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ORNITHOLOGICAL LITERATURE

WHERE HAVE ALL THE BIRDS GONE? By John Terborgh. Princeton Univ. Press, Princeton, N.J. 1989: xvi + 207 pp., 35 black and white photos, 18 graphs and maps. $40 (hardcover), $14.95 (paper).—As I write this review, the northbound warbler migration is in full swing. Full swing? Well, it is merely a shadow of the great flights I remember from 40 years ago. Or is it? Does memory play tricks on me or are there fewer warblers today? Ornithologists and birders have argued about the status of warblers and other Neotropical migrants for some time. If these species are indeed declining, is it because of changes occurring in the breeding range or in the wintering range? Do the migrants use the primary tropical forest or are they mostly in the second-growth? These are some of the contentious points and several symposia have been devoted to these birds and the factors affecting them. Now comes John Terborgh, a knowledgeable and experienced tropical ecologist, with a book subtitled, "Essays on the biology and conservation of birds that migrate to the American tropics."

Terborgh starts with a summary of his boyhood experiences in rural Virginia, not far from Washington, and then discusses the great changes that took place as the area was "developed." From this anecdotal base, he proceeds to present some harder data. He analyzes the observed declines as shown by two long-term breeding bird censuses taken near Washington. Over the years, the populations of these were reduced by 45%, and many species disappeared completely. This has generally been attributed to the fragmentation of the habitat in the region surrounding these study areas. Most of the affected species were the area-sensitive species which do not do well if forced to nest too near to a habitat edge. After a careful consideration of the data, and the results of several experimental studies, Terborgh concludes that the main factors influencing these populations are increased nest predation and increased parasitism by the Brown-headed Cowbird (*Molothrus ater*). Quiz time! Is there any relation between the adoption of the mechanical cornpicker and the population of Hooded Warblers (*Wilsonia citrina*)?

Turning to the question of deforestation in the tropics, Terborgh finds that the few hard data available are not in agreement, although suggestive. Terborgh feels that loss of the tropical forest is not YET an important factor for most birds. He does, however, offer the interesting suggestion that the disappearance of Bachman's Warbler (*Vermivora bachmanii*) may be due to the replacement of most of the Cuban forest by fields of sugar cane.

The heart of the book is the sequence of chapters discussing the migrants and their migrations. In these chapters, he combines his own considerable observations with suitable data from the not altogether adequate published literature to provide some answers to many of the questions that arise. These chapters summarize much of what is known, little as it is, of the migrants in their winter ranges.

Where do the migrants come from? Most of them are from eastern North America, particularly the great eastern deciduous forest. Where do they go? The bulk of them winter in Mexico, the Bahamas, and the Greater Antilles. What habitats do they occupy in the tropics? Contrary to the ideas held earlier, migrants are most common in the primary forests. Relatively few of them go to the lowland forests, and at middle elevations migrants are more common than residents. Unfortunately, it is at middle elevations that the greatest human pressure occurs. Why do the birds migrate in the first place? Terborgh ascribes the urge to migrate almost solely to changing food resources. He does offer a balanced discussion of the old argument as to whether the migratory species originated in the temperate zone or in the tropics.

Terborgh points out that one can make few broad statements and must almost treat each

species individually. Some of the migrants maintain winter territories, some join in flocks, both single species and mixed, some are solitary, and some join the ant-following flocks of resident birds.

In the chapter called "A Glimpse of Some Tropical Habitats" he describes vividly the changes observed when a patch of Ecuadorian cloud forest studied earlier was converted to a cow pasture. This is contrasted with the changes reported for a Yucatan milpas area. While pointing out that the milpas method of farming practiced for centuries has not harmed the avifauna greatly, Terborgh reminds us that this primitive agricultural practice is almost a thing of the past. His worst case scenario describes the almost total destruction of the mangrove forest in Ecuador to promote the shrimp industry. A somewhat more optimistic "best case" is the similarity of coffee plantations, with their tall shade trees, to an imperfect replica of the primary forest. Terborgh does not, however, mention the latest development, the introduction of coffee trees that do not require shade.

While much emphasis has been placed on the removal of tropical forests, little note has been made of the conversion of the South American pampas into monoculture croplands. Several shorebird species winter in this area and are under resulting stress. It is pointed out, however, that the birds that nest in the North American tall-grass prairie are not really affected by current events in South America. Their breeding habitat has already been almost totally eliminated in the United States, and further events in the south can have little effect.

A thoughtful chapter on "The Whys and Wherefores of Deforestation" points out that in the United States we still have some forest left, because we had a treeless area of fertile soil, the great prairies of mid-continent for growing our food. Most European countries lacked this and thus have little forest remaining. The countries of the Neotropics also lack this cushion, and so while the rate of deforestation in the tropics is about the same as the rate at which the North American forest was removed, the results in the south will be much different.

It is obvious that the passerine population in the eastern United States must be less than it was in pre-colonial times, since the present-day forests are only about 60% of the original. But given the poorer quality of much of the present forest and the extent of fragmentation, Terborgh estimates that the population may be only one-quarter of what it was 400 years ago. If this is the case, we may have to wait until three-quarters of the tropical forest is gone before the effects will be noticeable. At that time, it may be too late to do anything about it.

The book closes with a thoughtful chapter on conservation, mostly conservation in the tropics, but also with some pertinent suggestions for U.S. citizens. Terborgh points out that most people in the tropical countries want to live in the cities, but lack of jobs forces them into the countryside with resultant destruction of the forest. Short-sighted governments, indeed, encourage this. In the long run, such a program is doomed to failure. Terborgh suggests that tropical forestry could be a hope for the future and something like the multiple-use management extolled (but often not practiced) by the U.S. Forest Service might work in the tropics.

For North Americans he gives a list of issues for political action and several "matters for individual discretion." One of these is a heretical idea that will raise many eyebrows. Perhaps the indiscriminate feeding of birds in the winter should be given second thoughts. Besides making things nice for chickadees and cardinals, it helps raise the populations of nest predators such as Blue Jays (*Cyanocitta cristata*) and Common Grackles (*Quiscalus quiscalus*), as well as nest parasites like the cowbird.

This is an important book which should be, and no doubt will be, read by all interested in birds or other aspects of the environment. Terborgh, as a scientist, has attempted to present a factual exposition of this subject, and in this aim he has most definitely succeeded.

I recommend the book to all, but I suppose that it is too much to expect that congressmen, cabinet officers, or other policy makers will ever read it.

Since Terborgh wrote this book, a number of things have happened in this fast-changing field. The symposium on Neotropical Migrant Landbirds held in December 1989, in which Terborgh was keynote speaker, presented many more hard data on these birds. The picture was no brighter. Of great significance was a paper by Robbins, Sauer, Greenberg, and Droege (Proc. Natl. Acad. Sci. 86:7658–7662[1989]), which utilized Breeding Bird Survey data to show that many of the migrant species in the eastern forests had undergone precipitous declines in the period 1978–1979, while the short distance migrants and permanent residents had shown little change. Perhaps the critical "break even" time when tropical deforestation begins to be more important than habitat change in the north is already on us. The publishers of *Bulletin of the Atomic Scientists,* in light of current international developments, recently turned back by several minutes their logo, the "Doomsday Clock," which since the 1940s had ticked off the time until the holocaust of nuclear war. If such a clock exists for the migrant birds, perhaps there are not many minutes left until midnight.—GEORGE A. HALL.

ORNITHOLOGY. By Frank B. Gill, illus. by James E. Coe. W. H. Freeman and Co. Publishers, New York, New York. 1990: 672 pp., 363 figs., 35 tables. $49.95.—Congratulations to Frank Gill. His new book, "Ornithology," is a remarkably comprehensive survey of the entire field of the biology of birds. Its intended audience is undergraduate students and their instructors, and it will set a new standard for teaching in the field. Because it contains a significant and well-balanced summary of the science of ornithology, including research findings right through the 1980s, it will be an important addition to any library, personal or public.

The organization of the book makes it easy to use. The six parts are Origins, Form and Function, Behavior and Communication, Behavior and the Environment, Reproduction and Development, and Populations. Each of these parts contains three to five succint chapters plus a few recommendations for further reading. Within this framework, Gill's easy narrative style belies the high level of scholarship required to pull together and evaluate the literature on so many subjects. The bibliography contains more than 1500 citations. In the Preface, the instructor is advised to select among chapters so as to tailor a one-semester course to particular areas of interest.

The book is generously illustrated with over 350 photographs, graphs, and drawings. Tables, mathematical models, and statistical tests are minimized. The first of two appendices is a 62-page survey of the birds of the world by orders. This section is illustrated with more than 100 excellent bird portraits by James E. Coe. Guy Tudor served as consultant for the bird portraiture. This appendix is a modern version of the section in "Fundamentals of Ornithology" (1959, John Wiley and Sons, Inc.) by Gill's academic ancestors at the University of Michigan, Josselyn Van Tyne and Andrew J. Berger. Gill's version follows the taxonomy of the reference list of the birds of the world by Morony and coworkers (1975, American Museum of Natural History) and the sixth edition of the A. O. U. Check-list of North American Birds. English and scientific names of each of the 9021 species of birds are given in Appendix II.

Gill points out areas of ornithology that are of current interest, areas where there is disagreement, and areas where progress awaits new ideas and techniques. He discusses the various kinds of evidence that have been used to support different positions on controversial issues. His conceptual approach throughout is evolutionary.

Gill's enthusiasm for the intellectual challenges of his subject is especially apparent in his discussions of recent research. In section 1 on Origins, he gives examples of how morpho-

logical, paleontological, and molecular data contribute to the analysis of how groups of birds are related to one another. Are flamingos derived from storks, ducks, or shorebirds? Were flightless ancestors of today's large flightless ratites (the ostrich in Africa, rheas in South America, emus in Australia, etc.) present on the three southern continents before they separated by continental drift many millions of years ago? The chapters in parts III and IV on behavior and the final chapter on speciation, where Gill is closest to his own area of interest, are especially well done. In these sections he discusses what can be learned from the comparative study of mating systems, kinship in social groups, physiological correlates of behavioral differences among individuals, and the experimental study of the development of song. The only areas that may be missed by today's students are some parts of avian ecology and conservation. I could not find Joseph Grinnell or Evelyn Hutchinson, the concept of the ecological niche, analyses of large-scale trends in populations of waterfowl or landbirds, or much on wildlife management, even of endangered species. But neither could I find areas that could have been sacrificed to make room for these subjects.

Overall, Frank Gill's maturity as a scientist and his appreciation of the beauty and the abilities of birds have enabled him to present a staggering amount of material in an engaging and dynamic manner. I think reading "Ornithology" would enrich the life of anyone with a serious interest in the subject, and I am glad to say that I think that audience has been increasing exponentially in the last few years.—FRANCES C. JAMES.

LIFE OF THE TANAGER. By Alexander F. Skutch, illus. by Dana Gardner. Cornell University Press, Ithaca, New York. 1989: 114 pp., 24 color plates, 19 line drawings, 4 tables. $36.50.—Alexander Skutch has compiled many observations on tanagers, mainly from his own fieldwork in Costa Rica, into a nicely illustrated volume that seems to target as its audience the growing number of birder-naturalists who visit the tropics. The well-written, non-technical text is organized into 12 chapters: (1) "The Tanager Family," an overview of the diversity of colors and shapes in the family; (2) "Food and Foraging," which emphasizes the role of tanagers in dispersing fruit; (3) "Voice," (4) "Daily Life," which covers mainly sociality, preening, anting, mobbing, and roosting; (5) "Displays and Disputes," nine pages of anecdotes concerning "quarrels"; (6) "Temperament," which covers wariness of humans and unfamiliar objects; (7) "Courtship and Nests"; (8) "Eggs and Incubation"; (9) "Nestlings and their Care," which includes some excellent descriptions of day-by-day growth of nestlings; (10) "Helpers" (at the nest); (11) "Enemies," which includes an informative tabulation of nesting success; and (12) "Tanagers and Man." A bibliography follows the text, although the references are usually not cited directly in the text.

Other reviewers of Skutch's recent books have pointed out that most material included has been recycled from earlier, more technical publications. Others have noted with varying levels of disdain Skutch's often peculiar outlook on nature and his tendency towards anthropomorphic interpretations of behavior. This volume could be criticized on these grounds as well. I only hope that all those "bad" snakes that Skutch has killed through the years have at least been preserved as scientific specimens. My only major disappointment with the text was that it did not adequately convey the spectacular nature of the mixed-species flocks of gaudy, gleaming tropical tanagers that provide visitors from temperate latitudes with their most indelible, heart-throbbing tropical memories.

So what's in it for the ornithologist? I confess that I was entertained by the anecdotes, some of which are hilarious, others macabre. Some of my favorites include: (1) the female Tropical Gnatcatcher (*Polioptila plumbea*) that ignored its own mate, which was building a nest, to care for nestlings of a pair of Golden-masked Tanagers (*Tangara larvata*) that it tried to drive off; (2) the Scarlet-rumped Tanagers (*Ramphocelus passerinii*) that scolded

shoes hidden in a thicket from marauding mercenary soldiers; (3) the two female Blue-gray Tanagers (*Thraupis episcopus*) that shared incubation duties of a four-egg clutch; (4) the American Swallow-tailed Kite (*Elanoides forficatus*) that seized a tanager nest in flight and carried it and its nestling occupants upwards into the sky; and (5) the Green Honeycreepers (*Chlorophanes spiza*) that reveal their nasty habits at his feeding station. My favorite quotes are: "Some male birds have trouble finding the nest" ("big surprise," says my wife, with great smugness) and "Sometimes birds continue for days to bring food to nests from which they have lost their young." On the other hand, there are just some things about tanagers I'd rather *not* know: ". . . nestlings turn to present their rear ends, from which oozes a gelatinous or watery stuff . . . , which the parent eats little by little, appearing almost to lick it up with its tongue."

Dana Gardner's artwork complements the text nicely. His interesting compositions and brilliant colors counterbalance the somewhat porcelain-like birds. The only mistakes that I noticed were the labelling of the Black-faced Tanager (*Schistochlamys melanopis*) as a "male" (it is monomorphic; the immatures are frequently assumed to be females) and the placement of the arboreal White-rumped Tanager (*Cypsnagra hirundinacea*) on the ground.

If one wants a comprehensive book on the biology of tanagers, then buy Mort and Phyllis Islers' "The Tanagers" (1987, Smithsonian Inst. Press), a scholarly monograph that compiles virtually every bit of information available for all 242 species. If one wants pleasurable reading with many interesting stories skillfully interwoven to illustrate much about the behaviors of tanagers, and if one seeks inspirational prose that enthusiastically conveys much of the magnetism of tropical birds, then buy Skutch's book.—J. V. Remsen.

Return of the Whooping Crane. By Robin W. Doughty. Univ. of Texas Press. Austin, Texas. 1989: 182 pp., 31 color text figs., 6 maps, 7 tables, 2 appendices. $24.95.—Perhaps no other North American bird better symbolizes the plight of endangered species than does the Whooping Crane (*Grus americana*). From a low of 21 individuals in 1944, the population has slowly increased to a current (spring 1990) level of 141 wild birds, plus an experimental flock and those in captivity. Doughty's book is a very readable account of the trials and tribulations of biologists, conservationists, government agencies, and the general public in their efforts to save the Whooping Crane from extinction.

"Return of the Whooping Crane" is divided into seven chapters which include an introduction, discussion of the winter habitat at Aransas National Wildlife Refuge, Texas, nesting habitat in the Canadian Northwest Territories, radio-tracking activities in the early 1980s, propagation programs at the Patuxent Wildlife Research Center, attempts (many of them frustrating) to establish an experimental flock in Idaho, and finally a conclusions section with some thoughts about the future.

Perhaps the most significant contribution made by this work is the attention given to the details of Whooping Crane ecology on the nesting and wintering areas. A wealth of data exists in the scientific literature on habitat needs, management methods, and management direction for those areas. Doughty has quite handily synthesized that information and presented it in a form that both the scientist and lay person can understand and enjoy.

The color photographs, with two exceptions, are very high quality and do an excellent job of portraying Whooping Cranes and their habitats. Seven high quality, multi-colored maps depict various portions of the range of this species including the daily locations of a radio-marked bird tracked from Canada to Texas.

My only real frustration with this book revolves around the over-kill given to the propagation facilities at Patuxent, and the amount of space devoted to the experimental flock in Idaho. This, I believe, was done at the expense of providing more information on the habitats

(and threats to those habitats) used by the birds while on migration. Captive rearing and the Idaho release program are both "showy" aspects of Whooping Crane recovery which have generated much interest in the Whooping Crane. However, little information is provided about migrational habitat other than that obtained from the controversial radio-tracking studies conducted in the early 1980s. There are five federally designated areas of critical habitat for Whooping Cranes in the United States; four of them are migration stopover areas. Discussion of critical habitat is limited to about three paragraphs in the conclusion section, and the bulk of that discussion deals with issues on the winter habitat at Aransas National Wildlife Refuge.

The text is remarkably free of errors, although the publication date for one of my papers in the bibliography was cited as twenty years before the actual publication date. The bibliography contains 287 titles, including scientific papers and various agency reports. This alone is a valuable contribution to the understanding of Whooping Crane ecology.

Although the book does not cover some aspects of Whooping Crane recovery that I believe should have received more space, this book is highly recommended. Doughty's work was designed as an update to McNulty's 1966 publication, "The Whooping Crane: the Bird that Defies Extinction." Because of the multitude of advances in our understanding of Whooping Crane biology since McNulty, Doughty's update was necessary in order to summarize the current state of knowledge. My only hope is that the next update twenty years from now will be titled something like "Recovery of The Whooping Crane." The current title will serve as an essential base for evaluating future efforts to recover the Whooping Crane.—CRAIG A. FAANES.

DISEASE AND THREATENED BIRDS. Edited by John E. Cooper. International Council for Bird Preservation, Technical Publication No. 10. U.K. 1989: 200 pp. 16 figures, 19 tables, 24 black-and-white photos. A collection of 14 papers by 23 authors presented at the XIX World Conference of the ICBP, June 1986, Queens University, Kingston, Ontario, Canada. Paper. ISBN 0-946888-18-13. £16.50.—While the influence of disease on population dynamics of free-living birds has not weighed heavily in the investigations of biologists, the dire nature and intensity with which endangered and threatened species of birds are being managed approaches the mode of operation of modern poultry operations. Predicted rates of extinction over the next decade forecast an increasing spiral in this trend. Given the importance of disease recognition and control in the poultry industry, one readily concludes that similar concerns should be addressed by those charged with the responsibility for managing endangered and threatened avian species.

This book, edited by one of the world's great advocates for application of veterinary principles to the management of wild birds, adeptly serves as a primer for scientists who, although familiar with the conservation biology of a species, are untrained in assessing the impact of disease processes. The first several papers review the ecology of avian pathogens and the various methods the poultry industry has devised for managing these. Accordingly, the reader is informed that disease can be dealt with by exclusion, elimination or control by vaccination, environmental management and chemotherapy. As ensuing papers indicate, most endangered species in captivity are presently relatively free of pathogens. Given the millions of dollars and decades of time spent by the poultry industry to eliminate troublesome pathogens, such as *Mycoplasma* (sp.) and *Salmonella* (sp.), as well as the annual expenditures for control of coccidia, it is clear that every effort to continue to exclude pathogens from endangered species is the most desirable route.

The basis for concern about diseases in small populations is established in a paper by J. E. Cooper where the combined effects of genetic impoverishment, exposure of naive indi-

viduals or populations to exotic pathogens and the stress of captivity create a situation ripe for exploitation by pathogens and opportunistic organisms. The concern extends also to the potential, but as yet undocumented effects, that could arise wherein captive-produced and released individuals, upon having been rendered carriers of a pathogen in captivity, could upon release to the wild, expose wild birds to a novel pathogen. Indeed, the possibility for dissemination of pathogens by birds is addressed in a chapter which documents introduction of avian influenza by migrating shore birds.

Two situations where exposure of naive populations to a pathogen apparently occurred are provided. The first is an outbreak of Eastern Equine Encephalitis (EEE), an insect-borne viral infection in Whooping Crane (*Grus americana*) at a captive propagation site. Losses of adult breeding birds were significant, and rapid diagnosis required application of a multidisciplinary, technologically sophisticated approach. While control by vaccination of the captive birds was achieved, the event caused re-evaluation of proposed sites in the wild for establishing founder flocks of cranes. In the second case, strong evidence for the role played by introduced pathogens in the demise of the Hawaiian Crow (*Corvus hawaiiensis*) is presented, implicating both avian pox and malaria. These two case profiles are complimented by other papers examining diseases in free-living Australian birds and providing a perspective on the impact of the ubiquitously distributed avian hematozoa. Clearly, the concern for diseases must go beyond the walls of the captive propagation facility.

The text is amply complemented throughout with tables, graphs, line drawings and black-and-white photographs. The multidisciplinary collaborative approach advocated by the editor is facilitated by an appendix which contains a registry of individuals and laboratories throughout the world available for consulting work in wildlife diseases. A second appendix briefly presents screening protocols and post mortem procedures.

Now, who should read this book? I think it pertains to a broad and diverse audience. Biologists, technicians, and managers of endangered and threatened species for whom concepts of pathogen dynamics are not their native tongue, should have this on their must read list. Veterinarians will find it a useful collection of information and will enjoy comparing the information with their own experiences and approaches. Researchers will rejoice at the many situations that are described as being in need of further research. And on that account, perhaps those operating in the rarified atmospheres of agencies and granting institutions which allocate funds should read it also.—PATRICK T. REDIG.

THE HUMMINGBIRD BOOK. By Donald and Lillian Stokes. Little, Brown and Company, Boston. 1989: 96 pp., 70 color photographs, 8 range maps. $9.95.—Hummingbirds are big these days, so it is no surprise that yet another book on the subject has come out.

The Stokes' book fills the "how-to" niche that has been almost completely void. Billed as the complete guide to attracting, identifying, and enjoying hummingbirds, this book comes close to living up to expectations. An initial section on feeders covers types, selection, placement, and number. Additional sections discuss feeding mixtures, maintenance, and feeder problems. These pages introduce the basic concepts of hummingbird feeding for the experienced and beginner alike. A special section on attracting orioles is a nice addition, but it would have been better placed farther from the front of the book.

Since hummingbirds feed on nectar and pollinate many flowers, the sections on habitat are especially valuable. Lists of hummingbird wildflowers of the West and of the East make no claim to completeness yet get the point across that the birds and flowers belong together. The strategy of hummingbird gardening is well discussed in the section by that name although the accompanying plant list contains several species which seem to contain little nectar and

therefore provide only color rather than sustenance. A novice hummingbirder could easily go astray with this list.

The authors have included numerous pages of assorted hummingbird biology and trivia that enable the non-biologist to understand quite a bit about this large family. A section entitled "Photographing Hummingbirds" by Sid Rucker leads one to believe that anyone with a good camera can take good photographs of these agile birds. It fails to mention that most portrait shots are taken of captive birds, a technique beyond the reach of anyone lacking appropriate permits. Two pages of identification notes are primarily useful for identifying males in their breeding regions.

The last half of the book is taken up with species accounts of those species which occur in North America. Each of the eight species with wide distribution is allotted four pages. Range maps show a broad picture of the breeding areas and, in most cases, the wintering grounds. Diagrams of "dive displays" for each species depict the distinctive aggressive displays of each species. A "quick guide" box for each species gives breeding period, migration times, breeding range, and non-breeding range in a brief capsule. Species that have small ranges within the U.S., or that occur irregularly are equitably allotted a single page. A list of resources at the end makes no claim to completeness, but it should have included all of the commonly used field guides for North American birds.

Many attractive photographs add to this book's appeal. For the most part, they are excellent. Although I have a personal preference for "natural" pictures, "studio" shots go far in allowing the reader a clear, unobstructed view. A few of the photos ring less than true. Two female *Selasphorus* misidentified as Black-chinned Hummingbirds on page 7 seem to be the same birds as two Rufous Hummingbirds on page 79. How did they get two hummers to perch next to each other? The adult male Calliope Hummingbird displaying on page 41 has the white-tipped rectrices of an immature. I didn't know that a male could reach breeding condition without molting his original tail feathers.

My major criticism is their failure to capitalize the common names of each bird species, except those that include proper names, and are therefore already capitalized. Lacking capitals, descriptive names seem less like names of species than just generic birds. A zealous nit-picker would list other faults but I shall refrain. This book's value is to the backyard birder or enthusiastic nature lover, and for them, the book is very good.—NANCY L. NEWFIELD.

THE BIRDS OF OHIO. By Bruce G. Peterjohn, illus. by William Zimmerman. Indiana Univ. Press, Bloomington, Indiana. 1989: 237 pp., 50 color plates with captioned figs., two maps. $50.00.—The appearance of a major new state bird book is always good news for birders and research ornithologists alike. At their best, these treatises pull together a wealth of information on the distribution, migration, historical trends, and habitat associations for each of the species covered. New insights about avian behavior or ecology may also be distributed liberally throughout the species accounts. The "Birds of Ohio" clearly falls in this category; it is an authoritative and insightful review, the first for Ohio in nearly a century.

Peterjohn begins with a short, six page introduction devoted mainly to defining terms. The species accounts occupy the rest of the book. Most begin with an introductory paragraph presenting a short vignette of the species, describing some interesting aspect of its behavior or ecology, or commenting on historical trends in its status. Abundance throughout the year, by region of the state when appropriate, is then described in detail. Unusually large counts are mentioned, but normal levels of abundance are emphasized. Frequent use is made of

"daily totals" to describe abundance (e.g., "daily totals seldom exceed 3–6"). Detailed accounts of historical trends in abundance, often stretching back to the mid-1800s, are provided for many species (those whose abundance has changed?). The book concludes with a list of references (526 entries) and an index. A series of full-page paintings by William Zimmerman and a single painting by Ohio artist John Ruthven are also included.

This work has three impressive strengths. First, as noted above, the chronologies of the annual cycle are extremely detailed. Arrival times in southern, central, and northern Ohio are reported, overflights are distinguished from the arrival of residents, and the probable causes of unusually large or early flights are discussed. Similar detail is provided for fall migration, and for residents, average dates of laying, hatch, and nest departure are provided Abundance during many of the periods is also reported. This information will enable anyone to determine whether their sightings in the field are typical, unusual, or improbable.

Second, the historical information has been summarized and presented in an interesting and valuable manner. Ohio has a detailed record of avian trends. The first comprehensive account, by Dr. Jared Kirtland, appeared in 1830, and subsequent statewide accounts were published in 1882 and 1903. Numerous regional accounts, especially Trautman's classic "Birds of Buckeye Lake" (1940), have provided detailed information on population trends in this century.

Peterjohn has obviously mastered this imposing body of knowledge. He writes easily and confidently of ups and downs in avian abundance during the past 160 years. Those who view avian populations as rather static, changing little in abundance from decade to decade, would do well to browse through "The Birds of Ohio." For example, among 24 species accounts, spaced evenly throughout the book, I found four species that have generally increased, five that have generally decreased, and four that have both increased and decreased since the mid-1800s. One species was reported not to have changed substantially in abundance since about 1800, and no trend information was given for nine species. Thus, for more than half of the species, pronounced changes in abundance have occurred in the past 160 years. These descriptions of historical trends in abundance should be of interest to many ornithologists, not just those with specific interests in Ohio birds.

The third strength of Peterjohn's book is that it is laced with insightful comments and ideas about the species he describes. For example, many readers will be interested to learn that Common Ravens (*Corvus corax*) "were probably the most numerous corvid in Ohio when the state was first settled," and that documentation of Ivory-billed Woodpeckers (*Campephilus principalis*) in Ohio from archaeological sites must be based on leg bones or other body parts, not on the bill, head, or wings "since they were prized by Indians and actively traded between tribes." Peterjohn frequently discounts early or late records pointing out that they were probably mis-identifications. These remarks should serve as useful cautions for field observers. The author also includes numerous comments about habitat preferences that will interest specialists as well as birders.

My biggest regret about "The Birds of Ohio" is that no syntheses are included. The detailed species accounts could have been used to address numerous issues, such as the following: How have woodland, grassland, scrubland, and wetland birds changed in abundance during the past few decades? Which species are most affected by hard winters, and how fast do they recover? How long have species reduced by market hunting taken to recover? Have area-sensitive or neotropical migrants declined more than other species? It is certainly the author's prerogative to decide that such issues are outside the scope of his book, but I think "The Birds of Ohio" would have been more interesting if a few analyses—perhaps emphasizing conservation issues—had been included. I was also sorry that little use of Breeding Bird Survey data from Ohio was made. The data are easy to obtain and show many temporal and spatial trends clearly. Zimmerman's plates, while attractive, are not, in my opinion,

outstanding, and most have already appeared in "The Birds of Illinois." It is unfortunate that the Indiana Univ. Press did not commission a new set of plates, especially considering the large number of excellent bird artists currently available for such a project.

In summary, "The Birds of Ohio" is a detailed and authoritative account, emphasizing abundance and distribution both at present and since the mid-1800s. It will certainly be *the* book of Ohio birds for years to come, and should be of interest to all ornithologists concerned with temporal trends in avian populations as well as to anyone interested in birds or birding in Ohio.—JONATHAN BART.

THE AMERICAN CROW AND THE COMMON RAVEN. By Lawrence Kilham, illustrated by Joan Waltermire. Texas A&M Univ. Press, College Station, Texas. 1989: 255 pp., Appendix of Scientific Names, 17 numbered figs., 8 tables. $29.50.—Lawrence Kilham absolutely loves corvids. This book is obviously a labor of love about the behaviors of crows which is divided into four unequal sections. The first two parts provide detailed descriptions of his observations of the behaviors of wild American Crows (*Corvus brachyrhynchos*) both in Florida and New Hampshire. The second section concludes with Dr. Kilham's notes and remembrances of hand-raising a crow, "Crowsy." The third part of the book is a rather rambling description of crow behavior in general which speculates on some possible evolutionary origins, associations, and aspects of crow social systems. Part four of the book concerns Common Ravens (*C. corax*) in the wild and the hand-raising of a young crippled Raven, "Raveny."

There are several chapters associated with each section. Each chapter is comprised of very detailed qualitative descriptions of the observations Dr. Kilham made concerning particular aspects of behaviors (e.g., varieties of foraging), and then a discussion in which the author, with a liberal use of literature citations, draws analogies to similar behaviors in other corvids, other avians, and perhaps other vertebrates, which usually includes wolves (*Canis lupus*) and humans (*Homo sapiens*). It is in these discussion sections that Dr. Kilham's scientific background is demonstrated, and also these areas that form the basis for a fatal flaw in the book. This flaw may lead the casual reader and the dedicated amateur to incorrectly conclude that she/he is reading scientific literature.

The preface of the book tells the reader that statistics are not necessarily useful in trying to understand animals. Yet in each discussion section strong evolutionary correlations are drawn between the crow or raven behavior and similar behaviors in other organisms. I suggest that venturing such relationships demands the use of some statistical support. To suggest the notion that avian behavior has a peculiar place in science that does not rely on statistics does not give proper legitimacy to the field.

To the professional ornithologist, the descriptions of the behaviors have little meaning. There is no flow. There is little context. There is not nearly the amount of quantitative detail to allow the descriptions to be useful. For example, Chapter 4 (Territory and Food Storing), begins with a brief description of 47 territorial encounters between 1981 and 1983. The description references a pen and ink drawing which adds no detail nor clarity to the description. To have some value, the professional ornithologist needs to have some idea of the length of each encounter, the behaviors of each of the participants and the periodicity of the encounters (time of year, time of day, period since the last encounter etc.) for the description. I fear an amateur might find this description engaging and then mistakenly infer that it is a scientific observation due to the detail and scientific context of the writing.

Throughout the book, the behavioral descriptions are liberally laced with anthropomorphic terminology (e.g., use of weapons, fooling, small talk, respect, etc.). Although a non-

scientific book could make such depictions, the overriding tone of this book suggests that anthropomorphic descriptions are scientifically permitted.

In summary, I can not determine who should read this book. It is not one that should be on the professional shelf of an ornithologist. The amateur must be wary of the book also. It has a prevailing style of scientific veracity which may deceive the unsuspecting amateur into the pitfalls that field biologists and behaviorists have been successfully climbing out of for the last dozen years.—RICHARD B. STIEHL.

BIRDS OF THE CANADIAN ROCKIES. By George W. Scotter, Tom J. Ulrich, and Edgar T. Jones. Western Producer Prairie Books, Saskatoon, Saskatchewan. 1990: xvi + 170 pp., four black-and-white drawings, many color photographs. $22.95.—Anyone who has experience in birding in the northern Rocky Mountains probably has seen a copy of Ulrich's "Birds of the Northern Rockies." The present book is very similar to that text. It presents the birds of the Canadian Rockies through a series of color photos accompanied by descriptive paragraphs. One might ask why a second book was necessary, given the similarity of the coverage format (several photos seems to be the same in both books). Additionally, one might also wonder why the present book, similar in size to "Birds of the Northern Rockies," costs nearly three times as much. "Birds of the Canadian Rockies" does cover areas not included in the scope of the northern Rockies book, but there is considerable overlap of the avifauna in each.

"Birds of the Canadian Rockies" is an attractive book and is relatively free from typographic errors. The pictures generally are clear and helpful, although some appear to be of birds in captivity. Both the Downy Woodpecker (*Picoides pubescens*) and the Hairy Woodpecker (*P. villosus*) photos show the birds in virtually the same position on the same perch! The authors occasionally point out interesting facts about distribution or habitat selection of selected species, but this part of the book could have been much stronger.

A few things are disturbing about the book. Although it purports to be a field guide, it is of little use in identifying some birds. For example, the authors say only God can separate Hammond's Flycatchers (*Empidonax hammondii*) from Dusky Flycatchers (*E. oberholseri*) in the field. They also do not recognize the division of the Western Flycatcher into two species, the Pacific-slope Flycatcher (*E. difficilis*) and the Cordilleran Flycatcher (*E. occidentalis*). For my taste, too many "throw-away" words are used in the descriptions of birds in this book. These include the frequent use of words such as "odd-looking," "handsome," "busybody," "elegant," "boisterous," and others. The coverage of each species is uneven. As many as three different photos are presented for species that have little plumage variation and are easy to identify (e.g., American Dipper [*Cinclus mexicanus*]). Others are pictured only once and some not at all. Photos of sexually dimorphic species sometimes include females, but there are several notable omissions (e.g., Yellow-headed Blackbird [*Xanthocephalus xanthocephalus*], Red-winged Blackbird [*Agelaius phoeniceus*], Red Crossbill [*Loxia curvirostra*]). Diet, song, and plumage variation are given for some species and omitted for others.

All-in-all, the book will be popular with the casual visitor to the northern Rockies, but will not be of much use to an experienced ornithologist, and I hope that beginning birders buy a copy of one of the standard North American field guides before they obtain this one.—CHARLES R. BLEM.

VOICES OF THE NEW WORLD PIGEONS AND DOVES, ORDER COLUMBIFORMES, FAMILY COLUMBIDAE. By J. W. Hardy, G. B. Reynard, and B. B. Coffey, Jr. ARA Records, P.O. Box 12347, Gainesville, Florida 1989. Monaural tape/casette, $10.50.—In this casette tape, the authors have brought together the voices of 61 of the 70 species of columbiforms known to breed in the New World. These include fifty-seven native and four introduced species from the Old World. With few exceptions, the cuts retain the high quality of recording of all previous ARA productions.

Columbids are marvelous subjects for the study of evolution of behavior as their bowing displays (or the homologs) are innate, so that morphologically similar species often have very similar displays which may be useful in understanding relationships (Goodwin, Auk 83:117–123, 1966; Frith, H. S., Pigeons and Doves of Australia, Rigby Publishing, Adelaide, 1982). The cross-fostering and hybridizing experiments by Whitman, Lade, and Thorpe have revealed that the voices of pigeons are also innate (e.g., Lade and Thorpe, Nature 202: 366–368, 1964). These recordings enable the listener to test whether the evolution of voices also parallels changes in morphology. One sees that in most cases they do, e.g., the morphologically similar *Columba leucocephala* and *C. squamosa* have strikingly similar songs.

When the songs and displays are not similar in taxa considered to be close relatives, is it because voice has evolved independently of morphology or is it because the relationships of those taxa need closer scrutiny? For example, *Zenaida macroura, Z. aurita, Z. auriculata,* and *Z. graysoni* have very similar displays and songs, but *Z. asiatica* and *Z. galapagoensis* do not. Are these taxa correctly treated as congenerics?

In the notes accompanying the tape, the authors inform us that when they designate a sound as "song" they are referring to the advertising song. However, the recordings of the Rock Dove (*Columba livia*) are those delivered during its bow-coo (or display coo). In contrast to the relatively complex songs of the New World *Columba* species, the advertising song of *C. livia* is a simple one note coo repeated in series (Baptista and Abs, Vocalizations, *In* Physiology and Behavior of the Pigeon, M. Abs (ed.), Academic Press, pp. 309–325, 1983).

Although, as pointed out by Hardy et al., New World *Columba* "growl" in aggressive contexts, they also use a "growl" sound as an alternate to the advertising coo or during the nest demonstration display (see e.g., Goodwin; Condor 66:418–422, 1964).

Song repertoire in most pigeons and doves is usually quite small: one or two advertising songs and a nest-display song. The advertising song may sometimes double as the bow-coo song. The Croaking Ground-Dove (*Columbina cruziana*) has an exceptionally large song repertoire. Although Hardy et al. present two song variations in the tape, Trollope (Avicul. Mag. 80:181–188, 1974) reports that it utters a distinct nest-calling song plus four "variations" of the advertising song. There is also marked sexual dimorphism in vocalizations. This species deserves a closer look.

None of my remarks is meant as serious criticism of what is an outstanding compendium of the songs of New World pigeons and doves. The flute-like songs of doves may be enjoyed for their beauty alone; additionally, as developed above, these songs may be used as taxonomic tools to understand better the relationships between taxa.

In addition to the advertising songs of the nine taxa not yet recorded, this reader hopes that recordists will also make an effort to record the nest-display songs of all the species, as these sounds will probably also prove useful to taxonomists. For example, a number of authors have suggested that New and Old World *Columba* are not close relatives (review in Ingold et al. Comp. Biochem. Physiol. 77:427–430, 1984). Hardy et al. present the nest-display songs ("growls") of 11 of the 17 New World *Columba* species. Sound spectrograms of these and a twelfth species from my collection (*C. squamosa*) are structurally quite similar, and may well prove a useful character in distinguishing the New and Old World forms.—LUIS F. BAPTISTA.