REVIEWS

Birds of Colorado.—Alfred M. Bailey and Robert J. Niedrach. 1965. Denver, Colorado, Denver Mus. Nat. Hist. Pp. i–xxii + 1–454 (vol. 1) and i–x + 455–895 (vol. 2), 1,175 total pp., incl. inserts, plates, and map. 124 col. pls. and over 400 black and white photographs. $35.00.—This recent addition to the state bird book category is an impressive, lavishly illustrated—perhaps even overillustrated—pair of volumes that occupy as much shelf space, in all dimensions, as Roberts' classic "Birds of Minnesota." The work covers 439 species (46 more than Sclater's "History of the birds of Colorado" published in 1912) and "64 additional races, all the latter based on specimens examined by the authors."

Following the preface appear the names of the 23 contributing artists and 36 photographers, a list of the color plates, a check-list of Colorado birds, and good drawings of bird topography. The 8-page foreword covers the scope of the work, a discussion of scientific nomenclature, and acknowledgments. Next come 15½ pages of "Introduction" dealing with the following titles: Geographic Distribution of Birds (about half of which is geological), Migration, Orientation, Hazards of Migration, Pesticides, Arrival, Incubation, Nesting Success, and Longevity. Under each of these the state of Colorado is only incidentally mentioned, but the next several pages treat Colorado history, especially ornithological activity from 1776 to the 1950s, with considerable emphasis on the Denver Museum's contributions. Following this is a discussion of topography, drainage systems, and climate, plus a nicely illustrated section on life zones in which the state is discussed on the basis of Merriam's system. A novel inclusion here is the 11 pages of "Some Common Colorado Plants" listed by family and presenting statistics on the number of species in each of the mentioned genera, plus their altitudinal ranges. Interesting as this might be to botanists, it is too sketchy to be of much use to ecologists and probably of no value whatsoever to the bird student. One consults botanical manuals for information on plants.

Next is a page or two on the altitudinal ascent of spring, and the breeding season, from the lowland plains to the alpine zone. This is followed by general comments on migration in Colorado. I was interested to learn here that conspicuous "waves" of migrants are generally as uncommon in Colorado as in southwestern New Mexico. Of interest to bird listers will be the nearly 9 pages of information on the 1963 spring and Christmas bird counts.

The species accounts (beginning on page 72) include sections on recognition, general range, the species' status in states adjacent to Colorado, detailed summaries of Colorado sight records, and mention of specific museum specimens with localities and dates. Many accounts include a commentary on general habits with some mention of the authors' personal contact with the bird in Colorado. The foregoing entries are all useful, and seem to be carefully prepared. In addition to these, in a large number of cases, are the authors' often detailed accounts of experiences with birds in places far removed from Colorado, for example, long paragraphs devoted to Bailey's notes made on Common Loons in Michigan, Yellow-billed Loons in Alaska, and Red-throated Loons there and in Labrador. A significant portion of the text is made up of such material which, while not without interest, has little or nothing to do with the birds' status or behavior in Colorado.

Although Bailey and Niedrach "have endeavored to prepare copy of interest to the amateur naturalist rather than to the scientist" (page 3) they express the hope that some of the books' information will prove valuable to the professional orni-

thologist as well. It is important, I think, to establish this at the outset, for the inclusion of 35 or more species based on sight records, or for which the authors could not locate specimens, doubtless will establish the "tone" of this work for the scientific reader. Here again, the question is raised as to what constitutes a scientific record of occurrence. Having reviewed and regularly used various southwestern regional works in recent years, I find that "Birds of Colorado" impresses me as occupying a position somewhere between the one of extreme care employed by Phillips, Marshall, and Monson in accepting records for "The birds of Arizona," and the casual, often uncritical, treatment by Ligon ("New Mexico birds and where to find them").

The scientist in me rebels at acceptance of certain "records," like one of the Pileated Woodpecker (p. 486) reported by Justice William O. Douglas. The authors say, "We have a decision from a Justice of the Supreme Court of the United States that the noble Cock-of-the-Woods has occurred in the state, and who are we to question such a report?" I submit that many ornithologists will question it!

Polytypic species are in general dealt with first under the binomial, then with each subspecies receiving full treatment as mentioned above under "species." After reading the detailed treatment of the Common Nighthawk, *Chordeiles minor*, I was amazed to see only one race of the Horned Lark (*Eremophila alpestris leucolaema* Coues) included. Evidently "the birds of the mountains belong to the same subspecies as those of the prairies" (page 539), yet the writers state that "other races have been recorded from the state by various authors, and we have examined numerous specimens which have been given other names." They point out that at least five other races occur in adjacent states and anticipate future recordings of additional forms in Colorado. It seems too bad that a problem such as this, to be at least largely resolved by judicious collecting, could not have been undertaken prior to completion of this work, which will stand as the major treatise on Colorado birds for a long, long time. Despite the nearly 900 pages in these two massive volumes, perusal of them indicates that a fair amount of basic ornithological spade work remains to be done in this fascinating state. The authors are, of course, aware of this—probably better than anyone else. They make occasional reference to the paucity of work in various regions, e.g. in the southern counties and in the pinyon-juniper country of western Colorado.

It should be noted that not all species variously reported from Colorado on the basis of sight records have been included. See for example the mention of "hypothetical" Colorado warblers somewhat obscurely placed at the end of the Painted Redstart discussion on page 710.

Specimens referred to throughout the text are largely those in the Denver Museum; rarely are Colorado birds located in other collections mentioned. Several of the old specimen records (e.g. the 1905 Eastern Wood Pewee) are mentioned only on the basis of references to them in the literature, although certain others such as the *Myiarchus tuberculifer* from Ft. Lyon in the Museum of Comparative Zoology have been tracked down and confirmed.

The taxonomy is conservative, with A.O.U. Check-list nomenclature followed almost throughout. There are a few exceptions, for example treatment of *Zonotrichia leucophrys oriantha* as synonymous with the nominate form following Banks' 1964 monograph. Frequent references are made to recent authoritative studies that suggest taxonomic changes from those in the Check-list. I disapprove of assignment of trinomials to any bird when no specimen has been secured and examined; see for example, the accounts of the Hepatic Tanager (page 736) and Phainopepla (page 846).

The work is quite free of serious errors and generally is well edited. One con-

temporary ornithologist's name is misspelled (page 517) and the perching birds are referred to as the "Order PASSERES" on page 739, though termed "Passeriformes" on page 508. Following the regular species accounts at the end of volume 2 are some "added notes" dealing with Rivoli's Hummingbird and the Phainopepla. A gazetteer and 33-page bibliography terminate the work.

The photographs illustrating these volumes range from excellent to some that I think might better have been omitted. Certain pictures such as those of the Fox and White-crowned sparrows are lovely; others of species seldom photographed (crossbills, rosy finches, Pine Grosbeak, Brewer's Sparrow) are valuable additions. A few of the enlargements from motion-picture film (for example the Chestnut-collared Longspur on page 843) are very good but others are less successful. Some pictures suffer from overenlargement, revealing numerous scratches and blemishes from the negatives. Unfortunate spotting, apparently in printing, has defaced quite a few photographs marring their original beauty, and I personally find objectionable the obvious retouching visible in several others. Occasional pictures of such things as an albino Blue Jay (page 555), the out-of-focus Catbird (page 604), and others that are technically poor or without data, are needless inclusions. Most objectionable to me are the numerous photos of captive birds (none labeled as such). Some are quite natural and pleasing, but the dazed-appearing Tree and White-throated Sparrows seem to have been subjected to repeated electronic flashes. The awkwardly perched Song Sparrow with soiled tail, the inappropriately perched warblers, and various others of this sort detract from the books' many superior photographs and contribute absolutely nothing of value. The picture of Cattle Egrets attending an Indian rhinoceros seems out of place in a book on Colorado birds, and in general I think the inclusion of photographs has been overdone. One shot of a Piping Plover on a person's hand would seem sufficient, and three of a Mountain Plover at the nest are needlessly repetitious Three full pages of pictures are devoted to this species, and even more to the Long-eared Owl with, again, three very similar pictures of an adult at the nest. There is a notable lack of consistency in providing data with the photographs.

The book's colored plates warrant some attention. Among the most pleasing to the eye are those by Donald Malick, but I would have preferred to see more originality shown in some of them. Malick's White-throated and Black Swifts (plate 69) do not properly convey either species, missing the facial pattern typical of the latter and the clean-cut black and white effect of the former. Nor are his leucostictes (plate 113) quite convincing—perhaps because of too prominent an eyering or too large an eye for these very small-eyed birds. Some figures in the wood warbler plates by Richard Parks exhibit something of an Audubonesque quality that stands out distinctly from other paintings in the books. Some of these have minor inaccuracies, such as the brown (instead of flesh-colored) tarsi and toes of the Northern Waterthrush (plate 103). I could make additional criticisms, but I wish to emphasize that many of the book's colored plates are very good indeed. Unfortunately they are so diverse in style and excellence as to preclude any really detailed treatment of them here.

I have had opportunity to use "Birds of Colorado" for some time, checking on the status of various species that I have been studying in New Mexico. The work is very definitely a useful one and one that no working ornithologist in the Southwest can afford to be without. I would have preferred less emphasis on illustration, which, not only seems overdone, but which has produced bulky volumes at a cost prohibitive to many students.—DALE A. ZIMMERMAN.

The species of birds of South America and their distribution.—Rodolphe Meyer de Schauensee. 1966. Academy of Natural Sciences of Philadelphia. Narberth, Pennsylvania, Livingston Publ. Co. Pp. xvii + 577. 6 × 9 in. $10.00.—This work by Meyer de Schauensee is a major contribution to the ornithology of the Western Hemisphere. In this era of expanding interest in world ornithology almost every serious student of birds needs it as a reference work. It is the only modern, single-volume treatise in existence listing the species of birds inhabiting South America. Other comprehensive lists, such as "Nomenclatur avium neotropicalium" (1873) by Sclater and Salvin and "The birds of South America" (1912) by Brabourne and Chubb are taxonomically obsolete and do not reflect our current knowledge of distribution; hence they are of limited value to the few present-day workers who have access to them. The "Catalogue of birds of the Americas" (1918–1949) authored singly or in various combinations of authorship by Cory, Hellmayr, and Conover is also, at least with respect to the early volumes, badly in need of revision and besides requires, for the same geographic and taxonomic coverage, reference to the entire 15 separately bound components. Here we have a single volume that treats the 22 orders, 95 families, 917 genera, and 2,906 species inhabiting the mainland of South America, the islands of the Caribbean off Venezuela from Aruba to Trinidad and Tobago, Gorgona Island off the Pacific coast of Colombia, Fernando de Noronha off the coast of Brazil, and the islands in the vicinity of Cape Horn. The Galapagos Islands and the Falklands are excluded. The treatment, which is strictly on the species level, is thorough and accurate. For readers interested in subspecies, an asterisk follows the names of polytypic forms, and, as further assistance in this regard, the author appends a country-by-country partial bibliography. The range of each species, presented in considerable detail, includes, where appropriate, the distribution outside of South America, and most entries note the life zone that the species inhabits. When a species is accredited to a country an actual record is allegedly available for that country. In other words, Meyer de Schauensee never presumes occurrence in a country on the basis of mere geographical probability. In the case of species known from only a few specimens or records of occurrence, he provides the names of the localities where examples have been taken.

Among the book's numerous laudable features are several that deserve special notice. Wherever the nomenclature differs from that found in the "Catalogue of birds of the Americas" or in the "Check-list of birds of the world" commenced by James L. Peters and now being completed by various authors, the reason for the deviation is given, or reference is made to the study on which the change is based. Meyer de Schauensee includes the name previously used, and all these names appear in the index. The sequence of orders and families adheres for the most part to that of Wetmore (1960), and where the author departs from this sequence he points out the departure and usually gives his reason for it. The copious annotations under species after species that call attention to special problems, to debatable points of view, and to taxonomic uncertainties demanding attention, are, however, features of the book that particularly enhance its usefulness.

Another commendable attribute of the work is the careful attention given to providing suitable English names, a task in which the author acknowledges the collaboration and assistance of Eugene Eisenmann, who in turn consulted competent authorities, especially before changing names that have appeared in works on Neotropical birds published in recent years.

The book is well printed and typographical errors are by no means excessive, although one of them occupies a place of unfortunate prominence—in the printing of

the hard cover the "and" in the title was changed to "with." The author and his chief collaborator, Eugene Eisenmann, are to be congratulated for producing a work that constitutes a major advance in American ornithology, one that is certain to foster further advances.—GEORGE H. LOWERY, JR.

Pigeons and doves of the world.—Derek Goodwin; illustrations by Robert Gillmor. 1967. London, Brit. Mus. (Nat. Hist.), publ. no. 663. 446 pp., 3 col. pls., many black and white illustrations; 9 × 11 in., cloth. $15.12.—This volume helps fulfill a long standing need for a general account of the species of Columbidae. A particularly useful feature is the inclusion of much information on behavior, in line with the special interests of the author. Goodwin explains that the word "pigeon" is of Norman-French origin and is usually applied by the layman in Britain to the larger species, while the word "dove" is of Anglo-Saxon origin and is applied to the smaller species. But there is no very consistent use of these names by ornithologists.

The book is divided into a general survey of the biology of pigeons and doves in the first 50 pages and a systematic section giving an account of the species of the world in the next 380 pages. More specifically, the general section considers nomenclature, adaptive radiation, coloration, plumage sequences, clutch size and egg color, maintenance behavior, voice and display, reproductive and escape behavior. The systematic section follows a set format for each species: common name, scientific name, reference for original description of the species, description of appearance, distribution and habitat, feeding and general habits, nesting, voice, displays, other common names, and references. Each species account is also accompanied by a map showing its approximate geographic distribution, and in addition for most species there is a good black and white drawing made from the living bird or from photographs, where this was possible. For each genus or group of closely related genera an introductory section discusses the phylogenetic relationships and courageously presents a dendrogram of all the species, summarizing the author's views of their relationships. He states that he has preferred to use broad genera and wherever possible to avoid monotypic genera, while under the species headings he has described and named only the more distinctive geographic races. The book closes with one index to English names and another to scientific names.

The general organization and clarity of the writing are excellent. Some general behavioral traits characteristic of the Columbidae are elaborated. The well-known habit in these birds of drinking by continuous sucking is believed to be an adaptation enabling water to be taken as quickly as possible, reducing the danger from predators. Goodwin, in his extensive observations of pigeon and dove behavior, has seen no use made of the preen gland, and the powder down that permeates the plumage of pigeons appears to function in lieu of preen oil to aid in waterproofing the feathers. When roosting, the head is not tucked behind the wing but drawn close to the body. Compared with passerine birds pigeons have a rather limited vocal repertoire. Four basic calls are distinguished: the advertising coo (which is very similar to the nest call), the display coo, the distress call (which may often be used as a warning note), and the excitement cry (which may be used as a greeting call or threat note). Most pigeons and doves have a display flight that attracts conspecifics, and there are widespread similarities in the various courtship displays and activities of different species. The eggs are white or nearly so in all species and are seldom left uncovered once incubation begins. All young pigeons, insofar as the author knows, have a white or pale tip to the bill with a very dark area immediately behind it and

a dull base. Many, probably most species of pigeons, attack the young of the first brood and drive them away when the second brood hatches.

The emphasis on behavior is continued in the taxonomic section where much valuable information is summarized under various species, bringing out, for example, the close association between motor patterns of display and special plumage features of coloration. The verbal representations of vocalizations of different species do not seem particularly helpful except perhaps as aids to the memory of someone who has just heard the calls. At some future day tape recordings and spectrograms of the distinctive vocalizations of the species of birds of the world may be available, but it is too much to expect at present for so large a family of birds as the Columbidae. No reference is made to any existing collection of sound recordings of pigeon and dove species.

The plumage descriptions are detailed and appear to be accurate, being based on direct examination of specimens in the British Museum and in the American Museum of Natural History. The author mentions no source for the maps of geographic ranges and, although a convenience to the reader, some of these maps are crude and inaccurate. Almost all the quite extensive Canadian part of the range of the Mourning Dove (*Zenaidura macroura*) is omitted, as is much of the West African part of the range of the African Collared Dove (*Streptopelia roseogrisea*).

Often a species of dove or pigeon has more than one popular or common name, and the list of such names given for each species is a useful adjunct. This is especially true as the same popular name is sometimes used for very different species, e.g. "Ringdove" for several *Streptopelia* species as well as for *Columba palumbus*, and "Mourning Dove" for the American *Zenaidura macroura* and the African *Streptopelia decipiens*.

The author has made extensive use of the literature, but left a few surprising omissions. Thus, there is no special treatment of homing and migration, and though the book contains sections on the "Feral Pigeon" (*Columba livia*) and on the Domestic Ringdove (*Streptopelia "risoria"*), there is no reference to W. M. Levi's extensive compendium on the domestic pigeon nor is any mention of D. Lehrman's detailed studies published over the last 20 years on reproductive behavior and endocrine physiology in the Domestic Ringdove.

Goodwin emphasizes that one purpose of the book is to indicate what is not known, and the outline used in the treatment of each species brings this out well. It underscores, for example, the great need for detailed behavioral studies in such important genera as the Green Pigeons (*Treron*), the Fruit Doves (*Ptilonopus*), and the Nicobar Pigeon (*Caloenas*). The work has involved long preparation for which years of experience by the author with living pigeons and doves have well adapted him, and the end result is a most useful and readable reference book.—NICHOLAS E. COLLIAS.

A stereotaxic atlas of the brain of the pigeon (*Columba livia*).—H. J. Karten and W. Hodos. 1967. Baltimore, Johns Hopkins Press. 193 pp., 86 pls., 11 figs., 1 table, 12¾ × 9¾ in. $20.00.—This beautifully executed book has appeared at a most opportune time, because it will considerably facilitate research on the nervous system of the pigeon. The development of techniques for recording electrical activity and temperature in localized areas of the brain, chemically, and for making lesions in circumscribed brain areas has advanced our knowledge and understanding of physiology (e.g. regulation of food and water intake, interactions between endocrine and nervous systems) and of behavior in many species. The availability of a stereotaxic atlas that permits the accurate placement of probes and cannulae is extremely valuable. The choice by authors of the pigeon is fortunate for, thanks to the pioneering work

of Riddle and his associates, a considerable amount of physiological and behavioral information is available for this species.

The atlas presents on one page a diagram of the transverse section of the brain with the stereotaxic coordinates and on the facing page a photomicrograph of the corresponding Nissl stained section. By showing the nuclei (cell groups) and fiber tracts in diagrammatic form, this type of presentation also warns the uninitiated worker how difficult some structures may be to recognize. The addition of photomicrographs of sections stained for nerve fibers would have been valuable to those who are not neuroanatomists, but this would have put the cost of the atlas beyond the reach of most of those who are interested in it.

The atlas has 76 diagrams throughout the entire brain based on cross sections 0.25 mm apart and 10 sagittal sections based on reconstructions. The drawings are excellent; the photographs, although very good, seem to suffer somewhat from the high contrast. It seems to me that the photomicrographs of Nissl stained section of the cat and monkey (*Macaca mulatta*) brains in the atlases by R. S. Snider and W. T. Niemer and R. S. Snider and J. A. Lee, respectively, and published by the University of Chicago Press, allow one to see more detail than the photomicrographs in this atlas.

The authors have done an outstanding job in labeling the various structures. A great deal of detail is available to those who want to explore the pigeon brain. The question of nomenclature, which always poses difficulties, has been solved nicely by indicating alternate names wherever desirable and by citing the authority in possibly controversial cases. Enough of the methodology of preparing the atlas is described to allow anyone to duplicate the work—the animal's head is placed in the stereotaxic instrument, details on fixation, cutting, staining, and photographing the brain, and how the corrections for shrinkage were made.

The price of the atlas may make it readily available only to those who want to explore the mysteries of the anatomy and function of the pigeon's brain, but for those, and we hope they are many, one may quote Churchill's famous words: "Never have so many owed so much to so few."—A. VAN TIENHOVEN.

The book of the American Woodcock.—William G. Sheldon. 1967. Amherst, Univ. Massachusetts Press. Pp. xvii + 227, 43 figs., 11 tables, col. frontispiece, 4 appendices, 7 × 10¼ in. $8.50.—This book presents the existing relevant information on the life history of the American Woodcock, *Philohela minor*, that Dr. Sheldon and his students have compiled during 15 years of painstaking field work. Their data and those of other investigators are nicely organized into chapters on the history, range, physical characteristics, breeding habits, feeding habits, migration and homing, hunting, management, and population dynamics of the woodcock. There is also a chapter on its European counterpart, *Scolopax rusticola*.

The author is a professional biologist, but in this case he does not seem to have written specifically to other professionals. The book contains enough raw data on the life history and ecology of the woodcock to be valuable to avian biologists, but the word usage and style of presentation should make it appeal to many whose interest in the bird is avocational.

The book is a significant contribution to the biology of a bird noted for being elusive and inconspicuous. It should also stimulate and help the additional study needed for efficient management of the woodcock as an upland game bird and to understand better the physiological basis of the adjustments of this unusual shorebird to life in the forest.—M. L. MORTON.

Adaptations for locomotion and feeding in the Anhinga and the Double-crested Cormorant.—Oscar T. Owre. 1967. Amer. Ornithol. Union, Ornithol. Monogr., No. 6. 138 pp., 56 text figs., 28 tables. $3.50 ($2.80 to A.O.U. members).—Any study of functional anatomy must evaluate anatomical structure in the light of observed behavior or ecology. This paper admirably fulfills this condition. Owre emphasizes the flight patterns and feeding mechanisms of the Anhinga (*A. anhinga*) and the Double-crested Cormorant (*Phalacrocorax auritus*) in south Florida, and discusses in detail the osteological and myological adaptations that enable these closely related forms to occupy partially overlapping habitats.

Anhingas are generally found on smaller bodies of fresh water with close walls of emergent vegetation upon which they climb and nest. Where such conditions exist in salt water the birds are usually present also. They become airborne by diving from a perch. Once on the wing they are more maneuverable and can climb much more steeply than cormorants. Their flight alternates flapping with gliding. In contrast cormorants occupy more open, usually marine waters where they can obtain the necessary long run by which they become airborne. Their flight pattern is continuous flapping.

Anhingas impale their prey on straight mandibles after slowly stalking it among weeds or near the bottom. Cormorants pursue their prey actively and grasp it between hooked mandibles. Owre emphasizes several adaptations present in Anhingas that contribute to the slowness of their swimming—the highy wettable plumage, the marked lack of pneumaticity in the long bones, and the habit of holding the wings and tail partially spread under water, a posture that impedes vertical movement. They do not use their wings for propulsion while swimming. All remiges are molted simultaneously, a fact not widely recognized, as the birds become secretive and wary during molt. The rectrices are also molted simultaneously, often with the remiges.

With these differences in mind Owre describes the osteology and myology of the wing, leg, tail, and skull. Anhingas have a shorter wing skeleton but a longer wing span relative to their weight than do cormorants. The actual volume of the wing musculature in the lighter Anhingas is almost equal to that in cormorants, a finding correlated with the stronger and more maneuverable flight of Anhingas. As expected in the stronger swimmer, the leg musculature of cormorants comprises a larger proportion of their total weight than does that of Anhingas.

The detailed measurements of bones and volumes of muscles are presented as proportions: e.g. of the total bony length or volume of musculature in the limb under study. Unfortunately Owre compares parts as a percentage of their whole rather than to an outside standard. This procedure does not show whether one part is actually larger or some other part is smaller than another, and it does not show the relationship of the limb to the whole body. Admittedly this is a difficult problem with musculature, which is volumetric and hence a proportion of weight. With the skeleton Owre could easily have used a linear standard such as trunk length or the cube root of weight. He does this for the wing skeleton but omits similar comparisons for the leg, pelvis, and skull, though he gives data on weight and on actual measurements so that interested readers can perform many of these calculations.

Readers should be aware that this paper was essentially completed about 1958. Only one paper of later date is cited. The major consequence is that the chaotic tangle of muscle nomenclature among American authors, which has been partially resolved in recent publications, is not materially lessened. Two systems of muscle terminology are in use today. Owre uses one, that of Fisher and Shufeldt, without reference to

the other, that of Hudson and Gadow which has the greater authority and priority. Cross-references would have been useful to avoid additional confusion. This is especially needed because two names—*Iliacus* and *Piriformis*—occur in both systems but for different muscles. Owre also adheres to the terminology imposed by accepting the digits of the hand as numbers II, III, and IV, a controversy not yet settled.

As we have come to expect in this monograph series, typographical errors are few. On page 38 the reference to Engels (1944) should be to Engels (1941). On page 50 (nine lines from the bottom) the word remiges is subsituted in a discussion of the central rectrices. On page 57 a reference to the insertion of *M. depressor caudae* must, from the description, refer to *M. depressor coccygis*.

More serious is the confusion over the correct form of the names for the perforated flexors to the anterior toes. There are three such flexors, one to the base of each toe, insertions of which are perforated by the tendons of other flexors. The past participle *perforatus* describes this condition. Owre must have been accustomed to using abbreviated names, for he incorrectly uses the present participle *perforans* on five occasions (pages 87 to 91). The most serious of these lapses is in the title to the description of *M. flexor perforatus digiti II* (page 90). Two other flexors are both perforating and perforated, passing to digits II and III. On page 87 Owre refers to *M. flexor perforans et perforatus digiti IV*; there is no such muscle to the fourth toe. From his description, he apparently intends to refer to *M. flexor perforatus digiti IV*.

The illustrations are exceptionally complete and for the most part clear. On occasion the lines between muscles are not easily distinguished from lines indicating the direction of individual muscle fibers.

Owre briefly considers the question of taxonomic status and concludes that the two forms are best considered as separate but related families rather than as subfamilies. The most valuable aspect of the paper is the continued emphasis on function of osteological differences, of different muscle development, of the action of individual muscles and of groups of muscles. It is precisely this kind of study in which ecological observations are keyed to the actual structure that is so much needed in anatomical studies of birds.—JEAN W. COHN.

ALSO RECEIVED

Know your New Zealand birds.—K. E. Westerskov. 1967. Christchurch, England, Whitcombe and Tombs, Ltd. 144 pp., 75 photos, 16 col. pls., map, 7⅞ × 4¾ in. $2.25 (New Zealand currency).—Offering little competition as a field guide to the recently published "Field guide to New Zealand birds" by Falla et al. (1967), at least for a slightly experienced and ambitious watcher, this little guide might be even better for the complete novice to carry along as a part of miscellaneous items of his general outdoor gear. The color plates are from Buller's "Birds of New Zealand" (recently republished by the same company). The photographs are black and white and I would think of only limited use and certainly of less than average interest. The book achieves compactness in part due to run-on treatment of species within families, with species common names in boldface. It treats 184 species of the islands' avifauna but lists all 273 species with scientific names in a separate section. There are a helpful terminal bibliography, and sections on migration, societies, birds in national parks, road-kills, storm-killed birds on beaches, shooters birds, bird songs, bird tracks, age and sex determination.—J. W. H.

The wild Turkey and its management.—Oliver H. Hewitt (Ed.). 1967. Washington, D. C., The Wildlife Soc. Pp. xiv. + 589, 3 col. pls., numerous black and white plates and tables, 6¼ × 9½ in. $6.00.—Obviously the enlightened and continuous effort made by game managers has been responsible for the marked increase in the population and range of America's wild Turkeys in recent years. In this latest publication of the Wildlife Society 19 authors present the latest information on the biology and management of the wild Turkey. The monograph is organized so that about half of it concerns general topics such as taxonomy, physical characteristics, physiology, behavior, population dynamics, and limiting factors. The rest of the book is devoted to management practices in specific geographical areas. One cannot fault the logic of the book's organization, but one does not proceed very far into it before becoming aware that 19 authors, mostly game managers, do not have 19 different things to say about the Turkey. The overlap in chapter contents serves some usefulness in that it gives one confidence that the correct story is being told, but it detracts greatly from the usefulness of the work to anyone outside the field of game bird management. Aside from this it presents excellent data on food habits, habitat utilization, predation, and population trends. Other subjects touched on, such as the complex relationship that exists between turkeys and deer and the effects of hunting on Turkey populations, show the need for continuation of present research programs. Lacking are any controlled studies on behavior and physiology of the Turkey, which must be conducted if Turkey management is to continue successfully.—M. L. Morton.

Vertebrates of the United States.—W. Frank Blair, Albert P. Blair, Pierce Brodkorb, Fred R. Cagle, and George A. Moore. 1968. Second Ed. New York, McGraw-Hill Book Co. 616 pp., numerous text figs., 7 × 9 in. $20.00.—The first edition of this work appeared in 1956. According to the preface, the main purpose of this second edition is to bring the taxonomy up-to-date, while a second is to correct errors that have come to attention in the intervening 11 years.

The author of the section on birds, Pierce Brodkorb, well-known avian paleontologist, anatomist, and systematist of the University of Florida, does, as might be expected, a thorough job of anatomical characterization. His descriptions of plumage pattern, coloration, critical measurements, and presentation of occasional interesting and important biological facts for species (e.g. migratory information on *Oporornis agilis*) are clear and succinct. The artificial keys are simple, to the point, and easy to use. They do not seem to me to be oversimplified, although as usual with keys to birds they would be difficult to use in the field, are too incognizant of individual variation for use with large series in museum collections, and most useful with freshly killed typical adult specimens. The last fact suits them nicely to the purpose of the book—to provide a text for a college survey course in vertebrate natural history or on any one of the five classes treated.

Eisenmann's earlier major criticism (Auk, 75: 483–484, 1958) of the ornithological section is still valid: Brodkorb has made too many taxonomic alterations from current usage in a work largely meant for nonornithologists, under the guise of encouraging them not "blindly to follow static authority." Yet, most of his innovations are presented not only without a brief explanation of their bases but also without a reference to an authoritative work that might support alteration. A terminal bibliography corrects a second serious fault of the first edition.—J. W. H.

International zoo yearbook.—Caroline Jarvis (Ed.). 1968. London, Zool. Soc., vol. 8. Pp. vi + 414, 70 black and white photos, numerous text figs. and tables, 7 × 10 in. $18.75.—This annual publication is not so well-known as it should be among vertebrate zoologists. Those especially involved with keeping captive wild animals for research, or studying wild and especially exotic animals for which details of life history data are difficult to obtain, should be especially interested in perusing the contents of these reports. Zoos have grown gradually more cognizant of the roles they can play in advancement of biological knowledge and simultaneously aware of the fact that biological knowledge can increase their success in maintaining and reproducing many species in confinement. Moreover, they now realize that an increasingly more sophisticated public responds favorably to animals kept under conditions resembling natural habitat in which they behave in a manner similar to behavior in the wild. All this had led to the hiring of zoo personnel with biological training and to increased access to zoo animals for research by qualified biologists. The interesting and valuable biological contents of this yearbook reflect these changes, for it contains articles by such persons on their researches and observations. Most of the articles in volume 8 will be of interest to mammalogists, but it also contains short articles on breeding rheas, emus, cassowaries, King Vultures, and Double-toothed Barbets in captivity, a list of zoos of the world and their general contents as of 31 December 1966, and a list of bird species bred in captivity in 1966.—J. W. H.

The birds of Nippon.—Nobusuke Taka-Tsukasa. 1967. Tokyo, Maruzen Co., Ltd. 701 pp., 2 col. pls. About $22.00.—This curious volume would be more accurately titled "The ornithological writings of Prince Nobusuke Taka-Tsukasa," as it deals with only four orders of the birds of Japan, a check-list of the birds of Bonin Islands and Micronesia, and an incomplete account of the parrots of various parts of the world.

The first and by far the bulkiest portion of the volume deals with the galliform, turniciform, charadriiform, and gruiform birds of Japan with a useful historical account of Japanese ornithology and a discussion of the physiography of the region. The accounts of the birds are detailed and exhaustive, but are taken, without change, from the author's earlier publication, now extremely scarce and difficult to obtain.

The second part (pp. 591–605) is a brief account of the Bonin Islands and the islands of Micronesia that were formerly part of the Japanese empire, followed by a list of the birds known from all these islands, but without indicating from which of the islands each has been recorded.

The third section (pp. 607–690) is an account of 61 species of 19 genera of parrots, all of Asia, Africa, and Australia, but not complete for any of these continents. The impression one gets is that these may have been the parrots the late author had in captivity, as he was a well-known aviculturist, but the absence of all macaws, cockatoos, the African Gray Parrot, and other favorite psittacine cage birds makes this doubtful.

It is unfortunate that so elaborate and handsomely printed a volume should contain so little that is new and should be so haphazard in what it includes that its usefulness is at best doubtful. As a memorial to its eminent author the book has a place in libraries rich enough to afford such nonutilitarian items, but unfortunately it is not so titled or presented.—Herbert Friedmann.