REVIEWS

EDITED BY WALTER BOCK

Collected papers in avian paleontology honoring the 90th birthday of Alexander Wetmore.—Storrs L. Olson, ed. 1976. Smithsonian Contributions to Paleobiology, No. 27. xxvi + 211 pp.—On June 18, 1976, Alexander Wetmore, the Honorary President of the American Ornithologists Union, reached his 90th birthday. Alex Wetmore contributed to ornithology in many ways, but perhaps his most significant achievement was a steady stream of papers, numbering 155 in all, on fossil birds since 1917. Thus for 60 years, Wetmore kept alive the interest and tradition in avian paleontology during a period when few other workers had more than a cursory interest in this aspect of ornithology. He is thus the important link between the older school of paleornithologists of Milne-Edwards, Lydekker, Shufeldt, and Lambrecht and the vigorous school of younger workers well represented in this superb Festschrift volume.

The volume opens with "Appreciations" by S. Dillon Ripley and Jean Delacour, followed by an all too brief account of Wetmore's work on fossil birds by Storrs Olson. Olson traces the pioneering work by Wetmore on the reevaluation of previously described fossils, on West Indian fossils, on the Green River fossils, on Oligocene birds, on oceanic island fossils, on the birds from the Miocene marine beds of Chesapeake and from the phosphate beds of North Carolina, and other work too numerous to mention, to the later fruitful studies of many avian paleontologists who followed in his footsteps. Many of the papers presented in this volume are direct outgrowths of studies begun by Wetmore several decades earlier. A bibliography of Wetmore's publications in avian paleontology is presented followed by an index to the fossil avian taxa described by Wetmore including citations to publication and page for each.

The bulk of the volume is comprised of 18 papers ranging from an analysis of the evolution of avian flight based on *Archaeopteryx*, to subfossil birds, such as moas and flightless ducks, which bridge the gap between fossil birds and historical times. The contributions of these papers are too numerous to analyze in detail in this review; only a few of the more important discoveries will be mentioned. Martin and Tate present a detailed description of *Baptornis*, a diving bird related to, but less specialized than *Hesperornis*. Brodkorb describes the first definite land bird from the Cretaceous, a form apparently ancestral to the Coraciiformes and the Piciformes. A number of Paleocene and Eocene birds are described, including an owl, by Rich and Bohaska, and several piciform birds by Feduccia and Martin, a number of which are placed in a new family, the Premobucconidae of the Galbulae. The descriptions of a tody from the Oligocene of Wyoming and a motmot from the Oligocene of Switzerland by Olson raise most fascinating taxonomic and zoogeographic problems. These and other discoveries of fossil members of taxa geographically far removed from their Recent distribution indicate that many current ideas on the history and distribution of birds must be rethought. Several papers discuss ordinal relationships, most important of which is the description by Brodkorb of *Alexornis antecedens* as a member of a new order of birds ancestral to the Coraciiformes and the Piciformes. Collins shows that the Aegialornithidae, a fossil family previously believed to be apodiform birds, are members of the Caprimulgiformes and should be placed close to the Caprimulgidae. Other taxonomic revisions include Cracraft's analysis of the moas. Using a principal components analysis he proposes that the Dinornithidae are comprised of 13 species

arranged in six genera and two subfamilies, and suggests that these large flightless birds present an example of adaptive radiation as interesting as the well-known Hawaiian honeycreepers and the Darwin's finches.

To the many Recent and fossil birds named for Alex Wetmore, four more must be added—an owl, a caprimulgiform, an auklet, and a grebe. However, to this list a fifth bird must be added. Although the basis of the name comes from Greek, the new genus *Alexornis* is clearly named for "Alex" Wetmore, a use of words that could only come from the fertile mind of Pierce Brodkorb. And what greater honor could be bestowed upon an ornithologist who has contributed so much to the study of avian paleontology and classification than to have a new order of birds, the Alexornithiformes, which is apparently ancestral to two orders, the Coraciiformes and the Piciformes, dedicated to him on his ninetieth birthday.

The greater honor is, indeed, to receive such an excellent collection of papers in avian paleontology which testify to the vigorous strength of this field and its assured future growth. Surely no greater reward exists for decades of work in a field than to know that your tasks have been picked up by younger scholars who are making discoveries and reaching new understandings that were beyond one's greatest hopes in 1917 when your first paper in paleornithology was published. Although these papers are technical paleontological studies, they cover a broad range of topics and include much of interest to all ornithologists; I recommend this volume highly and urge all avian biologists to peruse it if for no other reason than to discover the wealth of work being done in paleornithology. Storrs Olson must be congratulated and thanked for his central role in organizing and editing this excellent collection of papers.—WALTER J. BOCK.

Avian biology.—Donald S. Farner and James R. King (Eds.). 1971–1975. New York, Academic Press. Vol. 1, 586 pp.; vol. 2, 612 pp.; vol. 3, 573 pp.; vol. 4, 504 pp.; vol. 5, 523 pp. Prices variable and frequently increasing.—That the study of birds has contributed substantially to the growth of modern biological thinking is well known and hardly needs repeating. The theoretical contributions of C. Darwin, T. H. Huxley, E. Mayr, K. Lorenz, N. Tinbergen, D. Lack, and R. MacArthur were derived wholly, or in large part, from their observations on birds. Indeed, it may be that no other group of organisms has been as important in the formulation of generalizations within organismic biology, and although birds have given up some of their primacy of late, especially to insects, they certainly remain the most thoroughly studied group of vertebrates. Thoroughly studied birds may be, at least in terms of numbers of workers, but what is the current state of intellectual health within ornithology and what might be our prognosis for the coming decades? If the papers contained in these five volumes are any indication, then ornithology need not worry at all about the onset of intellectual rigor or complacency. Simply stated, the volumes of "Avian biology" are the best synthetic compendium on any group of organisms. Perhaps only the series "Biology of the Reptilia" will offer any significant challenge, and whereas that series may include some contributions that are more detailed descriptively, none so far match those of "Avian biology" in terms of a conceptual-theoretical approach. "Avian biology" stands as a testament to the biological significance of much ornithological work. Moreover, these volumes also testify to the vision and judgment of the organizers and editors, Donald S. Farner and James R. King.

"Avian biology" is the direct descendent of "The biology and comparative physiology of birds" (2 vols., 1960–1961) edited by A. J. Marshall, although comparisons between

the two works pretty much can stop there. The content of all but one of the chapters in Marshall (the chapter on development by R. Bellairs) has been carried over, but it has been greatly expanded, subdivided into additional chapters, or otherwise significantly modified and reorganized. While the two series were designed to express the same concept—the review of ornithological knowledge—the two differ importantly in execution. Marshall's attempt was limited to 2 volumes with 24 chapters averaging about 39 pages in length. We now have in "Avian biology" 5 volumes with 40 chapters averaging 66 pages each. Interestingly, there is a steady progression in chapter length through the 5 volumes, volume 1 having chapters only 50 pages in length, volume two 64 pages, volume three 67 pages, volume four 95 pages (!), and volume 5 with chapters averaging 71 pages. Consequently, compared to Marshall's volumes, the content of "Avian biology" is staggering in its breadth. Although some important topics are missing (see below), the subject matter included is nevertheless impressive.

Volume 1 has 11 chapters covering classification and adaptive radiation (R. Storer), paleontology (P. Brodkorb), speciation (R. Selander), terrestrial (R. MacArthur), marine (N. P. Ashmole), and desert (D. Serventy) ecology, ecology of reproduction (M. Cody, K. Immelmann), ecological aspects of behavior (G. Orians), and population dynamics (L. von Haartman). Volume 2 has 9 chapters on the integument (P. Stettenheim), patterns (R. Palmer) and control (R. Payne) of molt, circulation (D. Jones and K. Johansen), respiration (R. Lasiewski), digestion (V. Ziswiler and D. Farner), nutrition (H. Fisher), metabolism (R. Hazelwood), and excretion (V. Shoemaker). Volume 3 contains 8 chapters on reproduction (B. Lofts and R. Murton), adenohypophysis (A. Tixier-Vidal and B. Follett), peripheral endocrine glands (I. Assenmacher), neuroendocrinology (H. Kobayashi and M. Wada), vision (A. Sillman), chemoreception (B. Wenzel), mechanoreception (J. Schwartzkopff), and behavior (R. Hinde). Volume 4 has 5 chapters on peripheral and autonomic nervous systems (T. Bennett), pineal organ (M. Menaker and A. Oksche), skeletomuscular system (W. Bock), thermal and caloric relations (W. Calder and J. King), and physiology of flight (M. Berger and J. Hart). Finally, in volume 5 are included 7 chapters on mechanics of flight (C. Pennyquick), physiology of migration (P. Berthold), orientation and migration (S. Emlen), circadian rhythms (E. Gwinner), vocalization (F. Nottebohm), incubation (R. Drent), and zoogeography (F. Vuilleumier).

How are we to judge these 40 chapters by 47 leading students of avian biology? Reviews such as those in "Avian biology" can be written with different styles and approaches. Ideally, a review might summarize the data and ideas pertaining to a given field of inquiry, subject them to critical analysis, and propose new methodological and conceptual approaches for future evaluation. Naturally in writing a review all of us will deviate to a greater or lesser extent from the ideal. Sometimes the subject matter dictates it; sometimes it is a matter of personal emphasis. A reviewer might prefer to summarize the data base without critical analysis or, instead to concentrate on the ideas, de-emphasizing the data base. Reviews, therefore, may be descriptive or conceptual, and in either case may or may not be analytic. Most of us, I suspect, would like to see both, but each is of value in its own right. Irrespective of which approach is taken, a review by its very nature should provide the reader with some insight into the literature of the topic being discussed; if it cannot do that, then as a review it has failed.

It is questionable whether any individual possesses the expertise to analyze critically the contents of any given volume of "Avian biology," let alone the entire series. Indeed, the published reviews I have seen to date have contained considerable summarization of contents but very little critical commentary, and I suspect that if

a person has specific criticisms, these necessarily would be directed toward those papers closest to each individual's speciality. So given the task at hand this is neither the time nor place to harp about one's own special interest group—rather than focus on the "twig" or "tree" level, we must look at the whole forest, to borrow a phrase from Ken Parkes. We can begin by asking, how successful are these volumes in reviewing the current field of avian biology? The answer has two components: first, the measure of success of the individual papers, and second, that of the overall coverage and balance of the subject matter compared to that which might have been included.

Judged in terms of the individual papers, these volumes are successful beyond expectations. Virtually all authors produced comprehensive reviews of the topics assigned to them. Most summarized observational data within a theoretical framework, but my impression is that the ecologically oriented papers were more successful at this than the others. It is impossible to make an objective comparison of the reviews primarily because no two topics are strictly comparable; what would be the criteria? Consequently, it may be unfair to single out certain authors for special praise, but some make unusually favorable first impressions: Selander on speciation (vol. 1), von Haartman on population dynamics (1), Jones and Johansen on the blood vascular system (2), Lofts and Murton on reproduction (3), and Calder and King on thermal and caloric relations (4). In addition, a number of reviews are primarily descriptive in nature and some are outstanding, notably Ziswiler and Farner on the digestive system (2), Assenmacher on the peripheral endocrine glands (3), and Bennett on the peripheral and autonomic nervous systems (4). In citing the above reviews I do not intend to detract from the other papers in these volumes, because the *first* of my first impressions was of the high overall quality of the reviews. Despite this, some of the reviews were perplexing. For example, three were carried over from Marshall's volumes with only slight modification, Storer on classification (1) and adaptive radiation (1), and Hinde on behavior (3), and as a result they are not as comprehensive, up-to-date, or as fresh in approach as they might have been. Also, MacArthur's paper on terrestrial bird communities (1) hardly qualifies as a review, but this reflected the genius in the man: to him ideas were far more important than a cataloging of data points and writing a review probably would not have been easy intellectually.

Turning now to a consideration of the series as a whole, we can ask whether the five volumes adequately cover "avian biology" and whether the coverage is balanced or not. There is little question that the series covers a broad spectrum of biological subjects—much more than was treated in Marshall's volumes. As could be expected, most of the material emphasizes the structure and function of organ systems; thus morphology, physiology, and endocrinology dominate. Papers with an ecological leaning are also strongly represented. Interestingly, most of the research reviewed in these volumes is not done by card-carrying ornithologists but by workers whose primary interest is to use birds to investigate various biological systems. I raise this point not as an important criticism of "Avian biology" but to relate the content of the latter to what ornithologists do, which is mostly ecology, behavior, and breeding biology (e.g. examine the recent issues of any ornithological journal). Few ornithologists, it would seem, actually investigate problems of structure and function. Therefore, "Avian biology" might have served professional and amateur ornithologists better if some of the material on ecology, behavior, and breeding biology had been expanded. In fact, one of the major criticisms that might be leveled at the series is that a number of these subjects were treated superficially, including nesting behavior, food and feeding, courtship, territory, pair bond, social behavior, and so forth. The chapter

by Hinde on behavior (3) was simply too broad in scope to give adequate coverage. All this leads me to what seems a fairly important point: these volumes will serve as references for teachers for years to come, and my experience is that the material included in their courses is primarily in those areas that are slighted the most (structure and function receive limited attention). So my complaint is not with the content of the five volumes: it is simply that five volumes were not enough.

Other subjects were not included or were only treated briefly. Two chapters on the brain and one on migration systems requested by the editors were not delivered. Despite an editorial *mea culpa* in the preface that the subject of development was simply too large to include, I believe several chapters on the growth and development of birds, even if somewhat abbreviated, would have provided invaluable depth to the series. Also missing were detailed discussions of ecological energetics (but see "Avian energetics," R. A. Paynter, Jr., Ed., Publ. Nuttall Ornithol. Club No. 15, 1974), phylogenetics (most of the relevant literature is contained in C. Sibley and J. Ahlquist, Peabody Mus. Nat. Hist. Bull. 39, 1972), and genetics. I also found that the inclusion of several chapters created minor logical gaps within the series as a whole. For example, the presence of Serventy's excellent chapter (vol. 1) on the biology of desert birds and the equally fine chapter by Ashmole on sea birds (vol. 1) raises the question why chapters on tropical, temperature, or arctic ecology were not included also. But all these criticisms do not alter the substantial value of "Avian biology" as, after all, they are basically criticisms of greed: I would like to have seen more. On the other hand, who can fault Drs. Farner and King for their collective pleading, "Enough is enough. I want out!" Their competence and dedication lasted them through five volumes, and the literature of ornithology has been enriched by it.

In the decade or so between Marshall's volumes and those of Farner and King, the number of workers studying birds and consequently the number of papers produced has increased spectacularly. Most importantly, significant conceptual advances, primarily in ecology and other areas of evolutionary biology such as systematics, have transformed the *modus operandi* of much ornithological research. "Avian biology" documents that transformation in the subjects dealing with ecology, breeding, biology, and to a lesser extent behavior, but it is less successful in the area of systematics. It seems to me this reflects an emphasis on attempts to understand processes rather than reconstructing historical events. The problem is that many workers in ecology, behavior, and some areas of systematics believe they are studying processes when in fact their research strategy is primarily historical (e.g. much of the commentary on species diversity, speciation, competition, etc. is of this sort), and thus they should be interpreting their results within a historical-theoretical (comparative) framework. Indeed, several of my colleagues go so far as to suggest that process possibly cannot be studied at all—it is all historical.

In closing, I would like to comment on the potential long-term significance and impact these volumes might have on the study of birds. It would be naive to believe that "Avian biology" will transform or revolutionize the science of ornithology. Radical ideas transform science, and the nature of these volumes is such that new ideas—in the form of hypotheses or generalizations—do not predominate. Most authors are content to view their subject matter through the lens of currently accepted theory. To a certain extent this is unfortunate, because much of ornithology operates, and suffers, under a heavy weight of tradition, and when that occurs—as in any science—creativity and conceptual advances are hindered. But if you compare "Avian biology" with its predecessor, "Biology and comparative physiology of birds," you will see that a different, qualitatively more advanced biology of birds has emerged

within the last decade. Part of this, I'm sure, is due to technological advances in experimental analysis, data processing, and the like. Part is certainly due to the exponential rise in the number of workers and the amount of published information. I would like to believe that it is also the result of better scientific training of students, including an increased emphasis on concepts. In any case, "Avian biology" provides a documented view of much of modern ornithology, and therefore should compel the conscientious worker to expand his or her inquiry beyond the ideas and data contained in these papers. Consequently the series will be particularly important to the student and beginning investigator, and because of this should have a noticeable impact on the quality of future ornithological research.—JOEL CRACRAFT.

Natural sciences in America.—1974. Keir Brooks Sterling (Advisory Ed.). New York, Arno Press, 58 volumes. $1800.00 ($2162.00 if books are purchased separately).—This series of reprinted books may be described as a publishing adventure. Keir Sterling with E. H. Colbert, E. S. Gruson, Ernst Mayr, and R. G. Van Gelder, and the help of the library staff of the American Museum of Natural History, have provided a valuable service to students of natural history by reprinting many important volumes that are hard to find and expensive when available. Emphasis was placed on birds and mammals, and on works treating systematics, distribution, natural history, and ecology of the North American vertebrate fauna.

The importance of this reprinting effort is not felt by ornithologists lucky enough to be in an old institution with a library dating back well into the last century. Its value is far greater to workers who are at newer colleges, museums, and other institutions whose library resources would not permit purchase of that essential older, but expensive book when available in the used book market.

This set includes 43 books (some multivolumed), most from the 1800's but 11 from the 1900's; the latest is 1955. Of these books, 17 deal solely with birds and many others would be of direct interest to ornithologists. Some of the reprinted ornithological volumes are Baird, Brewer, and Ridgway "A history of North American Birds," and "American ornithology," Coues "Birds of the Colorado Valley," "Birds of the Northwest," and "Key to North American birds," Nuttall "A manual of the ornithology of the United States and of Canada," the complete "Bulletin of the Nuttall Ornithological Club," Ridgway "Ornithology," and Wilson and Evans "Aves Hawainensis."

Of considerable interest are the 13 original anthologies, two of which deal exclusively with birds. These are "American ornithological bibliography," which is the 2nd and 3rd installments of Coues bibliography, and "Contributions to the History of American Ornithology" which includes the AOU's "Fifty year's progress in American ornithology." Many of the other anthologies contain many avian papers and are of direct interest to ornithologists. Some are "Contributions to American systematics," "Early nineteenth century studies and surveys," "Fauna Americana," "Selected works of Joel Asaph Allen," and "Selections from the literature of American biogeography." Several of these would form the basis of interesting graduate seminars. Indeed some of these anthologies are the most useful volumes published in this series.

Two volumes are published for the first time. One is a historical biography of C. Hart Merriam under the title of "Last of the naturalists" by Sterling. The second is a long unpublished (from 1792–1793) manuscript by Benjamin Smith Barton entitled "Notes on the animals of North America."

All volumes are published by photo-offset and are generally of good quality, both printing and binding (all are in a uniform red binding). Reproduction in a few

cases is poor, which I suspect is the fault of the original. All plates are black and white, but are generally quite clear. All volumes are the same format size (6" × 9"); a statement is included on the amount of reduction of the illustrations.

The price of each volume varies considerably. Some are quite reasonable while others appear to be overly expensive. I was informed that the price was determined by the cost of reprinting each particular volume, but this does not appear to be simply proportional to the number of pages in the volume. Each volume (in a few cases, set of 2 or 3 volumes) can be purchased separately. A brochure is available from Arno Press, 330 Madison Avenue, New York, New York, 10017 for further information.

"Natural sciences in America" fills a gap in the many reprinting efforts of the past three decades. Although the entire set may be too expensive for even institutional libraries in these days of budget cutbacks, it does contain items of interest to most ornithologists either for their personal or institutional library. Dr. Sterling and his associates are to be congratulated for their work and excellent judgement in choosing the volumes reprinted and in putting together a series of interesting anthologies.—WALTER J. BOCK.

Breeding Birds of North Dakota.—Robert E. Stewart. 1975. Fargo, Tri-College Center for Environmental Studies. 295 pp., 18 color pls., 16 color and 63 black-and-white photos, 185 maps. $18.50.—This splendid book is unique among state bird books in the way it combines state-wide population data, ecological information, and classical ornithology. Its scholarly production and handsome format will make it a standard reference work for northern Great Plains ornithology for many years to come.

Stewart begins by describing North Dakota climate, physiography, and habitats in clear and concise terms. Accompanying maps of biotic areas and physical features allow the reader to gain quickly an accurate impression of the state. Discussions follow of biogeographical affinities of the state's breeding birds, detailed descriptions of the biogeographical regions of the state, and of their various habitats. The 16 color photographs by John Lokemoen of the state's principal habitat types are an outstanding contribution, portraying attractively the complexity of the entire state.

For a number of years, Stewart (together with Harold Kantrud) has conducted detailed studies of North Dakota bird populations as well as of prairie ecology in general. This work is summarized nicely. After sampling 130 randomly selected quarter-section plots across the state, Stewart estimates the state supports 25,990,000 pairs of breeding birds representing 196 species (190 of them native). There are 60–1396 pairs per sq mi with a mean density of 368 pairs per sq mi. Passerines account for 79.6% of the total, anseriforms for 8.8%, and charadriiforms for 3.9%.

The 50 most abundant species constitute 91% of the breeding bird population. Six species, *Eremophila alpestris*, *Calcarius ornatus*, *Agelaius phoeniceus*, *Sturnella neglecta*, *Calamospiza melanocorys*, and *Ammodramus sandwichensis* constitute 45% of the breeding bird population. *E. alpestris* alone accounts for more than 10% of all breeding birds. Six species were found in more than 60% of the sample plots. In order of decreasing frequency these were *S. neglecta*, *E. alpestris*, *Molothrus ater*, *A. phoeniceus*, *A. sandwichensis*, and *Anas platyrhynchos*.

Most of the book is devoted to carefully prepared and up-to-date species accounts. Of the 196 species known to have bred in the state, 190 are native. Eggs or dependent young have been found for all but five species and these five have been sighted repeatedly as pairs or territory holders. Twenty-two additional species are given

hypothetical status as breeding birds. Of the species Stewart studied, 48.1% were Passeriformes, 11.1% Anseriformes, 9.5% Charadriiformes, and 7.9% Falconiformes.

Eight species, including *Cygnus cygnus*, *Haliaeetus leucocephalus*, *Grus americana*, *G. canadensis*, *Charadrius montanus*, *Ectopistes migratorius*, *Caprimulgus vociferus*, and *Corvus corax*, were extirpated between 1880 and 1920. Two of these, *H. leucocephalus* and *G. canadensis* were found breeding after the book went to press and these records are added as footnotes. Five additional species have not been found breeding since 1960: *Melanitta fusca*, *Mergus merganser*, *Falco peregrinus*, *Tyto alba*, and *Melanerpes carolinus*.

Species accounts include statements of relative abundance, dates of breeding, egg and nestling dates, numbers of nest records, clutch sizes, descriptions of habitats and nest sites, and various sorts of additional information. Included are 182 range maps, with symbols portraying the following information for every township in the state: nests or dependent young 1950–1972, nests or dependent young before 1950, territorial male or pairs 1950–1972, or territorial male or pairs before 1950. These maps are an invaluable element of the book and Stewart is to be congratulated for having the endurance to complete such as task.

Throughout the species accounts, valuable information is added wherever unpublished data were available, e.g. under *Pelecanus erythrorhynchos* census data are included for the Chase Lake colony from 1905 (about 500 adults) to 1974 (4062 active nests). These additional discussions are particularly valuable for the little-known species typical of the northern prairies. Species accounts are supplemented beautifully by 63 black-and-white photographs, most of which are of high quality. Many of these pictures show seldom illustrated postures or activities.

In contrast to the photographs, the 18 color plates do not represent a significant contribution to ornithology. The single painting by D. Randall Crooke and 12 by Walter A. Weber are all of highly appropriate prairie species, but several of Weber's paintings have poor color reproduction, and their overall quality is not high by contemporary standards. The reproduction of several species at greater than life size is not pleasing. The five plates by Roger Tory Peterson (originally reproduced by Mill Pond Press, Inc.) are reproduced well but their style does not blend well with the other paintings and since they do not illustrate species typical of the northern plains, their contribution is decorative only.

Breeding Birds of North Dakota is an outstanding book, well worth its price of $18.50. It should be of considerable value to anyone interested in bird populations or breeding ecology; and it will be essential to students of prairie avifauna far outside the confines of North Dakota.—Lewis W. Oring.

A field guide to the birds of South-East Asia.—Ben F. King and Edward C. Dickinson, illustrated by Martin W. Woodcock. 1975. Boston, Houghton Mifflin. 480 pp., 64 plates of which 32 in color, 161 line drawings. $17.50.—There is little to criticize about this well-done guide, which covers for the first time an ornithologically rich but little-known region; so little-known, in fact, that only seven years ago a striking new species of bird was discovered there. This guide also covers all species occurring in Hong Kong, and all but 58 species recorded from Taiwan; many are winter visitors and therefore readily found in Japanese guides. A list of those species is provided in an appendix. This guide should therefore be very useful to any observer in Taiwan and Hong Kong. Thanks to a rational use of space, the text is packed with a remarkable amount of information. For each species, descriptions are given for the various plumages, including that of the young. These are

followed by a short descripition of voice, mostly from Smythies' *Birds of Burma*, although not every species is covered, despite the fact that good notes on voice are often readily found elsewhere in the literature. Following the section on voice is the general range of the species, its distribution in South-East Asia, including the altitudinal range, an important point, and its habitat. Not all birds can be identified in the field, and when such cases arise, methods are provided for determining the identity of the bird in the hand. Instructions for measuring live birds are provided in the introductory chapters. "Be gentle" is such considerate advice! Each species is given an individual number (total 1192) by which it is referred to in the captions for the plates. The book is remarkably free of typographical errors or misspellings. It may be mentioned in passing that No. 434 should be *Cypsiurus balasiensis*, the original spelling, instead of *batasiensis*, the emended name now in use. The use of scientific names is probably the most modern of any field guide or checklist and it was a relief to find no antiquated nomenclature. Most changes in generic names are the result of recent taxonomic findings. Thus *Picoides* replaces *Dendrocopos*; *Carduelis thibetanus* becomes *Serinus t.*, etc. This policy brings at least one unfamiliar name, *Rhaphidura*, heretofore *Chaetura* (*leucopygialis*). By the same token we may wonder, for example, why *Limnocryptes*, *Ketupa*, *Xenus*, and a few others have not been replaced by *Gallinago*, *Bubo*, and *Tringa* as seems to be the trend. The taxonomic limits of the species are happily handled. I should take exception to the inclusion of *Otus sunia* within *O. scops*, the voices of these two taxa being so utterly dissimilar.

I agree entirely with the authors' view that English names should be unified and that better names be introduced while few people are yet familiar with them. More than two pages are devoted to this topic in order to explain the procedure adopted in choosing an adequate name. Theirs seems to be a very thoughtful exposition of this touchy subject. Although the authors claim to be conservative in their approach, they have made some rather bold, but rightful, innovations. A minor objection is the use of "needletail" for a genus of swifts, the character alluded to being inconspicuous.

Maps of the area covered are presented on the end papers. The geographical divisions within the countries are fortunate. I appreciate the retention of the familiar former divisions in Vietnam of "Tonkin," "Annam" etc. The recent nascence of Bangladesh has been noted, as the name appears in the introduction, though "East Pakistan" still crops up here and there in the main text, and on p. 16 the name "West Pakistan" is mentioned next to Bangladesh. Apparently "Assam" is used in its old concept, when it included what are now several states of north-eastern India, whereas today the province of Assam is restricted to the plains of the Brahmaputra. A useful feature would have been the addition of distribution maps. Those of us who have been spoiled with an abundance of field guides including such maps have come to consider them as the best eliminating character in a guide and a most instructive feature. I calculate that a small map for most species treated would have added about 60 pages. Their usefulness would have compensated amply for the extra bulk.

The color plates, half-tones, and line drawings are excellent and generally accurate; when not so, a corrective note is added to the caption facing the plate. These captions also carry the scientific names, a practical feature. The crowding of more than 20 birds on one plate does not diminish the usefulness of the book as a guide. The tired Adjutant Stork on pl. 2 adds an amusing touch. Each salient character aiding in identification is shown by an arrow (the "Peterson system"). It might be noted that prinias (pl. 54) usually carry their tail upward. On pl. 56 all flycatchers are given a rather upright stance, while the blue robins (pl. 50) are shown in a more horizontal posture; but in nature a number of the flycatchers inhabiting under-

growth are similar in habits to the blue robins. Neverthless it is a pleasure to see so many species depicted together in one handy volume. The artist as well as the two authors have had several years of field experience in south-eastern Asia. Their collaboration has produced a truly fine guide in which every detail is given careful attention.

The above criticisms, by their sheer smallness, only serve to emphasize the high quality of the book. Although it is expensive as compared to North American or European guides, the contents make it well worth the price. I highly recommend this guide to any field observer or bird bander concerned with the avifauna of Asia as a whole. To the museum ornithologist as well, the book should prove an indispensable source of information. It is sad that it should appear at a time when, one by one, the countries of South-East Asia are closing their doors to the western travelers and scientists.—MICHEL DESFAYES.

American sportsmen and the origins of conservation.—J. F. Reiger. 1975. New York, Winchester Press. 316 pp. $10.00.—The relationship of this book to ornithology is so indirect that the work barely merits a review on these pages. In a rather subtle way, however, the book may have a considerable effect on at least one aspect of ornithology, that involving scientific collecting. In essence, the volume is an entry in the hunting versus antihunting controversy, by a historian who is a sportsman. A challenge to antihunting preservationists, the premise is that sportsmen (those who hunt and fish for pleasure rather than for food or profit), and not preservationists, were the founders of conservation concepts in the United States. The implied conclusion is that modern hunting and fishing are valid, conservation-oriented activities. The proof of the thesis depends on demonstrating that those persons who led the conservation movement were in fact sportsmen, as defined, rather than fitting any other categorization, and that only those who fit the definition were effective. The method is to detail both the sporting proclivities and conservation efforts of leaders in the movement and to ignore or belittle other activities of those persons and other persons not considered sportsmen. Although effective in making a point, the technique suffers from the difficulties inherent in any one-character classification.

The book might as correctly have been entitled "George Bird Grinnell and the origins of American conservation." It is a rather detailed analysis of Grinnell's philosophy and activities and the effect of his influence on Theodore Roosevelt, in whose presidency the conservation movement gained considerable momentum. In some ways this book is a sequel to the author's earlier "The Passing of the Great West" (Winchester Press, 1972), which presented Grinnell's early life. The latter book is better reading than the present one, and seems to give a more well-rounded picture of Grinnell. I recommend it to those who wonder what field ornithology was like a century ago.

My hangup with the present book results from the author's need to make the "sportsman" image of his heroes supreme, even to the point of denigrating other aspects of their careers and lives. If a person made a contribution to the cause, it was because he was a sportsman, whatever else he may have been. If he happened also to be a scientist, which before 1900 routinely involved collecting animals for study, his collecting was a camouflage for his love of hunting. The terms scientist and scientific collecting are invariably placed in quotation marks—the kind of quotes that mean "so-called." An example from page 65: "Although it may be difficult for some to accept, the great majority of the 'ornithologists' who crusaded against bird

destruction for millinery were sportsmen before and after they attained 'scientist' status."

The adverse potential of this book on scientific ornithology is embodied in this linkage of the collecting of specimen material for scientific purposes, and sport hunting (and incidentally, the potential bears on our sister sciences as well). On page 66, Reiger states: "Because the ornithologist's chief tool was the shotgun, he often used the same techniques and experienced the same feelings as the sportsman." As noted above, the book is a challenge to preservationists who are opposed to hunting; they will easily be able to undercut Reiger's efforts by picking at the book's many weak points. Although the rebuttal may be directed at Reiger, the repercussions will be felt by modern sportsmen and by others whom he has effectively tarred with the same brush.—RICHARD C. BANKS

Sex and Evolution.—George C. Williams. 1975. Monographs in Population Biology No. 8. Princeton, Princeton Univ. Press. x + 200 pp. Cloth. $13.50; paper $4.95.—Sex is more than a topic of idle barroom discourse. Evolutionists and theoretical biologists have pondered the evolution and adaptiveness of sex for decades, and George Williams' treatment is the most scholarly to date. At the outset he suggests that the emphasis upon sexual rather than asexual reproduction among higher organisms is inconsistent with current evolutionary theory. Modifications of that theory are thus called for, and most of the book is devoted to the development of logical models which, in the end, supply partial adaptive explanations for sexuality, at least in some kinds of organisms.

The basic paradox of sexual reproduction is its persistence and predominance in so many evolutionary lineages despite the considerable cost it incurs through dilution of the genetic contributions of individuals to subsequent generations. Sexual forms produce haploid gametes through meiosis, and thus only half of an individual's genes will be represented in its offspring. An individual that reproduces asexually produces carbon copies of itself, so *all* of its genes are represented in each of its offspring. Sexual reproduction then must confer some other advantages to counter the 50% disadvantage of the cost of meiosis. A given investment in sexual reproduction, for example, should have at least twice the profit in offspring as the same investment in asexual reproduction in order to balance the cost of meiosis and be favored by selection. Williams' task, then, is to find the substantial selective benefits that sexual reproduction must confer.

The key to the solution is environmental variability. If between-generation variations in environmental factors influencing fitness are frequent, selection will favor individuals whose offspring exhibit variability. Sexual reproduction, through recombination, produces variable offspring, while asexual reproduction, except as a result of mutation, does not. Williams considers several verbal models of life history strategies in the context of such conditions of intense and variable selection. Most relate to "high-fecundity" organisms such as oysters, elm trees, corals, cod, and the like. Williams presents a thoughtful treatment of both theory and evidence from such high-fecundity forms. Here arguments favoring the evolution of sexuality have considerable merit; through the production of vast quantities of offspring, spanning a wide range of genotypic and phenotypic expressions, such forms can sustain the intense selection necessary for the advantages of sex to outweigh the costs of meiosis.

Williams' explanation for the persistence of sex in organisms with low fecundities, such as birds, mammals, and many insects, is not convincing. In these organisms,

reproductive output per generation is so low that sufficient numbers of differing offspring are not available to compensate for the inherent disadvantages of sexuality. Williams maintains that sexual reproduction must thus be consistently selected against, but because such forms are presumably derived from high-fecundity lineages in which sexuality completely replaced asexual reproduction, the option of reverting to the more profitable asexual mode is not generally available. Higher vertebrates are thus sexual not because that is "best," but because they have no alternative.

Williams is apparently driven to this conclusion because he does not believe that the offspring of low-fecundity organisms might often be exposed to a wide variety of complexes of selective factors quite different than those which their parents experienced (i.e., a variation in selective intensities sufficient to overcome the 50% cost of meiosis). But we really have little notion of how frequently and how severely the environments of higher vertebrates (and a lot of insects) vary, in terms of components actually meaningful to the organisms themselves. Simple logical or mathematical models that consider variations in one or two environmental features may provide comforting explanations of sexuality in high-fecundity forms. There, between-generation selection *is* frequently quite intense, and often relates closely to obvious variations in physical or chemical features of the environment. In low-fecundity forms, however, fitness may be determined by a somewhat more subtle complex of environmental variables. Environmental variations may thus involve a wide array of rather indistinct features, and fluctuations on time scales several generations in length may be important. Here simple models fail, and Williams' treatment becomes correspondingly shallow. It seems likely to me that a proper understanding of the variability of environments of low-fecundity organisms may lend support to the same explanation for sexuality that Williams champions for high-fecundity forms. Sex produces a variety of offspring, and this is adaptive when the environmental settings for those offspring are variable and uncertain.

Despite this shortcoming, *Sex and Evolution* is a worthwhile book. While it doesn't really provide many answers, it does pose a variety of thoughtful and interesting questions. Unlike most of the volumes in this series, this contains few equations (I noted only two!). Williams' prose makes delightful reading (although its easy flow may draw the unwary reader into an uncritical acceptance of too many of his ideas). Direct references to birds are few, but the book is nonetheless important reading for serious avian biologists. After all, Williams experiences his greatest difficulties in explaining the adaptiveness of sex in organisms like birds, so the greatest contributions to unravelling the puzzle are perhaps to be made there.—JOHN A. WIENS.

Birds of the Antarctic and Subantarctic.—George E. Watson. 1975. Washington, D. C., American Geophysical Union. xvii + 350 pp, 11 color plates, many black-and-white drawings, maps. $15.00—Although a field guide in size and format, George Watson's new book on antarctic birds is actually a far more comprehensive work. Its scope rivals that of R. C. Murphy's "Oceanic birds of South America." It outlines the biology of the species that inhabit the antarctic region, summarizes ornithological studies to date, points out the work remaining—and is besides an excellent and readable guidebook to the lands and waters below 55°S.

The first section provides a general introduction to the birdlife and avian adaptations in extreme environments, but is largely devoted to those aspects of the physical environment—climate, currents, convergences, ice, terrestrial and aquatic environments—that influence the distribution of life near the pole. Since the book is intended for a broad spectrum of readers, including the many nonzoologists who are a

major untapped resource of information on the Antarctic, Watson includes a brief section on how to identify birds, make censuses at sea, and salvage specimens that may fly aboard ship. The importance of preserving an ecologically sound region is stressed, accordingly those articles of the Antarctic Treaty that deal with the preservation and conservation of wildlife are included.

The major portion of the book is devoted to species accounts. For each species, information on identification, flight and habits, voice and display, food, reproduction, arrival, eggs, hatching, fledging and departure, molt, predation and mortality, ectoparasites, habitat, and distribution is included. This is far more than one would expect in a field guide, and perhaps more than most birders or Lindblad tourists would care to know. But this book is not merely a field guide; it is a capsule of current knowledge, valuable to the field workers as well as to armchair ornithologists inclined to visit the region vicariously. Distribution maps presented for each species are essentially simplified versions of those published elsewhere (Watson et al., 1971, Birds of the Antarctic and Subantarctic, American Geographical Society) modified in light of more current studies. These simplifications are quite reasonable, although occasional inaccuracies appear. For example, the Yellow-nosed Albatross is shown to occupy subantarctic waters off eastern South America, whereas it is clearly a species of the subtropical zone.

The illustrations by Bob Hines are pleasing and accurate for the most part. The color plates will be of particular interest to seabird enthusiasts, as they depict species that are usually shown only in black and white. Unfortunately, many of the plates are overcrowded and the individual illustrations so small that field marks are sometimes obscured. Nonspecialists should be able to identify most species by reference to the plates alone, but even trained observers will find it difficult to identify the dabbling ducks or the Gray-backed Storm-Petrels. And as for the prions and diving-petrels, which present perennial problems in taxonomy, the combination of text and plates will not permit all birds to be identified with confidence—even in the hand. I was disappointed that the plumage characters that distinguish the Brown and South Polar skuas were not shown clearly. Ironically, the best and most useful plate (11) is not of seabirds but of the endemic land birds that have evolved on remote southern islands.

Black-and-white sketches scattered through the book illustrate the vagrants that have been recorded. These are attractive and may be useful to experienced workers, but will not allow novices to identify waterfowl and shorebirds with any confidence.

The third section, Geographic Accounts, is especially useful. It presents brief but extremely interesting descriptions of the antarctic and subantarctic islands, with information on the "appearance, location, physical environment, climate, vegetation, exploration and present status of knowledge of birdlife." This summation is not only a baseline but a stimulus for further studies. For example, we learn that the Shag Rocks (west of South Georgia) have never been adequately surveyed—and probably cannot be landed on; that no ornithologist has yet visited Scott Island; that data on the Balleny Islands need amplification. If you are curious about why Gough Island, for example, is so named you can find out. And if the overcritical reader discerns that Bouvetya was explored by scientists prior to its discovery, it only heightens the fascination of this region. Two major tables summarize bird lists for the major islands and the at-sea distributional patterns of birds in various sectors of the cold seas.

Watson has kept the reader in mind. In addition to providing an impressive list of references, he has usefully categorized them by taxonomic groups, geographic lo-

calities, and speciality studies, etc., so that students can go directly to the pertinent literature.

Because they have delighted seafarers of all nations, seabirds have acquired a fantastic variety of common names. These, including entries in English, French, and Spanish, are given in an appendix.

For my own research in South America, I have always taken along two volumes of Murphy, hoping that they would survive one more round of pitching cabins and leaky decks. Next trip, I shall leave these cumbersome, valuable volumes at home and bring Watson's guide instead. Like Murphy, it is a book you can read for pleasure as well as profit, and I cannot imagine anyone interested in seabirds or the Antarctic who would chose to be without it. It may not help you identify everything you see, but it will prove a valued and enjoyable companion.—J. R. JEHL, JR.

Die Vogelarten der Erde.—Hans E. Wolters. 1975. Hamburg and Berlin, Verlag Paul Parey. 80 pp. (1st Lieferung). 38DM; **Checklist of the World's Birds.**—Edward S. Gruson. 1976. New York, Quadrangle. 212 pp. $10.95.—Yet two more check-lists of the birds of the world must be added to the four already published (see the review by K. C. Parkes, Auk 92: 818–830, 1975). One, the Gruson volume is very similar to lists already available; the other, Wolters', is quite different from those discussed by Parkes and may fill a need not easily met by the available lists.

"*Die Vogelarten der Erde*," of which only the first Lieferung is available, is based upon an analysis of avian classification by Wolters; it is not a simple summary of the information in Peters and other sources. Wolters recognizes 50 orders, the limits of which and sequence are closer to Stresemann's sequence (Auk 76: 269–280, 1959) than to the Wetmore's or Peters' sequence. Moreover, Wolters accepts the phylogenetic approach to classification as advocated by Hennig and hopes in this check-list to demonstrate a practical application of phylogenetic systematics to a whole class of vertebrates. Wolters also provides more information than in the earlier lists, giving author and year for each genus and species, German and English names for each species, range, and a list of some of the subspecies. The latter is valuable because it includes the names of many well known allopatric species which are merged in recent lists without any indication of what happened to the name. Unfortunately, the decisions are those of Wolters presented without reasons or references to the literature. A bibliography will be presented in later Lieferungen, but no citations are presented in the main body of the list.

A major consequence of the use of phylogenetic classification is an oversplit classification, but mainly on the generic and subgeneric levels. Many well known large genera such as *Falco*, *Larus*, *Charadrius*, and *Sterna* are broken up into numerous genera and subgenera. If a name is available, it is used, but Wolters avoids the coining of new names that are all on the subgeneric level. However, the demands of phylogenetic systematics are not consistently applied to the supergeneric levels as the genera, subfamilies, families and orders are not grouped together as monophyletic sister groups—that is, the arrangement is clearly not a dichotomous hierarchy. Regardless of whether the presented classification is a good reflection of phylogenetic systematics, the overly split classification at the generic and subgeneric levels will make this list less useful to many ornithologists and difficult to use because of the many unfamiliar names.

Gruson's volume is by an amateur ornithologist and is designed for those desiring a list for "ticking." He provides a source for each species that is a regional book as well as a code to the general zoogeographic distribution. Unfortunately he does not

refer to the authority followed for any taxonomic decision and is not clear on whether extinct species are included. He lists species within a genus alphabetically, which is really unnecessary because of the small number of genera with 10 (or even 5) or more species. Accuracy is equivalent to that of earlier lists (e.g. that of Clements; see Parkes' review).

Gruson's work is similar in purpose and scope to the Edwards and the Clements lists. As such, I would second Parkes' recommendation that the Edwards book may be best for the needs of most bird watchers.

The greatest disadvantage of Wolter's list is its extremely high price. This Lieferung of 80 pages is 38DM (about $15.00; the subscription price); hence the entire volume of 7 Lieferungen of 560 pages would be 276 DM or about $110.00 which is half the cost of the complete "Peters Check-list." Price alone will place Wolters' volume out of the reach of most individual ornithologists and even libraries. Most ornithologists, bird watchers, zoo keepers, law enforcement agents, and others requiring a list of birds of the world will find one of the previously published lists more suitable for their needs. Unfortunately the cost of "*Die Vogelarten der Erde*" will keep it out of the hands of many systematic ornithologists and out of the review and discussion it merits.—WALTER J. BOCK.

ALSO RECEIVED

The birds of Nottinghamshire.—Austen Dobbs (Ed.). 1975. North Pomfret, Vermont, David & Charles Inc. 226 pp., 16 pls., 11 drawings, 12 maps & diagrams. Cloth. $17.00.—If the author had subtitled this book "Birds of Robin Hood Country" he might have had a best seller for the younger set. As the book now stands it is a very nice study of a very small part of the small British Isles. The most intriguing part of the book to me was the place names that have remained unchanged since 1100 when the real Robin Hood ruled in Sherwood Forest. I have a small book entitled "The truth about Robin Hood," by P. Valentine Harris which tells about all the sources of the legend. It is extremely interesting that in comparing it to my childhood copy of Robin Hood and the maps and text in the present "The birds of Nottinghamshire" I find that the only change in England is the loss of forests. Robin Hood can not be blamed for the changes in the bird life as he and his Merry Men sustained themselves on the king's deer and not the birds.—ELIZABETH S. AUSTIN.

Penguins. Past and present, here and there.—George Gaylord Simpson. 1976. New Haven, Yale University Press. xi + 150 pp. $10.00.—It may appear strange to have a book on penguins written by Simpson who is known to us as a mammalian paleontologist and student of evolutionary theory. But not strange at all for a person who has been interested in these birds since 1933 when he made the largest single collection of fossil penguin bones ever found and who has written a dozen papers on fossil penguins since 1946. "Penguins" is a popular, charmingly and clearly written book that presents an informative overview of living and fossil penguins. A selected bibliography provides a guide to the literature and to the extensive information on the detailed adaptations of these birds to their aquatic, polar environment. The book is well illustrated with black-and-white and color photographs, including a comparative figure of heads to show the recognization marks of all species; one erratum was noted—the photographs in Figures 7 and 8 have been transposed. For me, one of the most interesting discussions in "Penguins"

was the origin of the name. Simpson points out, in contrast to the general belief, that the name penguin was first applied to the Great Auk, citing a letter written by Parkhurst dated 13 November 1578 on a voyage to Newfoundland. In an account of Thomas Candish's voyage around the world in 1586–88, Francis Petty, without explanation, starts to call the "goose-like foule" of the southern oceans "pengwins" which was quickly adopted in English and spread to other European languages. Thus, the original use of *Pinguinus* as the generic name for the Great Auk, and the title of Anatole France's book "Ile au Pingouins" are not misnomers. Simpson's "Penguins" is recommended to all ornithologists, but especially to amateurs as an excellent introduction to the biology of a fascinating group of birds.—WALTER J. BOCK.

The titmice of the British Isles.—John A. G. Barnes. 1975. North Pomfret, Vermont, David & Charles Inc. 212 pp., 12 pls. Cloth. $13.95.—This well-presented survey of the titmice family as represented in the British Isles will be of interest to no one but a specialist in titmice or a resident of the British Isles. I was interested in the references because they so thoroughly ignored the world population of titmice. In the chapter entitled "Individuality and intelligence" I was amazed to find no reference whatsoever to the trained titmice of the Orient.—ELIZABETH S. AUSTIN.

NOTES AND NEWS

Timely creaks from the editor's uneasy chair.—With next January's issue (Vol. 94, No. 1), and with the Council's full approval, I am giving the venerable Auk a face-lifting that is more or less imposed on us by economic necessity. The new trim size will be 6⅞ × 10", and the new type bed will be 30 × 48 picas, with 2 more picas for running heads. This will give us about 600 words to the page instead of 500 as previously and will cut down on the number of pages needed for the same amount of material. Best of all, the change should save us at least $1000 per volume in printing costs and considerably more in postage as each number will weigh less.

The cover will be on the same yellow paper, with the Fuertes Auk slightly enlarged photographically. Type faces and sizes will remain the same, as will running heads and subheads. The only change in format will be running an introductory abstract in 8-point instead of the former final summary in 10-point.

As before, each paper received will normally be submitted for evaluation to at least two reviewers competent in its particular discipline and will be assigned a priority date when judged acceptable by the reviewers and the Editor. Articles are usually published in sequence by date of acceptance with occasional exceptions for timeliness or expedience. Articles are published without charge up to 12 printed pages, above which authors are assessed at current costs—presently $60 per page.

At present we expect to be able to finance publishing about 750 pages annually in the new format. With our growing backlog the time lag from acceptance to appearance in Auk is now running 16–20 months. Authors willing to pay full page costs will have their articles published in the next issue following the article's routine editorial processing. Such pages are added to our 750-page quota and do not delay the appearance of unsubsidized papers.

Vol. 94 will be my tenth Auk and my swan song as your Editor. I have enough material edited and ready for the printer for January, April, and July 1977, and more