

REVIEWS

EDITED BY M. ROSS LEIN

The following reviews express the opinions of the individual reviewers regarding the strengths, weaknesses, and value of the books they review. As such, they are subjective evaluations and do not necessarily reflect the opinions of the editors or any official policy of the A.O.U.—Eds.

Cladistic biogeography.—C. J. Humphries and L. R. Parenti. 1986. Oxford, Clarendon Press, Oxford Univ. Press (Oxford Monogr. Biogeogr. No. 2). xii + 98 pp. ISBN 0-19-854576-2. \$35.00.—Biogeography has occupied a central position in systematic and evolutionary biology since long before Darwin. The importance of biogeography is to some degree the result of its domain of inquiry, which spans the scale of earthly space and time, from the level of continental biotas with vast temporal extension to populations isolated only recently. In either case, it is clear that biologists will not understand historical patterns and processes—the evolution of biotas to the origin of species—without consideration of the subject matter of biogeography.

Any objective analysis of intellectual trends within 20th-century historical biogeography will recognize a conceptual tradition that runs from Darwin and Wallace, through W. D. Matthew, to the more contemporary writings of Darlington, Simpson, Mayr, and numerous other plant and animal biogeographers. That tradition, called narrative biogeography by Ball (1976, *Syst. Zool.* 24: 407–430), has as its central postulate the hypothesis that biogeographic patterns, irrespective of scale, can be explained by processes of long-distance dispersal from centers of origin. The best-known examples include Darlington's attempt to explain the origin of continental biotas in terms of pervasive intercontinental dispersals from the Old World tropics and Mayr's long-time advocacy of peripheral isolation of small founder populations (peripatric speciation) as the predominate mode of species' origins. Thus, at both ends of a spatiotemporal scale, long-distance dispersal across preexisting barriers, whether they be physiographic or ecological, is considered the underlying process that shaped biogeographic patterns.

For the last two decades this narrative, dispersalist paradigm has been eroding. As Ball noted, the introduction of cladistic analysis into systematics established a new analytical phase in historical biogeography (lest readers have doubts, let them tabulate the number of precisely stated phylogenetic hypotheses used by the leaders of the dispersalist school in their practice of biogeography). At first there was a marriage between the old and the new: hypotheses about centers of origin and pathways of dispersal were proposed in terms of specific phylogenetic hypotheses. Over the past decade, however, the discipline of vicariance biogeography emerged in which congruent spatial patterns (as revealed by cladistic analysis) were

explained in terms of vicariance, or disruption, of preexisting ancestral biotas by historically younger vicariant events. Dispersal remains an important process, but analyzed within the context of a vicariance pattern, it leads either to cosmopolitanism or to "distributional noise," rather than to the establishment of a complex pattern of biogeographic relationships.

"Cladistic Biogeography," although a small book, concisely reviews this history of biogeographic thinking and sets out the principles and methods of vicariance biogeography. It is designed to be a general introduction to the field, and therein lies its strengths and weaknesses.

There are only four chapters. The first presents a historical review of biogeography up to and including the contributions of the late Leon Croizat. Chapter 2 summarizes briefly cladistic methodology and its incorporation into biogeography. The chapter then describes the content of the papers by Donn Rosen, Gareth Nelson, and Norman Platnick (all published in *Systematic Zoology* between 1976 and 1978) that established the theoretical basis for vicariance biogeography. In Chapter 3 the authors extend theory to the real world and consider examples in which biogeographic patterns among taxa are both congruent and incongruent. They explore various alternative explanations for these results and discuss the relationship between the biological area-cladogram (as revealed by congruence in the cladistic relationships of taxa with representatives endemic in the same area) and the geological area-cladogram (as revealed by our knowledge of historical geology) for those same areas. In the last chapter the authors attempt to demonstrate the power of vicariance biogeography by tackling one of the classic problems of historical biogeography: the origin of the austral biotas of the Northern and Southern Hemispheres.

In terms of the goals set by the authors, the book is successful. It provides an excellent introductory-level treatise on vicariance biogeography and can be recommended highly to a wide audience of student and professional biologists and geologists who wish to discover what vicariance biogeography is about. Because the book summarizes much of the important primary literature, it should be a welcome supplement to courses on biogeography.

The book is not without shortcomings. It breaks little new ground in terms of theory or methodology, being content merely to integrate the work of others. This will be disappointing to readers whose interests are in systematics and biogeography and who are

already familiar with the primary literature. Compared with the long history of the dispersalist tradition, vicariance biogeography is in its infancy. Unresolved methodological problems remain. For example, Humphries and Parenti present an excellent summary of component analysis, which was proposed by Nelson and Platnick to compare cladograms for congruence. Component analysis, however, attempts to resolve conflicts by summarizing all area relationships into a single area-cladogram that depicts all shared historical area components. The method is designed to produce a single, simple pattern. This clearly is valuable but is inadequate as a method if we wish to assume that the different area-cladograms are themselves accurate windows of history (as we would conclude if each pattern were congruent across different taxa). In this case, we want a *more general* hypothesis that accounts for the conflicts themselves. In fact, it is virtually certain that any large biota will have many taxa that share a number of different patterns for its areas of endemism. In these cases, component analysis would tend to mask the very complexity we need to explain. Because areas have reticulate, as well as vicariant, relationships to one another, resolution of historical patterns will require methods of analysis not currently available in component analysis.

Other pertinent methodological aspects of vicariance biogeography are also missing from this volume. There is little mention of the concept of endemism and how areas of endemism are delimited using distributional congruence. Similarly, the authors do not discuss in detail how vicariance biogeography might be used to understand the role and relative importance of long-distance dispersal.

Darwin, of course, used biogeography as evidence for descent with modification. It is becoming clear that vicariance biogeography opens a wide, innovative door to the analysis of evolutionary pattern and process at the level of differentiating populations. The dispersalist paradigm has dominated our thinking in this area, and some of our most cherished notions—that speciation is primarily via founder events, for instance—need reevaluation. Vicariance biogeography can help provide this, but unfortunately such matters are left unexplored in this volume.

In summary, this book is a welcome addition to the literature of biogeography. It is the best summary of the latest advances in the field and as such provides an appropriate starting point for those interested in gaining an understanding of the significance of vicariance biogeography.—JOEL CRACRAFT.

Handbuch der Vögel der Sowjetunion. [Vol. 1, History of exploration. Gaviiformes, Podicipediformes, Procellariiformes.]—V. D. Ilichev and V. E.

Flint (Eds.). 1985. Translated from Russian (Ptitsi SSSR, 1982, Moscow, Nauka) by B. Stephan, E. Stephan, and D. Wallschläger. Wittenberg Lutherstadt, A. Ziemsen Verlag. 350 pp., 8 color plates, 67 line drawings, maps. DM 78.00.—The publication of this book was mandated by the Soviet Academy of Sciences, the Soviet Scientific Council for "Biological Foundations of the Exploration, Conservation, and Protection of the Fauna," and the A. N. Severtsov Institute of Evolutionary Morphology and Ecology of Animals.

Frequently, ornithologists are separated from their foreign counterparts by various language barriers. Fewer still can read Russian, with its Cyrillic alphabet. During the last half-century efforts have been made to bridge this gap through sporadic and spurious Russian efforts to publish in one of the western "congress languages," and later through English translations of Russian works published in the United States. The first modern comprehensive faunal work of the USSR was translated into English in Israel in 1966–1968 (G. P. Dementiev and N. A. Gladkov, Eds., 1951–1955, *Birds of the Soviet Union*, vols. 1–6). More recently, to the great pleasure of an increasing number of tourists visiting the USSR, an authentic and up-to-date "Field Guide to Birds of the USSR" (V. E. Flint, R. L. Boehme, Y. V. Kostin, and A. A. Kuznetsov, 1968, in Russian) appeared in an English translation in 1984 (reviewed in *Auk* 102: 240). The Russian original of the subject of this review appeared in 1982; I have the 1985 German translation before me now.

The size and format are roughly the same as the original. The paper quality is better in the German edition: thicker and whiter. Although the German text is a true translation of the Russian, it was printed in two columns and thus saved space. The original text is almost half again as long as the German. The color plates illustrate members of the fauna treated in this volume as well as eggs of the breeding species. These are the same plates as in the Russian original, with fine artwork by the late Y. V. Kostin. They are, however, much better printed. In the Russian version the head of the Arctic Loon has a yellow shifting, the immature Red-necked Grebe has a light-violet flank, and the dark phase of the Fulmar is a dusky violet color. These color aberrations are corrected in the German edition, and the printing is sharper; the eyes of birds, including their colors, are clearly visible, as are the patterns on the eggs. The treatment of the checklist items is accompanied by line drawings of diagnostic body parts or behavioral stances. Each species description is accompanied by one or several distribution maps. This was a pioneering effort in the early 1950's by Dementiev and Gladkov, but today is essential for all faunal works and identification guides. I compared the maps in Dementiev and Gladkov, Flint et al., and the present treatise and noted great improvements over the first, and more accuracy in the Ilichev and Flint volume than in the maps in the Flint et al. guide.

The German edition mostly uses maps from the 1982 Russian edition, but the black-and-white maps were redrawn so that the distribution symbols and the area hatchings are rendered in a green color that enhances the readability of the maps, even though some are reduced by half. Some maps in the German book differ from the earlier Russian edition, apparently incorporating newly available data (e.g. see the map of *Podiceps nigricollis* on p. 249 in the German edition). Maps in "The Birds of the Western Palearctic" (S. Cramp and K. E. L. Simmons, Eds., vol. 1, 1977), rendered in black, gray, and red, are far superior to any of those in the Russian works. However, the world distribution maps are much better in Ilichev and Flint than in Cramp and Simmons, though the later work obviously used much of Cramp and Simmons's data. As one would expect, distribution limits in the European part of the USSR appear to be more accurate, or at least more detailed, in Ilichev and Flint than in the British work. I also compared the distribution maps of the breeding species treated in this volume with those in C. Harrison ("An Atlas of the Birds of the Western Palearctic," 1982, Princeton, New Jersey, Princeton Univ. Press) and found that Ilichev and Flint's maps are more accurate, even for eastern and northern Europe in general.

Ilichev and Flint treat all species of Gaviiformes, Podicipediformes, and Procellariiformes that occur in the Soviet Union. This descriptive part of the book covers the usual headings of monographic treatment of species: nomenclature, status, description, field marks, coloration and other structural characteristics, measurements, molt, subspecification, systematic notes, distribution, breeding range, wintering, migration, habitat, abundance, breeding behavior, nest, eggs, clutch size, incubation, breeding success, circadian activity, behavior, food, enemies, economic value, and protection. I compared species descriptions with Cramp and Simmons, and the "Handbook of North American Birds" (R. S. Palmer, Ed., 1962/1976, New Haven, Connecticut, Yale Univ. Press) and found similar coverage in the three books, but the British and American volumes each has a detailed heading for voice whereas the Russian book provides only generalities of vocalizations among the field marks. On the other hand, Ilichev and Flint's treatise covers such items as economic value, enemies, and protection. It is understandable that these lack coverage in the Palearctic Handbook, but they are missed in the otherwise more detailed treatment by Palmer.

Although the above evaluates the last 130 pages of the book, I purposefully treated that section first because it will be continued in future volumes, and will characterize the work on the avifauna of the Soviet Union in comparison with similar treatments of other continents. As far as I can judge, the authors/editors have successfully presented up-to-date information concerning the avifauna of a vast part of the world. A comparison of the distribution data available be-

tween the 1982 and 1985 editions points toward continuing scrutiny and inclusion of new knowledge as it becomes available. The two-thirds of the text that precedes the faunal handbook is unique, and merits a different kind of evaluation.

From page 15 to 20, the history of ornithology in the Soviet Union is sketched in broad outline. Early Russian ornithology dates to the expeditions of P. S. Pallas, from 1768 to 1774. His work, and that of I. I. Lepechin, G. S. Gmelin, and others, culminated in Pallas's "Zoographia Rosso-Asiatica" published between 1811 and 1835. These names are familiar as authors of species descriptions of birds also occurring in North America. From the mid-19th century M. A. Menzbir, N. M. Przevalskii, N. A. Severtsov, G. Radde, T. Pleske, and S. A. Buturlin were outstanding personalities in Russian ornithofaunistics. A. F. Midden-dorff's somewhat earlier Siberian work even included aspects that we would consider ecological. Menzbir published a handbook of Russian birds in 1893-1895. This handbook and the faunistic studies by his students, foremost those of N. A. Zarudnyj and P. P. Sushkin, characterize the "Menzbirian period" of Russian ornithology, which lasted into the second decade of this century. We are familiar with the works and names of outstanding faunists and ornithogeographers of the following generation: the late G. P. Dementiev, E. V. Kozlova, L. A. Portenko, and B. Stegmann, and others still alive and active.

The concise historical background is followed by 153 pages of detailed history of ornithofaunistics, divided into 36 chapters by the gross geographic regions of the USSR. These chapters describe in detail the faunistic exploration and even the lack of exploration in every corner of the Soviet Union. Last, 16 pages list some 440 books and papers, sorted by time periods, principally from 1850 to 1984 (!), including the Russian title and its German translation for each publication. This is an indispensable faunistic bibliography for students of palearctic or general zoogeography and for those specializing in the avian geography of the Soviet Union.

This immense territory, acquired piecemeal through the Russian equivalent of "Drang nach Osten" ("press eastward"), is unevenly explored even today. It is therefore important for a centralized administration, such as that presently governing Soviet Eurasia, to present a candid evaluation of the avifaunistic knowledge of the area. Such an effort is also important for nature conservation, which has become a centrally directed and enhanced movement within the Soviet Union. One chapter in this book, between the historical narrative and the avifaunal descriptions, is devoted to the "Status of the avifaunistic exploration of the Soviet avifauna." Because of the unique nature of this evaluation I will review it here in detail.

The system was invented and used by I. A. Dolgushin (1960) in a monograph on the bird fauna of Kazakhstan. Ilichev and Flint applied it to the entire

territory of the Soviet Union. Because the state of exploration varies widely both quantitatively and qualitatively, several approaches were used for scoring. Each criterion in the evaluation was scored 0-4; there are 10 criteria, for a maximum score of 40. The criteria are grouped into 4 large categories, viz. Degree of faunal exploration, Completeness of faunistic knowledge of the area, Data on abundance and ecology of the species, and Completeness and quality of avifaunistic publications. For the study the territory of the Soviet Union was divided into 90 natural area units based on size, distinctness, and information available. A map of the districts is printed on the endpapers. Additional maps in the text summarize the general state of avifaunistic knowledge, completeness of species occurrence, completeness in terms of faunistic publications, and currency of the existing knowledge. Closest to a full score come the three northwesternmost districts (Karelia, the Leningrad area of Russia, and Estonia and Latvia of the Baltic coast). One territory, the plateau west of the lower Lena River in north-central Siberia, is totally unexplored (score of zero).

This district-by-district historic review, and the geographically based evaluation of avifaunistic research, raise the work of Ilichev and Flint above the level of the standard faunistic monographs.

Nearctic ornithologists should enjoy this volume. It is true that much of our avifauna is better explored than the one treated here. It is also true that atlas surveys have been started, and are mushrooming in many parts of our continent. But we lack an assessment such as the one sketched above! We lack a comprehensive overview of the state of exploration in any of our states or provinces. We have no idea how much, or rather how little, is known of population trends except for game species or species obviously threatened. We also lack detailed faunistic-phenological data for our avifauna. For example, when does the Lark Sparrow arrive or depart in Louisiana, Arkansas, Missouri, Iowa, Minnesota, or Manitoba? When does the Fulvous Whistling Duck molt in California? In Texas?

The German edition, which makes the Soviet fauna work available for a wider readership, is a first-class and exemplary undertaking that every ornithologist with an international scope of interests should use. Also, I learned from Professor Ilichev in June 1986 that his second volume (in Russian) is almost off the press!—MIKLOS D. F. UDVARDY.

Guía de campo de las aves de Chile.—Braulio Araya M. and Guillermo Millie H. 1986. Santiago, Chile, Editorial Universitaria. 389 pp., 173 pp. with unnumbered line drawings of birds. No price given. **Aves de Tierra del Fuego y Cabo de Hornos.**—Ricardo

Clark. 1986. Buenos Aires, Argentina, Literature of Latin America. 294 pp., line drawings on 121 pp., 1 map, 1 field checklist. ISBN 950-9725-00-5. Available from L.O.L.A. Bookstore, Viamonte 976, 2°D, Buenos Aires, Argentina. 20.50 Australes (about \$18). **Aves de Patagonia y Tierra del Fuego Chileno-Argentina.**—Claudio Venegas C. 1986. Punta Arenas, Chile, Ediciones de la Universidad de Magallanes. 79 pp., 25 pp. of bird drawings, 1 map. No price given.—By a fortunate coincidence I was in Patagonia when *three* new bird guides appeared. Usually, it takes a while for a novelty of this kind to seep up to the United States. There is a dearth of field guides for the "Southern Triangle," that narrow portion that describes the southern half of Chile and Argentina. The last authoritative avifaunal treatment for Chile was by A. W. Johnson in 1967, and, though amended in 1972, it is out of date, and not a field guide. Argentina has long been served by the late Claes Olrog's publications, all out of print, as is Tito Narosky's (1978) "Aves Argentinas." With the Araya guide, we now have a modern guide for all of Chile, with its 439 species, about two-thirds of which are breeding birds. The other two books cover southern Chile and southern Argentina only. Venegas lists 260 species that occur south of the 42°S parallel, and 208 of these are treated in detail as occurring in Tierra del Fuego. The Clark guide is restricted to Isla Grande de Tierra del Fuego, and the picturesque archipelago to the west and south of it. He treats 198 species, of which 116 are known breeders.

The Araya guide (G. Millie participated in the initial work on this book until his death in 1977) is pocket-size, softcovered, and printed on excellent paper that allows good reproduction of the simple but well-done line drawings. Seabirds are shown in flight. Normally there are 3 species per page, corresponding to their pictures on the opposite side. Length data and a very brief description of plumages (in 3-4 lines) are followed by habitat and faunistic role (i.e. whether stationary or migrant, visitant or nester, rare or common). The text is so concise that one-third or even one-half of each page is empty. This space could have been filled with more information, if extant, on voice, ecology, food habits, and the like. No doubt much information is still missing about many a South American bird. As this handy guide undoubtedly will survive several editions, however, I strongly urge the author to add material as it becomes available. This book offers two tidbits especially welcome to the visitor becoming familiar with the Chilean avifauna. One is an introductory chapter, albeit only 5 pages, about the history and necessity of bird conservation in Chile, mentioning some of the most endangered species. Second is a glossary of morphological terms, several of which are new words even for a reader familiar with Spanish.

The Clark guide is also softcover and pocket-size, though on coarser paper. The line drawings are less

clear. It also treats 1-3 birds per page, with illustrations on the opposite page, and also has some large empty spaces, especially following the introduction of families. These familial descriptions include concise mention of some outstanding behavioral, nesting, and feeding habits. Moreover, Clark offers for each family a tabulation of the "local faunistic role." His five categories are resident, breeding migrant, summer visitant, winter visitant, and occasional visitant. There is a small bibliography. The English name of each bird is included. This book likewise offers two extra tidbits: a simple but good vegetation map of Tierra del Fuego and—surprise—an inlay of a neat, folded checklist of the kind our Audubon Societies and National Parks provide for local birders. This was a first for me from South America!

Professor Venegas's brief treatment is intended to be a completed and improved abstract of an earlier, extensive book (C. Venegas and J. Jory, 1979, *Guía de Campo para las Aves de Magallanes*. Punta Arenas, Chile, Publ. Ocas. Inst. Patagonia, Serie Monogr. No. 11) and its 1982 supplement (Ann. Inst. Patagonia 13: 189). It contains a map and a short bibliography. The glossary complements that of Araya for the North American reader who wants to learn the Spanish expressions used in a bird description. The illustrations, though much larger than in either of the other guides, are a little too dark and obscure, though printed on better paper than the text. Size, local faunistic role, and a brief description accompany the figures. Systematic order is not kept because the plates, each of which shows up to 8 species, often of different avian orders and of different sizes, were derived from another publication. A systematic list (English names included) is divided according to the five geographic divisions of the area.

It is hard to compare critically the descriptions of species of a remote, distant avifauna without much particular knowledge. I used as random examples species with which I am familiar. Comparing the South American with nearctic and palearctic guides, I found that the descriptions differ in two respects. First, certain features are omitted in some and included in other guides (especially the "soft parts," eyes, and feet). Second, color descriptions tend to be subjective. Thus, *Nycticorax nycticorax* has a "black back" according to Peterson and Bull/Farrand, is "dark-backed" in Robbins, has a "glossy blackish-green . . . back" in Udvardy, "dorso y lomo negros con brillo verdoso metálico" (upper and lower back black with greenish metallic shine) for Araya, "espalda negro" (upper back black) for Clark, and "negro sobre dorso" (black on the back) in Venegas.

Last, but not least, I compared nomenclature. I found no trouble with the Latin names. But these three guides attest to the confused condition of South American vernacular names. I suggest two explanations. First, some common or familiar birds truly differ in various parts of this immense continent. Thus, *Zonotrichia ca-*

penis is the *chingolo* for all of us who identified this handsome sparrow in Mexico or in Colombia. So it is called in Clark; but it is *chincol* for both Chilean authors. The Patagonian Tyrant, *Coloramphus parvirostris*, is *viudita* in Chile but *peutren* in Argentinian Patagonia. Second, for northern visitants, e.g. nearctic shorebirds without known local vernacular names, the authors have used their creativity: *Calidris fuscicollis* is *playero de lomo blanco* for Araya and Venegas but *playerito rabadilla blanca* for Clark. Both names are apparent translations of our "white-rumped," except that Clark's is more precise. When I found that *Calidris canutus* has three variations, *playero rojizo* (Clark), *playero ártico* (Araya), and *chorlo ártico* (Venegas), I gave up. Long live the initiative of the Spanish Ornithological Society, which is trying, through an international committee, to establish a uniform vernacular nomenclature for the Spanish-speaking world by 1992, the Columbus quinquacentennial year!—MIKLOS D. F. UDVARDY.

The Sparrowhawk.—Ian Newton. 1986. Vermilion, South Dakota, Buteo Books. 396 pp., 24 black-and-white plates, 90 figures, 63 tables, 4 appendixes. ISBN 0-85661-041-0. \$35.00.—This is Dr. Newton's third book, his second on raptors, all done with equal scientific rigor. It represents, like several others by the same publisher, the definitive volume on a species in the United Kingdom and the major work on the species throughout its total range. However, like several other works (e.g. Greenshanks, *The Peregrine Falcon*, *The Barn Owl*), its title is too comprehensive and should be restricted to the Eurasian Sparrowhawk (*Accipiter nisus*) in Britain. Only smatterings here and there in the text or tables give data on the Sparrowhawk outside of Scotland or even elsewhere in the United Kingdom and northern Europe. My experience with other widespread raptors such as falcons makes me confident that population trends, seasonal trends in breeding success, dispersal, or mortality (to name a few topics) of the Sparrowhawk, as described by Newton for the United Kingdom, differ from those found in north Africa, southern Japan, northern India, or the islands of the Mediterranean Sea, for example. This aside, however, Newton has done a masterful job. The book represents the results of 14 years of work, and while some previously unpublished material is included, it is largely taken from Newton's voluminous papers on the species. There are 29 papers cited for which Newton was principal author. His associate, M. Marquiss, coauthored 14 of the papers and was principal author on 3 others. These men certainly emerge as experts on the species.

The 25 chapters start with an introduction to the species. A few of the subsequent chapter titles are: Population trends, The Sparrowhawk as a predator,

The breeding cycle (a sequence of 5 chapters covering courtship through the postfledgling period of young), Moulting, Mortality, and Effects of pesticides. The concluding chapter relates the main features of Sparrowhawk ecology to evolutionary theory in a highly successful manner. In many ways this is the most interesting chapter as it gives insights into Newton's thinking processes and shows his broad background.

Some salient concepts and unusual data sets emerge. Remige feather patterns are consistent from year to year for each individual, but differ from individual to individual. This method of individual identification should be investigated (with caution) for other species. Rectrices from North American buteos, for example, would not be helpful in this way as their pattern may change considerably year to year. The different mortality factors are not additive in Sparrowhawks. Newton includes data on results of adult food augmentation experiments; data on food delivery rates relative to number of young; data on mass at fledging relative to survival, which differs from patterns found in many other bird species; and data on lifetime reproductive output of single individuals. Data are presented to show that for males the limiting resource permitting breeding is a home range with abundant food, while for females it is an established male able to provide food. Nesting information was obtained from nearly 1,400 nests. It was instructive to learn that less than half of the females produced 75% of the young, that 75% of the females that fledged died before breeding, and that only 24% produced any young at all. Overall, only 12% of eggs laid gave rise to a productive breeder.

Newton documents a recovery in population numbers following the ban on aldrin and dieldrin in the United Kingdom, although at the same time DDE residues had not decreased (1963–1983). Despite continued eggshell thinning and egg breakage, presumably the results of DDE, the population has recovered. From an analysis of 500 dead birds and contents of 1,500 eggs he concludes that the decline in the United Kingdom was a function of adult mortality caused by cyclodiene organochlorines other than DDT.

Newton makes a convincing case that mate choice of males by females is a function of habitat richness in terms of prey availability and male vigor. He uses mass as a measure for male vigor. Unfortunately, there was not much variation in mass. It would be instructive to test further the concordance of these two variables. Could a male with average "vigor" (success in food provisioning) living in a highly productive territory be as reproductively successful as a male living in a territory of lower food resources but who was highly skilled at food provisioning? If not, which of the two factors is more important? Newton writes about the investment made by each sex in the nesting effort. He shows also that the female would desert the nest even after eggs were laid and incubation started if the male did not provide her with enough

food. It would have been instructive to know how much investment she shared in nest building before egg laying.

Errors and oversights are few and minor. The Mueller and Berger (1970; p. 123) and Harvey et al. (1976; p. 264) references are not in the literature cited. The date for the papers by Leshem is given as 1984 in the text but as 1985 in the literature cited. Table 9 cites Bomholt (1983), but the date is 1981 in the literature cited. In discussing foods (p. 135), Newton writes "In particular, rare but easily caught species may be eliminated locally Thus I was surprised to see how many escaped budgerigars appeared among prey remains . . . so many in fact that . . ." I turned to Table 17, which was the only list of prey species that presented percentage occurrence, to find out how many were in fact caught. Budgerigars were not listed. The index gives "Budgerigar, as prey" on page 155, but in fact page 155 covers "Defense of the nesting place."

Overall, the book is a very well-done monograph on the autecology of a species. It is written at a technical level but is nonetheless easy reading for the lay raptorophile. It should certainly be a part of university and other libraries as well as one's own.—CLAYTON M. WHITE.

[Population ecology of migratory ducks in Latvia.]—H. A. Mikhel'son, A. A. Mednis, and P. N. Blum. 1986. Riga, Latvia, Zinatne. 12 text figures, 19 tables. 40 kopecks.—Directed by the eminent ornithologist H. A. Mikhel'son (recently deceased), studies on the population ecology of 13 species of migratory ducks were conducted over a period of 23 yr. Twelve thousand nests were counted and 48,000 chicks were banded, primarily of the Northern Shoveler (*Anas clypeata*) or Tufted Pochard (*Aythya fuligata*), on the undisturbed 35-km² Engure Marsh. From these data the authors determined the overall composition of the breeding population of Northern Shoveler females to be about 45% returning breeders, 44% first-time breeders, and the rest immigrants; for the Tufted Pochard the proportions were 61%, 21%, and 19%, respectively.

This pattern differed among habitats. In Tufted Pochards breeding on islands (the best habitats), the proportion of returning breeders was higher, and that of first-year breeders and immigrants was lower, than among birds breeding on the exposed slough. In all habitats the sites with the most successful production of fledged young generally were occupied by the most aggressive and experienced females.

The authors present a model of age-structured demography to account for evidence of what they believe to be population self-regulation. The evidence is in two parts. First, the mortality rate among young birds varied with breeding density in both Tufted

Pochards and Northern Shovelers in that post-hatching survival increased in years with low breeding densities. This relationship was quite significant ($r = -0.81, P < 0.01$) over 14 yr of observation, and is well supported by both tabular and graphical data. Second, the degree of philopatry or site fixity among females seemed to work as an effective means of regulating numbers. Under favorable conditions practically all breeding females return to their previous breeding sites, and first-time breeders return to the proximity of their hatching site.

The authors propose that with a decrease in nesting success and increase in brood mortality, the proportion of females returning decreases, and that unsuccessful females are more likely to disperse to other breeding sites as immigrant birds. When conditions improve a high proportion of dispersed females return to their original nesting sites. Thus, older females can appear to have two or more breeding sites, often at considerable distances from each other. At nesting sites with poor protection or in unstable conditions, variations in the return of females appear to be the basic means of population regulation.

In stable, well-protected habitats, offspring mortality decreases and overall fledging success increases, although it may be moderated by age-structured, density-dependent factors. The clutch and offspring of young females have a greater mortality than those of older, more experienced females. Furthermore, as breeding densities increase and the mortality rate increases faster among younger breeders, the disparity between age-related success becomes greater, and the population age structure will oscillate as a result.

This model has interesting implications for management strategy, which is beyond the scope of this review but is, in fact, the rationale for this comprehensive study. On more theoretical grounds, the process of population structure is seen by the authors as prolonged and sequential, distinguished by several dynamic stages in which philopatry and competitive ability are especially important.

This monograph is especially accessible to those without knowledge of Russian because the figure and table captions are translated into English. Mikhel'son was among the first to do this, which may explain the familiarity of and worldwide esteem given his work. His complete bibliography is appended to the monograph.—DOUGLAS SIEGEL-CAUSEY.

The ecology of animal movement.—Ian R. Swingland and Paul J. Greenwood (Eds.). 1984. New York, Oxford University Press. xvi + 311 pp., 17 tables, 59 text figures. ISBN 0-19-857618-8. \$19.95. (Hardcover edition issued 1983, ISBN 0-19-857575-0. \$54.00.)—In assembling the 12 reviews (by 15 contributors) in this volume, the editors seek to "stimulate and surprise"

with new ideas on fundamental problems in movement. They emphasize ultimate rather than proximate causation, as one would expect of a text grounded in behavioral ecology. The selections cover a spectrum of animal movements, from foraging to range expansion. A wide variety of taxonomic groups is considered, and birds figure prominently. In short, this is an eclectic reader.

I found the book's thematic structure a bit forced and even counterproductive. The three sections, each headed by a short commentary chapter, are devoted to (1) movement within (i.e. use of) home range, (2) relocation from one home range to another (i.e. "dispersal"), and (3) long-distance movement (i.e. "migration"). The very disunity of terminology and concept that an eclectic approach exposes renders these categories indistinct and the assignments to them almost arbitrary. The so-called commentaries do not help, for they neither reveal hidden similarities among the disparate chapters nor resolve obvious differences.

If the book as a whole lacks coherence, how do the chapters fare as isolated contributions? Not surprisingly, they vary in appeal. Greenwood and Swingland open with a very brief review of territories, dispersion, foraging, predation, and home-range size, citing the same few papers that are standard fare in all behavioral ecology texts. Pyke follows with a critical review of the patch-departure aspects of optimal foraging models. He explains the models lucidly, rigorously criticizing purported empirical support for them, including his own work. Pyke concludes with a welcome call for more realism, including the use of more complicated, situation-specific simulation models.

Mace, Harvey, and Clutton-Brock give an update on attempts to relate home-range size to body size and energetic needs. After noting methodological problems in earlier such comparisons, they analyze several data sets, including ones for Passeriformes and Galliformes, and find that body size predicts home-range size more precisely than do energetic needs. They then attempt three predictive models based on daily energy expenditures, all of which fail an independent test using a primate data set. Like Pyke, they are not sanguine about future progress in their field, but expect to keep trying. Both these reviews, though now dated, are good short introductions to their fields.

Horn gives "a sketchy review" of the better-known dispersal models. The most interesting part of his short chapter addresses the apparent contradiction of the r-K continuum: dispersal is not a conventional characteristic of K-strategists, yet such animals obviously would benefit from sending some offspring in search of vacant patches. But, it seems to me, if the K-syndrome is realistic, there will be no distant vacancies, and no reward for long-distance dispersal.

Stenseth contributes 40 pages on microtine density

cycles and dispersal. After an insightful review of relevant models, he introduces his own generalized model. Published data provide some support for his model's prediction that the rate of adaptive dispersal should be high only when populations are growing rapidly, not at their peaks. But Stenseth ventures onto thin ice with the hypothesis, following Hamilton, that density cycles are driven by these adaptive dispersal events. He argues that a high optimal-dispersal rate decreases relatedness within a patch, aggression therefore rises, breeding stops, and the population crashes. The hypothesis also explains why populations keep increasing when fenced (the Krebs effect): with no immigration, average relatedness does not drop, and breeding is never interrupted by hostility. This daring hypothesis deserves testing.

Swingland addresses the important question of intraspecific variation in movement patterns with a confusing explanation of differences among mixed and pure-conditional ESS models. Genetical realism would consider the differences to be academic. Still, the game-theory approach is useful in emphasizing that alternative behaviors may have frequency-dependent pay-offs.

Chapters by Greenwood, on mating systems and dispersal, and Shields, on inbreeding and philopatry, recount yet again the authors' familiar views on these subjects. Shields's chapter provides easier access to the essentials of his important ideas on inbreeding and the advantages of sex than does his recent book.

In a short chapter on insect migration, Rogers offers a graphical model that incorporates mortality, investment in flight apparatus, and reproductive gain associated with migration. These parameters make the model analogous to Stenseth's, a fact that neither authors nor commentators seem to have noticed.

Taylor and Taylor use insect migration as a paradigm for survival by movement. They assert that "migration in ecology is change of place between generations" (certainly a parochial definition). Because migration takes an individual to optimal habitat, it obviates competition. A recasting of the Lotka-Volterra competition equations into matrix form, with spatial transfer probabilities, cleverly formalizes their point. The process is proposed to drive long-term range changes, and to explain the movements that Wynne-Edwards mistakenly took to be altruistic. The Taylors' exposition is wide-ranging and ambitious, and deserves fuller development.

Safriel and Ritte search for universal ecological correlates of colonizing ability with an updated version of the MacArthur-Wilson island model. They test predictions that r-strategists are better colonizers by comparing Red Sea molluscs that have colonized the Mediterranean, via the Suez Canal, with closely related species that have not. The results support the hypothesis, but the cases are too few to rule out mere chance.

The book ends with Sinclair's disappointing chap-

ter on the function of long-distance migration in vertebrates. This is actually the only chapter that deals with return migration in any detail. Migration, he asserts, is an adaptation to finding better breeding habitat. The stories presented of course support the hypothesis. Contradictory stories are not told.

Overall, I was disappointed by the frequent and uncritical use of the r-K and ESS concepts, which shows a lack of concern with genetical constraints on what may evolve. The book does succeed in its modest goal of providing a "conspectus of present thought and work" on the behavioral ecology of movement, although publication delays (the references end with 1982) have robbed it of timeliness. But the field, with all its parochialism, needs the synthesis that was not attempted here. Ornithologists working in the field, and graduate students, may well use one or more of these essays as an entry into the specialized literatures that characterize the ecological study of movement. Others, including undergraduates, may prefer to wait for something more coherent and synthetic.—
D. ARCHIBALD MCCALLUM.

The Breeding Bird Survey: its first fifteen years, 1965-1979.—Chandler S. Robbins, Danny Bystrak, and Paul H. Geissler. 1986. Washington, D.C., U.S. Department of the Interior, Fish and Wildlife Service Resource Publ. 157. iii + 196 pp., 77 maps and graphs, colored cover. Available from Publication Unit, U.S. Fish and Wildlife Service, Washington, D.C. 20240; or National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161. No price given.—Are bird populations declining? For many years popular opinion held that some previously common species were on the decline, but that others (e.g. "blackbirds") were undergoing an explosive increase. Such were opinions of the birding community in the early 1960's, and the impression of declining numbers was strengthened by Rachel Carson's book "Silent Spring." But where were the data to support these impressions? For many years the National Audubon Society had sponsored the Breeding Bird Census, a series of counts using the spot-map method, but this activity was popular only with a dedicated few, and the data were scattered and inconclusive.

The Breeding Bird Survey (BBS), a project attempting to harness the unused manpower of hundreds of amateur ornithologists, was hatched in the fertile mind of Chandler Robbins of the U.S. Fish and Wildlife Service. After a trial year in 1965 in Chan's home state of Maryland, the program was extended in 1966 and 1967 across the whole country and, with the cooperation of the Canadian Wildlife Service, to Canada. The people who participated, and continue to participate, in this endeavor found it to be a lot of fun, and

much of value was learned. This volume summarizes the results through 1979.

The census method consists of driving a 25-mile route, with a 3-min stop every half-mile. During the 3 min all birds heard and those seen within a quarter-mile are recorded. The selection of the routes and the timing of the survey are prescribed in a rigid set of rules. In the 15 yr reported, over 2,000 runs were conducted. The data obtained have been analyzed in numerous ways, including the production of computer-drawn density maps.

In the introduction the authors discuss the method and analyze some of the errors and biases. They conclude that as long as the method is followed rigorously, and the same people do the counts year after year, most of these biases cancel out in making comparisons. While this is true in the main, the method is strongly slanted toward roadside and edge-inhabiting birds. Witness that the four most abundant species were Red-winged Blackbird (*Agelaius phoeniceus*), House Sparrow (*Passer domesticus*), Common Grackle (*Quisculus quiscula*), and European Starling (*Sturnus vulgaris*). Although the year-to-year comparisons for forest interior species might be valid, the true densities of these species may not be apparent.

The bulk of the text treats the status of 230 species. These data are given as plots of mean birds per route against year, with a trend line superimposed. Separate graphs are given for the eastern, central, and western regions. The text discusses the statistical significance of the plots and divides the data into finer categories, most often the 7 physiographic regions recognized or the 95 "strata," which are subdivisions of the regions. Often the center of distribution is identified. Maps accompany the text to show the densities of relative abundance for 31 species. Four colored maps show the changes in number of birds per route, number of species per route, and diversity across the continent and also give, for comparison, a plot of Christmas Count Data. Finally, there are detailed tables of the mean number of birds per route for each species in each state or province.

The results are mixed. I haven't made a species-by-species count, but my superficial impression is that more species increased over the period covered than decreased. This would appear contrary to common opinion. Range expansions, such as the movement of the Tufted Titmouse (*Parus bicolor*) and the Northern Mockingbird (*Mimus polyglottos*) into New York and New England and, in particular, the rapid and dramatic expansion of the eastern population of the House Finch (*Carpodacus mexicanus*), are vividly apparent. Both the titmouse and the mockingbird showed continental decreases despite the range expansions.

The data show clearly the disappearance of the Loggerhead Shrike (*Lanius ludovicianus*) and Bewick's Wren (*Thryomanes bewickii*) in the east. The effects of the hard winters of the late 1970's are reflected in the data for the Carolina Wren (*Thryothorus ludovicianus*),

the kinglets, and a few other species that winter in the southern United States.

The vireo and warbler populations were all found to be increasing, and this was attributed in the east to the spruce budworm outbreak and the ban on the use of DDT. Recent published work, however, including some by Robbins and his group, has shown that many of these neotropical migrants, particularly those of the forest interior, are declining. Is this contradicted by the BBS data? In reply to my query Chandler Robbins said that the dramatic decreases in the forest-interior birds have come since the 1979 closing date of this report. This may be so, but, as indicated above, I wonder if the BBS results are really reliable for these species. Some of my data indicate that the decline began before 1979, indeed perhaps before the 1965 opening date of this data set.

This minor quibble aside, the report is extremely valuable and anyone interested in populations or range changes will find much food for thought. While this study is intended to serve as a baseline for the future, one can only regret that a similar study was not started 30 years earlier.

The appendices include a copy of the instructions for making the counts, an explanation of the new method used to compute long-term trends, and a 12-page list of the many participants. The attractive cover shows a map showing 7 physiographic regions of the continent and a fine colored drawing of the corvid species characteristic of each.—GEORGE A. HALL.

Nearctic avian migrants in the Neotropics.—J. H. Rappole, E. S. Morton, T. E. Lovejoy, Jr., and J. L. Ruos. 1983. Washington, D.C., U.S. Department of the Interior, Fish and Wildlife Service. vi + 646 pp., 6 figures, 332 black-and-white illustrations (maps). Available from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Paper. No price given.—This publication represents a considerable effort by the authors to summarize existing information on nearctic migrants in the tropics. I believe it represents a major step toward the stated goal of "stimulating research, conservation, management, and policy making efforts that will result in conservation of New World biota in general and nearctic migrants in particular." Functionally, the book is divided into two parts. In the first 100 pages there are an executive summary, introduction, discussion of the ecology and distribution of migrants, outlook for migrants in the face of rapidly changing tropical environments, and research and management recommendations. The remaining 550 pages are a series of 9 appendices, including a list of the species considered, habitat use, food use, distribution maps, status by country, an annotated bibliography, author

index, list of researchers, and a summary (by Byron Swift) of wildlife laws in Latin American countries.

Although the appendices stand as an excellent source of raw data and reference material, my enthusiasm for this work does not extend to the 100 pages of text. After defining a nearctic migrant as a species that breeds, at least in part, north of the Tropic of Cancer and winters south of that line (about half of the 650 bird species that breed in temperate North America are nearctic migrants), the authors try to build a case for the fact that many of these species are in danger—in fact, “endangered” (p. 64). To do this, they argue that the nonbreeding season is important for migrants’ survival, that about a third of all migrants need forests, that forests are disappearing, and that migrant populations are declining. Unfortunately, the crucial nature of the nonbreeding season is based on only six references, none of which provides the kind of data from which such a conclusion could safely be drawn. The statement that a third of all migrants invade forested (*vis-à-vis* scrub or aquatic) habitats each year is based on the observation that a third of the *species* use predominantly forested habitats, but the kind of habitat-use information that one would need to determine the relative use of one habitat vs. another is simply unavailable. Finally, the alleged decline in migrant populations rests on the “gut” feelings of a handful of authors and unspecified references from one portion of the bibliography. Whether any migratory species is truly endangered because of tropical land-use practices is far from resolved, but I fear that the casual reader will get the impression that at least a third of the nearctic migrants could be classified as such.

Additional important issues are glossed over much too lightly in the text portion of this book. Most are capped with conclusions that carry more weight than they currently deserve. For example, the three explanations for why some migratory species use early successional habitats are neither exhaustive, nor mutually exclusive, nor tested in a scientific fashion. The authors assign example species to each category, nonetheless. I also had trouble following the logic behind the conclusion that the presence of winter territories indicates that “many migrant populations are limited during such times.” The discussion surrounding food use builds toward the empty conclusion that “Migrants, like residents, function as integral members of the tropical communities that they inhabit.” What, if anything, is a nonintegral or nonfull-fledged member of a community? The syntheses of two additional topics are much too cursory to justify the conclusions that “direct migrant-resident agonistic interactions are of minor importance in the ecology of either group,” or that “the main benefit derived from [mixed-species flocking] is most likely related to predator avoidance.”

Although most of the stated conclusions may be true, I feel that the authors generate an unwarranted air of precision and resolution about many of the issues. In the absence of time or space for truly critical syntheses, the authors might have posed these generalizations as questions in need of more thorough investigation, rather than as conclusions or established fact. Perhaps most regrettably, each of these conclusions appears in the executive summary and will probably be read as fact by many.

The text portion aside, the information in the appendices will prove indispensable to anyone who plans to work with nearctic migrants in the tropics. The list of migrant species seems quite complete, but my search for selected taxa found *Hylocharis leucotis* and *Oporornis tolmiei* to be missing from the list and all subsequent appendices. Because of the scarcity of information on winter habitat and food use, those two appendices represent valuable summaries with only minor gaps in information, as far as I can tell. The range maps are no more detailed than those found in field guides, but each has the added feature of presenting a complete winter range.

The bibliography of more than 3,000 references is clearly the meat of this publication. All facets of nonbreeding biology are included, except for navigation and orientation. About a fourth of the entries are annotated, with notes on the study location, study period, habitats, methods, migrant species involved, topics covered, and number of citations. The references were compiled from a computer search of literature published over the previous 10 yr, combined with perusals of the citations in those papers, the major bird journals, and reprints from researchers in the field. There are taxonomic, geographical, and other conceptual categories, but, unfortunately, cross-referencing is nonexistent. Should you look for Eaton’s paper on Cuban warblers under warblers or Cuba? (It’s under warblers.) Any of several cross-referencing schemes might have improved the utility of the bibliography. The confusion is compounded by 7 pages (433–439) that were bound out of place (should go after p. 479) in the two copies I have seen.

As there seems to be an ever-increasing interest in tropical migrants, and an outlook that the authors describe as dismal for many migrant species, I applaud their attempt to bring together the existing literature on the subject so that attention might become more rapidly focused on important issues. This kind of publication represents a tremendous synthetic effort. My reservations about the text portion of the book notwithstanding, it will prove to be indispensable for students of nearctic migrants, primarily because of the research time that will be saved through use of the appendices, especially the bibliography.—RICHARD L. HUTTO.

Key to ageing and sexing of European passerines.—P. Busse. Text figures by Tomasz Cofa. 1984. Beiträge zur Naturkunde Niedersachsens No. 37. Jahrgang, Sonderheft. 224 pp., numerous diagrams and drawings. DM 29.80.—Modern bird banders are aware that far more data can and should be obtained from a banded bird than a simple species identification and the details of its occurrence. The sex and age of the bird are most important, and in Europe, as in North America, have been the subject of much study and numerous publications. The author attempts to summarize present knowledge of the subject. He hopes further that workers will use this book as a base to add their own findings, knowing full well that "it is a psychological trait that everyone likes to point out omissions, faults and inconsistencies appearing in published papers."

Although the book is written for experienced banders, a lengthy introduction covers in great detail, with illustrations, the various methods for aging and sexing live birds in the hand. A general discussion of molt and plumage sequence is followed by sections on the identification of juvenile and immature plumages. For instance, diagrams illustrate that the outer tail feathers of 9 species tend to be narrower and more pointed in immatures than in adults. Another diagram shows that juvenile primary coverts of *Parus ater* and *Prunella modularis* are more pointed than those of adults. Aging by soft-part coloration and skull ossification is covered in detail. Sexing criteria include shape of the cloacal protuberance and presence of a brood patch. The section on biometrics runs to 10 pages and includes extremely complex instructions for measuring and recording the wing formula. These 30 pages constitute an excellent primer on modern bird banding, and I strongly recommend them to all banders for study; even the most experienced may find some useful hints. About the only omission I found was the recommendation that all banded birds be weighed.

The remainder of the book consists of species accounts for 190 European passerines. These are arranged by genera in alphabetical order, from *Acanthis* to *Turdus*, and the species are likewise in alphabetical order within each genus. This may cause initial confusion, but users will no doubt adjust. A complex diagram is really the kernel of each account. It depicts mainly plumage sequences by month and year, but includes information on soft-part colors, skull ossification, and other things. It will take the user a while to learn the "language" of these diagrams, with their symbols and various types of hatching, but they synthesize all that is known of molt and other criteria for aging and sexing each species. In addition to the diagram, there are notes and comments on molt and other characteristics peculiar to the species, keyed to the diagram by asterisks and other symbols.

For the European bird "ringer" this book is a "must." For North Americans the main interest is probably

the introduction, because only a few of the 190 species covered are likely to turn up at North American banding stations.—STUART KEITH.

Eskimo Curlew: a vanishing species?—J. B. Gollop, T. W. Barry, and E. H. Iverson. 1986. Saskatchewan Natural History Society, Spec. Publ. No. 17. 159 pp., 23 figures, 7 maps. Available from S.N.H.S., Box 1121, Regina, Saskatchewan S4P 3B4, Canada. Can. \$9.00.—This publication recounts the oft-told tale of the former abundance of the Eskimo Curlew (*Numenius borealis*), the intensive market hunting that reduced it to virtual extinction at the end of the 19th century, and the persistence of a few birds to the present day. The authors offer little evaluation or new interpretation of the data; the main value of the book is that it brings together a widely scattered literature (about 600 papers were reviewed) and much previously unpublished information.

Considerable information comes from the unpublished notes of Roderick R. MacFarlane, who collected for the Smithsonian Institution in the 1860's near Ft. Anderson in the Northwest Territories. MacFarlane's notes are the sole documentation of the Eskimo Curlew's breeding biology and habitat. He kept careful records of clutch size, egg dates, hatching dates, characteristics of the nest, local vegetation, and behavior of adults near the nest. He recorded no quantitative information from which to estimate population size or breeding density. MacFarlane refers to the species as being "very numerous" to "even scarcer than last year," but never suggests the phenomenal numbers claimed by others. The authors point out that the number of nests found can be used to estimate the relative abundance of shorebirds breeding in the area, but that this is complicated by the ease of finding nests. I suspect that the motivation for finding rarer or new species also biases such an estimate. MacFarlane's notes are quite valuable, but readers who want to mine them for additional information on the Eskimo Curlew, or other species, unfortunately cannot learn from this book where they are available.

The main text covers the curlew's year by province, state, or country, starting at the breeding grounds and following the species through its fall migration, wintering, and spring migration. Each geographic account presents information on known specimens, previous and current status, dates, and localities. The accounts contain extensive quotations from the original literature or unpublished sources. Most of the 19th- and early 20th-century reports are from hunters, promoters, and those lobbying for the elimination of market hunting. Because many of the reports were compiled years after the observations were made and because many of the reporters had reason to color the facts, the details, especially of total numbers, are high-

ly suspect. In spite of these shortcomings, the reports give a clear picture of the timing and extent of the movements of the species. After breeding most of the population moved to staging areas in Labrador and then flew directly to South America unless forced down by the weather. The species' movements through South America and its winter distribution are poorly documented, but the flight probably was directly to and from the wintering grounds in Argentina. In the spring the species staged in a few traditional areas from Texas to South Dakota and then went directly to the breeding grounds. Modern studies, especially those of the International Shorebird Survey, have shown this to be a typical pattern among shorebirds. That the market hunters found and fully exploited the species' spring staging areas is probably the main reason for their rapid decline.

Eskimo Curlews have been reported in 25 of the 41 years since 1945. Although these records show that the species has persisted against all odds, they offer scant hope for the future. There is no indication that the population is recovering or that the risk of extinction is less now than it was at the turn of the century. Why other heavily persecuted shorebirds have made recoveries while the Eskimo Curlew has not remains one of the major questions about the species' recent history. The Upland Sandpiper (*Bartramia longicauda*) was also a favorite of the market hunters and also winters in Argentina. Though it came under increased pressure with the decline of the Eskimo Curlew, it is now a common breeding species in York Co., Nebraska, where the Eskimo Curlew was once harvested by the wagonload.

The text is well written and illustrated. For some reason, maps 5 and 6 appear before maps 1-4. This book will be of interest to those interested in shorebirds and their conservation.—J. G. STRAUCH, JR.

Ducks of North America and the Northern Hemisphere.—John Gooders and Trevor Boyer. 1986. New York, Facts on File. 176 pp., 250+ color and black-and-white illustrations, 11.5 × 8.5 in. ISBN 0-8160-1422-1. Cloth, \$24.95.—The rather unusual title of this book appears to be a means to reassure the North American audience that birds of the Nearctic are emphasized. Indeed, 34 of the 52 species listed occur in North America, but that is more the result of the biogeography of waterfowl than the authors' intention. A better title for this work would have been "Ducks of the Holarctic," but perhaps some of the potential audience would have been misled.

The illustrations are the focus of this text. Boyer presents a color plate of the definitive plumage of each species, and sometimes a color plate of a subspecies or of another plumage. Each species illustration is accompanied by 2-4 smaller, color lateral views

of the adult sexes in flight. Smaller illustrations (sometimes also in color, but largely in black and white) along the wide margins of the text are used to illustrate similarities among related species, particularities of the bill or wing, etc. Small range maps indicate the generalities of the continental summer and winter ranges. Two initial plates illustrate the external anatomy of a duck (Mallard) and, without accompanying text, some differences in bill structure that can be related to feeding habits and the different stances of diving and puddle ducks on land.

The introductory text (3 pages) makes bare mention of the differences in the duck tribes, the use of bi- or trinomial names, and some of the losses in numbers and habitat of Anatidae that are the result of human work. The nomenclatural emphasis is on "common" names; no reference is cited for the scientific nomenclature used.

The text accompanying each species, according to Gooders, was prepared as "something readable to accompany each of [the] . . . paintings." Gooders's statement is a good definition of what was accomplished. The text is neither a source of new data nor of new scientific interpretation. It seems to be a selected paraphrase, without attribution, of a number of comprehensive texts on birds. To the authors' credit, they list as a "Selected Bibliography" the texts they apparently used as exclusive sources; without footnotes or literature cited references, however, the text cannot be used in any scientific way. The text suffers from some of the usual problems of heavily edited material; some items seem out of context and many sentences appear unrelated within paragraphs. Of more concern are some of the authors' emphases. For example, most aspects of reproductive behavior are severely anthropomorphized, and many anecdotes or only partially supported statements from the literature are stated as generalities. The naive reader will be unable to separate the wheat from the chaff in the text, despite the general validity of most of the material.

This book should be evaluated with regard to its intended purpose: essentially a pleasing presentation of waterfowl illustrations. One may then set aside the text and find much to recommend the paintings. Boyer paints with great detail, using many fine strokes to present texture and form. The paintings are not habitat vignettes, but rather bird portraits with the subject appearing lifelike and with greater detail than one would expect given the apparent distance from the subject. Boyer seems to be less sure of himself in larger scenes with background structure. In fact, several plates with skewed perspective reminiscent of works of earlier ornithological illustrators are a distracting departure from the overall quality of the prints. Boyer's depictions of water, especially moving water, are excellent, and the paintings of wavering reflections and raindrop-created ripples are especially commendable.

Those interested in a compilation of quality waterfowl art will appreciate this text. It is printed on high-quality paper and has an excellent binding and attractive book jacket. Serious ornithologists may desire this book as a decorative piece, but will want to reserve their scientific attention for more serious compilations.—RONALD E. KIRBY.

Guide to owl watching in North America.—Donald S. Heintzelman. 1984. Piscataway, New Jersey, New Century Publ., Winchester Press. xiii + 193 pp., 65 black-and-white photographs, 2 text figures. ISBN 0-8329-0361-2. Paper, \$8.95.—The first 25 pages consist of rather standard "species accounts" and some mistakes. For example, the Eastern Screech-Owl (*Otus asio*) may have a turquoise bill, and occasionally eats fruits and berries; the Snowy Owl (*Nyctea scandiaca*) has "legs feathered to the toes," rather than legs and toes feathered. [For a more complete list of errors and omissions, see J. S. Marks's review (1985, J. Field Ornithol. 56: 319).] "Identification plates and field marks" (pp. 55-103) covers much the same material as "species accounts," but the wording tends to be different. Thus, the Northern Pygmy-Owl (*Glaucidium gnoma*) is a "tuftless western owl" on page 13, and on page 76 we learn "it has no ear tufts." Such material could have been consolidated, and many of the repetitious photographs could have been eliminated. Field marks do not come through clearly. The Northern Pygmy-Owl is said to have "sides grayish-brown spotted with white," but the photo (p. 77) shows a big white streak along the bird's left side—mysterious until one notices that the bird lacks a left wing!

In the "Owl pellet guide" (p. 40), the novice is lured into believing he can correctly identify most owl pellets by size, shape, color, and texture. This is nonsense. "Owls of the World" (Burton 1973, Dutton, New York), which is listed among "books consulted," makes it abundantly clear that this is impossible.

The 222 owl-watching sites—presumably the main thrust of the book—are for the most part national parks or forests; national wildlife refuges, recreation areas, or wildlife management areas; nature centers, sanctuaries, and the like—the very places most bird-watchers would gravitate to without direction. Much of each write-up consists of details on how to get there ("Access"), with a generalized description of the area itself. The actual directions for finding owls are often meager: "Enter park, drive within view of marshes or woods and check for owls" (p. 142) or "Park in a suitable spot, and listen for owls at night" (p. 118). If the purpose of this book is to get people interested in owls, why does the author make it so difficult? He suggests hiking "across many acres of pine plantations or woodlots searching every tree for owls." He does not point out that the Great Horned Owl (*Bubo*

virginianus) is common, and may nest in more counties in North America than any other bird, nor does he mention that the screech-owls (*Otus* spp.) are often more abundant and easier to watch in our suburbs than out in the country. He does not propose cruising at dusk to spot nocturnal owls perched on utility poles and high in treetops, nor does he suggest squeaking like a mouse to call a hunting owl to you in silent flight.

Heintzelman's main emphasis is on tape-calling. He strongly discourages visits to nests but enthusiastically recommends purchase of a tape recorder and tapes by novices! He states that one should never play owl voice recordings long or repeatedly during the breeding season—but how long is too long? And how often is too often? How many determined birders have already been calling these same owls? The owls' reaction to tapes does wear off eventually, but it is suspected that in a poor year fewer chicks of sensitive species like the Spotted Owl (*Strix occidentalis*) survive. Indeed, some bird groups consider tape-calling during the breeding season unethical.

Plainly, amateurs have already caused trouble. Heintzelman mentions that Cave Creek Canyon (one of his recommended watching sites) has banned tape-calling. The Bavarian National Park also has banned tape-calling because it causes the smaller owls to sing longer, thus attracting the larger owls that prey on them. Heintzelman, indeed, recommends that recreational owl watchers start with the calls of small owls and then play calls of larger owls! Perhaps it is time for professionals to assess the effects of tape-calling, rather than (as Heintzelman suggests) having recreational owl watchers experiment.—FRANCES HAMERSTROM.

The Atlantic Alcidae. The evolution, distribution and biology of the auks inhabiting the Atlantic Ocean and adjacent water areas.—David N. Nettleship and Tim R. Birkhead (Eds.). 1985. London, Academic Press. xx + 574 pp., figures, tables. ISBN 0-12-515670-7. Cloth, \$44.00. Paper, \$19.95.—This volume was conceived "to provide a summary and synoptic view of current knowledge" of the biology and ecology of the auks. Interest has heightened in the study of marine birds, and several recent publications treat the biology, ecology, and conservation of seabirds, including the alcids of the Atlantic. The present book therefore faces stiff competition, and most of the topics have been treated elsewhere, albeit generally in less detail. Because this volume is devoted entirely to one group of birds from a single region, the authors were able to provide incredibly thorough reviews, and their thought-provoking syntheses clarify many old ideas and provide important new directions for research in the future.

The family Alcidae includes 22 living and one recently extinct species of wing-propelled diving birds that are confined to the Northern Hemisphere. Sixteen of the living species are restricted to the Pacific Ocean and adjacent water areas, 4 are confined to the Atlantic, and 2 others occur in both oceans. The two faunas have been linked irrevocably since the group's origin in the Pacific and its expansion into and further radiation in the Atlantic. Because our knowledge of the Atlantic alcids is more complete, their treatment apart from the Pacific alcids seems justified, and some of the authors draw upon appropriate data from the Pacific to round out their comparisons.

The 10 chapters are written by 9 authors, most of whom have studied Atlantic alcids for more than 15 years. There is some overlap in chapter content, but this is inevitable when several authors are involved. In fact, it strengthens this book. The contents separate clearly into two parts: Chapters 1-4 are broad, introductory overviews while Chapters 5-10 deal with more specific topics. The book is well indexed and carefully edited, although it is not error free. The sequence of the chapters is logical, and each chapter and its subsections are numbered. The formats of the figures and tables are consistent throughout. The black-and-white photographs in Chapter 1 are of high quality. All references cited are listed together in a 51-page bibliography at the end of the volume, thus avoiding redundancy. A locality index serves as a gazetteer to individual geographic locations and indicates where in the text these appear. The subject index is selective.

J. Bédard reviews (pp. 1-51) the paleobiology of the Alcidae and reveals a field in motion. He acknowledges that the earliest known alcid is from the late Eocene of Oregon, thus supporting the Pacific origin of the group. Bédard examines Olson's (1985, *Avian Biol.* 8: 79) argument for modification of long-held zoogeographical and phylogenetic relationships because of recently discovered fossils of Atlantic origin and reassessment of other fossil material. Bédard attacks the splitting that produced the 20 or so subspecies of auks in the North Atlantic. He believes only a few of these can be recognized and stresses that until museums acquire adequate and appropriate material, alcids "are better identified by reference to their colony of origin, without reference whatsoever to artificial and really misleading categories" (p. 42). More work is needed using classical museum and biochemical techniques. Surprisingly, the classification used here, and by other authors later in the volume, follows (in part) the 5th edition (1957), and supplements, of the A.O.U. Check-list, instead of the 6th edition (1983).

The numbers and geographic distributions of auks in the Atlantic have changed dramatically since the 1800's, and D. N. Nettleship and P. G. H. Evans reveal (pp. 53-154) that this is due in part to human activities. This chapter is important because it summarizes historical information, including that on the extinct

Great Auk (*Pinguinus impennis*), identifies the changes in numbers and distribution, and establishes the present status of each living species throughout the Atlantic. This information is set against a background of broad oceanographic features. The authors do much more than echo the often-heard appeals of seabird groups to standardize methods of censusing and sampling. They state that breeding populations should be censused by measuring breeding pairs, using eggs or chicks as measures of breeding effort. Finally, they emphasize the need to monitor long-term trends in the sizes of breeding populations.

M. P. Harris and T. R. Birkhead compile (pp. 155-204) published information on the breeding biology of all Atlantic auks. They confirm that the reproductive features are highly variable within a species and urge further studies of each species. The "reasoned speculation" (p. 177) used to deduce the features of the Great Auk's breeding biology makes fascinating reading. Their findings are remarkably similar to those of Bengston (1984, *Auk* 101: 1), except for the age at which the young left the nest. The interpretation of the Black Guillemot's (*Cephus grylle*) plasticity in nest-site use, including the use of artificial sites, as pointing against a nest-site limitation of numbers, suggests to me that such limitation indeed exists.

Birkhead and Harris identify (pp. 205-231) the major ecological correlates in these species through comparative study. Their chapter is important because they analyze previously published, but confusingly interpreted, data and present certain data sets in new ways. Their more important conclusions are that twinning experiments tell little about the evolution of clutch size without determining adult survival or chick survival to breeding age, that female size (or perhaps quality) contributes to variation in egg size, and that calendar egg-laying date may be more important than intragroup synchrony for arctic-breeding alcids.

Only with the Atlantic alcids could P. J. Hudson examine (pp. 233-261) in detail the population parameters of each species. Auk populations have seldom been stable for long periods, and some seem to be increasing while others are decreasing. The author identifies mortality resulting from oceanographic changes, revealing the importance of monitoring population changes along with climatic and oceanographic trends. The biology and attendance patterns of nonbreeders and subadults have important implications in censusing. Further studies are needed because recent data show that emigration of immature birds influences estimates of survivorship to breeding age. Finally, Hudson challenges researchers to undertake more long-term studies of recruitment and age-related mortality factors at many large alcid colonies, supported by detailed studies of the birds' movements and survival at sea. He cautions that conservation and management procedures can be implemented only when we understand how survivorship, recruitment, and productivity interact.

M. S. W. Bradstreet and R. G. B. Brown summarize (pp. 263–318) the extensive literature on foraging and diets of Atlantic alcid. The diets, poorly to well known for six species and speculative for the Great Auk, are reviewed separately for adults and chicks. Information on nonbreeders and subadults is often lacking. A section on “foraging” under most species examines topics such as diving depths, foraging ranges (which seem to contract in some species after hatching), sizes and number of food loads, and adjustments in the amount of food ingested relative to its quality. Research needs include clarification of relationships between the distribution and density of birds and their prey at sea, diets of adults when feeding young, diving behavior, and biology of prey species. The need persists for information on digestion and nutrition, necessitating laboratory studies and the development of nondestructive methods of obtaining data on diets. The utility of using average dive/pause ratios as indicators of diving efficiency and for characterizing foraging parameters should be tested. A question left unanswered is why there are five species of small planktivorous alcids in the North Pacific and only one, the Dovekie (*Alle alle*), in the Atlantic.

A. J. Gaston’s syntheses (pp. 319–354) clarify our understanding of the voluminous literature on growth and development, and his interpretations should guide workers in the future. He emphasizes correctly that the Alcidae uniquely exhibit diverse behavior immediately after hatching, rather than different patterns of development *per se* (e.g. see Sealy 1973, *Ornis Scandinavica* 4: 113). Gaston’s use of the term “fledging,” however, is confused despite Burger’s (1980, pp. 367–447 in *Behavior of marine animals*, vol. 4 [J. Burger et al., Eds.], New York, Academic Press) plea for accuracy in its use. Gaston examines physical growth in an evolutionary context, and distinguishes between the optimum strategies of chick and parent. He emphasizes the need in future studies to standardize the sampling and measuring of growth so that valid comparisons can be made, and cautions workers to consider the crucial role of adult size when comparing growth rates interspecifically and not to compare maximum and fledging masses when looking at mass recession. Three post-hatching behavioral strategies are exhibited in the Alcidae. Semiprecocial and “intermediate” strategies are found in species in both oceans, while the truly precocial murrelets (*Synthliboramphus* spp.) are restricted to the Pacific. Gaston explains these differences, as have others, on the basis of differences in the species’ feeding ecology. Why the “intermediate” species are not truly precocial may involve the interaction of nest-site availability and pelagic feeding habits.

The question of how and why some bird species nest colonially, while others do not, has received considerable theoretical attention, and several alternative hypotheses have been generated to explain avian coloniality. T. R. Birkhead examines (pp. 355–382) these

hypotheses using data from auks, and couches his synthesis in terms of the relationship between the evolution of both colonial breeding and social signals “which enable alcids to breed in large and often dense colonies” (p. 356). Birkhead notes that although the “information centre hypothesis” has not been tested rigorously in birds, circumstantial evidence from alcid studies supports it. Nonrandom departures of individuals in some high-arctic colonies, correlated with colony size and the location of food patches, may provide one setting for testing it. Until such time that uniquely marked individuals can be followed at sea and food predictability can be measured, support for this hypothesis will remain at best correlative. Birkhead notes that mixed-species colonies of alcids are common, but that we do not know whether this is because nest sites are scarce or because individuals gain an as yet unidentified advantage. His examination of the social signals is important because he outlines sexual and agonistic behavior and tries to identify the differences and similarities between the species. More work on this subject is needed, and almost nothing is known of the social behavior of most of the Pacific alcids, especially the solitary murrelets (*Brachyramphus* spp.).

R. G. B. Brown’s chapter (pp. 383–426) on the distributions and movements of populations of Atlantic alcids at sea during the nonbreeding season is extremely important because it demands that we consider what alcids are doing, and where, throughout the year. This has important implications for the conservation of seabirds. Information on movements and wintering areas of Atlantic alcids is in some cases meager, and the extensive banding programs needed to fill in gaps are expensive, often dangerous, and generally frustrating. Some 10,000 adult Dovekies banded on colonies in northwest Greenland and west Spitzbergen have not yielded any recoveries outside their colonies! Three foreign recoveries obtained off Newfoundland reveal that the Thule birds may winter there, but too far offshore for easy confirmation. Dovekies that winter off Greenland originate, based on 12 recoveries, from the eastern Atlantic. Thus, Brown’s preliminary analyses of the migration patterns show that populations of the same species behave differently, some coincident with currently recognized subspecies, others not. A reappraisal of taxonomic diversity, as Bédard suggests, might permit unbanded individuals’ colonies of origin to be identified.

Evans and Nettleship examine (pp. 427–488) changes in the status of species that were implicit in their earlier chapter, and give a causal perspective of these changes as they relate to the known biological features of alcids. Although the authors echo much that has been published recently in other volumes, their focus on alcids in the Atlantic and adjacent waters affords them the opportunity to provide a more detailed treatment. They identify clearly many conser-

vation needs and reveal how basic research has and will lend itself to accomplishing these goals.

Students of alcid and their habitats should study this book carefully because it summarizes and synthesizes so much information and because it shows clearly what remains to be done. These were the editors' stated goals, and they have achieved them admirably. This book should be included in all university, museum, marine station, and private libraries whose users exhibit a serious interest in the marine environment and its birds. Conservation groups and governmental agencies charged with monitoring and protecting marine habitats and their fauna should read carefully the recommendations given in the last chapter.—SPENCER G. SEALY.

Evolution through group selection.—V. C. Wynne-Edwards. 1986. Palo Alto, California, Blackwell Scientific Publications. xi + 386 pp. ISBN 0-632-05139-X, cloth, \$57.00; 0-632-01541-1, paper, \$29.00.—In 1962, V. C. Wynne-Edwards published "Animal Dispersion in Relation to Social Behavior." The main thesis of the book was that social behavior regulates population size in relation to resource availability by restricting breeding opportunities, and that such self-regulating behavior could have evolved only through a process of selection operating on social groups rather than on individuals. This theory met immediate resistance from evolutionary and behavioral ecologists, and, although it prompted some theoretical and experimental investigations that showed how group selection could operate, neither the functions Wynne-Edwards attributed to social behavior nor the evolutionary mechanism he proposed were taken very seriously. With the emergence of sociobiology and its emphasis on kin selection, Wynne-Edwards's views came to be regarded as somewhat of a historical footnote in behavioral ecology. Now, in this new treatment, Wynne-Edwards has again forced his theory into our consciousness.

The basic theme is unchanged. Social attributes of species are held to be "wholly dependent on mutual cooperation for the achievement of beneficial effects, and require that individuals conform to rule in order to promote the common good" (p. ix). This is expressed especially in the nearly universal precaution against overexploitation of food resources; if "nutritional plenty is truly the outcome of innate precaution, then conforming with such rules must be vastly beneficial; . . . it could not exist in a world where individuals were set against each other, all against all, in an unregulated scramble for food and still more progeny" (p. ix). The primary function of social behavior is therefore "to regulate the population, by controlling reproduction, or thinning the numbers down to a density the food resources can support" (p. 9). Further, "population homeostatis, complex pro-

cess though it is, appears indeed to be one of the most universal faculties in the animal kingdom; and, of course, it is one that could not evolve without group selection" (p. 350).

Critics of Wynne-Edwards's 1962 book challenged his arguments for a variety of reasons, but the problem of cheaters was paramount. How could social cooperation evolve by group selection if selfish individuals, which do not bear the costs of social sacrifices, enjoy higher fitnesses than the social conformers? In Wynne-Edwards's view, this problem was a consequence of incorrectly assuming that cooperative individuals "would have to forfeit some of their potential fitness, as compared with their freeloader non-cooperative rivals." Instead, Wynne-Edwards now argues, "the cooperators would be able to hand on to their successors well cared-for, productive habitats, [but] the freeloaders would be unable to prevent their own numbers and conflicts from escalating, with the result that their habitats would be stripped of renewable assets in a ruthless pursuit of personal fitness. . . . cooperative populations in well-conserved habitats would speedily and easily attain higher mean fitnesses than self-seeking individualists could maintain" (pp. 12-13). If true, this argument might explain the superiority of a cooperative group over a group comprised of cheaters, but it does not resolve the problem posed by individual cheaters within a social group. Wynne-Edwards apparently believes that social groups are so tightly organized that such individual cheaters will be cast out of the group straightway.

After reviewing his 1962 hypothesis, Wynne-Edwards devotes five chapters to various aspects of food limitation and nutrition. Here he develops his view that food (or other resources) are usually limiting to populations and that social conventions function to ensure that this limitation does not lead to unmitigated strife. The evidence is mainly anecdotal rather than quantitative, and some of the material seems only vaguely relevant to the main thesis of the book.

Chapters 7-13 present a detailed review of the research on Red Grouse (*Lagopus lagopus scoticus*) conducted by Jenkins, Watson, Moss, and their colleagues in the heather moors of Scotland. This long-term study was initiated in part to test Wynne-Edwards's earlier ideas, and it provides the bulk of the evidence bearing on the theme he develops in the present book. Red Grouse are territorial birds that feed primarily on heather, and there is a close relationship between territory size and population density. Territory size and territorial behavior, in turn, reflect the amount and quality of food available. Much of the mortality of adults is induced socially as a consequence of territorial exclusion. Thus, the social system, by regulating densities of local populations in relation to variations in local food conditions, can prevent overgrazing of the heather. Wynne-Edwards's detailed account of the Red Grouse research is fascinating, and

the basic features are consistent with his hypothesis. There is no direct evidence that the social traits of the grouse must be consequences of group selection, however, and the traits may be interpreted just as readily in terms of classical individual selection.

The remainder of the book is devoted to further development of the hypothesis with reference to population cycles and the group structure of populations, extensions of the argument to examples from other organisms (gastropods, fish, and platyhelminth parasites), and considerations of group selection in relation to individual and kin selection and to the integration of multispecies communities. Throughout these chapters, Wynne-Edwards does not waver from his underlying thesis. Philopatry is viewed as an adaptation "that enables descendants to benefit from the habitat conservation of their ancestors" (p. 173). Longevity and polygamy are group adaptations that optimize the genetic structuring of demes or socially defined "in-groups." In integrated multispecies communities, "every species could be contributing something positive to the welfare of the whole, and every species consequently made more secure and productive than it would have been, had it lacked the interspecific support it receives" (p. 325). Kin selection provides no better explanation of the evolution of group traits than does individual selection, because "inclusive fitnesses" are coincident with individual lives, and just as transitory" (p. 332). The book is written in a rambling, conversational style that, although lightening the reading, has the effect of loosening arguments that are already rather loose.

To test Wynne-Edwards's ideas, one must document that (1) individuals behaving cooperatively in a social group do indeed fare better than cheaters, (2) cooperation results in an optimal level of resource use (or underutilization), (3) variations in resource availability or quality, or both, are reduced in comparison with resources used by less cooperative groups, (4) socially organized populations exhibit less variation in abundance than less social species, and (5) social traits that facilitate these patterns are consistent with the operation of group selection but could not have arisen (or would arise far less readily) from individual selection. Although Wynne-Edwards addresses all of these points, he emphasizes the qualitative consistency of observations with the hypothesis rather than a careful, quantitative consideration of alternative views, and he resorts far too often to assertions or story-telling to support his thesis. When alternative hypotheses are considered, they are generally dismissed merely by asserting that they are incorrect or inadequate. The key points of the entire argument, whether the group traits Wynne-Edwards discusses really function to conserve resources for future generations and whether these traits could have evolved only by group selection, are never subjected to quantitative tests or even to logically rigorous arguments. The truth of the first is inferred from the

apparent consistency with the examples he describes, whereas the second is simply asserted to be true.

Thanks to the analyses of Wilson, Wade, and others, group selection now enjoys greater respectability as a possible evolutionary force than it did when Wynne-Edwards published his earlier book. It may even account for the evolution of cooperative social organizations, as Wynne-Edwards claims. But to establish this with any degree of confidence requires that the essential points of the argument be assessed in a careful, quantitative fashion and that alternative hypotheses be subjected to equally rigorous tests. In "Evolution through Group Selection," Wynne-Edwards has updated and reinforced his earlier arguments about the evolution of social traits. As before, however, he has relied on consistent examples and strong assertions to prove his case. In so doing, he has failed to provide the necessary evidence or logical arguments to corroborate his hypothesis and falsify the alternative hypothesis of individual selection. The book is thus a disappointment.—JOHN A. WIENS.

Threatened birds of Africa and related islands.

The ICBP/IUCN Red Data Book, part 1.—N. J. Collar and S. N. Stuart. 1985. Third ed. Cambridge, England, International Council for Bird Preservation and International Union for Conservation of Nature and Natural Resources. xxxiv + 761 pp., 12 color plates. ISBN 2-88032-604-4. £24.00.—The Red Data Book series is the official catalogue of the world's endangered species. The volume on birds has now embarked on its second major revision since its initial compilation by J. Vincent in 1966. The first revision, by W. B. King, appeared in 1978. The 3rd edition abandons the loose-leaf binding, which facilitated updating, and the 1- or 2-page accounts of each of the world's endangered species in favor of a bound edition with expanded treatment of a larger selection of species from a limited geographical area. Part 1 of the 3rd edition, covering only Africa and its islands, is longer than the entire 2nd edition, which was global: individual species accounts are now as long as 35 pages. Three additional parts of the 3rd edition (covering, in order, the Americas, Europe and Asia, and Australasia and the Pacific) will appear over the span of perhaps a decade.

Species accounts cover distribution, population, ecology, threats, conservation measures taken and proposed, remarks, and references. Twelve original color plates by Norman Arlott depict species at particular risk, not seen for 50 or more years, and species not previously illustrated. The presence of the plates seems incongruous in what is otherwise a reference book. The greatly expanded length of the new multipart edition and the added expense of typesetting and color plates mean that the total cost of complete,

4-volume coverage of the world's endangered birds will be several times that of previous editions. Because the various parts will be published in a staggered fashion, there will no longer be an up-to-date Red Data Book for all the world's endangered birds. One wonders for whom the expanded prose and elaborate format will be worth the increase in cost and loss of convenience.

To present the most comprehensive and current information available, the authors relied heavily on citations based on *pers. comm.*, *in press*, *in litt.*, and unpublished reports not subject to peer review. To avoid potential problems that might arise from this approach, the authors circulated drafts of species accounts "to individuals likely to be able to provide informed comments, corrections and additional data." In some instances their failure to contact authorities led directly to biases and seeming contradictions that could have been resolved readily. For example, one report of an 83-ha mean home-range size for the Seychelles Kestrel (*Falco araea*) is contrasted with a mean territory size of 40 ha, reported by another researcher, in such a way as to create the impression that the two reports were at odds, when, in fact, they were not. In the account of the Cape Vulture (*Gyps coprotheres*), the authors biased their material toward one faction in a real scientific controversy over population numbers and the importance of nestling mortality. The fact that there were dissenting views is not mentioned. Despite such inevitable difficulties, the authors have done a remarkably thorough job of ferreting out sources of information.

Of 172 species covered, 2 are categorized as extinct, 28 as endangered, 15 as vulnerable, 31 as indeterminate, 78 as rare, 18 as insufficiently known, 1 as out of danger, and 4 as of special concern. Selection of a category for each species appears to have been subjective. Information on how the authors decided which category best described each species' status would have been instructive. Distinctions between categories are not trivial; they can sometimes determine whether or not a conservation project gets funded.

Following the species accounts are 7 appendices. The first two list all species by country of occurrence and category of threat. The third gives a lengthy annotated list of 93 species categorized as "near-threatened." Other appendices provide information on threatened species recorded in Africa but being covered in other parts of the series, threatened incipient species, subspecies treated in the 2nd edition (subspecies are not otherwise covered in the 3rd edition), and candidate species given lower priority than species treated elsewhere in the volume. An index to Latin and English names completes the volume.

Some contend that focusing conservation work on individual species is a misplaced emphasis and that conservation of ecosystems is the only conservation we can afford today as extinction rates increase to unprecedented levels. Yet the Red Data Book will

continue to play its role, particularly when reference is made to clusters of threatened species within the same ecosystem. Conservation of individual species will continue to have merit, for educational and promotional value can be derived from such conservation efforts. Reference to nonavian threatened species that share habitats with threatened birds would have greatly increased this volume's applicability to ecosystem conservation.

Collar and Stuart perceive a different role for the Red Data Book than that filled by previous editions. The level of detail, the restricted geographical scope, the increased cost, and the length of time between revisions will restrict the market for the current edition. Ornithologists working in Africa and bird conservationists who feel they must keep up with information on endangered birds will want this book despite these problems, but it will be of less interest than previous editions to most ornithologists. We urge ICBP to publish a companion volume that assesses the status of all endangered species with less detail, but in a more useful and timely fashion. Endangered birds are of global concern, and whole avifaunas can be wiped out in a decade these days. With 7% of the African avifauna now at risk, we hope this volume will provide researchers and managers with the information and impetus to develop conservation programs that begin to address the situation. The success of the volume depends on how well it helps stimulate such activities.—WARREN B. KING AND STANLEY A. TEMPLE.

OTHER ITEMS OF INTEREST

Die ausgestorbene Vögel der Welt.—Dieter Luther. 1986. Third ed. Wittenberg-Lutherstadt, Die Neue Brehm-Bücherei No. 424. A. Ziemsen. 216 pp., 43 black-and-white illustrations. DM 21.00.—This popular book about the extinct birds of the world is now presented in a third edition. The introduction deals in detail with the MacArthur-Wilson theories of insular extinction, especially as applied by Terborgh to extinction-prone species and as affected by human activities. The distribution of extinctions over the last 400 years on the islands of Oceania has been almost twice as great as in all other geographic regions combined.

The bulk of the book lists the extinct species, in systematic order; describes their morphology and measurements, data on their former distribution, and their life history and behavior if known; and presents a critical evaluation of the time, circumstances, and reasons for their extinction. A detailed listing and discussion of the extant specimens in the museums of the world follows, often with accurate data on sex, age, and measurements of these specimens. The 43 illustrations concern 33 species, many of them the

well-known reproductions of the Rothschild series of Hawaiian drepanine finches.

A literature list of 323 items is extremely handy for readers who want to complement their knowledge about extinctions; many of the references to specimens in museums of both Germanies are not easily obtainable from the copious English-language literature on the subject.—MIKLOS D. F. UDVARDY.

Anatomia avium domesticarum.—Vladimír Komárek. 1979. Bratislava, Czechoslovakia, Příroda. 162 pp., 101 plates, 18 text figures. Cloth, 70 Korunas. **Anatomia avium domesticarum et embryologia galli.**—Vladimír Komárek, Lubomír Malinovský, Leo Lemež, and others. 1982. Bratislava, Czechoslovakia, Příroda. 205 pp., 143 plates. Cloth, 110 Korunas.—These attractive anatomical atlases, measuring about 35 × 27 cm, provide detailed illustrations, mainly in color, for domestic geese, ducks, chickens, and turkeys. The first volume provides a general introduction to avian evolution and covers the external body regions and osteology. The second treats the arthrological, myological, digestive, respiratory, urogenital, circulatory, nervous, sensory, and integumental systems and the embryology of the chicken, including development of the blood cells. Latin terms in the labels of most illustrations enable those unfamiliar with the Slovak language of the text to use the figures and plates. The first volume contains a useful bibliography related to osteology and 12 pages of synonyms in Latin, Slovak, and Czech for anatomical terms used in external topographic anatomy and osteology. These volumes will interest avian anatomists and others working with Anatidae or Galliformes and should be included in libraries with comprehensive holdings in ornithology, anatomy, or veterinary medicine.—GEORGE A. CLARK, JR.

Pocket guide to the birds of Borneo.—Charles M. Francis. 1984. Petaling Jaya, Selangor, Malaysia, Sabah Society and World Wildlife Fund Malaysia. 123 pp., 41 color plates, 4 black-and-white plates. ISBN 967-99947-0-8. Malay \$10.00.—This small (6¼ × 4½ × ½ in.) guide consists of reductions of the plates from Smythies' "Birds of Borneo" with a facing caption page. The caption pages have the English and scientific names and length in centimeters for each species. There is brief identification or range information for perhaps 60% of the species illustrated. Although not a complete guide, its small size and stiff, water-resistant paper make it useful to stuff in a pocket while afield, leaving the large and heavy Smythies' volume at home or in your hotel room. The plates are excellent and well reproduced, the text material useful. I use it in the field and recommend it.—BEN KING.

New colour guide to Hong Kong birds.—Clive Viney and Karen Phillipps. 1983. Third ed. Hong Kong, Government Printer. 194 pp., 77 color plates, 1 black-and-white plate, 10 figures, 3 maps. No price given.—Completely revised and enlarged, this useful guide to the 400+ species known from Hong Kong is arranged with a color plate and caption/text page facing it. Nearly all species are illustrated in color. Useful flight plates are provided for hawks, shorebirds, gulls, and terns. Text accounts are 4–19 lines long and give English, scientific, and Chinese names; length in inches; description and field marks; habits and habitat; status; distribution in Hong Kong; and range. Good birding areas in Hong Kong are described in the introduction.

The plates range from fairly good to excellent. Be cautioned: browns are often rusty, and rusty or rufous tones frequently turn out red. The brief textual material is useful. Most birds seen in Hong Kong could be identified readily with this book—a good and attractive buy.—BEN KING.

The Arctic and its wildlife.—Brian Sage. 1986. New York, Facts on File Publications. 190 pp., 129 plates, 38 text figures. ISBN 0-8160-1083-8. \$24.95.—In a minimal number of pages, along with some excellent graphics, Sage has produced an interesting introduction to the Arctic. The coverage is worldwide, and each page is packed with relevant details. After defining the Arctic he follows with chapters on topography, climate, and the marine and terrestrial environments. The organisms are introduced in chapters on adaptations of animals and plants, the circumpolar flora, arctic insects, birds, and terrestrial and marine mammals. Space is clearly a limiting factor in chapters that average just over 15 pages each. But the text is supplemented by technically excellent and appropriate photographs, diagrams, and maps.

The single chapter on "Breeding birds" includes sections on migration, breeding biology, tundra bird communities, and a general discussion of marine birds. All of this is accomplished in 34 pages, the longest chapter. In each section Sage develops specific ideas or approaches and packs in an impressive amount of information. The chapter also includes "selected species accounts" that are short and succinct, and contain useful citations. The sketches are arranged by order and focus only on one or a few species. There is an appendix that lists 183 species worldwide as arctic breeders.

Sage presents many facts about the shape and environment of the Arctic and the organisms that live there. The information is accurate and useful, but brief—literally only a snapshot. I found the best place to get a history of the relationship of humans to the Arctic and how it feels to be there is from Berry Lopez's "Arctic Dreams" (1986, New York, Scribner's Sons).—A.H.B.

Life histories of North American diving birds.—Arthur Cleveland Bent. 1986. New York, Dover Publications. 320 pp., 55 plates. ISBN 0-486-25095-4. Paper, \$6.95. **Life histories of North American gulls and terns.**—Arthur Cleveland Bent. 1986. New York, Dover Publications. 337 pp., 93 plates. ISBN 0-486-25262-0. Paper, \$8.95.—These are “republications” of the 1963 Dover editions. They were, in turn, published by the U.S. Government Printing Office in 1921 as Smithsonian Bulletins 107 and 113.—A.H.B.

New England wildlife: habitat, natural history and distribution.—Richard M. DeGraaf and Deborah D. Rudis. 1986. U.S. Department of Agriculture. General Technical Report NE-108. 491 pp., figures, numerous drawings and maps (unnumbered). No price given.—Although reptiles, amphibians, and mammals are included, 52% of the species accounts and over 55% of the pages of this report are dedicated to birds. The taxonomic sections are organized alike for all groups.

Each major section begins with complex, multipage matrices that give details of the habitats for each species. The matrices indicate species occurrence and usage in forested and nonforested conditions. The nonforested habitats are divided into three categories: terrestrial, wetlands/deep water, and other. The forested types are indicated by the dominant tree species, and each is illustrated by a full-page photograph. Each of the types is divided subsequently into numerous subcategories. A color-coded system indicates which season and for what purposes (e.g. breeding, feeding) the habitat is used. The preferred and utilized habitats are indicated. Human use of habitat (i.e. saw timber) is indicated also. The patterns generated by these matrices are often indicators of change in the ecology of an area and its usage by animals. The authors consider these matrices the most important part of the report.

Each species is illustrated by a line drawing. The species accounts include range, relative abundance in New England, habitat, species habitat requirements, nesting (dates, clutch size, nest site, significant phases of the young), territory size, sample density, foraging, comments, and key references. Accounts vary from a few lines to full, double-column pages. As a result the details presented also vary immensely.

The stated purpose of the report is to “aid foresters and forest wildlife biologists in assessing the potential effects of proposed habitat management practices on wildlife species.” It may help, as it provides a data base. It is a very different approach from that in recent reports on the Red-cockaded Woodpecker (1986, *Auk* 103: 848) and the Spotted Owl (Audubon Soc. Spec. Rept.). Given the rate and extent of change New England is experiencing, the information is only a small step. Local governments, wetland and zoning commissions, and commercial developers may find it useful in their planning.—A.H.B.

The birds of Mount Nimba, Liberia.—Peter R. Colston and Kai Curry-Lindahl. 1986. London, British Museum (Natural History). 129 pp. ISBN 0-565-00982-6. £17.50.—This slim volume documents a major environmental disaster. Mt. Nimba is an isolated massif that straddles the borders of Guinea, Liberia, and the Ivory Coast. In 1955 iron ore was discovered on the Liberian portion, and extensive mining activity ensued. Guinea and the Ivory Coast have maintained their portions as natural reserves. In stark contrast, the mining activities in Liberia produced enormous ecological change. The forested mountainside has been reduced to a denuded landscape, the watercourses devastated, and significant portions of the mountain's topography destroyed.

Curry-Lindahl proposed in 1958 that the developers (Liberian-American-Swedish Mineral Company, LAMCO) institute a program of long-term biological studies of the area. This volume is one product of that effort.

A series of black-and-white photographs gives a sense of the ecological damage. It is outrageous that what began as lowland rain forest, literally for as far as one could see, was reduced to scarred remnants, secondary-growth scrub, a town for 15,000 people, an industrial plant, and roads. Strip mining led to erosion, streams were silted, and the wildlife changed. All this in the course of just three decades.

The message is that humans are capable of inflicting massive damage on the environment. The bulk of the book is a systematic list of the birds in the area. Fifty-five families are treated. The species accounts include specimen dates and sex, impermanent colors, stomach contents, annual cycle, migration status, and habitat. An appendix lists body mass and wing, tail, and bill dimensions. The species accounts are very short but citations of the supporting literature are adequate to provide a larger biogeographical context.

Color photographs are used with great efficacy to show the ecological changes and illustrate three rare bird species. There is a color plate by Phillip Burton of two new species (*Melaenoris annamarulae* and *Melignomon eisentrauti*).—A.H.B.

A guide to foraging methods used by marine birds in antarctic and subantarctic seas.—P. C. Harper, J. P. Croxall, and J. Cooper (Compilers). 1985. British Antarctic Survey, Biomass Handbook No. 24. 21 pp. Available free from Information Office, British Antarctic Survey, Madingley Road, Cambridge CB3 0ET, U.K.—Derived from Ashmole's (1971) analysis, this little volume describes briefly the feeding techniques of marine birds. There is a current bibliography of 91 items, all in English. A table summarizes methods and food types for almost 70 species.—A.H.B.

The birds of ancient Egypt.—Patrick F. Houlihan. 1986. Warminster, England, Aris & Phillips (distrib-

uted in North America by Humanities Press, Atlantic Highlands, New Jersey 07716). xxix + 191 pp., 1 color plate, 199 figures. ISBN 0-85668-283-7. \$49.95.—Here is a considerable piece of scholarly detective work, and a lot of fun. Published in England and distributed in North America by Humanities Press, it is subtitled Vol. I of the *Natural History of Egypt*. The volume discusses more than 70 species as depicted in Egyptian art. The images range in age from predynastic (4500 year BCE) through Ptolemaic times (~250 BCE).

Each species description includes the characteristics used in its identification, current distribution in Egypt, and "comments." The latter are eclectic and include details of the birds in the figure such as colors; condition of the painting, carving, or sculpture; and museum or site locations. Often some historical or cultural perspective is presented, and particular effort is made to identify any special role the species played in the religious or social context of the period. Ecological factors, such as the association of the Egyptian Vulture (*Neophron percnopterus*) with human settlements, are correlated with known population or social changes.

The examples of carvings, paintings, sculpture, and jewelry are chosen carefully to illustrate changes in artistic interpretations and style, and the high level of craftsmanship reached in different dynasties. Where appropriate, information on various species' use as human food, as religious objects, in decoration, or in aviculture is given.

A checklist of the birds of Egypt by Steven M. Goodman is presented as an appendix. In addition to an update of the 1930 list of Meinertzhagen, a transliteration of colloquial Egyptian Arabic names is included. The "Explanatory notes" are useful and, I

suspect, answer questions that amateurs often frame concerning this rather nontraditional method of information dissemination.—A.H.B.

William L. Finley, pioneer wildlife photographer.—Worth Mathewson. 1986. Corvallis, Oregon, Oregon State University Press. xii + 197 pp., text figures. ISBN 0-87071-351-5. \$29.95.—The photographs of the California Condor in this volume are known to most western birders, as they have been a part of the lore of this species. They were taken in 1906, but are only a small part of the legacy of work represented in this book. Finley (1876–1953), his friend Herman Bohlman, and Irene Barnhart Finley, his wife, produced an historic collection of still and motion pictures.

Finley was an active conservationist, helped form Oregon's Fish and Game Commission (1911), and eventually became State Game Warden. He spent considerable time in the field, and a large portion of the photographs document these activities in the early years of this century. Travel was by wagon or boat, and equipment was primitive. But Finley's accomplishments were impressive. He was responsible for the reintroduction of elk in Oregon and developed programs in hunter safety and fish stocking. With his wife he produced numerous books and motion pictures that were important in establishing the awareness of conservation in the United States. These photographs cover a wide range of activities, with some unusual shots of nesting birds and camera coverage of the climbing techniques involved. All the more impressive as they used large-format, glass-plate equipment.—A.H.B.