

REVIEWS

EDITED BY JOHN WILLIAM HARDY

A history of the birds of the Azores.—David A. Bannerman and W. Mary Bannerman. 1966. Edinburgh, Oliver and Boyd. 262 pp., 7 col. pls., 23 photographic pls., 8 maps, 31 wood engravings, $7\frac{3}{4} \times 11$ in. Quarto.—This book is volume 3 of "Birds of the Atlantic islands" by one or both of the same authors.

The Azores are near the middle of the North Atlantic, lying only 300 miles closer to North Africa to eastward than to Newfoundland toward the northwest. Their position is reflected in the high proportion of New World birds recorded. The nine islands of the group are scattered through an area of approximately three degrees of latitude by six of longitude, centering close to $38^{\circ} 20' N$. They therefore have a wholly temperate environment. They have had no connections with other lands since emerging from the ocean, which means that their avifauna has reached them only by flight across water.

The archipelago has been studied during the past century by ornithological visitors from France, Great Britain, Germany, Sweden, Portugal, the United States, and even Japan, and in recent years notably by residents of the islands themselves. Mr. and Mrs. Bannerman cite a bibliography of 43 titles, of which one dates from 1591, and, among almost contemporary papers, there is a report of the Oxford University Women's Azores Expedition of 1960, which comprised two zoologists and two geographers. This list of references is little more than a third as long as that in the preceding Bannerman volume, relating to Madeira and its outliers, in which naturalists have taken a lively interest throughout four centuries. In fact, with the exception of the Cape Verdes, the Azores are the least studied of the eastern North Atlantic islands, to which the Bannermans have now given comprehensive treatment in four lavish volumes.

The aim of the book is identical with that given the other groups, namely to picture the bird life comprehensively, and to describe the landscape, climate, flora, and the changes produced by man since the first settlements, which, except in the Canary Islands, were only in modern times.

In fulfilling their purpose, the authors have had the advantage of original contributions by Azorean colleagues, notably Senhores Alvares Cabral and José Agostinho, whose chapters add significance to the discussions of the several islands, their relative size, physiography, altitude, hydrology, climate, and biota. The maps are satisfactorily informative. There is a chapter on the birds preserved in the Museum at Ponta Delgada, and an exceedingly useful list of the Portuguese names of all the species.

The resident birds of the Azores are few in species but not in the size of populations, and are all of Palearctic or Holarctic families. The breeding forms that have a wider range than the Azores include 5 petrels, 2 ducks, European Coot, 3 shorebirds of which the European Woodcock is the commonest, 3 Laridae, and the Long-eared Owl.

Of endemic forms, which are mostly only barely distinguishable, and a few of dubious validity, the buzzard (*Buteo*) is the most conspicuous. Others include races of the European Migratory Quail, Moorhen, Wood Pigeon, Rock Dove, Blackbird, and Blackcap. Of the three kinglets (the only bird represented by more than a single subspecies in the archipelago) one is of wide distribution, the other two each confined to single islands. The Gray Wagtail and Chaffinch are endemic races, as is the Bullfinch, which is the most famous and distinctive bird of the islands, the male being "hen-feathered" with no trace of a rosy breast. A number of other residents are believed to have been introduced by man from Madeira or elsewhere.

Birds that pass through the Azores as migrants are vastly more numerous, and their

list has been augmented even since the publication of the Bannerman volume. As noted above, the American element among these is very large. Known from the Azores are 14 species of herons, 19 of waterfowl, 9 of Rallidae, and 29 of snipes and their relatives. A vulture (*Neophron*) has found its way from Africa and a cave swift (*Collocalia*) from Asia! In some instances it is vain to speculate about the origin of certain species. The frigate bird may have arrived from a tropical African colony and the Snowy Owl is as likely to have come from the arctic via western Europe as from North America.

The authors have traveled to every island of the Azores, and have given a detailed record of the distribution and behavior of the birds. Their photographs and other illustrations are meaningful and handsome. They write with appreciation of the island people, for example, of the natives of Corvo, the most remote station, whom they found kindly, intelligent, and well-educated. The only wheeled vehicles on Corvo are oxcarts, and guns are nonexistent for, by common consent of the inhabitants, the whole island is a bird sanctuary.—ROBERT CUSHMAN MURPHY.

Antarctic bird studies.—Oliver L. Austin, Jr. (Ed.). 1968. Amer. Geophys. Union, Publ. No. 1686. Pp. ix + 262, $8 \times 10\frac{1}{2}$ in. Cloth. \$16.50.—“Antarctic bird studies” is Volume 12 of the Antarctic Research Series, the first dealing specifically with the biology of birds. The book is a collection of eight papers, each based on work sponsored either partly or wholly by the U. S. National Science Foundation, although it is made clear that close international cooperation between the U. S. Antarctic Research Program and programs of other nations engaged in antarctic research was largely responsible for the success of the work.

The papers are long and detailed, and, in spite of the fact that five of them concern themselves with aspects of the biology of the Adélie Penguin (*Pygoscelis adeliae*), there is almost no overlap in topics. Each paper presents substantial new data and the product gives increased insight into the intricate ways living systems have evolved to permit life to exist and flourish in the harsh environment of the Antarctic.

“Biology of the great albatrosses *Diomedea exulans* and *D. epomophora*” by W. L. N. Tickell is a meticulous study of the breeding biology of the Wandering Albatross conducted by the author on Bird Island, South Georgia, using data gathered during six austral summers and one winter. Comparisons are made wherever appropriate with L. E. Richdale’s (Biol. Monogr., 3, 1950; Biol. Monogr., 4, 1952) work on a small colony of Royal Albatrosses at Taiaroa Head, New Zealand, and J. H. Sorensen’s (Cape Expedition Sci. Res. of N.Z. Subantarctic Expedition, 1941–45, Bull. 2, 1950) Royal Albatross work on Campbell Island. Tickell’s data point up the remarkable similarities in the breeding biology of the two species. The most significant difference involves a slower rate of growth of Wanderer chicks. In both species and in *D. chrysostoma* (Tickell and Pinder, Nature, 213: 315, 1967), successful breeders breed every other year, but birds of nests that fail early in the season reneest the succeeding year. The behavioral or endocrinological stimuli that inhibit annual reproduction in spite of physiological capability are unknown; Tickell suggests they are associated with prolonged chick-feeding.

This paper contains a remarkable amount of data, gathered painstakingly and analyzed statistically. It should take its place among the classic studies of the breeding biology of sea birds. One could only wish for greater emphasis on the adaptive significance of the data. Such current topics as the mechanism for the regulation of population are mentioned only in passing.

“The avifauna of Haswell Island, Antarctica” is by M. E. Pryor. Haswell Island, about 1 km² in area, lies off the east coast of Antarctica at 66° S, close to Mirnyy

Station, a permanent research station of the Russian Antarctic Expedition. Pryor reports on the status of the eight species of sea birds breeding on the island and environs based on daily visits in the austral summers of 1961–1963. The present paper is an expansion of a series of five reports presented for publication in Russian; only one of these reports is referred to in his bibliography. Data are presented on the populations of each species, usually based on nest counts, the location and type of nest site, and the breeding phenology, starting with the arrival of adults in October and November and running to the end of incubation or the start of brooding, depending on the species. Termination of the gathering of data at this inopportune time each year was forced by lack of transportation to the island. Pryor's data on egg and chick mortality are of special interest. Although South Polar Skuas (*Catharacta maccormicki*) were constantly in attendance, flooding of nest sites or inclement weather caused most of the observed mortality, and the Skuas acted as scavengers.

"Territorial and social behavior in the Adélie Penguin" by R. L. Penney adds to an increasingly large body of knowledge on the biology of the Adélie Penguin, furthering the researches of W. J. L. Sladen (e.g. Falkland Islands Depend. Surv., Sci. Rept., 17, 1958) and others. By following individually marked and recognizable birds for three breeding seasons Penney was able to reveal the basis of pair formation and maintenance. Individuals were sexed by behavioral criteria; specimens were collected to confirm the sexual identifications. Returning established breeders recognized both the location of the previous year's territory and the previous mate, individual recognition taking precedence over territory. Pair bonds in succeeding years were broken most frequently by presumed mortality, second by widely asynchronous return of one of a pair.

Chicks in the creche stage, upon hearing a recorded playback of a parent's vocalization, leave the creche and return to their natal territory with an "alert and anticipatory" appearance. How parents recognize their chicks is still unknown.

"Circadian rhythms of activity in the Adélie Penguin (*Pygoscelis adeliae*) during the austral summer" by D. Müller-Schwarze discusses the effects of continuous daylight, but with light intensity varying by a factor of 200, on the activities of Adélie Penguins at Cape Hallett (72° S). Activities such as traveling to and from open water between the colony and the feeding grounds and general movement in the colony showed daily cyclic rhythms. Maxima of activity came at various times depending on the activity; minima came at midday. The author suggests that midday temperatures as high as 3° C may have been enough to account for the reduced activity in birds with poorly developed heat tolerance.

"Biochemistry of the Adélie Penguin; studies on egg and blood serum proteins" is by R. E. Feeney, R. G. Allison, D. T. Osuga, J. C. Bigler, and H. T. Miller. Adélie Penguin egg white, yolk, and blood serum proteins are compared with those of other species. Egg white proteins were unusually high in sialic acid, and low in lysozyme. Immunological cross-reactions between egg whites and those of other birds revealed strongest reactions, and hence closest taxonomic affinities, with the grebe (*Podicipediformes*) and two petrels (*Procellariiformes*), and not with any of several ratites. Enthusiasts of ornithogastronomy will be pleased with a section entitled "The palatability of penguin eggs."

"Salt and water metabolism of the Adélie Penguin" is by D. S. Douglas. Adélie Penguins must conserve water and salt ions during incubation when they have only intermittent access to them. At other times, such as the chick-feeding period, their

bodies must cope with a high load of salts. Douglas examines the mechanisms for salt and water balance. The nasal gland grows in proportion to body weight. It secretes salts at a rate proportional to its weight, but its ability to concentrate ions does not vary with size of the gland. Osmotic load, not the kind of ion, elicits nasal gland secretion. Changes in plasma osmotic pressure alone do not cause secretion, but they may be "possibly necessary conditions for the normal initiation of secretion."

Fasting Adélie Penguins had one-seventh of the urine flow of fasting chickens, a water conserving ability that permits long incubation stints without water replenishments.

Artificial salt loading showed no clear results. Neither cloacal flow nor cloacal discharge concentrations increased consistently under such conditions.

"Feeding preferences of the Adélie Penguin at Cape Crozier, Ross Island" is by W. B. Emison. A simple but efficient stomach pump permitted food samples to be taken without harm to the birds. Euphausiids, primarily *Euphausia crystallorophias*, comprised 91–95 per cent of Adélie Penguins' food by number of organisms and 60 per cent by volume. Fishes, primarily *Pleuragramma antarcticum*, comprised 4–8 per cent by number and 39 per cent by volume. Amphipods made up the remainder.

One fewer baleen whale theoretically makes available enough euphausiids to rear 5,000 additional penguin chicks. Recent increases in pygoscelid penguin numbers may indeed be attributable to greater food abundance through decreased competition with whales.

"The USARP bird banding program, 1958–1965" by W. J. L. Sladen, R. C. Wood, and E. P. Monaghan discusses the history of banding in the Antarctic from L. Gain's initial efforts in 1909 up to 1965. In addition recoveries of birds made away from their banding site are presented, along with maps showing the major recovery areas and banding stations of several prominent species. A lengthy series of tables summarizes all distant recoveries on the basis of species and banding or recovery area. The authors discuss the circumpolar distributions of *Diomedea exulans*, *D. melanophris*, *D. chrysostoma*, and *Macronectes giganteus* based on band recoveries. One might question the justification for publishing *all* the USARP distant recovery records.

The authors and the editor have put together an impressive volume, remarkably error-free. Tables and figures are abundant and are always comprehensible and located near enough to their reference to permit rapid location. The price may seem high but there is no question that the volume is of high quality. I look forward to additional volumes of this series.—WARREN B. KING.

Danske ynglefugle i fortid og nutid [Danish breeding birds: past and present].—Bernt Løppenthin. 1967. Odense, Odense University Press. 609 pp. Dan. Kr. 100.00.

—Denmark is a small country occupying several islands and a central peninsula jutting out from the northern coast of central Europe. It does not boast a large variety of natural habitats; it is flat, has no mountains, and is mostly an agricultural country. Its size is roughly that of the Florida panhandle. I have flown over Denmark in little more than half an hour, covering its islands and mainland. Neat green fields, a regular network of roads, and clusters of villages and towns hide the surprisingly rich avifauna of 180 breeding bird species. Løppenthin discusses these in a thick volume that is faunistic and zoogeographic, but mostly an historic monograph.

Small as the country is, it has an excellent ornithological literature dating back to Frederik Faber (1824–28) and Erich Pontoppidan (1763–67) and even earlier. All this literature is brought together and critically evaluated in the present work.

The book consists of three parts. The first is entirely historical; it describes the development of nature in Denmark from the late Würm (= Wisconsin) deglaciation

(about 18–20,000 years ago) when only some rigidly high arctic coasts were released from the grip of the land ice, until now, when intensive modern agriculture, urbanization, and also considerable reforestation, gave the finishing touch to the appearance of modern Denmark as an avian habitat. This chapter takes 67 pages.

About 37 pages are devoted to the ecologic and zoogeographic grouping of the historical Danish avifauna. The Sclater–Wallacean system of zoogeographical regions is discussed with mention of its refinements in Eurasia by the Russian zoogeographers (the only ones who bothered with this earnestly) and a concise and quite subjective description of these as they fit the Danish avifauna. The ecological point of view is represented by references to the principal plant formations of these geographic areas. Each of the 282 species discussed in the book is assigned to one of the entities.

The third and last chapter, 388 pages in extent, is a detailed, documented, scrupulous list of every species that has ever occurred in Denmark, regular or accidental, fossil or recent, hypothetical or certain.

The historic account is fascinating to those interested in the origin, history, and current status of the avifauna. There is perhaps no other area in the whole world than southern Scandinavia where postglacial natural history and simultaneous prehistoric human history is so well-known and documented. As the land got rid of the ice and of the subsequent several floods, the first settlers moved in and their *køkkenmøddinger* (kitchen middens) contain, besides innumerable artifacts, bony fossils of their avian meals. Of course no one, including Løppenthin, knows whether these birds were residents, transients, or periodic invaders; the fact is that they were there and from the paleoecologic knowledge we can conjecture which ones might have been nesting there. Løppenthin goes a step further because on this meager solid ground he conjectures heavily about birds—in fact, about total ecofaunas—that *might* have been there as the ecological circumstances *could* have allowed their immigration at that particular time. These hypothetical or theoretical historic lists make the first chapter a highly vulnerable part of Løppenthin's work. It cannot be totally dismissed as fancy, though, if we stand for the principle of *uniformitarianism*—i.e. (applied to this case) that factors which acted in the (geologic) past are active at present as well. Thus, for example, we learn that in the Subarctic (Allerød) Time, about 11,000 B.C., southeastern Denmark was covered by scrubby birch and willow forest; Løppenthin's species list (species that "might have immigrated during Subarctic Time" p. 28) contains such tundra woodland birds as the Willow Ptarmigan and the Crane (fossils) and the Velvet Scoter, Merlin, Fieldfare, Brambling, and others (undocumented). These species at present do live in the north of Scandinavia, under similar environmental conditions; the list as such is, however, unwarranted. Aware of the drastic distributional changes species undergo at the present time, our adherence to the "reversed uniformitarian principle" (Udvardy, Dynamic zoogeography, New York, Van Nostrand Reinhold, 1969) says that distributional irregularities must have occurred in the past also, and makes every undocumented member of the lists subject to serious doubt.

The faunal lists in the second chapter—ecogeographic ones this time—are more than vulnerable, but the average Danish reader as well as the interested American ornithologist is not likely to raise such questions as why the worldwide Osprey is classified as a *Sarmatic* species.

In contrast, the last chapter comprising over half of the book meets with my undivided admiration. Backed by 42 pages of listed references, here is a thorough checklist with unsurpassed critical documentation. Especially clear from the species accounts is the dynamism of many Danish birds as they appear in the historic sources. Place names,

scientific descriptions, old journals, and hundreds of other documents are here brought together to determine, for instance, whether *Picus medius* that Brunnich mentioned in 1764 from Christiansø really was identical with the present *Dendrocopos medius*. How careless or faulty data crept into contemporaneous literature through misquotations, guesses, and misprints carried from author to author is masterfully clarified. Løppenthin's main, though largely unstated theme is that most of the faunal changes that he documents are the results of the changing impact of civilization, and not of climatic fluctuations. Forest birds grew scarce, and even disappeared totally with the increasing clearance of land through the Middle Ages. They gradually reappear in modern times as more forests are planted. Because of these meritorious aspects, Løppenthin's book is a must for avian geographers in agricultural countries, especially in Europe.

I eagerly sought in this book a synthesis of the ecological and dynamic geography of the Danish avifauna. The pertinent data are there, but they are not summarized. I do not blame the author for this; his synthesis was aimed in another direction, toward the historic development of the fauna. We do not even get a clear picture of the size of the various ecological or regional elements of the present Danish ornithofauna: we have to dig it out ourselves. A couple of randomly chosen examples will suffice: *Carduelis flavirostris* is listed on p. 117 as a Paleorine (= Paleomontane) element. Later (p. 118) it is stated that this bird perhaps nested in Denmark in Late Glacial Time, that there are no recent, concrete data about its nesting here, and neither are there any habitats that would satisfy its nesting requirements. The list of South-boreal species includes *Falco naumanni* (pp. 104–105) but later Løppenthin says that "chances are extraordinarily small to find the Lesser Kestrel as a breeding bird in Denmark." These then are entirely hypothetical species, and it is a tedious task to discard them from the species lists.

Faunal dynamism (Udvardy, Bonn. Zool. Beitr., 20: 1, 1969) is the faculty of a geographic fauna to change its components through time. This is a function of the dynamism of the component species. The present breeding avifauna of Denmark, according to Løppenthin, is composed of 180 species; in addition, 15 breeding species disappeared from Denmark after 1850. The unit we consider, the avifauna of 1850–1960, has 195 species. We learn from Løppenthin's tables that a number of these have distributional limits across or around Denmark while others cover the whole country and areas beyond. As most distribution areas fluctuate mainly at their borders, the above, first element represents primarily the dynamic potential of the avifauna. There are now 67 breeding species with their borders across Denmark; in addition, 15 species died out during the time period considered. This adds up to a dynamic potential of 82 species, or 42 per cent of the total breeding avifauna. The sum of the total number of species from Løppenthin's data that actually showed great border fluctuations is 80 (56 new breeders, 15 extinct breeders, and 9 species that greatly diminished or even died out only to reappear 40 years later). Thus the total dynamic potential of the fauna was realized during the period considered. Besides the geographically dynamic elements Løppenthin lists 19 species that drastically decreased and another 10 species that greatly increased their populations. We may call these species *plastic*, as opposed to the *static* element (84 species).

In a well-studied avifauna of a small geographic area the error in the calculated dynamic potential is negligible but errors might skew the relation of plastic/static elements, as the population dynamics of small-sized and rare birds is difficult to follow. Therefore it seems realistic only to say that 42.5 per cent of the total Danish avifauna of 1850–1960 is dynamic, and that about one fourth of the remainder is composed of plastic species with great population fluctuations.

It is of interest to compare the above with similar calculations for the breeding avifauna of Hungary (Udvardy, loc. cit.). Like Denmark, Hungary is flat, agricultural, and densely populated. Its avifauna between 1860 and 1960 totaled 200 species, the size of the Danish breeding fauna. The dynamic potential of the Hungarian avifauna was found to be 83 species or 41.5 per cent about the same percentage as in the Danish avifauna. However in Hungary the realized dynamic potential amounted only to 37 species, the lesser half of the potentially dynamic element—in Denmark, as we just saw it, all species' borders have displayed movements during the same time period.

The comparison bears out the theme of Løppenthin's book: that since the close of the last glaciation Denmark's avifauna has undergone progressive changes. It puts the dynamism of this avifauna in a perspective, showing that such a degree of dynamism is not restricted to Denmark. Most likely all avifaunas are dynamic, and upon their postglacial readjustments and evolution is superimposed the increasingly dominant dynamic impact of human civilization and population increase. The reviewer wishes that more avian faunists would document as carefully as Professor Løppenthin has the changes in local distribution through time.—MIKLOS D. F. UDVARDY.

Handbook of New Guinea birds.—Austin L. Rand and E. Thomas Gilliard. 1968. Garden City, New York, The Natural History Press. Pp. i-x + 1-628, 27 text figs., 40 black and white pls., 5 col. pls. \$19.95.—Of the major ornithological regions of the world the Papuan Region or Subregion is the only one for which no handbook or even field guide was available prior to 1968. Even though New Guinea is geographically an island, ornithologically it is a continent. It has more species (568) of breeding land and freshwater birds than Australia (531) and the two areas have only 191 species in common. New Guinea is particularly rich in birds of paradise (43 species), pigeons (39), kingfishers (24), and flycatchers (46). Many of the endemic genera (*Goura*, *Otidiphaps*, *Clytoceyx*, *Psitttrichas*, *Rallacula*, etc.) are highly peculiar. To an ornithologist it is truly a paradise.

This gap in the literature is most successfully filled by Rand and Gilliard's handbook. The field characters of New Guinea birds are still too poorly known to make the preparation of a field identification guide possible, but this handbook will serve as a convenient and reliable introduction to the Papuan bird fauna. As the authors say, this is a volume somewhat like Chapman's famous "Handbook of birds of Eastern North America," which in its day was the bible of every young bird student in North America. It is sad that Tom Gilliard did not live to see its publication.

Under each species there is a plumage description, a detailed characterization of the range, notes on nesting (where known), and remarks on habits, food, and calls. These life history notes, which summarize what is recorded in the literature as well as the observations of the authors, document how appallingly little is as yet known about New Guinea birds. This is beginning to change now that it is so much easier to get to New Guinea.

To facilitate identification there are numerous keys (to plumage characters) throughout the volume, sometimes to the species of an entire family, or in the larger families to smaller groupings. This is supplemented by 5 colored plates showing 27 species, and 49 plates of black and white halftones showing 127 species. Even those users who are unfamiliar with the families and genera of the Papuan region should be able with the help of these figures to spot a near relative of a so far unidentified species.

The standard nomenclature and classification is employed with little reference to a considerable number of recent proposals for modifications. The area covered includes

also the Western Papuan Islands, the islands of Geelvink Bay, the Aru Islands, and the Eastern Papuan Islands.

The volume was printed in England and proofreading may have been difficult. This may explain the rather large number of misprints in scientific and locality names.

Most of the illustrations are by Albert E. Gilbert and are quite pleasing and lifelike; others, by Douglas E. Tibbitts, look rather stiff and wooden.

The study of the habits of New Guinea birds should make rapid progress, now that this reliable handbook is available.—ERNST MAYR.

Handbuch der Vögel Mitteleuropas, Anseriformes.—Kurt M. Bauer and Urs N. Glutz von Blotzheim. Frankfurt am Main, Akademische Verlagsgesellschaft. 1968, vol. 2, 535 pp., 5 plates, 75 text figs., 26 tables. 1969, vol. 3, 504 pp., 1 plate, 77 text figs., 20 tables. 57 DM (subscription price 48.50 DM).—With the publication of these two volumes covering the waterfowl, the new "Handbuch der Vögel Mitteleuropas" changes its status from a brave beginning to a respectable series well on its way to completion. Together these volumes constitute an outstanding monograph on European anatids that is scarcely surpassed by specialized treatises on this family. Many monographs of anatid biology, including some very recent ones, are available, yet Bauer and Glutz have made a major contribution to ornithology by collecting and summarizing this material into a single source. Volume 2 treats 31 species of waterfowl, including swans, geese, shelducks, and dabbling ducks, and volume 3 covers 22 species, including the diving ducks, eiders, scoters, mergansers, and stiff-tailed ducks. The general scheme and coverage of each species in these volumes follow those established for volume 1 which were discussed in my review of that work (Auk, 85: 522, 1968), I will not repeat these comments. Nor will I attempt to review critically the detailed information presented in the species accounts; such evaluation may be obtained from reviews by other workers more familiar with the European avifauna and with the biology of waterfowl. Instead I would like to offer a few observations, mainly on general features of handbooks.

A general skimming of both volumes and scattered spot reading showed that the authors maintained the high standards established in volume 1. They continue to avoid unnecessary disputes and complications in areas such as classification and molts and plumages. Bauer and Glutz assumed the risk of strong criticism by proponents of other systems of anatid relationships or of other approaches to the complex topic of molts and plumages in their decision to push ahead with their handbook; their decision is a wise one. The illustrations are devoted mainly to distribution maps, subtle points of plumage and molts, and various behavioral displays.

The section on field characteristics has questionable value because of the excellent accounts available in field guides and the publications of the Waterfowl Trust. Moreover, the decision to exclude hybrids is an unfortunate one because information on the plumage and field marks of hybrid waterfowl would be most useful to field workers, if for no other reason than to call their attention to possible hybrid individuals. Indeed, no references are given even to the general reviews of hybridization among anatids and lists of known hybrids, which constitutes a major lack in this publication.

A second serious lack is a discussion of waterfowl classification with reference to divergent views. To be sure the important recent papers are cited, such as those by Johnsgard, to which the reader can go for fuller details and more complete bibliographies. Yet I cannot help feeling that the systematics of the waterfowl is of broad interest and that it deserves a fuller treatment, if for no other reason than that this family

served as the prototype for systematic studies based upon behavioral and other non-morphological features. Indeed I know of no other family of animals in which the currently accepted system of classification depends more upon nonmorphological features than the Anatidae. Most notable for its absence is reference to Delacour and Mayr's classic paper on the classification of the Anatidae which is the foundation for all later discussions.

Literature references follow each species account with the exception of those citations marked with an asterisk. No mention is made anywhere in volumes 2 and 3 of the meaning of this asterisk. I had to refer to volume 1, pp. 29-31 for the essential information. The asterisk indicates that the reference may be found either in the general list of papers on pages 32-58 of volume 1, or in the list of references at the end of the introductory text for each order (volume 2, pp. 23-24 for the Anatidae), or in a general list in the introduction of volume 2 (pp. 18-20), or in a large supplementary list to be published in volume 4. A spot check of a number of these marked citations shows that most, but not all, of the references are given in volume 1 or in the introduction of volume 2; the missing ones will presumably be listed in volume 4. Finding a particular reference is not simple because one must first note the general text heading or subject material under which the citation appears and then look in several places in different volumes to locate the reference; the system of subheadings in the bibliographies complicates the search. Finally, a double check is required if the reference is not found, to be certain that it is not given. In some cases, the reader will have to wait until the publication of volume 4 to learn the reference, or check the *Zoological Record*. Problems of publishing a multivolumed handbook are responsible for some of these bibliographical difficulties, but many are inherent in the scheme adopted. Even when the entire handbook is published, the system of presenting these special references will remain a most cumbersome one unless all these references are brought together in the final volume.

I became interested in the value of this handbook to various areas of avian biology partly because of my own special interests in the functional and adaptive significances of morphological features. For students of avian distribution, behavior, reproduction, migration, yearly cycle, and some aspects of ecology, the material appears to be most useful. But for most laboratory studies of avian biology, the material in these volumes is of limited value even when the researcher wishes to correlate the results of his laboratory work with information from the natural history of these birds. As an example, I checked the accounts of several species for information that would be valuable if I undertook a functional morphological study of the feeding apparatus or of the locomotor system of waterfowl. I concluded that the material included in these accounts is of such limited value for these studies that I would have to go to the original sources (which are probably little better). I point out this problem not as a criticism of the handbook or of the decision of the authors to cover only certain aspects of avian biology, but to emphasize an important problem of avian biology—that of correlating field studies with laboratory work. The closer and more meaningful such correlations can be made, the better will be our understanding of avian biology. The strength of biological disciplines, such as ornithology, and the importance of future contributions to be made by ornithologists in comparison to disciplines organized along functional lines such as morphology and physiology, will depend upon the ability to reach broad correlations from field and laboratory investigations. In spite of the excellent compilation by Bauer and Glutz, younger ornithologists need not despair, because far more remains to be done than is yet accomplished.

The rate of coverage of species in these volumes is rather low when compared with the European avifauna. The first three volumes include 98 species (44 in volume 1, 31 in volume 2, and 22 in volume 3), many of which are accidental or of rare occurrence in Europe. At this rate of coverage, the 11 volumes of the handbook will treat about 360 species, and at the rate of coverage for just volumes 2 and 3, the handbook will cover only about 290 species. While I do not know the total avifauna for the area of central Europe, the number of species covered in Peterson's "Field Guide" is 550 species. Clearly the depth of discussion for the species in the first three volumes and especially in the two volumes on the waterfowl will be far greater than that for passerine and other small land birds, assuming that the handbook will be completed in 11 volumes. In view of the many excellent treatises on the Anatidae, many of them published in the past 15 years, I feel that the decision to cover the waterfowl in such great detail is unfortunate. A far greater contribution can be made to avian biology if the same energies and space are devoted to those groups of "little brown birds" for which few if any good reviews exist. Hopefully this can still be done, but it is difficult to see how the same thorough analysis of the entire central European avifauna can be accomplished in 11 volumes.

In my review of volume 1, I pointed out the difference in price between single volumes and the subscription rate and urged ornithologists to take advantage of the subscription rate (at least for their institutional libraries). The handbook is still available at a reduced subscription price, and I would once again urge all ornithologists to obtain the "Handbuch der Vögel Mitteleuropas" for their institutional libraries.

The speed at which volumes 2 and 3 were published is noteworthy. As volume 1 appeared in 1966, a time period of one and a half years for each successive volume can be calculated. At this rate the handbook should be completed in 1981, which will be a remarkable achievement. I wish the authors every success in attaining this goal. Ornithologists are once again indebted to Drs. Bauer and Glutz for continued excellence in their monumental task, and they are to be congratulated for writing two outstanding volumes on waterfowl biology.—WALTER J. BOCK.

Chemical fallout: current research on persistent pesticides.—Morton W. Miller and George G. Berg (Eds.). 1969. Springfield, Illinois, Charles C Thomas, Publisher. Pp. xxi + 531, numerous tables and figures, 6 × 9 in. \$22.50.—This carefully edited book is a collection of 25 papers, including discussions, read at the first Rochester Conference on Toxicity, University of Rochester, Rochester, New York, 4–6 June 1968. Most of the articles are technical research reports, and several of these are sufficiently broad in scope to provide collectively an overall appreciation of problems resulting from environmental contamination with pesticidal and industrial organochlorine and organomercurial compounds.

Among key papers appearing in the volume is R. Risebrough's survey of organochlorine pesticides and industrial "plasticizers" (polychlorinated biphenyls or PCB compounds) in Pacific Ocean ecosystems. Pesticides, and presumably PCB, enter the ocean from the atmosphere and both are found in highest concentrations at top trophic levels, including aquatic birds. The level of contamination of marine ecosystems approaches that of freshwater systems in California. A. Johnels and T. Westermark give a corresponding view of mercury contamination in Sweden where seed-eating and predatory birds have been found dead in large numbers. Mercury levels in feathers of ospreys and grebes have gradually increased since about 1860, but were low in goshawk feathers until 1940; the authors conclude that buildup in aquatic

environments from industrial sources has been long-term, but in terrestrial situations, seed-treatment with mercurial compounds in agriculture has been more recent. Elsewhere in the book W. Stickel states that the U. S. Fish and Wildlife Service examined Black Ducks, gulls, and Ospreys from northeastern United States, finding mercury levels within normal limits according to a Swedish specialist, but concluding that the mercury situation in this country should unquestionably receive much more attention. Swedish paper pulp mills have discontinued the use of phenylmercury since 1966, but the industry in the United States still uses mercury compounds widely.

The paper by R. Welch et al. on the effects of chlorinated insecticides on steroid metabolism is of primary interest because it is clear that steroid hormone changes can be brought about at residue levels far below those required to cause acute poisoning. The discovery that *o,p'*-DDT has estrogenic effects in rats should be considered now in the light of recent published evidence that this isomer of DDT is rapidly converted *in vivo* to *p,p'* compounds that are not estrogenic. Hence the estrogenic effect may not be as significant as supposed. C. Wurster's review of possible mechanisms relating organochlorine residues to disturbances in avian reproduction is an able summary, and should be of value to those not familiar with the literature on the subject. Not included in the paper or the following discussion is a mention of recent speculation and current research of the possibility that DDT or its metabolites directly inhibit the enzyme carbonic anhydrase. As this product is critical in calcium transport, its inhibition may contribute to the thinning of eggshells seen in a variety of birds at upper trophic levels. The results of a comprehensive study of the effects of chronic exposure of pheasants to DDT is given by E. Hunt et al. in a paper that will be of considerable interest to anyone concerned with pesticides in birds. Although pheasants may not be typical of most birds in all their responses to DDT (treated pheasants did not show eggshell thinning) data given on the dynamics of residues in various tissues, including eggs, provide a useful baseline for other studies.

The final chapter is in part a lively and sometimes caustic discussion of J. Robinson's paper on organochlorine insecticides and bird populations in Britain. Robinson, an employee of Shell Chemical Co. at the time, subjects the data of ornithologists and conservationists to considerable rigor. Although his conclusion that organochlorine residues have had in general no clear effect on predatory birds in Britain may be questionable, his paper is a blunt reminder of the type of analysis that work in this field may be subjected to.

No one interested in a quality environment should miss R. van den Bosch's paper on "the toxicity problem." He describes the enormous use-acceptance following heavy sales promotion, of Azodrin, an organophosphate introduced for cotton pest control in California. This despite early warnings by the State Experiment Station and Extension Service that the material is clearly a menace to wildlife and natural insect predators and seldom results in increased cotton yields. He agreed with R. Rudd that the effective control of hazardous chemicals capable of environmental pollution will not come about until the problem is disastrous—a situation they feel is near at hand. In the statement concluding the conference Rudd states that presently we are "challenging change by imputing damages, fixing guilt, and generally resting our case upon essential legal grounds," and that "we could make far better judgements if we had a wider kind of identification with the fate of the human community and other living communities, and if we accepted the responsibility for their stability and health."

Nowhere in the book can I find mention of the date of the actual conference and

unless one obtained this elsewhere he would not know how old the data are, especially important in this rapidly moving research area. Typographical errors are not numerous, and only one other error was found ("DDT" should read "DDD" on line 1, page 371, see page 27).

Tragicomedy is supplied by the disclosure of the crash in California of a crop-spraying aircraft where the pilot was found to be fatally poisoned with his own spray (TEPP and Phosdrin) and another where pilot-error, perhaps due to pesticide intoxication, apparently caused the fatal accident.

This book will be an important reference to those working on general problems of chemical pollution, but people studying narrow aspects of organochlorine or mercury influences on organisms may have occasion to refer to it also.—JAMES H. ENDERSON.

Biographical key/names of birds of the world/to authors and those commemorated.—Owen E. Wynne. 1969. Published by Col. O. E. Wynne, Courtwood, Fordingbridge, Hants., England. 246 pp., mimeo., cloth bound, $10 \times 7\frac{1}{2}$ in. 40 shillings (plus 14 s. postage to America, including Canada).—This is a useful alphabetical list of persons who have named birds or who have had birds named after them, to the end of 1964. It gives the surname of each such person, his title and initials, year of birth (and death if not living), a genus in which he described a form or in which he is commemorated, a brief biographical note (often mentioning a major ornithological or zoological publication), and a reference to the published source used for biographical details. Only one genus is mentioned under any person's name, regardless of the number of taxa he may have described or in which he may be commemorated. The preface states that the giving of both genus and species (i.e., the scientific binomen) after a person's name indicates he was the author; however I find that the converse does not follow, for the listing of only a generic name may indicate either commemoration or authorship of a form in the genus. A number of scientific names *based on given names* are also included, usually with a cross-reference to the person honored. Scientific names based on surnames are not usually listed—presumably to save space and on the assumption that the identification would be apparent from the surnames of the persons listed. For example, no bird called *wetmorei* is listed, as such a name would evidently refer to the ornithologically unique "Wetmore, Dr. A.," the only person included with that surname. But when we come to surnames like Smith, Sclater, Miller, and many others borne by two or more zoologists or collectors, this list does not enable us to determine the person commemorated by *smithi*, *sclateri*, or *milleri* and the like, unless it happens to be a form in the single genus listed under an individual's name. I suspect more puzzling cases of scientific names are based on surnames than on given names. This little book will go a long way toward enabling us to identify persons commemorated in ornithology. The comments I have made are designed to point out how the work could be made even more useful, should the author undertake another edition.—E. EISENMANN.

Diseases of cage and aviary birds.—Margaret L. Petrak (Ed.). 1969. Philadelphia, Lea and Febiger. Pp. x + 528, 315 illus., 12 in color, $8\frac{1}{2} \times 11$ in. Cloth. \$32.50.—Considering the economic and esthetic value of cage birds and their long history of association with man, very little research has been performed on the cause and cure of their diseases. Margaret L. Petrak and 24 collaborators have performed a great service by putting together in one volume much of what is known about

this field. Their book will be very useful to practicing veterinarians, veterinary students, and aviculturists. It should stimulate more research in a fledgling field that they have now defined. I hasten to point out that this book is more than a catalog of bird diseases and how to treat them. It has much basic avian biology in it, and it will be useful to any biologist interested in birds. The first 174 pages are non-clinical in nature and deal with topics such as behavior, genetics, anatomy, physiology, and nutrition. Other chapters describe the common types of cage birds and how to maintain them properly. The remaining, clinical, portion of the book first has chapters on how to handle, examine, and anesthetize birds. Next, the characteristics and treatment of disease in all major organ systems are discussed. Finally, the most important remaining chapters deal with infectious and parasitic diseases, mycoses, neoplasms, and metabolic disorders.

The budgerigar, *Melopsittacus undulatus*, is heavily emphasized in many chapters. This gives the book a unifying subtheme, and the approach makes some sense because probably more is known about the budgerigar than any other cage bird. Unfortunately, it has caused some contributors to restrict their efforts almost completely to the budgerigar and their respective chapters suffer for it. The outstanding chapter by Howard E. Evans on the anatomy of the budgerigar is an exception. The best chapters are those in which the authors have thoroughly reviewed the pertinent literature and incorporated data from wild species into their discussions. After all, wild birds are the reservoir for many diseases of cage birds. These contributors tend to develop discussions pertinent to all cage birds, passerine, psittacine, or others. In this regard I would single out the chapters by Paul A. Buckley on genetics, Donald S. Farner on physiology, C. Ivar Tollefson on nutrition, John L. Leonard on clinical observations, Leslie Arnall on diseases of the respiratory system, R. N. T-W-Fiennes, J. P. Cavill, Paul Arnstein, and Karl F. Meyer on infectious diseases, and I. F. Keymer on parasitic diseases.

The book's format and appearance are excellent. It is beautifully printed on glossy paper. The photographs and line drawings range from adequate to good. The tables are easily interpreted, although not all are really needed and some are oversimplified or inadequately titled. A problem inherent to a book with this many authors is the lengthy time lag between the completion of the assorted manuscripts and publication. In this case the gap, as judged by the references consulted, was 3 to 5 years.

As a pioneer-type volume, this work is entirely adequate and will undoubtedly serve its avowed purpose in the field of veterinary medicine. Outside this field distribution among interested people will probably be hampered by its price.—
MARTIN L. MORTON.

Natural areas in Indiana and their preservation.—Alton A. Lindsey, Damian V. Schmelz, and Stanley A. Nichols. 1969. Indiana Natural Areas Survey, Department of Biological Sciences, Purdue University, Lafayette, Indiana. Pp. viii + 594, 138 figs., 114 tables, 6 × 9 in. Cloth. (Not available for purchase; widely distributed to universities and libraries by the Ford Foundation, to whom any inquiries should be directed.)—One of the major objectives of this book is to stimulate similar publications from other states, so that worthwhile natural areas can be located, catalogued, and preserved before it is too late. The authors divide Indiana into eight natural regions based on biological and geological criteria. Within these divisions, 153 natural areas are singled out for detailed discussion (principally botanical) and assigned a priority for setting them aside as nature preserves. Caves are not included. Size, location ownership, and unique features are given for each of the 153 areas.

Appendix I lists about 70 additional sites not recommended as potential nature preserves (some of them, however, are already state parks, state forests, or state fish and game areas).

The ornithologist will find little about birds in this book, but will be able to locate important remnants of relatively undisturbed native vegetation and other unique habitats where he might wish to conduct field investigations. Incomplete lists of birds are included for certain localities, but the significance of the presence of a few species has not been made apparent. For example, four natural areas listed in the book are the only known nesting sites for the Veery in Indiana. One Newton County prairie remnant is evidently holding the remaining Greater Prairie Chickens (the known 1969 population totals four birds!). Another site is the only known 1969 nesting locality for the Osprey in the state. No doubt other Indiana birds nest only on certain of the above natural areas. These sites will assume more and more importance in future years as habitat destruction continues, and it is hoped that key areas can be purchased and preserved. It is already too late to save the Prairie Chicken.—RUSSELL E. MUMFORD.

Exploring our national parks and monuments.—Devereux Butcher. 1969. Second Ed., Revised. Boston, Houghton Mifflin Co. Pp. xiii + 379, numerous un-indexed black and white photos, many of them taken by the National Park Service, a few maps. \$8.95.—This book has grown considerably from the 160 pages of the \$1.75 first edition published by Oxford Press in 1947. The author and the public interested in our national parks and monuments should be glad Mr. Butcher has found a publisher that keeps his work in press and up-to-date.

I am not always aware when new national monuments are authorized, but I assume Mr. Butcher is, as he lists Biscayne National Monument in Florida authorized in 1968. I am glad to see him alert his readers to dangers that beset our national parks and monuments—lands of privately owned land, pressures by commercial interests, hunters, and herders, and that ditching and damming by the U. S. Army Corps of Engineers that threaten Mammoth Cave, Grand Canyon, Glacier, Echo, and Everglades National Parks.

I am sorry Mr. Butcher did not see fit to acknowledge the photographers and map-makers and to give the late distinguished archeologist, Dr. Frank H. H. Roberts, Jr., credit for his article on the American Indian in the table of contents as well as on the page where it starts.—ELIZABETH S. AUSTIN.

From Laurel Hill to Siler's Bog/the walking adventures of a naturalist.—John K. Terres. 1969. New York, Alfred A. Knopf. Pp. xxii + 227, 1 frontispiece map of a University of North Carolina wildlife reserve, the Mason Farm, 10 full page black and white chapter headings, and 23 vignettes, charming paintings reproduced in black and white. \$6.95.—A persnickety reviewer might go through this book and find something to carp about if he tried very hard. I can't. It is a book that will bring pleasure to both the tyro and the professional biologist. John K. Terres is a man with an inquiring mind who uses the English language to recreate color, sound, and the daily drama of life in forest, field, and swamp. On 600 acres of the old Mason Farm in the hills of North Carolina he found the changing fauna and flora of three centuries and four seasons, and brought them to life in the pages of a book where anyone can follow him over hill and dale with enjoyment.—ELIZABETH S. AUSTIN.

Owl.—William Service. 1969. New York, Alfred A. Knopf, Inc. 93 pp., 3 sepia prints by Walter Richards. \$4.00.—Speaking of owl habitat William Service says, "And in what is left of it nearby, aliens appear, the subsidized predators: dogs and cats." If he had said, "dogs and cats and man, including William Service and his three children," he would have been more honest. This book is another series of essays about a wild bird held captive in a private home. An adult educated man, not ignorant of but ignoring the laws of nature if not the laws of the land, lets his children keep a young Screech Owl that has fallen out of the nest. With the aid of his publisher he is now blatantly advertising the fact and encouraging others with his clever prose to go and do likewise instead of putting fallen nestlings where the parents can reach them.

"Robert the Quail," who hatched on a kitchen counter after its parents deserted nest and egg, was kept with a good excuse and due process of law. "Owl" was kept with no excuse and no purpose. Nothing in Mr. Service's record of Owl's behavior adds any new information to what we know about owls. Everything Mr. Service has to say and more was published by Edward Howe Forbush in 1927 in "Birds of Massachusetts," by Arthur Cleveland Bent in the appropriate volume of his "Life Histories" in 1938, and by Herbert Zim in his children's book "Owls" in 1950. Not even the Screech Owl's death after 18 months' confinement brought new knowledge. An autopsy performed by a local veterinarian could not be expected to bring to light the information that might have been unearthed by an expert in avian pathology at Patuxent.—ELIZABETH S. AUSTIN.

ALSO RECEIVED

A paddling of ducks.—Dillon Ripley. 1969. Reprinted Ed. Washington, D. C., Smithsonian Inst. Press. 256 pp., numerous ink drawings, 9×6 in. Cloth. \$5.95.—Originally published in 1957 (Harcourt, Brace and Co.), this is a nontechnical account of the author's experiences with ducks, as an ornithologist and aviculturist. Distributed by Random House. Overpriced.—J.W.H.

Journey to red birds.—Jan Lindblad. 1969. Translated by Gwynne Vevers. New York, Hill and Wang, 176 pp., 25 halftone and 23 col. photos, 1 map. \$6.50.—Swedish author and photographer Lindblad is an adventurer-naturalist. Having been awarded a prize of \$33,600 by the Swedish Film Institute for a nature film, author and spouse took off on a trip to the West Indies, especially Tobago and Trinidad. The book is an account of their travels, observations, and photographic work with the Scarlet Ibis, American Flamingo, Oilbird, and hummingbirds, among other animals. There are some especially good photographs of oilbirds and an account of their activities at the nest and in their cave.—J. W. H.

Attachment of the young. Imprinting and other developments.—F. V. Smith. 1969. Edinburgh, Oliver and Boyd. Contemporary Science Paperbacks ser., No. 38. Pp. vii + 120, 4 figs., 5 black and white photos, $4\frac{1}{2} \times 7$ in. 90 cents.—A handy summary reference guide to literature on the subject of imprinting in birds and related phenomena that occur in mammals, including humans.—J.W.H.

Endangered plants and animals of Oregon. III. Birds.—David B. Marshall. 1969. Corvallis, Oregon State University, Spec. Rept. 278 (July), Agr. Exp. Station. 23 pp., $8\frac{1}{2} \times 11$ in. Paper.—Previous reports have dealt with fishes (I) and amphibians and reptiles (II).—J. W. H.