

## BOOK REVIEWS

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### A LANDMARK IN THE HISTORY OF NORTH AMERICAN ORNITHOLOGY

**The Birds of North America: Life Histories for the 21st Century.**—A. Poole, P. Stettenheim, and F. Gill [eds.], 1992–1993. Volume 1, Nos. 1–40. The Academy of Natural Sciences, Philadelphia, PA; The American Ornithologists' Union, Washington, DC. Price \$2,995. Series available by subscription only.

Partial skeletons of works intended to be synoptic litter the trail of North American ornithology. Ridgway's *Birds of North and Middle America* and Palmer's *Handbook of North American Birds*, for example, burst onto the scene, brightly illuminated the discipline, but eventually incinerated in the atmosphere of human limitations and the indifference of potential collaborators. The major exception, A. C. Bent's *Life Histories of North American Birds*, extended over more than half a century (1910–1968) and was not concluded until after Bent's death. Even that series was undertaken to complete an unfinished project by Charles Bendire. Bent's "Life Histories" emphasized topics of greatest interest to that era of ornithology—eggs, nests, food, migration, and distribution—and, when relevant, differences in the habits of subspecies. As invaluable as the Bent series was and is, the unparalleled growth of ornithological knowledge through the 1980s underscored the need for a major new compendium to cover the 700-plus species treated by the fifth edition of the AOU Check-list of North American birds (1983).

The American Ornithologists' Union in collaboration with the Academy of Natural Sciences of Philadelphia addressed the problem. Building on the success of *Mammalian Species*, published by the American Society of Mammalogists, and on the experience of the Palmer volumes, a central editorial office in Philadelphia established an efficient mechanism for the timely production of individually authored species accounts. The resulting "species profiles" appear upon their completion, thereby avoiding publication delays caused by adherence to check-list order. With a different author or authors for most species accounts, the editors boldly claimed that the series "literally orchestrates all available expertise of American and Canadian ornithologists to set the foundations of North American ornithology for the next century."

The first issues appeared in 1992, with groups of accounts appearing several times annually. Over 80 numbers have been published to date, with additional commitments received from prospective authors for approximately 400 of the 700-plus species eventually to be treated. The series is scheduled for completion in 10 years. Volume 1 includes an overview of the series plus 40 accounts ranging in length from 12 to 28 pages. Each account follows a standard outline of

topics: distinguishing characteristics, distribution, systematics, migration, habitat, food habits, sounds, behavior, breeding, demography and populations, conservation and management, appearance, measurements, acknowledgments, and references. Here we evaluate the first 40 accounts.

Each species writeup stands alone and offers an excellent summary of existing information, especially for poorly studied forms. In contrast, for well-known species with a rich literature, the profiles instead provide convenient introductory encapsulations that direct the reader to primary sources when more in-depth information is desired. The extensive personal experience of many authors is evident in the treatments of several species (e.g., Spruce Grouse [*Dendragapus canadensis*], Blue Grouse [*Dendragapus obscurus*], Ring-billed Gull [*Larus delawarensis*], Gray Jay [*Perisoreus canadensis*], Indigo Bunting [*Passerina cyanea*], and Smith's Longspur [*Calcarius pictus*]) that include information not published elsewhere. Some other accounts are much less authoritative. Six, for example, were prepared by workers with only one or two contributions to the original literature for their particular species, and in that on the Inca Dove (*Columbina inca*) the author cited no personal publications. Even the offerings of compilers or enthusiasts are useful, however, if only to identify species requiring further study. Where feasible, editors should encourage joint authorship to achieve a broader perspective.

Knowledge available for each species inevitably dictated potential material for inclusion, but what was selected for publication often lacks balance and emphasizes the interests of individual contributors. For example, the astounding vocal capabilities of the Northern Mockingbird (*Mimus polyglottos*) received its justifiable several pages of discussion. But why should the relatively simple and boring voices of the Tree Swallow (*Tachycineta bicolor*) and House Sparrow (*Passer domesticus*) deserve treatment of a similar length?

A major positive feature of Bent's Life Histories, which this series attempts to replace, has been lost. Recall that Bent's histories were organized by *subspecies*, which allowed the reader to compare features affected by geography. Because even well-known species have often been studied intensively in few areas, geographic variation in every aspect of life history has not been properly encompassed. In some cases (e.g., Bell's Vireo [*Vireo bellii*]), undue emphasis is placed on rare or endangered populations and little comparative information is given for commoner populations. Thus, when the place of study is not given, one must immediately wonder whether the species might do something else (eat different food, encounter different predators, use different nest sites and materials, etc.) in another region. Because we can anticipate increasing

interest in and concern for geographic differences in all life history parameters, we suggest that authors consider this issue in accounts now being planned.

In a significant number of life histories, authors and editors have too often accepted the primary literature at face value, with neither critical analysis nor comment. Thus, we read that American Tree Sparrows (*Spizella arborea*) nest exclusively on the ground and that calls of the Snowy Owl (*Nyctea scandiaca*) can be heard seven miles away. The Northern Mockingbird is correctly stated to have been "sighted as far north as Churchill, Man.", but does not have an isolated population, and surely not one "established in 1890s" (the first ornithological surveys did not occur until 1902 and 1930). Such lapses remind one that species profiles should be critical evaluations and that authors and editors must be responsible for checking the authenticity of all suspicious information.

A factoid-picker's bazaar, these life-histories often contain information that is impossible to find elsewhere: the dry mass of one female Broad-tailed Hummingbird (*Telasphorus platycercus*) skeleton (0.133 g = 3.8% of typical live body mass); the number of different songs of one male Five-striped Sparrow (*Ampispiza quinquestriata*) in Arizona (>200); how to identify the three kinds of Blue Grouse (*Dendragapus obscurus*) droppings (each of which should have been illustrated); the sleeping posture of a Kirtland's Warbler (*Dendroica kirtlandii*); the fact that a Gray Jay can carry 91% of its body mass; the estimated number of Indigo Buntings (10–20 million pairs); and that the House Sparrow (*Passer domesticus*), despite its rapid morphological evolution, does not show expected latitudinal variation in clutch size. While it may titillate animal "rightists," we see no reason to include the statement that, "Where spring hunting [of the Wild Turkey (*Meleagris gallipavo*)] with rifles is allowed, mortality of hunters is highest."

Conservation matters generally receive a consistent and balanced treatment. The status of the Mexican Chickadee (*Parus sclateri*), however, is described as "precarious" in the United States (where the species is clearly of marginal occurrence), despite the fact that in the center of its range it is "the most abundant insectivore at the study site." Furthermore, it is unjustified to impute additional concern for the welfare of this montane chickadee on the basis of the undocumented generalization that genetic variability is reduced on mountaintop islands. Such alarmism weakens the case for valid conservation issues.

A glossary provided in the Introduction is generally adequate but provides incomplete definitions for several terms (e.g., *amplitude*, *degradation*, and *intensity*, which are defined only with reference to sound; *notched*, which applies to the tail in addition to primaries; and *operculum*, which applies to a lid or flap over the ear in addition to its nasal meaning). Furthermore, *savannah* occurs not only in the tropics and subtropics but also in the Temperate Zone, and *mandibles* do not "correspond to the main bones of the jaw in mammals." (*Maxilla* is undefined.) The definition of *Macrogeographic variation* is incomprehensible. Because the glossary excludes all Dwightian terms for molts and plumages, authors are therefore forced to use the Humphrey-Parkes system.

In layout and design, the life histories are generally attractive but with much wasted space. Names of the three editors occur on every other page of every account except for the cover. The back page of every number repeats information about the series, which must already be known to subscribers, and again lists the names of the editors, the remainder of the production staff and the two advisory committees. Twenty individuals, in addition to the authors, comprise the corpus of the complete enterprise.

Illustrations accompany each profile. One individual of each species is shown in a color photograph on the cover page. These photos are generally excellent, but none has a caption giving the sex of the bird (important for the Barn Owl [*Tyto alba*] and Snowy Owl, for example), the locality of the photo, and the subspecies depicted (relevant for species such as the Blue Grouse, Gray Jay, and Bell's Vireo [*Vireo bellii*], all of which show pronounced geographic variation in appearance). Additional photos of plumage differences by sex, age, and season would be useful. Good quality black-and-white sketches, predominantly by D. Otte and J. Zick-efoose, adorn many accounts. The best depict behaviors that have not been commonly illustrated previously (e.g., in the Rock Dove [*Columba livia*]). Others break no new ground (a Tree Swallow [*Tachycineta bicolor*] emerging from a nest box) and are merely filler. Representative habitat photographs, even in black-and-white, would have been more informative.

On the first page of each life history, maps in color depict the extent of geographic distribution; seasonal differences are shown where appropriate. Although their small scale does not permit fine resolution of range boundaries, these maps convey the essence of occurrence and are extremely useful. Additional maps for several species attempt to show geographic variation in population density based on results from Breeding Bird Surveys (BBS). For plotting population trends in territorial male passerines (e.g., Indigo Bunting), these maps are informative. However, BBS data are inappropriate for plotting distribution or density for species that cannot be censused by song or which do not maintain territories in the census area. For example, the BBS map of the Ring-billed Gull shows populations in parts of California, southern Louisiana, Florida, New Jersey, and other areas where the species does not breed. The disclaimer that "some individuals were undoubtedly nonbreeders," is of no use to those not already familiar with the species, and the map is therefore misleading.

Following the style of *The Handbook of the Birds of Europe* by Cramp and Simmons, principal events in the annual cycle, breeding, molt, and migration, are each illustrated in unlabeled circle diagrams accompanied by a small key. We find these diagrams unattractive and difficult to use because they require one's eyes to switch repeatedly between the diagram and the key in order to interpret the information. Such data would be more quickly comprehended if illustrated on figures in which the abscissa describes time in months and the events are each labeled on the diagram itself, thus obviating the need for a key.

Collectively, the reports are bulky; the complete series will occupy an estimated 2 m of shelf space. Material in each account is also difficult to access. Many

users will eventually organize them in check-list order to facilitate information retrieval. It seems clear that the days of using print to transmit the kinds of information found in this series are numbered. Such material would seem ideally suited for CD-ROM technology, where it can be indexed, quickly searched, and stored in a minimum of space. Extensive graphics could permit easy visualization of behavioral postures, foraging motions, habitats, plumages, nests, eggs, and bones. Vocalization could be heard while audiospectrograms were being inspected.

Finally, we see evidence of too many cooks. In an attempt to achieve consistency in the series and to compensate for authors of varied interests and skills, editors have used their prerogative to insert or revise text or to add maps and artwork. Some of this is inevitable, but it needs to be done with the collaboration of the contributors, who bear final responsibility for content. This, and other problems with the enterprise, from the use of inexperienced compilers to glossy packaging and the pressure for quick publication, can be traced to economic considerations, such that the series' entrepreneurial tail has wagged the science dog.

Any undertaking of this scope is bound to have start-up problems. Nonetheless, the attributes of the series far outweigh the negatives and we enthusiastically endorse the first volume of these new life histories. Because their utility and influence is bound to extend into the future, their inauguration is truly a landmark in the history of North American ornithology. —JOSEPH R. JEHL, JR., Hubbs-Sea World Research Institute, San Diego, CA 92109, and NED K. JOHNSON, Museum of Vertebrate Zoology and Department of Integrative Biology, University of California, Berkeley, CA 94720.

## CROSSBILL DIVERSITY

**Evolutionary Differentiation in Morphology, Vocalizations, and Allozymes Among Nomadic Sibling Species in the North American Red Crossbill (*Loxia curvirostra*) Complex.**—J. G. Groth. 1993. University of California Publications in Zoology, Volume 127. University of California Press, Berkeley, CA. 143 pp. \$18. ISBN 0-520-09782-3.

Ludlow Griscom began his 1937 monograph on the systematics of Red Crossbills (*Loxia curvirostra*) with the observation that, "A general review of the variations of the Red Crossbill in the New World has been badly needed for a generation. The greatest confusion and difference of opinion exist as to the number of races to be recognized and just what the correct diagnosis of each one is." Crossbills still retain an aura of mystery, stemming from the combination of their peculiar morphology, erratic geographic occurrence, and protracted breeding season. The group presents thorny problems to ornithologists and systematists. (1) How many Red Crossbill taxa are there? (2) How can they be distinguished reliably from one another? (3) What level(s) of taxonomic distinction should be applied to them? (4) What should their names be? (5) What are the phylogenetic relationships among them? (6) What factors and processes have caused them to evolve? (7) How are they distributed in space and time? Unfor-

tunately, some of the most influential accounts of these birds (e.g., Griscom 1937) confused more than they clarified these issues, leaving a whole generation of ornithologists to view crossbills as oddities whose habits, patterns of distribution, diversity, and evolution defy comprehension.

Groth's new monograph on North American Red Crossbills finally solves most of the above problems associated with this complex of songbirds, and establishes a firm basis for further work. Groth performs an exhaustive analysis of variation in morphology and allozymes among North American Red Crossbills grouped into "types" according to spectrographic features of their flight calls and other vocalizations. He concludes that the complex is a collection of seven (perhaps eight, counting the poorly-known Newfoundland form) sibling species, separable on the basis of vocalizations and morphology, rather than a set of geographic subspecies as previously thought. This nicely written and clearly illustrated monograph should be particularly satisfying to those familiar with the unsettled literature on crossbill systematics, for it brings order from chaos. It should also be of interest to any student of evolutionary processes, since these crossbill taxa maintain, and perhaps evolved, their morphological, vocal, and ecological distinctiveness in spite of broad sympatry.

*Morphology and vocalizations as means of grouping Red Crossbills.* Groth begins with a lucid recapitulation of the history of the "crossbill problem" that should impress all readers with the degree to which the systematics of the group had become entrenched in confusion. He then proceeds to address satisfactorily, for the first time, many of the pressing questions regarding these birds. Groth's success stems in part from his application of rigorous numerical techniques to the problem. Previous treatments have relied heavily on "eye-balling" the size and plumage of specimens, or taking relatively few measurements (e.g., bill characters, wing length, body mass) and then assigning specimens to groups based in part on the subjective opinion of the researcher. But the rigor of Groth's quantitative analysis is only part of the story. A quantitative analysis of morphology alone would have lacked any independent basis (e.g., in collection locality) for verifying the validity of assigning a specimen to a particular category. This is because crossbills are nomadic, and birds of all morphologies can be found virtually anywhere on the continent at one time or another. The crucial discovery that crossbill "chip" calls can be assigned to a limited number of vocal types permitted Groth to group specimens independently of morphology, plumage, and collection locality. His phenetic analysis of morphology, based on a suite of characters of the external anatomy and skeleton, reveals that the seven independently identified "vocal types" indeed correspond to "morphotypes," each of which contains but a fraction of the morphological variation present in the total sample. These seven types fall nicely into the four "size classes" of Red Crossbills proposed by Monson and Phillips (1981), thus corroborating the validity of that proposed classification.

*Geographic patterns of distribution and the subspecies concept in Red Crossbills.* Central to Groth's conclusion that the different types of Red Crossbills are sibling

species is his contention that they are not separated geographically. All of the other possible ways of distinguishing the crossbill types (i.e., as populations, subspecies, or semispecies) would be inappropriate if crossbills were found to be broadly sympatric because all of these designations are, by definition, based on geographic separation (see Mayr 1963, Futuyama 1986). Groth suggests it is not biologically accurate to assign the varieties of Red Crossbills into non-overlapping geographic breeding ranges. He demonstrates that many of the vocal types of Red Crossbills are widely distributed, and may breed regularly at highly disparate locations. Furthermore, different types often breed at the same time in the same location, yet pairs of mixed vocal type are extremely rare. Groth's data, as well as my own field experience with five of the seven types he describes, lead me to accept his conclusion: these types are not geographic subspecies. It is important to note, however, that they are not all distributed uniformly throughout North America. Though they overlap substantially, different types appear to be substantially more prevalent in a subset of the entire geographic range of the group (see Dickerman 1987, for a discussion of the concept of "core ranges" for different varieties of red crossbills).

*Ecological differences.* The different crossbill vocal types identified by Groth are also important because they reflect ecological differences that are not apparent from the morphology alone. For example, types 2 and 5 are highly distinct vocally but are very similar morphologically and coexist widely in the mountains of the west. However, type 2 is most often found in ponderosa pine forests, while type 5 is usually associated with higher elevation lodgepole pine/Engelmann spruce forests. The two often coexist in type 5's preferred lodgepole pine habitat, but type 5 seldom visit type 2's preferred ponderosa pine habitat. Groth's observations outlined in this monograph should serve as a basis for further work on patterns of habitat use by the different types.

*Seven species of crossbills?* Whether the different types should be classified as sibling species will undoubtedly be subject for much debate for many years to come. Perhaps when a molecular phylogeny becomes available there will be less ground for disagreement. Groth's estimates of genetic relatedness based on allozymes must be treated with extreme caution for a variety of reasons that he discusses. One unassailable fact will remain, however, even once a molecular phylogeny is constructed: crossbill taxa that we might wish to call subspecies will overlap geographically, precluding the use of the subspecific designation.

*Practical implications.* First and maybe foremost, it is no longer responsible for museums to collect crossbills without obtaining tape recordings of at least the flight calls, and preferably the excitement and alarm calls as well, of every individual collected. The great degree of morphological similarity among some of the types means that medium and large birds collected without vocal information cannot be assigned unambiguously to type at the present time. Second, a conundrum now exists as to what names to apply to each of the different crossbill types (this conundrum persists whether or not Groth's proposal to elevate the types

to species status is followed). It is not currently possible to tell which vocal type(s) are represented by some of the type specimens for named subspecies, and many of the available names applied to intermediate-sized "subspecies" (size classes II and III) may be synonyms. Groth notes that settlement of these uncertainties of nomenclature will require some independent means of distinguishing the identity of these type specimens. He suggests that the best hope for a solution to this problem lies in the development of a genetic signature for each vocal type based on analysis of DNA. Third, Groth's work provides a basis for others to clarify temporal and spatial patterns of crossbill distribution. Anyone with a good tape recorder can document the kinds of Red Crossbills they observe in the field. Sampling poorly-known regions like Central America and Alaska can reveal whether any vocal types remain to be described, and widespread systematic sampling will permit more precise assessment of the geographic distribution of each vocal type. Last, if data similar to what Groth has collected become available for Old World *Loxia*, then tape recordings could detect invasions among continents, which may be relatively common in this group and of great significance to the generation of an accurate phylogeny.

*Conclusions.*—Groth has met admirably Griscom's (1937) challenge to identify, and diagnose the characteristics of, the varieties of Red Crossbills in North America. For this contribution his monograph will stand as a classic in ornithological systematics. Whatever we choose to call the types of crossbills, Groth has demonstrated consistent and reliable means of recognizing biologically real forms. Some of the most recent work on crossbill evolution (Benkman 1993) and reproductive biology (Coombs-Hahn 1993) would not have been possible without this new interpretation of crossbill systematics. All future work should use Groth's analysis as a foundation.—THOMAS P. HAHN, Department of Zoology, NJ-15, University of Washington, Seattle, WA 98195.

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### WHAT'S WRONG WITH MIGRANTS?

**Ecology and Conservation of Neotropical Migrant Land Birds.**—John M. Hagen III and David W. Johnston [eds.]. 1992. Smithsonian Institution Press, Washington, DC. xiii + 609 p. ISBN 1-56098-113-X HB—\$48, 1-56-98-140-7 PB—\$17.95.

Migratory birds, especially those that move seasonally between the Nearctic and Neotropical regions, have become a current conservation *cause célèbre* among ornithologists, environmentalists, and policymakers (witness the book's preface by Congressman G. E. Studds). From the pages of the *New York Times* and *National Geographic* to *The Condor* and *Science*, much has been written about the problems facing these birds, many of which are declining. Adding to the growing literature, this book is the proceedings of a 1989 symposium hosted by Manomet Bird Observatory. From that symposium emerged 51 papers that—for better or for worse—represent the state of our knowledge about the ecology and conservation of these birds. This is not the first time that such a gathering has produced a major publication. A 1977 symposium on the same general topic resulted in a very similar proceedings in 1980: *Migrant birds in the Neotropics: ecology, behavior, distribution and conservation*, edited by A. Keast and E. S. Morton. It is, therefore, appropriate to highlight in this review the progress that has occurred during the intervening 12 years.

Much has happened. In addition to an expansion of funding that has fueled the accumulation of more basic scientific information, there is now a major coordinating program—the Neotropical Migratory Bird Conservation Program (a.k.a. Partners in Flight)—organized by the National Fish and Wildlife Foundation. A central challenge for this program is to bring order to the largely uncoordinated, provincial, isolationist approaches that have characterized field work on these complex species populations. The organization and content of the present volume are in many ways symptomatic of why this challenge looms especially large.

The book is divided into main sections that represent how researchers and conservationists have typically approached their tasks: trends in populations, the nonbreeding season, the breeding season, and hemispheric perspectives. By compartmentalizing the problems into these units, it is difficult to fully comprehend the dynamics of populations as complex as these migrants. Indeed, only one chapter in these proceedings—on the Cerulean Warbler by C. S. Robbins, J. W. Fitzpatrick and P. B. Hamel—attempts to cover the entire geographic range and annual cycle of a species; other chapters address isolated snippets of complex temporal and spatial phenomena. The parable of the blind men examining an elephant comes to mind as capturing the essential difficulty of this approach.

The section on detecting trends in populations illustrates clearly the difficulty of making sense out of various studies, each well done in its own right, that have their own unique methodological, temporal and geographical biases. Reading the 12 chapters, one is

quickly exasperated by inconsistencies and contradictions in honest results and left hungry for a synthesis that never comes. Still, the papers represent fairly the state-of-the-art in large-scale, long-term bird population monitoring, and the volume of data and subsequent analyses greatly exceeds what was available in 1977. Yet, in the intervening 12 years little clarity has emerged. Populations have changed, but documenting those changes with ever increasing sophistication has not yielded commensurate insights into underlying problems.

Much attention has focused on possible problems for migrants during the nonbreeding season. Environmental changes in the Neotropics are certainly occurring so rapidly and on such a massive scale that it is difficult for biologists to monitor the magnitude of the ecological effects. How major landscape changes are impacting overwinter survival rates of birds remains elusive. Greenberg's introductory chapter identifies the touchstone of success in clarifying and correcting the problems: broadly-based approaches that integrate Neotropical migrants into studies of tropical ecosystems and biodiversity, in general. The types of narrowly focused studies which are prevalent in the proceedings' 20 chapters fall short of this ideal. Still, since 1977 much progress has been made as the spatial and temporal scales of studies have expanded. Continued expansion should eventually allow us to evaluate the species-specific consequences for overwinter survival of occupying various types of habitats within winter ranges. Until we can do that, blaming population declines on events in the tropics will remain speculative and contentious.

In contrast to studies on wintering areas, work on migrants during the breeding season is building a convincing case for Nearctic contributions to population declines. In 1977, problems on the breeding grounds were largely excluded from the discussion, despite evidence for their importance. This time long-term, large-scale studies are shedding new insights into how habitat changes and impaired reproduction may be playing a major role. Among the nine chapters in this section, T. W. Sherry and R. T. Holmes' 10-year studies of American Redstarts in the Hubbard Brook forest are especially insightful. If nest predation and brood parasitism are the main factors affecting recruitment into this population in relatively unfragmented habitat, then it is amazing that other populations, such as those studied by S. K. Robinson and others in fragmented midwestern landscapes, can persist at all in the face of severe reductions in nesting success. The chapter by Villard, Freemark and Merriam uses metapopulation theory to explore some of the complex population phenomena that characterize these birds. It is a model that others should adopt.

The smallest section of the proceedings (with only six chapters, a few of which seem misplaced) deals with hemispheric, year-round perspectives. More work at this scale, which integrates information on populations throughout a complex annual cycle, is needed. I believe that the most insightful future studies will be ones that pay comparable attention to the dynamics of a species' population throughout its range and throughout the year.

There are some patterns throughout these proceedings that are disturbing to me. First, only three papers were authored by Latin American ornithologists, although the last article is jointly written by the 12 Latin American participants (out of 300) at the symposium. Second, there is a recurring theme, though eschewed by a few authors, that our top priority is to collect more data. Do we really need to be more precise in our estimates of rates of declines, of rates of nest failure, of rates of habitat loss and fragmentation in order to take conservation action? I hope not, for our current data suggest dire consequences of delaying. J. Terborgh's opening chapter (the symposium's plenary address) advocates the right mix of basic natural history, applied research, and conservation action, while remaining sensitive to the different geographical, cultural and socio-economic conditions that exist among habitats occupied by migratory birds. In many respects, this chapter comes closest to the synthesis that the proceedings so badly need.

My guess is that these proceedings have had and will continue to have important impacts (e.g., they helped in the initiation of the Partners in Flight Program), but that a similar symposium held in 10 years will reach very different conclusions. The ecology and conservation of Neotropical migratory birds will remain vigorous areas of study and conservation action in the 1990s. These proceedings stand as the benchmark on which future studies will be designed and future conservation activities devised.—STANLEY A. TEMPLE, Department of Wildlife Ecology, University of Wisconsin, Madison, WI 53706.

#### BLINDED BY SCIENCE: PRECONCEPTIONS CONSTRAIN UNDERSTANDING

**The Pinyon Jay.**—J. M. Marzluff and R. P. Balda. 1992. T. & A. D. Poyser, London, U.K. 317 pp. HB \$49.95. ISBN 0-85661-064-X.

*The Pinyon Jay* begins close to the skin, hot at the level of the organism and cools at the edges of theory. The book is loaded with first-class natural history. It is rich in photos and maps and graphs and sonograms and is supported by beautiful illustrations by Tony Angell, Terry Vaughan and Caroline Bauder.

Angell's drawings convey the feel of the birds in a way that scientific narrative may not. The solitary, frost-shrouded female, incubating in a snowstorm above the first line of Chapter 8, conveys the fragile vulnerability of the breeding bird and draws the reader into the moment like good haiku.

One of the sustaining pleasures of this book is the enthusiasm the authors bring to their study. Anyone who has been snagged by the study of nature recognizes Balda's heart-stopping excitement when he tells of discovering 14 nests in his first four hours in the field. Of such pleasure is the stuff of obsession, and Balda's obsession gave rise to 25 years of observation and experimentation.

*The Pinyon Jay* is testament to the enduring value of long-term quantitative field investigation. The data on vocalization, flock composition, breeding phenol-

ogy and the provision of extended-family trees by clan, birth and pair-bond are pure gold. This is the kind of information that lives on long after authors, reviewers, and their theories are gone. Marzluff and Balda have given us a treasury for hypothesis testing and comparative study.

In fact, *The Pinyon Jay* is a gold mine whose richest veins are sometimes under-excavated. For instance, the authors should be encouraged to examine more closely the evolutionary significance of their data on helper and non-helper lineages. Buried in Chapter 9, this information represents the most compelling example of the selective advantages of helping at the nest ever published.

In their treatment of helper and non-helper lineages, Marzluff and Balda document the differential proliferation of known genetic lineages in a population over time. In at least three ways, they describe how lineages with helpers are more successful than lineages without. If the authors don't quickly excise this material and publish it in *Science* or *Nature*, someone else will.

*The Pinyon Jay* is also embarrassingly full of another kind of vein, the kind that needs stripping, not mining. They are veins of unsightly bias. Now, let it be said that Marzluff and Balda are not more guilty of bias than the rest of us. However, theirs happens to be a text that presents a particularly good example of the ways in which unconscious, community-wide bias can limit scientific methods, observations and interpretations.

Because it has appeared at a time of pervasive cultural change, *The Pinyon Jay* stands as a good example of what can happen when unconscious bias makes us cut our natural history to fit our theoretical cloth. Sometimes, the cutting edge of theory slices off considerable hunks of understanding. In *The Pinyon Jay*, the investigation and interpretation of natural history were cut to fit current theory. Because the book is focused on the "how" and "why" of social behavior, theory dictated "what" was and was not examined. Thus, *The Pinyon Jay's* success depends not only on the authors' open-mindedness, but also on the discipline's.

However, if we, as practicing scientists, were true to our goal of employing multiple working hypotheses, the fact that Pinyon Jays rarely fight and that those who do are juvenile and, seasonally, female, might have caught the authors' attention. These data form a large part of the information presented in *The Pinyon Jay*.

The way this book is structured, the way its questions are asked, illustrates how constraining is the assumption that male linear dominance hierarchies must form the backbone of all social organization. For instance, in their treatment of intraspecific aggression, the weight of theory rests so heavily on the authors' shoulders that they do not trust the obvious conclusions that arrive after watching 25 years of Pinyon Jays *not* fight. That Pinyon Jays rarely fight is not lost on the authors. They comment on the harmony of Pinyon Jay groups even at the beginning of Chapter 6: *Dominance relationships within the flock*. In this chapter, the authors pursue what has long been sociobiology's high ground, the linear dominance hierarchy, more specifically, the male linear dominance hierarchy.

Failing to find naturally occurring aggression, the authors and their coworkers set up artificial feeding stations and watched to see whether the birds would fight over food. Amazingly enough, although hundreds of birds came to feeders, fighting was still rare. In fact, in two years of experimental and statistical manipulation, the authors were able to identify only 14 birds whose behavior yielded anything remotely resembling a linear dominance hierarchy.

Revealingly, there are naturally occurring situations in which Pinyon Jays fight much more fiercely than they do at their feeding stations. For example, "attacks escalate and birds become locked in combat with talons and bills brought into play. . . . Fighting birds lock feet and flap vigorously as they fall to the ground. Birds peck at each other with forceful stabs during these encounters" (p. 97–98).

How do the authors treat these fights? Do they count them? Do they develop a quantitative scale of aggression? Do they include them in their ethograms? No. Here is how Marzluff and Balda analyze the only real intraspecific aggression they have ever observed among Pinyon Jays: "In late winter and early spring . . . birds become aggressive towards other flock members. Mated females seem especially testy. Their hormones surge as the breeding season approaches, giving them the avian equivalent of PMS which we call PBS (Pre-breeding syndrome)!" This is the kind of paragraph that made the publishers of *MS Magazine* rich. Unfortunately, it is all the authors have to say about seasonal changes in naturally occurring aggression.

In fact, a close reading of Chapter 6 makes it clear that the authors, like the protagonist of a 1980s rock song, have been *blinded with science*. Their science told them to look for adult male dominance hierarchies and that is what they did. Even within the context of their

quest, the conceptual constraints imposed by a theory-laden perspective caused them to miss one of their most intriguing results.

Of 960 "aggressive acts" at the feeding stations, two-thirds were initiated by juveniles. "These young," write Marzluff and Balda, "were very belligerent, and were constantly squabbling amongst themselves. . . . However, they had fewer than expected squabbles with all other cohorts" (p. 104–105).

Unlike many birds, Pinyon Jays appear to become less aggressive as they mature. The authors were startled to discover that the adult male, revealed by their statistical manipulations as the "alpha" dominant, "fought so seldom (only 12 times), we never suspected his high social position in the flock" (p. 110).

Stepping outside the conceptual constraints imposed by human competitive individualism, these findings suggest that, among highly social species whose very survival depends on group membership, selection has favored the evolution of tolerance and non-aggression. This is certainly one conclusion that can be drawn from *The Pinyon Jay*. The reason it is possible for the reader to draw conclusions that apparently were invisible to the authors of *The Pinyon Jay* is that, despite the authors' occasional lapses into conceptual tunnel vision, their book is rich in natural history.

*The Pinyon Jay* makes great reading. As I read it, I found myself highlighting and making notes and interrupting other people with "Hey, listen to this...". Whether it makes you want to cheer or fight, it will never bore you. Flaws and all, this book is rich and provocative. Its exclusions invite more books; its inclusions secure it an enduring place in the annals of ornithology.—MARCY F. LAWTON, Department of Biological Sciences, University of Alabama, Huntsville, AL 35899.