REVIEWS

EDITED BY WALTER BOCK

Behavior, mimetic songs and song dialects, and relationships of the parasitic indigobirds (*Vidua*) of Africa.—Robert B. Payne. 1973. Amer. Ornithol. Union, Ornithol. Monogr. No. 11. vi + 333 pp., 2 col. pls., 50 text figs. $8.00.—Indigobirds or combassous are a uniform group of small, short-tailed, parasitic weavers whose closest relatives are the long-tailed and paradise widow birds, also brood parasites. They are found throughout the savannahs and open country of Africa and are known to be parasitic mainly, if not exclusively, on not too distantly related estrildine finches of the genus *Lagonosticta*, birds of essentially similiar body and egg size and ecology. Taxonomists have been unable to agree on the specific limits of indigobirds, and various classifications have ranged from as many as eight species to one polymorphic species. The equivocal taxonomic treatment is due to the difficulty in finding consistent morphological differences between populations. Adult males differ only in the degree and hue of sheen of their wholly black plumage, and in the colors of the bill and feet (useless in museum specimens). Females and young males are dull brown, streaked above, and prior to this study could not with certainty be assigned to a particular taxon in most cases. Traylor, in preparing a classification for Peters' Check-list, exhausted the morphological evidence available and concluded quite reasonably that indigobirds appear to behave as good species in some localities but intergrade completely in others. He was forced to rely almost exclusively on small differences in size to demonstrate sympatry of two or more taxa. At about the time Traylor was completing his morphological analysis, Wolters and Nicolai published observations of captive viduines that suggested, for the first time, that not only might there be specific differences in the songs of indigobirds but that these differences might well be correlated with a host-specific vocal mimicry. These remarkable findings offered potential for much-needed new criteria for determining specific limits within this difficult assemblage, and a possible explanation for the peculiar relationships of indigobirds that had frustrated taxonomists for so long.

Stimulated by the behavioral observations of Nicolai, in particular, and by the provocative analysis of morphological variation by Traylor, Robert Payne recognized that the time was ripe for a thorough field-oriented study of indigobirds, in which such techniques as sound recording and analysis, collecting birds of known voice and mate preference, and experimental playback of vocalizations could be brought to bear on the nagging questions of variation and relationships within this group. We can now add *Vidua* to the growing list of avian genera whose systematic study has been facilitated by the diagnostic value of carefully documented vocal behavior. The scope of Payne's study is truly impressive: two years of work in Africa (1965–67), involving 55,000 miles of travel, 500 hours of field observations of indigobirds during their breeding season, nearly 3 miles of recording tape exposed, spectrographic analysis of thousands of songs of indigobirds and firefinches (*Lagonosticta*), maintenance and observation of captive birds (flying free in the author's home!), and an examination of over 1,800 museum specimens, including 302 collected by the author. He has supplied us with careful documentation of his itinerary, localities for field recordings and spectrograms, and distributional data for known localities of both indigobirds and their firefinch hosts. My only editorial criticism is of the use of high-contrast photographic reproductions of the sound spectrograms, in lieu of halftones that better preserve the very detail one strives to capture in the objective machine

analysis of avian sounds. Otherwise, the volume appears to be superbly edited (I managed to find one typo). I understand that one error of substance, caught by the author too late for correction, in no way alters his conclusions and will be corrected in an article submitted to the Bull. Brit. Ornithol. Club.

It has long been known that viduine finches resemble their estrildine hosts in egg color (white) and size, pattern of mouth markings, and juvenal plumage. Some earlier workers attributed this to *mimicry*, i.e. an adaptation favoring survival of the parasites. Chapin, Friedmann, and others have argued against this interpretation; they point out that the Estrildinae and Viduinae are closely related anyway, and that the more parsimonious treatment of these remarkable morphological similarities is to ascribe them to common descent. Because of this unquestioned common ancestry it is difficult to argue the case for "mimicry" of eggs and young, unless evidence can be found for *host-specific* mimicry among indigobirds and their firefinch hosts. Payne, using far more extensive and representative material than available heretofore, could find no consistent differences in eggs or young among the various species of firefinches, with the possible exception of the color combinations (not the pattern of markings) in the mouths of the young—this being "the only conspicuous visual character that is known among different species of firefinches that would make one kind of indigobird a mismatch to some foster brood-mates." Unfortunately his evidence comes only from the two species of *Lagonosticta* maintained by him in captivity and from his interpretations of the published descriptions of other species. In the absence of data on mouth color in young indigobirds, we are left with considerable uncertainty as to the question of host-specificity even with regard to this morphological character. Payne argues, however, that the similarities in eggs and young of indigobirds and firefinches *are* properly considered mimetic "because the resemblance of parasites to host has been maintained by natural selection, even though the common ancestors of the estrildids and viduines may already have had this character," and that "species-specific color patterns of the young firefinches probably have provided an important selective basis for the evolution of species-specific brood parasitism among the indigobirds." Selection, of course, could act to reinforce similarities resulting from common origin, but the argument as presented here is unconvincing.

Host-specific parasitism by indigobirds had been suggested by several workers, but the lack of reliable species differences in the eggs, young, or morphology of the adult females of the parasites generally has precluded the demonstration of host-specificity on anything but indirect evidence. Specific vocal mimicry by indigobirds, to be sure, is no more than indirect evidence that a single species of indigobird might restrict its parasitic habits to a single species of firefinch, yet the argument is cogent and represents the core of Payne's study, and it is here that the author makes a truly significant contribution.

Payne based his concept of vocal mimicry on the observations and recordings of 302 male indigobirds; none mimicked any bird other than a firefinch, and no male mimicked more than one species of firefinch; only 4 firefinches mimicked other than the species normally parasitized. In addition to 6 or more mimetic songs, each male was found to have in its repertoire 12 or more nonmimetic songs (dissimilar to firefinch songs). Behavioral observations and playback experiments suggest that the nonmimetic songs are involved with agonistic behavior between male indigobirds, regardless of species, whereas the mimetic songs are used intraspecifically in courtship and mating behavior. Though lacking experimental evidence, Payne's field observations and indirect evidence suggest strongly that both mimetic and nonmimetic songs are learned. The host firefinch provides the model for the young male indigobird to develop its

mimicked song, while nonmimetic songs presumably are learned from adult indigobirds in the area. The behavioral basis for mate selection, Payne argues, is most likely the female response to mimetic song, i.e. she is attracted to songs that mimic her foster firefinch species, hence mimetic song insures assortative mating wherever indigobirds are sympatric. He found that each female indigobird parasitizes only a single species of firefinch, the one providing the same vocal stimuli as the male indigobird with whom she mated and presumably those sounds most closely matching the sounds of her foster parents. Mimetic song, then, may well be the mechanism behind the host-specificity of brood parasitism in these birds.

Aside from the case for vocal mimicry and host-specific parasitism, Payne's study is packed with observations of other aspects of the biology of indigobirds that bear witness to his energy and persistence in the field. This review can do no more than present a smorgasbord of some of his findings, but savor these as examples: Breeding males vigorously defend their call sites against all other males regardless of species; the females visit the call sites and the males court all females indiscriminately, thus placing the vital role of species discrimination at time of mate selection squarely with the female. I was pleased with his conclusion that such interspecific territoriality may increase the probability of assortative mating, for I had made a similar suggeston with respect to this behavior in *Sturnella* nearly 20 years ago, only to have it regarded as unlikely by several critics. Payne classifies the mating system of indigobirds as "promiscuous polygyny"; each breeding male has more mates than does each female, and females sometimes visit more than one call site and mate with more than one mate. The female locates a firefinch nest by watching the host species and by searching; the male indigobird plays little if any role in advertizing or selecting nests to be parasitized.

Payne's evidence of differences in the mimetic songs of the various taxa and of differences in the morphology of females collected in association with different males provides us with our most convincing case for the existence of distinct species among indigobirds. In regions where only one kind of male predominates, the females all resemble each other in plumage and color of feet and bill. In areas where two or more kinds of males occur, correspondingly distinct females were recognizable in the field and collected. In determining specific limits, Payne gives great weight to his belief that mimetic songs are the main isolating mechanism; in general those mimicking a common species of host are conspecific, whereas those mimicking different hosts are distinct species. But he quite wisely considers morphological evidence of interbreeding as well, for one kind of indigobird may mimic different hosts in different regions, and several kinds may locally mimic a single common host species. Allopatric forms that share the same mimetic song but show morphological evidence of interbreeding are considered conspecific. The resulting taxonomic revision, based in part on a classical museum approach, supplemented with spectrophotometric analyses of plumage coloration and valuable new data on color of soft parts, differs only in detail from that by Traylor. Two new subspecies are described, one form is elevated to full species status (making four species instead of three as recognized by Traylor), and two forms are assigned to different species. The similarities in the conclusions of the two workers is a tribute to Traylor, who did not have the behavioral information yet managed to avoid the pitfalls experienced by others in analyzing the perplexing morphological variation in this assemblage. Both Payne and Traylor admit to some intergradation between these "species" of indigobirds, and in the absence of behavioral information it is impossible to assign meaningful specific names to all specimens or even to all populations: "at the present time many of the central African specimens of indigobirds remain unidentifiable, and the pattern of morphological

variation in the complex will remain enigmatic at least until tape recordings are made and singing birds have been collected."

Payne's study provides us with unique field evidence of the role of vocal mimicry as a behavioral means of maintaining assortative mating in sympatric species, and thereby lends credence to the hypothesis proposed by Nicolai that host-specific imprinting has been a significant factor in the evolution of viduines. It is argued that assortative mating is the result of imprinting to the foster parent companions and learning their songs; the signals used in species discrimination and mate selection are newly acquired in each generation, thus imprinting provides a mechanism for maintaining over several generations some degree of behavioral isolation. Subsequent geographic isolation would unquestionably enhance the behavioral separation and promote a greater rate of genetic divergence. Without the initial splitting of a population through imprinting, Payne questions whether any speciation would occur. The morphological intergradation that he admits to in certain areas could be attributed to a breakdown of these cultural mechanisms, perhaps resulting from geographical variation in the signals of the host firefinches or from a switch in hosts because of nest predation or disturbance. This is not an admission of sympatric speciation, but rather an argument for an effective combination of cultural and geographic speciation.

This is a remarkable piece of research, and one that is certain to inspire and stimulate further investigation in and out of *Vidua*.—WESLEY E. LANYON.

Birds of the world. Their life and habits.—P. Barruel. 1973. Revised ed. New York, Oxford Univ. Press. 222 pp. Transl. by P. Barclay-Smith, 206 black-and-white photos and drawings, 94 col. photos, 8 col. pls. $25.00.—Stated on the jacket as a revised edition and inside the book as a new edition ("entirely reset"), this actually is a revised edition of Barruel's 1954 book of the same title. The 1973 edition contains over twice as many illustrations, and proportionately over seven times as many color photographs (3% of the old edition's, 25% of the new edition's photographs are in color). In terms of cost, the new book is exactly twice as expensive as the older edition, which is not unreasonable in 19 years of inflation. More importantly, the photographs in the new book are much better; those in color have replaced some earlier black-and-whites, many excellent new photographs of the latter type have been added, and those black-and-white photos retained from the earlier edition are smaller and sharper, often with their earlier excess margins trimmed. Four of the least successful color plates in the 1954 book have been eliminated, and those remaining are brighter, indeed in some cases (Bullfinch, p. 209) too much so. I dwell on the illustrations, which include the same fine line drawings of the earlier work, because, averaging one and one-half per page of text, they are a major—probably the major—feature of the book (certainly in terms of cost).

Although the illustrations are generally of good to excellent quality, they slight New World birds, and are more appropriate to a European or at least an Old World book. Only 15 photographs cover all New World birds not found in the Old World, a number put in perspective by the fact that there are 12 photographs of penguins listed in the index (one however, on page 18, also captioned penguins, actually shows Razor-billed Auks!). Some 24% of the photographs depict birds (mainly seabirds and shorebirds) that occur in both hemispheres, but of the remainder showing birds endemic to either hemisphere only 7% are of New World birds. The color plates, which might have been used to shift this balance, contain 11 New World and 33

Old World species, and one species common to both hemispheres. Such strong bias should discourage purchase of the book in the New World.

The text itself has the same chapters and headings, with roughly the same proportion of space devoted to each as in the 1954 edition. The text is largely identical; my perusal indicates that revision involved rewording, deletion or addition of a sentence here and there, plus usually one or sometimes more insertions of several paragraphs into some sections. I personally do not find this an appropriate manner of revision for coverage, after two decades, of subjects such as "problems of migration," "the formation of the pair bond," and "fluctuations of populations." The text nevertheless is adequately written for general readers—however, make no mistake about the contents covering all aspects of avian biology, for only locomotion and food, reproduction, migration, sociality, and some population aspects are treated.

I was amazed to find pages 21 to 28 bound upside down in my copy (interestingly these reversed pages contained the book's only color pages bearing pagination). Errors such as misspellings are not numerous, although there is some "slippage" in use of unfamiliar European names (e.g. skimmers are referred to throughout as "scissorbills"). More important than these problems are those of coverage and misleading indexing. I don't think I can be faulted for objecting to seven comments about the Wren (the *only* troglodytid mentioned), and 13 notations for the Robin (plus two figures—versus only seven notations for all New World nine-primaried oscines other than Old World *Emberiza*). Even when mentioned, New World groups other than the popular hummingbirds usually are referred to generally by family group names. Perhaps I am being finicky, but an extreme is attained in the omission from the 1973 edition's list of principal families of the Acromyodi of the Mimidae, Thraupidae, and Parulidae, all so listed in the 1954 book! "Wood-warbler" occurs in the index hyphenated (unnecessarily) as the common name of *Phylloscopus sibilatrix*; the only wood-warbler actually mentioned in the book is the Parula Warbler. Hoatzins merit no notice, and but one tyrannid is mentioned. The index is very misleading, citing under group names "various genera" that in fact are not mentioned. Under "Tyrants" we see (p. 222) "various genera, Tyrannidae, 97," and on page 97 what do we find but a simple statement that small tropical birds often nest in the vicinity of aggressive birds such as "Drongos and Tyrants" (this too is the only mention of Drongos, and it merits in the index the notation (p. 217) "Drongos, *Dicrurus* and allied genera, Dicruridae, 97"). Wood-creepers and woodhewers receive casual mention under those general names at three points in the text; in the index (p. 222) we find "Wood-creepers, *Dendrocolaptes* and allied genera, Dendrocolaptidae, 24" and "Woodhewers, various genera, Dendrocolaptidae, 17, 41." These cited pages bear mention of woodcreepers or woodhewers under those group names with no indication of species or genera. However, the woodcreeper *Campylorhamphus trochilirostris* is beautifully figured in a color plate, without indexing under woodhewers or woodcreepers, but under "Sickle-bills" and "Red-billed Sickle-bill," in both cases cited as (once with "allied genera") representing the Vangidae!

I can recommend this book to those who wish to broaden their library collection of Eurasian bird photographs, but its incomplete treatment of avian biology, a misleading index, and the inadequate coverage of birds of the world in its illustrations are serious shortcomings. Hence librarians and those who would use it as a general reference work, especially in the Americas, are urged to look elsewhere.—LESTER L. SHORT.

Stability and complexity in model ecosystems.—Robert M. May. 1973. Princeton, New Jersey, Princeton Univ. Press. Monogr. in Population Biol. No. 6. ix + 235 pp. $11.50 (cloth), $4.95 (paper).—Mathematical formulations of the dynamics of populations and population interactions have been the foundation of theoretical population ecology for two generations. The basic models, such as Lotka-Volterra, are found in virtually every introductory ecology text. Because such simple models generally bear faint resemblance to the dynamics of real world situations, their contribution to ecological theory has increasingly been questioned. In his cogent dissections and extensions of these mathematical models, Robert May has given them new meaning, and turned them into something other than interesting intellectual playthings for armchair ecologists whiling away long winter nights.

May's basic aim is to assess the stability of population systems (not "ecosystems" in any real sense) by exploring the behavior of mathematical models. "Stability" is viewed in a physical-mathematical sense, as the tendency for population size perturbations to damp out in time, returning the system to some persistent configuration. Most of the analyses concern neighborhood stability, the ability of a deterministic population system to remain in the vicinity of an equilibrium point. Cyclically fluctuating populations, which by some views are unstable (as they deviate markedly from "equilibrium") are considered examples of stable limit cycles, in which the system oscillates in a regular manner between defined limits, and if disturbed will tend to return to the equilibrium configuration. Such systems are stable, at least mathematically, and may have interesting properties. For example, May's models suggest that for a prey population with a growth rate large relative to that of its predator, an increase in environmental carrying capacity may have the effect of carrying the predator-prey population system from a stable equilibrium point to a stable limit cycle. Thus as prey habitat conditions improve, the tendency for population numbers of both prey and predator to fluctuate may increase. This conclusion has important implications for attempts to view stability of numbers as a measure of habitat "optimality."

Time lags in interactions can also affect the stability of systems. May develops models to show that if a population system has a potentially stabilizing negative feedback mechanism which is applied with a time delay that is long compared with the natural time scale of the system (e.g., relative to generation length), the result will be instability rather than stability. A vegetation-herbivore system with no predators may thus be unstable. By adding a predator population, the time scale of the system may be changed, making it longer than the feedback time lag, thereby inducing stability. The ecological controversy over whether herbivore populations are regulated by their food supply or by predators is thus placed in a different perspective: It is the interplay between vegetation effects and predator effects that may "regulate" herbivore populations rather than either alone.

To be useful, mathematical modeling should do more than symbolically describe the intuitions of field naturalists; the models should also lead to new insights, to "counter-intuitive" predictions. The series of models May develops repeatedly counter one of the favorite intuitions of ecology, that increasing the complexity of a system (especially its trophic complexity) generates greater system stability. In fact, in the model systems quite the opposite holds true. The models with many species, or with complex trophic interconnections, are in general less stable than the corresponding models with few species: Complexity begets instability rather than stability. This follows from the observation that with greater size and interconnectedness of a food web, more modes of population oscillation are represented. Because mathematically each mode is as likely to be unstable as to be stable, increasing

the number of links in the web simply increases the probability of instability. Thus while competitive interactions may lead to more efficient community utilization of environmental resources through closer species packing (greater niche overlap, or narrower niches), this evolutionary trend is countered by the destabilizing effects of the increasing complexity. That complex systems in the real world frequently are stable may reflect evolutionary processes that have, in effect, "sought out those relatively tiny and mathematically atypical regions of parameter space which endow the system with long-term stability." Mathematically the relative stability of natural ecosystems is counter-intuitive.

But May's treatment is, after all, mathematical; and while his models offer major extensions of earlier models and are thoroughly stimulating, they are still simple in portraying the biology of systems. By his own admission he does not consider genetic variation or natural selection, and the population systems are considered to occupy uniformly unvarying space (although environmental variation in time receives close attention). To the extent that genetic or spatial variation or selection can contribute to system stability, their omission compromises the models. Further, it seems unlikely that studies in natural systems can supply values for the various factors in May's equations, so that their chief utility may well be in the elaboration of further theory. Nonetheless the models do generate important insights that may offer some new perspectives for both field and laboratory studies.

May relegates his thornier mathematics to appendices, and explicitly states his aim to communicate such insights as emerge from his models to field and laboratory ecologists. I suspect that while other mathematical devotees will take greatest delight in his book, many biologists will still find the text rough going. The insights that do emerge are worth the effort.—JOHN A. WIENS.

The visible migration of birds at Ottenby, Sweden.—C. Edelstam (Ed.), 1972. Stockholm, Svenska Reproduktions Aktiebolaget. Ottenby Bird Station Rept. No. 58, Vår Fågelvärld, Suppl. 7. 360 pp., 1 photo, 2 maps, 5 tables, 4 sets of histograms; also numerous line drawings by Harald Wiberg. Cloth. Members 80 Sw.cr., others 95 Sw.cr. (price includes overseas mail and is payable in advance to Sveriges Ornitologiska Förening, Runebergsgatan 8, S-11429 Stockholm).—The first major publication of the Ottenby Bird Station is a result of the foresight and enthusiasm of Gunnar Svärdson, its past director. It is based on counts of almost 4 million southbound diurnal migrants at Ottenby, Öland Island, Sweden, during summer and autumn 1947–56. The 66 pages of text and notes are printed in Swedish with parallel translation in English. The book's folio size results primarily from the presentation of the data in histograms.

One chapter gives a brief history of the previous field studies conducted at Ottenby, a description of the locality, and the methods and problems of the field work. The succeeding chapters are on annual variations, seasonal rhythm, daily variations, diurnal rhythm, reverse migration, and weather. Each chapter is divided into discussions of the data, histograms, and sources of variation.

Under annual variations are treatments of 117 species in 27 nonpasserine and 55 species in 23 passerine families, these being the ones that attained a 10-year total of over 100 birds. To present data on the seasonal rhythm of migration, observations have been totaled over 10-day periods and are offered in a table with selected species represented by histograms. The largest chapter is that on daily variation, with 180 pages devoted to yearly histograms of those species recorded during at least 60 of

the 1509 observation days. Unidentified birds are referred to in a section devoted to notes.

The chapter on diurnal rhythm should be of interest to all students of migration. Histograms present the data and "demonstrate unquestionably the importance of covering all the daylight hours if one wants to obtain a balanced picture of visible migration." Hourly totals as percents of daily migration from sunrise to sunset are presented for 70 species or groups (e.g. *Sterna hirundo*, *S. paradisaea* and *Sterna* spp.). Taking these factors into consideration, it is evident that the diurnal rhythm of migrants varies from family to family but is relatively uniform within the family.

In addition to a discussion of reverse migration at Ottenby the editor has included a daily 07h weather summary that includes cloud cover, wind direction, wind speed, visibility, precipitation, temperature, cloud cover at the lowest level, cloud base, air pressure, and the trend of air pressure.

The use of histograms is a good way to help visualize migrational data, but they have drawbacks. Although the editor expressed his desire that the histograms, with unmarked ordinates, would be sufficiently detailed to permit the scientific or lay reader to translate the bars into numbers, I did not find this so. A ruler, not provided in the book, is a necessity to attempt the conversion, where 5 mm (1/5 inch) = 10% or 1, 2, 5, 10, 20, 100, 200, 500, or 1000 birds. Daily totals greater than those represented by 50 mm contain numbers above their bars, and this limits the reader in visualizing the total day-to-day pattern.

The editor did not present any statistical analysis but suggests possible approaches and applications of the data. It is doubtful that an analysis could be conducted from the data presented in the book because of the inability to determine accurate daily totals or hourly total percents. I found the text difficult to follow in part due to the awkward sentence structure and paragraph organization. Some of the other problems are the omission of the scale for *Columba oenas* and *C. palumbus* and the use of statistical terminology when not referring to actual tests.

In summary, in this work, data are presented in a meaningful manner but lack the desired precision. This is a serious drawback and detracts from the importance of this long-term migrational study. Although the work is not a necessary acquisition for most individuals, I would recommend the book for libraries to maintain a degree of completeness on the subject.—KENNETH O. HORNER.

Anatomy of the chicken and domestic birds.—Tankred Koch. 1973. Ames, Iowa State Univ. Press. vii + 170 pp. $9.95.—This small volume on the anatomy of the chicken, with some comparative observations on the domestic duck and goose, is a translation of Kock's "Bau und Funktion des Gelflügelkörpers," and appears to be designed primarily as an avian anatomy and physiology text for veterinary students. No publication date is given for the original German text, which was translated directly without any extensive textual revisions. The author is not known to me as an avian anatomist and I suspect that his training and research is primarily in mammalian anatomy judging from the numerous references and comparisions with mammalian structure. The book suffers because of its particular anatomical nomenclature, which is a mixture of avian and mammalian names. This problem appears to be greatest for the appendicular musculature; however, these names are the easiest to correct because of the excellent treatments of these muscles by Hudson, Berger, and other avian anatomists. Anyone using this work as a guide to anatomical dissection and identification should check the terminology with some

standard ornithological anatomical reference before using the names. I would like, however, to consider the usefulness of this anatomical atlas independent of these nomenclature problems.

Judgement of this book rests primarily with its use as an anatomical atlas compared with other readily available works. It rates well compared with major ornithological references and may be the best of the available veterinary texts, except for the most expensive ones. I was able to identify appendicular muscles more easily with this guide than with some more scholarly ornithological anatomies, and I believe that with its help any ornithologist could identify a bird's gross anatomical features quickly and accurately. Although it is based on the domestic chicken, the figures and text are sufficiently general and serve reasonably well for most birds. With the clear warning that this book is not a definitive avian anatomy and that the names must be checked before they can be used, I believe that it is useful as a dissection and identification guide and can recommend it to ornithologists who would like to have a single, moderately priced avain anatomical atlas.—WALTER J. BOCK.

ALSO RECEIVED

Bird infirmary.—Eva Engholm. 1973. New York, Taplinger Publ. Co. 174 pp., 40 photos taken by Harry Deal. $6.95.—This is a detailed report of a language teacher's care and feeding of sick and injured birds. In the last chapter are several lists of food and medication successfully used on various birds. The book might be helpful to a person who works with avian casualities.—E.S.A.

Emma's search for something.—Mary Anderson. 1973. New York, Atheneum. 164 pp., 10 black-and-white drawings by Peter Parnall. $5.95.—This book comes from the publisher's children's department. Emma, the pigeon heroine, has learned to read and perches from early morning until twilight, day after day (with a break for luncheon), outside one window of the public library to read a 900-page book over a woman's shoulder. Emma is an unbelievable pigeon and so is this book. From it the young can learn a great many things that "ain't necessarily so."—E.S.A.

They saved our birds/the battle won and the war to win.—Helen Ossa. 1973. New York, Hippocrene Books. 287 pp., illus. $6.95.—An excellent narrative of the history of bird conservation, particularly in the Western Hemisphere, from its origins in the feather trade debacle in the late 19th century to the insecticide, pollution, and overpopulation problems of today. Mrs. Ossa writes simply and entertainingly, and she has researched her subject accurately and well. Final chapters contain good suggestions on what we as individuals can do to save our birds and our environment. Highly recommended.—O.L.A., JR.

Birding from a tractor seat.—Charles T. Flugum. 1973. Privately printed, Box 30038, St. Paul, Minnesota 55175. Pp. 13 unnumbered + 435, 20 black-and-white drawings by Walter J. Breckenridge (reprinted from books by Olin S. Pettingill and Richard J. Dorer). $8.95.—This delightful book is a collection of articles that first appeared as columns in a publication called "The Community Magazine." Mr. Flugum is not a list-making bird watcher. He is a constructive bird watcher who studied the habits and behavior of every bird that came his way, and he

reports of them most accurately in simple language and a fine unpretentious style. He also gets down from his tractor near the town of Albert Lea in southern Minnesota to take his readers on field trips to other parts of the state and memory excursions into his youth. I particularly enjoyed what he had to say about hawks and owls. It is so refreshing to find a farmer who does not condemn all birds of prey. His accounts of the birds of the fields and woods made me feel as thought I ought to go and buy a tractor and a plow to get his view of the world. I liked his tale of the baking soda bird cards and one in which a young minister came to bird watch on his farm and went with him for a tractor ride on which Flugum added Brewer's Blackbird to the preacher's life list.

All in all, this book gives one a pleasant view of the birds of Minnesota, and it's much easier to hold than Thomas S. Roberts' ponderous tomes. I wish Mr. Flugum had included an index as well as a table of contents so one could look up a bird and find every mention of it by page.—E.S.A.

Glimpses of bird life.—Alexander Dawes Du Bois. 1974. Minneapolis, T. S. Denison & Co., Inc. Pp. 100, 36 black-and-white photographs. $5.95.—This slim volume of very pleasant, well-written accounts of nine species of birds was published posthumously through the efforts, I am sure, of the author's sister, Charlotte A. Du Bois, who wrote the brief introduction and also an excellent obituary of him in Auk (1966, 83: 712).

Alexander Du Boi's vocation was electrical engineering, but his hobby of bird photography and bird observation was of top professional caliber. His pictures are excellent, especially when one considers that most of his equipment was improvised and probably, like Frank Chapman's, of circa pre-WW I vintage.

This book has nine short chapters, each on the nesting and activities of a single species under the camera's eye—Ruby-throated Hummingbird, Eastern Wood Pewee, American Bittern, Cedar Waxwing, Mourning Dove, American Goldfinch, Great Horned Owl, Wood Thrush, and Common Nighthawk. I suspect that the author intended to cover many more species when he started this labor of love in our great Middle West.—E.S.A.