and vegetation, interspecific competition merely sharpens the transitions for birds.

Much of the field data gathered concerns feeding behavior and calls. The accounts of calls are the most carefully documented and comprehensive available for New Guinean birds.

While it may seem petty to single out shortcomings and misjudgements, attention should be drawn to some of them. Occasionally poor, even misleading examples are chosen to illustrate important principles and patterns of evolution, distribution and ecological segregation. Thus altitudinally allopatric forms such as the *Paradisaea raggiana* group—*P. rudolphi* and *Toxorhamphus novaeguineae*—*T. poliopterus* are used to illustrate east-west geographical allopatry. Elsewhere, lowland taxa have been used as examples to show differential rates of reproductive and ecological isolation in a quite inapplicable montane context.

There also seems at times a slight tendency to twist the facts to suit the argument. In an explanation of how species may be represented by different races on northern and southern scarps of the eastern highlands region, *Melanocharis striativentris* is given

as an example. This species is nevertheless monotypic in the region. Altitudinal replacement between species of the genera *Peneothello*, *Pachycephalopsis*, and *Poecilodryas*, implying exploitation of equivalent niches, is just not true in the simplified way it has been described. Members of these genera overlap altitudinally much more widely than Diamond suspects, exploiting subtly different forest niches and levels close to the forest floor. Nor can it be claimed, as has been, without evidence, that *Gerygone cinerea* and *Acanthiza murina* occupy the same niches and replace each other altitudinally. Species of the two genera always occupy different niches wherever they come in contact in Australia. In such cases—there are others as well—it seems that too many conclusions have been jumped to too quickly.

The area chosen for study under the heading of "Eastern Highlands" is partly incongruous, in that it includes the Lake Kutubu area on a lowland plateau that is well-isolated from the main eastern highlands region. This lowland avifauna has no real relevance to that of the eastern highlands. Its excision would have led to a tauter treatise and perhaps elimination of the extensive discussions of evolution and distribution in both lowland and montane faunas that stray beyond the essential scope of the work. By contrast, the annotated account of the species concentrates on the birds of Karimui rather than those of the Eastern Highlands as a whole. Published data from other areas are blended in rather perfunctorily and given prominence only where records from Karimui and Okapa are minimal or lacking. It is also inappropriate that much information on the food of species of "Eastern Highlands" birds is incorporated from geographically extraneous sources.

There are some wrong statements. The melanistic morph of *Accipiter novaehollandiae* is not new to science, having been previously recorded from western New Guinea, and the call described for *Ptiloris magnificus*, actually a harsh bi-syllabic growl, is surely inaccurate. The taxonomic account of *Meliphaga flaviventer* is confused and poorly done throughout. *M. j. giullianetti*, recorded from Lake Kutubu and elsewhere in the eastern highlands, is not included under representative races; and the referral of the Karimui population to the Weyland Mountains race *rubiensis* is incongruous, as there are intervening forms.

Perhaps the most critical objection can be levelled at the generic treatment of the birds-of-paradise, the Paradisaeidae. Such a major revision as attempted here deserves to be based on original investigation and new data. It derives instead from a somewhat flung-together rehash of what has already been known about the family for the last decade or more; generic limits are no better based than those in the widely accepted treatments of Mayr and Gilliard, which used the same information. Diamond has embarked on a wholesale lumping of genera, recognizing only ten as compared with twenty by Mayr and Gilliard. To be sure, some lumping is overdue, such as *Drepanornis* with *Epimachus*, *Diphyllodes* with *Cicinnurus*, and *Phonygammus* with *Manucodia*. But the union of such structurally and behaviorally diverse groups as *Parotia*, *Astrapia*, *Cicinnurus*, *Seleucidis* and *Pteridophora* in the one genus *Lophorina* serves only to cloud relationships between them and obscure the still incompletely understood lines of evolution in paradisaeids as a whole. One serious nomenclatural error has slipped through as a consequence of the lumping: two different species bear the name *Lophorina magnifica*.

English vernacular names are given to all species. These are drawn from various sources and so contribute to the perplexing plethora of vernaculars presently in use for New Guinean birds. The need for standardization is now greater than ever.

The monograph is well-bound and printed in the high standards of the Nuttall

Ornithological Club. Unfortunately some misprints and gaps in cross-references have crept in, probably during the proof-reading stage.—RICHARD SCHODDE.

SURVIVAL STUDIES OF BANDED BIRDS. By Joseph J. Hickey. Special Scientific Report—Wildlife No. 15, Fish and Wildlife Service, U.S. Dept. Interior, Washington, D.C., 1952, reprinted with minor corrections 1972: 177 pp., 71 tables, 21 figs., paperbound. Price not given.—The original edition of this pioneer work was never reviewed in *The Wilson Bulletin*. It is still of interest from several points of view, and the Fish and Wildlife Service has made a useful contribution to modern libraries by reprinting it. This report discusses at length a methodology for analyzing banding data, with particular emphasis on the many inherent biases in these figures (some of which have since been corrected by the present day automatic data processing techniques used in the Bird Banding Laboratory, but many others of which are inescapable). By use of life tables, Hickey analyzes the population dynamics of ten species of North American birds, from cormorants to jays, with particular emphasis on the Mallard. He also provides for modern workers a base study of population dynamics before pesticides entered our environment. The research was conducted in 1946-47, but was almost entirely based on data gathered in the late 1920's through the 1930's; the report includes literature references through 1951. This study should be required reading for anyone embarking on an analysis of banding data.—MARY H. CLENCH.

THE WORLD OF THE WOOD DUCK. By F. Eugene Hester and Jack Dermid. J. B. Lippincott Co., Philadelphia and New York, 1973: 160 pp., 80 photos. \$5.95.—Because it is a game bird of widespread breeding distribution in the United States and because of the accessibility of its nests, the Wood Duck is among the more researched species of birds. Consequently much information on the species is available. In this book, Hester and Dermid have done a creditable job of assembling this information and making it available to popular readers. Much of the information came from their nearly twenty years of observations, but research reports by other workers have also been used, 60 references being listed in the bibliography.

The fine photographs of Wood Ducks and their habitat or animal associates make this an attractive book and provide a welcome supplement to the word descriptions. However, it is to be regretted that a natural-color illustration of a pair of Wood Ducks was not included. Black and white photographs and a word description (with a confession of its inadequacy) are poor substitutes for a natural-color illustration of the male of this species.

The authors' experience with their subject and familiarity with the literature enabled them to write a book providing little chance for argument. However, there are several items with which I disagree. Hester and Dermid state (p. 73) that a "place" (presumably a water area) of at least 10 acres is essential for use by a Wood Duck brood. At the Olentangy Wildlife Experimental Station in Ohio, I found as many as five broods gathering on and successfully using ponds of less than half this size. Also, I found Wood Ducks feeding only in the mornings and evenings of autumn, whereas Hester and Dermid say that the birds spend the day feeding at this season (p. 93).

Certain areas of the Wood Duck's world are covered more satisfactorily than others, perhaps reflecting the thrust of the authors' research. For example, northward movement after the nesting season, as shown by band recoveries, is not mentioned although it occurs among Wood Ducks the same as other ducks.

I find it most unfortunate that a book in Lippincott's Living World Series has been written to promote hunting interests (p. 114), for the time has come when sport hunting must go the way of market hunting. With human population steadily increasing and wildlife habitat diminishing, sport hunting simply must be phased out, and this can best be done by discouraging our young people from engaging in it. To justify sport hunting, Hester and Dermid use the worn-out rationalization that hunters kill only birds that would otherwise die from natural causes. Actually, the size of the Wood Duck population is probably now limited chiefly by shooting, with a scarcity of safe nesting cavities a secondary factor. During the winter of 1972-73, I placed 30 Wood Duck nest boxes on 14 beaver ponds in north-central North Carolina, and only one of these boxes was used by nesting Wood Ducks. This low rate of usage could have resulted only from a scarcity of Wood Ducks. Hester and Dermid note (p. 44) that shooting may sometimes eliminate local breeding populations. While the desire of hunters to have Wood Ducks to shoot has provided motivation for helping Wood Ducks, I dream of a day when help to Wood Ducks will not come left-handedly.—PAUL A. STEWART.

THE WORLD OF THE RUFFED GROUSE. By Leonard Lee Rue III. J. B. Lippincott Co., Philadelphia, 1973: 160 pp., 86 photos. \$5.95.—The Ruffed Grouse has been the subject of two major treatises (Bump et al., 1947; Edminister, 1947); in Rue's book, this grouse is again given monographic treatment. As in the earlier accounts, the species is discussed in a New England context. Whereas the former two publications were essentially scientific documents, written by and for wildlife managers, Rue's book is a popular account, written largely from the natural historian-sportsman's point of view and presumably directed at readers with similar interests.

The book is divided into four sections: Characteristics, Annual Cycle, Relationships with Man, and Nomenclature of Ruffed Grouse. Unhappily it is neither as authoritative nor as accurate as its predecessors, albeit somewhat easier to read. For serious students of avian biology this book will be a great disappointment. The text is marred by categorical statements for which there is no scientific evidence, and inaccuracies for which there is no excuse. The photographic record, which includes 86 black and white photographs, is also much below the standard expected in popular publications in 1973.

Throughout the text, Rue's bias as a hunter shows in his obvious interest in the exceptional rather than the average bird (largest size, greatest weight, record crop volume, greatest distance travelled, oldest bird, etc.), and in the pages devoted to appropriate gear and dogs for hunting this species.

In discussing the characteristics of Ruffed Grouse, Rue deals with a spectrum of attributes, from external and internal morphology to population phenomena. Unfortunately, in discussing these attributes he often ignores important considerations. For example, in treating sexual dimorphism in plumage, he seems unaware of changes in mensural characters with the first postnuptial molt. The photograph on page 26 purports to show the difference in the rectrices of males and females; however, it fails to show the feature referred to, namely the incomplete bar in the tail (cf. photograph on page 16). In fact, the illustration would be a more appropriate example of differences in shape and size of tails of yearling and adult birds. The discussion of color phases in Ruffed Grouse leaves the reader with the impression that two distinct forms exist—red and grey phases. Certainly in the central part of the bird's range, every intermediate gradation imaginable exists.

The author's understanding of such physiological attributes as digestion in Ruffed Grouse seems superficial at best. He states (p. 38): "the crop . . . is used as a storage compartment, corresponding to the rumen of a deer. It serves the same purpose, allowing the bird to feed quickly and then digest its food at leisure." The crop, unlike the rumen, allows food to bypass until the rest of the gut fills; there is no evidence that digestion occurs within it. In discussing the passage of food through the gut, Rue states (p. 39): "From the gizzard, food passes through the duodenal loop and the large and small intestines." In using large and small, Rue is either confused about the passage of food or referring to lengths rather than diameters, a procedure not generally followed in anatomical descriptions.

With reference to population phenomena, Rue states (p. 39): "The Ruffed Grouse population is also controlled by a ten-year cycle, so that the population fluctuates widely from year to year and area to area." The first part of the statement tells us nothing. What population is Rue referring to—spring or autumn? How can a population be controlled by a ten-year cycle? The last part of the statement does not follow, because if population abundance of this species follows a cyclical curve, the widest fluctuations will not be from year to year but will be several years apart. The reader's understanding of causes of changes in abundance of Ruffed Grouse is not clarified by statements which seemingly contradict the above, for example, on page 74, "adverse weather [in summer] is probably the most important factor controlling the population." Yet on page 131, the author claims "overwinter mortality usually runs to 70 percent of the grouse's autumnal population," implying that winter is the most significant period because it "is a time of testing" (p. 115).

Rue's discussion of territoriality in Ruffed Grouse leaves one confused. He states (p. 44) that young birds, being less dominant, acquire less desirable territories, yet he states that only eight percent of territory holders move to new territories. What happens to these young birds when they become adults? Is the mortality rate on "desirable" territories only eight percent and on "undesirable" territories near 100 percent? How are these figures reconciled with a 70 percent overwinter mortality (p. 131)?

Inconsistencies in the text do not enhance the credibility of the author. On page 44, Rue states that "the environment will not support (or the grouse themselves tolerate) more than four males per square mile in spring." Yet on page 141 one reads "one grouse to four acres of land is considered maximum carrying capacity for the best of habitat, because the grouse themselves will not tolerate a higher population," presumably in autumn. Assuming an equal sex ratio, which is reasonable if one accepts the contention that the species is monogamous (p. 59), then by my calculations each hen would have to produce 28 chicks to reach such densities. This is four times the number Rue states survive to the end of the summer (p. 91). Another example of such inconsistencies is the average weight of males—20 ounces on page 20 and 23.3 ounces on page 99. On page 69, an interesting anecdote appears: "after a week or so of brooding her eggs, [the female Ruffed Grouse] will discard any that are infertile by rolling them out of the nest." One wonders what the selective advantage of such a behavioural pattern might be and how often this has been documented.

Inaccurate statements in the text are inexcusable. For example, Rue maintains (p. 72) that at hatching "ten primary and fifteen to seventeen secondary feathers show as small, dark, wet strings." Bump et al. (1947) showed 26 years ago that only 7 primaries and 9 secondaries were visible at hatching. Rue also maintains (p. 102) that "all of their [adults] primary feathers will have blood in the shaft until the end of the year," imply-

ing that molting continues until the end of December. I know of no data supporting such a contention, and my experience has been that even the most distal primary in adults is bloodless by the middle of October.

The quality of the photographs suffers on two counts—technical flaws and poor subject matter. With the present high level of technological sophistication in photography, there is really no excuse for out-of-focus photographs (pp. 19, 25, 40, 56, 107, 109, 147), ones that have been obviously retouched (pp. 21, 30, 33, 107), or that fail to show what is indicated (pp. 26, 29). Excepting the pictures of shot birds, nearly all Rue's photographs fail to show the Ruffed Grouse to any advantage. The dishevelled state of the plumage and the fact that many pictures show the same bird and background suggest to me that the author has used captive birds for most of his pictures.

It is interesting that Rue refers to the A.O.U. Check-list (1957) in connection with the subspecies of Ruffed Grouse, yet he does not follow it when naming other species. Thus, the Rock Ptarmigan (*Lagopus mutus*) is referred to as *Lagopus rupestris* (p. 35), and Franklin's Grouse (*Canachites canadensis franklinii*), as *Canachites franklini* (p. 21). The photograph labelled Franklin's Grouse is, in fact, a female Blue Grouse (*Dendragapus obscurus*).

In conclusion, although this book contains a great deal of information on a popular species of game bird, it is badly marred by unsubstantiated anecdotes, informational inconsistencies and inaccuracies, and poor quality photographs.—D. A. BOAC.

ALBERTA VIREOS AND WOOD WARBLERS. By W. Ray Salt. Publ. No. 3 Provincial Museum and Archives of Alberta, 1973:121 pp., 9 col. pls. by Ludo C. E. Bogaert. Paper cover. \$4.50. (Obtainable from Provincial Museum and Archives of Alberta Bookshop, Edmonton).—When the author of this publication was engaged in writing *The Birds of Alberta* (W. R. Salt and A. L. Wilk, 1958, revised 1966, Department of Industry and Development, Edmonton, 511 pp.) he became increasingly aware of a considerable body of relevant information that was of necessity excluded from the book. The present volume, the first of a proposed series, makes available in detail much of that excluded information dealing with the status of 30 (two of hypothetical status) wood warblers and four vireos in Alberta.

Each species account opens with a brief version of the derivation of the vernacular and scientific names. Distribution within the province is carefully deduced from a presentation of thoroughly-compiled supporting data. Distribution of the subspecies, as well as the species, within Alberta is included. A section on nesting and its aspects includes valuable information on habitat, timing, nest site, nest materials, clutch size, cowbird parasitism, and song. Migration within the province is dealt with in considerable detail, with early dates of arrival and late dates of departure for various Alberta localities.

The data are, in general, abundantly documented as is attested by a 4½ page bibliography and a list of 24 sources of previously unpublished information. However, the citations of (Young, 1922) and (Clarke, 1939), on page 37, are not included in either list. (Young, 1922) apparently refers to C. H. Young's field notes made between May 15 and September 22, 1922, in Waterton Lakes Park, Alberta, and (Clarke, 1939) evidently to Dr. C. H. D. Clarke's notes made in 1939, also in Waterton Lakes Park, and compiled by Wildlife Division, National Parks Bureau, Ottawa, pp. 1-18.

Autumn plumages of the warblers and vireos are depicted in color as an aid to the identification of these birds in their more difficult fall aspects.

This publication will of course be especially useful in Alberta, but its carefully compiled data on nesting and habitat are often hard to come by and will be useful also to anyone who may need to compare these local data in connection with studies of geographic variation in aspects of reproductive cycles. This attractive and informative publication is a bargain at the price asked.—W. EARL GODFREY.

GROUSE AND QUAILS OF NORTH AMERICA. By Paul A. Johnsgard. University of Nebraska Press, Lincoln, Nebraska, 1973:xx + 553 pp., col. paintings by C. G. Pritchard, J. P. O'Neill, D. F. Landau, and L. A. Fuertes. \$25.00.—The literature on game birds in North America is remarkably rich, both in monographs dealing with individual species and in shorter journal publications and bulletins. It is a formidable task to master this literature and put it together in a concise form. Dr. Paul Johnsgard has done this remarkably well. His objective was to produce a dual-purpose volume, of value both as a reference work for the biologist and as a source book for the naturalist and hunter. On the whole I think the author has achieved his objective.

The book contains nine chapters in Part I dealing with comparative biology and 23 chapters in Part II, each of which deals with a species. There are keys to identification of adults (only) which are easy for the layman to follow, as good diagrams of body regions and feather areas are provided at the beginning of the book.

Many who are not linguistic scholars will be interested in the short section on name derivations. New to me was the revelation that the origin of the name *Colinus* is from a Nahuatl (e.g. Aztec) root.

One of the two indices is based only on vernacular names of species and a second on scientific names. Categories such as molt, food, distribution, eggs, etc., are not listed. If the book is to be used as a reference work, it is not sufficient to know that the California Quail is mentioned on 79 different pages. Even the Table of Contents does not help, as it does not give the pages on which the various sections within chapters appear. The absence of a good general index is a serious deficiency.

The value of Part I, the more technical section of the book, lies in the literature summaries and the opportunity to make comparisons quickly among species.

Chapters are provided on Evolution and Taxonomy, Physical Characteristics, Molts and Plumages, Hybridization, Reproductive Biology, Population Ecology and Dynamics, Social Behaviour and Vocalizations, Aviculture and Propagation, and Hunting Recreation and Conservation.

I did not like a few generalizations. For example, "Most quail and grouse are fairly mobile, but few undertake true migrations" (p. 82) is a statement inconsistent, as far as grouse are concerned, with the chapters dealing with individual species. Migratory populations exist or have existed in all North American species of grouse except the Ruffed Grouse. Accounts of migration of Spruce Grouse have not yet been published, but there is reason to believe that a migratory population of Spruce Grouse exists in northwestern Ontario and northeastern Manitoba. In Eurasia most of the grouse species have at least one migratory population. The ability to migrate, so widespread among the grouse, is at variance with what we see in most other galliform groups. It deserves to be stressed and examined in detail. In contrast, among the American quail only the Mountain seems to have migratory populations.

The chapter dealing with social behavior and vocalizations contains useful speculation about the evolution of strong pair bonds in the quails and the virtual disappearance

of territorial behavior in some species. This is contrasted with the grouse subfamily in which territoriality is unusually well-developed.

The evolution of lek behavior after the emancipation of males from nest guarding and brood care duties, and through the presumed greater attractiveness to females of groups of displaying males, has also been suggested by Snow (1963) in regard to manakins.

I agree with Johnsgard on the likelihood that the Sage Grouse, the prairie grouse group, and the Black Grouse of Eurasia evolved their lek behavior independently.

The descriptions of the postures and movements that compose quail displays are not up to the standards set for grouse. For example, the tidbitting display of the Bobwhite is mentioned without a description of the postures. On the other hand, treatment of quail calls is much more thorough than that of the grouse.

The taxonomic arrangement followed for the grouse is that of Short (1967), whose work was based on literature review and the study of museum skins. While I think that the arrangement is basically correct and a great improvement on previous classifications, a study of morphology alone can be misleading.

Aldrich and Duval (1955) were the first to treat the Lesser Prairie Chicken as a race of *Tympanuchus cupido*. Short (1967) judged as trivial many of the differences between Greater and Lesser Prairie Chickens cited by Jones (1964) to justify specific status for the latter. Johnsgard has followed Short in his treatment of the Lesser Prairie Chicken. Anyone who has seen both the Greater and the Lesser Prairie Chickens on their leks cannot but be impressed by the differences in the sounds they produce. The "gobbling" calls of the Lesser Prairie Chicken can be distinguished from the booming notes of its larger relative as far away as they can be heard. Indeed there seems to be a greater similarity, but not homology, with some of the calls of the Sharptail Grouse than with the Greater Prairie Chicken. There are other behavioral differences that seem to me to be greater than one would expect of a race. For example, Lesser males duet, a behavior that is never seen in the Greater Prairie Chicken. I would be most interested to know the function of these distinctive differences if they do not serve the purposes of species identification, advertisement, and isolation. Johnsgard elsewhere agrees with Sharpe's (1968) suggestion that the Lesser Prairie Chicken should be treated as an allospecies, but because this view has not received general acceptance, in this volume he has treated the Lesser Prairie Chicken as a subspecies.

The discussion of the evolution and relationships among the ptarmigan is sometimes inconsistent and, with respect to the White-tailed Ptarmigan, hard to accept. Morphologically this species would seem to provide a link between the *Dendragapus* grouse group and the Rock and the Willow Ptarmigan. The eggs of the White-tailed Ptarmigan are sometimes indistinguishable from those of the Spruce Grouse, and differ from those of the Rock and the Willow Ptarmigan. Beneath the feathering on the toes the White-tail has well-developed pectinations. These structures appear in greatly reduced form on the terminal joint only of the toes of the Rock Ptarmigan but are virtually absent in the Willow Ptarmigan. It seems likely that alpine-tundra floras evolved on the tops of the Rocky Mountain chain as it was pushed up during the Tertiary, perhaps before tundra appeared in our present arctic. The high level of endemism in the alpine-arctic flora of the British Columbia-Yukon-Alaska area suggests that this was a center of evolution for this vegetation. It seems likely that the White-tailed Ptarmigan is the closest living relative of an ancestral ptarmigan that evolved with this flora. Invasion of the arctic could have given rise to the Rock Ptarmigan and, eventually, the Willow Ptarmigan.

Polygamous or promiscuous mating habits predominate among the grouse. There is no reason to presume that monogamy was the ancestral or more generalized type of reproductive behavior for grouse. The ptarmigan and perhaps the Hazel Grouse seem to be the only species in which partial monogamy is present. The Willow Ptarmigan, in which pair bonds are stronger than in the other ptarmigan species, would seem to be at the end of an evolutionary trend rather than "primitive" as suggested by Johnsgard. Even in the Willow Ptarmigan, the nature of the monogamy recorded differs from that observed in, for example, many passeriform or anseriform genera.

I could find no mention of the distinctive nature of the juvenal plumage in the ptarmigans. All three species are set apart from the rest of the grouse by the absence of central white shaft streaks on much of the dorsal plumage and by the presence of white spots on the tips of the feathers—these giving a spangled appearance to their backs.

It is hard for this reviewer to accept eastern Asia as the area of origin for the Spruce Grouse and Sharp-winged Grouse. Behavioral evidence suggests that the Spruce Grouse is closer to the ancestral stem of the family than any other living species. Within *Dendragapus*, behavioral elements are relatively simple in the Spruce Grouse and become more complex and elaborate in the Blue Grouse. Finally, they become very complex in the Sage Grouse and there may even be grounds for merging *Centrocercus* with *Dendragapus*. It is likely that the Sharp-winged Grouse was a late Tertiary invader of Asia that did not succeed in penetrating far into the continent because of canalization of its gene pool.

The book contains many illustrations in color and black-and-white, the standard of which is somewhat variable. The 28 color photographs of the grouse are excellent, but their value could have been enhanced with better captions. The only information given is the species and sex of the bird depicted. Some of the black-and-white photographs of grouse are very good, particularly the action shots of Greater and Lesser Prairie Chickens fighting. Some add nothing to the beautiful color photographs and others are either badly reproduced, or the originals were not really of publication quality (e.g., some of the ptarmigan pictures).

Most of the color photographs of quail and the Grey Partridge are not up to the standard of the grouse color photographs but are, nevertheless, good illustrations. This is perhaps excusable, as wild quail are far more secretive and harder to waylay for photography in their native habitats than are grouse. The tropical forest species indeed must be almost impossible to photograph in their native range. To overcome this deficiency, nine color paintings of quails by Pritchard, O'Neill, and Landau are reproduced. The hitherto unpublished study by Fuentes of the hybrid Scaled \times Gambel's Quail is, in my opinion, a gem.

Of the 28 black-and-white photographs of quail and the Chukar, 18 are of birds in captive settings; these may be good illustrative material but I find them unaesthetic.

Two photographs show the cloud forest habitat of the Buffy-crowned Tree Quail and the Spotted Wood Quail. The only other quail habitat photograph is of the tropical rain forest habitat of the Singing Quail. I would have welcomed more photographs of the habitats of the less well-known neotropical quails.

Two plates by Pritchard show the downy young of grouse and quails. Contrast in the down patterns in all these paintings seems to me to be overaccentuated. I have never seen a Ruffed Grouse chick as dark in color as the one depicted. The few Sage Grouse chicks that I have seen have a most unusual brown and black spectacle mark on the lower neck. This mark seems to cover the area where the green gular skin patches

will eventually develop. This diagnostic mark is not illustrated or mentioned in the text.

The numerous black and white figures and diagrams are of high quality and make their points. Distribution maps are often extremely difficult to produce in such a way that all are satisfied. Range expansions or contractions often go unrecorded for many years in the literature; an author cannot be expected to know about all of them, but he is sometimes unfairly faulted for not recording them. A species, the range of which has changed over a period of time, is particularly hard to illustrate. The prairie chickens are a case in point. The Greater Prairie Chicken's original distribution has been described in the text. The boundaries of its expanded range, coincident with early farming methods, have been indicated by a dashed line, and its present distribution is indicated by shading. Yet there are late 19th century published accounts (McIlwraith 1894) of prairie chickens living in Ontario 100 miles east of the boundary indicated.

The range of the Bobwhite Quail in Ontario has greatly contracted from the extensive range indicated. Clarke (1954) was apparently the authority for this distribution, but his range map has not been followed by Johnsgard. There have been no self-sustaining wild populations on the north shore of Lake Ontario for 70 years.

Johnsgard has made an excellent digest of the existing literature, but except for some of the information on the quails, his book contains little that is new. Interested laymen will find much to stretch their horizons, for the book is well-written and is never boring. Professionals will find it a useful book for teaching and reference, and will probably feel that it is not overpriced at \$25.00, considering current prices. If a second revised edition is contemplated, a good index will raise its value greatly.—HARRY G. LUMSDEN.

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BEHAVIOR, MIMETIC SONGS AND SONG DIALECTS, AND RELATIONSHIPS OF THE PARASITIC INDIGOBIRDS (*VIDUA*) OF AFRICA. By Robert B. Payne. Ornithological Monographs No. 11, American Ornithologists' Union, 1973:vi + 333 pp., photographs, maps, audio-spectrographs, paper cover. \$8.00 (\$6.40 to A.O.U. members).—This important study deals with a group of small African birds that have long baffled museum taxonomists. Parasitic indigobirds have variously been treated as comprising from a single, polymorphic, polytypic species to as many as eight distinct specific taxa. Because of the great similarity in morphological (plumage) characters, and the impossibility of ascer-

taining from museum specimens which females belong with which males, these small birds were the despair of those, including this reviewer, who had occasion to write about them. The relationships that might be postulated between them defied adequate definition in the usual terminology of avian taxonomy, either of the old typological, or the newer biological, species concept.

Over many years it was learned through the piecing together of observational data, largely fragmentary and anecdotal individually, that the indigobirds are parasitic in their breeding, using firefinches (*Lagonosticta* spp.) as their hosts. In 1929, Neunzig first brought out evidence of unusual mimicry, largely buccal, between the nestlings of the parasites and of their hosts. His presentation suffered from lack of sufficient recorded data, and gave the appearance of circular reasoning, i.e. if the mouth-markings of a nestling indigobird closely resembled those of the young of a given species of firefinch, it was advanced that it was parasitic on the latter to the exclusion of other possible hosts, but to which it seemed less similar.

With the advent of sound recording techniques and the use of audiospectrographs, which made possible objective, direct comparisons of the songs of the species of hosts and of parasites and which eliminated the hitherto difficult personal factor of the investigator's auditory acuity, Nicolai was able to show close vocal mimicry to be of primary importance in the host-parasite relationships of these birds. Nicolai advanced the argument that speciation in the indigobirds was a result of host-specific imprinting—as evidenced by the evolutionary development of buccal characters and song imitation, rather than a result of geographical or ecological isolation. It was to test this thesis that Payne made the very meticulous and extensive field observations, with sophisticated techniques, such as playback experiments, reported in the present work.

Indigobirds present innumerable difficulties to the investigator of their breeding biology. They are promiscuously polygynous; they form no pair bonds; the females go to their host nests without the males—to which they were attracted selectively in the first place by their specific vocal mimicry of definite host species. In addition to their mimetic songs, the indigobirds also have complex non-mimetic vocalisms, often involving an extensive repertoire. Payne found that in some areas of Africa two or more kinds of indigobirds live together without interbreeding while in other areas “every species of indigobird appears to interbreed with another kind.”

On the whole, Payne's conclusions, fortified with ample and excellent data, corroborate and extend Nicolai's earlier ones. For the first time we now are given evidence from the biology of the living birds—as contrasted with the earlier mute evidence of their plumage characters, that makes possible a solution of the complicated relationships of these creatures. Payne recognizes four species with numerous subspecies. At the same time, he admits that many of the central African specimens in museums remain unidentifiable, and writes that “the pattern of morphological variation in the complex will remain enigmatic at least until tape recordings are made and singing birds have been collected in the Congo.”

Payne's book is of great interest, not only in its elucidation of an exceedingly puzzling group of birds, but also in pointing out a mode of speciation direction otherwise unknown in our understanding of avian systematics. It still remains to be seen what, if any, changes in the picture and in his interpretation of it, may result from his further field studies after the book was published.—HERBERT FRIEDMANN.

THE NATURAL HISTORY OF GARDNER PINNACLES, NORTHWESTERN HAWAIIAN ISLANDS. By Roger B. Clapp and THE NATURAL HISTORY OF KURE ATOLL, NORTHWESTERN HAWAIIAN ISLANDS. By Paul W. Woodward. Atoll Res. Bull. Nos. 163 and 164, Smithsonian Institution, Washington, D.C., 1972:iv + 25 pp. and xxi + 318 pp., maps, charts, photos. Prices not given.—The purposes of these reports are to bring together the all-too-brief and scattered information in the literature and in unpublished manuscripts, to present a short history of early exploration and biological activity (up to the early 1960's), and to record the current status of the vertebrate fauna and the vascular flora of certain Hawaiian islands, as observed by the Pacific Ocean Biological Survey Program of the Smithsonian Institution.

The historical narrative includes brief remarks on the ships that touched, and sometimes wrecked, on these land masses, along with some of the biological observations of the visitors. The sections on the vegetation are brief. Both studies provide information on climatic and general conditions and geology, but the data for Gardner Pinnacles are very limited, as might be expected from the extremely small land area (about eight acres) and from the few short visits that have been made to these precipitous, bare rocks.

The major emphasis is on the avifauna, while fish are not mentioned. Two species of sea turtles and two of geckos are indicated to occur, as are the Polynesian Rat (*Rattus exulans*) and the Hawaiian Monk Seal (*Monachus schauinslandi*), two whales, two dolphins, the ever-present domestic dogs, a monkey and domestic pig. The latter two, fortunately, are gone.

Each report contains a seemingly comprehensive section on literature pertinent to these land masses. However, many references pertinent to the observations in the species accounts are not included.

There is real value in gathering old knowledge of such isolated bits of land and in bringing forth new information, no matter how fragmentary. The ecosystems represented are little known and deserve far more attention than has previously been accorded them. Hopefully, some studies included in the International Biological Year will give further impetus.

The following comments apply primarily to Woodward's Kure Atoll study, which lasted more than five years and covered more than 2,300 man-days on the atoll. This one-sided attention of my review in no way disparages the worth of the limited data presented on Gardner Pinnacles.

In my opinion, the most important contributions concern the breeding biology of species of seabirds on Kure, especially their seasonality, numbers, and inter-island movements. The information on total estimated numbers in the populations, on numbers of "non-breeders," or numbers of casualties is only of limited value until we also know the ages, sexes, and biological states of the individuals included. Much the same can be said for the data on the recapture rates of birds banded without knowledge of these parameters.

Very useful for easy comparative study are the generalized graphs depicting cycles in breeding and in populations (pp. 69-71), the table of egg dates in various years (pp. 72-75), and the inter-island movements of banded birds (pp. 84-86).

The more extensive, and generally more valuable, species accounts are those of the Bonin Petrel, Wedge-tailed Shearwater, Christmas Shearwater, Red-tailed Tropicbird, Blue-faced Booby, Brown Booby, Red-footed Booby, Great Frigatebird, Sooty Tern, Gray-backed Tern, Brown Noddy, Black Noddy, and White Tern. Of less merit are the accounts of the Black-footed and the Laysan Albatrosses, perhaps because they

seem largely to duplicate (though generally support) studies on nearby Midway Atoll, or perhaps simply because I am more familiar with the biology of these two species.

The importance of long-term studies in bringing to light additional problems or in calling attention to new areas of information is evident in several of the accounts. For example, in some species, population estimates vary near 100 percent for comparable two-week periods in successive years. This can be seen in the Wedge-tailed Shearwater (p. 123), the Red-tailed Tropicbird (p. 136), the Red-footed Booby (p. 187), and the Great Frigatebird (p. 207). These variations do not appear to be parts of trends in population numbers, as is evident for the Sooty Tern (p. 247). What is their origin? Are they evidence of cyclic breeding, of changes in food supply, of disturbance? Or of differences in the techniques and dispositions of the estimators? Why do some other breeding species (e.g. Blue-faced Booby, p. 150) fail to show short-term swings in numbers? What is responsible for the fluctuations in the numbers of certain migrants—American Golden Plovers or Ruddy Turnstones?

What are the factors causing the irregular variations in egg dates, demonstrated for the Red-footed Booby (p. 195), Brown Booby (p. 173), and Red-tailed Tropicbird (p. 139)? Why, in 1966, did the Blue-faced Boobies (p. 156) delay egg-laying until March, when they initiated it in January or early February in the other five years of observation?

In summary, the authors and their co-workers have provided major additions to our knowledge and in many cases have furnished a basis for evaluating certain features of biological change. They are to be commended.

Having said this, I venture a critical comment. I hope that the authors and editors of future reports in this series will reduce the repetition of information in text, tables, and charts; that they will eliminate as far as possible information already established and published; that they will more thoroughly integrate the new information with that previously known (*cf.* most species accounts); and that they will eliminate irrelevant material (e.g. numbers of birds "handled," birds banded, or collected, and the amount of time spent, person by person).

Such "derelictions" probably came about through attempts to produce a complete picture of the islands and of the energy expenditures by the observers. But omitting them will make the worthwhile information, so abundantly present in these papers, more readily and pleasantly apparent to the reader, and will reduce the feeling, engendered particularly by the lengthy paper on Kure Atoll, that these are really "in-house" reports.—HARVEY I. FISHER.