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ORNITHOLOGICAL LITERATURE

AVIAN ECOLOGY. By C. M. Perrins and T. R. Birkhead. Methuen, Inc., 733 Third Avenue, New York, New York 10017, 1983:221 pp., 40 numbered tables, 76 numbered text figures, references, index. $21.00 (paper).— This book is designed to fill the authors' perceived gap in the literature of material for ". . . the advanced undergraduate and the serious amateur wishing to know more about the ways of birds . . . ." After a brief introduction there are eight chapters ranging in topic from social systems through reproduction and migration in which the authors attempt to tell us a little about each of the major topics in the ecology of birds. Owing to the geographic location of the authors, the book is decidedly slanted towards the European literature and for the most part ignores many of the "traditional" examples from North America. This is not necessarily a criticism, however, as I for one am really behind on the European literature and found this book to be quite informative in that regard.

In Chapter 1 the authors give an overview of their approach to the book in which they discuss each characteristic from its adaptive standpoint and compare the experimental and comparative approaches to bird biology. Chapter 2 deals with social systems, namely territoriality and coloniality. Territoriality, shown to be the result of competition for scarce resources, is said to limit populations. Brown's economic defendability model is supported with Gill and Wolf's fine sunbird study. Interspecific territoriality is examined using Reed's Great Tit (*Parus major*) and Chaffinch (*Fringilla coelebs*) study. The advantages of coloniality are divided into antipredator and feeding categories, while the costs are listed as increased competition, risks of rearing unrelated young, cannibalism, and increased transmission of ectoparasites and disease. As in the remaining chapters, Chapter 2 ends with a short summary.

Breeding systems are the subject of Chapter 3, which is basically a synopsis of Lack's, Orian's, and Emlen and Oring's papers. Short sections on brood parasitism and cooperative breeding are included (cf. Table 3.3 for a good summary of the costs and benefits of cooperative breeding). Reproductive biology is divided into two chapters: Chapter 4 on breeding seasons and Chapter 5 on clutch size. The general tone of the two chapters centers around the trade-off between the date at which birds start to breed and the number of eggs they lay. The review of proximate and ultimate factors at the start of Chapter 4 is refreshing. The discussion of clutch size quickly dismisses all theories other than Lack's idea ". . . that the clutch size that evolves is that which leads to the parents rearing the largest number of young which survive to breed." The strengths and weaknesses of the theory are discussed and recent modifications (e.g., Ricklefs, Charnov, and Krebs) to the parent idea are summarized.

Chapter 6 covers population biology, including the illusive concept of stability; rates of increase; carrying capacity and limiting resources; survival rates and life tables; natural regulation of population density (density-dependent and density-independent factors); and a catch-all section on practical applications with paragraphs on species protection, reduction of pest species, and exploitation (e.g., hunting). I feel the strength of this chapter is the synthesis of ideas on density-dependent and independent factors, while the weakness lies in the discussion of Wynne-Edward's old ideas on social regulation. Let the dead rest in peace.

Initially, my interest in the book was drawn to Chapter 7, bird communities. After a short overview of concepts, at a highly simplified level which might turn off people who have had one ecology course, the authors present a discussion of niche theory based on the premise that ". . . we are observing a situation as it is and trying to infer what caused it," a problem that all bird ecologists know to be nontrivial. Unfortunately, the authors do not present any

of their ideas to solve the problem, nor do they give an adequate survey of the relevant literature. The sections on resource partitioning and "evidence for competition" are too vague to be of much use as reference material and not insightful enough to be stimulating. The authors end this chapter with a short section on island biology but ignore the recent controversies regarding turnover rates, equilibrium theory, and island (refuge) size. In sum, I found this chapter to be somewhat disappointing.

In contrast, I found Chapter 8 on foraging behavior to be very interesting, again, however, at the simplified level. The chapter is based on the pros and cons of Charnov's optimal foraging model, including Cowies' laboratory test of the model using Great Tits and Krebs and Davies' famous conveyor belt study. A discussion of solitary versus group foraging is presented, and the chapter ends with a summary table of conclusions on the optimal foraging approach. The book finishes with a very short summary of the work done on migration, completely ignoring Cox's ideas on the role of competition in the evolution of migration.

My overall impression of the book is that it is probably good for advanced undergraduate students in European schools. Its suitability for North American schools is somewhat limited, however. For example, as none of the scientific names are given (a major fault in this book) the typical North American bird student, or amateur birder, is unlikely to know that a "Sand Martin" is a Bank Swallow (*Riparia riparia*). Moreover, although university libraries may have many of the European literature citations (e.g., Ibis, Nature, Ornis Scand.) it is unlikely that the "serious amateur" would have access to such literature and, therefore, follow-up work to that in the original text would be difficult to obtain.

Editorially the book is well done. Aside from a few minor errors (Bluebird [*Sialia* spp.] as two words and then as one in the same paragraph) the work is clear. I found all of a random sample of 30 text citations in the reference section. In sum, the text is not sufficiently detailed to be useful as a reference book, and it is too specific to be used in an ornithology class; however, as an intermediate between the two it hits the mark. I wonder if there is such a market in the U.S.?—ROBERT C. WHITMORE.

THE GROWTH AND DEVELOPMENT OF BIRDS. By Raymond J. O'Connor. John Wiley and Sons, New York, New York, 1984:315 pp., 96 numbered text figs., 45 tables. $39.95.—The contents of this book are much broader and of interest to a much wider audience than indicated by the title. The aim of the book appears to be to summarize current knowledge of all aspects of young birds, including physical and behavioral development from egg to experienced adult. A unifying theme is an emphasis on the selective advantage of physical and behavioral adaptations to the young bird's environment, including such aspects as nest location, food type, predation level, population density, and habitat stability. Differences resulting from the precocial-altricial spectrum are brought out well. In addition to thorough coverage of physical development, there are chapters on feeding, imprinting, instinct and learning, migration and dispersal, and song.

This broad coverage is both a strength and a weakness. The book should find its largest audience among students and others wanting an introduction to and review of the subjects discussed. It is immensely readable, and full of fascinating nuggets of information, from the number of tastebuds in a hatchling, to the ability of some birds to carry their young between their legs. Very scattered literature has been brought together, and classic studies are described in some detail, giving methods as well as results. Some indications are given of where further work is particularly needed, although it isn't always clear which chapters present everything known on a subject and which are a general introduction to a topic. Innumerable ideas for Ph.D. research came to mind as I read.

Readers already well-versed in certain fields of study in avian growth and development also will find this book interesting, though perhaps of less practical use. It is salutary to be reminded that one's own field of endeavor occasionally should be viewed in the wider context of a bird's entire developmental strategy, though it is hard to integrate, for example, development of nestling thermoregulation with song learning. Specialists will find nothing new in the chapters on their own areas, even though coverage seems very good.

The information was accurate for areas I know something about, although I disagreed occasionally with O'Connor's interpretations. In several places there is a tendency to equate correlation with cause and effect (e.g., on pp. 89 and 106). A homely cover, more than a few typographical errors, and O'Connor's predilection for exclamation marks are all small points that will irk some readers. This book is generally a good source of more specialized references (through about 1980), but I found several items I wanted to pursue (such as in Table 2.1) that were not accompanied by a citation. Some important ideas were excluded due to their recent publication (e.g., Clark and Wilson's views on hatch asynchrony, Quart. Rev. Biol. 56:253–277, 1981), but the book's broadness of coverage should help preclude the rapid obsolescence a more narrowly focused text might face.

I agree wholeheartedly with O'Connor ". . . that single factor explanations are inadequate, development patterns being most properly viewed as only one component in total life histories. . ." (p. 70). It was rather disappointing, therefore, that there was not more emphasis on and reiteration of this point; a final tie-up chapter would have been a welcome addition. However, the success of the book as a current overview of a very broad subject, previously unsummarized and burgeoning with new research, is undeniable. High readability and relatively low price make this book accessible to a wide audience, and it will prove a worthwhile read for people working with young birds in any capacity.—ERICA H. DUNN.

COASTAL WADERS AND WILDFOWL IN WINTER. By P. R. Evans, J. D. Goss-Custard, and W. G. Hale (eds.). Cambridge Univ. Press, London, England, and New York, New York, 1984:331 pp., 115 numbered text figs., 32 tables. $54.00.—This hefty sum buys knowledge, clear thinking, and insight into the ecology and conservation of shorebirds and ducks in marine habitats. It also purchases substantial doses of speculation, curious logic, and even some aggravation.

The book emerges from a symposium held in Texel, the Netherlands, in 1981, sponsored by the Wader Study Group, an international body coordinating shorebird research. In the preface, the editors state their hope that students of animal ecology and behavior as well as ornithologists interested in the conservation of birds of coastal habitats, will find the book valuable. They shall, although I doubt so valuable that many individuals beyond a dedicated core of specialists will pay $0.16/page.

The book is divided into three sections with the editors taking separate responsibility for the contents of each part: food resources and energetics (Evans, 6 chapters), social behavior (Goss-Custard, 5 chapters), and overviews of geographic regions and their roles in the Palearctic-African migration system (Hale, 8 chapters). With a total of 19 chapters plus an introduction to each section, the 331 pages scatter into many short works. Too little space is available for this review to comment on them all.

The first chapter (Evans and Dugan) offers a sweeping overview of the relationship between shorebird predators and their invertebrate prey. Anyone contemplating ecological work in this field should read Evans and Dugan's chapter. Many avian ecologists labor under the impression that the shorebird-invertebrate system is simple and therefore easy to study. Relative to most other avian predator-prey systems, perhaps it is. But Evans and Dugan

lay level upon level of complexity onto the relationship. The simplicity of shorebird ecology is that its complexity is conspicuous, unavoidable, and dissectable. War is peace, etc.

Seven of the remaining 10 chapters in sections 1 and 2 focus on shorebirds; the other three on ducks. In all, they make good reading. For example, Pienkowski, Ferns, Davidson and Worral develop a logical structure for studying the foraging energetics of shorebirds while Townshend, Dugan, and Pienkowski set forth a fascinating natural history of Black-bellied Plover (*Pluvialis squatarola*) winter territoriality. Goss-Custard and le V. dit Durell coauthor a fine exploration of Eurasian Oystercatcher (*Haematopus ostralegus*) population dynamics. They show that density-dependence is far from being a dead issue, particularly in the behavioral mechanisms by which the dependence comes about. Their use of computer simulation is refreshingly appropriate and helpful.

Several Dutch workers offer powerful contributions. Zwarts and Wanink's chapter on clam predation by Eurasian Oystercatchers and Eurasian Curlews (*Numenius arquata*) drives home the complexity point (above) further. Their data on the large differences in reward between prey of similar sizes should produce sleepless nights for anyone whose study does not discriminate carefully among prey size classes.

Then from whence the aggravation? My chief complaint is the emphasis on weaving stories from patchy data. Facts are marshalled in favor of interpretations, rarely against. While I don't want to ride the hobbyhorse of hypothesis-testing, a healthier skepticism towards one's own ideas would have benefitted the execution of a number of these chapters. Readers should watch for unproven generalities offered as fact (e.g., Chapter 2: "Most waders regulate their weight in winter") and a selective use of literature. Despite new interest in theories on "action at a distance," I doubt that endless citations to one's own prior papers will improve the original results.

C. Swennen's chapter on roosting flocks of Eurasian Oystercatchers is simply excellent. Work such as this should have antedated all the speculative frenzy about roost adaptive function. His results show that the quality and health of individuals varies strongly among roosts, with important implications for theory, management, and research technique.

The final eight chapters, save one, describe various wader concentration areas in the Palearctic-African migration system. The sites included are done well, if briefly. Several interesting themes are developed, especially on prey biomass removed and correcting estimates by factoring in the turnover of individuals. Nothing is said about Spain, France, nor the Mediterranean. I would have preferred Hale's concluding chapter to be an overview of the individual contributions within this section, rather than what it is: Hale's unlikely arguments about the role of secondary hybridization in producing large races of shorebird and speculative scenarios of population changes in waders during the last 20,000 years.

Thus, as any multi-authored symposium volume in an active field, this book has passages of strength as well as weakness. It is never boring and the authors write clearly and incisively. Read it. Your time will be well spent.—J. P. MYERS.

EXPERIMENTAL BEHAVIORAL ECOLOGY AND SOCIOBIOLOGY. By Bert Hölldobler and Martin Lindauer (eds.). Sinauer Associates, Sunderland, Massachusetts, 1985:xiv + 488 pp., text figs. $30.00 (paper), $55.00 (cloth).—I regret to report that the title is a con. This volume is not (as one might think) a potential competitor of Krebs and Davies nor even a general book about behavioral ecology and sociobiology. In fact, it is the proceedings of a symposium to the memory of Nobel Laureate Karl von Frisch, and most of the contributions are about bees. Indeed, the book prostrates any reasonable distinctiveness of behavioral ecology and sociobiology by defining them jointly as comprising "the study of the evolutionary adaptiveness of behavior in general" (p. 1), which I always took to be one aim of ethology. And

one finds Niko Tinbergen, who shared the 1973 Nobel Prize with von Frisch, called "the great experimental behavioral ecologist," whom I always took to be a founding father of ethology. Oh well, what's in a "buzz-word?"

There are five major sections: orientation, learning, and foraging (five papers on bees and ants); analysis of communication signals (two papers on bees, one more general, one on birds, one on primates); communication and reproductive behavior (three papers on hymenopterans, one a bit more general); social organization (four papers on social insects, one on birds, one on primates); physiology and societies (three papers on arthropods, one more general, one on tree shrews); and an epilogue about cognitive dimensions of communication. The chapters are infuriatingly unnumbered, and, therefore, not conveniently referred to, but among those unlikely to interest most ornithologists I especially enjoyed the contributions of Wehner and Rossel (on bee orientation), Michener (on the evolution of eusociality of bees), and Wilson (on the evolution of castes in ants). Many of the papers concern material already published elsewhere.

Chapters likely to interest readers of the Wilson Bulletin are few, as suggested by the above overview. Markl contributes a somewhat general chapter on communication illustrated mostly by insects, while Sherman and Holmes write on kin recognition, illustrating it with some avian material but concentrating on ground squirrels. Griffin's epilogue also mentions birds. There are, in the end, only two manifestly ornithological papers. That by Emlen and Vehrencamp on cooperative breeding was already published in an earlier version in "Perspectives in Ornithology" (Cambridge Univ. Press, New York, New York, 1983), whereas Scheich's chapter on auditory brain organization is new material. The former authors trace those environmental factors (habitat saturation and unpredictable ecological fluctuations) that promote helping to rear offspring of close kin as the best fitness strategy when reproduction is impossible. They also try, less successfully I believe, to account for differences in cooperative breeding, such as the extremes of helpers-at-the-nest and fully communal nesting.

Scheich presents some truly surprising findings based on a method of injecting 2-deoxyglucose labeled with carbon-14 into the blood. Those neurons of the auditory field L—the primary projection area of the telencephalon—were activated by a sound to take up the deoxyglucose and mark the brain cells for autoradiographic analysis. Studying the guinea fowl, Scheich and coworkers discovered that the brain responds not to the loudest frequency components in calls, but rather to the frequency having greatest contrast with other components. Furthermore, when a call is frequency-modulated there is a contrast-enhancement analyzing mechanism to process recognition. Scheich points out that the effects of attenuation and reverberation of calls in the natural environment need to be reanalyzed in terms of frequency-contrast and its enhancement if we are to understand properly ecological constraints on vocal communication.

There are some excellent papers in this volume, but my copy will not go on my sociobiology or ornithology shelves, but rather will take its place alongside von Frisch's various classics on bees.—JACK P. HAILMAN.

BIRD NAVIGATION: THE SOLUTION OF A MYSTERY? By R. Robin Baker. Holmes and Meier Publ., New York, New York, 1984:230 pp., numerous figs. and black-and-white photographs. $24.50 (paper), $32.50 (hard cover).—This book treats anyone interested in bird navigation to the whole realm of past and present research on the topic. For the serious student of migration or homing, it presents an excellent review of experiments, criticisms, and models of all of the main schools of thought on how birds navigate. The interested

layman, however, can be introduced to and captivated by the subject matter easily, as it is written in nontechnical language.

The reader is first given an historical review of the study of bird navigation from Aristotle to the work of the 1980s. Following a chapter on terminology and the definition of navigation, the major experimental techniques and tools are described. Then each of the major possible navigating cues is covered chapter by chapter. These include discussions of the use of landmarks, smell, an inborn compass, magnetic influence, stars, and grid maps. Each chapter offers not only summaries of many experiments, but discussions of the merits and flaws of the research.

The closing chapters present the reader with two hypothetical journeys. The currently accepted sensory cues used by birds are put into action, first by a homing pigeon returning to its loft and, second, for an hypothetical passerine on a long-distance migration. The last chapter looks at the future of navigation research.

The stated aims of the book are to present the facts and interpretations of the methods of navigation and to relate them to past theories as well as identify the main areas of future research. The author succeeds admirably with his interpretations, which repeatedly demonstrate the complexity of behavioral studies, particularly the problems of reproducibility and the near impossibility of eliminating all outside influences during experimentation. For example, he notes the presence of low frequency sound and distorted magnetic fields in a planetarium during experiments testing orientation to the rotation of an artificial sky compared to the rotation of the magnetic field. An artificial 50Hz noise is present in all modern buildings. In addition, the intensity of the magnetic field is lower inside a building. The author also points out that the very rotation of the magnetic field introduces another variation.

"Bird Navigation" is an excellent reference book for demonstrating the process of stimulation of ideas through controversy, the evolution of theories, and the use of the scientific method. Even the extensive list of references (20 pp.) is reason enough for the serious student of navigation to purchase this book.—ALLAN H. WERDEN.

A FIELD GUIDE TO BIRDS OF THE USSR. By V. E. Flint, R. L. Boehme, Y. V. Kostin, and A. A. Kuznetzov, translated by Natalia Burso-Leland. Princeton Univ. Press, Princeton, New Jersey, 1984:xxxi + 7 + 353 pp., 48 color plates (by Kostin), 303 maps, 71 text figs. $65.00.—The progenitor of this book had 635 pp., which were 3 cm shorter and one cm narrower than the U.S. Production. There was little front matter and usually two species per map. The 48 plates were together near the back. It was published by "Mysl" in Moscow in 1968, in an edition of 50,000—very large for a Russian ornithological work. The price was 2 rubles and 12 kopecs in hardcover. It has long been unavailable. This reflects the growing popular interest in U.S.S.R. birds.

The new book, in English ("American?"), includes a useful map of biotic zones (discussed in text), a brief discussion of birds in each zone, helpful hints for the bird-minded traveler, and other information. The problems of translating, updating and adding new material from Flint, and editing were considerable, and nitpickers have some ready-made opportunities. Pages are in two columns, set in smaller type than the original; the maps (some modified or updated) are of the same size as originally, and a few are confusing in detail (e.g., where three species overlap in distribution).

The color plates (same size in both printings) show the birds in static poses, all usually facing the same way (mostly to the left); originally, a few were in register, but most were slightly blurred. The American reproductions appear cleaner and inked more lightly; there is a definite reduction in richness of coloring. My preference is for the coloring of the original

reproductions, although the new printing is perfect in register and reveals that Kostin's "art work" is more precisely detailed than shown earlier. The plates are useful—all those pipits, shrikes, thrushes, wheatears, warblers, buntings, etc.!

Species accounts are assigned and indexed by consecutive numbers (not pages). The names in English, Latin, and Russian (transliterated) are given, as well as a plate number and map number. There are then sections on "Field Marks," "Habits," "Range and Distribution," and "Similar Species." Much is revised and expanded. An odd touch: food habits are mentioned in this field guide.

There is an index of English names and a cross-reference list (40 pp.) giving technical names in taxonomic sequence, variant names in English, plate, and map numbers. There is also an index of generic names and another of Russian vernaculars.

The user will have a few problems with this book. For example, Moryanka ["little sailor" in Russian] is bird (not page) no. 104, but in the English index is "Oldsquaw" (*Clangula hyemalis*) and numbered 711–712; these numbers are assigned correctly in the cross-reference list to orioles. There are a few quirks. For example, on the plates, the fulmar still stands high (like gulls) and two small petrels high also (like terns).

This may be the highest-priced guide to date. In North America, who will buy it? All ornitho-bibliomaniacs. Many libraries. A novice birder who can afford a USSR visit may want it; but, east as far as the Urals, a visitor is likely to feel comfortable (as do some Russians) with one of the more portable European guides (plus an escort who knows some birds and where they are). The hard-core "lister" already will know more birds than practically any Russian tour leader and probably will debate with his companions some taxonomic treatments in this book (*Sitta* complex, for example)—am I, or am I not, adding a species to my life list?

The intrepid peripatetic birder will supplement this new USSR guide with Colin Harrison's western palearctic *Atlas* (Princeton Univ. Press, Princeton, New Jersey, 1982), in part because many of its attractive maps cover far more geography to the eastward than the book's title. Also eastward and overlapping is Meyer de Schauensee's *The Birds of China* (Smithsonian Inst. Press, Washington, D.C., 1984), of same overall size but thicker, with 38 color plates. None of the three is down to proper field guide size. Stacked (all in hardcover), they measure 25 × 17.5 cm by 9.5 cm high, weigh 2.76 kg (6 lb), and cost $135.00. After a hard (?) day's birding, a little vodka along with comparing passages in these books should round out many an evening.—RALPH S. PALMER.

ROBERTS' BIRDS OF SOUTHERN AFRICA, 5th Edition. By Gordon Lindsay Maclean, illus. by Kenneth Newman and Geoff Lockwood. Trustees of the John Voelcker Bird Book Fund, Cape Town, South Africa, 1985:848 pp., 76 color plates. No price given.—Austin Roberts's Birds of South Africa was first published in 1940 and underwent three editions by G. R. McLachlan and R. Liversidge. Only a few years after "Roberts 4th" was published (1978), Maclean has written a new edition, with mostly new illustrations and a rewritten text. The book covers the region south of the Caprivi and Zambezi River. Many changes in names, both common and scientific, are seen. The common names are based on a survey of 100 ornithologists, and the author justifies the South African bias against names used elsewhere (such as in Zimbabwe) on a one man-one vote criterion: the 100 were mainly from South Africa, and there are more English-speaking ornithologists there than in East Africa, even counting the tourists, says Maclean. By this criterion the names will not be acceptable to world birders.

The most significant improvement in Roberts 5th is the color plates. Newman's plates in Roberts 4th were poorly printed; they are more true to color and sharp in the present edition. Lockwood's plates are good too, but in many the colors are dull (at least in my copy). The

last two color plates range from albatrosses through finches, species reported within the area only in the past few years; these are done on a scale incompatible with the corresponding similar species on the other plates.

The text is well organized in species accounts, nearly a page per species (887 species are recognized), each with measurements, identification, distribution, habits, food, voice, and breeding. Measurements (wing, bill, weight, etc.) are taken where available from the original Roberts (1940) or from other sources, not acknowledged in the text, and not all are from populations in southern Africa. In some species the sexes were measured separately, in some they were not. The sketches of wing and feather shapes in Roberts 4th have been deleted; they will be missed by banders and museum workers who try to identify certain *Cisticola* warblers, *Lamprotornis* glossy starlings, and *Lagonosticta* firefinches.

Range maps within southern Africa are in green, yellow, or blue (resident, breeding, or nonbreeding); few have more than one color. The distributions are generally like those in Roberts 4th. The yellow spots in these maps are nearly invisible. Where ranges have changed (e.g., the Grey-headed Sparrow (*Passer griseus*) southwest through much of the Cape Province), no reason is given, nor is the extension mentioned. No overall detailed map with most place names mentioned is given, nor is there a gazetteer.

"Voice" sections include sonagrams for more than half of the species. These are useful for birds with only one common call, and the sonagrams often convey the differences among visiting wader species better than the words given to the calls. They are less useful in birds with regional or individual differences or those with large repertoires (as in the firefinches (*Lagonosticta rubricata* and *L. rhodopareia*), and still less when the figure shows the alarm call and not the song (*L. senegala, L. rufopicta* = "*L. nitidula*").

"Breeding" sections include seasons, clutch size, nest description, egg descriptions, and comments on incubation and nestling periods. For those species with which I am most familiar, misinformation is scarce. There is no evidence to conclude as does the author that a female Village Indigobird (*Vidua chalybeata*) lays only one egg in a particular nest of its foster species; in aviary observations individuals lay more than one in a nest. Successful brood parasitism by the Pin-tailed Whydah (*V. macroura*) is limited to *Estrilda* waxbird species, and certainly does not occur in *Cisticola* and *Prinia* warblers. Fewer than half of the species have one or more recent references; in most cases these are in recent issues of Ostrich or Bokmakierie.

What has been lost in this edition is the perspective of geographic variation among populations and of the history of ornithology in Africa. Authorship and type locality were excluded for the species, and with very few exceptions subspecies names do not appear. One consequence is that birders in different parts of the region may misidentify species that varied geographically in color. For example *Vidua chalybeata* populations in the Okavango-Cunene area have a white, not red, bill, and this species is, in fact, the only common indigobird known in this area. By ignoring subspecies and the notion of geographic variation, the author mistakenly "gives" the area to other species of white-billed indigobirds, one (*V. funerea*) whose foster species (*L. rubricata*) is unknown within hundreds of km (as is the indigobird); the other ("*V. incognita*" = *V. wilsoni*), was described from aviary birds imported possibly from Zaire and is unknown in the field anywhere in Africa, though its foster species *L. rufopicta* (=*L. nitidula*) does occur within the region. Including such records on the basis of identifications that were made without knowledge of the variation within and among species in the present work can only confuse our ornithological science. In a few other cases, a vestige of information in the earlier infraspecific taxonomy is seen where subspecies have been split into "species." Problematic "new" species that usually have been considered races of more widespread species include the Ashy Tit (*Parus cinerascens* = *P. afer cinerascens*) and the Mountain Pipit (*Anthus hoeschi* ? = *A. cameroonensis*) (usually

included in *A. novaeseelandiae*). No breeding sympatry is known between the forms, nor are differences in display behavior, so we have no strong reason to infer more than one species. At least questions such as these could be asked if a brief list of subspecies accounts and traits were available, as in the earlier volumes. Any list of subspecies is potentially a set of hypotheses about species limits, and can be tested in the field in possible areas of contact, but today's reader of Roberts' 5th will not have these when he goes into the field, and so the questions in systematics may not even be asked.

Roberts 5th summarizes a wealth of field data on the bird species and shows southern Africa to be a relatively well studied avifauna. This is the best book available on identification and biology of the birds of southern Africa, and it is one of the outstanding regional ornithology guides of the world.—ROBERT B. PAYNE.

SOUTH AFRICAN RED DATA BOOK—BIRDS. By R. K. Brooke. South African National Scientific Programmes Report No. 97, Foundation for Research Development, Council for Scientific and Industrial Research, P.O. Box 395, Pretoria 0001, South Africa, 1984:vii + 213 pp., no price given (paper).—The rare and endangered species of birds of South Africa were inventoried previously in "The South African Red Data Book—Aves," by W. R. Siegfried et al. in this series in 1976. The present book is both an inventory and a conservation analysis of the same avifauna. The objectives were to (1) establish which locally breeding species are rare or threatened enough to warrant formal recognition or action, (2) define the rarity of and threats to each species, (3) determine conservation priorities, and (4) determine priorities for research. General comparisons by habitat are summarized, and a series of categories is used to assess the degree to which each species is threatened and deserves action.

The region as defined includes South Africa, Lesotho, and Swaziland. Within South Africa, the national states or homelands, as well as the four provinces, have their own conservation ordinances.

The text is organized into species accounts with detailed range maps of present and former distributions; summaries of habitat, status, estimated numbers and population trends; breeding rate in the wild (clutch-size, number of broods, incubation period, age at which females first breed), reasons for population changes; numbers known in captivity and the prognosis for captive breeding; current research efforts; the distribution and numbers in other parts of the species range; and references. The bibliography includes more than 1000 references and is up-to-date. The 1976 Red Book was useful to research workers; the author lists the published papers and theses in which it was cited and more than half of the species were cited therein.

Of the 108 species regarded as rare, threatened, or endangered in the book, six are birds of the Southern Ocean. Of the 102 mainland breeding species, 49 (48%) are associated with grasslands and wetlands; a recommendation that the biomes most in need of ecological study and conservation are the grasslands, marshes, and estuaries may guide further efforts. Several larks are endemic to South Africa, and their distributional ranges have contracted drastically over the past decades (particularly in the northern Cape Province, East Griqualand, and the Orange Free State) due to habitat changes associated with agriculture and domestic stock. Changes in abundance and distribution within the past 10 years are less evident; more of the differences evident in the species in this book and its 1976 predecessor are due to changes in the criteria used to recognize rare and endangered species than to changes in habitat or success in conservation efforts.

The five species with the highest recommended priority for conservation action indicate the historical and ecological factors involved as well as the strongly regional emphasis of the book. The Blue Swallow (*Hirundo atrocaerulea*) breeds locally in several counties of

southern and eastern Africa but is given the highest priority. Its high priority derives in part from an erroneously scored regional uniqueness ("all of the population in southern Africa" in the priority table) and, in part, from a population decrease in this century (it nests underground on grassy hillsides in high rainfall areas, now often planted with commercial crops and unsuitable for nesting; overgrazing and flash floods also result in unsuitable habitats). In contrast, Maclean (Roberts' Birds of Southern Africa, 5th ed., 1985, see above review) gives the status as "Uncommon to rare . . . but not immediately threatened; at most 5–6 pairs/km^2." Egyptian Vultures (*Neophron percnopterus*), with a population widespread in nonforested parts of Africa, southwestern Asia, and the Indian peninsula, are known as breeding birds in South Africa only from one old record in the Transkei. Historical decrease of the species in South Africa is due to poisoned carcasses and to attacks by farmers for the vulture's feeding on Ostrich (*Struthio camelus*) eggs and chicks. Perhaps also the feeding ecology has changed with the destruction of herds of antelope. Jackass Penguins (*Spheniscus demersus*) are endemic and have decreased in numbers due to intense commercial cropping of eggs well into the 1960s. Commercial exploitation of surface-shoaling fish near the colonies, oil pollution of the sea, and the continuing destruction of the colony habitat by commercial guano harvesting continue to depress penguin numbers, currently estimated at between 50,000 and 170,000 pairs. Yellow-billed Oxpeckers (*Buphagus africanus*) are widespread elsewhere in Africa but are rare and have not bred in South Africa since 1910, due to game decimation, cattle disease, and arsenic pollution of cattle. Roseate Terns (*Sterna dougallii*) are restricted as breeding birds in South Africa to one coastal site, but have a wide breeding distribution in the northern hemisphere.

The emphasis is clearly on those species that are rare within South Africa with less material on the South African endemics. The book is a useful source of information about the biology and conservation of the included species of southern Africa birds.—ROBERT B. PAYNE.

TUNNICLIFFE'S BIRDS, MEASURED DRAWINGS. By C. F. Tunnicliffe RA, introduction and commentary by Noel F. Cusa. Little, Brown, and Company, Boston, Massachusetts, 1984: 160 pp., 80 color plates, most with commentary. $49.95.—"Charles F. Tunnicliffe was born and raised on a farm near Macclesfield, England in the early years of this century. He studied at the Royal College of Art and took up etching and engraving in the 1920s. In 1932 he illustrated Tarka the Otter for Henry Williamson and began a long and prolific career as a wood engraver and book illustrator. His fascination with birds developed during the prewar years. In 1947 he left Macclesfield to live in Anglesey, where he spent the rest of his life. An indefatigable worker, he eventually became a popular watercolorist specializing in natural history subjects." This quote from the back of the dust jacket gives an insight into Tunnicliffe the man, but looking at his work gives the best insight into his love of and sensitivity to birds. His measured drawings are exactly as the name implies. Each bird is drawn life-sized, in a variety of poses, on a single Imperial sheet of paper. The drawings are made from fresh (and, occasionally, not so fresh), unprepared birds, that are meticulously measured with calipers. Occasionally very large birds occupy more than a single sheet of paper. Often scattered among the life-sized drawings are small sketches and vignettes to show particular feathers, other, usually nonsilhouetted, views of a head, the details of certain feather groups, or any details that Tunnicliffe wished to emphasize or include. Tunnicliffe's fine art training is not lost in his extremely detailed and accurate reproduction of the birds that he was drawing and painting. The arrangement of the pieces on each page makes for an incredibly beautiful work.

Tunnicliffe began making his measured drawings merely as references to be used in later paintings, but in his latter years he seemed to turn his attention more to the measured works. It was well known that he wanted people to save birds for him, and dead birds regularly appeared on his doorstep or in his mailbox, often with no indication of their source. It

seems that Tunnicliffe did not personally collect birds for his paintings, but he did let "everyone" know that anything they found dead was wanted. He also kept in contact with friends that hunted as well as with local game keepers (sadly, the lovely Golden Pheasant [*Chrysolophus pictus*] printed on the cover is not included in the book!). In his lifetime he produced about 300 of the measured drawings. The ones reproduced in the book were chosen to be representative.

There are four sections of paintings: "Predatory Birds," "Water Fowl," "Sea & Shore Birds" and "Miscellaneous Birds." The last section of the book is devoted to a memoir of Tunnicliffe by Noel Cusa.

This volume is a picture book, but a picture book full of life. Having kept many live birds and having prepared bird specimens, as well as being a painter of birds, I find myself wanting to look at the works over and over again. They are exquisite. The Tawny Owl (*Strix aluco*) on p. 37 looks as soft as I know it is; it has the right wing spread and I can "feel" the bones in it, and I find myself mentally flexing the legs, watching the talons and feet curl as the foot is drawn close to the body! The detailed drawing of the left half of the tail of a female [Green-winged] teal (*Anas crecca*) on p. 51 shows the blunt, whitish tips of extremely fresh fall plumage, and the dense, short plumage of a duck, so totally different from the plumage of the Tawny Owl. He often uses a colored background, working whites onto the paper with chalk or gouache. Two different [common] Black-headed Gulls (*Larus ridibundus*) on pp. 94 and 95, show how effectively the background color of the paper can be used to create the effects of cold and warm light on the subject. Tunnicliffe often and successfully shows head-on views of birds. A Little Auk (*Plautus alle*) (i.e., Dovekie [*Alle alle*]) on p. 101, a Whimbrel (*Numenius phaeopus*) on p. 111, and a [Eurasian] Jay (*Garrulus glandarius*) on p. 127, all illustrate his ability to show this difficult position. Furthermore, the Jay shows Tunnicliffe's sensitivity to the positions and changes of feather tracts, as well as the details of the rippling texture along the inner webs of the bird's secondaries. Artists who do not have close familiarity with live or fresh birds may be amazed to see how large and puffy the head on the Blue Tit (*Parus caeruleus*) on p. 145 appears, or how "dumpy" and short-tailed the Stonechat (*Saxicola torquata*) on p. 147 is.

Tunnicliffe used whatever he needed to get the effect he wanted, but he tended to work in a transparent manner—even when using an opaque medium such as gouache. This manner of working leaves his birds "fresh and fluffy," not hard and overworked. It is hard to give an impression of someone's work without making a comparison. I would have to say that Tunnicliffe's work reminds me of that of three artists—Louis Agassiz Fuertes, Lars Jonsson, and Larry McQueen.

The book is beautiful and anyone interested in looking at beautiful reference paintings of birds will want to own it. I strongly recommend the book also to anyone who paints or draws birds. The information contained in Tunnicliffe's work is extremely valuable, and also very inspirational. The fact that all of the birds are Old World, most being British, in no way detracts from the book's value and interest to anyone, anywhere in the world. The information about the birds and recollections of Tunnicliffe by Noel Cusa make an interesting contribution to the book, but it is the artwork that "steals the show." This is a "coffee table" book that deserves to be enjoyed, studied, and appreciated. I, for one, would like to see another volume produced. The binding, general construction, printing, and color work all seem to be very well done. The price is a bit high, but in 1985 that's the way it is!—JOHN P. O'NEILL.

HUMMINGBIRDS: THEIR LIFE AND BEHAVIOR. By Esther Q. Tyrrell, with photographs by Robert A. Tyrrell. Crown Publ., New York, New York, 1985:212 pp., 214 photographs, 26 drawings. $35.00.—This elegant book is in the finest tradition of coffee table books. Often there are several photographs per page, and relatively few pages have no photographs. The

book clearly is meant as a vehicle for the outstanding photographs of North American hummingbirds and many of the flowers they visit. The text is aimed at a lay audience and is modern in its treatment of hummingbird biology. Topics covered in the text include anatomy, feathers, flight, courtship and nesting, food and metabolism, behavior, and pollination. In addition, there is a list of plant species in North America visited by hummingbirds, a list of all species of hummingbirds, and a bibliography that includes many recent references. An early section of the book summarizes salient features of the biology of North American species of hummingbirds, with each species account accompanied by two photographs of the male, one showing a ventral and the other a dorsal view. A line drawing of the female, while well done, is not useful for identification, or for size comparisons.

The photographs, limited to species found in North America, illustrate points made in the text. For example, the section on feathers has some interesting pictures of hummingbirds in molt. Other photographs show torpid hummingbirds (birds with lowered body temperatures), birds cleaning their bills, and even with the long tongue extended well beyond the bill tip. What could have become a somewhat repetitious series of photographs of a limited number of species has been turned into an educational message in itself. The captions for the photographs clearly relate the picture to the textual material. In a few cases (e.g., p. 97) the caption is contrived to make the photographs illustrate the text.

A chapter on the techniques used to obtain the photographs would have been very informative. The text hints at the electronics necessary for these exceptionally detailed photographs, but a discussion of the time and effort involved in photographing these birds might have been very interesting to readers.

The text is easy to read and generally is free of errors. The author has read much of the modern and historical literature about hummingbirds and nicely juxtaposes early statements based on little or no direct observation with modern theories and research findings. Much of the discussion points out how hummingbirds differ from other birds in their biological characteristics, but in a few cases, such as parts of the discussion of anatomy, sections with little distinctive significance for hummingbirds are included for completeness. The use of jargon purposely is kept to a minimum, but a few terms are used that are not clearly defined. Occasional lapses occur in the metabolism section. Energy use is sometimes given as oxygen consumed without mention of conversion factors to calories. Torpor is mentioned without a definition until several pages later. A more interesting problem occurs when energetics are discussed in terms of calories. The small size of hummingbirds means that most people studying metabolism use the unit of the calorie, which is only 1/1000th of the Calorie normally referred to in human diets. The distinction is especially important when scaling metabolic rates of the birds and humans (p. 134). A similar interesting problem with units occurs on p. 56 when the text says hummingbirds may eat from 3 to 7 g of nectar from a feeder at one feeding. This amount, which would approximately equal the weight of these birds, is overstated by a factor of about 100. A few minor errors occur in the accounts of individual species: the Anna's Hummingbird (*Calypte anna*) now breeds fairly regularly in Arizona and the range of the Magnificent Hummingbird (*Eugenes fulgens*) extends to Costa Rica and Panama. However, is spite of these few minor mistakes, the author has done a very good job of making the biology of these unique birds accessible to the lay reader.

As with any book of this sort that attempts to cover so much material with minimal text, one can always mention items of interest that do not appear. Perhaps a diagram of the circulatory system would have helped the anatomy chapter. Some mention should have been made that the view of the figure of the reproductive tracts is from the ventral surface. This is not crucial for the male, but the female drawing has the ovary on the right side, while the text correctly states that the right ovary atrophies early in development. I think most lay readers would have benefited from more emphasis on the relatively small pro-

portion of a day that the birds spend flying. Most casual observers see hummingbirds at flowers and generally think they must spend most of the day flying.

The list of flowers pollinated by hummingbirds is taken from Johnsgard's recent book (*The Hummingbirds of North America*) and perpetuates the idea that visits by hummingbirds generally produce pollination. While that notion is correct in most cases, a sentence or two to indicate just how little is known about actual pollinators for many North American wildflowers might have been useful. The list of hummingbirds of the world seems an unnecessary addition as no information is given about ranges, merely a list of the common and scientific names.

While I feel that it is a reviewer's duty to point out errors and make suggestions for improvement, I want to emphasize that this is a first-rate book for its intended audience. It will not replace Crawford Greenewalt's equally striking book "Hummingbirds" (Doubleday, Garden City, New York, 1960) for those interested in photographs of more than North American species, but the diversity of photographs and their use in illustrating aspects of hummingbird biology make this an outstanding achievement.—LARRY L. WOLF.

BOBWHITE THESAURUS. By Thomas C. Scott. International Quail Foundation, Edgefield, South Carolina, 1985:306 pp. $29.95.—This may be the most useful book ever written for the Northern Bobwhite (*Colinus virginianus*) researcher. The thesaurus contains two sections: an index of subject-categories and the associated bibliography. Nearly 3000 publications have been indexed into 73 principal subject-categories. Listings in the subject-categories include geographic locations (often down to county level), when they are relevant to the findings. Time period involved also is included in the article listing when it is important to interpretation of data presented. The bibliography section includes all known publications prior to 1983 and covers over 100 years of bobwhite research.

Any person initiating a research project on the Northern Bobwhite will save considerable time, effort, and money by using this book. They will be assured of locating every article ever published on this species. Articles are not abstracted but the key words used in subject-categories enable researchers to select those specific articles that are relevant to their interest and geographic location.

Similar books for other species that have been the subject of extensive research will certainly be published as a result of the success of this one. Dr. Scott and The International Quail Foundation, which funded publication, have provided an invaluable service to bobwhite researchers and are to be commended for their efforts. The book is neatly and attractively done and is highly recommended.—EDWIN D. MICHAEL.

VOICES OF THE NEW WORLD JAYS, CROWS, AND THEIR ALLIES, FAMILY CORVIDAE. By John William Hardy (compiler and ed.). ARA9, ARA Records, Gainesville, Florida, 1984.—The jays as a group are notable for the complexity of their vocal behavior. To attempt to present recordings of all of the many and complex vocalizations of the New World corvids is a monumental task, and one at which Hardy has had considerable success. This record contains some recordings of all but one of the New World species. As a contributor to the record, I can find some very minor points to criticize about his handling of the Pinon Jay (*Gymnorhinus cyanocephalus*), but the criticisms are only of significance to one extremely familiar with that particular species. Overall, I find the recordings to be of very good quality and, for the species with which I am familiar, a fairly complete record of most vocalizations. The weak points of the record come almost totally from the lack of good recordings of some calls of some species. What is here is good. What is not here is probably not available anywhere. I highly recommend the record as an excellent introduction to corvid vocalizations

to anyone who is contemplating work with jay vocalizations, or who is just interested in bird calls. I hope that Hardy will update the record 10 years from now as new recordings become available.—PATRICK D. MCARTHUR.

MODERN FALCONRY. By Jack Samson. Stackpole Books, Harrisburg, Pennsylvania, 1984: 160 pp., 42 photos, 19 line drawings. $12.95 (paper).—This is an attempt by the former editor and current editor-at-large of Field and Stream, Jack Samson, to provide a primer for beginning falconers who want to acquire a hawk or falcon and train, care, and equip them for hunting or recreational sport. Samson has drawn on his experience as head of the raptor division at the American Museum of Natural History's Trailside Museum in New York in the writing of this book. Considering Samson's stated professional accomplishments, the book adds little to the already large list of books or primers for beginning falconers. Many European books are available for a few dollars more, should one care to be exposed to this practice.

The book is divided into 21 chapters with such titles as: "How to Get Your Hawk"; "Flying to Fist and Lure—Kestrel/Sparrow Hawk"; "Releasing a Hawk to the Wild"; "Care and Treatment of Hawks"; "New Federal Falconry Regulations"; "Fact Sheet, Federal/State Qualifying Examination for Falconry Permit"; and "Whither Falconry?" Considering the subject matter to be found in other falconry books, the chapters on regulations and examinations may be the major contribution of the book. There is not a lot of professionalism evident considering the content. One chapter, for example, which deals with the "Sparrow Hawk" (*Falco sparverius*), is followed by a chapter on the Kestrel/Sparrow Hawk, with no clear indication that this is the same species referred to in the preceding chapter. Samson should have followed one terminology or the other throughout the book.

Some chapters are very informative, such as "How to Get Your Hawk," which is more or less cook-book in style, although without a lot of detail on how, for example, to tie a noose for a trap; other chapters are more-or-less bits of rambling information. An example of the latter is chapter 10 on the "Training and Flying the Merlin/Pigeon Hawk." Most of the four pages in the chapter are taken up by two photos; one is of a person with a lure and has nothing to do with the Merlin (*Falco columbarius*). Furthermore, the text deals more with biology of the species and the author's experience watching one hunt.

The photos vary from poor to good quality. The best photo is on the cover, which depicts an absolutely beautiful falcon that appears to be either a very dark Aleutian Peregine (*Falco peregrinus pealei*) or a hybrid peregrine (*F. p. pealei*) crossed with a dark Gyrfalcon (*F. rusticolus*). The chapter on the Prairie Falcon (*Falco mexicanus*) has a head photo (p. 98) of a Kestrel that is labeled as a Prairie Falcon.

Throughout, the book is relatively free of typographical errors, follows the general theme of conservation, and provides some new information, but overall, it adds little to one's library.—CLAYTON M. WHITE.

APPLIED STATISTICS AND THE SAS PROGRAMMING LANGUAGE. By Ronald P. Cody and Jeffrey K. Smith. North-Holland, New York, New York, 1985:187 pp., numerous figs. $14.95.—A substantial, perhaps overwhelming, number of ornithologists are now using computer software (SAS, SPSS, etc., for mainframe and minicomputers; ASYST, STAT/PROTRAN, etc., for microcomputers) to prepare their descriptive and inferential statistics. Although these programs provide an efficient, and at times essential, way of analyzing data, their accompanying documentation (user's guides, etc.) are sometimes perceived as unsurmountable barriers to the use of these programs. As a result, many ornithological data receive less-sophisticated treatment on handheld calculators, or they wind up being analyzed by a second party in the "Statistics Lab." "Applied Statistics and the SAS Programming Lan-

guage" is one of a recent cornucopia of books designed to hurtle would-be computer users over, or at least into, the documentation prepared by software publishers. In this instance the documentation in question is that prepared by the publishers of SAS (Statistical Analysis System) (SAS Institute Inc., Cary, North Carolina), one of the major statistical software packages. The usefulness of texts of this genre, and the reviewed text is no exception, depends upon the reader. The book is an unnecessary acquisition for those of us who have used SAS for some time and are accustomed to its documentation: there is little in this publication that we do not already know. And, unfortunately, the book will be of little use to that declining number of ornithologists who persist in acting like conscientious objectors to the computer age. The book will be useful, however, to those who are ready, willing, and eager to learn the whys and wherefores of statistical software (i.e., graduate students contemplating a less than rosy job market). The book also may be helpful to those who use SAS on an intermittent basis, and need a refresher course from time to time. This is not to say that the book is a substitute for the SAS publications "Introductory Guide," "SAS User's Guide: Basics," and "SAS User's Guide: Statistics." This volume is far too brief for that. But it does offer a second view and, for those who might be frightened off by the bulk of the SAS publications, Cody and Smith should help demystify the increasingly essential research tool that is computerized statistics.—K. L. B.

THE ATLAS OF BREEDING BIRDS OF VERMONT. By Sarah B. Laughlin and Douglas P. Kibbe (eds.). University Press of New England, Hanover, New Hampshire, 1985:456 pp., 12 maps, 199 line drawings and range maps, 8 transparent map overlays. $45.00.—Preparing atlases has become an increasingly popular endeavor among serious amateur birders throughout the East. Most of the eastern states have such projects at various stages of completion, but to Vermont goes the honor of being the first state to complete the project and publish the results.

For the possibly uninitiated, an atlas project is carried out by laying off a grid on the area being studied. Most eastern states have adopted the grid formed by the U.S.G.S. 7.5-minute quadrangle topographic maps (western states have usually adopted the latilong as a grid). Each grid block usually is divided into six blocks, each covering about 25 km^2. The aim is to establish a list of breeding birds for each of these blocks. Most atlases set up a graded series of criteria to classify a species, as a "Possible," "Probable," or "Confirmed" breeder. With the results obtained over what is usually a 5-year period, it then becomes possible to draw a fairly accurate map of the breeding range of a species in the state (or other political subdivision being studied).

The number of available birders in Vermont was small enough that the project leaders elected to cover only one randomly selected block in each quadrangle, and then to add a few others of special or unusual habitats. A total of 178 species was confirmed as breeding in the state, and 14 additional species were listed as either Possible or Probable. For each of the species there is a small pen-and-ink sketch of the bird, a page of text about the species, and map of the state indicating the blocks in which the species was recorded. A short table describes the distribution of the breeding blocks in the seven physiographic regions of the state. There is a set of eight plastic map overlays, making it possible to compare the breeding distribution of the species with such things as the Physiographic Regions, Vegetation Regions, etc. Accordingly, we have at hand a fine picture of the distribution of the breeding avifauna of Vermont in the late 1970s (working period was 1977 to 1981). This can serve as a baseline for future studies as changes occur.

The most unfortunate limitation on works such as these is that no attempts can be made to census the various species. The forests of Vermont contain many of the Neotropical migrants whose populations are thought to be declining. For example, the Ovenbird (*Seiurus*

aurocapillus) was found in 98% of the blocks surveyed, but we have no indication of the numbers involved. A block with a confirmed breeding record of one pair is indistinguishable from a block with 50 pairs. Elsewhere in its breeding range the species has declined greatly. A more or less subjective statement in the Ovenbird account says that the population "apparently" has not changed significantly over the last 100 years. I sincerely doubt that that statement can be true. I hope that as the various Atlas Projects come to completion some of the manpower used can be turned to the important task of making quantitative censuses of those species that are not adequately monitored by the Breeding Bird survey, which works best for roadside and edge species. Vermonters are to be congratulated for completing this project in such fine shape. The high percentage of Confirmed breeders speaks to the dedication and tenacity of the observers, as many of these species nest in areas of difficult terrain or forest cover. The publication is a most attractive one although its price may be prohibitive to some. A part of the text deals specifically with Vermont data, often giving migration dates and, in a few cases, populations. Apparently, the editors and project leaders wanted this volume to serve also as a one-volume "bird book" for the people of the state, as there is much general discussion of the birds' habits, habitat, and breeding biology that comes from other, readily available, sources and might well have been omitted.

We can look forward to additions to the Atlas of North American Breeding Birds as the various state projects come to completion, and we can hope that future state atlases are as successful as this one.—GEORGE A. HALL.

BIRDS OF NAHANNI NATIONAL PARK, NORTHWEST TERRITORIES. By George W. Scotter, Wayne P. Neil, and J. David Henry. Special Publication No. 15, Saskatchewan Natural History Society, Box 1121, Regina, Saskatchewan, 1985:74 pp, 1 map, 13 black-and-white photographs and drawings. $7.00 (Canadian).—This attractive booklet, in the tradition of National Park booklets, both Canadian and U.S., lists brief annotations for 170 species known from this Park, which is located at about 61°N. The known breeding ranges of 10 species are extended and the Wandering Tattler (*Heteroscelus incanus*), Barred Owl (*Strix varia*), Hammond's Flycatcher (*Empidonax hammondii*), Clark's Nutcracker (*Nucifraga columbiana*), Philadelphia Vireo (*Vireo philadelphicus*), Black-throated Green Warbler (*Dendroica virens*), and Mourning Warbler (*Oporornis philadelphia*) are reported from the Northwest Territories for the first time.—GEORGE A. HALL.

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