More Than Kin and Less Than Kind: The Evolution of Family Conflict

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Reviews

Edited by R. Todd Engstrom

The following critiques express the opinions of the individual evaluators regarding the strengths, weaknesses, and value of the books they review. As such, the appraisals are subjective assessments and do not necessarily reflect the opinions of the editors or any official policy of the American Ornithologists' Union.

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More Than Kin and Less Than Kind: The Evolution of Family Conflict.—Douglas W. Mock. 2004. The Belknap Press of Harvard University Press, Cambridge, Massachusetts. 267 pp., 21 black-and-white photographs. ISBN 0-674-01285-2. Cloth, $27.95.—Douglas W. Mock of the University of Oklahoma has dedicated much of his research career to careful examination of family life in herons and egrets. Through a series of studies combining field observation with rigorous hypothesis-testing, Mock and his students and collaborators have significantly increased our understanding of the proximate and ultimate causes of hatching asynchrony, siblicide, family conflict, and brood reduction in birds. At its 121st Stated Meeting at the University of Illinois in August 2003, the AOU recognized that impressive body of work by naming Mock the recipient of its William Brewster Memorial Award for 2003.

Therefore, it seems entirely fitting that *More Than Kin and Less Than Kind* should be published less than one year later. In it, Mock summarizes his more than 20 years of work on avian family life while simultaneously synthesizing a large and fascinating literature on the evolution of family conflict for both a general and a biological audience. The book is focused primarily on birds, but briefer considerations of family conflict in plants, insects, mammals, and other organisms enrich the discussion of such topics as sibling rivalry under resource limitation, intergenerational conflict, hatching asynchrony, obligate and facultative siblicide, infanticide, and male–female conflicts over parental care.

This is one of a number of excellent recent books in evolutionary biology (e.g. Olivia Judson's *Dr. Tatiana's Sex Advice to All Creation* and Marlene Zuk's *Sexual Selections: What We Can and Can't Learn About Sex from Animals*) that are targeted primarily at a general readership but are sufficiently well referenced to be useful to specialists. The 15 chapters of *More Than Kin and Less Than Kind* include 287 superscripted endnotes and a 19-page Works Cited section that encompasses nearly 300 references. Even avian biologists and behavioral ecologists who are familiar with the topics considered in the book will learn plenty from Mock's engaging survey of the field.

The book is beautifully written. As someone who has spent much of his professional life teaching evolutionary biology to undergraduates, I found myself pausing frequently to admire Mock's obvious abilities as a teacher. With patient but lively prose, Mock skillfully meshes lucid explanations of evolutionary theory with key natural-history observations, crucial experimental details, perceptive historical context, and amusing anecdotes. Mock is a keen observer, not only of the egrets and herons he has watched for so many years, but also of the nature of field biology (e.g. "moments of great exhilaration and discovery are rare outposts in the vast deserts of labor and tedium") and scientific discovery (e.g. "scientific knowledge is nothing if not ephemeral, and only nonscientists misinterpret that as a flaw"). Reading *More Than Kin and Less Than Kind* is like taking a course from a gifted teacher—an altogether enlightening, inspiring, and enjoyable experience.

Readers may quibble with some of Mock's analyses. For example, his view that Robert

Trivers's theory of parent–offspring conflict has shed relatively little empirical light on siblicide in birds will undoubtedly provoke some raised eyebrows. But Mock's perspectives are so clearly articulated and thoughtfully explained that even readers with dissenting views will be unlikely to object strenuously.

I highly recommend this book to anyone interested in the evolutionary biology of family conflict. It will be especially useful to ornithologists working on such topics as hatching asynchrony, siblicide, brood reduction, and parental care. And for anyone wanting to know how to write a scholarly biological book that will appeal to a general audience, *More Than Kin and Less Than Kind* should be essential reading.—Ronald L. Mumme, *Department of Biology, Allegheny College, 520 North Main Street, Meadville, Pennsylvania 16335, USA. E-mail: rmumme@allegheny.edu*

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Magnificent Mihirungs. The Colossal Flightless Birds of the Australian Dreamtime.—Peter F. Murray and Patricia Vickers-Rich. 2004. Indiana University Press, Bloomington, Indiana. vii + 410 pp. ISBN 0253342821. Quarter cloth and boards, $75.00.—This is an exhaustive, superbly illustrated treatment of the Dromornithidae, a family of large to very large flightless birds known from fossils from Australia and Tasmania. The fossils range in age from a rather equivocal early Eocene partial footprint to the late Pleistocene *Genyornis newtoni*, which died out about 50,000–30,000 years ago, presumably as a result of human predation and habitat modification by fire.

The book is divided into four major sections: "Discovery," a short chapter on the history of fossil finds and their discoverers; "Systematics and Morphology," the longest section, containing paleontology, descriptive osteology, systematics and phylogeny, and evolutionary origins; "Paleobiology," consisting of functional morphology, biomechanics, weight estimates, and so forth; and "Paleoecology," which treats associated fauna and flora, biotic history of Australia, possible feeding habits, and the like. The book's concept, organization, and visual presentation are brilliant, but the execution has some serious flaws.

The first known species, *Dromornis australis*, was described in 1874 by Richard Owen, and for almost a century and a quarter the dromornithids were associated with paleognathous ratites such as emus and cassowaries. The name "mihirung" was originally adopted for these birds by Rich (1979) from Aboriginal traditions of giant emus (*mihirung paringmal*) believed possibly to apply to *Genyornis*. It was not until the seminal paper of Murray and Megirian (1998), based on newly collected Miocene skull material, that the anseriform relationships of the Dromornithidae were revealed. Six years later, Murray and Vickers-Rich glibly and rather misleadingly refer to these birds as gigantic geese and imply that their nonratite nature should have been apparent earlier.

E. C. Stirling and A. H. C. Zietz, who were director and assistant director, respectively, of the South Australian Museum, excavated and published impressive monographs on extensive fossil material of *G. newtoni* from 1896 to 1913. According to Murray and Vickers-Rich,

> Stirling and Zietz's comparisons and discussion of *Genyornis* morphology and relationships are so intently focused on ratite osteology that as each structural incongruity is realized they dutifully note it, adjust their spectacles, and move on as though there were no alternatives. (p. 59)

Furthermore, the skull "contains ample evidence to have placed the *Genyornis* [*sic*] among the Neognathae even at the time Stirling described it" (p. 60). The penetrating clarity of Vickers-Rich's hindsight is a scientific marvel, for in her own monographic treatment of the Dromornithidae (Rich 1979) they were ratites from start to finish.

For the record, the first person in the history of the Dromornithidae to insist that these birds could not be ratites was unlovable old cladist-baiting *moi* (Olson 1985). This seemingly significant fact, acknowledged by Murray and Megirian (1998), was omitted by Murray and Vickers-Rich. Although the reference can be found in the bibliography, it is not cited in the text.

Although I was pleased to learn of the evidence that the dromornithids were derived from Anseriformes, one might now fairly ask "Derived how many times?" Nowhere here or in Rich (1979) is there a clearly articulated argument or character analysis demonstrating that the Dromornithidae constitute a monophyletic group. The skull and foot structure of the clade that includes *Genyornis* are very different from the skull and foot, when known, of the other members of the family. If all these birds are large flightless derivatives of Anseriformes, why might not the *Genyornis* clade have evolved large size and flightlessness independently within the Anseriformes? In fact, because details of the skull of *Genyornis* are poorly known (owing to the incomplete, crushed nature of the available specimens), the evidence that the relationships of this group lie with the Anseriformes is less satisfactory than in older taxa for which better skulls are known. For example, the large, blade-like retro-articular process shown for *Genyornis*, one of the most characteristic features of the Anseriformes, appears to be an almost entirely hypothetical construct (fig. 107, p. 127). Monophyly of the Dromornithidae is, therefore, an issue that still needs to be addressed.

Given that the dromornithids, or at least some of them, belong in the Anseriformes, where do their relationships lie within the order? This question gets more consideration than that of monophyly, but its treatment is badly distorted by prejudices and by another, more serious, omission of pertinent literature.

The authors are dismissive, even derisive, of the suggestion of Olson and Feduccia (1980) that screamers (Anhimidae) might be secondarily derived macrofeeders that evolved from a filter-feeding ancestor. They conclude that macrofeeders such as screamers and the Magpie Goose (*Anseranas semipalmata*) represent the primitive condition in Anseriformes and that filter feeding is derived. They also state that the Anseranatidae have no fossil record. Did they simply overlook the early Eocene *Anatalavis oxfordi* (Olson 1999)? That species was published in one of the quadrennial proceedings of the Society of Avian Paleontology and Evolution, each of which has become a primary source in avian paleontology and ought to be familiar to everyone in the field. *Anatalavis oxfordi* was based on an excellent associated skeleton, lacking the hindlimbs, from the London Clay and was referred to the Anseranatidae on the basis of highly distinctive derived characters of the pectoral girdle. The bill morphology indicates very clearly that it was a filter-feeder. The type species of *Anatalavis* from marine deposits in New Jersey is either late Cretaceous or earliest Paleocene. Thus, the earliest certain member of the Anseriformes, which is also the earliest member of the Anseranatidae, was a filter-feeder. This strongly suggests that the macrofeeding Magpie Goose is secondarily derived from a filter-feeder. Screamers, too, may thus be so derived.

Unfortunately, the two known early Eocene taxa of Anhimidae, from Wyoming and England, have never been described. Those were not filter-feeders and lacked many of the autapomorphic characters of modern screamers, such as great skeletal pneumaticity and the double-spurred carpometacarpus. Murray and Vickers-Rich make a weak case for dromornithids being screamer-like, on the basis of the supposed lack of uncinate processes and the presence of a knob at the distal end of the pectoral crest of the humerus. Eocene screamers lack that knob, however. Furthermore, the authors show a rib of *D. stirtoni* (fig. 60) with a large, very distinct facet for an uncinate process. Such a facet would seem to indicate a synovial joint, and I doubt that such would form were there not a bony uncinate process to articulate with it.

In the end, no good case is made for the relationships of the Dromornithidae within the Anseriformes, even at the level of family. Although the authors favor a closer relationship with either the Anhimidae or Anseranatidae, it would seem that even the Anatidae, through a terrestrial goose-like form such as *Cereopsis,* cannot be ruled out.

The generic-level systematics used in this book is a complete mess. To begin with, the type species of *Dromornis*, Owen's *D. australis*, is known only from a single femur and remains practically the only Pliocene fossil of the family. The paucity of Pliocene material makes it uncertain that the late Miocene *D. stirtoni* is correctly referred to *Dromornis*. The close relationship between the middle Miocene *Bullockornis planei* and the larger *D. stirtoni* that succeeds it is emphasized repeatedly. At first implicitly (p. 273), and then more explicitly (p. 330), it is suggested that this is an ancestral–descendent relationship. Why, then, are the two species maintained in separate genera?

Then we have the species that was originally described by Rich (1979) as *Ilbandornis*? *lawsoni*. The only change in status for this species in 25 years is that quotation marks were added around the genus, so that everywhere it appears as "*Ilbandornis*?" *lawsoni*. Do the quotation marks make the identity even more uncertain than before, or make us more certain of the uncertainty, or what? The illustrations and descriptions make it very clear that this late Miocene species has nothing to do with *Ilbandornis* but shares distinctive characters with *Genyornis*. It would have been far preferable to have simply called it *G. lawsoni* rather than carry it through the entire book, befogged in punctuation, in a genus to which it patently does not belong. Another taxon is referred to throughout as "?*Bullockornis*" sp. Does the fact that the question mark comes before the genus here, rather than after, have any significance? The quotation-mark fetish reaches its apogee with "*Dromornis*" *australis* (p. 304). Because *australis* is the type-species of *Dromornis*, it belongs in *Dromornis* by definition, and the quotation marks add nothing but confusion.

The following example epitomizes the addled systematics used in this book:

> The genera [*sic* = species] *Ilbandornis woodburnei* and "?*Bullockornis*" sp. have slightly more derived morphological states and share no definite synapomorphic states with *Genyornis* or "*Ilbandornis*?" *lawsoni*. They retain several plesiomorphic states but also share some derived states with *Bullockornis planei* and *Dromornis stirtoni*. Despite the current retention of distinct generic names, they probably represent species of a single genus, among which were structurally suitable ancestors for *Bullockornis planei* and ultimately *Dromornis stirtoni*. "?*Bullockornis*" sp. represents a species close to the ancestry of *Ilbandornis woodburnei*. Cranial fragments are known for "?*Bullockornis*" sp. and *Ilbandornis woodburnei*, indicating a close relationship. (p. 329)

It is a great pity that a competent systematist was not enlisted to sort out this horrendous farrago of indecision before such an important book was published. Still, because of the superior nature of the illustrations, it is possible for an intelligent reader to make some sense of part of the evolutionary history of these birds, in spite of the disastrous nomenclature.

A lengthy chapter on body mass estimates goes into great detail to document three different methods of estimating mass and rather diffidently concludes that *D. stirtoni* may have been the heaviest bird that ever lived. Here, as elsewhere throughout the book, there is much additional information and speculation on other large flightless "ground birds" such as *Diatryma*, moas, and phorusrhacids, so that the volume should become an essential reference for anyone studying those birds.

Sections on appearance and posture, locomotion, and feeding apparatus are replete with beautiful anatomical reconstructions. As with any group of organisms known only from fossils, one must rely to a greater or lesser extent on conjecture, and there will doubtless be more than one interpretation of the structure of dromornithids. But I have never known any two functional anatomists to agree on anything, even concerning living birds, so this should not be regarded as a detraction.

Complementing the functional anatomical discussions are chapters on paleoecology and the fauna and flora associated with dromornithids through the Cenozoic. What emerges is a most useful overview of the evolution of terrestrial biotas on the Australian continent that should be particularly useful for those outside Australia who are unfamiliar with this history. These sections are not without a good measure of advocacy, conjecture, and redundancy, but the overall conclusions seem quite reasonable and believable to me.

In a nutshell, the dromornithids are presented as large, browsing herbivores that evolved in open-canopy scleromorphic forests. They were capable of moving over considerable distances with reasonable celerity, and the taxa at any given period are believed probably to have been widespread on the continent. The authors repeatedly argue that most of Australia was not a wet, closed-canopy rainforest as apparently has often been asserted. From the middle Miocene onward, dromornithid diversity declined, as did overall body size; in contrast, diprotodontids and other large herbivorous marsupials show overall increases in size over the same interval. Those animals are believed to have been better adapted than dromornithids to the decreasing quality of browse as climatic conditions became drier and plants responded accordingly.

Following the main text is an idiosyncratic appendix entitled "Basic Avian Skeletal Anatomy," which emphasizes comparisons between taxa thought relevant to understanding the osteology of dromornithids, namely emu, magpie goose, and megapode. Terminology is supposed to be based on Howard (1929) rather than adopting "the strictly formal Latin *nomina anatomica*" (p. 337), as though that were a medieval incunabulum rather than a citable reference (Baumel 1993). The reader is unlikely to be much enlightened by the tedious descriptive text, but the section is salvaged by the excellent illustrations. Discrepancies in anatomical nomenclature are evident: e.g. "furculum" (fig. A1) vs. the correct "furcula" (fig. A12) or "pygidium" (fig. A12) vs. the correct "pygostyle" (fig. A1). I suspect that there are even more serious errors to be found here, especially among the details of the cranium.

Because many of the legends are long and complex, one wishes that more labeling had been included directly on the figures. Nevertheless, the quality of the copious illustrations is uniformly excellent. The stunning life-reconstruction of a pair of *Bullockornis planei* by Peter Trusler that adorns the dust jacket is one of the most arresting of its kind that I have ever seen. Because many librarians discard dust jackets, it is fortunate that this painting is reproduced in color on the half-title and title pages. The two-page black-and-white reproduction that appears later in the text is washed-out and completely ineffectual.

The Glossary may have been an afterthought, perhaps at the insistence of an editor, in which a selection of words were randomly picked from the text and crude definitions supplied. This makes for entertaining reading, as there are some real howlers. Definitions may be completely wrong ("Alpha taxonomy: A classification of organisms based on overall similarity of morphology") or misleading or unhelpful ("Dorsal: The top side"; "Lacrimal: A bone of the skull"). Mandibles are defined as "lower jaws," though the term "upper mandible" is used throughout the book. "Endocranial fossa" is defined only as "the space occupied by the brain," which called to my mind the jar of alcohol in which Einstein's brain now floats. Is that an endocranial fossa? We can only imagine the perplexity of the nonscientist who, fifteen lines down, finds that "fossa" is "a slender cat-like carnivorous mammal from Madagascar."

Minor errors of every description are disturbingly frequent: typographical, spelling, grammatical, word-choice, factual, bibliographic. These start on the first page of text (Acknowledgments: p. vii), where Brad Livezey appears as "Brad Linezen," and continue throughout the book to the last page of the bibliography, where we find the following reference: "Zeitz, A. C. 1894. *Nature* 50:184–208." The name should be spelled "Zietz," not "Zeitz," and the article was not authored by Zietz anyway, but by Stirling. The title should not have been omitted, and the actual pagination is 184–188, 206–211. Out of curiosity, I checked each of the other 10 references on that less than half a page and found 11 additional errors, including completely erroneous pagination for another reference.

What is termed at one point the "Magnificent Teratorn" (p. 255) is later called "Great Teratorn" (p. 275) but is never identified by its scientific name (*Argentavis magnificens*). Then, *Teratornis* is erroneously stated to have been "the largest flying bird known" (p. 319), when that honor actually goes to *Argentavis*. And so on.

Don't get me wrong. This is still a highly meritorious and impressive book. Anyone with an interest in morphology, paleontology, and evolution of birds; in the evolution of terrestrial ecosystems; or simply in exquisite scientific illustration, will find much to learn and enjoy in these pages. In concluding, the authors note some recent discoveries and remark that "after a decade of digging, preparing, comparing, measuring, and hypothesizing, our effort remains a work in progress" (p. 335). My sincere hope is that, in another decade, knowledge of dromornithids will have advanced so far as to merit a reissue of this work in which the new information can be incorporated and all the flaws of the present edition corrected. This might then become one of the great classics in both ornithology and paleontology.—Storrs L. Olson, *Division of Birds, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560, USA. E-mail: olsons@si.edu*

Literature Cited

Baumel, J. J., Ed. 1993. Handbook of avian anatomy: Nomina anatomica avium, 2nd ed. Publications of the Nuttall Ornithological Club, no. 33.

Howard, H. 1929. The avifauna of the Emeryville shellmound. University of California Publications in Zoology 28:301–394.

Murray, P. F., and D. Megirian. 1998. The skull of dromornithid birds: Anatomical evidence for their relationship to Anseriformes. Records of the South Australian Museum 31:51–97.

Olson, S. L. 1985. The fossil record of birds. Pages 79–238 *in* Avian Biology, vol. 8 (D. S. Farner, J. R. King, and K. C. Parkes, Eds.). Academic Press, New York.

Olson, S. L. 1999. The anseriform relationships of *Anatalavis* Olson and Parris (Anseranatidae), with a new species from the Lower Eocene London Clay. Smithsonian Contributions to Paleobiology 89:231–243.

Olson, S. L., and A. Feduccia. 1980. *Presbyornis* and the origin of the Anseriformes (Aves: Charadriomorphae). Smithsonian Contributions to Zoology, no. 323.

Rich, P. V. 1979. The Dromornithidae, an extinct family of large ground birds endemic to Australia. Bureau of National Resources, Geology and Geophysics Bulletin 184:1–196.

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Speciation.—Jerry A. Coyne and H. Allen Orr. 2004. Sinauer Associates, Sunderland, Massachusetts. xiii + 545 pp. ISBN 0-87893-091-4. Cloth, $89.95. ISBN 0-87893-089-2. Paper, $54.95.—This is an important book, perhaps the most important work on the subject of speciation in decades. The species problem—explaining the origin of discrete groups living together in nature—is undoubtedly one of the greatest questions in all of biology. I found the book's logic extremely compelling. The authors first establish the existence of the phenomena under study—in this case, the reality of species. They unapologetically justify the biological species concept as an appropriate framework for studying the origin of species. And they are explicit about what they consider to be the central conceptual theme in speciation research: the origin and evolution of reproductive isolating barriers. Coyne and Orr do not dabble in semantics or philosophy, and the book cuts quickly to the process of species formation, relegating the traditional debate (or quagmire) over species concepts to a carefully worded appendix.

The remainder of the book is a tour and status review of the most significant facets of the speciation process: the geography of speciation, the nature of isolating barriers, the genetics of reproductive isolation, speciation by reinforcement, polyploidy, speciation by hybridization, the relative importance of natural selection and genetic drift, and macroevolutionary considerations. Each chapter follows a predictable format: the authors examine theoretical and experimental evidence, as well as evidence from nature. They critically revisit the literature (including their own work) and provide their own conclusions and synthesis. Through it all, the authors demand testable hypotheses and insist on examples from nature wherever possible. Such hard-nosed empiricism, from two scientists who clearly understand the theory, is very refreshing.

Some readers may find Coyne and Orr to be overly critical—perhaps downright negative—in their assessment of previous research. They hold all studies to a hard standard, and it occasionally seems difficult to do anything properly in their world. But they are at least consistent, and they clearly indicate what needs to be done in future studies. Their extensive discussion of sympatric speciation (Chapter 4) is a good example of this. To satisfy sympatric speciation, they hold a long list of potential cases to extreme scrutiny and a standard of evidence that is difficult to obtain. They conclude that, although several promising cases exist, sympatric speciation appears to receive far more attention than it warrants. One may disagree with their dismissal of some putative cases of sympatric speciation, or with their null hypothesis of allopatry—that speciation is allopatric until proven sympatric. But in the end, the lack of evidence for sympatric speciation when it should be detected (e.g. among species on small oceanic islands or among host-specific parasites) makes it difficult to believe that speciation under sympatric conditions is common.

One of the many highlights of the book is a lucid discussion of postzygotic isolation (Chapter 7). Why do hybrids often suffer reduced fitness, and what are the genetic and ecological bases of such fitness reduction? The evolution of postzygotic isolation through accumulation of genic incompatibilities is treated at length, because such gene interactions may be a critical ingredient in allopatric and parapatric speciation. Postzygotic isolation can arise because interbreeding between genetically divergent populations brings together alleles that have never been tested by natural selection in the same genome. Hybrid progeny, which may comprise a mixture of derived alleles that normally do not occur together, suffer reduced fitness because of between-locus incompatibilities. Of course, such incompatibilities may be complex, involving many loci, and there may be many such incompatibilities separating a pair of sister species, each contributing to reproductive isolation.

It now seems clear that such incompatibilities in diverging populations play a large role in the evolution of postzygotic isolation, and much of our understanding of the issue derives from the authors' own work on the relationship between genetic divergence and reproductive isolation. In Chapter 8 (Genetics of Postzygotic Isolation), they review recent work on the types of genes that cause postzygotic isolation, the developmental consequences of genic incompatibilities, the numbers of genes contributing to postzygotic isolation, and more. The authors do an excellent job with those complex issues, particularly the question of how many genes cause postzygotic reproductive isolation—a difficult question to frame, much less answer. A pair of closely related but reproductively isolated species may now be separated by hundreds of incompatibilities, but complete postzygotic isolation may have originally been caused by a small fraction of the current incompatibilities. And every case may be unique: there may be thousands of possible non-overlapping paths to complete postzygotic isolation.

The most exciting and novel aspect of the book is its extensive use of phylogenetic and comparative approaches to address the evolution of reproductive isolation. Coyne and Orr do not simply make passing reference to the implications of speciation mechanisms for macroevolutionary pattern. Rather, they claim that macroevolutionary studies themselves may hold the key to understanding mechanisms of speciation. With the recent proliferation of molecular phylogenetic data, there has been a resurgence of interest in rates of evolutionary diversification. It is now possible to ask questions like "how much do evolutionary rates vary among passerine clades" and (perhaps more interestingly) "why do evolutionary rates vary among passerine clades?" In the latter question, we are primarily interested in how individual traits within species, or properties of species themselves, relate to rates of speciation and extinction. There are now many examples of traits that are positively correlated with diversification rates (Chapter 12: Speciation and Macroevolution)—traits associated with sexual selection in animals, for example.

Coyne and Orr propose that such correlations can be used to infer the isolating barriers that typically cause speciation: if a trait creates additional isolating barriers when reproductive isolation is already complete, how can that trait increase rates of speciation? Traits that increase speciation rates should thus be primary causes of reproductive isolation. That line of reasoning helps address a fundamental problem that creeps up repeatedly throughout the book: given that many pairs of sister species are separated by multiple isolating barriers, how can we ever determine the nature of the barrier(s) that initially caused reproductive isolation? The macroevolutionary approach is not without problems, because traits showing positive correlations with diversification rates could do so by either increasing speciation rates or decreasing extinction rates. However, the authors cautiously suggest a way to distinguish among those alternatives, and they conclude that such comparative analyses may be the best method of identifying isolating barriers important in speciation.

In summary, this book deserves to be read by evolutionary biologists, ecologists, and natural historians alike. The text is eminently readable, and the authors move seamlessly between molecular and classical genetics, mathematical theory, ecology, and comparative biology to review ideas both old and new. We see how traditionally disparate research traditions complement the study of reproductive isolation. Above all, it is the authors' remarkable gift for synthesis that makes the book so valuable. With its publication, Coyne and Orr have laid the foundation for a 21st-century research program on the biology of speciation.—Daniel L. Rabosky, *Department of Ecology and Evolutionary Biology, Corson Hall, Cornell University, Ithaca, New York 14853, USA. E-mail: DLR32@cornell.edu*

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Partners in Flight North American Landbird Conservation Plan.—T. D. Rich, C. J. Beardmore, H. Berlanga, P. J. Blancher, M. S. W. Bradstreet, G. S. Butcher, D. W. Demarest, E. H. Dunn, W. C. Hunter, E. E. Iñigo-Elias, J. A. Kennedy, A. M. Martell, A. O. Panjabi, D. N. Pashley, K. V. Rosenberg, C. M. Rustay, J. S. Wendt, and T. C. Will. 2004. Cornell Lab of Ornithology, Ithaca, New York. 84 pp., 47 color plates, 21 text figures, 8 tables, 4 appendices. Available from Terry Rich, PIF National Coordinator (208-378-5347 or terry_rich@fws.gov) for a requested $10 donation.—In 1989, the Manomet Bird Observatory sponsored a symposium that gathered researchers concerned about perceived declines in populations of birds that breed in North America and winter in the Neotropics. The results of that symposium (Hagan and Johnston 1992) were serious enough that the National Fish and Wildlife Foundation sponsored another meeting in December of 1990, where the Neotropical Migratory Bird Conservation Program, also called Partners in Flight (PIF), was formed to lead conservation efforts aimed at saving migrant birds.

Concern for migrant birds led to a tremendous burst in research activity in the early 1990s, culminating in a massive meeting of researchers and managers at Estes Park, Colorado, in September 1992. Papers from that meeting appeared both as a General Technical Report (Finch and Stangel 1992) and as a publication from Oxford University Press (Martin and Finch 1995). With the Estes Park meeting, the massive committee structure that constitutes PIF was put into place, with the goal of developing state-of-the-art conservation plans that would "keep common birds common."

Although PIF has been functioning since that 1992 meeting, few widely visible products have resulted from PIF activities since the 1995 book. The proceedings of a 1994 cowbird symposium appeared in 2000 (Smith et al. 2000); a second international symposium was held at Cape May, New Jersey, in 1995 but did not produce any publications; and a research statement from the AOU that was started in the early 1990s finally appeared in 2002 (Donovan et al. 2002). The appearance of inactivity regarding migrant birds is changing: we now have this publication, we will see the results of the third international symposium on migrant birds soon (Ralph and Rich, 2004), and there will be a separate volume on migration (but without a conservation emphasis) early next year (Greenberg and Marra 2005).

After my first reading of the *Partners in Flight North American Landbird Conservation Plan*, I wondered how much real "plan" there was. I expected details on how one saves migrant birds, but did not find them. I was a bit relieved when the first author of the publication noted at the recent AOU meeting that this really is a "broad-scale, multi-species assessment." Because detailed planning is so regionalized, they argue that one cannot have a single plan to cover North America. Rather, this publication is the international overview of PIF and how it hopes to conserve migrant birds throughout the breeding, wintering, and migration habitats used by hundreds of species on two continents. This attractive, well-written volume provides the blueprint for PIF, the broad guidelines needed both to conserve birds and to mobilize the many conservation agencies required to preserve such wide-ranging species. It points out priority species and regions and sets population goals, leaving the detailed management work for the nearly 100 regional plans that are either finished or in the works (they can be found at www.partnersinflight.org).

Rather than summarize the detailed structure of the plan, I will summarize the goals of this book with the following questions:

(1) *How do we choose priority species for conservation?*—Populations of many species are doing just fine; we need to determine which species are vulnerable, so that we can focus limited resources on their future populations. The authors demonstrate the procedures used by PIF to develop assessment scores for each species, how species with high scores are put on the

Watch List, and how other species with limited distributions are deemed Stewardship Species. Overall, the assessment process leads to a list of 192 species of "Continental Importance," which constitute the focus of the PIF plans.

(2) *Where do we focus our conservation efforts for migratory birds?*—A migrant may spend several months of its annual cycle in two locations, then use a variety of sites when moving between breeding and wintering habitats. Only one of those locations may be problematic and in need of conservation activities, but determining where limiting factors occur is difficult. Using assessment scores from various species, the book presents many maps depicting the distribution of vulnerable species throughout the annual cycle. The authors also present summaries based on avifaunal biomes, point out important areas for those regional lists of birds, and note where species go each winter.

(3) *What are the general principles for regional habitat management?*—In recent years, we have made tremendous progress in understanding the interaction between avian demography and a variety of measures of habitat, including not only habitat quality, but such modern concepts as habitat size and juxtaposition. The authors advocate the need for landscape-level habitats and a regional focus on management, recognizing that some species will require an overview that incorporates several of the regional conservation plans.

(4) *Can we estimate population sizes and establish population goals for the future?*—Using recent Breeding Bird Survey (BBS) data and modern habitat-distribution models, the authors have made global population estimates for all North American migratory birds. Those estimates are then converted into population targets for the future, following implementation of the regional flight plans. For example, there are an estimated 14 million Wood Thrush (*Hylocichla mustelina*) currently; the goal is to increase the population to 21 million in the future.

Concerns about the validity of such estimates led to the meeting of a panel of statisticians who have reviewed the methods used in making them (Thogmartin et al. unpubl. data). Recognizing the difficulty of the task, the panel points out a variety of weaknesses in the approach and suggests ways to improve it, many of which would require changes in how the BBS is run. Given that we still argue about how to count birds in a woodlot, any attempt to estimate bird populations on a continental scale is going to be controversial and require several rounds of improvements. In addition, the simple act of setting future goals based on these data seems to me to present conservationists with several problems, including choice of the target population and the sensitivity of estimates to assumptions in the models. As we try to encourage landowners to adopt conservation practices that often mean some sort of sacrifice, is the argument that we need 11 million more Dickcissels (*Spiza americana*) going to be a convincing one? I worry that false impressions of precision with these numbers could end up doing more harm than good.

(5) *What are our future needs, especially from research and monitoring activities?*—Several sections of this document deal with research and monitoring needs for the future. Monitoring needs are suggested primarily for species for which BBS does a poor job. Research needs are primarily those of Donovan et al. (2002). As a researcher, I was struck that their goal that "new research should be applied, and should move away from descriptive, correlative, and short-term work in small geographic areas, to large-scale replicated studies, controlled experiments, and long-term studies of demography" (p. 30) is the exact opposite of the research one can realistically hope to find support for in the current funding climate. The text also seems to imply that research into monitoring is our major need, whereas I have tried to make the case that we know far too little about the demography of these birds to know how to manage for them, particularly in winter (Faaborg 2002). I hope that their plea for more research support is heard, so that researchers can develop scientifically sound basic ecological principles on which to base our management throughout the annual cycle of these birds. I fear, though, that funding for such seemingly basic research is becoming increasingly hard to find.

This attractive book should help revive what I see as lagging interest in the conservation of migratory birds. I encourage anyone who is interested in these species (and that includes nearly all AOU members) to read it and see how the analysis of status and conservation goals fits those species on which he or she specializes. Even though the plan is the product of the best workers we have with regard to Neotropical migrants, I feel that we should consider it a work in progress, because we still have much to learn about Neotropical migratory birds.—John Faaborg, *Division of Biological Sciences, University of Missouri-Columbia, Columbia, Missouri 65211, USA. E-mail: faaborgj@missouri.edu*

Literature Cited

Donovan, T. M., C. J. Beardmore, D. N. Bonter, J. D. Brawn, R. J. Cooper, J. A. Fitzgerald, R. Ford, S. A. Gauthreaux, T. L. George, W. C. Hunter, T. E. Martin, J. Price, K. V. Rosenberg, P. D. Vickery, and T. B. Wigley. 2002. Priority research needs for the conservation of Neotropical migrant landbirds. Journal of Field Ornithology 73:329–350.

Faaborg, J. 2002. Saving Migrant Birds. University of Texas Press, Austin.

Finch, D. M., and P. W. Stangel. 1993. Status and Management of Neotropical Migratory Birds. U.S. Department of Agriculture, Forest Service General Technical Report RM-229.

Greenberg, R., and P. P. Marra, Eds. 2005. Birds of Two Worlds. Johns Hopkins University Press, Baltimore, Maryland. In press.

Hagan, J. M., III, and D. W. Johnston, Eds. 1992. Ecology and Conservation of Neotropical Migrant Landbirds. Smithsonian Institution Press, Washington, D.C.

Martin, T. E., and D. M. Finch, Eds. 1995. Ecology and Management of Neotropical Migratory Birds: A Synthesis and Review of Critical Issues. Oxford University Press, New York.

Ralph, C. J., and T. R. Rich, Eds. 2004. Bird Conservation Implementation and Integration in the Americas: Proceedings of the Third International Partners in Flight Conference. U.S. Department of Agriculture, Forest Service General Technical Report PSW-191. In press.

Smith, J. N. M., T. L. Cook, S. I. Rothstein, S. K. Robinson, and S. G. Sealy, Eds. 2000. Ecology and Management of Cowbirds and Their Hosts. University of Texas Press, Austin.

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The History of Ornithology in Virginia.—David W. Johnston. 2004. University of Virginia Press, Charlottesville, Virginia. x + 219 pp., 25 text figures, 7 tables. ISBN 0-8139-2242-9. Cloth, $35.00.—Virginia is arguably the birthplace of ornithology in North America. Captain John Smith and naturalist Mark Catesby were among the early describers of Virginia's common birds. David Johnston's book, however, begins by taking the reader back to the Tertiary period, some 65 million years ago, with Storrs Olson's description of fossils from tidewater Virginia. John Guilday, studying bone deposits in mountain caves, identified 80 species of birds, including Rock Ptarmigan and Spruce Grouse, from a time when Virginia's climate differed greatly from that of today. Archaeological studies and accounts of aboriginals in the 17th century complete Chapter 1.

The next four chapters lead the reader through the evolution of ornithology during the 16th through 19th centuries. The earliest British, French, and Spanish explorers left no record of wildlife observed, so Thomas Hariot and John White at the Roanoke Island colony in 1585 were the first to describe and illustrate (White) the local birds and call them by their Algonquian names (appendix B). Starting in the Jamestown settlement in 1607, John Smith and others called the birds by their closest British equivalents. Readers will be fascinated by the accounts of early explorers and naturalists, including the many charming direct quotes from poorly known early naturalists: William Strachey, Rev. Alexander Whitaker, Ralph Hamor, Philip Bruce, Samuel Clarke, Nehemiah Grew, John Banister, and John Clayton. Exploration of the Commonwealth continued through the 18th century. By the 19th century, emphasis was on scientific collecting and preparation of state and local lists.

For the 20th century, the chapters are topical. Chapter 6 relates contributions by Smithsonian scientists and employees of the U.S. Bureau of Biological Survey and U.S. Fish and Wildlife Service. Most of the scientists mentioned lived in Virginia, and all made contributions to Virginia ornithology. Subsequent chapters focus on geography; conservation; "Artists-Naturalists and Presidents"; extirpated and non-native birds; falcons, eagles, and hawks; bird banders prior to 1960; and "The Twentieth Century and Beyond."

The final pages include some modern centers of bird study, principal ornithological accomplishments of the 20th century, local and state bird lists, books on Virginia's avifauna, an epilogue, Algonquian names of birds, principal collectors of Virginia birds, cooperative observers who submitted bird observations to the Biological Survey–Fish and Wildlife Service from 1880 to 1970, a selection of nature writings pertaining to Virginia, references by chapter, and a brief index.

Appendix A is a list of common and scientific names of 311 birds mentioned in the text. With two more pages, Johnston could have given a complete list of Virginia's 435 birds as of the close of the 20th century. And it would have been of interest to many people to see when and by whom each species was first recorded in Virginia—information that his thorough specimen and bibliographic search would have revealed.

Johnston cleverly includes samples of bird art spanning historical time, starting with Virginia petroglyphs and including paintings by John White (ca. 1585), Simon Gribelin, Ulysses Aldrovandus (ca. 1599), Edward Topsell (1614), Mark Catesby (ca. 1731), Alexander Wilson (1808), John James Audubon (1843), Walter Weber, and Jackson Miles Abbott. The only map depicts historic Peregrine Falcon eyries (1907–1963).

This book was researched over a 10-year period, as is shown by a long list of acknowledgments to librarians, archivists, curators, ornithologists, and birders. It is well written and can serve as an example to other ornithological historians. I was surprised, however, to see May Thacher Cooke identified as a sister of Wells W. Cooke, given that May always referred to him as "father." Johnston considered a 1649 report of heath cocks (prairie-chickens) too far out of normal range to be credible. He apparently was unaware that this species persisted in Maryland into the 1860s.

The book's greatest failure is its index, which is poorly organized and very incomplete. Birds are indexed only by families, so to find a rail, one must look under *cranes, rails, and allies*. Many authors are listed under topical headings, but not under their own names. One finds Oberholser's name under "authors," but not under "O" or "ornithologists" or "collectors." Spencer F. Baird is indexed under "authors," "collectors," and "Smithsonian," but not under "Baird." The following prominent ornithologists are among the many not indexed either under their name or among the authors or ornithologists: Paul Bartsch, William Brewster, John Buckalew, Thomas Burleigh, Roger Clapp, May and Wells Cooke, Ira Gabrielson, and Frederick Lincoln. Anyone researching individual persons would have to read a substantial part of the book to determine whether a particular person had been mentioned. And for those who are indexed, the page numbers are not necessarily complete.

A problem with literature searches is that a Virginia search may not reveal titles that are in a national or regional category, such as the District of Columbia or the Del-Mar-Va Peninsula. Thus, Buckalew's 1950 note in *The Auk* that details the first North American record of *Larus fuscus* was missed. The specimen he collected in Maryland had first been identified on the Virginia side of the state line.

The first cooperative bird-migration count in North America should have been mentioned. It was organized by Harry Oberholser on 12 May 1913. The Virginia participants read like a Who's Who in Ornithology: A. Wetmore, E. A. Preble, W. L. McAtee, H. H. T. Jackson, E. A. Mearns, W. Palmer, and J. H. Riley (*The Wilson Bulletin* vol. 29, 1917).

I found no mention of the Audubon Society of the District of Columbia (1897–1959), which became the Audubon Naturalist Society. Virginia ornithologists, including John Aldrich, Paul Bartsch, and Philip DuMont, were prominent among the active members. The Society's journals, *Wood Thrush* (1946–1950) and *Atlantic Naturalist* (1950–1968), regularly reported bird observations from throughout the Commonwealth of Virginia as well as Christmas Bird Counts from the Washington suburbs and occasional research papers about Virginia birds.

Also missed by the author (not indexed under Virginia) were more than 80 years of bird observations compiled quarterly by some of Virginia's most active field observers for publication by National Audubon in *Bird-Lore, Audubon Magazine, Audubon Field Notes,* and *American Birds*. The compilers were H. C. Oberholser, 1917–1940; C. S. Brimley and J. H. Grey, 1941–1944; E. B. Chamberlain and C. S. Brimley, 1945–1947; J. J. Murray, 1948–1957; F. R. Scott, 1958–1980; H. T. Armistead, 1980–1993; E. A. T. Blom et al., 1993–1995; and M. J. Iliff, 1996–2000. Observations from Virginia's

Appalachians were compiled for the same journals by M. G. Brooks, 1948–1958; G. A. Hall, 1959–1998; and R. C. Leberman, 1999–2000.

This book will be nostalgic reading for the older generation. For me, it brought back pleasant memories of close to a hundred friends from yesteryear. Present Virginia Society of Ornithology members, however, should not expect to find the names of so many of their living friends.

The History of Ornithology in Virginia belongs in college libraries throughout the New World and in the personal collections of birders and naturalists in Virginia and surrounding states.—Chandler S. Robbins, *U.S. Geological Survey Patuxent Wildlife Research Center, Laurel, Maryland 20708, USA. E-mail: chan_robbins@usgs.gov*