# 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.*

**An atlas of past and present pollen maps for Europe: 0-13000 years ago.**—B. Huntley and H. J. B. Birks. 1983. Cambridge, England, Cambridge University Press. xiv + 667 pp., numerous figures, tables, appendix; 34 acetate overlay maps in separate folder; book and overlays in boxed set. ISBN 0-521-23735-1. $185.00.—About six years ago, while I was reading extensively to prepare a graduate course in biogeography, I began to realize the full significance of the work of authors like Margaret Davis, John Birks, Hazel Delcourt, Paul Delcourt, Brian Huntley, Thompson Webb, III, and others, who were attempting to map the distribution of plant taxa and to reconstruct the vegetation of western Europe and of North America during the late Pleistocene and Holocene. The potential impact of the Cooperative Holocene Mapping Project (COHMAP) was barely appreciated then by most ornithologists or by other animal evolutionists interested in the eco-geographical pathways of speciation of our favorite taxa during the late Quaternary. We all worked on the premise that the advances and retreats of glaciers squeezed parts of biota into refuges, a process that reversed itself on a cyclic basis. Such events allowed the geographical separation of species populations into isolates, the raw material for later allopatric speciation. When I finally saw the Atlas of European maps published by Huntley and Birks, I somehow knew that our reconstructions would have to be worked out all over again. The extraordinarily complex migrations of various plant taxa, and even more, the fact that vegetation types unlike those we know today were composed and unmade repeatedly during the last 20,000 years or so, was here for all to see. Eventually, we will have to rethink the speciation events in genera like *Alectoris, Certhia, Oenanthe, Parus, Phylloscopus,* or *Sylvia* in Europe, or *Colaptes, Dendroica, Icterus, Parus, Pheucticus, Oporornis,* or *Sturnella* in North America. We will have to recreate the fate of vegetation types with the close help of our colleagues in paleo-palynology, and to have a fresh look at some of our cherished concepts, including that of refuges.

Huntley and Birks had two main goals. The first was "to present the available pollen-stratigraphical data for the European late-glacial and Holocene in a form that displays the major patterns of spatial variation in the data." The second was to "display major patterns of expansion and retreat of taxa, the directions and rates of migration, and the possible location of glacial refugia for the forest trees of Europe" (p. 7). The core of the Atlas (Chapter 5, Fossil pollen maps, pp. 72–554) consists of 377 maps with detailed annotations for 55 taxa grouped into trees, shrubs, and lianes (37 taxa), dwarf-shrubs (2), herbs (8), aquatics (3), pteridophytes (4), and others (*Sphagnum*). Detailed examination of these maps has convinced me that these goals have been achieved with great success.

The maps are called isopoll maps, where the isofrequency contours of a given pollen type are drawn by lines that join "geographical localities with the same pollen percentage for a given taxon at the time for which the map is drawn" (p. 2). Thus, not only is the presence or absence of the taxon indicated, but also, and most importantly, its relative abundance in the total pollen record. As the authors state, their maps do indeed "provide a simple and effective means of summarising large and complex sets of pollen-analytical data and of displaying major patterns of spatial variation in such data at selected times in the past" (p. 2). Over 800 localities were available to Huntley and Birks for their maps, and they estimate that the temporal resolution of their data is about 500 radiocarbon years. All maps use an Albers Conic Equal Area projection at the scale (originally) of 1:10,000,000.

To take an example, for deciduous oaks (*Quercus*) there are isopoll maps for the time periods 13,000, 12,000, 11,000, 10,500, 10,000, 9,500, 9,000, 8,000, 7,000, 6,000, 5,000, 4,000, 3,000, 2,000, and 1,000 yr BP. In such a time series one can easily see that 13,000 yr ago deciduous oaks were restricted to the southern tips of the Balkan, Italian, and Iberian peninsulas. By 11,000 yr BP these trees occupied the entire three peninsulas. By 9,500 yr BP they had reached all of southern Europe from England to the Black Sea. Southern Scandinavia was occupied about 7,000 yr ago, when deciduous oaks were nevertheless still most abundant at the southern tips of the three Mediterranean peninsulas. Other taxa have quite different histories. Elm (*Ulmus*), for instance, was extremely scarce in Europe between 13,000 and 11,000 yr BP but started to appear in southeastern and south-central Europe about 9,500 yr BP. From that time on the genus increased in abundance, but its advance was not uniform and took place on several fronts or from several centers. By about 6,000 yr BP elm had reached westward to Ireland, southward to the northern limit of the Mediterranean-climate region (as we know it today), and northward to central Scandinavia. Retreat was sharp thereafter, so that by 5,000 yr BP the oc-

currence of *Ulmus* was quite restricted geographically and its abundance greatly reduced. The decrease continued to such an extent that by 1,000 yr BP elm "pollen is sparsely scattered across Europe with only a few localised areas of consistent" occupation in western and eastern Europe (p. 432).

Such descriptions cannot render accurately the numerous impressions one receives from careful study of these and the other maps in this unique Atlas. This book simply has to be studied at leisure. The maps have to be scrutinized individually, then compared, and finally overlapped in one's mind. Overlays have to be placed on them, and further comparisons have to be made then. (The 34 overlays include such items as latitudes and longitudes, national boundaries, topography and major river systems, site distributions every 500 radiocarbon years, and reconstructions of the ice sheets at 9,000, 10,000, 10,500, 11,000, 12,000, and 13,000 yr BP.) Finally, Chapter 6 (pp. 555–634), entitled "Discussion and conclusions," has to be read and reread. I say reread because the authors' conclusions are expressed largely in statistical terms because they used principal components analysis to untangle the web of single-taxon patterns that may mask an understanding of the whole picture, and one needs to be sharp about the significance of the graphic and tabular overviews. The climax of the Atlas is the vegetational reconstructions at 2,000, 4,000, 6,000, 8,000, 9,000, 10,000, 10,500, 11,000, 12,000, and 13,000 yr BP. I will not give away the plot here, but will nevertheless say that of the 21 vegetation units characterized by Huntley and Birks for the late-glacial and Holocene, as many as 10 have no analogue in modern vegetation, an idea that should make us pause when we nonpaleoecologists reconstruct past vegetation for our bird taxa.

"The overall value of the maps should . . . be assessed by the extent to which they generate new testable hypotheses," state the authors on the last page. Clearly, Huntley and Birks have paleoecological hypotheses in mind. But for other specialists, such as ornithologists, the value of the maps also lies in the challenge they offer us. We can now look, as it were, at the ebb and flow of plant taxa and of vegetation types every 500 yr or so. We are now in the position of attempting to reconstruct speciation in consumer organisms against an environmental background that has reached a degree of precision not even thought of a couple of decades ago. How we will carry out this task is not clear yet. To help bring this extremely important body of work to the attention of the ornithological community, my colleague Edward Connor and I asked Brian Huntley and Thompson Webb, III (whose stimulation, we are told in the preface, was instrumental in the preparation of the Atlas) to describe their studies during the biogeography symposium we organized at the International Ornithological Congress in Ottawa in 1986. I urge all ornithologists whose research involves Pleistocene and Holocene reconstructions of distribution patterns to read the papers by Huntley and Webb in the I.O.C.'s Proceedings and to acquire the Atlas.—FRANÇOIS VUILLEUMIER.

**[The artist brothers von Wright. The most beautiful bird paintings of Finland.]**—A. Leikola, J. Lokki, and T. Stjernberg. 1986. Helsinki, Finland, Valitut Palat/Readers Digest. 288 pp., richly illustrated in color. Distributed by Otava Publ. Co., Uudenmaank. 8-12, Helsinki, Finland. ISBN 951-9079-62-9. 390 FIM (about $80).—Three von Wright brothers, Magnus, Wilhelm, and Ferdinand, made history in the last century as nature artists. Their great-grandfather, a Scottish nobleman, served the Swedish king in the 1700's. Knighted in Sweden, he settled in Finland, then a Swedish province. Like most Swedish landowner families, the von Wrights remained when Finland became a satellite of Russia in 1809. Thus, the famous brothers, born in 1805, 1810, and 1822, were (and their late descendants still are) part of the Swedish-speaking minority in Finland. With an English name (pronounced phonetically as "vregt") with the prefix "von" (German!) indicating their title, speaking Swedish and feeling Finnish, they were typical products of northwestern Europe.

All three artist brothers showed their talent at an early age. Magnus, the eldest, had access to an illustrated Swedish Fauna at the age of 7 and copied the pictures of birds. He drew horses with strong coffee instead of paint, which he lacked. His father encouraged the talented boy, and at 13 he began to paint birds from nature. Bird hunting and taxidermy were natural companions, if not prerequisites, for his passion of painting birds, and at 19 he donated a series of bird skins to the Society for Fauna and Flora of Finland. At 21 he published 3 years' data on the spring arrival of migrants in Finland based on his own observations. The same year (1826) Magnus traveled to Sweden to study. His excellent bird paintings attracted a wealthy patron, who engaged him to paint all the birds on his estate. The task was too big to be accomplished alone, so Magnus called for his younger brother Wilhelm, 18. Together they published the magnificent *Svenska Foglar* ("Swedish Birds," 1828–1838), in 30 installments. Later Magnus returned to Finland and married. With growing fame, his taxidermist job changed to "painting master," viz. scientific illustrator, of the University. Though in want of formal schooling, Magnus published scientific works on the faunistics and phenology of the Finnish avifauna. He also painted Finnish landscapes and was considered a leading artist of the country when his "Birds of Finland, Part 1" appeared (1859). Magnus wrote more scientific papers, donated more bird specimens to the public collections and, above all, painted. He also worked on the second part of "Birds of Finland" but never finished. It appeared in 1873 post-

humously, edited by J. A. Palmén, another Finnish investigator.

The young Wilhelm von Wright also began to paint, from nature, in his early teens. When brother Magnus took him to Sweden he quickly gained fame there. He became illustrator for the Scientific Academy at the age of 25. By then he had published a series of aquarelles of butterflies and illustrated the "Fishes of Scandinavia," published 1836–1857. Wilhelm married and settled in Sweden, revered as the best animal painter of that country. After a stroke in 1856 he did not paint any more.

Ferdinand, 12 years younger than Wilhelm, likewise showed remarkable talent early on with a keen interest in nature, extraordinary coordination of eyes and hand, and extraordinary memory for forms and color. His brother Wilhelm took him to Sweden to help with the paintings assigned to him. Ferdinand painted birds and attended the Stockholm Art Academy. Later, as an accomplished bird and landscape artist, he returned to Finland and settled on the family estate. He often traveled to Sweden, and painted at his bedridden brother Wilhelm's residence. In the last decades of his life he suffered from strokes and other ailments, but continued painting until his death in 1906.

The above abstract is taken from the first chapter of a marvelous oversized book on the life and accomplishments of the von Wright brothers. This chapter is illustrated with excellent color prints of animal paintings, landscapes, portraits, still lifes, and ethnographic tidbits by the three artists. The bulk of the book, however, is a series of accounts of bird species. Each account includes a full-page reproduction of a painting by one of the brothers and a page of text with smaller illustrations of the same bird. The von Wright brothers were masters of details when it came to plumage and soft parts. For example, the Herring Gull (*Larus argentatus*) shows an adult in breeding plumage by Ferdinand (1839); another, smaller reproduction by Wilhelm (1838) shows an "old bird in winter plumage"; and a third, by Magnus (1837), represents a bird in its third autumn, stretching its wing, showing the mixture of old, brownish and molted, gray feathers. All three are excellent aquarelles. A group of Bohemian Waxwings (*Bombycilla garrulus*) feasting on mountain ash berries, rendered in oil by Ferdinand in 1876, is artistically the most advanced painting, foresaging the style of the Swede Bruno Liljefors. In comparison, the 1829 aquarelle of the same species by Wilhelm is a tad dark (by age?), and the aquarelle of the juvenile bird, by Magnus (1850), is a tad light. Yet, the three were chosen skillfully by the authors-editors, so the individual style of the three brothers can be compared.

Some 100 of northern Europe's birds are illustrated in a variety of plumages, all by the most realistic bird artists of the continent in the last century. Though the book is written in Finnish, the paintings alone make it a treasure. As we leafed through these pages we came to realize that over half of the birds depicted by the von Wright brothers are also members of the North American avifauna. Most of the birds inhabit the circumpolar boreal forest, or the northern wetlands, or were introduced here from Europe. The accompanying text deals with their distributional history in Fennoscandia, often pointing out some historical facts relating to the research of the von Wright brothers (e.g. establishing that the white-tailed and all-dark specimens of the Sea Eagle, *Haliaeetus albicilla*, were age-related plumages of the same species) or the present precarious existence of many threatened and vanishing birds. In other cases they are tidbits of life history, behavior, and migrations.

Artists, zoologists, and art historians for over a century have appreciated the color plates the von Wright brothers produced for *Svenska foglar, Skandinaviens fiskar*, and other volumes. Those tomes now are rarities and fetch large sums when one appears at an art auction. In this volume, prepared with the best skill of the renowned Finnish publishing industry, the ornithologists of the world are given a chance to become acquainted with the work of 3 European Masters. The art of the brothers, especially of Ferdinand von Wright, is in a class with those better-known bird painters of the 19th century, Audubon and Gould.—MAUD E. UDVARDY AND MIKLOS D. F. UDVARDY.

**The naturalist's field journal.**—Steven G. Herman. 1986. Vermillion, South Dakota, Buteo Books. viii + 200 pp. ISBN 0-931130-13-1. Paper, $14.00.—What has come to be known as the "Grinnell System" of taking field notes evolved in the early 1900's at the Museum of Vertebrate Zoology, University of California, Berkeley. Although the origin of this style of record keeping is somewhat obscure, Joseph Grinnell was certainly its chief proponent. This simple yet systematic scheme enabled Grinnell and his associates to record meticulously the details of natural history and distribution of California vertebrates for four decades. Importantly, this technique did not die along with Grinnell in the late 1930's; other vertebrate zoologists at the MVZ, notably Alden H. Miller, refined the system and perpetuated it through several generations of academic offspring. The method is now widely applied by field biologists at many other institutions in the United States and elsewhere (e.g. Argentina, where indigenous efforts are underway to inventory faunas).

In brief, the system consists of three components, all handwritten in the field: a daily *journal*, in which are entered the date, locality, weather, description of habitats encountered, lists of species observed, and general remarks; *species accounts*, which include notes on individual species; and a *catalog*, a sequentially numbered list of preserved specimens with annota-

tions on sex, reproductive condition, various measurements, and other notes where appropriate. The basic structure of the system allows great discretion and flexibility regarding content. This important attribute encourages the prolific writer to describe local conditions thoroughly and to put down other information of potential interest that might otherwise go unrecorded.

Herman's booklet represents the most thorough discussion to date of this note-taking method. His exhaustive treatment ranges from a review of the highlights of Grinnell's life through a painstakingly detailed description and analysis of every conceivable aspect of format and content. One and one-half pages are devoted solely to the technical pen. He even includes an astute observation, apparently from personal experience, on the relationship between volume of beer consumed during note writing and both the penmanship and quality of notes. Although the relationship may not be linear, it is clearly inverse. Herman also effectively plays the role of Dutch uncle, exhorting the fieldworker to write complete notes despite exhaustion, illness, or other competing priorities. "Don't dread the writing and don't spend hours in preparation for it. Just sit down and do it." "NO JOURNAL THIS DAY, NO SLEEP THIS NIGHT." The discipline that Herman's attitude encourages would have pleased Grinnell.

One chapter, "A primer in field ornithology," written in part to answer the beginner's inevitable question, "What do I write about?," conveniently summarizes topics such as field identification, estimating numbers, age and sex differences, molt, behavior, territoriality, and, especially, breeding biology. This chapter would be a very useful assignment for undergraduates taking their first course in field ornithology.

A significant question remains. Given the availability of portable tape recorders and computers, is the Grinnell style of handwritten field records obsolete? The answer is an emphatic "no," and Herman clearly agrees: "The fact of the matter is that the Grinnell System . . . has much to offer the modern student. No science can be done without the kind of self-discipline it encourages. No good field work can be reliable without a written record, set down in the field." This is not to say that descriptions of rapid behavioral sequences should not be dictated into a tape recorder (or captured on movie film) and later transcribed into formal field notes. Detailed habitat descriptions and foraging motions could be recorded in similar fashion. But there is an enemy lurking in this process. Only one who has endured the agony of transcribing even a reasonably short section of tape can appreciate the gargantuan task involved in writing out or typing an entire field season's worth of dictation. Furthermore, the real possibility of accidental erasure of magnetic tape or computer files cannot be dismissed lightly. The utility of portable word processors for permanently recording field data remains to be demonstrated.

By far the weakest section of the text is that dealing with the catalog. This major component of the Grinnell System is allotted just slightly over 2 pages of discussion and 3 sample pages of Herman's catalog with accompanying annotations. These samples are not very instructive; of the 20 specimens of birds listed only 1 has reasonably complete data beyond date and locality. Most catalog entries lack data on sex, reproductive condition, skull pneumatization, fat condition, and body mass, all features of interest to the modern avian biologist. In his introduction to the catalog, Herman emphasizes the need for very tight restrictions on collecting because of the past misdeeds, excesses, and selfishness of collectors. (Thus, once again our noses are rubbed in the alleged sins of our predecessors.) "It is easy to imagine the potential for destruction that would exist if everyone who decided to take up collecting were allowed to do so without restraint." This alarmist preoccupation with purported pillaging and plundering, and the consequent backlash of punitive policies, not only distorts the truth but also offers little encouragement to the serious beginner who wants to be trained in specimen-related ornithology. Furthermore, these anticollecting sentiments seem strangely out of place in a book supposedly honoring the traditions and philosophy of Grinnell. What Herman fails to appreciate is that Grinnell considered collecting specimens to be absolutely essential to the study of scientific natural history and that no accurate and thorough work could ever be done without it. This situation has not changed. Therefore, it is unfair to present the Grinnell System without clear acknowledgment of the enormous importance of collections to the growth of avian biology and without recognition that a multitude of persisting problems in ornithology can be solved only by judicious specimen collecting. The dwindling group of persons who take trivial numbers of birds for justifiable scientific purposes should be encouraged and not thwarted either by unreasonable legal restrictions or by the irresponsible value judgments of those who do not comprehend population regulation in wild birds.

Despite the fact that this book represents a good review of only two-thirds of the Grinnell System, it can be read profitably by beginning naturalists and by professional biologists who struggle to organize diverse observations. The work can also be enthusiastically recommended to serious amateurs who want to record their field data in a fashion suitable for permanent storage in a library or museum archive. More broadly, Herman's text heartily reaffirms the continuing role of the field naturalist in modern science, a role that is no less important now than it was in Grinnell's day.—NED K. JOHNSON.

**Birds of the Texas Coastal Bend – abundance and distribution.**—John H. Rappole and Gene W. Blacklock. 1985. College Station, Texas, Texas A&M University Press. xvi + 126 pp., 14 color plates, 8 figures, 5 maps. ISBN 0-89096-221-9. $19.50.—This small but attractive book is the first attempt, other than several local checklists, to summarize the abundance and distribution of the birds of part of the Texas Gulf coast. Specifically, the Coastal Bend study area extends over nine Texas counties, five of which actually border the Gulf of Mexico. The largest city in the area of coverage is Corpus Christi.

Rappole and Blacklock state that the Texas Coastal Bend is the richest bird country in North America. This might be questioned by some readers, however, as it depends on how one interprets the numbers of birds listed. A number of hypothetical species for Texas are included in this book, as well as some that have not been accepted for the state by the Texas Ornithological Society Bird Records Committee. Philip Unitt's "The Birds of San Diego County" (1984, San Diego Soc. Nat. Hist. Mem. 13) reports 448 species with accepted records, greater than the number in this book.

The chapter on Occurrence and Distribution is brief. Many species are summarized in three or four lines. Abundance and seasonal occurrences, highest density (where appropriate), and habitat preferences are given by abbreviation coding. These same data, with the exception of the last feature, can be found on the graphic representation of a Season Checklist, which is easier to read than the species summaries.

Unfortunately, documentation is confined to an appendix section entitled Specimen Documentation, yet it includes photographs as well. The presence of specimen data in this list is limited to species with fewer than five confirmed records for the Coastal Bend. In many instances, specimen data is also referred to in the main chapter. Inclusion of these data in the Occurrences and Distributions chapter would have made it easier to read and eliminated the repetition of specimen data. I found myself constantly turning back and forth from the main part of the text to the appendix, making it inconvenient and awkward to use. The list of specimens in the appendix is not complete. For example, I have specimens of Lesser Golden-Plover, Black-legged Kittiwake, and Bobolink not listed from the area of study. I had no way of checking other collections for other omissions. I also found my specimen of Blackpoll Warbler credited to the Dallas Museum of Natural History.

"Birds of the Texas Coastal Bend" is recommended to anyone visiting this part of Texas, although the price might prohibit some from purchasing it for use on a brief visit to the area. The book was written with birders in mind and accomplishes this purpose. The chapter on habitat, with its excellent color plates and maps, and a section on accessible localities of the major habitats will be extremely useful to persons unfamiliar with the Texas Coastal Bend.—WARREN M. PULICH.

**The dynamic partnership: birds and plants in southern Australia.**—H. A. Ford and D. C. Paton (Eds.). 1986. Handbook of the flora and fauna of South Australia series. South Australia, D. J. Woolman, Government Printer. 199 pp., 8 color plates, 23 text figures, 38 tables. ISBN 0-7243-4640-6. No price given.—Eighty-seven species of birds have been recorded eating fruits and arils in southern Australia, and about 15% of the mostly endemic plant species of southwestern Australia seem adapted for bird pollination. And then there are all those parrots cracking seeds. Taken together, southern Australia seems to be an evolutionary showplace for interactions between birds and plants.

Studies of these interactions have increased in the past decade, and the 16 papers in this volume summarize what is currently known about avian frugivory, nectarivory, folivory, and seed predation south of 30°S. Most of the chapters report on the natural history of these interactions: which birds feed on which plants, how specific birds are to particular plant taxa, and what kinds of adaptation seem to be associated with these interactions. That is, much of the book summarizes the raw material that is needed for more detailed ecological and evolutionary studies of these interactions. This in itself makes the book worthwhile for anyone working on interactions between birds and plants because, until now, these studies have been widely dispersed throughout the avian, botanical, ecological, and taxonomic literature.

A few chapters on nectarivory and pollination go beyond natural history to consider ecological and evolutionary questions in foraging and specificity. Honeyeaters, especially, and lorikeets and silvereyes are the most frequent visitors to flowers in southern Australia, and the Proteaceae and Myrtaceae are the plant families they visit most often. The general organization of the avian nectarivorous guilds appears to be similar to those of hummingbirds and honeycreepers in other geographic areas, with body size, bill size, and aggressiveness shaping the guilds (D. C. Paton). Specificity of avian species for particular plant species or genera (e.g. Purple-crowned Lorikeets on *Eucalyptus*) and reliance of plant species on particular avian species for pollination has been suggested or shown for some local populations but may vary geographically. D. C. Paton summarizes the morphological and other adaptations in the birds and plants that appear to have resulted from diffuse coevolution of these taxa. S. D. Hopper and A. H. Burbidge show that honeyeaters searching for nectar can differentiate among *Anigozanthos* species and their interspecific hybrids, which differ in nectar production and height.

Although fruits are eaten by scores of birds in southern Australia, none is apparently an obligate frugivore. Avian species eat fruits of over 100 species in 36 families (N. Forde), but only in the rain forests of southern Australia does fruit seem to be more important than nectar as a source of food for birds (H. A. Ford). Studies of bird/plant interactions in these forests have thus far been few. Mistletoes in Australia are unusual in that birds are both pollinators and dispersal agents, and some avian species associated with these taxa may be among the more specialized frugivores (N. Reid).

Seed eaters include parrots, finches, and quails, and other species for which seeds form smaller parts of their diets. Some of the seed eaters apparently restrict their diet to the seeds of one or a few plant species (L. Joseph). Such specificity is certainly unusual in bird/plant interactions and presents exciting possibilities for studying the associated ecological conditions. Several other chapters review the diets of ducks and waders along the coast (P. A. Paton) or the diets of avian species in semiarid and arid areas, where nectarivory and frugivory are uncommon (K. S. Shurcliff).

As is true worldwide, native woodlands in Australia are being replaced with plantations of exotic trees or grasslands for pastures, and natural communities are being reduced to small habitat patches. Four chapters report the results of census studies on the effects of these changes on avian assemblages. The conclusions are familiar. Forest fragmentation has led to increases in the relative abundance of birds commonly found in more open forest (R. W. Howe). Urban areas have disproportionately collected exotic species, which are primarily ground foragers (R. J. Green). Monterey pine (*Pinus radiata*) plantations include a majority of species found in native forests but in very different proportions. Species that rely on nectar, pollen, and fruits—that is, many of the avian species that are the focus of this book—are the ones that cannot survive in these plantations (B. C. Gepp). Finally, in a short speculative chapter H. A. Ford argues that dieback in some eucalypt forests, which has been common since the 1940's, may be partly a result of lower insectivorous bird numbers.

Most of the authors emphasize how little is currently known: There have been no chemical analyses of the pulp of Australian fruits used by birds. There have been no studies of nectar-feeding birds in the subtropical forests. The importance of frugivorous birds as seed dispersal agents is unknown. And rarely have avian densities been accurately estimated over long periods of time.

The major weakness of the book for the general avian and ecological audience is that few authors attempt to compare their observations and results with other geographic areas of the world. A. V. Milewski does attempt a comparison between southern Australia and southern Africa, contrasting the abundance of nectar-feeding birds and parrots in Australia with the abundance of fruit-eating birds and small-seed-eating birds in southern Africa. But the few other chapters that make comparisons do so in only a few sentences. The book is intended as one of the handbooks on the flora and fauna of southern Australia, however, and in that capacity it does a very good job in summarizing this literature for readers worldwide.

The strength of the book is both in the summary it presents of current knowledge (through 1982; only a few papers are cited from 1983 and 1984) and in the realization of where the major gaps are. It is impossible to read these chapters and not come away with the feeling that the diversity of these interactions provides wonderful opportunities for asking comparative questions on how interactions evolve under different ecological conditions.—JOHN N. THOMPSON.

**The migrations of hawks.**—Donald S. Heintzelman. 1986. Bloomington, Indiana, Indiana University Press. xiv + 369 pp., 22 text figures. ISBN 0-253-33821-2. $35.00.—More than a decade has passed since the publication of "Autumn Hawk Flights" (1975, New Brunswick, New Jersey, Rutgers Univ. Press) by D. S. Heintzelman. Since its publication, hawk watching and migration research have experienced dramatic growth. In the early 1970's regular hawk counts were conducted at fewer than a dozen sites in North America, and there were rarely crowds at lookouts such as Hawk Mountain Sanctuary, Pennsylvania; or Cape May Point, New Jersey. Now counts of migrating hawks are conducted at hundreds of sites in North America, and standing room at major lookouts is often limited. "Autumn Hawk Flights" played a role in the growth of hawk migration research because it was the only comprehensive treatment of the field at the time. "The Migrations of Hawks" is a revision of Heintzelman's 1975 work, with material included from "A Guide to Hawk Watching in North America" (Heintzelman 1979, University Park, Pennsylvania State Univ. Press).

The emphasis of this second edition is similar to that of the 1975 edition: to describe hawk migration research and the growth of hawk watching. Heintzelman devotes 11 of 20 chapters in the book (169 of 281 pages of text) to describing more than 1,100 locations where hawks have been seen migrating. The remaining 9 chapters examine the development of hawk watching and hawk migration research, methods used to study hawk migration, weather and soaring migration, altitude and speed of migration, migration routes, and hawk migration counts as indicators of population trends. Included in the text are 17 figures and 5 maps. The volume ends with an astounding 61 pages of references, including more than 1,000 titles.

In general, the volume falls short of the 1975 edi-

tion. Although it includes the most complete list of sites where migrating hawks can be observed, the author does not analyze or synthesize the myriad facts presented. Whereas the 1975 edition included an abundance of photographs, tables, and figures, the present version has few figures and no tables to present and explain data. Statements about flight behavior, population trends, and other aspects of migration are often made without data or analysis. For example, populations of Turkey Vultures (*Cathartes aura*), Cooper's Hawks (*Accipiter cooperii*), Goshawks (*A. gentilis*), Broad-winged Hawks (*Buteo platypterus*), Red-tailed Hawks (*B. jamaicensis*), Rough-legged Hawks (*B. lagopus*), and Merlins (*Falco columbarius*) are said to exhibit "cycles" at 3–5 yr intervals. Populations of Ospreys (*Pandion haliaetus*), Northern Harriers (*Circus cyaneus*), Goshawks, Broad-winged Hawks, and Rough-legged Hawks are reported to have 10-yr cycles. The source of these claims are 24 years of hawk migration counts (not included in the volume) from one site in Pennsylvania. Such statements cannot be taken seriously and make the reader skeptical of other conclusions in the volume.

There are other problems with the book. The long list of "hawk lookouts" is dry reading. Because the descriptions of lookouts are not long enough to include details, they could have been relegated to an appendix, creating space for more interesting information. Accounts of locations where migating hawks have been seen on only one occasion could have been omitted without loss to the volume. Some readers will be pleased that someone has assembled such a complete list of unreviewed citations about hawk migration, but the omission of important citations from North America and Europe is inexplicable.

Because of the shortcomings of this volume, I do not recommend it to the academician or layperson. The first edition was more complete and is still a good, though out-dated, introduction to hawk migration for the layperson. With the abundance of fine books now available, "The Migrations of Hawks" cannot compete for a place in university libraries and private collections.—PAUL KERLINGER.

**The birds of Canada.**—W. Earl Godfrey. 1986. Second ed. Ottawa, Canada, National Museums of Natural Sciences, National Museums of Canada. 596 pp., 74 color plates by John A. Crosby, 107 line drawings by John A. Crosby and S. D. MacDonald, endpaper maps, 398 distribution maps covering most breeding species. (Issued in French as "Les oiseaux du Canada, edition revisée"; ISBN 0-660-90265-9.) ISBN 0-660-10758-9. Canadian $39.95. Distributed in the United States by the University of Chicago Press; U.S. $39.95.—P. A. Taverner's (1928, 1934) two volumes on Canada's birds treated in broad terms the known avifauna of his time and stood for more than three decades as the only chronicles of this vast region. Then the year 1966 brought the first edition of Godfrey's "The Birds of Canada," a landmark at the time, featuring information on biology, status, systematics, mapped distributions in the country of almost all breeding species, and color plates and line drawings illustrating most of the breeding birds. Now we have the important second edition of this work, which benefits substantially from Godfrey's tireless efforts to update the species list (totaling 578 as of December 1984) with respect to taxonomic and distributional components that have accrued in the nearly 20 years between the issue of the two editions.

A comparison of the two editions is inevitable. I was immediately struck with the influence of designers on aesthetic qualities of the new book. Titles and headings are now highlighted in boldface black and red to attract the eye of the reader and to emphasize features of importance. The original plates by John Crosby have been rematted, new color separations have been used, and in some cases individual species have been reoriented on the page. Species new to Canada have been added to the appropriate plate (e.g. Painted Redstart, plate 65; Lesser Goldfinch, plate 68), and new superbly executed plates of gulls delineating tricky plumages are included. In addition, for the first time in color, familiar in-flight portraits of diurnal raptors are provided.

Throughout this edition, in general or specific terms, whatever worked in the first edition with respect to statements about biology of Canadian birds, if still current, has been repeated verbatim. The Introduction is flanked by semidiagrammatic line representations of bird topography (reused intact from the first edition) excellently done by Stuart D. MacDonald. The Introduction comprizes brief essays on the value of birds and bird study as a hobby, classification of birds, scientific scope of the book (which tells us among other things that 426 species are known to have bred in Canada in historic times), and bird banding. Also included are explanations of the topics treated in each species account. At the end of the main text is a short glossary of "technical" terms used in the accounts ("belly," "dimorphic," "juvenal," etc.) and selected references, mostly on bird distribution in the provinces and districts of greater Canada.

Basically, the biological information in the species accounts follows a standard format: a map of the breeding distribution followed by a detailed account of the range in Canada reflecting the limits of breeding by localities mentioned in the text, and for migrant species areas frequented by birds in transit. Maps and detailed range description are featured in the left-hand column in 8-point type. In the right-hand column, in 10-point type for emphasis, are brief, but adequate, general descriptions of appearance; dimensions in the form of standard wing, tail, exposed culmen, and tarsal measurements for adult males, given as ranges and means (wing lengths only for females);

field marks (including voice); generalized habitat preferences; nesting (site, nest type, brief egg descriptions, and clutch size); range both for summer and for winter outside of Canada; subspecies in Canada (a departure from the practice of the 6th edition of the A.O.U. Check-list, from which subspecies designations have been eliminated); and remarks on aspects of the biology or status that further distinguish a species from all others.

Godfrey is especially to be commended for keeping abreast of current taxonomic issues. For example, Thayer's Gull (*Larus "thayeri"*), treated as a full species in the first edition of Godfrey and in the 32nd supplement of the A.O.U. Check-list, is included in this second edition as a race of the Iceland Gull (*L. glaucoides*). Godfrey based his decision on studies by Brian Knudsen (undertaken in 1973–1975 for the National Museum of Canada) in which no assortative mating between *L. "thayeri"* and *L. kumleini* was found at Home Bay, Baffin Island. Rather, Knudsen noted widespread interbreeding there of these two taxa (*contra* Smith 1966, Ornithol. Monogr. No. 4). In another vein Godfrey has been quick to adopt the separation of the Pacific Loon (*Gavia pacifica*) from the Old World Arctic Loon (*Gavia arctica*). He also includes the newly recognized sibling species of the Western (*Aechmophorus occidentalis*) and Clark's (*A. clarkii*) grebes, accompanying the account of the latter with line drawings of the heads of each showing the diagnostic details of the distribution of black on the crown.

No review of the present work would be complete without additional tribute to John Crosby, who remains an artist of great skill. His portraits capture color and typical resting or in-flight poses and well illustrate diagnostic features. The choice of new backgrounds enhances the depictions from the standpoint of both aesthetic and "field recognition" qualities and at the same time gives a softer, more pleasing aspect to each plate, in contrast to the mostly stark-white backgrounds of the first edition.

Overall this is a fine book, remarkably free of typographic and factual errors (although the use of "juvenal" occasionally is a bit fuzzy). The production and binding are of the highest quality, and I have no quarrel with the author's style, which varies from mildly conservative to piquant when he's drubbing the folly of *Passer* and *Sturnus* introductions. The author's mission is accomplished. The range and habits of Canadian birds are available in reasonable detail in a single volume that can grace with equal ease the shelves (or coffee tables) of both professional and lay ornithologists.—JON C. BARLOW.

**Conservation biology. The science of scarcity and diversity.**—M. E. Soulé (Ed.). 1986. Sunderland, Massachusetts, Sinauer Associates, Inc. xiii + 584 pp. ISBN 0-87893-794-3, cloth, $46.50; IBSN 0-87893-795-1, paper, $27.00.—The appearance of a new or distinctive theme in ecology is in itself noteworthy, and the emergence of conservation biology is especially exciting. The roster of authors illustrates that many highly respected "pure" academic types are involved in this multifaceted area. The volume considered here, following its 1980 predecessor (edited by Soulé and B. A. Wilcox, 1980) and appearing just before the first issue of the new journal *Conservation Biology*, represents a key introduction or addition to this topic. As indicated by the book's contents, the discipline of conservation biology encompasses a diversity of general subjects, including genetics (Section I), community ecology (Sections II and IV), and island biogeography (Section III), as well as treatment of specific kinds of habitats and problems (Section V) and socioeconomic and philosophical questions (Section VI). The 25 contributed chapters, together with the synthesis and commentary for each section, suggest that the essence of conservation biology is simple—save sufficient habitat—but that intimidating questions and issues (both biological and socioeconomic) stand in the way of this goal. Even if the biology of the critical species or communities were well understood, which is rarely the case and which may be critical, conflicting human interests usually place large hurdles in the way of doing what is needed. For example, in our relatively affluent and conservation-conscious society, there are great socioeconomic pressures on the remaining pockets of habitat of many rare and threatened or endangered species, even though federal laws exist to protect such species (e.g. Endangered Species Act) and presumably take precedence, at least on federal lands. (See Dawson et al. 1987, Condor 89: 205; and Ligon et al. 1986, Auk 103: 848 for examples of recent attempts to address such conflicts.)

Yet these problems, serious as they are, seem almost trivial when compared with the loss of habitat in most tropical regions of the world, where the vast majority of species, including birds, live and where human populations are growing at almost unbelievable rates in impoverished countries that have no resources to devote to habitat protection. I can attest to the severity of the problem, having conducted a 10-yr field study in Kenya, with the world's fastest-growing human population. In short, the obstacles to effective conservation are immense everywhere, and appear to be especially daunting in the regions of the earth that are biologically most critical.

Although "Conservation Biology" contains only one chapter devoted exclusively to birds, a majority are of direct relevance to ornithologists. All of the chapters in Section I deal with biological issues that also pertain to conservation questions: minimal viable populations (Gilpin and Soulé), costs and benefits of inbreeding and outbreeding (Ralls et al., Templeton), and heterozygosity and fitness (Allendorf and Leary, Ledig). In Sections II and III, Cody considers avian diversity in Mediterranean-climate regions, Wilcove

et al. discuss habitat fragmentation in the Temperate Zone, Lovejoy et al. describe edge and other effects of isolation on Amazon forest fragments, and Janzen illustrates how subtle the threats to species preservation can be, even within well-protected preserves. I found the three chapters of Section IV to be most interesting. Pimm briefly reviews many ideas related to community stability and looks at the effects of introducing species to islands and of species-removal experiments. Terborgh marshalls evidence that a very few plant species support much of the vertebrate fauna in tropical forests, and he uses this keystone concept to suggest that tropical forests could be selectively lumbered and plant species compositions altered without destroying the vertebrate faunas. This idea is important, untested though it is, in that it attempts to provide a means by which preservation of tropical forest can be justified both to distant economic planners and to small farmers at the forest edges. Dobson and May review some of the most famous cases of the effects of disease on animal and human distributions (e.g. rinderpest and sleeping sickness in Africa) and then consider the possible effects of such diseases on conservation efforts. Clearly, this is an important and poorly studied aspect of animal distributions. Section V treats a variety of sensitive habitats—aquatic, caves, forest, and the Sahel of Africa. The last of these describes the long-term effects of humans and their grazing animals: desertization. Humans and their animals are directly responsible for moving the Sahara south at a rapid rate, a striking example of how even primitive man has altered the environment in a major way. Section VI, "Interacting with the real world," deals with reclamation of shattered ecosystems (Cairns), design of a nature reserve for Indonesian New Guinea, with the associated sociopolitical problems (Diamond), and questions concerning the intrinsic value of the conservation effort (Naess).

In my view this book is an extremely important contribution, both as an introduction to the field of conservation biology and as a source of basic ideas and information. We can expect conservation biology to blossom within the next few years (e.g. become part of the curriculum of most biology departments), and this volume is essential for college and university libraries as well as for ecologists of all types. Although it could be criticized as unbalanced in favor of tropical forests, this is understandable in view of the biotic richness of those ecosystems and the rate at which they are being destroyed. An important omission, if one views "Conservation Biology" as a guide to issues and a means of addressing them, is the absence of any description of the ways governmental agencies, such as the USDA Forest Service, develop policies related to specific conservation issues. A chapter dealing with this matter in the United States would be extremely useful to private conservation-oriented groups and individuals. This is perhaps the most critical aspect of conserving specific organisms and areas in regions where the federal government controls a large proportion of the critical habitat.

In view of the environmental catastrophes that have occurred already, or that are occurring now, I can express only great admiration for the leaders in this area, and for Editor Soulé in particular. One must be optimistic by nature and possess a sense of personal responsibility for maintenance of small fragments of the planet as they occurred when or shortly after humans first appeared on the scene. Unfortunately, most of us will devote little time and few resources to conservation issues, and that's too bad. We should; who derives more enjoyment (as well as livelihood) from the natural world than ornithologists and other biologists? If every other peruser of this review would devote herself or himself to one local or national conservation issue and contribute financially to one organization that works to preserve tropical habitats, North American ornithologists could make a critical difference.—J. DAVID LIGON.

**The pheasants of the world.**—Paul A. Johnsgard. 1986. New York, Oxford University Press. xv + 300 pp., 53 color plates, 45 text figures, 24 distribution maps. ISBN 0-19-857185-2. $65.00.—This is the fourth major monograph on pheasants of the world. First was that of D. G. Elliot, "Monograph of the Phasianidae, or Family of the Pheasants" (1870–1872). C. W. Beebe's 4-volume, very limited edition of "A Monograph of the Pheasants" (1918–1922) was brought out in popular edition in 1926 under the title of "Pheasants, Their Lives and Homes." Finally came Jean Delacour's "The Pheasants of the World" in 1951, with a slightly revised edition in 1977. Johnsgard saw the need for a monograph that would emphasize the biology of pheasants. He was spurred on by finding the hitherto unpublished watercolors of 47 of the world's 49 species of pheasants painted in the early 1900's by a little-known British artist, Major Henry Jones. Johnsgard is a biologist and behaviorist by training. His book is a compendium of the works of others, for he has done little with pheasants other than some observations in captivity.

The 8 chapters of Section 1 deal with comparative biology, with separate chapters on Relationships and classification, Hybridization and zoogeographic patterns, Growth and behavioral development, General and social behavior, Ecology and population biology, Comparative mating systems and social signalling devices, and Aviculture and conservation.

Section 2 (220 pages) has a key to the classification of Phasianidae followed by chapters on each of the 16 genera and their species. All descriptions follow the same format: Vernacular names, Distribution, Measurements, Description, Identification, Geographic variation, Ecology (habitats and population

density, competitors and predators), General biology (foods and foraging behavior, movements or migrations, daily activities, and sociality), Social behavior (mating systems and territoriality, voice and display), Reproductive biology (breeding season and nesting, incubation and brooding, growth and development of young), Evolutionary history and relationships, and Status and conservation outlook.

The material is clear and concise. It is easy to compare the same topic between species because of the consistent organization. For each species there is a range map and one or more black-and-white drawings of male courtship displays.

Appendix 1 gives the derivations of scientific and vernacular names of pheasants. Appendix 2, a distributional checklist of francolins, partridges, and Old World quail, is of dubious relevancy in this book.

The Bibliography contains over 300 references, many written in the 1980's. The Bibliography reflects the tremendous increase in interest in the behavior of pheasants since Delacour's book. In addition, field studies have changed from general surveys to far more detailed analyses of habitats and behavior.

The Index lists genera, species, and subspecies but contains no subject index. Fortunately, the consistent presentation of material in the species accounts makes it easy to locate information on specific topics such as clutch size or displays. The book is in attractive 8½ × 11 inch format, with clear print and readily identified headings.

Each of the three 20th-century pheasant monographs makes its particular contribution. Beebe spent 17 months in the field in Asia. His great literary talent, coupled with superb photographs and paintings of pheasants in their native habitats, fairly take the reader into the field with him. Delacour, who for years had the world's outstanding collection of pheasants in captivity, emphasized avicultural aspects. Johnsgard's contribution is his comparison of the biology of pheasants. His sketches are made from actual photographs of displaying birds and accomplish what words alone fail to do. In contrast, the descriptions of calls, no matter how detailed, fail to help the reader much. The inclusion of spectrograms would have been ever so useful to the behaviorist, but perhaps not appropriate for a book of this kind. References to where recordings of bird calls might be found would have been valuable, however. Descriptions of behavior are almost entirely descriptive rather than analytical as to causation or function.

Johnsgard has made a rather exhaustive review of the literature. There has been a great burst of research and field observations since Delacour's book appeared in 1951. Despite this, there are virtually no in-depth field studies of any pheasant in its native habitat. The great bulk of the comparative biology deals with only three species: Ring-necked Pheasant, Red Junglefowl, and the domestic fowl.

The book is the only one to contain colored plates of both male and female of all 49 recognized species of pheasants. Nothing is known of how and where Major Jones painted. His backgrounds would suggest he saw few, if any, of his birds in the wild, quite in contrast to the backgrounds in Beebe's monograph. Jones painted each feather tract meticulously, but not as any real bird would appear. Lincoln Allen's superb colored photographs of pheasants now appearing in *The Gazette* may be far more satisfying.

The identification of the range of each species, as to mountain ranges, specific valleys, and wildlife preserves, should be useful to ornithologists who wish to see particular species.

The book should be excellent for any field biologist launching a study of pheasants in their native habitat. Johnsgard has been of great service to American ornithologists and aviculturists in providing so many references from the largely inaccessible Asian and even British journals. The treatment of biology and especially behavior should give aviculturists greater understanding of their birds. In addition they might value having under one cover illustrations of all of the 49 species of pheasants.—ALLEN W. STOKES.

**Birds of the Pacific slope.**—Andrew Jackson Grayson; with a biography of the artist and naturalist (1818–1869) by Lois Chambers Stone. 1986. San Francisco, California, The Arion Press. 433 pp., 21 illustrations, 6 photos, 7 color plates; portfolio of 156 unbound color plates, 1 black-and-white plate. ISBN 0-910457-10-7. $4,500.00 (sic).—This sumptious publication will be of great interest to ornithologists, historians of 19th-century California and western Mexico, and admirers of bird painting of a style greatly influenced by Audubon but with many original qualities. Andrew Jackson Grayson's name has been known to ornithologists from the taxa named *graysoni* described from specimens that he sent to the Smithsonian Institution, and had it not been for Lois Chambers Stone, the author of his biography, the neglect of most of his life's work might have persisted. In 1949 she discovered a portfolio of paintings by Grayson in the Bancroft Library at the University of California, Berkeley, that had remained there virtually unnoticed since 1879, when they were donated by Grayson's widow. Stone's discovery started her on a tortuous path of biographical research that has culminated in this major work. Her initial findings prompted publication between 1949 and 1957 of 23 color reproductions of Grayson paintings in *The Condor* (of which 9 were included also in the Distributional Check-list of the Birds of Mexico). Now all of Grayson's 156 surviving bird paintings have been reproduced in the original sizes and with the most modern techniques of color rendition. The work consists of two sections, a written volume and a portfolio of the plates. The former is in two parts. Part I (151 pp.) includes a

preface by S. Dillon Ripley, a historical introduction by editor G. R. Todd, and Stone's biography of Grayson. Part II (227 pp.) comprises a list of contemporary names for all of Grayson's birds and Grayson's own notes and species accounts for each. There follows a selected bibliography, a list of Grayson's published writings (mostly in newspapers and magazines), notes on previous publications of his paintings, an annotated list of type specimens collected by Grayson (by G. E. Watson), and an index. The portfolio consists of the unbound 19 × 25 in. color plates in a strong and handsome container. The plates are printed on high-quality heavy paper designed for permanence and are suitable for handling or framing.

The biography of Grayson is written with careful scholarship and great clarity of style, and what a story it is—full of bold adventure, high ambition and unquenchable dedication, achievement and tragedy. Grayson was born and raised in northern Louisiana but yearned for the far west. At age 28 he helped organize a wagon train, and with his wife and two-year-old son set out from Independence, Missouri, in May 1846. The pioneers arrived in the promised land of California in October of that year. Three years later the gold rush is on, and little San Francisco becomes a boomtown. Grayson's fortunes rise and fall, but he keeps generally prosperous, prominent, and respected. Then, in 1853, Frances Grayson takes her husband to see the recently acquired set of Audubon's "Birds of America" at the city's Mercantile Library. Grayson is enthralled, and becomes a man with a mission—to paint all the birds of the Pacific slope, those unknown (at least in life) to Audubon. He has no artistic training but proceeds to teach himself. He corresponds with Baird at the Smithsonian and sends specimens; Baird encourages him and sends advice, books, and requests for more specimens. He travels to Mexico, experiencing shipwrecks, loss of precious cargo, fevers; Frances is always with him, surely the equal of Lucy Audubon in self-sacrifice and dedication to her husband's dream. Grayson settles in Mazatlán, and devotes himself to collecting, writing, and, above all, painting and the goal of publishing his art. He visits the Tres Marias Islands and Socorro, discovering endemic forms that now bear his name. Maximilian has been installed as Emperor of Mexico, and he and Carlota are eager to patronize the arts. The Graysons travel by coach to Mexico City for an audience, and on the way are robbed of all valuables except his paintings. The royal couple is impressed and publication at last seems assured, but economic collapse and revolution put to an end to that prospect. Then, murder most foul; their only son, now 22, is killed for no known reason. Inconsolable, Grayson continues to work but succumbs to yellow fever in 1869. Frances returns to California with the paintings, hoping for a publisher, but publication in color is too costly. Finally, in 1879, she donates the paintings to the Bancroft Library.

This summary only hints at the many fascinating episodes and personalities that enliven the biography. In Mexico, Grayson met Janos Xántus de Vesey, and a photo of them together is included. From a safe distance in time, the wily Xántus seems an intriguing figure—part pioneering collector, part self-aggrandizing charlatan (pp. 130–131). Baird's role with respect to Grayson is enigmatic; he could find funds for Xántus and others but seldom anything for Grayson. Did Baird realize, correctly, that Grayson would persevere in any case, sustained by a few books and materials and some gracious flattery? (Baird wrote him that the Tres Marias and Socorro "may become as famous through your labors as the Galápagos through Darwin.") In fairness, dollars were more precious in those days. Grayson complained to Baird that he had dispatched three boxes of specimens from Mazatlán to Washington "but it cost me three dollars and a quarter to get them off." No wonder bandidos were on all roads, and Grayson's true account of a stagecoach robbery (pp. 118–119) reads like improbable fiction.

Apart from the history, what is the ornithological value of Grayson's writings? A large part is in the descriptions of habitats and bird populations as they were in his day. His bird biographies vary greatly in length and detail, but most can be read with profit by contemporary ornithologists. His fullest accounts are especially valuable for Mexican species such as *Melanerpes chrysogenys, Corvus imparatus, Calocitta colliei,* and *Cacicus melanicterus.* Of particular interest are his notes on primeval conditions on Socorro and the Tres Marias Islands. The birds were so numerous and tame that he could obtain specimens easily with a noose at the end of a pole, and he fondly described "this virginal world upon which man has not yet placed his rude hand." That rude hand has since brought devastation to the birds of Socorro, which Grayson was the first ornithologist to see, and everything he wrote about its birds takes on special importance. Like the young Darwin in the Galápagos, Grayson wrote in wonder about the special creation of unique forms on remote islands, but did not further pursue such ideas.

Reviewers are obligated to mention mistakes, however understandable or small. Grayson's accounts include a few errors or confusions, but these are easily spotted. The King Vulture is not as large or larger than the California Condor; *Oxyura dominica* surely never nests in tree holes; the habits of *Chordeiles acutipennis* seem to be mingled with those of some other caprimulgid; colors of the young *Cyanocorax beecheii* are given as those of the adult female. Some apparent hearsay is included: the female *Dendrocygna autumnalis* carrying her ducklings in her mouth from the tree nest, and *Coccyzus americanus* preying on eggs and young of other birds. A few minor errors are not Grayson's. On page 259, "Socorro" should read "Tres Marias" for *Forpus cyanopygius.* For three subspecies

named *graysoni* (pp. 158–160) the name of the author given is that of the describer of the nominate form (e.g. Linnaeus) instead, but all are correct in Watson's list (pp. 426–430).

Now, at last, I come to the plates. Grayson is being hailed as "The Audubon of the West," and in many ways the sobriquet is deserved. His stylistic debt to his idol is obvious, and in a few instances the postures of his birds are virtual copies of Audubon's (e.g. the Scrub Jay eating an egg). Some of his paintings have detailed backgrounds, and others are depicted solely with foliage and flowers. Every part of the paintings was his own work, and many of his compositions are exceptionally fine and include excellent portrayals of plants, insects, and vertebrate prey species. His best paintings are worthy of Audubon, and considering that he worked in isolation and without training, his achievement is extraordinary. Grayson's strengths as a bird painter come through clearly: he was best at birds in profile; colors of unfeathered parts were accurate, and he faithfully portrayed many small but important details; he was usually more successful with medium- to large-size birds; he often showed them with typical prey, or at their nests, or with their young; his plants and flowers and local backgrounds are a delight (e.g. Canyon Wrens foraging over a crumbling wall in run-down Acapulco). His weaknesses are also clear, and are those expected of an untrained artist. To quote Baird, some of the birds have a certain stiffness; body proportions are not always correct, the heads tending to be small; Grayson almost always had difficulty rendering birds in frontal or angular views or in postures requiring perspective; the feet do not always grip the perches, and the bird may appear off balance. Fortunately, his strengths and weaknesses often are in balance. He emulated Audubon but could not match the master's dash and dynamism, thus sparing him from Audubon's melodramatic exaggerations. Sometimes everything came together for Grayson, showing his true potential. My favorite example is his Ferruginous Pygmy-Owl, a gem of a miniature. For once the slightly turned head is convincing, and the rest—especially the plumage texture and the unfinished moss-covered branch—is elegantly done. Others will doubtless prefer his more colorful and complex compositions, with good reason. Grayson's untutored technique, combined with genuine artistic ability, imparts a great deal of charm to his work that is often absent from much contemporary wildlife painting of uncanny photographic realism. His earnest sincerity is almost palpable, and the viewer *wants* him to succeed. Without making a serious comparison, I suggest an analogy between Grayson's pictures and those of Henri Rousseau; both show an appealing blend of naiveté and innate skill.

The quality of the reproduced plates is so high that most are virtually indistinguishable from the paintings. The few that I believed slightly off in color (the green of some parrots, for example, seemed not bright enough) turned out to be quite faithful to the originals. To my eye there are only two exceptions to this: the color of the male Cardinal and Painted Bunting appears a bit too rose-red, but others may see it differently.

It is bracing to be reminded that the art of fine bookmaking is alive and well, and this publication will be an ornament to any personal or research library or museum. But such quality does not come cheaply, and the price is an awesome $4,500. Is it worth $4,500, a mere 0.0001% of the recent price for Van Gogh's "Sunflowers"? I shall not presume. The answer depends on the individual's or institution's interests, resources, and sense of value.—THOMAS R. HOWELL.

**Audubon wildlife report 1986.**—Amos S. Eno, Roger L. Di Silvestro, and William J. Chandler. 1986. New York, National Audubon Society. xxi + 1,094 pp., 32 black-and-white plates, 55 text figures. ISBN 0-930698-23-1. $34.95.—This volume is of value to researchers, teachers, and managers who must interact with public agencies that manage wildlife. The book provides excellent, in-depth descriptions of the bureaucratic organization, functional procedures, and budgetary problems of the major federal land-management agencies, with emphasis on the U.S. Forest Service. The historical accounts of each agency are excellent. Descriptions of agency structure and offices permit direct contact with an appropriate section if a reader desires specific information on an issue or problem. Descriptions of agency problems, shortcomings, and controversies appear to be objective and, in most cases, represent both sides of the issues. All chapters in the book, each by different authors, are clearly written, well edited, and easily read. References cited in each chapter are current.

Because of an apparent haste to get the volume to press, several major errors were made with the labeling of some of the maps, and an attached list of corrections accompanies the volume. The labeling and clarity of some of the illustrations are poor. Color printing on maps and bar charts is frequently not aligned precisely and often leads to confusion. Neither figures nor tables were numbered, making it difficult to find the textual background information.

It was disappointing to see the Red-cockaded Woodpecker (*Picoides borealis*) described as a "colonial-nesting bird" (p. 161) rather than as a cooperative-breeding species. In general, the short section on this species was too brief and barely skimmed the surface of the problems faced by the bird and its managers in National Forests.

The chapter on migratory bird protection might have been better labeled "migratory waterfowl protection" but for a few inadequately brief paragraphs on migratory nongame birds and raptors. This defi-

ciency is somewhat alleviated by the inclusion of other nongame birds in the chapter on the Hooded Warbler (*Wilsonia citrina*). The section on Hooded Warblers is of great value as it focuses attention on the declining populations of mature forest migrants, a major problem yet to be faced and solved by avian conservationists.

The chapters on single bird species are a major plus for the book. They are thorough and go to the "cutting edge" of the conservation problems with each species. The biological and background information presented for each species is excellent and provides information for both professional and amateur ornithologists. The narrative on the conflict between timber economics and Spotted Owls (*Strix occidentalis*) is excellent. This section accurately addresses the problems encountered when management tries to provide only the "minimum habitat" for sensitive species. Problems faced by Common Loons (*Gavia immer*) and Osprey (*Pandion haliaetus*) as a result of acid rain are two important topics discussed in the volume that may have significant impacts on the species in the future.

This volume provides valuable information and alerts readers to the current problems of many sensitive species. The book describes the problem areas in detail and lists the public agencies that manage the land and have the authority to control the destiny of many wildlife species. The volume would be an asset for college and university libraries and the personal libraries of individuals who deal with the management and conservation of wildlife on public lands.—RICHARD N. CONNER.

**The birds of Burma.**—B. E. Smythies. 1986. Third ed. Pickering, Ontario, Silvio Mattacchione & Co. xxxii + 432 pp., 32 color plates (from the originals by A. M. Hughes). ISBN 0-9692640-0-3.—In 1934 Smythies left Oxford University to join the Burma Forest Service. The first edition of his "Birds of Burma" was published on New Year's Day, 1941. The original 1,000 copies, published by the American Baptist Mission Press (Rangoon), sold within a year. The value of the contribution of this volume to the natural history of the area was recognized by natives, westerners, and the occupying forces of Japan. The copies that remained in Burma at the outbreak of World War II were collected by the Japanese and shipped to the Royal Veterinary College, Tokyo. They were subsequently destroyed during the bombings of Tokyo, and copies of the original are extremely rare and essentially unattainable.

The original color plates were executed by A. M. Hughes, on commission from H. C. Smith. Smith was also one of the driving forces behind the original program, which began in 1937. Hughes illustrated 290 species under extremely difficult circumstances. The originals were carried out of Burma, probably in 1942, by Mrs. Smith, who included them as part of the 30 pounds of personal possessions allowed each evacuee. They remained in a safe-deposit box in Bombay until after the war.

A second edition of the book was produced in 1953. It was more comprehensive in approach and attempted to include all the common birds. It covered a century of records and included species appearance, behavior, habitat, and breeding biology where known. It has been out of print almost 25 yr, and copies come on the market only sporadically.

The third edition is an effort by a small independent publisher to again make available Smythies work on Burmese birds. This is a large-format (23 × 28 cm) edition that is unique in several ways. First, the text was revised by Smythies. The sequence of families follows Wetmore's classification, a dramatic change from previous editions. Second, the original paintings were rephotographed using modern production techniques.

Although Smythies has not been in Burma since 1948, records are updated where possible. The scientific names, given frequently as trinomials, follow Peters (2nd ed.). There is a lengthy description of the topography, but only one, quite inadequate map. There is no modern graphic representation of the diversity either in altitude or in vegetation. The species accounts (1,027) comprise local names, field identification, voice, habits and food, nest and eggs, status, and distribution. The latter is probably the most difficult feature to assess. There are no species distribution maps, or indication of species density. We have come to expect this and other survey information in books on birds. Presumably, it is not due to lack of interest that these data are not available from Burma but because of its recent isolation.

The 32 color plates are attractive. There are 9–12 species per plate, with no sense of crowding. As anticipated, the species presented are selective, but the representation is broad. Given the history of the plates, it is remarkable that they exist at all!

This effort represents a new trend in publishing in the ornithological literature. It is more than the simple reprinting many books undergo. The color work is excellent and probably better than either of the earlier editions. It is even more remarkable that the author of the original text, which was produced over 50 yr ago, participated so fully in the revision. These features pertain to content. Equally unusual is the publishing strategy. There was a limited print run of 1,500 in a standard binding and 200 in a "blue leather edition, hand bound and tooled, in a slipcase." An equivalent number were published simultaneously in England. There is clearly an attempt to make this edition a collector's item as well. It is my impression that there is a reasonable probability of success.—A.H.B.

**A birder's guide to Trinidad and Tobago.**—William L. Murphy. 1986. College Park, Maryland, Peregrine Enterprises. v + 124 pp., 36 figures. ISBN 0-941475-01-8. Paper, $12.95. **Avifauna Parcial Parque Nacional Natural "Las Orquideas."**—Horacio Echeverri E. A. T. 1986. Medellin, Colombia. xxii + 239 pp. Paper. No price given. **Birds of Singapore.**—Christopher Hails and Frank Jarvis. 1987. Singapore, Times Editions. 168 pp., photographs and drawings. ISBN 9971-40-099-5. $29.90.—These three volumes represent a newer trend in the ornithological literature. I will consider them together, although they vary in their success. They deal with potentially interesting, certainly exotic, places. They fall under the general rubric of "The Birds of . . ." or "A Guide to the Birds of . . . ." Physically, they are pocket-size and differ from the table-size volumes with similar titles. The subjects are local or specialized geographic or political units. Two recent such publications for the United States are "Grand Canyon Birds" (1987, Univ. Arizona Press) and "Discovering Sierra Birds" (1987, Yosemite Nat. Hist. Assoc.). Their existence is a tribute to the current interest in travel and the increased accessibility of places throughout the world.

These books differ from the more comprehensive, annotated area bird lists ("Birds of Canada," 1986) or the "Peterson"-style field guides that attempt to categorize completely the birds and, in addition to aiding accurate field identification, include information on status, song, and habitat.

The books under review here are guides to finding common birds. They are intended as introductions to each area and include directions to local birding spots—even what to wear, where to stay, and how best to get around locally. In addition to local natural history, there may be information on the area, all of which adds an air of adventure and can be of immense value to the traveler.

The Murphy volume on Trinidad and Tobago is the least sophisticated ornithologically. It is *literally* a guide for birders, as opposed to being a guide to the birds. The text is chatty and rich in the "how's, where's, when's and why's" of travel and exploration of the islands. There are no pictures or illustrations of birds. Almost 45 pages are dedicated to detailed information on precisely where to look for birds. Early chapters include addresses of inns and hotels, various services available, and even suggestions for the type of film to use. There is a long list (11 pages) of "specialities," presumably useful to "listers," and another list of about 70 accidentals. A set of bar graphs plots monthly occurrence for the 366 regular species.

The guide to "Las Orquideas" was produced under the auspices of INDERENA (Colombia's National Institute of Renewable Natural Resources) and is intended for park visitors. It is written in Spanish and begins with a history and description of the park. The major portion of the book is the species accounts. They cover 132 of the 225 species known to occur in the park. The accounts are reasonably complete and include Latin, local, and English names, a short description of the species, observations of significant dates and habitat, and geographic distribution and local sites in the park where they are most likely to be seen. One unusual feature is the inclusion of lists of ordinal and familial characteristics. This provides the reader with a brief set of features that might be useful in understanding the natural history or behavioral observations.

The book has two weaknesses. The images of the birds (one per species) are small and reproduced only in black and white. Nothing in the text aids in identification such as plumage features, appearance of the soft parts, etc. The size and murkiness of the images make them less than useful in the field. Some species are illustrated only by silhouettes, others by line drawings. There are no scales on the drawings, but the text includes average length, body mass, and other clues to size. The presence of sexual dimorphisms is noted, but only males are illustrated.

This book would be easier to carry than Hilty and Brown's "A Guide to the Birds of Colombia" (1986, Princeton Univ. Press) but cannot replace it. The strongest aspect is the local information, especially on altitude and habitat. The 32,000-ha park spans an altitude gradient of more than 3,000 m. There is remarkable habitat diversity and lots to be seen.

In contrast to "Las Orquideas Parque," Singapore is a collection of islands totalling 520 $km^2$ that houses more than 2.5 million humans. Yet the checklist includes 295 species. There are 131 species treated in the book, of which 118 are residents. Singapore birds are diverse because of the variety and richness of the local habitat, the uniform climate, and its location on a major migratory flyway. Birds breed there 10 months of the year (not October or November). The authors have included boxed lists of birds of mangrove swamps, forest, city parks and gardens, and farming and rural areas.

The species accounts are precise, terse, and eminently useful to "people who have a new or casual interest in birds." A section on how to identify birds also contains instructions for where to find birds that is supplemented by clearly marked maps. The species listings include common and scientific names, overall size (English and metric), and information on expected behavior and localities. The narratives are descriptive and emphasize the unique aspects so valuable in identification. Appropriate information on immatures, dimorphisms, and other features are given.

One strong point of this book is the pictures. Frank Jarvis masterfully captures the birds in characteristic poses, often with informative background material. For most species illustrations occupy over half the space, and they are wonderful. Plumage textures are realistic; these *look* like birds in the wild. Each rendering is accompanied by smaller vignettes, often of

the bird in flight. Specific features of difficult species [e.g. commoner white egrets, tailorbirds (*Orthotomus*), female sunbirds] are presented in boxed sets for comparison. Of the three books considered here, this is the best produced, hardbound and printed on heavy paper. The illustrations are appealing and larger than in most field guides, and the text is pleasant to read.

There is clearly a market for these books. People travel more, and there is an increase in interest in birds. Consider the number of advertisements for trips in any issue of *Audubon* or *Natural History*. It is important that the information included in guides be accurate and accessible. Each of these books has a slightly different task, but they are all variations on a theme. The point is to get to where the birds are and then be able to find and identify them. These books would be helpful. Murphy gets you there and attends to creature comforts. Hails and Jarvis present superb illustrations and enthusiastic descriptions in a unique environment. Echeverri deals with probably the most remote localities. Together they represent a step beyond the traditional field guide.

At least two trends are apparent from the publisher's viewpoint. Field guides are changing. The traditional pocket-size volume of species accounts, distributional maps, and keys for identification is being expanded to include more natural history and ancillary information. One recent example is a new guide to the birds of England and Europe (Perrins 1987, Univ. Texas Press) that, in addition to the species accounts, introduces general discussions of life history, behavior, migration, evolution, and systematics. These volumes become a combined mini-textbook and field guide. Unfortunately, there is a zero-sum economy involving space, and the pictures of the birds tend to be reduced to a size of marginal value. If one had to state a preference, it would be for more or larger figures of birds, especially in various behaviors, and fewer words.

The second trend is in the publication of guides to more limited areas. The specialities may be a particular national park, an isolated land area, or a small but interesting political subdivision. There are also abridged guides to only the common birds of a country (Bruun 1985, Common Birds of Egypt, Armenian Univ. Cairo Press). Both types are aimed toward the traveler with a casual interest in birds or the peripatetic birder with specific travel goals. All these publication ventures are to be welcomed. Their usefulness ultimately will be tested in the field. Meanwhile, they reflect a growing interest in the environment and, by implication, concern for conservation of these resources. This is a positive step.—A.H.B.

## OTHER ITEMS OF INTEREST

**The sunning behavior of birds. A guide for ornithologists.**—K. E. L. Simmons. 1986. Bristol, England, Bristol Ornithological Club. xvi + 119 pp., 108 figures by Robin Prytherch. ISBN 0-9511768-0-3. Paper. Order from Bristol Ornithological Club, % The Anchorage, The Chalks, Chew Magna, Bristol BS18 8SN, U.K. £7.50 (U.S. $14.00 + 10% for overseas postage).—Probably most, if not all, species of birds sunbathe, and this detailed monograph, based on more than 200 cited references and over 1,600 records by the author, summarizes observations and ideas on this behavior. Numerous sunning postures occur among birds of the world, and in the longest chapter (47 pp.) Simmons, in a fine effort, proposes the first comprehensive terminology for these postures.

Simmons argues that sunning in cool conditions often assists in thermoregulation, but that the sunning frequently seen under hot conditions must have another function, such as, conceivably, correcting misalignments of the flight feathers, acquisition of vitamin D, or control of ectoparasites. In dismissing the suggestion that birds might sun simply because it feels good, Simmons contends that birds often persist in sunning even when highly discomforted by it. In view of a number of unresolved issues, sunning offers many challenges for experimental studies.

The book, including numerous figures of sunning birds, is attractively produced, and I noted only two minor typographic errors. This volume will be essential for anyone studying sunning and will also interest a broader ornithological audience. Institutional libraries with extensive ornithological holdings should acquire a copy.—GEORGE A. CLARK, JR.

**Evolution of animal behavior.**—M. H. Nitecki and J. H. Kitchell (Eds.). 1986. New York, Oxford University Press. 184 pp., 45 text figures. ISBN 0-19-504006-6. No price given.—This is a short book resulting from a one-day symposium on the evolution of behavior. The seven chapters, each by a different authority, cover everything from the evolution of foraging tactics as deduced from the fossilized tracks of extinct marine invertebrates to the evolution of parental care in living primates. Readers with an ornithological bent will probably focus on Fitzpatrick and Woolfenden's summary of the evolution of different social organizations in *Aphelocoma* jays. These authors discuss how delayed breeding may have served as a foundation for delayed dispersal from the natal territory, which in turn set the stage for the evolution of helping behavior by birds that had postponed departure from their birthplace. Ornithologists and nonornithologists alike will enjoy Ostrom's chapter on what we can deduce about the behavior of dinosaurs from their fossils. Ostrom offers an amusing and highly readable account of hypotheses on the feeding, parental, and social behavior of various dinosaurs.

Although each chapter can stand alone as a useful

review of its topic, the rationale for combining these seven contributions into one book is not obvious. Four of the chapters are clustered under the heading "Historical approaches to the evolution of behavior." These chapters deal with questions about the interpretation of behavior from fossils and how to create behavioral phylogenies. The three remaining chapters are grouped under "Field and experimental approaches to the evolution of behavior." These chapters are concerned with how to determine the adaptive value of behavioral traits of living species. Although Fitzpatrick and Woolfenden's chapter provides a link of sorts between the two parts of the book, and although the editors gamely try in a 4-page introduction to show the connections here, it would have been far better to stick with one or the other category in a book of just 178 pages. As it is, the book provides a sampler of case studies of two very different approaches to behavioral evolution without the coherence and integration needed to be useful to a beginner in search of an overview and without the depth of coverage needed to be helpful to the advanced student. University libraries probably should secure the book, but I cannot recommend it for personal bookshelves.—JOHN ALCOCK.

**Acid rain and waterfowl: the case for concern in North America.**—Paul W. Hansen. 1987. Arlington, Virginia, Izaak Walton League of America. 39 pp., 6 figures.—There is a growing and productive literature on quantitative aspects of the energy requirements, resource utilization, and timing of breeding of waterfowl. One goal of this work is to understand the long-term energy costs, physiological adaptations, and modifications in behavior relevant to species management. Species involved vary in body mass and natural history, which introduces other variables into these investigations. Egg production and incubation costs are often derived from these measurements and add significantly to our ultimate understanding. Various reviewers have emphasized species differences and indicated the existence of a number of "reproductive strategies" that consider prereproductive condition, migration, habitat at the nest and breeding grounds, and other factors that may limit some phase of the processes. The work is creative and important to our understanding of this group of attractive birds.

But the birds are disappearing. In this report Hansen makes a case for the effects of wetland acidification on those anatid species that breed in the affected areas. Reduced water quality influences the production of invertebrates, fish, and other links in the food chain. Acidification increases the solubility of mercury, a toxic metal that continues to turn up in the organs and feathers of these birds. Acidification also decreases the available calcium, which can influence egg production. Hansen believes the American Black Duck may be among the most vulnerable (because of its early breeding) and susceptible species. He suggests that this, rather than (or in addition to) genetic swamping by Mallards, may explain its recent decline.

This report is a summary of a considerable body of information and a rational call for more research. It implies a commitment on the part of industries and governments to attempt to reverse the current trends. Its treatment is even handed and scholarly. Like the recent reports on the Spotted Owl (1987, Condor 89: 205) and Red-cockaded Woodpecker (1986, Auk 103: 848), it should be read widely, especially in schools. There are conflicting data regarding the status of many species (see Robbins et al. 1986. The Breeding Bird Survey: its first fifteen years, 1965–1979, U.S. Fish Wildl. Serv. Resource Publ. 157), and accurate information is essential for appropriate action.—A.H.B.

**The atlas of wintering birds in Britain and Ireland.**—Peter Lack. 1986. Calton, Staffordshire, T. & A. D. Poyser. 447 pp., 16 figures, species maps. ISBN 0-85661-043-7. Available in the United States from Buteo Books, P.O. Box 481, Vermillion, South Dakota 57069. $55.00.—Through a massive organizational effort by the British Trust for Ornithology and the Irish Wildbird Conservancy, almost 4,000 10-km squares were surveyed an average of 16 times over 3 years. The results, derived from 180,000 *hours* of timed surveys, is truly impressive. What emerges is a comprehensive picture of the winter-bird populations of the United Kingdom. It is the perfect companion for the Breeding Bird Survey. The United States, with only one *state* breeding bird survey published, has a way to go!

The focus of this volume is the 192 individual species accounts, each of which is accompanied by a full-page map. The narratives produced by 100+ authors are brief, authorative, and entertaining. Each contains information on the habitat, natural history, population size, and movements of the birds plus assorted comments relevant to understanding particular aspects of the maps. A table gives the number of squares where the species were recorded (and the percentage of the total squares), several cogent citations, and a cross-reference to the "Breeding Atlas." The maps yield quantitative information on population densities by dot size. Each map has three sizes of dots, where size reflects the numbers of birds seen in a day. Conversion factors, i.e. definitions of dot size, are given both in the table and on the map. The visual impact is impressive. Compare, for example, the Mallard (p. 96) and Cetti's Warbler (p. 328) to get an idea of the differences in numbers and distribution. It is a rapid and effective method of information transfer. Each account is enhanced by a sketch, the work of 23 artists. There is a list of just over 100 additional species that

were reported once or twice during the survey and their locations. These are the rarities.

The introductory materials, presumably prepared by Peter Lack, offer many insights into the problems of production and the usefulness of the results. Details of the planning, organization, field methods, data storage, and analysis are included. There are examples of the cards and sheets used in the field, and maps show the distribution of yearly visits to each survey square. The rules for inclusion of a species are simple and have produced what appear to be reliable records. There are chapters on the weather over the 3 years and some patterns of seasonal distribution and movements of birds. The text is uniformly well written and gives the reader a sense of the status of each species. Make no mistake, these are important data, presented in a useful format (without a single graph!).

The B.T.O. and I.W.C. are to be congratulated, and the folks who spent so much time in the field, in winter, are to be admired. Together they have produced an elegant and useful product. It is crammed with useful information, well organized and accessible.—A.H.B.