

## REVIEWS

EDITED BY WILLIAM E. SOUTHERN

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

**Scaling: why is animal size so important?**—Knut Schmidt-Nielsen. 1984. New York, Cambridge University Press. xi + 241 pp., 47 text figures. ISBN 0-521-31987-0. \$29.95 hardcover, \$9.95 paper.—Comparative biologists try to explain a diversity of structures and functions using simple rules. This book introduces the rules and uses of scaling for a few highly selected structures and functions. Scaling examines consequences for a change in organism size, and it is fundamental to comparative biology. Most are familiar with it from the “mouse-to-elephant” curves relating energy demands to size (the “hummingbird-to-ostrich” curve may be familiar to ornithologists). Many problems and methods for scaling originate in engineering, and Schmidt-Nielsen points out: “Animals as well as engineers live in a physical world, and the same principles apply to both.” This is true, but engineers design machines to solve known, relatively simple problems, while biologists study highly evolved complex machinery and try to understand the problems. The latter is difficult and challenging. It often requires examining conflicting problems for survival and reproduction.

The main shortcoming of this book is its limited scope. Some of the most interesting and exciting examples of adaptations studied with engineering principles are missing. The main strength of the book is the excellent explanation for the few topics covered.

The first three chapters give an introduction to the general subject by considering the range of size of organisms, how isometric and allometric comparisons are made, and some of the uses and abuses of the comparisons. The rest of the book focuses mainly on comparisons for metabolic rates and determinants of energy use. There is a chapter each on bird eggs and skeletons; the next 11 chapters deal with resting metabolic rate, lung ventilation, circulation, blood gas transport, activity metabolism (running, jumping, swimming, and flying), and temperature regulation. The writing is excellent, and the author provides insight for a few intriguing questions dealing with organism size.

Ornithologists may be particularly interested in the discussion of how egg design varies over a 30,000-fold size range so eggs lose a constant fraction of their weight prior to hatching. Data are reviewed dispelling the myth that birds have a lighter skeleton. The power requirements for flight are considered in part of a chapter, although it is the nature of

scaling analysis that much of the fascination of variation is lost in the averaging inherent to this approach. The author asserts that the lower limit to size in birds and mammals is set by the high frequency of heart contractions. This is suggested by a compensatory increase in heart size (greater stroke volume) in hummingbirds and shrews. An unexplored alternative may be the high frequency of energy processing, since reduction in body size (without mechanisms such as torpor) could increase feeding frequency to a point where continuous feeding would not meet demands for energy. To consider this would require using information on physiology to understand ecology, i.e. size-dependent gains as well as expenditures of energy. This type of synthetic analysis is notably lacking. Other points of interest dealing with metabolism include a review of McMahon’s hypothesis of elastic similarity as a basis for intraspecific scaling of energy demands to the 0.75 power of mass, and Taylor and Weibel’s hypothesis for “symmorphosis,” or the design of respiratory mechanisms to match demands at peak performance (about 10 times resting levels for mammals).

Much is missing. Although time in life span is briefly mentioned, there is no consideration of scaling and reproduction. Some of the more remarkable and interesting adaptations of organisms are thus excluded ( $r$  and  $K$  strategies, for example). Since adaptations involve both survival and reproduction, failure to consider reproduction (for which there is a considerable literature) severely limits this book. The scaling of demands of organisms for water is not mentioned. Size-dependent adaptations for water exchange are important to understand survival in some environments and energy uses for osmoregulation. Although the principle of optimal design is mentioned in passing in the last chapter, there are few explicit examples in the text. This principle has proven to be a major tool in the experimental analysis of adaptations, particularly for studies of energy regulation, locomotion, and resource allocation to sexual functions. It deserves more prominence than an afterthought.

It is not clear for whom this has been written. Much of the material (and more) can be found in introductory texts on comparative physiology. Perhaps it is intended as a supplement with slightly more selective detail. If so, it also must be supplemented to fill the extensive gaps. For more diversity with an equally engaging style I recommend Stephen Gould’s es-

says on scaling [compiled in "Ever Since Darwin" (1977) and "The Panda's Thumb" (1980), New York, W. W. Norton]. For an excellent introduction to the principles and uses of optimal design I recommend "Optima for Animals" by R. McNeill Alexander (1982, London, Edward Arnold).—F. REED HAINSWORTH.

**Body weights of 686 species of North American birds.**—John B. Dunning, Jr. 1984. Western Bird Banding Assoc., Monogr. No. 1. 38 pp. Available from the Association, Joan Truan, Assistant Treasurer, 3314 West Glenn Drive, Phoenix, Arizona 85021 USA. \$3.75.—This volume brings together body weight data for the regularly occurring avifauna of the continental United States and Canada. The data are arranged phylogenetically in one long table and include, for each species, scientific and common names, A.O.U. number, sex (when known), number in sample, standard deviation, range, collecting location and season, and source of information (221 references). The 87 species excluded from the publication are those reported only from Greenland, Baja California, and the outer Aleutian Islands; specimens accidental in the U.S. and Canada; extinct species; introduced species that are not widespread; and species for which no body weight data were found. Six species were included either because they recently have become established and regular breeders in the U.S. and/or Canada or because they represent taxa recently raised to the specific level.

The author makes clear the limitations of the data in that body weights can change daily, seasonally, and with age and location. He rightly advises authors to consult the original sources for the detailed information.

Although the title makes reference to North American birds, I counted at least 60 species for which the data came from outside North America! It is difficult for me to understand, for example, why the body weights for the Northern Gannet (*Sula bassanus*) are from specimens in England rather than Canada. Surely Canadian museums and some researchers (such as Bill Montevecchi?) have ample body weight data from Canadian colonies.

As a source book on avian body weights, this volume has considerable value as a starting point. For individual studies, however, the original sources should be consulted.—JOHN P. RYDER.

**Pelagic distributions of marine birds off the northeastern United States.**—Kevin D. Powers. 1983. Woods Hole, Massachusetts, NOAA Technical Memorandum NMFA-F/NEC-27. xvi + 201 pp., 116 line drawings. (Available from National Technical Infor-

mation Service, Port Royal Road, Springfield, Virginia 22161.)—Information about marine bird distribution in the pelagic zones of the eastern United States has been a major void in understanding the biological oceanography of the Atlantic. The need for this became even more painfully evident with the publication of the Canadian seabird atlas (Brown et al. 1975, Canadian Wildl. Serv.), which included all of the Canadian maritimes and eastern arctic waters. Although a few reports from Maryland (Rowlett 1980, USFWS report) and North Carolina (Lee and Booth 1979, Amer. Birds) waters have appeared, this study provides the first comprehensive coverage of marine birds for the northeastern U.S. and goes a long way toward filling the void.

The report begins with a brief description of the oceanography of the region, ranging from the narrow shelf off Cape Hatteras, North Carolina to the more complex banks configurations in the Gulf of Maine and southern terminus of the Bay of Fundy. A map of the major geographic features is provided. It also might have been useful to include maps showing sea surface isotherms at different seasons.

The methods indicate that a variety of vessels were used for surveys on a "ships of opportunity" basis; as a result, comprehensive, controlled sampling regimes such as those carried out in eastern Canada and in Alaska as part of the Outer Continental Shelf Environmental Assessment Program could not be emulated. This limitation, plus the admitted problems of observer variability and differences in species detectabilities, precludes much opportunity for statistical analysis. Nonetheless, much valuable, basic information has been generated that raises a number of important questions concerning how marine birds respond to their environment.

The bulk of the report is comprised of a series of distribution maps for each species. Forty-four species are included, but some are lumped (e.g. small "terns," "cormorants") or included in appendices because of the scarcity of sightings. For the 26 months of the survey, 4 seasons are separated and the greatest mean monthly density (birds·km<sup>-2</sup>·10'·x·10' block<sup>-1</sup>) figures are plotted by block. Different symbols are used to indicate 5 density ranges that vary from 0 to more than 100. For regional comparisons, the northeastern U.S. is subdivided into four subareas: Gulf of Maine, Georges Bank, southern New England (Nantucket Shoals south and west to and including the New York Bight), and the Middle Atlantic Bight.

A brief narrative account is included describing the breeding range, feeding methods and behavior, and major prey of each species. Where there are sufficient data, the species narrative account is followed by a seasonal distribution map. Whenever possible, an attempt is made to relate wintering populations to North American breeding populations to see to what extent North American Atlantic populations depend on U.S. waters in winter.

Several major findings emerge: (1) Not unexpectedly, the more productive northern areas, the Gulf of Maine and Georges Bank, support a greater abundance and biomass of seabirds than the Middle Atlantic Bight throughout the year. The contrast is especially great in summer and fall, apparently due to hydrographic differences. Currents over Georges Bank maintain good vertical mixing, but in the mid-Atlantic the waters are well stratified. (2) In each season, there are strong numerical dominance patterns among species, with relatively few species contributing most to abundance and biomass. Fulmars, shearwaters, storm-petrels, gannets, and gulls comprise the majority of the seabirds. (3) The high abundance of fulmars on Georges Bank and the Gulf of Maine during winter and spring was not expected based on earlier surveys. Powers suggests that they probably were simply not previously sampled. (4) A bimodal (June–July and October–November) peak in Greater Shearwater abundance was found in the same northern subareas. The author suggests that Georges Bank may be a midlatitude staging area before the southward migration of the population, which probably consists mostly of nonbreeders and/or subadults. The species breeds in the South Atlantic, and (5) the author seems surprised that the ratio of Herring Gulls to Great Black-backed Gulls never exceeded 2:1 in pelagic surveys, yet the breeding colony data suggest a ratio of about 7:1. Perhaps the species' differences in dependence on offal and refuse (see Hunt 1972, Ecology) could explain this.

One objection I had was Powers's use of terminology (and its implications) involving the "community structure" of the seabirds of the northeast Atlantic. That assemblages of different species occasionally occur does not argue for any type of "community" or "structure." If anything, seabird researchers are aware of how transitory species groups are at sea and how much variation exists in space and time. Most species are highly opportunistic, and conclusions about niche partitioning and competition are highly questionable. Although it would have been a formidable task for presentation, partitioning observations by year would have revealed the amount of annual variation in spatial use by species.

The overall objective of assembling a large amount of information on the numerous marine birds of the North Atlantic and presenting it in a concise fashion has been admirably achieved. I hope this major effort will be followed by periodic resurveys; however, with the energy corporations showing such little recent interest in bidding on oil leases off the Atlantic coast, it is doubtful that substantial federal support for pelagic surveys will be forthcoming. Despite this economic pessimism, this report should provide an impetus for further investigations under more controlled (i.e. specific cruises) survey conditions. Long-term investigations of how commercial fisheries practices affect seabird populations argue for more support for

long-term pelagic surveys and breeding colony censusing.

This report should be an important library reference for marine bird researchers, oceanographers, and ocean and coastal zone managers. Perhaps it can be republished in the future without the caveat on the cover page that cautions the reader that the TM series has "not received complete formal review, editorial control, or detailed editing." This volume appeared to have been well reviewed and edited.—R. MICHAEL ERWIN.

**Current ornithology, vol. 1.**—Richard F. Johnston (Ed.). 1983. New York, Plenum Press. xvi + 425 pp., 70 text figures, 17 tables, 4 appendices. ISBN 0-306-42339-6. No price given.—Why do we need another review series in ornithology? One might think that with "Avian Biology," "Perspectives in Ornithology," endless symposium volumes, ornithologically relevant papers in various annual reviews, biological reviews, and the Quarterly Review of Biology, etc., the ornithological community long ago would have gagged on publications purporting to review the field. Perhaps they have—Plenum Press should have some inkling by now based on sales—but this volume illustrates well that the patient can benefit from something it/she/he may not even realize it lacks. "Current Ornithology" dispenses a well-conceived and well-executed collection of timely, focused, and thoughtful summaries of where things now stand in discrete research topics within ornithology.

The preface provides the book's rationale: to present views or position statements on active fields of ornithological research. Reviews will be short, and "often done from the viewpoint of a readily-identified group or school." The succeeding chapters live up to this goal by a wide margin. Not that they are without controversy or error, but for the most part they offer enough to stimulate and satisfy any ornithologist and to challenge all with new ideas.

Three broad areas within ornithology find representation in this volume: four chapters in evolutionary ecology, including behavior; two on structure and function; and six in systematics. That's not quite the mix I would have predicted for a balanced overview of research activity in ornithology today—behavior, physiology, and especially community ecology are underrepresented. But who promised balance?

The chapters on evolutionary ecology display the diversity of approach in this field. Robert Ricklefs provides an admirably concise overview of life history theory presented in the currency of bird demography. This chapter should be read by any student embarking on a life history study in birds, as well as by professionals who may have thought they were doing so already. His conclusions offer a mix-

ture; while providing sensible encouragement for combining comparison, experiment, and modeling in analyzing life histories, he expresses pessimism on the likelihood of ever obtaining good estimates of constraint functions—trade-offs—between demographic parameters. While he shows that the slope of constraint functions can be estimated if one makes a series of assumptions, for me the assumptions are so central to what is interesting about life history patterns that the estimates are not satisfying.

David Winkler and Jeffrey Walters wrestle with the evolution of clutch size in precocial birds. It is a remarkably eclectic and scholarly piece (187 references, the prize for this volume) that lays out the logic (and illogic) of current arguments on the issue. No one has the answers yet, but Walters's dichotomy of active vs. inactive parents of precocial young opens an intriguing new direction for experiment.

Norman L. Ford takes the most focused perspective in the book, with a useful summary of evidence on what really happens in monogamous mating systems. By Ford's tally, at least 16% of 264 species of North American "monogamous" passerines indulge in extrapair copulations. A number of these involve males defending classic "type A" territories going off on extraterritorial excursions. Such trends will fuel fieldworkers' anxiety over the "away" category of time-activity budgets.

Ellen D. Ketterson and Val Nolan, Jr., review their continuing studies on factors leading to the evolution of age and sex class variation in migratory patterns. This field has revved up considerably since Ketterson's early work, especially in decibels. It's relatively easy to gather simple descriptive data on the issue—that males of many species remain closer to the breeding ground—and easier still to tell logical stories—that dominants ought to displace subordinates from the preferred winter range, or that some birds benefit by being the first to reach the breeding ground—but testing these notions has proven almost impossible. This chapter should help reduce the noise level.

The systematics papers also span the breadth of their field. One reads the chapters by Cracraft and by Sibley and Ahlquist and hears thunder rumbling in the distance. Whether it's a summer lightning storm or a torrential downpour is not yet clear. Cracraft offers a heated polemic on the inadequacies of the biological species concept. These noises aren't new to systematics, but to have them come from ornithology, from whence the BSC sprang, is ominous.

Sibley and Ahlquist provide one more update in the continuing saga of DNA-DNA hybridization and avian systematics at supraspecific levels. The authors respond to many of the criticisms that have greeted previous expositions. Their growing volume of evidence indicates that the next ten years of avian systematics will see radical reshuffling throughout the

Class. If only half of their assertions prove true—and my bet is that the fraction will be much higher—then this biochemical ground-truth will spawn a new generation of studies on adaptive morphological convergences. Avian systematics will never be the same.

L. D. Martin considers the evolution of birds and flight, not unlike his chapter in "Perspectives in Ornithology." Readers interested in a plausible counterargument should see Caple, Balda, and Willis (1983, *Amer. Natur.* 121: 455). Not to be disrespectful—avian paleontology has made monumental advances in its own bailiwick as well as in other ornithological disciplines—but too much of the debate on origins of flight rests on assertion and a few incomplete samples of a fossil organism, itself of questionable abilities and uncertain relevance to the mainstream of the phylogenetic sequence leading to modern birds. One makes do with what one has, but imagine trying to interpret liver function in birds by poking blindly with a 30-m piece of limp pasta at the partial gut of a single dead chicken. Caple et al. at least have laced the argument with a few basic physical principles.

There are three other systematics chapters: a procedural review by G. F. Shields on bird chromosomes, a discussion of hybrid zones in the Great Plains by J. D. Rising, and a synthesis of electrophoretic work on population structure by K. W. Corbin. G. F. Barrowclough (1984, *J. Field Ornithol.* 55: 509) takes valid issue with one of Corbin's techniques, in particular using linear regressions on a curvilinear relationship (Fig. 3). As a result, conclusions about the "genetic revolution" during speciation seem a bit hasty.

I leave to other reviewers the two physiology/morphology papers, one by C. Carey on egg structure and function, the other by J. R. Hinchliffe and M. Gumpel-Pinot on avian limb morphogenesis. Both are readable and digestible by the nonspecialist. But as an outsider to these topics, and knowing that considerable controversy lurks in waiting for the unwary in other chapters, I cannot help but wonder where they lie within their own fields in a spectrum of controversy (mainstream to radical) defined by the rest of the book. That is the one danger I see in a collection of this format. Let the reader beware.

"Current Ornithology, vol. 1" is an outstanding collection. The objectives stated in the preface are met resoundingly. Graduate students will find it an invaluable entrée into diverse and current research topics. It will stimulate, aggravate, incite, and excite every professional ornithologist. Buy it, and be ready to shell out more for subsequent numbers in the series. If this volume doesn't contain the issue of your dreams, the next one may. Richard F. Johnston, his editorial board, and his authors have added significantly and usefully to the ornithological literature.—J. P. MYERS.

**The status and distribution of New Jersey's birds.**—Charles F. Leck. 1984. New Brunswick, New Jersey, Rutgers University Press. viii + 214 pp., 1 map. ISBN 0-8135-1033-3. \$25.00 (cloth).—This volume is an event of note because it is the first of its type to appear for New Jersey since 1955. Thus, a substantial quantity of new ornithological information required evaluation and use in order to reflect the current status and distribution of New Jersey's birdlife.

The book is well produced, has a solid binding, good type style, and an attractive design. A jacket should have been provided, however, and the price should be half that set by the publisher—especially for a book lacking illustrations (more about that later).

The contents page is adequate, and the acknowledgments page includes names of the leaders and most active participants of particular note in New Jersey ornithology and bird-watching during recent decades. An 11-page introduction briefly discusses the state's geography and habitats and the format of the species accounts, which follow the sixth edition of the A.O.U. check-list (1983), and provides an analysis of the state's avifauna.

Leck recognizes most families accepted by the A.O.U. but assigns his own common names to them. The Emberizidae, however, is divided into various subfamilies, such as Parulinae for wood warblers. Scientific and vernacular species names follow those established by the A.O.U., but some widely used vernacular names also are included (for example, *Phalaropus lobatus* is referred to as the Red-necked or the Northern Phalarope).

The analysis of the state's avifauna indicates a dynamic change in the birdlife. A total of 450 species are included in the main text, but only 414 of those are well confirmed in New Jersey.

The species accounts, the section of primary interest to ornithologists and amateur birdwatchers, form the heart of the book. A vernacular and scientific name is given for each species, followed by a short description of its geographic range and a statement of its status in New Jersey. Periods of peak abundance also are provided, but *not* early arrival and late departure dates. The lack of these extreme dates is a serious weakness in the text. For some species, maxima or high counts are provided—sometimes for several sections of the state. Leck laments the lack of such data for many species, however, and wisely encourages people to gather such information for future use. Where useful or appropriate, bird census data such as Christmas Bird Counts also are provided.

A major flaw in the presentation of species records is the author's failure to cite names of observers and specific published sources within the text. Thus critical readers cannot easily refer to the original documentation for most records. There are some excep-

tions, however, where adequate author or literature references are provided, but these are far between. Equally annoying is the author's failure to cite essential specimens preserved in museum or other collections (there are many for New Jersey) and the lack of photographs for the more interesting or unusual records. Numerous photographs of this type exist. Were they not available to the author and publisher? In view of the price of the book, the publisher had an obligation to include some documentary photographs—at least in black and white.

Finally, I would prefer that hypothetical records either be presented in smaller type within the main text or be placed in an appendix. Instead, records (indicated as hypothetical) such as *Gavia adamsii*, *Diomedea chlororhynchos*, *Pterodroma hasitata*, *Hydrobates pelagicus*, *Oceanodroma castro*, *Accipiter nisus* are scattered throughout the main text—often based on very weak evidence even for placement on a hypothetical list. In a book of this type the author should have applied much more rigorous standards, even for the selection of species for the hypothetical list. Again and again, Leck speculates that a species may occur in New Jersey or someday will occur in the state because it was reported in an adjacent state.

Records of unestablished exotics, escapes, and unsuccessful introductions follow the main species accounts. Among the astonishing species included in this section are the Macaroni Penguin (*Eudyptes chrysolophus*) and Andean Gull (*Larus serranus*)! Who knows how they arrived in New Jersey?

A very useful gazetteer is provided, but the book's bibliography is really a literature-cited section emphasizing recent literature, as opposed to a list of all publications dealing with the state's birdlife. Numerous important articles and notes in regional periodicals, the most recent editions of some books, and many other books (including one published in 1975 by Rutgers University Press) are ignored. The index to vernacular and scientific names is adequate and useful.

Despite some serious weaknesses in this book, it represents the most current summary of New Jersey's avian status and distribution and as such is a welcome addition to the state's ornithological literature. I recommend the book to all persons seriously interested in New Jersey birds and further suggest it be added to private, public, academic, and museum libraries throughout the state and elsewhere.—DONALD S. HEINTZELMAN.

**Where to find birds in British Columbia.**—David M. Mark. 1984. New Westminster, British Columbia, Kestrel Press. 122 pp. ISBN 0-9690850-1-X. Paper \$6.95.—This revision of the 1978 edition has been

expanded to nearly twice the original number of birding sites. After a short introduction, the book is devoted mostly to describing good birding areas and explaining how to get there. The main chapters describe 8 geographical regions, and each begins with a short paragraph on the region's outstanding features. This is followed by a map that displays the birding sites discussed for the region. The maps lack detail, and the author points out that a good road map is necessary to drive to particular areas.

Site descriptions follow the regional maps. The species that are most likely to be seen are listed, and especially noteworthy birds are printed in bold-faced type. The author does a good job of addressing seasonal changes in species abundances and often suggests the best time of year for seeing particular groups of birds. Directions to each area are clearly written and seem easy to follow. A map code is listed above each entry, but the author does not explain how to decipher it; the code may refer to the location of the area on a provincial road map.

The last chapter of the book includes an annotated checklist of birds found in British Columbia and supplemental information on "sought after" species. I found this category to be based on highly subjective criteria (the opinions of the author and another individual), and many of its members rarely would be expected to be seen. The information on the status and habits of these birds, however, is well written and useful. Unfortunately, locations are given only for the more common species.

Generally, this book does a good job of directing the reader to birding areas and discussing what may be seen there. Locations can be found quickly by biotic area, geographical region, or common name. Visitors to the areas and resident birdwatchers should find this compact guide very useful.—NEIL SABINE.

**Population ecology of the Dipper (*Cinclus mexicanus*) in the Front Range of Colorado.**—Frank E. Price and Carl E. Bock. 1983. *Studies in Avian Biology* No. 7, Cooper Ornithological Society. iv + 84 pp., cover photograph, 20 text figures, 19 tables. \$9.00.—At the outset, it must be said that the authors did not intend this study to be a definitive life history of the Dipper. Diet, diseases, predators, and eco-physiology are not assessed directly; they are treated inferentially, and then only insofar as they bear on the population dynamics of the Dipper in the Colorado Front Range. Given that limitation, Price and Bock present a thorough analysis of the complex array of factors that regulate density, dispersion, reproductive success, and survival in a small but significant segment of the Dipper's range.

The monograph is divided into eight sections: introduction, study areas, methods, an overview of the

annual cycle of the Dipper in the Front Range, population movements, density and dispersion patterns, survival and productivity, and discussion and conclusions. In the introduction the authors list five specific "objectives" that contribute to answering the question: "What factors influence the dynamics of Dipper populations?" These objectives are essentially the major parameters one would want to measure to understand the dynamics of any population, namely spatial patterns, food resources, social interactions, reproductive success, and abiotic factors.

The rest of the introduction focuses on the general biology of the Dipper, including a review of the literature relevant to Dipper population biology. From this discussion it is evident that the Dipper is better suited than most birds for population studies because (1) their nests are relatively easy to locate, (2) their habitat (streams) is essentially linear, (3) they are easily trapped because mist nets can be set up across streams, perpendicular to their routes of travel, and (4) their primary food source (benthic invertebrates) is relatively easy to quantify. The introduction also includes a brief discussion of the traits of an "ideal" study population and an exhortation to ecologists to "choose organisms and/or study areas that, like ours, make holistic studies feasible," both of which struck me as an unnecessary attempt to imbue the study with greater general significance.

Most of the authors' data were gathered on two streams, Boulder and South Boulder creeks. A total of 72 stream segments 400 m in length were studied intensively, and other portions of these streams ranging from the foot of the mountains (at 1,600-m elevation) to as high as 3,050 m were visited periodically. Once the great mobility of local populations was realized, the authors also made visits to other streams draining the Front Range. Data on Dipper population dynamics were generated by complete monthly censuses, color banding of both adults and nestlings, territory mapping, and nest monitoring. Ages could not be determined after the postjuvenile molt; hence, breeding individuals banded previously as fledglings were used to calculate mean ages for each sex, a process that underestimated mean ages and yielded samples too small for statistical analysis. Minor difficulties also were encountered in measuring breeding densities due to occasional polygyny and the presence of nonterritorial floaters early in the nesting season. Data were collected on 472 days in 1971-1973, spanning three breeding seasons and two winters.

An exemplary feature of this study is the authors' attempt to quantify habitat variables. A total of 41 variables were used in their extensive correlation analyses, of which 21 were related to aspects of stream quality or climate regime. Included among these variables were measures of nest-site quality and dispersion, mean depth and width of stream, substrate quality, stream flow, precipitation regime, ice cover,

presence of brush piles or other hiding places, and Surber sampler estimates of food supply. Aerial and terrestrial invertebrates were not sampled; other studies indicate that these may comprise 20% of the diet. Benthic invertebrates were sampled only in shallow, rubble-filled areas. Although the introduction states that Dippers may "forage in water too swift and deep for humans to stand upright," the Dipper's apparent preference for shallow areas and the authors' use of other habitat-quality indices based on stream physiognomy suggest that this is a minor source of error in estimating food supply.

Major findings are that (1) winter ice cover plays a major role in the survivorship of individuals; (2) nest-site quality and dispersion are critical for successful reproduction, particularly the juxtaposition of good nest sites and adequate food supplies; (3) summer (postbreeding) populations disperse widely, the vast majority of individuals moving well upstream to higher elevations and some even crossing watershed boundaries; (4) brush piles and other refuges are important during postnuptial molt, when adults are flightless for 5-14 days; (5) floods in early spring cause the loss of nests placed too near the water, and siltation associated with the heaviest floods may reduce the food supply, causing desertion of territories and nests; and (6) predation seemed to be involved in several nest failures but does not appear to play a significant role in regulating the adult population. There also was marked carryover of effects from one season to another. For example, good winter survivorship caused high initial breeding densities, which in turn brought about reduced reproduction per adult because of lower average quality of nest sites and territories.

In my opinion the monograph could have been shortened by perhaps 10% without a significant loss of information. One source of redundancy is the organization of the results into categories of population attributes rather than by seasons. The authors repeat specific findings in different sections to remind the reader of what had gone before. The result, at least for me, was alternation between a mildly annoying repetition of facts and a diffuseness that made it difficult to keep track of the important patterns. The last two pages of text are largely redundant or irrelevant; why review studies of Red Grouse and voles just to tell us (again) that populations are often regulated by complex interactions among many variables?

Other critical comments are few and relatively minor. A one-paragraph summary of the similarities and differences between Front Range Dippers and Dipper populations elsewhere would be helpful; as it is, this material is difficult to dig out. Also, actual Surber samples of high-elevation benthic invertebrates might have substantiated their impression that food was most abundant for Dippers summering at high elevations. The range of *Cinclus mexicanus* is said to ex-

tend to southern Mexico, when in fact it extends to the mountains of western Panama. Otherwise, the text is free of obvious factual errors.

On the positive side, the Dipper is an unusual bird well worthy of a study of this magnitude, and Price and Bock have done a thorough job. Their monograph will find a place in museum libraries, and on the bookshelf of anyone interested in Dippers. It also will be a useful reference for anyone planning a life-history study of any small bird. Despite the correlative (rather than causative) nature of the relationships demonstrated, the authors convinced this reader that they have indeed uncovered the primary factors regulating Dipper populations in the Colorado Front Range. They paint a picture of an intriguing, semi-aquatic passerine that is well adapted to survive in a patchy, two-dimensional, asynchronously varying environment.—ELLIOT J. TRAMER.

**Mechanisms of morphological evolution. A combined genetic, developmental and ecological approach.**—Wallace Arthur. 1984. New York, John Wiley & Sons. xv + 275 pp., 70 black-and-white figures. ISBN 0-471-90347-7. \$36.00.—This book presents a new theory of evolution based on the idea that the neo-Darwinian model is inadequate to explain the origin of complex morphologies. Arthur accepts the principle that most evolutionary change results from the action of natural selection on phenotypic variation with an underlying genetic basis. However, he rejects the idea that large morphological changes can be attributed to selection acting on slight allelic variants at one or a few loci. He argues instead that while such processes may explain much of the variation that occurs at low taxonomic levels, it will not serve as a mechanism for the origin of major morphological reorganizations of the sort that characterize higher taxa, such as animal phyla. For such changes he requires a different evolutionary mechanism, and finds it in genetic changes that have large effects on the course of embryonic development. His approach is multidisciplinary, synthetic, and speculative, but unfortunately it is not entirely successful.

The first half of the book serves as a background for Arthur's ideas by summarizing current evolutionary theory. Topics include character measurement, the genetic basis of variation, artificial selection experiments, microevolution, speciation, and divergence after speciation. It is a well-written review that covers a lot of familiar ground: D'Arcy Thompson's cartesian grids, selection experiments in mice and *Drosophila*, shell shape in molluscs, beak size in *Geospiza*, ecotypes in *Potentilla*, and the obligatory critique of punctuated equilibrium. These discussions are brief and lucid and may serve as a good source of material for undergraduate lectures.

In the second half of the book Arthur develops his original ideas, and while these are stimulating they are not without problems. Arthur recognizes that any theory of this sort must explain evolutionary change on the basis of developmental processes, which he considers must lie mainly above the level of cellular differentiation in the realm of morphogenesis. Here he encounters a major stumbling block, which he clearly recognizes, namely that we currently lack a general theory of development upon which such an evolutionary theory may be based. As a contribution toward such a developmental theory he offers the idea of the "morphogenetic tree," a system of serially acting morphogens that lead to increased heterogeneity within the developing organism. It corresponds in shape to the branching tree of cellular differentiation in, for example, a diagram of germ layer differentiation, or one of stem cell differentiation in hematopoiesis. Presumably, Arthur is inserting into such trees a series of causative agents, the morphogens, although he does not mention these earlier representations.

Arthur introduces some useful terminology to clarify the ambiguous concept of regulatory genes. D-genes are those that regulate development, either by producing enzymes that make morphogens or by regulating genes that do so. S-genes are structural genes whose end products are not morphogens. R-genes are those that regulate S-genes. This nomenclature may be useful outside the context of the present book.

The next step is to synthesize these developmental genetic ideas with selection in natural populations, and I will comment on two problems at this level. The first is a lack of good examples. Arthur's major analyses focus on shell-coiling in gastropods and homoeotic mutations in insects. The first, as he admits, hardly constitutes a morphological revolution. The second, while more reasonably considered as macroevolutionary in scale, is poorly understood and has been more thoroughly discussed by other recent workers. The difficulty here is not so much the author's; it is simply that few morphogenetic mechanisms have been analyzed as yet from this point of view. Papers doing this are beginning to appear with some frequency now, and Arthur would have better examples if he were still writing the book.

A related problem is best exemplified by a direct quotation: "... it is by no means clear that the ... process of natural selection on polygenic variation that is responsible at least for intraspecific and intragenetic evolutionary divergence is the sole or even the predominant process giving rise to higher taxa such as orders, classes, or phyla" (p. 172). At the risk of appearing pedantic I must insist that taxa do not arise in the course of evolution, but of classification. Taxa are human constructs, even when correlated consistently with natural phenomena like clades.

What arises in evolution is phenotypic change. There is a rough correlation between distinctiveness and rank, but this does not mean that large phenotypic gaps necessarily arise saltationally, and as noted above, most of the examples discussed represent quite modest degrees of divergence.

In recent years it has been recognized that the weak link in our understanding of the evolutionary process is the connection between the level of the population geneticist and that of the morphologist, and that ontogeny is the key to that connection. Arthur recognizes that "A truly synthetic theory of morphological evolution must await a complete exposition of the genetic basis of development" (p. 250). That is the reason that this book, while stimulating, does not in the end provide us with such a theory.—ROBERT J. RAIKOW.

**Nest building and bird behavior.**—Nicholas E. Collias and Elsie C. Collias. 1984. Princeton, New Jersey, Princeton University Press. x + 336 pp., 87 illustrations. ISBN 0-691-08358-4 and ISBN 0-691-08359-2.—For Nick and Elsie Collias the study of nests and nest building has been almost a lifetime occupation, and there can be few who know more about the subject. Their interest focuses especially around the behavior of the Village Weaver and other related species, which they have studied both in the field and in captivity. Although their own studies provide material for some of the most important and interesting sections of this book, its scope is far wider. It provides a perspective on nests and nest building in the class as a whole and contains a wealth of material whose synthesis must represent a painstaking study of the ornithological literature.

The diversity of birds' nests is displayed in an opening chapter built around some speculations concerning the probable evolutionary course of nest-building behavior. From then on the main thrust of the book concerns the probable adaptive significance of variations in nest-building behavior between and within species. Evidence for the selective forces acting on nest-building behavior comes principally from comparisons between closely related species in relation to their ways of life, from convergent evolution in different species, and from variations in nest building and breeding success in particular species in relation to the environment. In each case, however, the features of the nest form part of a coadapted complex of characters related to the total biology of the species. In separate chapters nest-site selection and nest building are considered in relation to mate selection, the physical environment, nest competitors, parasites and predators, and gregarious breeding.



Several fascinating chapters on the techniques with which birds build their nests, and how these techniques develop in the individual, are based very largely on the authors' own work on the Village Weaver. The precise nature of the skills used in building complex nests has long been a matter of controversy. W. H. Thorpe (1956, *Learning and Instinct in Animals*, London, Methuen & Co., Ltd.), impressed by Tinbergen's description of the nest building of the Long-tailed Tit (*Aegithalos caudatus*), postulated that the several stages of building cannot be understood in terms of stimulus-response chains and must be controlled by at least short-term goals such that actions that brought the current structure nearer to the "ideal" were reinforced and more likely to be repeated. Although the authors do not discuss this view, their analysis at first seems to show that such a hypothesis is unnecessary. Their experimental data on adult birds are explicable on the view that the particular stimuli presented by the nest at each site elicit certain nest-building actions, and that "each stage automatically provides the stimulus for its own termination and for the start of the next stage in construction." However, that seems not to be the whole story, for the authors also studied the development of nest building in individual birds deprived of the opportunity to build to varying degrees. Although it is not clear in every case that their results were not due to lowered motivation, the experiments show that the nest-building ability of this species depends on practice "appropriately directed by the growing structure of the nest itself" and on "improvement in ability to select and prepare nest materials." They even suggest that "a mental image of a properly built nest based on experience" may be necessary, although here the evidence is tenuous. Since there is also evidence, not cited by Collias and Collias, that reinforcement contingent upon the performance of nest-building movements may play a role in canaries (1972, *Anim. Behav.* 20: 514), the behavioral processes involved in nest building cannot yet be regarded as fully understood. What is surprising, perhaps, is that other ornithologists have not tackled the exciting lead provided by the Colliases, for the problem has fundamental implications for the nature of species-characteristic behavior.

A similar comment could be made about work on the internal control of nest building. The authors could cite detailed studies of only three species, all of which were domesticated. The data available indicate considerable interspecies differences, and a rich field awaits exploration.

Two general points should perhaps be made. First, the many illustrations are generally rather poorly reproduced—a responsibility perhaps of the publishers rather than the authors. Second, one cannot believe that the innumerable studies cited were of a uniformly high quality: the authors have been conscientious

and kind rather than critical. The book remains an invaluable and fascinating synthesis of a scattered literature.—ROBERT A. HINDE.

**Biology of the Peregrine and Gyrfalcon in Greenland.**—William A. Burnham and William E. Mattox. 1984. *Meddelelser om Grønland, Bioscience* 14. 25 pp., 12 tables, 12 figures. ISBN 87-17-05221-1. Available from Nyt Nordisk Forlag-Arnold Busck A/S, Købmagergade 49, DK-1150 Copenhagen K, Denmark.—Since the discovery of DDT-induced eggshell thinning and its impacts on the reproductive success of Peregrines, extensive research has been conducted to determine its worldwide status and distribution. Extensive research was not conducted in Greenland, however, until 1972 when Burnham and Mattox began their 10-yr study of Peregrines and Gyrfalcons. The study area encompassed 6,050 km<sup>2</sup> of mountainous terrain in an ice-free region of western Greenland. Both inland and coastal areas were surveyed, largely on foot but also by boat and airplane, to determine the status of historic and currently occupied nesting sites. Environmental and logistical constraints clearly were major and prevented the researchers from visiting all Peregrine and Gyrfalcon eyries each year.

A total of 34 Peregrine nests were located and monitored during various years of the study. On average, 60% of the inland sites checked each year were occupied; of these 84% produced young at the rate of 2.8 per successful pair. Occupancy rates were much lower at the few coastal sites located; in 1974, only 1 of 5 sites was occupied and produced young. Gyrfalcon eyries were located at 22 inland and 14 coastal sites during the study. The authors stated that they were unable to arrive sufficiently early at Gyrfalcon nests to determine the number of pairs that bred; however, they assumed that a similar proportion of these pairs bred each year as was the case for Peregrines.

Analysis of prey remains at Peregrine nests in 1973 revealed that most of the diet was comprised of small passerines (90%), particularly Lapland Longspurs and Snow Buntings. Unfortunately, the methodology used to derive this estimate is not described. Moreover, in Table 7, where these data are presented, the number of samples, the number of prey individuals identified, and whether the table reflects frequency or biomass are not indicated. Gyrfalcons were reported to feed on a variety of prey, particularly arctic hare and Rock Ptarmigan, although small passerines also appeared to comprise a significant portion of the diet.

Evidence is presented that the eggshell thickness of Greenland Peregrines decreased 16% compared with pre-1940 eggs. Although no population declines have been documented, the authors agree with the

conclusions of Walker et al. (1973, *Arctic* 26: 255) that Peregrines are near a critical threshold in levels of contamination and that a small increase in DDE levels could precipitate reproductive failure and population declines. Analysis of Greenland prey species showed low levels of chemical contamination, leading the authors to suggest that contact with these pesticides occurs away from the nesting grounds.

No doubt locating and monitoring nesting Peregrines and Gyrfalcons in Greenland is extremely difficult, and the authors and their many cooperators should be commended for their efforts. Clearly, this study has been successful in providing baseline nesting data on two falcon species nesting in a remote part of the world. Those interested in Peregrines and Gyrfalcons will find the publication a valuable reference detailing aspects of their nesting ecology in the Arctic and will want a copy for their libraries.—MICHAEL W. COLLOPY.

**Seabirds of eastern North Pacific and arctic waters.**—D. Haley (Ed.). 1984. Seattle, Washington, Pacific Search Press. 214 pp. ISBN 0-91478-X. \$39.95.—This is a typical example of the "coffee-table bird book" genre, in oversized format, with excessive margins, with lavish illustrations, with text that varies from fascinating to frustrating, and without a complete bibliography. It begins with a foreword (by R. M. Lockley), a preface, and an introduction. In the latter, Haley gives a brief description of the surface oceanography of the region, a very brief review of the orders and families of birds to be considered, and in keeping with Pacific Search Press's anthropological interests, a discussion of the importance of seabirds in aboriginal cultures in Alaska, the Pacific Northwest, and Hawaii. The body of the book includes 14 chapters on different families or subfamilies of seabirds by 12 authors and a chapter on conservation by Warren King.

The color photographs in this book are superb. Except for the gulls, terns, petrels, and alcid, most species in each group are illustrated beautifully. In those groups, only representative species are displayed, but again with superb photographs. The text also includes a scattering of charming line drawings, regrettably unsigned.

The text is very readable and mostly well written, although the authors' styles differ greatly. Most chapters are informative, but the book could have profited from a stronger editorial hand. Differences among the chapters in approach and coverage suggest that the authors were not given (or did not countenance) much direction. Mayfield, in the phalarope chapter, discusses the hormonal basis of plumage color, the only really physiological subject in the book. Ainley introduces the cormorant chapter by discussing the etymology of the birds' names, and Anderson

reviews some mythology to introduce pelicans. Some chapters are introduced with personal anecdotes, others with descriptions of the birds' ecological roles. Some authors review population census data for their species, while others do not mention population sizes. Feeding and breeding habits are reviewed for the resident species in each group, but even here, coverage is haphazard. The chapters most dominated by personal anecdotes are among the most readable but tend to contain less biological information.

The absence of a strong editorial presence is most evident in the treatment of seabird conservation. In the introduction Haley reviews the major negative effects of civilization on seabirds, and about two-thirds of the chapters include comments on anthropogenic sources of mortality. King's conservation chapter might have provided a nice synthesis of these disparate comments, but it does not, and reads as if he did not have access to the rest of the text.

The text contains more than its share of simple misstatements, irritating oversimplifications, dubious pet theories, and uncritically accepted canards. I fail to understand why scientists writing for general audiences allow such lapses. They rarely improve readability and usually draw the ire of their scientific colleagues.

In the storm-petrel chapter, Ainley indulges in a pet hypothesis that rump color interacts in some way with climate and is related to migratory behavior, feeding ecology, and timing of molt and nesting. White-rumped species (and populations, within *Oceanodroma leucorhoa*) are supposed to be more migratory, range farther from the colony for food, nest in cooler climates or in winter in warm climates, and molt on different schedules. Even within the eastern North Pacific the data do not fit this claimed pattern very well. Black and Least storm-petrels are at least as migratory as Galapagos Storm-Petrels, and in several respects, the Fork-tailed Storm-Petrel does not fit. Elsewhere the pattern breaks down completely, with dark-rumped *Oceanodroma monorhis* and *O. matusdairae* making extensive interocean migrations and white-rumped *Oceanites gracilis* apparently being quite sedentary.

Howell's tropicbird chapter is quite authoritative and very readable, and in fact is one of the best chapters in the book. He concludes it, however, with speculation that the reduction of the hindlimbs in tropicbirds is an evolutionary adaptation to facilitate hovering, and supports this idea with a comparison of body proportions between tropicbirds and the nonhovering Royal Tern. Other smaller terns that do hover as adroitly as tropicbirds, however, have body proportions similar to those of Royal Terns. I do not wish to give the impression that I oppose hypothesizing, but before publication, speculations ought to be examined, at least for logical consistency and general agreement with the data.

Rice's chapter on boobies is interesting, but in several places unfamiliarity with the seabird literature

shows through. He states that "a fossil gannet of the late Pleistocene was found along the coast of California." Actually, several species of gannets are known from the Miocene, Pliocene, and Pleistocene of California. He designates the Gulf of California the "center of abundance" for the Blue-footed Booby, but Peru and the Galapagos Islands each may have larger populations. He also describes as "unique among seabirds" the shorter-than-annual breeding cycle of some boobies. This is a phenomenon shared by Galapagos Cormorants, Sooty Terns, White Terns, and probably several other tropical terns.

Mayfield seems unaware that Red Phalaropes may winter in numbers in the temperate North Pacific. Maher suggests that only Pomarine Jaegers have breast bands, and Drury implies that Franklin's Gulls nest in southern California. Drury also distinguishes between large gulls, 20-24 inches long, and middle-sized gulls, 20-24 inches long. Harrison repeats the reports of Common Terns laying six-egg clutches, but most evidence attributes these "clutches" to the efforts of two or more females. Manuwal states that Tufted Puffin "has the most extensive latitudinal distribution of any alcid," a distinction that actually belongs to the Common Murre.

The book provides an attractive and informative introduction to North Pacific seabirds, and as such seems most suited to general audiences. Despite its shortcomings, my copy will remain prominently displayed in my home.—WAYNE HOFFMAN.

**Vulture biology and management.**—S. R. Wilbur and J. A. Jackson (Eds.). 1983. Berkeley, University of California Press. xxii + 550 pp., many tables, diagrams, black-and-white photographs. ISBN 0-520-04755-9. No price given.—This book is a collection of 32 chapters on vulture biology, contributed by 38 authors from around the world, plus a foreword by Dean Amadon. About half the chapters derive from a symposium on vultures, held in 1979 at Santa Barbara, California. The remaining ones were solicited by the editors to deal with topics that were not covered adequately at the meeting. The result is the most complete and up-to-date account yet available on these birds.

After years of neglect by ornithologists, vultures recently have become subject to a great deal of research, stimulated largely by the declining and endangered status that many now have. Most work has been done by individuals or small teams of researchers in widely separated parts of the world, with limited opportunity for contact. The symposium clearly provided a useful, timely forum for the exchange of views, and the book provides a sound source of reference for ideas on future work.

The book is arranged in 8 parts, dealing respectively with palaeontology and systematics (51 pages);

status of the different species, arranged by region (75 pages); general biology (207 pages); study techniques and management (78 pages); contaminants (31 pages); relationships with humans (33 pages); and a very useful bibliography (28 pages). As expected in a multi-author volume, the standards of the chapters vary, but this is partly a consequence of the poor state of knowledge on some species.

The world's vultures are currently split into 22 species, of which 15 are Old World and 7 New World. For those who are unfamiliar with these birds, the book is full of fascinating information. Living on carrion, including rotten meat, vultures seem to have a remarkable ability to resist diseases, such as anthrax, and toxins, such as botulism. Some forage at enormous distances from the nest and carry food in the crop for regurgitation to the young. If the young are threatened, they spew up foul-smelling stomach contents, or collapse and feign death. Moreover, vultures are long-lived, and provide some of the most extreme examples among birds of K-selected species, with long-delayed maturity and low reproductive rates. These various features apparently have arisen twice, in Old and New World stocks, which supposedly evolved on independent lines.

Population declines usually are attributed, at least partly, to destruction of habitat and food supplies. Some species have been affected by the decline in large ungulate populations, and others by the decline in mortality of domestic stock, resulting from improved veterinary attention. Electrocutation on electricity pylons is a particular problem in southern Africa, resulting in the deaths of hundreds of Cape Vultures. Persecution is also important in some regions, often on grounds of transmitting disease to livestock, a possibility for which there is no good evidence. The Turkey and Black vultures of North America have been affected by organochlorine pesticides and show a degree of shell-thinning, but the actual impact on their populations is unknown.

Another problem concerns a supposed calcium shortage in the south African Cape Vulture, as described by Peter Mundy. The adults normally give small pieces of bone to their chicks, along with the food, to provide the calcium needs. They pick up splinters of bone that have been smashed by hyenas and other large carnivores. But in ranching areas where such carnivores have been eliminated, vulture chicks often are found with skeletal deformities, unable to fly. In the absence of bone splinters, the adults in these areas bring bits of glass and other artifacts to the nest.

Because they range over large areas, vultures present problems of conservation and management on a scale almost unknown in other animals. Huge areas offering favorable land use and human attitudes are needed to conserve populations effectively. The section of the book dealing with management inevitably is concerned mainly with short-term emergency measures, such as captive breeding and release or the

provision of artificial feeding stations ("vulture restaurants") that also have a role in research and tourism.

For those wishing to learn more about these fine birds, and their conservation problems, this book is well worth reading. Considering the location of the symposium, however, it is a pity that more information is not given on the California Condor. In general, the book is nicely produced. The main disappointment is in the reproduction of photographs, which is poor, even on the cover.—I. NEWTON.

**Meadowlark music and other nature sounds.**—

Catherine M. Thexton. 1983. One 12-inch 33½ rpm phonodisc; also available in cassette. Order from the author, Box 8, Balmoral, Manitoba R0C 0H0, Canada. Record, \$11.45 Can.; cassette, \$10.95 Can.—This is a new selection of Ms. Thexton's nature recordings from the southern Interlake region of Manitoba. It follows a format similar to that of an earlier production, "In Praise of Spring" (1981). The new recording begins with the sounds of early spring and a flock of American Goldfinches, and ends with a lone cricket chirping on an August evening. All recordings were made on 10 acres of Manitoba farmland that includes a tree-ringed slough, an oak forest remnant, and a spruce windbreak and that borders on hay and grain fields. The recordings are of 30 species of birds as well as a variety of frogs, one squirrel, and some insects. Coverage of each species generally is limited to less than 1 min, with the exception of a Western Meadowlark, which may have its full repertoire of primary song represented. There are no data on the circumstances of each recording, nor any information as to the equipment used. The recordings are of uniformly high quality, however. There are no verbal introductions, and one cut blends imperceptibly (and skillfully) into the other. The listener should have no difficulty in identifying the songsters, using the sequence of common names given by program and band number on the dust jacket. Scientific names appear on the dust jacket but not in the information accompanying the cassette. Considering that the purpose of these recordings is not to aid in identification nor to make a scientific contribution, but rather to entertain and to recreate the mood of the environment of a Manitoba farmyard, Ms. Thexton has achieved her goal. In fact, the recordings make for pleasurable listening!—WESLEY E. LANYON.

**Modern falconry: your illustrated guide to the art and sport of hunting with North American hawks.**—

Jack Samson. 1984. Harrisburg, Pennsylvania, Stackpole Books. 160 pp., 62 illustrations, 44 photos, 18

line drawings by Victoria Blanchard. ISBN 0-8117-2158-2. Paper, \$12.95.—Jack Samson, former editor and current editor-at-large of *Field and Stream*, has had years of experience as head of the raptor division of the American Museum of Natural History's Trailside Museum at Bear Mountain State Park, New York. The reason "Modern Falconry" was written dates back to an incident occurring in 1975 when he published two articles on falconry in *Field and Stream* ("Hunting with goshawks," by Chuck Keene, and "Hunting with falcons," by Ray Linder). Both articles stimulated a tremendous amount of reader mail, primarily from American youngsters, asking for more information on falconry, and it was decided to write this primer for beginning falconers.

The book makes no pretense at being a definitive work like "North American Falconry and Hunting Hawks" by Frank Beebe and Harold Webster, but its aim is to give the beginner, or interested reader, an idea of what the sport is all about. It was felt by the author that there was a "very real need for a timely, comprehensive, and inexpensive manual on North American falconry." The 21 chapters include such topics as "A brief history of falconry," "The language of falconry," "The hunting hawks of North America," "Raising and training the short-winged hawks," "Releasing a hawk to the wild," and "New federal falconry regulations." The book is well organized and easy to read—reflecting the author's experience as a foreign correspondent, a writer for the Associated Press, and editor of *Field and Stream*. Some people consider falconry a "cruel" sport, but it should be remembered that "a hawk or falcon kills by instinct and does so in nature to survive. If that is cruel all nature is cruel, nature is the way it is and no amount of emotionalism can change that."

The first part of the book discusses the methods used to train a falcon. Since the kestrel is the most readily available falcon, the discussion is centered on this species. Other species of larger falcons are trained in a similar way. Farther along the raising and training of short-winged hawks (accipiters) is discussed. The goshawk is the focus of this section. Jack Samson has had much experience in training and hunting with birds of prey and answers most of the questions that the reader might want answered. There are many regulations governing the sport, and a great deal of knowledge, free time, and dedication are necessary. The federal and state governments require prospective falconers to take an in-depth test on the subject. If the test is passed (80%), then a falconry permit is issued. Since falconry is a hunting sport, not pet keeping, a falconer also must have a small-game hunting license to engage in the sport. Game laws also must be followed. Falconry is the most ecologically sound method of hunting, where the hawk is the hunter and the falconer merely a spectator. "Falconry—Hunting with Hawks—is one of the few surviving hunting sports that dates to the earliest days of recorded human history. It was practiced in Asia—

specifically in China—as long ago as 2,000 years before Christ.” “The English took to falconry like Labrador retrievers to water, and no sport—not even fox hunting from horses—has ever gained the popularity that falconry did in the British Isles, especially during the seventeenth century.” Falconry has come of age in America, and the author hopes this modest manual will help the beginner discover the joys of a sport that began 4,000 years ago. “There is every reason to believe that falconry, if practiced properly and with supervision, can be one of the finest sports available to the veteran and youngster alike who love the outdoors and especially the great birds of prey.”

Most of the important research on raptors has been done by falconers. The Peregrine Falcon might have gone the way of the Passenger Pigeon were it not for the efforts of falconer-ornithologists like Dr. Tom Cade, Dr. Heinz Meng, Frank Beebe, and Harold Webster. These men pioneered in the captive breeding of Peregrine Falcons, and many Peregrines have been released back to the wild, supplementing and increasing the remnant wild populations. Many other species now are being bred in captivity—for use in falconry.

I noted a few places that could use clarification or additional information. The eggs of the Sharpshinned Hawk usually are heavily marked, not plain colored like those of the other two accipiters. It could be pointed out more strongly that the federal regulations permit only birds less than 1 year old to be taken (except kestrels and horned owls). In the discussion of the Gyrfalcon one gets the impression that there are four species instead of merely color phases. Also, Gyrfalcons have been photographed breeding in stick nests on cliffs, but these are nests that Rough-legged Hawks, Red-tails, or ravens had built. Falcons and owls do not build nests but use available ledges, cavities, or stick platforms built by other bird species. Two very important birds used in North American falconry have not been discussed—the Harris' Hawk and the Red-tailed Hawk. Both are excellent at catching rabbits. For tameness and versatility the Harris' Hawk probably has no equal. The disease “frounce” can be treated with enheptin, but recently a better product, emtryl, has been developed. A single pill, hidden in a piece of meat and swallowed by the hawk, does the job. The protozoans that cause frounce, found in pigeon crops, are killed by several days of freezing but probably not by just cooling the meat. Cramp (a crippling of the feet) actually is caused by a vitamin D deficiency (rickets). If very young hawks, taken at 1 or 2 weeks of age, are fed only meat, their bones will not develop properly and they will be unable to stand. Bones are necessary in their diet. Somehow a photo of a kestrel head found its way into the space (p. 98) where a Prairie Falcon's head should be. The photo “recovering a lost falcon from a tree” (p. 109) might better read “goshawk.”

“Modern Falconry” is an informative book that fulfills the author's aim: to “help newcomers who

are loaded with determination to channel it toward the rewards of a deeply satisfying and thrilling sport.” It also will provide the average person with the means of gaining a real understanding of what this sport is all about.—HEINZ MENG.

**Bobwhites in the Rio Grande Plain of Texas.**—Val W. Lehmann. 1984. College Station, Texas, Texas A&M Univ. Press. xv + 371 pp., 223 black-and-white photos, 20 color plates, 45 figures. ISBN 0-89096-186-7. \$20.00.—If one were to name the individual most qualified to write about Bobwhites in the southwest, it surely would be Val Lehmann. Lehmann, now retired, spent the better part of a lifetime working with this important gamebird in south Texas, beginning in 1936 with the Cooperative Wildlife Research Unit at Texas A&M, later with the Texas Game, Fish, and Oyster Commission, and finally from 1945 through 1972 as wildlife manager of the famed King Ranch. The setting for his book is the 22-million-acre Rio Grande Plain of south Texas, a vast, semiarid region made alternately hospitable and hostile to Bobwhites and cattle alike by the vicissitudes of weather, especially rainfall. Lehmann's intimate knowledge of, and appreciation for, the region's history, ecology, and wildlife are clearly evident from previous scientific publications and from an earlier book “Forgotten Legions: Sheep in the Rio Grande Plain of Texas.”

His present effort represents the culmination of more than 40 yr of observing, studying, and managing Bobwhites. It is a sturdy, handsome volume, richly illustrated with nearly 300 drawings and photographs, including some of the best color photos of Bobwhites that I have seen. The text is organized into three major sections. Part One, *Life History*, emphasizes inter- and intracovey organization, individual and group movements, nesting, and reproduction. Part Two, *Management Considerations*, deals with factors that influence Bobwhite abundance, including climate, soils, food, cover, predators, parasites and diseases, interspecific competition, hunting, and land use. The final section, *Management Recommendations*, outlines methods for increasing, or at least stabilizing, Bobwhite numbers on southwestern rangeland.

As noted on the dust jacket, Lehmann writes in an easy, informal style, and his text is filled with historical references and personal anecdotes. This makes for entertaining reading, although we sometimes are supplied with more detail than perhaps we care to know, such as when we are told that “When Almon Linney was planting corn on the J. J. O'Brien Ranch, in Goliad County, on April 7, 1941, approximately 50 pounds were spilled at the end of a turnrow” (the point being that a quail attempted to nest in the spilled grain) or that “Domestic turkeys were seen in

the act of destroying a quail nest with 10 eggs inside Ed Koy's turkey yard, in Colorado County, on July 15, 1938."

Lehmann's dedicated, long-term efforts produced a vast amount of tabular data (83 text and 27 appendix tables), mostly from trapping and banding and from visual observations and counts. Unfortunately, there is relatively little in the way of data reduction and analysis; results of the fieldwork are often merely chronicled in the text. Admittedly, application of inferential statistics would have been inappropriate in many instances owing to the nature of the data; however, even the use of descriptive statistics is scanty. The author illustrates or supports his ideas primarily by citing examples taken from larger data sets. Professionals will find it difficult to evaluate many of these findings and conclusions because of the less-than-rigorous treatment of field data. Non-professionals, on the other hand, sometimes may be overwhelmed by the sheer volume of raw numbers.

Much of the above criticism is directed toward Part One of the book, its weakest section. This material on life history is presented in 22 chapters, 11 of which deal mainly with seasonal covey organization and movement. The treatment of population dynamics (only 2 chapters totalling 16 pages) is disappointingly cursory, especially in view of the seemingly inordinate emphasis on covey organization.

In Part Two, Lehmann provides a tighter, more balanced discussion of the edaphic, climatic, and biotic factors that influence Bobwhite abundance in the southwest. Throughout, he stresses the critical importance of moisture: "... rainfall unquestionably is the life factor most often deficient and hence most often limiting. . . . To miss either the spring or fall rainy period is for bobwhites to suffer decline." In discussing predators and their control, Lehmann describes a massive effort to reduce coyotes on the King Ranch in the late 1940's and early 1950's. During an 8-yr period, an estimated 10,000 coyotes and 1,800 bobcats were trapped or poisoned. The apparent immediate effect was a dramatic rise in numbers of white-tailed deer and wild turkeys, and a lesser response from Bobwhites. These increases were short-lived, however, as limitations of habitat and rainfall again exerted control on the wildlife community. Lehmann notes that selective predator control is potentially effective only where habitat is adequate and hunting is properly regulated. Notwithstanding the Bobwhite's acknowledged ability to sustain high annual yields, Lehmann believes that harvest regulations sometimes may be too liberal for prevailing conditions. He is especially critical of the increasingly popular methods of quail "hunting," which include baiting, ground shooting, and shooting from elevated perches on vehicles. Here as elsewhere, however, Bobwhites are less threatened by the gun than by land-use practices designed to increase "pro-

ductivity." Lehmann notes that "Man's attempts to improve the productivity of rangeland for cattle have centered on the reduction of weeds and shrubs [which] . . . are often the most dependable and certainly the most nutritious bobwhite foods." He further observes that large-scale brush eradication, "a veritable obsession in the 1960's and 1970's," did not provide the anticipated increase in cattle production. "The real limitations, now and forever, are defects of climate and soil. Overzealous large-scale battles against brush have jeopardized and in some instances destroyed wildlife resources of greater value than livestock. As yet we have done precious little to recognize, much less repair, the damage. A new approach based on a much broader view of the total land resource, its assets and its defects, is perhaps the greatest legacy that we can pass to those who follow."

The book concludes with an authoritative discussion of quail management on semiarid rangeland. Here, Lehmann's vast experience is evident as he outlines both general and specific recommendations for improving Bobwhite habitat within the framework of the area's prevailing agricultural interests and the limitations of its climate and soils.

As indicated by its title, this book is distinctly regional in scope and purpose. As such, it will be of interest and value primarily to wildlife biologists, sportsmen, and landowners and managers in the southwest. Quail biologists elsewhere also will probably want to add this volume to their personal libraries. Despite some shortcomings, principally in the organization, presentation, and analysis of data, Lehmann's book contains a great deal of information and insight about the Bobwhite in particular, and about the history, ecology, and management of southwestern rangeland in general. Not to be overlooked, too, is the book's surprisingly modest price of \$20.00.—  
JOHN L. ROSEBERRY.

**Wood warblers' world.**—Hal H. Harrison. 1984. New York, Simon and Schuster. 335 pp., 24 color plates, over 200 black-and-white photographs. ISBN 0-671-47798-6. \$19.95.—Hal Harrison has studied wood warblers in the field for over 30 years, and his latest book clearly reflects this breadth of experience. Richly illustrated with photographs, most by the author, this book focuses primarily on the 53 paruline species known to nest north of Mexico.

In the general introduction, Harrison briefly explains wood warblers' current taxonomic position, then gives a short description of warbler nest cycle and behavior. The migration section mentions the southern ancestral home theory and a bit about ecological interactions between tropical residents and

migrant warblers; nothing is said about navigation abilities. The section on winter gives little information on areas south of the U.S., but contains interesting North American winter records. In the last section of the introduction, the author is particularly eloquent in making several important points on the subject of conservation.

The main body of the book is the 53 species accounts; major hybrids also are discussed briefly. A quite useful glossary follows (though was it really necessary to include "life list" here?). There is also an excellent bibliography with more than 250 entries.

The photographs in this book are stunning. The 24 color plates, composed of 55 photographs, cover 51 of the book's 53 species. Included here is the only color photograph of a Bachman's Warbler I've ever seen. The black-and-white pictures are also superb. Besides many excellent portraits of adults (often pairs) and of fledglings, there are shots of the nests of 49 species (two more are shown in the color plates) and pictures of typical nesting habitat(s) of all but the Rufous-capped Warbler—wonderful coverage indeed.

The species accounts are full of information, and written in a flowing, easily readable style. Much detail is given on nests and eggs, as befits a book by the author of the two Peterson nest field guides. Harrison adds personal anecdotes, drawn from his extensive field experience with warblers, that make the work come alive for the reader.

One useful feature is the pronunciation guides for scientific names. People tend to learn these far more easily once they've heard them; Harrison accomplishes this in written form. Another useful feature is the written renditions of the common songs. Harrison recognizes that people hear differently, and often gives more than one person's interpretation of a song: a luxury for which most field guides simply don't have space.

Each species account ends with a map claiming to show the breeding range of that species. This is an excellent idea. However, for many species, the maps do not indicate the species' whole breeding range. The first real shock comes on p. 77, where a small dot in Texas is labeled "Breeding range of Colima Warbler." Similarly, the map on p. 98 clearly indicates that Yellow Warblers come to a screeching halt at the Mexican border. Personally, I wish the maps did indicate the entire breeding ranges, since this would add greatly to the value of the book. However, having decided to give more restricted information, the author should have labeled his maps more accurately.

A bit frustrating is the frequency with which Harrison reports how many nests he has found containing cowbird eggs, without divulging the total number of nests inspected. Occasionally there are minor lapses indicating a certain lack of theory, such as giv-

ing a single number for the clutch size of a wide-ranging species. Moreover, one wonders if Harrison thinks parental investment applies only to males. On p. 120, he states that female Black-throated Blue Warblers, very wary early in the breeding season, become "surprisingly" fearless later on. Similar is his unfounded assumption that the more cautious Lucy's Warbler mentioned on p. 81 was a female. Given the relative parental investment at that stage, it may well have been a male, where it would more closely parallel the behavior of the male Blackburnian Warbler mentioned on p. 154.

These criticisms are all minor. Overall this book is a fine contribution to the semipopular ornithological literature. Packed full of information, it is well organized and extremely readable. The photographs alone are well worth the price. I strongly recommend it to anyone, both amateur and professional, who has an interest in our North American wood warblers.—  
SUSAN M. SMITH.

**Kirtland's Warbler: the natural history of an endangered species.**—Lawrence H. Walkinshaw. 1983. Bloomfield Hills, Michigan, Cranbrook Inst. Sci. Bull. 58. xii + 207 pp., 55 tables, 45 figures. ISBN 87737-035-4. Paper. \$11.95.—Prospective readers of this new book on the interesting and endangered Kirtland's Warbler should not expect to find a work that replaces Mayfield's 1960 book (Cranbrook Inst. Sci. Bull. 40) as the standard source for information about the species. The two books have approximately the same number of text pages and share a similar set of chapter headings, but they differ from each other in a number of important ways. Mayfield's book is based on a compilation, condensation, and careful analysis of all of the then available published and unpublished information on the warbler. It is also very readable and essentially error-free. In contrast, Walkinshaw's book is based almost entirely on data gathered from his own field work (exceptions are his Chapter 4 on distribution and Chapter 14 by Mark Bergland on factors affecting nesting success), and it appears from the plethora of numerical and other information presented that he reports nearly all data he ever gathered, whether or not there is anything to be learned from it. Furthermore, most of the time the results of data analysis are not subjected to statistical testing and some questionable conclusions result. The book is difficult reading owing in part to the liberal use of numbers throughout the written text and the frequent interruption of text material by tables and figures (over one-half the text pages have full to half-page tables or figures). Errors and other sources of confusion are encountered rather frequently throughout most of the book. All of the above

is not to say that the book is without merit but mostly to point out that it does not replace Mayfield's book as *the* book on the "life history" of the Kirtland's Warbler.

The potential value of Walkinshaw's book lies in the post-1960 data presented on various aspects of the species' breeding biology. Walkinshaw studied close to 300 nests, mostly from 1966 through 1977, and has genealogical information on a large number of banded birds. As nearly as I can tell, data from these additional nests do not alter Mayfield's conclusions on such topics as clutch size, incubation period, hatching and fledgling success, etc. However, since these nests were studied immediately before and after control of the Brown-headed Cowbird was initiated, his data present new information on the effect of this control on the rate of parasitism (greatly reduced) and the nesting success of the warblers (greatly increased).

Some of the more interesting and potentially useful information to ornithologists and population biologists is found in Walkinshaw's data gathered from banded birds. For example, 47 birds banded as nestlings returned to breed, some of them returning for up to 7 years. From this information it is possible for Walkinshaw to show that clutch size does not vary with age, and that young males breeding for the first time tend to select younger stands of pine than those in which they were raised. He also has over 150 returns of birds banded as adults, many of which also returned for multiple years. Walkinshaw's careful observations of individually identifiable birds also enabled him to gather data on such difficult-to-study things as age of fledglings at last feeding by a parent and the rate of survival of fledglings to independence. He also found additional records of polygyny and discovered one polygynous male that simultaneously held two nonoverlapping territories separated by 0.8 km.

In my opinion, the best use of this book will be made by persons searching through Walkinshaw's nesting data and/or individual genealogies to find information useful as data or comparative material for their own studies. However, prospective users should be forewarned to expect to encounter errors and other sources of confusion that are likely to complicate their task. The following is a sample of problems I noted in the first five chapters:

Table 1 lacks a key to abbreviations used, a capital "I" is used instead of the number "1" in six places resulting in an entry of "IM" instead of "1 M," and the total number reported here of banded nestlings that returned to breed does not agree with the totals in Tables 13 and 14.

Table 2 shows the number of singing male Kirtland's Warblers counted by the author for 17 years in 5 localities. We are not told whether these counts were made on the official census days or at other

times, nor whether the counts are supposed to represent the total male populations at those localities.

For Tables 3 and 4 we are not told the study areas to which the counts refer. Also, the last column of Table 3 is headed "TMWB" while in the key it is listed as "TMBW."

In the second paragraph on p. 10 the reader is referred to information in Table 6 that is actually in Table 1.

On p. 14 the Magnolia Warbler is described as having a white breast (actually yellow with black stripes).

On p. 15 Walkinshaw states that "One-year-old males had shorter wings than older adult males." His sample size is very small, the data overlap, and the slightly different means undoubtedly are not significantly so.

In Table 6 reference is made to Ryel 1980a and 1980b—the "selected" bibliography has only one 1980 entry for Ryel.

In the first paragraph on p. 34 the author flatly states that "the total 1978 count was 396 adult birds at the beginning of the breeding season," even though he has just explained that this number was arrived at by estimating the number of females (assuming one for each Michigan male). Also, in this same paragraph, the reference to Table 2 should be to Table 6, and another reference is made to the nonexistent "Ryel 1980b."

Similar errors and other forms of confusion appear in the remainder of the chapters written by Walkinshaw. However, since most of the numerical information presented in the book is in the latter chapters, the errors and difficulties encountered there are often more complex than those just mentioned above. Detailing those difficulties here would be similarly complex and require the use of too much space, so I believe it prudent to simply caution potential users to exercise care in extracting information for their own use.

Chapter 14, written by Mark Bergland, is a statistical analysis of factors that may influence the nesting success of the Kirtland's Warbler. It is a well-written and carefully analyzed study that is a follow-up and expansion of an earlier study by Anderson and Storer (1976, *Jack-Pine Warbler* 54: 105). Bergland has used additional nest data and evaluates some factors not previously considered (e.g. success in jack pine plantations vs. natural jack pine regeneration). His conclusions are essentially the same as those of Anderson and Storer, namely that in addition to cowbird control, nesting success also is affected positively by flat terrain and the absence of large trees/snags, and apparently not affected by the other variables considered.

Despite the book's shortcomings, it does make much of Walkinshaw's data on the Kirtland's Warbler available for use by others, and I am sure good use will be made of some of it.—NORMAN L. FORD.



**The birds of San Diego County.**—Philip Unitt. 1984. San Diego Society of Natural History, Memoir 13. xxiii + 276 pp., 12 color plates, 12 text figures, 129 maps. ISSN 0080-5920. Order from the Society, P.O. Box 1390, San Diego, California 92112 USA. Cloth, \$20.00; paper, \$14.00 (plus \$2.00 shipping; add 6% sales tax in California).—San Diego County, California is larger in area than 2 of the 50 states (combined), its geographic (and thus biological) diversity ranges from the seacoast across mountains of nearly 2,000 m elevation to extreme desert, it is the southwesternmost county of the contiguous U.S., and it is inhabited by dedicated birders whose observations have boosted the county list to more than 450 species. "The Birds of San Diego County" provides detailed information on the geographic, ecological, and temporal distribution and abundance of each of the 449 species of native birds reported in the county—for some, by subspecies. Maps of breeding distribution are presented for 129 of the 181 breeding species (of which 26 are considered to be extirpated or only occasional breeders). Ecological zones and terms of abundance are defined precisely, and the definitions are adhered to. Welcomed absent are long paragraphs of descriptive and generalized information.

An introductory section of 23 pages gives a historical overview, definitions, sources of information, comments on nomenclature, and, most importantly, describes and illustrates the geography and vegetation of the county. The body of the text (211 pages) consists of species accounts. This is followed by a list of 6 introduced species, a list of species inadequately or erroneously reported, a few pages of addenda, a systematic list of the species, the bibliography, and the index.

The species accounts begin with a summary statement of abundance in the various seasons and an analysis of habitats (ecological areas) in which the birds are found. For migrants, dates of early and late occurrence are mentioned, by area if the status differs markedly (as it sometimes does between desert and coastal lowlands, for example). Egg dates are mentioned for breeding species, and maps of present and past definite and probable nesting records are given. (The numbered maps are not referred to in the text.) Gaps in the present knowledge are pointed out, and differences in former and present distribution and abundance are discussed. If more than one subspecies occurs in the county, they are treated separately to the extent that information permits, and taxonomic problems or differences of opinion are discussed.

Most of the recent information is based on birders' observations, many published in *American Birds*. There are some hazards in relying so completely on information of this kind. Birders tend to look for the unusual, the rarity, and pay less attention to the common. This is reflected in the uneven treatment of the species. Common resident birds average much shorter accounts, with less detailed information, than rare migrants. Birders also tend to go to favored localities,

so that there are probably more records from the Tijuana River Valley than the entire desert region. The bias of concentration in the coastal zone is noted in the text. Species that are considered endangered or that are polytypic within the county receive the longest accounts.

The book apparently was completed in late 1981, considerably before its publication in 1984. An addendum gives important information received through December 1983, including records of 4 species and 2 subspecies new to the county (an indication of the rate of growth of the known avifauna), which did not make it into the main accounts or the summary List of Species. This publication lag overlapped publication of the 6th edition of the A.O.U. check-list, so the English and scientific names used by Unitt are a combination of those in the old 5th edition and more recent sources. The arrangement of the species of shorebirds and the sequence of passerine families does not follow either edition of the A.O.U. check-list, but the table of contents and index make it easy to find any species.

There are some unfortunate discrepancies between the species accounts and the Summary List. The California Gnatcatcher (*Poliotilta "californica"*) is separated from the Black-tailed (*P. melanura*) as a species in the list, but only as a subspecies in the account. The Orchard and Northern orioles (*Icterus spurius* and *I. galbula*) are combined in the list, probably as the result of a typo. The Black-throated Sparrow (*Amphispiza bilineata*) is omitted from the list.

Users of this volume who are interested in subspecies may share some of my concerns about the taxonomy at that level. In discussing the Solitary Vireo (*Vireo solitarius*), Unitt allots the few breeding records and most migrants and winter visitors to the race *cassinii*; a few others he assigns to *plumbeus*, and some are considered to be *solitarius*. Noting that all records of *plumbeus* are since 1969, he suggests that the migratory habits of the subspecies may be changing. No similar suggestion is made for *solitarius*, whose records date only from 1971. No specimens of either of these more easterly races have been taken. I suggest that the recent reports of those subspecies (and of other subspecies throughout the book) may reflect the birders' growing awareness of geographic variation and the beginning of their assumption that accurate subspecific identification is possible in the field. I am not convinced that that assumption is valid, and note most such identifications with a degree of skepticism. In other instances, the subspecies occurring in the county in a given season (winter for *Certhia "familiaris,"* breeding for *Cistothorus palustris*) is purely speculative, for lack of documenting specimens. One cannot say categorically that any of these identifications is right or wrong, but these examples (among many) point out the need for judicious (or even wholesale) collecting of specimens. Unitt comments many times on the need for specimens. Their present lack probably reflects both the birders' gen-

eral reluctance to collect and the short-sighted permit-issuing policies at both the federal and state level. On the other hand, Unitt did not take advantage of all the specimens available. A. W. Anthony's collection, now in the Carnegie Museum, was not studied, and some material in the SDNHM was not identified to the subspecies level.

In a number of species accounts and in the list of species inadequately reported (a "hypothetical" list), published observations, mainly from *American Birds*, are questioned or considered to be erroneous. Unfortunately, the basis of the doubt is not always indicated, and often there is no indication of what species the record may actually refer to. The hypothetical list includes two introduced species of which the records are valid but the current status of the species is in doubt. A separate compilation of presumed invalid published records would provide useful information for workers who use records from *American Birds* for distributional and analytical studies.

This review cannot be complete without mention of the 12 color plates by Allan Brooks nestled in the center of the book. These plates are from previously unpublished watercolors rendered in the early part of the century; the originals are from the Ellen Browning Scripps collection now in the SDNHM. They are typically excellent Brooks paintings and are by themselves worth the price of the book.

In summary, I recommend this book as a companion to the state bird books in personal and institutional libraries. It will be a well-used reference for those interested in distribution, and it will serve as an example of what a dedicated corps of birders, and a dedicated compiler, can accomplish.—RICHARD C. BANKS.

#### ALSO RECEIVED

**Seasonal spermatogenesis in the Mute Swan (*Cygnus olor*).**—Haide Breucker. 1982. Würzburg, West Germany, Springer-Verlag. vii + 94 pp., 30 photographs. ISBN 0-387-11326-6. No price given.—The book opens with a brief introduction to reproductive biology and discusses the need for morphological studies in this field. A review of the literature on spermatogenesis in birds follows. The major chapters are devoted to a detailed morphological description of gonadal development and regression in the Mute Swan. The text is largely technical, and a basic understanding of anatomy and reproductive biology is required. However, the discussions at the end of each chapter are easier to understand, and the author does a good job of relating his research to other studies on avian reproduction. Those who have a particular interest in vertebrate reproduction will find this book most valuable.—NEIL SABINE.

**Historia natural del Curiquinque *Phalacrocorax carunculatus* en los paramos.**—T. De Vries, J. Black, C. De Solis, and C. Hernandez. 1983. Quito, Ediciones de la Universidad Católica. Available from the senior author, Department of Biology, Universidad Católica, Apartado 2184, Quito, Ecuador. \$7.00 postpaid.—The life history of the Carunculated Caracara, one of the most conspicuous birds of the paramo of southern Colombia and Ecuador, was almost unknown before this study. The major previous reference dates from 1902.

The caracara lives in a windy, rainy, cold (8.5–12°C maximum air temperature) environment where food apparently is difficult to find. Parental neglect of eggs and young is common and reproductive success low in exposed nests. Number of feedings per hour ranges from 0.6 to 2.6, but average meal size is low, only 10–20 g. Earthworms form the bulk of the diet, although rodents, birds, and carrion also are important.

The authors review the role of the caracara in Ecuadorian folklore. This species is regarded as a good-luck talisman and sometimes is kept with domestic fowl, with which it is believed to interbreed, producing excellent fighting cocks!

The two-page discussion is disappointingly short. The authors could have discussed the caracara's adaptations to its severe climate and compared its life history with that of the other caracaras and the rest of the Falconidae. Nevertheless, this is a useful publication for anyone interested in caracaras or the ecology of the Andean paramo.—DAVID CAMERON DUFFY.

**A rage for falcons.**—Stephen Bodio; illustrations by Jonathan Wilde. 1984. New York, Nick Lyons/Schocken. 135 pp. ISBN 0-8052-3931-6. Cloth. \$16.50.—Not a *love* for falcons, nor even a *mania* for falcons, but *A Rage*. . . The title is a giveaway; the reader is warned not to expect balance, nor should he seek accuracy—too often hyperbole holds sway. For example, "Pigeons carry so many hawk diseases that until recently a more delicate hawk living on them was playing Russian roulette." Pigeons don't carry many hawk diseases. The truth is that many pigeons carry two common hawk diseases: trichomoniasis and herpes virus.

This book is well written in a tough, sportswriter's tone. It contributes little to ornithology. It is written to entertain experienced falconers who know the lingo and can distinguish between a bewit and a long-winger. The pen-and-ink drawings by Jonathan Wilde are sensitive, and often exquisite.

There used to be a more or less unwritten rule that falconry books be privately printed and distributed almost exclusively to falconers. This lack of advertising was intended to preserve a limited resource—

falcons, to keep riff-raff out of the sport, and to keep our standards high. Bodio's well-advertised book ignores this rule. He has written toward his title.—FRANCES HAMERSTROM.

**Ecological study of bird hazards at Indian aerodromes.** Phase II, Delhi, Bombay, Hindan.—Salim Ali and Robert B. Grubb. 1984. Bombay, Bombay Natural History Society. ix + 96 pp., 9 text figures, black-and-white photographs. No price given.—Survey of bird strikes at four locations in India. Data include species identified in strikes as well as all species recorded from airports and surrounding buffer zones. Many birds considered to have the highest hazard potential are large raptors or corvids whose numbers are supported by human activities in areas adjacent to the airfields.—A.H.B.

**Ecology and evolutionary biology.**—George A. Salt (Ed.). 1984. Chicago, Illinois, University of Chicago Press. 130 pp. ISBN 0-226-73443-9. Paper, \$7.95.—A collection of seven essays, of variable length, on theory structure and testing in ecology. Special focus on

the role of competition and related processes such as causal forces makes the philosophical aspects sprightly and interesting. The material is reprinted directly from the November 1983 issue of *The American Naturalist* (vol. 122, no. 5).—A.H.B.

**Fifty common birds of Oklahoma.**—George Miksch Sutton. 1984. Norman, University of Oklahoma Press. 113 pp., figures. No price given.—This fourth printing of this little volume is vintage Sutton, and filled with charm. Descriptions of 50 species are matched with plates assembled from a variety of sources. The Foreword, which discusses how species choices were made, apparently is also from the original (1977) edition. The quality of the plates is variable; they cover a good number of Sutton's productive years. More information on their dates and the artistic media used would be useful.

The species accounts include a smattering of Sutton's experiences, some traditional natural history, and his observations on the environment of Oklahoma. Each is written with care and shows Sutton's appreciation for the existence of birds.—A.H.B.

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(continued from p. 628)

ollect. Among natural English names for American birds are Bobolink, Chewink, Kingbird, and many others. Such as these not only more than hold their own, but are as great aids to the spread of knowledge as the Ptilogonys kind are hindrances; while such as Wilson's Thrush can only be accepted as provisional, until the better knowledge of the bird and its sur-

roundings shall result in the evolution of an English name founded on true principles.

ERNEST E. T. SETON,  
of Manitoba.

Glen Cottage, Howard Street,  
Toronto, March 21, 1815 [sic].