

## REVIEWS

Edited by Walter Bock

**The Audubon Society Field Guide to North American Birds. Eastern Region.**—John Bull and John Farrand, Jr. 775 pp., 584 color photographs. **Western Region.**—Miklos D. F. Udvardy. 850 pp., 627 color photographs. 1977. New York, Alfred A. Knopf; produced by Chanticleer Press, Inc., N. Y. \$7.95 each.—Over four decades have passed since Roger Tory Peterson, welding brilliant visual insight onto the pioneering framework of such authors as Ralph Hoffman, produced the first practical field guide. Later, exceptional workers like Pough and Eckelberry, Robbins and Singer, etc. created variations on this principle through different approaches in format and style, but their efforts were always anchored in the belief that there can be few short-cuts to the learning process.

Now, in bland disregard of years of accumulated wisdom, the publisher and editors of this current set of books are presenting what purports to be a “revolutionary” method of field identification, one destined to supplant outmoded concepts. So pervasively effective has been the promotion and distribution of these books that it could only be the disinterested person who is unacquainted with the general format. Therefore, this review will not take up space describing such treatment in detail. It is only necessary to state that this “new” method is predicated upon several misconceptions: that photography is somehow more realistic, less interpretive than painting, and that the arbitrary assignment of species into categories of shape or color (in the picture section), and habitat (in the text) is both more specific and more informative than the traditional arrangement reflecting actual relationships.

To address the first issue, the question must be asked whether photographs can be substituted for precise, diagnostic illustrations in a field guide. There is certainly an abundance of excellent color photography on display here, especially among the waterfowl, Laridae, shorebirds, flying raptors, and woodpeckers, almost all of it in faultless reproduction. In general, the quality and coverage of the Western edition surpasses the Eastern in this regard; compare, for example, the respective upland gamebird folios.

This reviewer has no quarrel with photography—without my clip file I would cease to function as an illustrator—but it must be stressed that it does not lend itself, in particular, to the depiction of passerines. The inherent limitations are aptly demonstrated in such complicated groups as flycatchers, wrens, vireos, and sparrows. I defy any novice to explain to me the salient characters of the brown thrushes after examination of the illustrations in both of these volumes.

Egregious examples can be selected almost at random. What true understanding can be gained of *Seiurus* warblers and female tanagers in the Eastern guide, of thrashers and black corvids in the Western, or of shrikes in either? The vagaries of light exposure are exemplified by the congeneric kingbirds (East), of foreshortening by the Wrentit (West), and of attitude by the Sage Thrasher (East and West). Eclipsing all these shortcomings is the fact that many alternate plumages are simply not included, e.g., immature hawks and cormorants or non-breeding alcids and warblers.

Misidentifications have been kept to a minimum but I note the following: in the Eastern guide a female Spruce Grouse (no. 268) masquerades as a Ruffed Grouse, the Black-headed Oriole (no. 387) is an Old World *Oriolus*, and the immature Iceland Gull (no. 31) and Mangrove Cuckoo (no. 523), while presumably correct, portray misleading characters. Also, some of the shorebirds are incorrectly labeled as to plumage, and the Virginia Rail is a classic museum mount. In the Western guide, the New Zealand Shearwater (no. 70) is actually a Fluttering, *P. gavia*, according to an Australian photo of the same bird. The Willow Ptarmigan (no. 269) looks like a White-tailed, the winter Franklin's Gull (no. 34) looks like a Laughing, the Poor-will (no. 249) is clearly a nighthawk, and the “female” Spectacled Eider (no. 142) is hardly a female. I would hazard a guess that the Spotted Owl (no. 293), with discernable yellow irides, is probably a Spotted Little Owl, *Athene brama* (both this photo and the Spotted Dove I suspect were taken in India). No. 516 leaves me puzzled; it does not appear to be a Solitary Vireo but is not quite right for a Hutton's or a kinglet either.

To answer the initial question, then, I must recommend a qualified “no”—photography is just too erratic to sustain solely the entire basis of a field guide. At the advanced level, to be sure, it is undoubtedly crucial to our understanding of certain problem groups, but a beginner must first develop some cognitive grasp of the characters of each species. Only a knowledgeable artist can render fully and properly such *gestalt*.

The second innovation, that of visual organization of pictures by *shape and color*, contains more serious drawbacks. Admittedly, the non-passerines are arranged somewhat along conventional lines although certain section headings are grammatically grotesque (“Upright-perching Water Birds”) or plainly condescending (“Pigeon-like Birds”). However, it is the color-grouping of perching birds wherein the absurdity of the whole idea is best revealed. Just how often is a Boreal Chickadee, for instance, perceived as “brown”

before it is recognized as a chickadee? What rationale can be offered for a "blue" female Cerulean Warbler (East), a "brown" female Red Crossbill (West) or an "olive/green" male Painted Bunting (East and West)?

Inconsistencies between the two editions are exhibited by the placement of Blue-Gray Gnatcatcher under "blue" in the Eastern and "gray" in the Western, Tropical Kingbird under "olive/green" (East) and "yellow" (West), Common Snipe under "Upland Ground Birds" (East) and "Sandpiper-like Birds" (West). Contradicting the editors' stated intent (p. 15, Eastern; p. 11, Western), the male Red-wing is placed only in the "black" section whereas its flashy shoulder-patches are the first thing most people notice. This chromatic scheme is not the bold new idea being promulgated—its previous manifestations in *bird* books were all predictable failures.

As if to compound the heresy, the species' accounts—the entire text—are divided up into broad categories of *habitat*. Certainly, some species may be reasonably assigned to circumscribed habitats, but the preferences of many other species are more catholic and cannot be pigeon-holed so neatly. Thus we discover, in the Eastern edition, the Yellow-crowned Night Heron in "Fresh-water Marshes," the Red-headed Woodpecker in "Grasslands," and the Yellow-throated Warbler in "Coniferous Forests;" in the Western edition, the Lesser Scaup in "Salt Marshes," the Black-chinned Hummingbird in "Alpine Meadows," and the Barn Swallow under "Inland Cliffs and Canyons."

Since there is an implied assumption in the Eastern book (pp. 19–20) that these are *breeding* habitats, what is one to make of Tree Sparrows in "Grasslands" and juncos in "City Parks and Suburban Areas?" The Rock Ptarmigan is listed here under "Coniferous Forests" although the authors' habitat paragraph clearly says "open tundra," a category for which there is no entry. Apparently attempting to reconcile the problem posed by Arctic breeders, the Western book does include two types of tundra habitat but, even though an elaborate explanation is provided on p. 13, it too becomes hopelessly bogged down in inconsistency (e.g., Long-tailed Jaeger under "Wet Tundra" but Sabine's Gull under "Open Ocean"). The reader who finds himself stymied by such a flawed concept may well recall with fondness those antique handbooks arranged by spring arrival dates!

Altogether then, it is next to impossible to find anything in these books. Particular species, whether in picture *or* text, can only be located through the index. Family descriptions are relegated to an alphabetically-arranged appendix, and even the photo credits lack cross-references.

The respective authors, nevertheless, have provided within this format very serviceable texts that are equivalent to others on the market. The basic data, from Description to Nesting, fulfill their function admirably, while supplemental paragraphs comment further on each species. Among popular guides, only those by Pough contain a comparable amount of information. All this material really deserves a more suitable vehicle.

The true calamity of these guides is that they were tailored for and are being pitched to the beginning student. Any veteran already grounded in the fundamentals can make use of the fine photographs and text—it is the amateurs who will find themselves plugged into a malfunctioning, gimmick-ridden system. Had these volumes been published as lavish photo portrait-galleries with text, maps and other embellishments, I would have praised them for studio reference as energetically as I condemn them as workable field guides.—GUY TUDOR.

**Rails of the World. A Monograph of the Family Rallidae.**—S. Dillon Ripley; with a chapter on the fossil species by Storrs Olson. 1977. Boston, David R. Godine. xx + 406 pp., 41 color plates by J. Fenwick Lansdowne; 10 photographs; 17 maps. \$75.00.—Rails, the family Rallidae, are among the most secretive and little known of birds. Even in the United States there are active field workers who have yet to see their first Black Rail or Yellow Rail, and the long controversy about the voice of the latter has still not been settled to everyone's satisfaction. Fortunately, a few species such as the American Coot are tame, abundant and offer easier insight into the biology of the group. Though of weak flight, rails have been wafted to many remote islands where they are better able to survive than most birds. The species resulting from such colonizations tend to become flightless and many of them have been exterminated or greatly reduced by man and the pests he introduces.

Professor S. Dillon Ripley, the author of this monograph, has conducted field work in most parts of the globe. A lifelong interest in waterfowl is extended to the Rallidae. His long association with museums also aided him in summarizing knowledge about a family many of whose species are only known from a few scattered specimens. A certain environmentally imposed similarity exists among many rails and makes their classification difficult. One is surprised to find that Ripley's classification departs rather widely from that recently set forth by Olson (1973 *Wilson Bull.* 85: 381–416), especially since both men are at the same institution and Dr. Olson has contributed a chapter to this treatise on the rich fossil history of the Rallidae.

Other introductory chapters summarize various aspects of railine biology. The literature coverage is extensive and up-to-date; a number of individuals have provided the author with unpublished information.

Species by species accounts comprise the major part of the book; these give general characteristics, habits where known, weights and measurements and analysis of subspecies, often with the aid of maps. Some might think subspecies are overdone, but certain of them may prove to be species and others pose interesting questions of dispersal. As the author notes, rails are to some degree a law unto themselves as regards insular distribution and need to be more carefully considered in framing theories of insular zoogeography.

The color plates are by the Canadian, Fenwick Lansdowne, one of our leading bird artists. He has grouped several species on a plate, without background other than a few rushes or flags introduced for aesthetic reasons. The frontispiece is of the New Zealand Takaha (*Notornis*), a classic example of a bird once believed extinct, but which was then rediscovered, and is now receiving attention that should be a model for the management of other endangered species. As mentioned, many rails are alike, and it would be impossible to avoid some monotony in a series of plates illustrating all of the species. A few full habitat paintings would, I think, have helped: for example a North American marsh featuring four or five species, or a high Andean lake with the Horned and Giant coots, the former with its unique pebble-buttressed nest. I notice that the only figure in the book with full background, a Corncrake settling on its eggs, has been used by the publisher in his advertising brochure. The list of plates in the table of contents uses vernacular names only; these are strung together in the manner currently in vogue, so we have, among others, Yellowbreasted, Dotwinged, Blackbanded, and Russetcrowned crakes. With English as my first language, I find my flow of reading slowed as such compounds are mentally disarticulated. No scale is given for the paintings and the figure of one species in which I happen to be interested, "*Rallus*" (*Habroptila wallacii*) of Halmahera, Moluccas, is too small in relation to other species shown on the plate, while the colors of the soft parts are washed out compared with the painting of a specimen in the flesh published by De Haan. Text illustrations are absent except in Olson's chapter on fossils, but there is a useful collection of 10 photographs.

The price is high, \$75, but when some technical volumes without color are selling for two-thirds that, perhaps it is not out of line. I do think that this book could have been made a little less ponderous without disservice to the artist.

Many species of rails are so little known that in the nature of things knowledge of the group should increase at a slow but steady pace. Nonetheless Ripley's *Rails of the World* will remain the standard reference on the family for the foreseeable future.—DEAN AMADON.

**The Bluebird: How You Can Help Its Fight for Survival.**—Lawrence Zeleny. 1976. Bloomington, Ind., Indiana University Press. xix + 170 pp., 4 color plates, numerous black and white photographs, drawings, map. \$7.95.—There is no doubt that the bluebirds—eastern, western, and mountain—are among America's most beloved birds. Nor is there any question that all three are having survival problems, for various reasons ranging from loss of habitat, catastrophic late spring cold spells, pesticide poisoning, and especially competition for nest sites, mostly by starlings, house sparrows and house wrens. This most admirable small volume, the first Audubon Naturalist Library book, is one man's effort to educate the interested public in practical ways to arrest and then reverse the downward population trends of recent years. Zeleny is no zealot; his presentation is a distillation of the knowledge he has gleaned from source references, from others interested in bluebird survival, and from his own years of successful nest-box trail experience. Written in an easy, conversational style, but with due attention to accuracy and authenticity, Zeleny gives us a discussion of bluebird life history and behavior, an examination of the causes of the present problems, and a lengthy (two-thirds of the book) discussion of the various means of aiding the bluebird in its comeback. With the directions and diagrams provided, anyone with the simplest tools and competence can construct and erect nest boxes acceptable to bluebirds and less so to other species. (Bluebirds will even use empty plastic bleach bottles.) Directions are presented for planning trails modeled after those that have been so successful in various eastern states. The monitoring of these trails, coping with bluebird predators, raising orphaned young, winter feeding, and other useful subjects are treated. An extensive bluebird bibliography is appended. I found no serious defects in the book, although male and female mountain bluebirds are unfortunately reversed, and I would have liked to have been told a little more about male breeding territories rather than simply that they were "staked out." But overall, this is a book we would like to see in every suburban and rural household; to be read and to be acted on. As George E. Watson says in his introduction, "Lawrence Zeleny's story of what a vast army of amateur conservationists have done and can do to help our bluebirds should serve as an inspiring example for other conservationists in the constant battle to help our wildlife survive in an increasingly technological and hostile [starling plagued] environment."—ROBERT ARBIB.

**Theoretical Ecology. Principles and Applications.**—Edited by Robert M. May. 1976. Philadelphia, W. B. Saunders; Oxford, Blackwell Scientific Publications. viii + 317 pp. \$13.50 (\$13.90 in Canada).—The past decade has witnessed a spectacular burst of activity in theoretical ecology. This book, a collection of contributions by some of the chief practitioners of this art, attempts to draw together the theoretical insights of ecology “to show how they can shed light on empirical observations, and to examine some of the practical implications.” Its success in meeting these aims is limited.

The overriding problem with the volume is its inconsistency and spotiness, a frequent feature of multi-authored texts. But quite beyond the differences in individual style, there are major differences in how “theoretical ecology” and its contributions are portrayed. Several chapters deal with theory by emphasizing semi-rigorous mathematics; the contributions of May on single-species populations, interacting populations, and communities, or of Hassell on arthropod predator-prey systems, or Caughley on plant-herbivore interactions are examples. Often these treatments seem to become immersed in the mathematics of the theory and fail to touch base with reality; Hassell’s contribution, which may be the best in the book, is a notable exception. Other chapters, such as those by Southwood on “bionomic strategies,” Pianka on competition and niche theory, Gould on “paleobiology,” or Conway on pest systems, approach theory in a more generalized, qualitative, and intuitive fashion. In general, these chapters do a better job of reviewing current theory and placing it in a real-world context. Additional chapters deal with ecological succession (Horn), island biogeography theory and natural reserve design (Diamond and May), schistosomiasis (Cohen), and the “central problems” of sociobiology (Wilson). Cohen’s contribution is interesting but perhaps overly narrow for a volume of this sort, and Wilson’s chapter seems a weak and superficial attempt to justify this old discipline with a new name.

The contributions also vary in the intensity or fervor with which theory is applied. Caughley, Diamond and May, and Cohen, for example, demonstrate that theory can lead to some interesting and novel insights, but that there are limits to its ubiquity and that alternative treatments may be valid. Others seem to have shed their reservations about the real-world applicability of theory. Southwood, for example, generalizes for birds that “the more the habitat varies, the larger the clutch size; the species can exploit the additional food by faster population increase.” This is surely a gross oversimplification of the factors influencing avian clutch size, and it stems from the determination to fit clutch size variation into  $r$ - $K$  strategy theory. Conway also employs this theory in his treatment of pest biology, and this brings him to the dangerously premature conclusion that “pesticides are likely to remain the main counter to  $r$ -pests; it is the only technique which has the speed and flexibility required to respond to the outbreak situation characteristic of  $r$ -pests.”

The volume as a whole leaves one with an impression of the current state of theoretical ecology that, while unintended, is quite likely accurate. Theory is pursued both through abstract mathematics unrelated (at least initially) to reality and/or by intuitions derived from reality, and it seems that the latter, despite their lack of rigor, are generally more successful in producing insights that do not do violence to nature. Southwood’s suggestion that “the infinite variety of nature may therefore be capable of being caricatured by the few parameters” contained in the mathematical expressions of theory indicates the sort of wishful thinking that is too commonplace in contemporary theoretical ecology.

The volume is apparently intended as a text for advanced undergraduates and graduate students, but its unevenness severely limits its usefulness. Aside from a few chapters, the book fails to convey much of the excitement of current theoretical ecology, and as a review it is incomplete. Despite several bright spots, it’s a rather disappointing book.—JOHN A. WIENS.

**The birds of Libya. An annotated check-list.**—Graham Bundy. 1976. London, British Ornithologists’ Union Checklist No. 1, 102 pp., 57 maps. Price scaled to inflation (£ 3.70, Jan. 1977).—This work is the first of a proposed series of checklists from selected areas in southwest Asia and Africa to be published by the B.O.U. The introduction includes a literature summary, climate and physical features of four regions (Tripolitania, Cyrenaica, the Fezzan, and the Libyan Desert), and a brief review of migration. Each of the 317 species accounts (1 extinct, 75% Palearctic migrants) is a summary of the literature by region and the bird’s status. Maps of breeding ranges are given for 61 species. The work is alphabetized by subfamily, genus and species within the family order of Peters et al. An appendix contains a useful summary of the status of species for each region. Doubtful records are in brackets.

This work summarizes the literature for each species and presents it in an easily readable form and in a well organized format. This reviewer agrees with J. F. Monk (editor) that a checklist need not be taken up with taxonomic decisions. However, the checklist falls short of its goal to take into account all previously published literature and introduces a new problem briefly outlined here, that of inaccuracy.

Localities on the maps of Libya, Tripolitania, and Cyrenaica make use of several transliteration systems and are not standardized. In addition, on map 1, Pisidia is labeled Zavia, Tokra does not coincide with text spellings, and the Arab Republic of Egypt is labeled U. A. R. Egypt. In some instances place names not on the maps are identified with coordinates but many others are not. Also, maps of breeding-bird distributions would be more useful if dots were used instead of shaded areas. In Table 1, no source is given and the symbols are not given equal value over time, and therefore the migration of *Ficedula hypoleuca* may begin 2.7 days or 1 week before *Muscicapa striata*.

While the terms abundant and common may be meaningful to a bird watcher, they are less meaningful to the ornithologist interested in densities in various habitats. Often the abundance terms are those of the original authors, but it is difficult to know how conclusions were arrived at or conflicts resolved in this work. For example, *Phylloscopus bonelli* is "common in April" but Stanford (1954) doubted "if we saw more than half a dozen." In the same account the 6 *P. bonelli* recorded by Hogg (1972) "before 1 April" were transferred by the author to "late March," but Florence's original fieldnotes list them on 7 February! Other misleading assessments include *Anthus cervinus* and *Sylvia atricapilla* observed 16–20 February which were thought to be winter visitors although individuals of these species are already migrating across the North African coast at that time.

The checklist does not mention Newbold and Shaw (1928), Molteno (1944) and Missonne (1973 and 1974). The omission of the most recent sources lead this reviewer to suspect that the manuscript may have not been updated at publication. In addition, it does not take into consideration museum specimens to substantiate observations. No reason is given for the inclusion of some, but not all, band recoveries.

Thus, the checklist is severely handicapped. Since a great deal of effort has gone into producing it, this reviewer hopes that any revision will be fully annotated and that future planned checklists will be free of the outlined problems. Unfortunately, this work is a necessity for oil-field workers, environmentalists, and ornithologists who will, some day, surely return to the Libyan Arab Republic. I caution them to refer to the original sources and pencil in their own corrections.—KENNETH O. HORNER.

**Utah Birds: Check-list, Seasonal and Ecological Occurrence Charts and Guides to Bird Finding.**—William H. Behle and Michael L. Perry. 1975. Salt Lake City, Utah Museum of Natural History. viii + 144 pp. Paper, \$3.50. **Birds of Utah.**—C. Lynn Hayward, Clarence Cottam, Angus M. Woodbury, and Herbert H. Frost. 1976. Great Basin Naturalist Memoirs No. 1 (Brigham Young University Press, Provo, Utah). iv + 229 pp. paper, \$10.00.—Behle and Perry's Check-list is a useful book consisting of four parts: an annotated list of 393 species (of which 39 are considered hypothetical), Seasonal Occurrence Charts with 5 categories of "chance of observing" when the species normally is present, charts of Ecological Occurrence across 18 habitat types, and guides for 17 field trips. The species list includes concise statements of status, dates of regular occurrence, and listings of subspecies known from Utah. The integration of hypothetical species into the general list is a convenience. The guides are carefully prepared, with access, distances between points of interest, accommodations available, lists of birds expected, and non-ornithological attractions carefully detailed. The arrangement is convenient, the charts are easily interpreted, and typographical errors are few.

"Birds of Utah" falls in a middle ground between an annotated check-list and the more ambitious of the state bird books. The volume had its inception in a thesis submitted by Clarence Cottam in 1927, was augmented by the further investigations of Cottam and Woodbury and, after their deaths, completed principally by Professor Hayward. Twenty-nine pages are devoted to historical background (in considerable detail) and habitat descriptions, and 170 to species accounts. Literature cited and an index to species occupy the balance of the book. Sixty-five photographs (21 in color) by Richard D. Porter and Robert J. Erwin serve as instructive portraits of 54 species. Unfortunately, little effort appears to have been made to position these in proximity to the relevant species accounts. In the species accounts, Status, Records of Occurrence and, where applicable, Subspecies are considered. These accounts permit more extended discussion than Behle and Perry's treatment, especially helpful where status varies regionally. For many of the breeding species, the nesting habitat is characterized. Changes in status, such as the local extirpation of Fox Sparrow, Veery, and Grasshopper Sparrow as human settlements have expanded, are substantiated. The listing of Records emphasizes the early explorers and is expanded for those species sighted infrequently. However, the recitation of dates and localities of collection for widespread species (e.g., Common Nighthawk) seems superfluous. The nomenclature is a curious blend of A. O. U. Check-list (acceptability of subspecies), Peters' Checklist (allocation to and sequence of passerine families), and Mayr and Short's "Species Taxa." The unfamiliar arrangement of songbird species renders Hayward et al. more difficult to use in conjunction with a field guide than the Behle and Perry Check-list with its traditional systematic usage. Geographic variation

is handled less expertly than by Behle and Perry (e.g., accounts of Dark-eyed Junco and Pigmy Nuthatch; section on Subspecies of Uncertain Status). The strength of this volume is its thorough documentation of the occurrence of birds in Utah.

In books addressed to the general reader, infraspecific categories pose problems that arise from the several stages of the speciation process encountered. By means of footnotes Hayward et al. direct attention to borderline cases and nomenclatural innovations, whereas Behle and Perry comment on such matters in the species accounts. However, in either of these publications, the listing of conventional geographic races, especially those that occur only as transients, seems an unnecessary complication.

To a considerable degree these volumes complement one another, and we are indebted especially to the senior authors, not only for bringing these works to press, but for their decades of dedicated investigation of birds in the Intermountain West.—KEITH L. DIXON.

**Avian Energetics.**—Raymond A. Paynter, Jr. (editor). 1974. Publications of the Nuttall Ornithological Club No. 15, Published by the Club, Cambridge, Massachusetts, 334 pp.—This rather unassuming publication of only 334 text pages appears on the surface to be only another glossy paged review volume, of which we see so many these days. Published in 1974, it has been read by most students concerned with avian energetics and reviewed by several experts, all of whom have attested to its unusual character, unusual in the sense that here is a milestone volume, one that through its thoroughness of treatment has both accurately summed up the current state of affairs in avian energetics and at the same time pointed the directions of the field for the next decade. Two excellent reviews are noted here, to which the reader is directed for detailed commentary (Wolf, L. L. 1975. *Wilson Bull.* 87: 562–564; O'Conner, R. J. 1975. *Bird-Banding* 46: 359–362).

Dr. William R. Dawson, Professor in the Department of Zoology at the University of Michigan, gathered the group together at the Centennial meeting of the Nuttall Ornithological Club and the 91st stated meeting of the American Ornithologists Union held jointly on October 10, 1973 in Provincetown, Massachusetts. This small contingent of four principal speakers, James R. King, William A. Calder III, Robert B. Ricklefs, and Vance A. Tucker, three discussants, George A. Bartholomew, S. Charles Kendeigh, and Eugene P. Odum, and the Chairman, Dr. Dawson, includes those that have made great original contributions to the field of avian energetics in the past 25 years. In his introductory statement, Dawson provided only some words about each speaker and discussant. I wish he had expanded his remarks in the written version to provide a short biographical sketch of each of these significant contributors.

The volume is divided into the short introduction, four lengthy chapters each followed by a discussion, and an appendix provided to permit the reader to convert the units used in the symposium to those he is most familiar with or to those in which we are currently required to express ourselves.

The first chapter is by James R. King, recognized authority on energetics of birds, who began to evolve his hypotheses in avian thermo-regulatory and energetic physiological ecology with Donald S. Farner some 25 years ago. From his post in eastern Washington, he has been able to test these hypotheses through extensive studies with the crowned sparrows and other birds and to glean international literature to support his theories. His approach in the early years was more organismic but later, his thoughts encompassed the environment strongly so that now he has been able to assume a commanding view of avian physiological ecology.

King's 50-page chapter, including tabular material plus over 270 citations, brings us up to date on seasonal aspects of the two major resources available to birds, time and energy. The first quarter briefly discusses the time and energy demanding activities of birds through the annual cycle, the second quarter treats the external (climatic) and internal (biological) factors influencing energy budgets, and the last half provides the methods and results of estimating energy budgets. It is this latter section that is the most useful as it provides the student with a complete review of the successes and shortcomings of the many methods used in an attempt to obtain the elusive accurate estimate of how much energy an individual bird requires in one day at any time of the year, in order to carry out all of its activities in the wild state. This is not a cookbook providing recipes for research techniques, but it does provide a detailed referenced analysis of the incremental energy demanding activities of birds, comparing them in many cases to the situation in mammals, and pointing out pitfalls or voids in results, interpretation, or actual experimental evidence. It appears from King's review that we have a reasonable series of estimates of daily energy expenditures for a few species, but we lack both the detailed explanations of the hows and whys of the variations in energetic cost and the integrative aspects permitting generalizations both in present day forms and from an evolutionary context. It was eminently

wise of William Dawson to bring S. Charles Kendeigh into the discussion of each paper. It is especially true with King's presentations as these two greats in avian biology have often taken diverse approaches to the same problems and come up with different solutions. At the conclusion of the first chapter, we see some of this divergence persisting, but at the same time, I see mutualism occurring, wherein King and Kendeigh are pulling their ideas together with benefit to ornithology.

Kendeigh has expanded his discussion including several tables of data to amplify several points raised by King, i.e. those regarding the use of basal metabolic rate as a reference level for estimating incremental energy costs, the value of measuring cage locomotor activity, the possibility of the significance of "specific dynamic action," additional data on energy cost of molt, and the differences in approach toward calculating daily energy budgets.

Eugene Odum provides a philosophical view of energy conservation from bird to man. He continues to remind us of the big ecological picture, that the demands for energy by birds are tempered by the system they are in, i.e. by their ecological association.

The second chapter on energetic consequences of body size is detailed by William A. Calder. Calder is a master at allometric analysis and in this chapter has managed to reduce most of the written word to mathematical symbols, thus disguising for some and illuminating for others the relationships of energetic parameters to body mass of birds. The first portion of the 65-page chapter discusses general principles of metabolism and thermoregulation in relation to size, anatomy, food acquisition, and geography (Bergmann's Rule) while the second half summarizes current knowledge on energetic relations of the smallest group of birds, the hummingbirds, with much of the original data taken from Calder's own works and those of our now deceased, highly regarded colleague, Robert Lasiewski. One of the more important points amplified throughout the discussion is that we have been concentrating too much on the relative energetic cost in terms of unit weight or area rather than on the energetic consequences of the whole bird's body mass. For total energy requirements, ability to store energy and heat against inclement weather, and ability to carry around an insulating cover of feathers, total body size makes a significant difference.

Almost one-half of the book is devoted to a review (not a synthesis) of energetics of reproduction in birds by Robert Ricklefs, one of the newer lights in the field of energetics. Before getting into specifics of reproduction, Ricklefs devotes considerable space in reviewing fundamentals of metabolism, which although especially useful if the chapter were to stand alone, is in part duplicated in other chapters and in part too basic to be included in this specialist review volume. Through detailed analysis, Ricklefs, on the ensuing 100 pages, performs a careful review of existing data on energetics of eggs and egg formation, incubation and growth of young through energy dependence of young from adults. The extensive bibliography confirms the thoroughness with which Ricklefs has reached for all data pertinent to his summaries. By providing the many graphic and verbal relationships, displayed primarily as working hypotheses often based on minimal data, Ricklefs challenges future ornithologists to verify his predictions. This chapter, perhaps because it discusses material not really well assembled earlier, will be a landmark for future studies.

In the discussion, Odum brings up an interesting analogy between altricial development and the development of a fuel-powered human society. We lack quality control in society now and are still clamoring for more energy as are nestlings. Odum also raises again the long debated subject of energy requirement for incubation, i.e. can the heat normally lost from the body provide sufficiently for maintaining eggs at body temperature. By concluding that we still need more experimentation on this subject, Kendeigh declined to comment on one of his favorite controversial points. Kendeigh does bring up several points relating Ricklefs' data to ecosystems rather than just to the organism level.

The final chapter by Vance Tucker, Duke University, is a statement of the energetic (physics) of natural avian flight. Tucker was one of the early pioneers in determining the energetic cost of flight by birds in wind tunnels. By extrapolation, he now has ventured to predict energy required by free flying birds realizing limitations to the accuracy of his predictions. The text portion of the chapter is short, 17 pages including tables and graphics, and discusses the differences between wind tunnel and natural conditions relative to flying, theory relating to flight under natural conditions, effect of wind velocity, and finally flight range.

Tucker calculates that aerodynamic and mechanical differences between wind tunnel and open air is probably less than 10%, which is mostly attributable to the drag imposed by the mask and tubing connecting the bird to the respirometer. Calculations of flight ranges from experimental work agree well with reality, except that deviations of up to 50% added distance observed might best be explained by aids such as flying in downwinds or updrafts.

The ensuing discussion points to Tucker's ability to pull together the physical-mechanical and the physiological perspective that make his contributions to our knowledge of avian flight so valuable as well as to problem areas yet to be investigated.

The symposium volume is an instant classic; it must reside on the shelf within easy arm's reach of every avian physiologist and ecologist.—GEORGE C. WEST.

**Konrad Lorenz.**—Alec Nisbett. 1976. New York and London, Harcourt Brace Jovanovich (A Helen and Kurt Wolff Book). xii + 240 pp., photographs plus sketches by K. Lorenz. \$10.00. **Behind the Mirror.**—Konrad Lorenz, translated by Ronald Taylor. 1977. (Original German book, *Die Rückseite des Spiegels*, copyright 1973.) New York and London, Harcourt Brace Jovanovich (A Helen and Kurt Wolff Book). 261 pp., four line drawings. \$10.00.—We were listening to a discursive but insightful paper when Konrad Lorenz leaned toward me and whispered of the speaker, “That boy is a genius!” Although it has been a decade, I still hear those gruffly accented words in my mind’s ear and cannot help but wonder if Lorenz had constructed his own epitaph. Ever viewing the world like some alert schoolboy about to catch a frog, enthusiastic almost to embarrassment, championing interpretations that seem to him obvious truth and dealing perhaps too impatiently with others who see the world differently, Konrad Lorenz will ever earn the approbation “boy.” And of “genius” there is no doubt. We understand the world better because of him, and him better because of Alec Nisbett’s no-nonsense biography simply entitled *Konrad Lorenz*.

Born to a 42-year-old mother when his equally colorful father, the famous surgeon Adolf, decided against abortion, Konrad began life in 1903 at the Altenberg castle familiar to readers of *King Solomon’s Ring*. Built with a king’s ransom received from the American meatpacker J. Ogden Armour for Adolf’s surgery on his daughter, the castle overlooks the Danube where young Konrad watched fish and began at age six his studies of waterfowl with a pet duck. In his research for the biography, Nisbett trooped over the family grounds and through the edifice, which he describes as a mixture of Austrian baroque and American megalomaniac styles. Here is the wall of the well that young Konrad’s tomboy playmate Gretl walked to demonstrate her courage to neighborhood boys. Today she is still Lorenz’s constant companion—his first and only wife.

Nisbett recounts the early years when Lorenz’s jackdaw colony, made famous in *King Solomon’s Ring*, began its partial destruction of the Castle’s roof and mentions Lorenz’s hand-reared starling that struck (Lorenz says) at imaginary prey, thus leading to his idea of vacuum activities. Nisbett also reports that Lorenz developed the idea of a displacement activity by analogy with sparking over in motorcycle engines, with which he shared an interest with his friend Bernhard Heilmann. Bernhard and Gretl, now his fiancée, stole Konrad’s diary on jackdaws and had it published in *Journal für Ornithologie* without Lorenz’s knowledge—or so Nisbett would have us believe. In these years, father Adolf missed receiving the Nobel Prize for his “bloodless” hip-joint operation, apparently by a single vote, and no doubt would have been incredulous if informed that his animal-rearing son would later cop the success.

An entire chapter is devoted to the “Goose Years” and Lorenz’s ideas on the behavior of the gray-lag goose, without any indication of subsequent literature challenging his interpretations. Nisbett then follows Lorenz’s developing career and thinking, his meeting Niko Tinbergen and their brief work together, and finally the coming of Nazi power and World War II. A chapter is devoted to Lorenz’s 1940 paper on “Disorders caused by the domestication of species-specific behavior,” widely cited as a Nazi or racist statement. Nisbett presents Lorenz’s defense well, but repeats his inconsistencies of thought apparently without noticing them. Lorenz claims—and I for one am prepared to believe it—that his aim was to point out what he saw as behavioral degeneracies accompanying domestication as a warning that *Homo sapiens* is dangerously domesticating himself. Lorenz admits that the paper was written in Nazi terminology, but as a mechanism for communication with them to change their ideas rather than to reinforce them. Taking the defense at face value, one is still confronted with Lorenz’s disgust at the *physical* appearance of domestic ducks as his main arguing point, yet the extension to humans is to “educate our own young in turn, to select a mate not by the size of her breasts but by her intelligence and moral values” (p. 87).

When the Lorenzs moved from Königsberg University, where Konrad was Kantian Professor of Philosophy, his papers were lost, and then soon he was in the army, at first with a motorcycle corps, then in a medical wing. In a Russian prison camp Lorenz wrote a long manuscript bleached onto old cement bags with potassium permanganate. This manuscript was not, as sometimes asserted, *King Solomon’s Ring* (which he wrote after the war), but a major work on epistemology, to which I return below. Adolf died at the age of 92 in 1946 and Konrad was jobless until the creation of the Max Planck Society (an interesting story in itself) which supported his studies at Altenberg. He wrote his “children’s book” (*King Solomon’s Ring*) and then *Man Meets Dog*. Nisbett explores the title of the former, but fails to mention that the latter’s German title is a play on words (*So Kam der Mensch auf den Hund*) that roughly expresses the equivalent of the English “going to the dogs.” Nisbett believes that Lorenz invented the theory that the domestic dog is derived from the golden jackal and hybridization with the wolf, but Darwin mentions this theory as current in his time and I have been told that it appears in Aristotle (although I have been unable to locate the passage). Nisbett concludes that the evidence is against Lorenz, but he is aware of just a few studies, ignoring chromosomal, biochemical and other evidence showing that the dog is simply a domesticated wolf. And Nisbett is unaware of what a devastating effect this conclusion has upon Lorenz’s interpretation of dog behavior and the foundations for his behavioral theory in general.

Nisbett leads us through the story of Lorenz's first research institute at Buldern, to Seewiesen in 1956, where he remained until retirement, and finally to his homecoming to Austria in the new mini-institute at Grünau. The story ends with Lorenz's Nobel Prize and the sad footnote of his naive acceptance of a subsequent award by a neo-Nazi society. Adolf lived to ninety-two and son Konrad plans to do so as well; I hope he betters the old man's record.

What can be said in overview of this unusual book, which lies somewhere between a biography written by Nisbett and an autobiography "as told to" him? First, it is evident that Nisbett had a restricted set of sources, largely British and German (or Austrian), because his knowledge of American science seems very weak. He tends to lump Americans into a huge category of largely antagonists to Lorenz, when he should have separated the critical psychologists (of both the neo-behaviorist school represented by B. F. Skinner and the New York City school of T. C. Schneirla and D. S. Lehrman) on the one hand, from the American ornithologists on the other. The latter are virtually never mentioned, and Lorenz's key role in developing the thinking and specific works of Margaret Morse Nice is not even mentioned. Nisbett fails to see the evident influence that William McDougall's writings must have had upon Lorenz's thinking, and indeed, the central notion of drive is not always as clearly brought out in Lorenz's thinking as it might have been. And when he does cite American supporters of Lorenz, Nisbett picks anthropologists Lionel Tiger and Robin Fox to mistakenly parade as zoologists! Nisbett just did not do any homework in the New World.

Second, the book lacks depth where I would have liked it most. For example, Lorenz's formal education is given short shrift. He was trained as a medical doctor in Vienna, but what were the specifics of his training? Surely some research in records would have revealed that. Why is it that Lorenz never mentions Freud, yet his conceptions are manifestly Freudian? Can there be a distinction between Lorenz's conception of displacement and Freud's of substitution? I think Nisbett has been too dependent upon Lorenz to frame the setting of his subsequent research, and not sufficiently knowledgeable or resourceful to ferret out important things on his own.

Third, Nisbett spends several chapters simplifying and explaining Lorenz's major works, and these chapters strike me as remarkably useful and accurate. (Or, to be more honest, what I really mean is that Nisbett's reading of Lorenz coincides with my own.) Perhaps because of his distance from the subject, Nisbett presents Lorenz's views without clutter and pretension, while adding his own disagreements where he cannot accept the master's viewpoint.

Fourth, the style and content are only reasonably even. The fresher and most objective passages seem to be those about which Wolfgang Schleidt (probably the best student ever turned out by Lorenz) would have had personal recollections, and so he was a useful informant. Tinbergen was obviously a poor source, being very guarded and impersonal in passages certainly based on interviews with him. Lorenz's own stories, however, are the highlights. Who can forget his asking Gretl how much she loved him and receiving the marvelous reply of "eight?" You must read the book for the follow-up to that one.

Finally, though, I think the book misses a major point. Nisbett does not see clearly that much of the scientific criticism of Lorenz's work is *not* wrapped in social terms. He, like Lorenz himself, misses the fundamental point of certain critics such as Lehrman, R. A. Hinde and me: that Lorenz's ideas are not testable. They are never formulated in explicit operational terms, and hence are prescientific in the broad sense. Yet these self-same notions are highly imaginative, providing just the kind of original flair to get a science going, yet insufficient to maintain its progress. It is the epistemological problem that Nisbett sees only through the eyes of Lorenz, and this problem restrains the entire analysis, maintaining it on the level of a readable story about a great man and his interaction with society, but preventing it from penetrating the mental genius and failings of one of the most unusual minds of our time.

What ever happened to that manuscript on epistemology, written on cement bags in a Russian prison camp and successfully brought home after the War? Well, it is Lorenz's new book, *Behind the Mirror*. It does not look like a cement bag, but it reads like one. The tone is set on the second page where we learn that "The knowledge of one's own existence expressed in the Cartesian *cogito ergo sum* remains the most certain of all knowledge." I suspect that any reasonably competent college student realizes that the conclusion (I am) hardly follows from its antecedent (I think) unless one admits the existence of "I" in the first place, which is what Descartes was trying to conclude. I think it was Bertrand Russell who rephrased it this way: there are thoughts, therefore there are thoughts (but not necessarily thinkers). What's that on page three: Lorenz quoting Percy Bridgman, the great mind who extracted from modern physics the epistemological concept of operationalism? Alas, the operational message is misunderstood and within a page Lorenz is again dealing with unmeasurable variables that Bridgman showed have no status in science. Having begun with a 300-year-old mistake in logic and continued with a devilish quote of modern epistemological scriptures, the book launches its quixotic journey toward ultimate confusion.

*Behind the Mirror* is not so much a treatise on scientific epistemology, about which Lorenz has nothing of

importance to say, as it is a personal exploration of the "mind." Viewed as a book about the analogical sources of Lorenz's own imaginative thinking, it is a useful document. Each animal, Lorenz argues, has been equipped through evolutionary selection on his ancestors with sensory and integrative mechanisms that *must* successfully reflect reality of the external world. Lorenz delves behind this mirror in an effort to examine the analytical processes that constitute the reflection. This particular effort, though, is unlikely to take an honored place on bookshelves next to Clyde Kluckhohn's perceptive anthropological analysis *Mirror for Man* or Lewis Carroll's revered *Through the Looking Glass*. At any rate, those are my reflections on the matter.—JACK P. HAILMAN.

**Crows of the World.**—Derek Goodwin. 1976. London, British Museum (Natural History), pub. no. 771. vi + 354 pp. Illustrated by Robert Gillmor; 3 color pls., 8 numbered figs., numerous unnumbered text figures (birds and maps). Cloth. \$28.50.—This long awaited book well fulfills two needs: (a) it summarizes much of what is known, both published and unpublished, about the family Corvidae, including full literature citations so that the reader can delve more deeply as needed; and (b) it points out the astonishing lack of information we have on many aspects of biology of dozens of species in what is often thought of as a well-known group of birds. The work is written in the combination of scientifically accurate yet non-technical style for which its author is already well-known through his similar book on the Doves and Pigeons of the World. Thus the work is an important reference for ornithologists and easy reading for the serious amateur naturalist as well. Mr. Goodwin has long held a research position with the British Museum. His early writings about the Jay (*Garrulus glandarius*) published in the *Ibis*, *British Birds*, and *Bird Study* between 1949 and 1956 were thoroughgoing, descriptive, and ethologically oriented basic reading for those of us just beginning our studies of jays. Goodwin observed his subjects both in the wild and in captivity. His compilations here reflect not only those studies but the branching out into an examination of other species in zoos, travel, and correspondence, and through his convenient access to the British Museum collections and library.

The book could have been smaller if it had been aimed solely at the scientific community, but the author takes the time and space to explain many subjects in elementary terms. Thus the introduction and chapter 1 on nomenclature can be quickly skimmed by most readers of this journal. Chapter 2 on adaptive radiation and adaptive characters is pointedly about the Corvidae and is a good summary even for corvid specialists to ponder. The same can be said for chapter 3 on plumage and coloration, and 4 on behavior (over 40 pages). With chapter 5 the accounts begin. Each group within the family is first presented in summary fashion, after which treatments of the separate species are undertaken. Where a species has well-marked distinctive groups (as with Scrub Jays), these are dealt with separately. Subspecies are not emphasized unless marked biological differences exist, and their external morphological features are noted briefly. Text references for most statements are made to authorities, year, and sometimes page, and complete bibliographic citations are given under References at the end of each account. Accounts are set up as follows: common and scientific names, reference to original description, description, field characters, distribution and habitat, feeding and general habits, nesting, voice, display and social behavior, other names, and references. Each account has a nice ink drawing of the species and a map indicating the general range.

I was asked to review this book because I study and write about New World jays. Beyond those birds, however, I know very little about corvids, especially of the Old World. I thus must first tell you that I think the book is in general a sound, scholarly contribution. I will now point out a few flaws, correct a few mistakes, and provide some supplementary information within New World forms, leaving it to readers to find out if positive features and faults are in the same proportion in other sections of the book.

Coupled with the written account of distribution, most of the range maps here are serviceable, but alone they are often needlessly inaccurate. For example, the range of *Corvus sinaloa* would appear to extend halfway across Mexico when in fact it is confined to the Pacific lowlands of Mexico. The one showing the overall distribution of jays in the United States has an incorrectly wide Great Plains gap, perhaps fairly reflecting pre-Columbian absence of jays, but for now at least, inaccurate.

While the species figured in the colored plates are small, they seem mostly good to me, and the limited selection is nicely balanced to show the variety of forms, colors, and patterns within the family. But *Cissilopha yucatanica* has yellow legs, not red (as the text account makes clear).

The general cut-off date for literature cited seems to be about 1972, with isolated citations as late as 1975 (Woolfenden, Auk). I note two unfortunate omissions. Hybridization of Blue and Steller's jays (Williams and Wheat 1971, Wilson Bull.) in Colorado is not mentioned, nor is hybridization of Brown and Magpie-Jays in Chiapas (Pitelka, et al. 1956, Condor). So far as I know hybridization is otherwise unrecorded in New World corvids in the wild and is rare in the family. For the entire group *Cyanolyca*, here treated as 9 species,

the author's accounts indicate that virtually nothing is known about natural history. Thus, though its discoveries were modest, it is unfortunate that my 20-page account of reproductive ecology of *C. nana*, the Dwarf Jay (Hardy 1970, Wilson Bull.) was overlooked. Also missed was some information on breeding time of *C. pumilo* in Dickey and Van Rossem's *Birds of El Salvador* (1928). Although Goodwin cites Woolfenden (1975) on Scrub Jays, his summary of breeding biology of the Florida bird makes rather less than one would predict of its fascinating social system. Despite these puzzling lapses, the author seems well acquainted with the literature, and cites some obscure reports, proceedings, and a number of letters received, showing that he worked diligently to obtain information from workers not prepared to publish detailed accounts.

In discussing the relationships of New World jays the author impresses me with his fairness toward various views and his generally sound synthesis of these toward his own statement of opinion. Although he recognizes more rather than fewer genera (following Hellmayr), the groups he retains are natural ones, in my view, if not all of equal rank. He hints at favoring an opinion that *Aphelocoma* and *Cyanocitta* are closely related, following Amadon's 1944 revision, but wisely does not formally embrace that opinion. Goodwin perpetrates the report of Selander and Giller (1959, Condor) that the Beechey Jay and San Blas Jay are sympatric near San Blas, Nayarit, when in fact a careful reading of their paper shows that those workers found the two species in the breeding season no closer than 5 miles from each other and did not detect breeding in either form at those sites. Five miles might be satisfactory to suggest the inevitability of interspecific contact in the breeding season in Nebraska, but it is far from providing such certainty in sedentary tropical jays, in my experience.

The phylogenetic tree on page 259 does not show what the text correctly suggests: that *Cyanocorax dickeyi* and *C. mystacalis* are surely each other's closest living relatives. Goodwin's discussion of the closest living relative to the *Cissilopha* jays seems fragile. The conclusion that they may be nearest to *Calocitta* seems to me less supportable than that they represent a separate colonization from South American stock perhaps similar to present-day *Cyanocorax violaceus*.

The Andean jays sometimes treated as one species (*Cyanolyca viridicyana*) with seven subspecies is here treated as 3 species. In 1967 (Condor) I wrote about habits and vocalizations of the northernmost population (Goodwin's *C. armillata*, which I treated as *C. v. meridana*). Information from my paper appears in Goodwin's accounts of 2 forms, *armillata* and *viridicyana*.

*Cyanolyca nana* probably has never been recorded in the present state of Mexico; the Mexican Check-list (1958) stated that it does presumably on some old specimens labeled simply "Mexico." *C. mirabilis* is now known to occur in Oaxaca as well as Guerrero, where it is represented by a distinctive race (see Phillips, Bull. British Ornith. Club, 1966). Goodwin cites only very early vague reference to vocalizations of *Cyanocorax mystacalis* and does not note my (1969, Condor) description and sonograms of the two commonest calls of the species in Peru. *Cyanocorax affinis*, it is suggested, "probably lives in social groups all of whose members are more or less involved in each nest," but no authority is cited for this opinion and my own single experience with the species (1959, Los Angeles Co. Mus. Contrib. in Sci.) suggests otherwise. From what I would think are ample museum specimens of the various age classes, Goodwin seemingly has failed to detect the marked yearling and 2-year-old phenotypes in the Yucatan Jay (see Hardy 1973, Bird-Banding). The ontogeny of soft part and plumage change in San Blas Jays is also not adequately treated (Hardy, *ibid.*, and B.B.O.C., 1976), but understandably in this case, as museum skins without sufficient data and accompanying field experience can be confusing indeed. The two well-marked types of Magpie-Jays (*Calocitta*) the author treats as two species, yet the only evidence available in the form of possibly intermediate plumage features in the black-throated form suggest that interbreeding occurs at the zone of contact (field work needed!).

The foregoing items that I criticize detract little from the large overall purpose and usefulness of this volume. It is a good book, one that I have learned from and will undoubtedly continue to consult for enlightenment about this marvelous family of birds. If young ornithologists don't now go afield in response to the frequency with which Mr. Goodwin must write "no information" it will not soon be possible to have a better book about the Corvidae.—JOHN WILLIAM HARDY.

**Reader's Digest complete book of Australian birds.**—1977. Reader's Digest Service Pty. Ltd., Sydney. 615 pp., about 750 figs. A\$24.50.—It has long been known that the birds of Australia are hardly less exciting and extraordinary than her mammals. Mound builders, frogmouths, lyrebirds, and a host of endemic song bird families have tempted many a bird watcher to visit this continent. However, not only the rarities are rewarding, but also scores of species of colorful lorikeets and cockatoos, pigeons, kingfishers, pittas, bower birds and birds of paradise, to mention only a few of the families to which the 700 odd species of Australian birds belong. Most Australian birds, furthermore, live out in the open and are relatively easy to observe (there are a few notable exceptions). A visit to Australia is rather easily arranged in this modern jet

age and as a result of this accessibility a demand for bird books developed. When I visited Australia first, almost 20 years ago, not a single really good bird book existed, while now Australia is better off than almost any other part of the world.

There are a number of field guides (Slater, etc.), and there is J. D. Macdonald's *Birds of Australia* (1973), a concise handbook, with keys and good illustrations by Peter Slater. There are also a number of books on parts of Australia, among which Serventy & Whittell's *Birds of Western Australia* (now in a fifth revised edition) is by far the most informative. Finally, there are books on special groups, such as the *Australian Warblers* (by A. McGill), *Australian Flycatchers* (H. R. Officer), *Australian Parrots*, and other families. The Reader's Digest folio volume is the latest addition and the best. It is not only an extraordinarily beautiful volume, but also technically up to date. Almost every better known Australian ornithologist contributed some species accounts. In all, there are 50 coauthors, among whom some have contributed far more species accounts than others.

The reason why the volume is so beautiful is that it is illustrated by more than 700 color photographs of living birds. This includes stunning portraits of the two species of *Atrichornis*, which are among the most difficult birds to be seen. I remember sitting for about an hour (with Allen Keast) near a patch of rushes in which we had heard a Rufous Scrub-bird, but the bird hid from us so carefully we did not even see the rushes move!

Even the migrant visitors to Australia are depicted, although I find it rather misleading when the Siberian Barn Swallow is shown feeding its young in the nest, when, in fact, this species is only a rather rare winter visitor. The quality of these photographs is almost uniformly superb. Most of them depict adult birds feeding the young, while photographic records of displays are few.

The volume is divided in three parts. In the first one, *Where birds live?* (10 pp.), the major Australian habitats are described and shown in maps and color photographs. The major part (581 pp.) is devoted to individual species accounts and to a short description (8 pp.) of the families of birds that occur in Australia. The last part (16 pp.), *The Life of Birds*, provides a concise introduction into bird behavior, migration, ecology, fossil birds, and the controversial question of the origin and history of the Australian bird fauna. The problem is that considering the history of the Australian "plate" (former connection with Antarctica and South America) one would expect the bird fauna of Australia to be closely related to that of South America, but this is not the case. The American element is both controversial and small.

The first question a bird watcher might ask is, can I identify what I see with the help of this book? Well, this is definitely not a field book. Its large size (9" × 13") makes this evident. Also there is no need for another Peterson-type book, since Peter Slater's *Field Guide to Australian Birds* fills that niche quite competently. Yet, the color photographs are so large and life-like that they are sometimes more helpful than a stylized field-guide diagram. There are good plumage descriptions, but not the diagnostic comparisons with similar species that one finds in field guides. On the other hand there is a detailed text for every species. It describes habitat, voice, flight, food, courtship, nest building, and other aspects of life history. When migratory, flight route and winter quarters are given, although ranges outside Australia are sometimes incomplete. All in all, it is the best descriptive account of the birds of Australia in existence.

The richness of the Australian bird fauna is rarely appreciated by non-Australian ornithologists. No less than 41 species of Procellariiformes have been recorded from Australia, some of them, of course, only washed up on the beaches after storms. There are 25 species of pigeons (3 introduced), 53 species of parrots, 66 species of honeyeaters, and 6 Australian species of bowerbirds, and 18 native species of finches. Every introduced species that is considered established is also included in the volume. I was rather startled to come across a beautiful plate of a peacock until I learned that there are some free living birds on Rottneest Island (I did not see them there on my visit). A distribution map is given for every native and some of the more widespread introduced species.

Classification and nomenclature are thoroughly up-to-date although there is still sufficient uncertainty about the relationship of many species to permit differences of opinion. One might ask, for instance, whether it is wise to place so many species of *Meliphaga* in the genus *Lichenostomus*, and to lump *Hylacola*, *Pyrrholaemus*, and *Chthonicola* in *Sericornis*? After the Mathewsian orgy of name giving the authors have apparently concluded that it is better to have too few names rather than too many.

One might want to register a few minor complaints. First of all the title is somewhat unfortunate. The "Reader's Digest" Book suggests something very popular. Actually this volume is a remarkable blend of appealing beauty and sound, up-to-date scholarship. Then, in a volume with so many contributors, it would have been helpful to indicate the author of each species account by his initials. Instead one has to go to page 614 to find this information in very small print. Even more hidden away (on p. 615) is a brief list of references. The publisher should have allowed for the possibility that some readers might want to know even more about birds than is in the volume. Admittedly these are minor blemishes. If I could have only one book on Australian birds, this one would be my choice. And it is very reasonably priced!—ERNST MAYR.

**Optical signals. Animal communication and light.**—Jack P. Hailman. 1977. Indiana University Press, Bloomington. 362 pp. \$15.00—Much of Jack Hailman's research has been concerned with the principles that render acts or objects visibly conspicuous, and with the evolution of morphology, color, or behavior in accordance with these principles. In 1967, for instance, he published studies of the "ontogeny of an instinct" in which he traced developmental changes in optical stimuli that elicit and direct the food-begging response in which Laughing Gull chicks peck at their parents' bills. An important finding was the correlation between the chicks' preferences for stimulus properties of color, speed of movement, and direction of presentation and the characteristics of the adults' bills and behavior. The interaction between a hungry chick and its parent is just one of many kinds of events in which visible sources of information are paramount. Hailman's intention in *Optical signals* is to set the stage for predicting the characteristics of such visible clues, and to draw together fields ranging from the physics of light and the physiology of vision to the study of communicating.

The task of explaining why bluebirds have their colors and bellbirds their wattles is enormously difficult, of course, and the precision with which issues have been understood or modeled varies greatly from topic to topic within physics, physiology, and ethology. Hailman assays to lay out basic features of our current understanding, to suggest what we should investigate, and to offer some tentative hypotheses. He draws many of his examples from birds.

Nearly one-third of the book reviews physical and physiological topics such as emission, reflection, refraction, the differences between Rayleigh and Mie scattering, iridescence, irradiance, differences in ambient light that are determined by different habitats, bioluminescence, biochromes, brightness and contrast, spectral discrimination, and perceptual phenomena. There is a very useful section on mechanisms by which animals give color to reflected light by means of biochromes, molecules that absorb different wave lengths selectively, and schemochromes, integumental specializations that lead to refraction, scattering, or interference and are important in producing blue, green, or iridescent feathers and the silvery reflection of fish scales. Hailman suggests that the phylogenetic origins of colored signals may sometimes lie in non-signal adaptations. For example, because biochromes absorb light their evolutionary contributions to specialized signals may often be secondary, and their origin in a lineage based upon their usefulness in protecting internal organs from ultraviolet radiation or as aids to temperature regulation; melanin may be deposited in feathers because it confers resistance to abrasion. Recipient eyes and nervous systems impose a large number of constraints on what can be a visible source of information, and characteristics of animals that limit their visual capacities are discussed, as well as ways in which eyes may have extended sensitivity (e.g. by having populations of cells that differ in their spectral sensitivities or responsiveness to low or high light levels). Visual perception is far too complex to be dealt with in detail, but Hailman provides an account of some key aspects that must affect the evolution of optical signals: temporal and spatial resolution, pattern and depth perception, and the influence of individual experience in the job of seeing.

One chapter is given over entirely to the optical effects involved in deception, in which a signal is interpreted by a receiver as "standing for something that it does not." Much deception functions to conceal an animal, and Hailman examines several ways that behavior and structure can minimize the tell-tale shadows animals cast on substrates, as well as the coloration known as "counter-shading" that reduces the lighting contrast between their ventral and dorsal sides. Other concealment entails effects that break up an animal's apparent outline, making its shape contrast less distinctly with its background through color matching, transparency, or disruptive patterning. Some concealment is based on mimicry: an animal imitates the visible characteristics of something else, such as leaves or a branch, or some other kind of animal—even a dead animal (playing 'possum'). And finally, concealment or other forms of deception can be based on specializations for visual ambiguity: an individual thrush feeding on *Cepea* snails can miss many because they are so polymorphic that the bird's perceptual set (searching image) will encompass only a fraction of the morphs locally available. That any species can likely profit from more than one kind of deceptive device is illustrated by plovers, whose plumage patterns and behavior can reduce shadow conspicuousness, dorsal colors match their backgrounds, and markings be disruptive and perhaps even imitate components of the habitat—up to six different principles of concealment.

In much social communication, however, signals must be conspicuous and thus based on principles that are often the inverse of those for concealment. In chapter 7 Hailman shows how physical characteristics and behavior can increase visibility. For example, shadow effects are augmented by reverse countershading of the plumage of male Bobolinks, eiders, and Black-bellied Plovers; shape is emphasized by uniform plumage coloration that contrasts with its background as in male Cardinals; visual contrast is enhanced by brightness dissimilarities such that black crows and icterids contrast with their well-lighted environments, and signal patches with the rest of a bird's plumage, as in the white wing patches of a black male Lark Bunting. There are additional ways of achieving visible conspicuousness, e.g. by repetition (tail-spots of cuckoos, wing-bars of wood warblers) or by optimizing the size of a stimulus (Hailman showed in his gull research that the

species with thick bills have a red spot only on the lower mandible or near the relatively thin bill tip whereas in species with thin bills the entire bill is red; he postulated that this could correlate with the larger numbers of retinal edge-detectors that would be stimulated simultaneously by a narrow, vertically-held stimulus sweeping horizontally across a chick's visual field).

Conspicuousness is affected by available light, clarity of the medium, detection problems presented by cluttered optical backgrounds, and the need to be conspicuous only to the appropriate recipients (e.g. predators are usually inappropriate, from the standpoint of their prey, and Hailman suggests several classes of adaptations to their presence). Chapter 7 includes enlightening discussions of the effects on vision of dim illumination, sun-angle, altitude, and the absorptive and reflective properties of plants and other environmental objects. This chapter also deals with the problems of being conspicuous against backgrounds that are homogeneous, bivalent, regularly or irregularly structured. For instance, the surface of open water is bivalent, bright when viewed toward the sun and darker from other angles or in dim light; many ducks, murres, and other waterbirds must compromise and Hailman shows that their ideal plumage might be dark with light signal-patches that are iridescent, saturated yellow or orange, desaturated green, or white. Most animals communicate against markedly heterogeneous backgrounds, however, and their visible characteristics are less easily predicted. He suggests that while some research might proceed from optical principles, other might begin with results by comparing species from various lineages and seeking correlations of visible features with habitats. Yet another approach, not stressed in this book, would be to study behavior and determine what aspects of communicating are most dependent on vision in different habitats—animals do have various sensory modalities available for the reception of signals and typically employ as many as they can. For some species visible signaling may be important primarily at close quarters and when there is adequate illumination, and sound, touch, or odor may be primary for other tasks.

An early chapter is devoted to ways of analyzing communication. For instance, "information" is defined as "the reduction of uncertainty" and the basic formulae of mathematical information theory are then derived. These show how quantities of information may be assessed and used in measuring changes in uncertainty during sequences of the behavior of at least an individual animal. But communication is a social matter, and Hailman quite rightly notes that "in most cases of animal communication, one cannot define the array [of items about which information can be provided] and therefore cannot calculate uncertainty." These formulae do not play a large role in later portions of the book. However, considerations of the capacity of specialized signals alone to reduce uncertainty for recipient individuals lead Hailman to recognize the importance in social communication of information from diverse contextual sources, a theme that does recur throughout the book.

This early chapter also introduces Peirce's classification of signs into indexical (pointing out), iconic (looking like), and symbolic (everything else), and toward the end of the book this is used to survey such signal characteristics as body (or head, or ear) orientation and markings that draw attention to it, and mimicry. Since the class of "symbolic" signals is negatively defined and populous it seems to have little application in guiding research. (I must admit that I am not convinced the terms index and icon are very useful either, although providing directional information is important.)

Hailman returns to the notion of iconicity later in a postulate about the evolution of certain signals. Visible signals that resemble "intention movements" are often interpreted by ethologists as having had their evolutionary origins in these abundant acts. (An "intention movement" is *part* of some other activity; e.g. a bird bending its legs and retracting its neck performs two acts that contribute to taking flight; if it then quits without flying it has performed them as intention movements of flight.) Since intention movements occur primarily when there is an enhanced probability that the completed act will follow, they provide information about this probability. Hailman interprets them as looking like that act and hence as being icons. However, they need only look like themselves to predict flying, and the postulate of iconicity does not follow. In fact, Hailman himself argues in a partly comparable way against too free interpretation of intraspecific similarities as mimicry: that a signal can become a useful guide for behavior before its form evolves close resemblance to some other stimulus, and there is no evidence that such stimuli do deceive their receivers.

*Optical signals* contains abundant avian examples with which postulates may be tested. For instance, northern carduelines may have red plumage signals that closely related southern members of the subfamily lack because long wave lengths reflect most strongly in the orangish ambient light (the northern sun is at a low angle, its light affected by Rayleigh scattering) and will appear brighter than other colors. The male Anna's hummingbird's iridescent patches can be conspicuous only to his female receiver and dark to all others because he adopts the appropriate orientation with respect to the sun's rays and to her. Swifts may be dark (some with white markings) because they must nearly always use their optical signaling against the sky as a background. Often diverse postulates may be equally plausible, and many of them will be difficult to test; in many cases the physical or perceptual properties we'd need to know are not fully understood or have been examined only with respect to human vision. While offering his numerous postulates Hailman does

repeatedly stress these difficulties. He concludes that prediction of the characteristics of visible signals from even a detailed knowledge of the factors he describes is unlikely, but sets the goal instead as one of predicting *differences* among animals in signal characteristics.

His book provides a good start toward that goal. It brings together many of the issues, shows the complexity of the problems, and offers numerous strategies and postulates. Its accounts are summarized in many useful tables that reduce the complexity to manageable proportions. Ethologists studying the evolution of visible signals will find it extremely helpful, as will ornithologists who are concerned with plumage and all aspects of visible structure.—W. JOHN SMITH.

**The ethology of predation.**—E. Curio. Berlin, Heidelberg, New York, Springer-Verlag. 250 pp. \$29.60.—This slender volume is an excellent summary of the behavioral aspects of predation. The inductive approach chosen by the author yields a book that will impress many as a compendium rather than a synthesis. Although a reasonable synthesis exists in the book, it will take a determined reader to find it among the endless accounts of examples. The book will probably serve as a source of references for the specialist rather than as an introduction for the average reader. Examples are drawn from Protozoa to Primates, but birds figure importantly in many of the discussions. I personally regard the book as a valuable contribution and hope that it will be read by avian ecologists, particularly those that are excessively enmeshed in theory. If nothing else, the work of ethologists will point out that the assumptions of various models in ecology frequently do not agree with the behavior of organisms.

The major deficiency of the book is the paucity of material on the ontogeny of predator and prey behavior. The author acknowledges this deficit; the publisher refused him yet additional space for a chapter on this topic. The publisher's restraint in providing space is not reflected in the exorbitant price of this book: 14 cents per page of text, or 12 cents per page including the extensive bibliography and indices. I feel that this is such an atrocity that the author and editors, as well as the publisher, should be pilloried. This appears to be a volume intended not for all specialists in predation, but only those of independent means. Even many small libraries will pause in considering purchase.

The presentation, as in most works, is biased. For the most part the biases of the author are remarkably similar to my own. It is therefore curious that I disagree (often violently) with essentially all of Curio's treatments of my own works on predation. In several cases, Curio dismisses one of my hypotheses and then expresses bewilderment over some of the results, while I offer a combination of hypotheses that explain all of the results. Curio does not cite my 1974 paper (Auk 91: 705–721), which contains data and discussion contrary to several of his arguments, but does cite my 1975 paper on prey selection, which agrees with one of his ideas. However, he misrepresents the experimental design and results of my 1975 paper: "American kestrels which had eaten nine laboratory mice of one color in succession attacked the tenth mouse more quickly if it was of a different color than those earlier ones" (*sic*, p. 29). Actually, I offered kestrels a single mouse of the same color for 10 consecutive captures and then a choice between one mouse of this color and one of a different color. Five of six birds showed a significant tendency to take the mouse of the novel color. I could go on for several pages, but I will instead implore the reader to read my papers as well as Curio's analysis.

I noted few other lapses, but wonder how other authors might respond to accounts of their works. Curio finds Kaufman's (1973a) results inexplicable, while I find Kaufman's explanation, which Curio fails to give, more than adequate. Curio states that S. Smith (1973) used rectangular pegs as mouse models; cylindrical wooden dowels were used.

I noted few things that might be considered errors of omission in this remarkable compendium. He fails to mention Cody's works on the possible advantages of foraging in interspecies flocks, Ivlev's experiments showing differential predation on crippled fish, and the possibility of group defense of a carcass against a larger predator is not given in an otherwise exhaustive listing of the advantages of hunting by social groups. He also fails to note that most of the experiments concerning the acceptance of novel prey were performed on laboratory-reared animals with extremely limited experience. The wider experience of normally reared animals appears to result in greater acceptance of novelty and weakens many of the arguments on the functions of novelty.

The book is remarkably free of the stilted prose, poor choices of words, and typographical errors one occasionally finds in work written in English by a German and printed in Germany. I noted only five minor typographical errors and a few poor choices of wording, e.g. "unsharpness" instead of "blurred" (when referring to a photograph of rapid movement), "Aufwuchs" or "periphyton," when "growths" would have sufficed, and an occasional bit of teutonic phraseology such as "partially extensive field work."

In all, this is an excellent book representing a monumental effort by the author. It will be used as a reference for years by those who have access to libraries with lavish budgets.—HELMUT D. MUELLER.

**North American bird songs—A world of music.**—Poul Bondesen. 1977, Klampenborg, Denmark. Scandinavian Science Press Ltd. 254 pp., 225 text figs. Paper. \$15.50.—This book is based largely upon recordings available in album format from the Cornell University Laboratory of Ornithology and Federation of Ontario Naturalists. The author treats in a descriptive text and in sonograms the songs of more than 300 species of North American passerine birds. Instructive supplementary sections include an introduction, analysis of bird song, song behavior, musical and poetic interpretation of bird songs, techniques in the reproduction of bird songs, and "grammophone" records. Other sections present a key to bird songs, vocabulary, bibliography, literature cited, references to recorded bird song material used for the sonograms, and an index. The usefulness of this volume in acquainting ornithologists with ways to describe, analyze, and think about bird song is marred occasionally by the author's foreign English; surely some Englishman or American could have been found to read the text for awkward usage and syntax. The author also attempts to use a nonbiological concept of song, which he defines as having discrete frequencies (hence *musical*) characteristics. This song definition leads to confusion, as a bird with a nonvoiced advertising vocalization (that is, a noise with no specific formant frequencies or harmonics) cannot be referred to as having a song. And birds with an advertising sound that has both music *and* noise must be said to have song elements interrupted by noise elements. Dr. Bondesen does finally give us a useful biological definition of song—the advertising vocalizations of the species—but meanwhile he devotes too much time and space to the music vs. noise, voiced vs. nonvoiced sound business.

Each species is treated by at least one wide-band sonogram, a physical description of the song using terminology set forth in the introductory section, an onomatopoeic and/or nontechnical description of the song, often a characterization of singing behavior, and usually a brief statement about habitat or distribution. Avian biologists concerned with developing further a standardized way of treating bird vocalizations in scientific papers will find the descriptive terminology and the sonograms useful. The price is steep for a paperback.—JOHN WILLIAM HARDY.

## NOTES AND NEWS

**Change in editorship of Ornithological Monographs.**—Beginning immediately, Dr. Mercedes S. Foster replaces Dr. John William Hardy as editor of the A.O.U. Ornithological Monographs. All authors whose manuscripts have been reviewed and returned to them for revision or who are contemplating submittance of a new manuscript should send them to the new editor:

**Dr. Mercedes S. Foster**  
**Department of Biology**  
**University of South Florida**  
**Tampa, Florida 33618**

**Recent decisions of the International Commission on Zoological Nomenclature affecting bird names.**—The generic name of the Emu is *Dromaius* Vieillot, 1816 (not *Dromiceius* Vieillot, 1816), on the basis of the first reviser rule. G. R. Gray 1840, List of Gen. Bds.: 63 (Bull. Zool. Nomencl. 34(1): 12, 1977).

The specific names of the Hottentot Teal and the Maccoa Duck become respectively *hottentota* Eyton, 1838 and *maccoa* Eyton, 1838. *Anas punctata* Burchell, 1822, is suppressed (Bull. Zool. Nomencl. 34(1): 14, 1977).

The family-group name for the auks is ALCIDAE (ex Alcadae) Anon., 1820, Synopsis contents Brit. Mus. 17th ed.: 68, type-genus *Alca* Linn. 1758 (Bull. Zool. Nomencl. 34(1): 25, 1977).

The **Frank M. Chapman Memorial Fund** of the American Museum of Natural History is administered by a committee that meets twice annually to review applications for grants and fellowships. While there is no restriction on who may apply, the Committee particularly welcomes applications from graduate students; management projects and projects by senior investigators are seldom funded. Applications should be submitted not later than 15 February and 15 September. *Application forms may be obtained from the Frank M. Chapman Memorial Fund Committee, The American Museum of Natural History, Central Park West at 79th St., New York, N.Y. 10024.*

Chapman grants during 1977, totalling \$45,608 with a mean of \$570.00, were awarded to: George T. Austin, life history studies of the Phainopepla; William H. Baltosser, comparative ecology and behavior of