

## REVIEWS

**Temperature Regulation and Water Requirements of the Brown and Abert Towhees, *Pipilo fuscus* and *Pipilo aberti*.**—William R. Dawson. Univ. Calif. Publ. Zool., 59: 81–124, pl. 11, 26 figs. in text. 1954. Price, \$0.75.—Dr. Dawson has compared the regulation of body temperature and the use of water by Brown and Abert towhees. The first lives in a district of California with hot days and the other lives nearby in an even warmer environment. At Los Angeles, *Pipilo fuscus senicula* encounters September days with weather reported as high as 35° C. but cooling to around 20° at night. In Imperial County where the Abert Towhees were obtained air temperatures approached 45° C. by day with low at night in July around 25° C. In both habitats the air was dry by day, but irrigation or cultivated vegetation made water available.

The towhees could stand about an hour of experimental exposure to temperature rising from 25° C. to about 45° C. At 40° C. their metabolic rates rose to nearly 3 times the basal level prevailing at thermoneutrality between 24° C. and 34° C. If they had been exposed to the diurnal temperatures indicated in weather reports their metabolic exertion would have been above the resting level during 7 or 8 hours daily.

My present outlook illustrates by contrast the wide temperature range successfully encountered in northern latitudes by physiological insulation. In recent mornings at Anchorage, dogs played as inconsequentially as usual in air which at –20° C. was about 60° colder than their bodies. In northern Alaska the larger wild mammals and even small birds like chickadees and redpolls proceed apparently undisturbed about their affairs in air which is 80° C. or more colder than their bodies. The large temperature range normally endurable below body temperature by arctic animals is in sharp contrast with the critical effects of the temperatures near those of their bodies which animals meet in the warm weather of many climates. For the physiologist it is easier to relate endurance of cold to temperatures which extend over 80° C. than the tolerance of heat in which, as Dawson shows, towhees pass from basal metabolic exertion at 34° C. to a rate of expenditure of energy and water at 40° C. which is not long tolerable.

At 5° C. and 23° C. both kinds of towhee kept body temperature near 42° by day but cooled about 3° immediately after the illumination was extinguished. Birds awakened at night promptly raised their temperature and the result was ascribed to activity induced by light. Reports of night declines in temperature of other species of birds indicate that the decline in body temperature at night occurs in many and is not related to cold. In winter nights at Anchorage around –20° C. we have found body temperatures sometimes 2° or 3° C. lower than by day, in 5 species of birds. Evidently our disturbance of the birds caused some of them to have normal daytime temperatures. The merit of Dawson's procedure is shown by the convincing regularity of his continuous records from thermocouples implanted in the birds' breast musculature.

In air at 39°, the towhees' body temperature was stable and only a little elevated provided that they had water to drink. At night the decline in body temperature was smaller than in cooler air. Without water, the body temperature was more elevated. The water evaporated by the birds increased with the temperature of the air.

Measurements of respiratory metabolism showed the minimum or basal rate to occur between about 24° and 34°. Above this thermoneutral range of temperature the towhees' metabolism increased rapidly. Of the total metabolic heat production,

evaporation dissipated an amount steadily increasing with heat production, but in air about 40° C all means for dissipation of heat could not keep up with the increased production of heat brought about by rising body temperature. Heat accumulated and the body temperatures rose.

It is interesting to see that the experimental analysis indicates the amount of heat which was accumulated in the birds and allows the inference that the storage permitted by the towhees' tolerance of hyperthermia is involved in their living through the hottest part of the day. They can thus accumulate a little metabolic heat by day, and presumably discharge the accumulation during the cool evening. On this regime, their precarious physiological state is apparent. Nevertheless these excesses over normal heat balance by day are naturally kept within physiological tolerance by behavior of the birds in seeking shade and especially by Abert Towhees through drinking and bathing. Abert Towhees were somewhat superior to Brown Towhees in the amount of drinking water which they could evaporate for cooling.

Abert Towhees showed some superiority over Brown Towhees in their combined physiological means for heat tolerance. These differences were numerically small but apparently significant. Figures quoted from Kendeigh's studies of heat tolerance by House Wrens (*Troglodytes aedon*) and English Sparrows (*Passer domesticus*) could indicate equal or superior metabolic and evaporative ability and heat tolerance in these two birds naturally living in lower extremes of heat than the towhees. Dawson rightly avoids conjecture on the paradox between the physiological picture in these few species and their geographical distribution.

A reviewer can, however, venture that physiological descriptions of natural behavior are inadequate for description of life in hot climates. We can measure temperature upon an arithmetical scale to which the metabolism of arctic animals can be related in air until it is 70 or 80° colder than body temperature. Above the thermoneutral temperature however, Dawson's figures show impressively such a rapid increase in metabolism that it could only be plotted over a range of 8° C. I do not see how to analyze this short section of the complex reaction to heat, but the problem has been nicely prepared by Dawson in terms of physiology and behavior. At the rate of current progress, experimentation and natural history are about due to provide new descriptions which will clarify and which may explain the abundant and diverse distributions of animals in the hot climates where they are so near the limits of the tolerance which is imposed by the warm-blooded habit.—  
LAURENCE IRVING, *Arctic Health Research Center, Public Health Service, Anchorage, Alaska.*

**On the Biology of Some Javanese Loranthaceae and the Role Birds Play in Their Life-histories.**—W. M. Docters van Leeuwen. *Beaufortia*, 4 (41): 103–207. 1954. It has long been known that birds are active in the dissemination of the seeds of the parasitic mistletoes (Loranthaceae). Both the common and specific names of the European Mistle Thrush (*Turdus viscivorus*) reflect its fondness for the fruit of this plant. In India, the East Indies, and Australia, the flowerpeckers or mistletoe birds of the family Dicaeidae have an even closer association with these plants. The alimentary tract in *Dicaeum* is especially adapted to facilitate the rapid passage of the seeds of the mistletoes, which are not digested; the pulp surrounding them is a source of food to the birds. When voiding the sticky seeds the bird expedites matters by rubbing its posterior against the twig on which it is perched. The mistletoe seeds stick to the twig, germinate, and grow there.

The blossoms of many tropical mistletoes are adapted for pollination by birds: brightly colored, odorless (Birds do not seek nectar by smelling it.), and with ample

supplies of honey within. The flowers often are so constructed that they remain sealed shut until forcibly opened by the bills of visiting birds, which become dusted with pollen as they probe for nectar. In regions where they occur, flowerpeckers seem to be the most active agents in the pollination of some genera of Loranthaceae, just as they are in the dispersal of the seeds. Mistletoes do occur, of course, in areas where the family Dicaeidae has no representatives, and conversely, the flowerpeckers themselves do not seem to be dependent upon these plants. Or at any rate a species of *Dicaeum* was found to have established itself on Krakatau following the volcanic cataclysm, before any mistletoes had reappeared.

The above are a few of the things discovered or confirmed by Docters van Leeuwen in his intensive studies in Java, which included experiments with captive, tamed mistletoe birds.—D. AMADON.

**Birds of the Sudan.**—Francis O. Cave and James D. Macdonald (Oliver and Boyd, Edinburgh) xxvii + 444 pp., 12 col. pls., 12 black and white pls., 2 maps, over 300 text figs. Price, 45 shillings.—The vast and highly diversified portion of Africa comprising the Anglo-Egyptian Sudan contains some of the best-known and some of the least-known parts of the continent as far as ornithological exploration is concerned. The great highway of the Nile Valley has been travelled by numberless individuals and parties, and its bird life has been the subject of a great many papers. On the other hand, the western half or so of the colony, from the arid wastes adjoining the southern borders of Egypt and Lybia, to the Darfur and Bahr El Ghazal Provinces, adjacent to French Equatorial Africa, the northeastern Belgian Congo, and Uganda, are much less known. Until the work of the late Admiral Lynes in Darfur some 30 years ago, that whole section was practically a blank on the ornithological map, and even today the data from there are quite spotty. In 1926 and 1931, W. W. Bowen issued a catalogue of Sudanese birds, and this list has remained the only comprehensive summation for the country until the appearance of the present book. Bowen listed 700 species of birds (not counting races), while Cave and Macdonald now record 871 species from the Sudan, an increase of nearly 25 per cent, a clear indication of the growth of our knowledge in the intervening quarter of a century. Including races, the Sudanese avifauna up to 1950 (closing date of this book) totals 1076 forms of birds.

Colonel Cave brings to his share of the compilation of this work an extended and extensive first hand knowledge of the country and its birds. Macdonald has supplied the "museum data," but has also profited by some personal observation of the land and its feathered inhabitants. The resulting volume is a condensed identification manual type of book; life history matters being either left out or only very briefly mentioned. In this the authors are probably justified as the first need for the man in the Sudan is a book that will enable him to name the birds he comes across in his studies. The condensed nature of the book may be sensed from the fact that this moderate sized volume describes the appearance and the occurrence of 871 species, and figures 106 of them in color and about 300 in black and white line drawings. It is as an identification manual that the book must be reviewed, and the lack of other types of information must be accepted as determined by the limitations of size. Within this category the book gives every indication of successfully serving the need for which it was written.

The twelve colored plates and the line drawings are all by D. M. Reid Henry, and are a notable addition to the iconography of African birds. If a criticism may be directed at the plates it is merely to point out that in a few cases scale is violated and the impression one gets of the size of a particular bird is a little inaccurate.

In their classification, the authors depart somewhat from other recent standard works on African birds, but not in ways that affect the usefulness of the book as a field manual. Thus the vultures are taken out of the *Accipitridae* and made a family *Aegyptiidae*, while the *Accipitridae* are put into the *Falconidae*; the babblers are split into two families, the *Turdoididae* and the *Illadopsidae*; the oxpeckers are raised to family rank, *Buphagidae*; the weavers are split into *Bubalornithidae* and *Ploceidae*; and the finches into the *Fringillidae* and the *Emberizidae*.—HERBERT FRIEDMANN.

**African Handbook of Birds, Series 1, Volume 1. Birds of Eastern and North Eastern Africa.** C. W. Mackworth-Praed and Captain C. H. B. Grant. (Longmans, Green and Co., London) xxv + 836 pp., 53 col. pls., 6 photo pls., numerous text figs. and maps, 1952. 45 shillings.—This handsome, well illustrated and sturdily bound book, the first of two volumes, provides a handy compilation of the subsocine birds occurring in East Africa from the north Sudan border south to the Zambesi. The second volume will cover the oscines. The two volumes presumably comprise the first of a series of handbooks on African birds; we are not informed, however, concerning the proposed scope of the overall work.

The stated objective of the authors is to provide a concise reference book for use in the field, particularly for identification. They point out that the achievement of this objective necessitates sacrifices of introductory and descriptive material. The 25-page introduction is devoted largely to explanations of terms and procedures followed. Bibliographic references are omitted in the interests of space. Three pages, however, are given to the listing of over 600 authorities who contributed information, the names ranging from Linnaeus and Gmelin to the authors themselves.

Fifty-three color plates carry illustration of about 300 species, artistically and capably executed by Green, Grönvold, Reid-Henry, Kelly, and Lighton. We are told that 1027 species will be illustrated in color, the balance presumably to appear in the second volume. Most of the plates are subdivided into six 2" × 2" squares by heavy ruled lines, each square presenting a single species. Most of the artistic value of the paintings is lost by this severe reduction and much of their practical value as aids to field identification. The now familiar method of grouping many species on a single plate is more effective in a field guide and far more economical of space. Marginal maps showing range in solid black are presented for each species and subspecies. These were executed with considerable skill and care and are very useful despite their small size. Marginal sketches designed to illustrate characteristics of species not treated in the plates are generally well done. The uniform broad margins provided for these maps and sketches are very incompletely used however, and seem wasteful in view of the imposed space restrictions.

The nomenclature is essentially that of Sclater's *Systema Avium Aethiopicarum* incorporating revisions already published by the authors in *The Ibis* and the *Bulletin of the British Ornithologists Club* from 1933 to 1951. Species are treated under family or arbitrary family division headings. Artificial keys for identification are presented for each family. The account of each species contains brief descriptions of distinguishing characters, general distribution, range in Eastern Africa, habits, nest and eggs, recorded breeding, food, and calls, thus following essentially the outline used in the *British Handbook of Witherby, et al.* Much interesting material has been assembled for these accounts, but most impressive is the indicated paucity of information on habits, breeding, etc. With so little to present on many species it would seem that more effective condensing could have been accomplished in the

interests of producing a conveniently sized handbook. Considerable repetition occurs between headings, and some headings requiring a whole line of text contain no more information than "no information." Subspecies are given independent treatment, often with considerable repetition of material already given under the nominate race, or with a wordy comment referring back to the nominate race. The mapping of subspecies ranges might have been done more economically and effectively by combining them into species maps using appropriate shading and stippling for each race.

Despite these criticisms of organization, this handbook must be recognized as the first of its kind for East Africa. It should fulfill its stated objective of providing a well illustrated reference book of bird identification for the officials, settlers, and natives of East Africa. To this list might be added the temporary visitors and travelers, real or arm chair, interested in getting a general acquaintance with the fascinating bird life of this part of the world.—JOHN T. EMLEN, JR.

**Land Birds of America.**—Robert Cushman Murphy and Dean Amadon. New York, Toronto, London: McGraw-Hill. 4 preliminary leaves, pp. 11–240, 264 photographs (221 colored). 1953. Price \$12.50.—Popular bird books have been issued in such numbers in the past few years that one is amazed at the continued demand. It is a pleasure to encounter one prepared by two professional ornithologists who are articulate, as well as technically competent.

The present work is primarily a pictorial effort, but it nevertheless contains a text touching lightly on many aspects of ornithology. The introduction deals with the history of ornithology and bird study, human awareness of birds, bird art, conservation, and other subjects. The rest of the text, designed as an accompaniment to the illustrations, is a running commentary covering the various groups of North American birds, arranged roughly in taxonomic sequence.

It is regrettable that, although generally informative and readable, the text shows evidence of hasty preparation. Otherwise we could pass on directly to the pictures, the book's principal *raison d'être* and the reason for its considerable initial cost. It is admittedly difficult, especially in popular writing, to qualify all statements in a manner satisfactory to specialists who are ever ready to quibble. In the present work this does not altogether excuse certain outright misstatements and half-statements which could easily have been avoided. The dodos (not dodo) were not restricted to a single island in the Indian Ocean; all Old World kites are not scavengers; the Marsh Hawk is not the only American hawk that nests regularly on the ground; the male Sparrow Hawk (*Falco sparverius*) does not have a slaty back; few mid-western ornithologists would agree that the Upland Plover is in danger of extinction; Kirtland's Warbler has been known to breed not in only three but in no less than fourteen Michigan counties; the Canada Warbler breeds from Georgia (not Connecticut) northward; Brewer's Blackbird nests on the ground or in low bushes as often as "in tall trees"; the Grasshopper and Savannah sparrows are not limited "to eastern hayfields"; and so on. The many lapses in the book do not do credit to the authors.

As mentioned, the main purpose of the book is found in its many illustrations, most of them colored. The work of a number of America's best bird photographers has been used to illustrate the various species, and some very fine pictures are included. Particularly excellent is a series of wood warblers at their nests by Eliot Porter (who has also supplied a short section on bird photography at the end of the book). Unfortunately, the average quality of reproduction is not good (see below). Also unfortunately, the authors have not been content to let the pictures speak for

themselves but have instead injected an argumentative comparison of the merits of bird photography and "bird art." The most concise expression of their views on this matter is found in sections entitled "Paintings of Birds" and "Birds in Color Photography" (pp. 11-14). The gist of their argument (which inferentially attacks almost the whole field of non-photographic ornithological illustration) seems to be that Audubon was, if not *the only*, then *almost the only* capable and worthy painter of birds ("Certain ornithologists may not agree with this estimate of Audubon's preeminence, but we have yet to find an artist who does not."). Without denying anything due Audubon, one cannot help supposing that the authors' acquaintance among artists, especially European, must be somewhat limited (What of Liljefors, Scott, Wolf, Millais, Thorburn, Lear, Kuhnert; and of Knight, Jaques, and Fuertes, among Americans?).

It is true that much so-called bird art has been bad art. There is need for fewer "bird artists" (in the restricted and all-too-frequent sense of the term) and for more artists who paint birds. But does this fact make it thoroughly safe to place undue reliance on the judgment of "artists" (unnamed) at large, or on "art critics" in particular? The authors naively state: "When we turn to such a published collection of great paintings as Thomas Craven's *Treasury of Art Masterpieces* [New York, Simon and Schuster, 1939], we find that Audubon is the only painter of birds to be included among the masters." They go on to quote Craven, never a man to mince words or qualify statements, in one of the most arbitrary opinions, even of Craven's, that this reviewer has read before or since the appearance of that volume: "As a painter of birds, he [Audubon] fixed a standard that has never been seriously contested, his most reverent emulators being no more than taxidermists. It is comforting to know that his pictures are ornithologically accurate . . ." In this remarkable mixture of purposes we find two ornithologists trying to be art critics quoting, in support of their opinions, an art critic trying to be an ornithologist!

The apparent reason for all this emerges with the statement: "This historical sketch indicates why we believe that color photography can now teach us much more about our birds than a further multiplication of painters' handiwork."

The whole argument is weakened by the authors' failure ever to distinguish clearly between the unattainable abstraction of perfectly accurate duplication of nature and the equally evasive quality of artistic worth. This confusion of values is evident in the statements: "[although subject to 'optical and chemical hazards'] the camera is free from personal bias. Illustrators and taxidermists prefer to draw or mount their birds in pretty poses . . ." and "[birds] fall into postures that appear unusual or even positively awkward, a fact which Audubon, almost alone among bird painters, had the forthrightness to express in his work."

This eulogy of photography proves most unfortunate in the present instance, though how much because of "chemical and optical hazards" and how much because of faulty color printing is hard to tell. In any event, it must have been embarrassing to have written: "For such truth a user of this book will find testimony in every color reproduction between its covers . . . camera likenesses more faithful than any artist's brush can paint or any taxidermist can reproduce, . . . through the unimpeachable records of color photographs . . ." and then to have found (to mention only the worst examples) the *green* chickadee (fig. 96), *cerulean blue* Water Ouzel (100), *blue* Western and *emerald green* Eastern Blue-gray gnatcatchers (103, 104), *blue* Solitary Vireo (136), brilliantly *blue-backed* Cape May Warbler (143), *lavender* Orange-crowned Warbler (155), *lead-gray* Oven-bird (165), *ultramarine* Slate-colored Junco (200), and the garishly *royal purple* Red-eyed Towhee (202).

Though the poor quality of many of these pictures is probably due to accidents of defective workmanship, the fact remains that *no graphic medium is perfect for all purposes*. Drawbacks pertain to color photography as a factual medium just as surely as they do to painting. Most of our fine bird photographers, who untiringly devote themselves to the improvement of their art, will probably agree to this readily. Color photographs seem harder to print accurately than paintings. Lenses and color films, though constantly being improved, are still far from perfect. Color values are difficult to photograph exactly, and the problem is further complicated because achievement of correct value in one part of the picture often throws off values in other parts differently lighted. This matter of contrast, as any photographer knows, is particularly troublesome in color work.

It is thus very difficult for the outdoor photographer to reproduce the flat local color often demanded in scientific illustrations, no matter how deplorable it may at times be artistically. To be sure, the camera lacks "personal bias" (except that supplied accidentally or intentionally by the operator), but this is merely another way of saying that the camera lacks intelligence, which, let us hope, is part of the equipment of at least some illustrators, whose chief advantage lies in their ability to circumvent or manipulate the physical laws which bind the photographer.

When speaking of drawing and painting versus photography as arts, comparisons are to be avoided. The subjects are no more comparable, so far as "worth" is concerned, than are painting and sculpture, water color and etching, ceramics and weaving. Let it suffice to say that works of art are difficult to produce in any medium and desirable in all. We owe much to those who create them, and should encourage "further multiplication" of "painters' handiwork" and photographers' efforts alike.—ROBERT M. MENGEL.

**Birds of Southwestern Ohio.**—Emerson Kemsies and Worth Randle. Cincinnati: privately published (lithographed). xii + 74 pp., 8 photos., 2 endpaper photos. 1953. Price \$2.75.—This book actually amounts to a revised edition of the senior author's "Birds of Cincinnati and Southwestern Ohio," Ohio Audubon Society, Cincinnati, 1948 (reviewed by Maurice Brooks, *Wilson Bull.*, 61: 119, 1949). The earlier work, in turn, was little more than a revision of (and not in all ways an improvement on) Woodrow Goodpaster's "Birds of Southwestern Ohio" (*Jour. Cincinnati Soc. Nat. Hist.*, 22: 6-40, 1941), although the fact is nowhere directly acknowledged. The work is considerably enlarged now, however, and available for the first time in durable and reasonably attractive format. It contains some material additional to that presented in its forerunners, many recent sight records and a few newly-taken specimens being mentioned.

Brief introductory material includes a general history of nature study in the area covered (Hamilton, Clermont, Butler, and Warren counties; parts of Clinton and Brown counties), definitions of terms, description of terrain, etc. The text proper is a briefly annotated list of birds considered to have been reliably recorded in the vicinity. One specimen or sight records by three experienced observers qualify a species for full standing in the list, less thoroughly documented forms being termed hypothetical. However, almost any vague record, no matter how ancient, of a bird killed seems to have been construed as an authentic specimen record. Listed are 300 species (including 12 hypothetical, and at least 3 unsuccessful introductions), 2 hybrids, and 12 additional subspecies. Some of the subspecies admitted are of very questionable validity and/or identification. For each form there is a brief definition of status, sometimes accompanied by miscellaneous remarks and particularly interesting records. Appended are a brief bibliography, sections on where to look for birds and on breeding bird and Christmas censuses, and indices.

The reader who is led by the title to expect a definitive or even fairly comprehensive treatment of the ornithology of the area will be disappointed. The authors mention but make small use of the work of Frank W. Langdon, Charles Dury, Ralph Kellogg, and others of the active group which in the period 1875-1900 made Cincinnati a lively ornithological center. Of the many titles on the birds of the area which appeared in that period, mainly in *The Journal of the Cincinnati Society of Natural History*, only one, Langdon's revised catalogue of 1879, is listed in the so-called bibliography. Some of the records of these early workers have as a matter of fact been included, but they are seldom specifically cited, and there is no convenient way for the reader to verify the records. To the important heritage of the work of that period, in the form of thousands of specimens in the Cincinnati Museum of Natural History, little attention (judging from the text) has been paid, and it is not apparent that the authors have personally checked a single one of the specimens. The carefully made recent records, frequently backed by specimens, of Maslowski, Goodpaster, Austing, and a few others reinforce an otherwise rather shaky structure.

One might also wish for more definite statement of the dates of occurrence, breeding status, and so on, of the different species than is given here in most cases. Some of the sight records are reported in a fairly convincing manner, but in many instances the authors have displayed what seems to me an excessive credulity, as in the account of the "Trumpeter Swan" recorded on November 8, 1951, and in the casual references to wintering Broad-winged Hawks. The following admonition (p. 31) will perhaps prove more revealing than the listing of further examples: "Identification of the four small *Empidonax* flycatchers is extremely difficult and should be made only after consulting one of the standard field guides." The writing is sometimes lacking in clarity.

Occasional remarks on subspecies are of negligible importance but betray some confusion as to just what a subspecies is. It is unfortunate that subspecific names were used at all in the present work.

Despite the shortcomings listed above, the work will prove helpful to ornithologists working in the area covered.—ROBERT M. MENDEL.

**Wildlife Abstracts, 1935-51. An Annotated Bibliography of the Publications Abstracted in the Wildlife Review, Nos. 1-66.**—Compiled by Neil Hotchkiss, 435 pp. U. S. Dept. Interior, Fish and Wildlife Service. Price, \$2.00, from the Superintendent of Documents, U. S. Gov't Printing Office, Washington 25, D. C.—The compiler, who has edited the *Wildlife Review* since 1948, has prepared a valuable work. The titles are briefly annotated, except in instances in which the title alone is sufficient to give the reader a good idea of the contents. The arrangement is by subject and in general follows that used in recent numbers of the *Wildlife Review*. A large index, in which the papers are listed both by subject and by author, adds greatly to the usefulness of the publication. The value of any bibliographic work ultimately depends on the completeness of the coverage; that of this work in turn depends on the coverage of the *Wildlife Review*, which in former years was not as extensive as it is now. Workers realizing this will find *Wildlife Abstracts* a valuable research tool, and those who do not have access to a complete file of the *Wildlife Review* will especially welcome this compilation. It is to be hoped that a similar volume will be compiled covering the next ten or fifteen years.—ROBERT W. STORER.

***Archaeopteryx lithographica*. A study based upon the British Museum specimen.**—Sir Gavin de Beer. London, British Museum (Natural History). xi + 68 pp., 15 pls., 9 figs. in text. 1954. Price, Two Pounds.—For some time



we have needed to reëxamine many of the avian fossils described during the nineteenth century in the light of our more advanced knowledge of the evolution and relationships of birds. The study here reviewed of the most important of all fossil birds by an eminent anatomist is therefore a particularly welcome addition to the literature of both ornithology and palaeontology.

Using X-ray photography and ultra-violet light, de Beer has been able to describe structures hitherto unknown. This new information has been added to what was previously described and the result is a thorough, monographic account. Aside from the descriptions of the various structures and comparisons with descriptions of the corresponding elements of the Berlin specimen, there are discussions of the history of the specimen and previous investigation carried out on it, the conditions of fossilization, the methods of study, the affinities with the Berlin specimen, the wider affinities of *Archaeopteryx*, and the origin of flight. An extensive bibliography, synonymy, and index are also included.

The author comes to the conclusion that the differences between the British Museum and Berlin specimens might be accounted for by differences in sex, age, and conditions of fossilization. Hence, he believes it is possible that both represent the same species. The lack of a keel on the breast bone and other characters associated with the pectoral girdle and wing, as well as the relatively small cerebellum, are used as convincing arguments in favor of the theory that *Archaeopteryx* was a glider and flapped its wings little if at all.

This monograph will undoubtedly prove to be one of great value for many years. It is to be hoped that its author will have the opportunity to apply his modern methods of study to the Berlin specimen, in this way will be able to solve more of the problems concerning the relationships of these birds.—ROBERT W. STORER.

**An Introduction to Ornithology.**—George J. Wallace. New York. The Macmillan Company. xii + 443 pp., 180 figs. 1955. \$6.00—A long overdue addition to the literature of ornithology, this college text will prove popular in introductory courses and should also enjoy a wide reading among amateurs. The book is divided into two parts. The twelve chapters comprising the first part cover historical aspects of ornithology, a general summary of the bird in relation to other vertebrates, anatomy, behavior, events of the annual cycle (3 chapters), migration, distribution, food habits, economic relations, and conservation and management. The four chapters of part two are classification and nomenclature, the fossil record, ornithological methods, and ornithological organizations and their journals.

The list of 314 titles at the end of the book does not include any of those cited in connection with each chapter. Throughout the text the author shows an awareness of current ornithological research (192 of the 314 references bear dates of 1950 or later). He has been generally successful in including recent developments in a concise—perhaps sometimes too concise—manner calculated to convey a concept which beginning students can grasp and then apply in field or laboratory observation. As an example of an overly abbreviated-description, we read (p. 59), "The peculiar bill of the Black Skimmer (Fig. 33a) serves the unique skimming purpose implied in the name<sup>273</sup>." This is hardly an adequate description for one who does not already know the Skimmer or have access to Tompkins' description. Two or three additional sentences might be of help to a beginner.

The format of the book is pleasing: large well-spaced type with bold-face for emphasis makes for easy reading and the glossy paper provides an excellent surface for the reproduction of the photographs and line drawings. The line drawings are uniformly good, but three or four of the photographs are a bit fuzzy—probably

the fault of the original in most cases. It would seem that a sharper picture of a day-old Black Duck (fig. 98) might have been found.

The section on anatomy is adequate for beginning students and is presented in an interesting manner relating structures to their functions and adaptations. The anatomist may raise an eyebrow at such a statement as (p. 54-55), "The brain itself (fig. 54) can be summarily dismissed as being similar in structure and function to that of other vertebrates," or at the surely unintentional implication (p. 71) that a tendon is a flexor. The author may certainly be pardoned the commission of such anatomical sins in view of his inclusion of the true function (or lack of it) of the ambiens muscle; Beecher's work on the jaw muscles; and Miskimen's and Hazelhoff's works on the respiratory system.

Three chapters on "The Annual Cycle" are followed by one on "The Migration of Birds." This organization seems to set migration apart from the annual cycle. Perhaps a discussion of migration as the first of four chapters on "The Annual Cycle" might save a little repetition and tie it in with other activities of the bird. The 116 pages of these four chapters rightly form the core of the book, and Dr. Wallace has done an admirable job in presenting this phase of ornithology. Questions will be raised throughout the reading in the minds of every thinking student, and this section will prove to be the most stimulating for class discussions. From the vast literature of ornithology the selection of a few examples to illustrate his points must have posed quite a problem for the author. Anyone may argue that some particular example should have been included instead of one which was selected, but in general the author has chosen carefully and well, selecting familiar and widespread North American species wherever possible.

Dr. Wallace and the publishers are to be congratulated for bringing out a concise, up-to-date survey of the field of ornithology. Errors of commission and typography are surprisingly scarce for a book in its first edition.—L. M. BARTLETT

**Life Histories of Central American Birds: Families Fringillidae, Thraupidae, Icteridae, Parulidae, and Coerebidae.**—Alexander F. Skutch. Pacific Coast Avifauna No. 31. Berkeley, California: Cooper Ornithological Society. 448 pp., frontispiece, 68 figs. in text. Price: \$9.00 (paper covers), \$10.00 (bound in buckram).—Skutch's earlier life history studies of Central American birds are familiar to most ornithologists, and several have been published in 'The Auk.' Hence, the organization, the wealth of detail, and the style of the accounts in this book require no special comment. The new work is a collection of life histories of nine finches (Variable Seedeater, *Sporophila aurita*; White-collared Seedeater, *S. torqueola*; Yellow-faced Grassquit, *Tiaris olivacea*; Blue-black Grosbeak, *Cyanocompsa cyanoides*; Buff-throated Saltator, *Saltator maximus*; Streaked Saltator, *S. albicollis*; Striped Brush-finch, *Atlapetes torquatus*; Orange-billed Sparrow, *Arremon aurantirostris*; and Black-striped Sparrow, *Arremonops conirostris*); thirteen tanagers (Scarlet-rumped Tanager, *Ramphocelus passerinii*; Crimson-backed Tanager, *R. dimidiatus*; Red Ant Tanager, *Habia rubica*; Gray-headed Tanager, *Eucometis penicillata*; Blue Tanager, *Thraupis episcopus*; Golden-masked Tanager, *Tangara nigro-cincta*; Plain-colored Tanager, *T. inornata*; Yellow-browed Tanager, *T. chrysophrys*; Silver-throated Tanager, *T. icterocephala*; Blue-rumped Green Tanager, *T. gyrola*; Yellow-crowned Euphonia, *Tanagra luteicapilla*; Bonaparte Euphonia, *T. lauta*; Turquoise-naped Chlorophonia, *Chlorophonia occipitalis*); ten icterids (Yellow-tailed Oriole, *Icterus mesomelas*; Lesson Oriole, *I. prothemelas*; Black-throated Oriole, *I. gularis*; Spotted-breasted Oriole, *I. pectoralis*; Melodious Black-bird, *Dives dives*; Chisel-billed Cacique, *Amblycercus holosericeus*; Montezuma

Oropendola, *Gymnostinops montezuma*; Yellow-rumped Cacique, *Cacicus cela*; Giant Cowbird, *Psomocolax oryzivorus*; and Boat-tailed Grackle, *Cassidix mexicanus*); five wood warblers (Pink-headed Warbler, *Ergaticus versicolor*; Buff-rumped Warbler, *Basileuterus fulvicauda*; Slate-throated Redstart, *Myioborus miniatus*; Collared Redstart, *M. torquatus*; and Hartlaub Warbler, *Vermivora superciliosa*); and three honeycreepers (Blue Honeycreeper, *Cyanerpes cyaneus*; Bananaquit, *Coereba flaveola*; and Slaty Flower-piercer, *Diglossa baritula*). The accounts of two of the warblers have been republished from 'The Wilson Bulletin'; the others are presented for the first time.

The choice of the groups included is a particularly fortunate one. All belong to the New World assemblage of nine-primaried song birds, a group about the interrelationships of which much has recently been written but much remains to be learned. While the icterids appear to be a fairly well circumscribed group, the other families discussed by Skutch here are not. Comparative life history studies like these are therefore of great value to systematists, first, in establishing a "norm" for the behavior of birds of a given family and, second, in placing the species of uncertain taxonomic position. It is particularly appropriate therefore, that Skutch has summarized his information on the birds of each family. The summary on the tanagers is especially valuable and constitutes the first good account of the habits of this family of birds.

All of the 40 species whose life histories are described in the text are illustrated by Don R. Eckelberry: a colored frontispiece shows four species of tanagers, and 36 particularly handsome black and white figures show the remaining species. Thirty-three photographs by the author illustrate the nests of eleven species, Central American habitats, etc.

This book is without doubt the most important so far published on the habits of tropical American birds, and it will be a valuable source of information for many years.—ROBERT W. STORER.

**Records of Parrots Bred in Captivity (Additions).**—Arthur A. Prestwich. (Privately printed, 61 Chase Road, Oakwood, London, N. 14. 80 pp. January, 1954. Price ten shillings.—Records of birds bred in captivity are important not only to amateurs but also to students of avian biology, as they often reveal peculiarities which have escaped the watchers of wild birds in nature. The Honorary Secretary of the Avicultural Society has spent a great deal of time and ingenuity gathering all available data on the numerous species of parrots which have nested in confinement. He has already published several volumes on the subject. A quantity of new information, however, has come to his knowledge since the appearance of his first reports, and the present volume is dedicated to it. His painstaking work is extremely useful not only to aviculturists, but also to all interested in the life habits of a peculiar and fascinating family.—J. DELACOUR.

**Evolution of the Vertebrates: A History of the Backboned Animals through Time.**—Edwin H. Colbert. xiii + 479 pp., 122 figs. in text. New York: John Wiley and Sons, Inc. Prince, \$8.95.—In considering this book, comparison with Romer's established text, *Vertebrate Paleontology*, is inevitable. Generally speaking, Colbert's work is briefer and less detailed, and the bibliography is less extensive. Thus it may have more popular appeal, while at the same time it will be less useful to more serious students.

In this new work, birds share a short (13-page) chapter with the flying reptiles, and the three titles on birds listed in the bibliography do not include Lambrecht's

*Handbuch der Palaeornithologie*, probably the most important single source book on fossil birds, or Wetmore's classification of birds or his list of the fossil birds of North America. Those looking for information on fossil birds will find little of interest in Colbert's book; those looking for a general account of vertebrate evolution outside of this group will fare much better.—ROBERT W. STORER.

**Finding Birds in Mexico.**—Ernest Preston Edwards. E. P. Edwards and Co., Amherst, Va. xix + 101 pp., 7 pls. Price, \$1.90.—This guide should prove very useful to anyone wanting to become acquainted with the common birds of Mexico. The introduction contains general information on the climate, vegetation, topography, and bird life. The first six chapters cover the major zoogeographic regions. The arrangement of these chapters is by towns, and for each town, there is information on the local birds, vegetation, and recommended hotels, auto courts, or camping places. The remaining parts of the book form a sort of appendix, containing sample bird-finding tours, a "habitat directory," a list of the birds of Mexico, a series of plates (in black and white) to assist the reader in identifying the common species, a directory of paved roads, a glossary of Mexican bird names, and an index of localities. The author has had much field experience in Mexico and knows the country well. The book as a whole reflects this, although there is some evidence of hasty preparation. This haste is particularly apparent in some of the illustrations. The head and neck of the Mexican Tiger Bittern (plate II, figure 21) were evidently copied from a painting by Sutton and a ridiculously small body and legs tacked on. The heads of the woodpeckers do not show the color patterns well; illustrators could use symbols or different kinds of shading to good advantage in plates such as this. Another possible criticism is that there is no information on where to find many of the less common species or those like the Tufted and White-throated jays and the Rose-bellied Bunting which have rather limited ranges. However, those wanting to find and identify the common birds seen along the highways of Mexico will find this book well worth its price.—ROBERT W. STORER.

**Aves Venezolanas. Cien de la mas conocidas.**—Kathleen Deery de Phelps. Creole Petroleum Corp., Caracas, Venezuela. 103 pp., 70 col. pls.—In this attractive publication are depicted one hundred of the best-known species of birds in Venezuela. Small-scale range maps are included, and brief captions (in Spanish) give information on the habits of the birds.—ROBERT W. STORER.

**De Vogels van de Nederlandse Antillen.**—K. H. Voous. Natuurwetenschappelijke Werkgroep Nederlandse Antillen, Curaçao. viii + 205 pp., 22 pls. (17 in color), 9 photos.—The six islands constituting the Netherlands Antilles, Aruba, Bonaire, Curaçao, Saba, St. Eustatius, and St. Maarten, do not form a natural geographic unit; the first three lie just north of western Venezuela, and the last three are at the northern end of the Lesser Antilles. And as might be expected, the avifaunas of these two groups of islands are quite different. Accordingly, in the annotated list of species, the distributions on the two island groups are handled separately. These species accounts also include sections on field marks, habits, distribution, and protection; a condensed summary in English concludes them. Although this book is primarily intended for visitors to the Netherlands Antilles, the accounts of the habits of the birds and H. J. Slijper's colored plates will prove helpful to ornithologists visiting other parts of the West Indies.—ROBERT W. STORER.