

ORITHOLOGICAL LITERATURE

AN APPROACH TO THE STUDY OF ECOLOGICAL RELATIONSHIPS AMONG GRASSLAND BIRDS.

By John A. Wiens. American Ornithologists' Union Ornithological Monographs, No. 8, 1969: $6\frac{3}{4} \times 10$ in., 93 pp., 30 figs., 17 tables. \$2.50.

The urge to quantify has recently made its way to one of the last strongholds of descriptive ornithology, the study of breeding biology. This monograph presents three years of quantitative data on the ecology of seven species regularly breeding in Wisconsin grasslands: Bobolink, Eastern Meadowlark, Western Meadowlark, Savannah Sparrow, Grasshopper Sparrow, Henslow's Sparrow, and Vesper Sparrow.

As Wiens states his goals, they ". . . were to develop and test a method for describing and analyzing habitats which would be useful in elucidating ecological relationships among grassland birds." His methodology consists of habitat description—using vegetation type, coverage and height, vertical light penetration, substrate and topographic descriptions; vegetation sampling via the point method; demarkation of the territories of birds present; and recording habitat utilization by continuous tape recorded observations of the birds present.

In addition to the development of an efficient and adequate means of habitat analysis, several important relationships among the inhabitants are delineated. Their territories varied throughout the season as well as yearly, but only the Eastern and Western Meadowlarks had mutually exclusive territories. While the territories of all species had many physiognomic aspects in common, the territory of each species was somehow distinctive. Bobolinks preferred dense tall vegetation with its associated deep litter and low light penetration, while Vesper Sparrows preferred short, sparse vegetation with little litter and high light penetration. Differences among the species also appeared in the frequencies and sites of performance for daily activities. Wiens found evidence of a dominance relationship among the species in the study which, together with their ecological differences, tended to reduce direct competition sufficiently to allow co-occupancy of this relatively homogeneous environment.

This is an excellent paper for the novice ecologist to peruse. It clearly presents methodology in detail and its application in daily field work is easily followed. More than most modern field studies, this monograph also pauses to theorize a bit. What were the theoretical considerations which prompted Wiens to undertake this study? What were the problems in the development of his methodology and the consequent changes they wrought from 1964 to 1966? The graphic representations throughout are clear and easily understood. Such inclusions make this monograph particularly exemplary to the conduct of scientific research.

Alternatively, these same inclusions engender much of the criticism I might make of this paper. Often Wiens is less than concise in the presentation of his ideas. In the development of his methodology, I found myself wishing he would simply state exactly what he did, and stop. Yet the comparison between sampling methods and their relative value and efficiency is instructive. Several of his points on theoretical ecological considerations are well taken, but often overly verbose. On pages one and two, Wiens theorizes that his bird species chose this grassland habitat on the basis of specific features of the habitat rather than on the presence of ultimate limiting factors imposed on them there; and regardless of the species, it remains constant in selecting the physiognomy of this habitat. The point is well taken, but supported by an excess of examples. On page five, he overstates the point, though a good one, that ecologists in their use of arbitrary

categorization of a community for ease of analysis, often neglect to put the whole back together again.

Again in paragraphs two, three, and four on page 12, Wiens makes several good points, but is unnecessarily complex in their statement. I had the feeling here that he was holding up his side of an argument against imagined opposition. This is more the tone of a dissertation than of a monograph.

Yet in following the format of an instructional monograph, Wiens occasionally assumes too much knowledge on the part of his reader. In such a "standard operating procedure" for grassland habitat description with regard to birds, more references (see pages 17 and 18) might have been included, particularly basic ones. So long as diversity values are discussed on page 81, a brief inclusion of the parameters included in this index would be more instructive and meaningful: how large were the survey units; how were they selected; are the diversity values based on unit area?

Of lesser import are occasional lapses in organization or presentation. The last paragraph on page five would have adhered to the paper better had a topic sentence introduced the ideal approach to the study of animal habitats—through the animal itself. The map symbols used on page 32 are not explained until page 48; although readers are referred to page 48 for explanation, this arrangement is inconvenient. The brief comments on range included species by species on pages 34 to 41, as well as information on site preference, might better have been included in the discussion beginning on page 81 where Wiens discusses these subjects in detail. On page 37, much of paragraph one seems of historical import but irrelevant to the present paper, as do the brief behavioral comments later on that page.

From time to time I encountered seeming omissions in the full development of an idea. On page 44, the Western Meadowlark is listed as one of the species that arrives early on territory, yet in Table 7 on page 46, the species isn't included until 15–25 May.

I would have found useful a comparison of Tables 11 and 13. And I would have found interesting further development of the idea that "The utilization of a habitat by a species is to a large degree dependent upon the relative frequencies of various activities in the total activity repertoire of the species." These frequencies determine the utilization import or dominance, but which utilizations dictate a preference for the habitat selected? The most dominant utilization need not be the most determining one.

I found the greatest strength of this monograph to be in its theoretical approach to the description of vertebrate habitats as is well stated on page 13, and the subsequent parameters of habitat measurement as outlined in Table 2. The description and comparison of territory characteristics, given between pages 44 and 64, are very well done and constitute the life force of this paper.—D. JEAN TATE.

BIRDS OF ISLA GRANDE (TIERRA DEL FUEGO). By Philip S. Humphrey, David Bridge, Percival W. Reynolds, and Roger Tory Peterson. Preliminary Smithsonian Manual. Published and distributed for the Smithsonian Institution by the University of Kansas Museum of Natural History, 1970: 8½ × 11 in., viii + 411 pp., 8 maps, 21 pls. by Jack R. Schroeder. \$7.00.

The southernmost part of South America, formed by the Straits of Magellan and Tierra del Fuego together with adjacent archipelagos and islands, has long been subject to ornithological observations. Scattered reports have been published since 1830 but there has not been any complete work on the avifauna of this region. The present book, which deals with the northern part of the Fuegian region (the "Isla Grande"), has been written in order to help overcome this lack. It is unfortunate that the archipelagos and

islands off Isla Grande were left out, because it would have been logical to treat the whole Fuegian region in one volume. On the other hand, knowledge of the distribution of birds on the many southern islands is so sparse that the authors were justified in omitting them. Wisely they were modest, avoiding guesses and hypothetical statements.

The book is meant to facilitate field identification and to be a reference for data on seasonal and geographic distribution and on ecology. Providing this much information has created a book that weighs about two pounds; while it is excellent at the desk, it is most uncomfortable in the field. It would have been better to publish this work in two parts—one on distribution and species accounts, and the other a guide to the species, with field marks, habits, and habitats for each. As it is, one wonders if anyone would not hesitate to carry this book in the field. It would be lamentable not to take the book, because it is really full of information.

The authors have included almost everything that has been published about the birds of Isla Grande, an immense task. The unpublished manuscript of the late Percival W. Reynolds was an important source of information, and for this reason Reynolds is listed as a co-author. The work is divided into several sections—"History of Ornithological Exploration," "Geography and Environments," "Avifauna of Isla Grande," "Species Accounts," and "Field Identification." The most important section is that of the species accounts, each of which has subsections on distribution and status, habits, reproduction, vocalization, general notes, description, weight, and specimens known to have been collected. The maps show details of different parts of the island and the plates show most of the birds found in Fuegia.

I found no errors worth mentioning in the species accounts, but I would like to offer some comments. The term "nonbreeding resident" does not fit species which actually breed in Fuegia, such as *Eudyptes crestatus*, *Diomedea melanophrys*, *D. chrysostoma*, and *Macronectes giganteus*, but species which do not breed in the region, such as *Daption capensis* and *Fulmarus glacialis*. Subspecies are not mentioned, but in certain cases it would have been well to call attention to little known forms, such as *Milvago chimango fuegensis* (Johnson and Behn, Supl. Aves. de Chile, p. 353, 1957). *Gallinago stricklandi* breeds in bushy or wooded damp areas, not marshes, like the habitat of *G. media*, *Philohela*, and *Scolopax*; during migration, however, the species appears in grasslands. In regard to certain species of terns, I think it would be sensible not to accept any sight records. There are several similar species along the coast of Argentina, such as *Sterna hirundinacea* (both southern and Brazilian populations, with different breeding cycles), *S. hirundo* (in the southern summer appearing in great numbers as far as Santa Cruz), *S. vittata* (wintering in Buenos Aires and Uruguay), perhaps *S. paradisea*, in addition to which both *S. forsteri* and *S. dougallii* can be expected; the different plumages of these birds are apt to be confusing. Species which certainly appear or can be expected to occur in the area of Isla Grande are, for example, *Phoebetria fusca* (recorded off Cape Horn), *Pachyptila turtur* (breeds on Beauchêne Islets, southwest of the Falkland Islands), *Phalacrocorax bougainvillii* (breeds in Chubut, Argentina, and has been reported from the Straits of Magellan), and *Larus belcheri* (breeds in southernmost Buenos Aires, occurs regularly as far as Santa Cruz, and has been recorded from Yellow Island, east of Hoste Island, Tierra del Fuego). *Bartramia longicauda*, which has been reported as far south as the South Shetland Islands, can also be expected in the Fuegian region, as can some other North American migrants, such as *Aphriza virgata* and *Larus pipixcan*.

In the section on field identification, the description and field marks of each species are placed opposite the illustration. The passerines are not in systematic order but are grouped according to habits and habitat. Plate 17, for example, shows "Ground-dwelling

Furnariidae," Plate 18 shows "Flycatchers. Forest zone species" and "Open ground or ground species," Plate 19 shows "Open country birds," Plate 20 "Forest birds," and Plate 21 "Finches." This arrangement is somewhat confusing and ought to have been checked. *Ceryle torquata* and *Curaeus curaeus* are not exactly forest birds, *Tachycineta leucopyga* is a tree swallow, *Sicalis lebruni* and *Melanodera melanodera* ought to have been placed with the ground birds, and *Troglodytes aedon* placed with the forest birds. Confusion of another kind exists in the plates where *Turdus falklandii* and *Scytalopus magellanicus* ("forest birds") are shown amid grass on the ground, true ground-dwellers such as *Sicalis lebruni* and *Phrygilus unicolor* are on branches, and *Zonotrichia capensis*, a typical "brush-bird," on the ground.

These negative remarks are insignificant in comparison with the great value of this manual. Certainly the book will encourage the collecting of more data on the natural history of Fuegian birds. It is to be hoped that the authors will complete this work with a volume on the remaining parts of the region.—CLAES C. OLROG.

THE COTURNIX QUAIL; ANATOMY AND HISTOLOGY. By Theodore C. Fitzgerald. Iowa State University Press, Ames, 1970: 10½ × 7 in., xix + 306 pp., 157 text-figs. \$7.95.

At present, books presenting detailed information on the anatomy of a bird are so scarce and so necessary that any such book could be a major contribution. Where the subject of such a text is a species used in genetic and physiological investigations, the potential value is enhanced. Regrettably, this text does not achieve this potential. Dr. Fitzgerald made a "valiant fight to finish the manuscript" despite his ill health; that he did so is a tribute to the man and the scientist. Undoubtedly, had he lived to shepherd the book through all of the prepublication stages, many of the errors and deficiencies which mark the text might have been corrected. However, the non-textual portion of the work was prepared by his colleagues and, as frequently happens in such cases, they could not provide the expertise, knowledge, or personal attention and care which the author would undoubtedly have exercised, regardless of their intentions or their competence in their own fields of interest.

The book is attractive; the format and type are exceptionally easy to read. The absence of typographical errors is gratifying as is the intention to aid the reader by including large numbers of illustrations. The organization, with a few exceptions, follows a traditional pattern. I do question the logic of a chapter sequence which runs: "Osteology"—"Arthrology"—"Angiology"—"Myology" (italics mine); Angiology seems to fit closer to the chapter on "Splanchnology." Also questionable is the placement of the chapter on "Integument" as the final rather than as the first chapter.

A strong feature of the book is the detailed section on arthrology; nowhere else to my knowledge is so much information available on the joints of birds. The promised, but essentially absent, comparisons between the Coturnix, mammals, and other birds used in research could have been most useful had they been included. While there is an extensive Bibliography there is a paucity of literature citations in the text; the resultant absence of any significant documentation of many factual statements is disturbing especially in a text oriented toward researchers. The various organ systems are unevenly emphasized. Extensive coverage is given to osteology, myology, angiology, and, to some degree, neurology, but only five pages are given over to the endocrine system, and four to the integument. The text also promises, by title, to cover "histology"; with comparatively few exceptions, it does not, leaving a significant void in coverage of functionally important histological aspects of many organs and tissues.

While much of the information presented is accurate, there are some disturbing and notable exceptions, some but certainly not all of which are discussed below.

Illustrations, while numerous, are quite inadequate and thus the reader must carefully study the labels to compensate for deficiencies in the legends. Sometimes the same view is labeled differently in different figures (e.g. Figs. 3.1 and 3.5), or major structures are left unidentified (e.g. several illustrations in chapters 2–5). There are instances where structures are discussed in detail in the text (e.g. middle cardiac vein, p. 63) but are nowhere illustrated. Finally, there are structures illustrated which in no way correspond to the text description (e.g. *Mm. quadratus femoris, ischiofemoralis, biceps femoris* and some instances of *M. gracilis*); in other instances illustrations are cited as supportive of text descriptions when other, uncited, illustrations depict more clearly, if still inadequately, the described structure (e.g., *M. caudofemoralis*). Many illustrations appear to be a cross between diagrammatic representations and a faithful reproduction without being identified as either; Figs. 3.26 and 3.27, which depict the renal portal system, appear to be faithful reproductions, but are instead, diagrammatic. If the reader accepts these figures as an accurate representation, he could construct a completely inaccurate pattern of possibilities of blood flow within this system. The renal portal valve in Figs. 3.26 and 3.27 is oriented backwards and a vein labeled “internal iliac” in Fig. 3.25 is, in Fig. 3.27, identified as “afferent renal”; Akester (*J. Anat.*, 98:865–876, 1964) identifies this vein as the caudal renal portal.

The section on arthrology contains inconsistencies in identification of the “types” of joints described; compare the classification of the humeroscapulo-coracoid, coxofemoral, and costosternal articulations. The vertebral intercentral articulation (rightfully limited to the cervical vertebrae) is classed as an amphiarthrosis (p. 39) despite the stated presence of a joint capsule composed of “fibrous and synovial layers” (pp. 39–40). Further, to refer to the action at these intercentral articulations as “hinge and gliding,” while possibly descriptive, is to me an improper and misleading use of terms which have a more precise and restricted arthrological application. Also questionable is the statement that the nasofrontal articulation produces a “gliding movement.” The generally accepted action at this articulation is that of a “hinge” (Fisher, H. I., *Wilson Bull.* 67: 175–188, 1955; Bock, W. J., *J. Morphol.* 114:1–42, 1964).

Perhaps the most disconcerting aspect of this work arises from the nomenclature employed by the author. The problem of anatomical nomenclature is not new and nowhere is it more acute than in avian anatomy. Unfortunately, while birds are vertebrates, and thus conform to a basic vertebrate body plan in which many structures are unquestionably homologous, the question of homology is in no way firmly established between many similar structures of birds and mammals. Birds are not mammals, they have not evolved from mammals, and the only relationship they have to mammals is that both had a reptile-like ancestor. They have evolved independently for more than 150 million years. To expect that the morphology of two such divergent organisms would be amenable to an identical system of nomenclature universally denies the unique character of birds. Yet, repeatedly the author—unintentionally, I am sure—does so, and I felt that this was an anatomical treatise on that most aberrant of creatures, “The Feathered Mammal.” In those instances where there was no possibility of equivalence of terminology, the author, as did Chamberlain whose work (1943, *Mich. State Coll. Agr. Exp. Sta.*) served as Fitzgerald’s authority for nomenclature of avian limb musculature, ignored completely the body of literature on avian morphology which has established a *de facto* even if not a *de jure* nomenclature. The resultant effect is one that can only lead to utter confusion for those who unwittingly accept most of the

terminology in this text as authoritative and thus follow it in their publications, or who attempt to compare information presented here with that available on other avian species. In many cases they will find that they do not speak the same language. It is my opinion that this text provides the strongest argument available for formulation and promulgation, at the earliest possible time, of a *Nomina Anatomica Avium*. The following selected examples illustrate this viewpoint.

One may find some argument for the use of the term "stifle joint" to designate the femori-tibiotarsal (= knee) joint of birds; one could for sake of convenience overlook the term "Ossa faciei" (misspelled in the text as "Ossa facici") though the presence of a "face" is questionable in birds. Perhaps one might accept use of the term "diaphragm" so long as it were pointed out that this term implies something less in function and structure than a similarly named structure in mammals. However, completely unacceptable to me is the term "hock" to refer to the tibiotarsal-metatarsal joint in birds. While the hock of mammals and its analogue in birds are both "inter-tarsal" joints, structurally, here the comparison ends. Similarly, it does not seem accurate to employ terms such as "jejunum," "ileum," and especially "descending colon," nor to use mammalian names for vessels supplying structures of the avian intestinal tract. Disturbing also are osteological references such as "lumbosacral bone" for the synsacrum; the author does give "synsacrum" as a synonym but he uses the term "lumbosacral bone." Also undesirable is use of the term "urostyle" for "pygostyle" even if used interchangeably as was done in the text.

There is a wealth of literature on avian anatomy to which one can refer for "names." While admittedly there are two sets of myological terminologies extant, (Hudson, *Amer. Midl. Nat.* 18:1-108, 1937 and Fisher, *Amer. Midl. Nat.* 35:545-727, 1946), most American workers select one and include a synonymy with the other in their work. These terminologies have been established over a long period of time as the result of the classical works of Gadow, Fürbringer, Garrod, Shufeldt, Forbes, and more recently, Hudson et al., Fisher, Berger, Bock, etc. Fitzgerald, however, chose as a basis for his muscle names, the work of Chamberlain (*op. cit.*) without either researching works on avian-mammalian homologies or investigating the question himself. Far preferable, it would seem to me, would have been a short comment indicating familiarity with the body of literature on avian terminologies, including citations, and a short statement of reasons for rejecting these studies. In this manner, the reader would then have been forewarned that major variations in nomenclature exist which require "translation" or reference back to the "classics." As it stands, however, the resultant confusion to the researcher because of the terminological differences suggests that extreme caution should be exercised in accepting the data on the myology. A few examples of the problems which can arise because of these terminological differences are cited below.

There are serious inconsistencies and inaccuracies in descriptions, terminology, and illustration of a large number of the muscles in the hind limb. The muscles identified by Fitzgerald as *Mm. biceps femoris*, *semimembranosus*, and *semitendinosus* are not the same muscles given these names in the ornithological literature. *M. semitendinosus* of Fitzgerald is *M. biceps femoris* of Hudson, *M. semimembranosus* is *M. semitendinosus* of Hudson and *M. gracilis* of Fitzgerald is *M. semimembranosus* of Hudson. The muscle identified as *M. biceps femoris* by Fitzgerald is *apparently* the caudal portion of *M. tensor fascia lata* although Fig. 4.10 is the only place it is illustrated; in all other illustrations the muscle is simply referred to as *M. tensor fascia lata*. Equal confusion results in the identification of other muscles (e.g. *M. quadratus femoris*, compare description on p. 158 with illustration on Fig. 4.21). *M. quadratus femoris* is supposedly

M. ischiofemoralis of Hudson but it appears more probable that it is, in reality, *pars iliofemoralis* of *M. piriformis*. I cannot overlook the fact that Fitzgerald uses the name "*M. pectineus*" for "*M. ambiens*"; this muscle has long been recognized to be without *any* apparent homologue in mammals.

The digital flexor muscles of the hind limb of the bird are unique in their arrangement and differ from those of the mammal. It is thus a gross oversimplification to simply arrange these muscles into a group of superficial and a group of deep digital flexors. Neither is there any justification for departing from the *universally* accepted nomenclature for the five major digital flexors by introducing completely new names for them. Finally, virtually no attention is paid to the frequently functionally important tarsometatarsal muscles. The names given to, and the general descriptions provided for, the few such muscles described are insufficient to be of any value at all.

Undoubtedly there is information of value in the text, but it is obvious that if other sections are as disturbing as those reviewed in detail, a great deal of care must be used in relying on this book as an authoritative reference. *Perhaps*, in company with a broad knowledge of the literature of avian anatomy, the text can be useful. It might serve as a possible point of departure for the most general information on the anatomy of the Common Coturnix; but it is neither an accurate or a reliable compendium for use by an investigator. The text is the only one available on the Coturnix, and for that reason one might wish to purchase it. I suggest extreme caution in reliance upon it as an authoritative text.—ROBERT D. KLEMM.

A FIELD GUIDE TO AUSTRALIAN BIRDS. NON-PASSERINES. By Peter Slater and others. Livingston Publishing Co., Wynnewood, Pennsylvania, 1970: 5¼ × 7½ in., xxxii + 428 pp., 43 col. and 21 bl. and wh. pls., 47 figs. \$10.00.

Although the name of Peter Slater figures prominently on the first page of this book, he is responsible only for the illustrations and for the text for one order, the Falconiformes. The text for the remaining 18 orders has been written by seven bird experts, six of whom are professional ornithologists employed by the Wildlife Section of the Commonwealth Scientific and Industrial Research Organization (CSIRO).

This book, which is the first of a two part issue, is designed to help in identifying any non-passerine bird that may occur in the Australian region. It contains a visual index for quick identification, a so-called check list, and a section of 131 pages which includes the plates, on which are shown every non-passerine found within the stipulated area, together with the name and the key markings of each species. The second section of 282 pages contains the notes on each species and distribution maps, with appropriate cross references to the illustrations in the first section. The final pages contain indexes of common and scientific names.

This is one of the most comprehensive field guides ever to be prepared on Australian avifauna. It incorporates most of the features that have appeared in other modern guides, and with such a galaxy of talent the text should be nearly perfect. In general, the typesetting and printing are good, but some letters are faint or even missing, and the black and white illustration of the Giant Petrel on Plate 3 is badly spotted.

The colored plates are somewhat garish, possibly owing to heavy inking in the printing. The Gang-gang Cockatoos on Plate 53 are almost as black as the black cockatoos. Although printing on blue paper outlines the white parts of the plumages, it is not conducive to clarity. It is stated that the "illustrations are intended to be an aid to identification, not works of art," and this aim has been achieved, helped by the large size of the image of each bird depicted.

Some of the plates, however, can be misleading. On Plate 2, the albatross heads, while not being drawn to scale, show variation in size. The bill of the Wandering Albatross is almost 20 per cent larger instead of being that much smaller than that of the Royal Albatross; the Sooty Albatross and the Light-mantled Albatross are similar to the other species instead of being much smaller. The identification key on Figures 15 and 16 shows the opposite sizes of the plates and gives the correct comparison of these species.

The only other group that I checked was the genus *Pachyptila*, which is identified almost solely by the size and shape of the bills. On figure 21 there are two drawings of the bill of the Dove Prion, and although the range of width of the bill of this species is said (p. 165) to be 11 to 14 mm., the drawings are 14 and 19 mm.

The paintings of the Cattle Egret in breeding plumage on Plates 13 to 15 show considerable variation in the same plumage state. The adult Swamp Harrier, on Plate 22, does not show the white patch on the rump, which is diagnostic; this field mark is not even mentioned in the accompanying key although it is referred to in the text on page 250. The black and white drawing of the Malleefowl on Plate 28 is described as "upper-parts attractively patterned," with no mention of color. On Plate 59, the title is given as Horsfield Brown Cuckoo, which is corrected on page 384 to Horsfield Bronze Cuckoo.

This book clearly reflects the chaotic state of the nomenclature of Australian birds, due to the lack of an accepted check-list. From the taxonomy used, including vernaculars, it would appear that the ornithologists within the CSIRO Wildlife Section do not accept the "CSIRO Index of Bird Names" which was prepared by one of their members. It is stated that the "text is arranged in systematic order, following the CSIRO Index—we have taken the liberty of departing from the order in a few places." The first liberty taken is to alter the sequence of one of the orders. The order of grebes—Podicipediformes—was placed in the Index *after* Procellariiformes and Pelecaniformes. Instead of now placing it *before* these two orders, to follow modern taxonomy, in the book it is placed *between* them. Many liberties have been taken in switching the sequence in which genera and species were placed. Even the sequence of families has been changed, and in one instance a new family, Arenariidae, has been introduced.

It is at the species level, however, that most changes have taken place. The Oriental Dotterel, *Charadrius veredus*, becomes a subspecies of Caspian Plover, *C. asiaticus veredus*; the Spur-winged Plover, *Vanellus novaehollandiae*, is lumped with the Masked Plover, *V. miles novaehollandiae*; the White-tailed Black Cockatoo, *Calyptorhynchus baudini*, becomes Yellow-tailed Black Cockatoo, *C. junereus baudinii*; the Red-sided Parrot, *Eclectus pectoralis*, is changed to Eclectus Parrot, *E. roratus*; the Cattle Egret, *Bubulcus ibis*, becomes *Ardeola ibis*; the Golden Bronze Cuckoo, *Chrysococcyx plagosus*, is made a subspecies of Shining Bronze Cuckoo, *C. lucidus plagosus*, and there are many other changes. Each author has acted as his own taxonomist.

The vernacular names have been altered to an even greater extent. This particularly applies to the Psittaciformes, Falconiformes, and Procellariiformes. No alternative names are shown, and the only clue to other works is through the scientific names, many of which are altered. This book is stated to be for beginners as well as for serious students, and it is essential that they be able to refer to other works on birds. This particularly applies to the current record-selling book, "What Bird is That," which has been on the market since 1931, and brought up to date with each edition.

This guide could become a popular book on Australian birds. Unfortunately, the number of pages in the two parts, some 800–900, will make it very bulky for a field guide.—
ROY P. COOPER.

EVOLUTION OF DIVING ADAPTATIONS IN THE STIFFTAIL DUCKS. By Robert J. Raikow. University of California Publications in Zoology, vol. 94, Berkeley, 1970: 10¼ × 6¾ in., vi + 52 pp., 32 figs., 16 tables. \$2.50.

This study is mainly a functional-anatomical comparison of the tails and hind limbs of four species of duck. Three of these—the Black-headed Duck, Ruddy Duck, and Musk Duck—belong to the stiff-tail tribe, Oxyurini. The fourth species, the Mallard, is used as a representative of the ancestral surface feeding stock from which the Oxyurini presumably evolved. These species (each representing a different genus) were selected because of their availability and supposed approximation to an evolutionary sequence in which increasing efficiency in underwater swimming is achieved at the expense of terrestrial locomotion.

After an introduction and a materials and methods section, four pages are devoted to a summary of locomotor habits. Unfortunately almost all of this information seems to have been taken from the literature and is lacking in details and preciseness.

The next section compares the tails of the four species. Tail vertebrae counts and measurements are given and the tail muscles are described. For both the tail skeleton and its muscles, ratios are used for interspecific comparisons (different tail lengths are expressed as a per cent of "trunk length" while the separate muscle weights are expressed as a per cent of total caudal muscle weight).

In the section on the hind limb, the approach is similar to that employed for the tail. Relative proportions of the pelvis and hind limbs are presented. Interesting differences in the knee joints are noted. Finally the hind limb muscles are described and their mechanical advantages and relative weights used in functional comparisons.

The data collected are employed to formulate both systematic and functional conclusions. The new anatomical evidence substantiates the earlier presumption that the three stiff-tails represent an evolutionary sequence. At the beginning of this sequence, the Black-headed Duck serves as a connecting link between the surface feeders and the more advanced stiff-tails. Raikow summarizes the functional modifications in the sequence as follows: "Various modifications of the osteology and myology of the hind limb and tail have occurred which improve the efficiency of an adducted leg posture in diving, and the use of the tail as an underwater rudder. These include lengthening of the tail and enlargement of the caudal levator muscles, narrowing of the pelvis and elongation of the postacetabular portion, enlargement of the area of origin of leg muscles from the knee area, reduction of the size of thigh muscles and increase in shank muscles correlated with the change from walking to swimming. Changes in the line of action of certain thigh muscles improve their effectiveness as fixators of the thigh during diving. An increase in the mechanical advantage of many muscles may be associated with the need for strength of action rather than speed, in swimming as compared to walking."

Raikow's approach is traditional and follows the general philosophy and techniques pioneered in avian anatomy by Alden Miller (1937) in his study of the Hawaiian Goose. Recently some of these techniques have been seriously questioned. Walter Bock has been particularly vigorous in exposing errors. For instance, muscle weights, volumes or ratios derived therefrom are not necessarily accurate indices of the force producing capabilities of muscles. Rather other parameters, particularly those involving fiber length and arrangement, must be considered. Likewise, the use of mechanical advantages to differentiate between muscles which generate force at the expense of speed versus muscles which produce speed at the expense of force is probably incorrect. Rather, Bock advocates the use of "free-body diagrams" (1968). Raikow's functional interpreta-

tions unfortunately place heavy reliance on both the mechanical advantages and relative weights of muscles.

If Walter Bock's recommendations are followed, many of the widely accepted "ground rules" of avian functional anatomy will have to be modified. Regrettably, there is still no study of a scope comparable to Raikow's which attempts to incorporate the new theoretical aspects of functional anatomy into an operational framework. Hopefully such a study will appear in the near future.

As it stands, Raikow's study contains a wealth of interesting information. His efforts should be commended even if his functional conclusions must be viewed with some skepticism.—LOWELL SPRING.

PORTRAITS OF TROPICAL BIRDS. By John S. Dunning. Livingston Publ. Co., Wynnewood, Penna., 1970: $8\frac{3}{4} \times 11\frac{1}{4}$ in., xx + 153 pp., 72 color pls., \$20.00.

Beautiful color photographs of 72 species of the most striking neotropical birds dominate this book. The photographer-author has commented on each species and family in a single short paragraph, usually to identify the habitat and something of the bird's behavior. It is a handsome book and will stimulate enthusiasm for tropical birds in most readers.

Dunning describes how he captured wild birds in nets and even includes plans for constructing the portable enclosure in which he photographed them in the field with electronic flash. The enclosure is supplied with vegetation and perches appropriate to the bird's habitat, the bird is introduced to the cage, photographed in what appears to be a natural setting, and then released. One-third of the plates are of tanagers, and an eighth are of antbirds; the remaining plates illustrate representatives of 21 other families. Even the colors of unfeathered areas are sometimes striking; e.g., eleven species have vivid red eyes!—STEPHEN M. RUSSELL.

THE PINE BARRENS. A PRELIMINARY ECOLOGICAL INVENTORY. By Jack McCormick. Research Report No. 2, New Jersey State Museum, Trenton, New Jersey, 1970: 6×9 in., 103 pp., 9 maps, one table, 23 halftones. \$2.75.

The New Jersey Pine Barrens constitute the most extensive (approximately 2000 square miles) wildland tract on the Atlantic seaboard. Although close to the densely populated metropolitan areas of Philadelphia and Camden, it is sparsely settled and has no major industries. Due to its infertile and droughty soil, it is, with the exception of its blueberry and cranberry culture, unattractive to agriculture. Mostly forested, it is interlaced with slow meandering streams and spotted with bogs. Its geological history is complex, but its most interesting feature is its flora, which has, in addition to common plants, a considerable number of rare ones. The Barrens are the northern limit of many southern species and the southern limit of some northern ones. Twenty-four species of plants, including two found only here, have been originally described from the Pine Barrens. Bird life here is relatively poor compared with other areas in the state.

The New Jersey Audubon Society, the Pine Barrens Conservationists, and other citizens' groups became concerned about threats to the preservation of the Pine Barrens. They enlisted the cooperation of the National Park Service in an endeavor to have the Barrens designated a National Landmark, thereby putting a brake on the threats of real estate developments, possible expansion of the blueberry and cranberry growing, and the establishment of a jet airport which would gobble up 51 square miles at one fell swoop.

The National Park Service made a grant to the Academy of Natural Sciences of Philadelphia for a study of the natural resources of the area. Jack McCormick of the Academy staff made the survey, and his report, entitled "A Study of the Significance of the Pine Barrens of New Jersey" was issued in January, 1968. The present publication is a summary of that report.

It concisely summarizes the past industrial background of the region, and lists its plants and animals. Two areas in the region which have varied habitats are studied in considerable detail. The value of the area, not only for the preservation of its native wildlife, open space conservation, recreation, hunting and fishing, and water supply, but also as a scientific laboratory for the study of its unique ecosystem is stressed. The Pine Barrens have generated much scientific debate, and this work points out that there is much yet to be learned. It is refreshing to have the challenges to our understanding so well delineated. An excellent bibliography will help all who wish to learn more about this fascinating region.—ERNEST A. CHOATE.

PUBLICATION NOTES AND NOTICES

CHECK-LIST OF BIRDS OF THE WORLD. Volume XIII. By Raymond A. Paynter, Jr. and Robert W. Storer. Museum of Comparative Zoology, Harvard University, Cambridge, Mass., 1970: $6\frac{1}{2} \times 9\frac{1}{4}$ in., xiv + 443 pp. \$15.00.

This volume treats the buntings and American sparrows, Plush-capped Finch, cardinal-grosbeaks, tanagers, and the Swallow-Tanager, all united under the family Emberizidae. These birds have been separated from the carduelines and *Fringilla* by the wood warblers, Hawaiian honeycreepers, vireos, and icterids (already treated in Check-list, Vol. 14). Of the fifteen volumes in this indispensable series, volumes 8 and 11 remain to be published.—P. S.

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