

## **Riddle of the Feathered Dragons: Hidden Birds of China**

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warblers as coevolutionary model species. The construction of medieval ponds have increased population sizes and accessibility of nests in mostly linearly formed (and, consequently, easily searchable) reedbeds. Furthermore, the trees planted on pond banks prepared “watchtowers” for female cuckoos. Chapter 10, on “the battle of the sexes,” covers a wide range of issues, including social and genetic mating systems, cooperative breeding, polygyny, and promiscuity. Reed warblers are also powerful migrants and the most successful long-distance colonists among passerines (chapters 11 and 12). Chapter 13 deliberates conservation and global climate change. The final chapter really exemplifies the integrative and holistic approach of the authors; they discuss morphological and behavioral convergences between reed warblers and their New World marshland counterparts.

In the Postscript, the authors touch upon the important issue of an increasing gap between traditional field-experience-based natural history and modern theory-driven science. The former’s descriptive nature is sometimes looked upon with contempt by those who pay great attention to being abreast of the development of the contemporary competitive and impact-factor-obsessed science. At the same time, the latter’s “ivory-towering” is sometimes viewed with an analogous contempt by the general public. This dichotomy is paralleled by a gap between amateur birdwatchers and professional ornithologists. Leisler and Schulze-Hagen argue that both descriptive natural history and up-to-date experimental science have their irreplaceable roles and that both are necessary for our comprehensive understanding of the natural world. An apt example is provided by the classic monograph *Reed-Warblers* by Brown and Davies (1949)—both the authors and their field helpers were amateur birdwatchers. However, the gap between amateur and professional ornithology has grown dramatically since then. Therefore, books that captivate both groups are especially valuable and may set the stage for more collaboration in the future. *Reed Warblers* is exactly this more generally attractive book.

Leisler and Schulze-Hagen wrote *Reed Warblers* in 5 years and managed to cover even the most recent literature—of 926 references, almost half (400) come from 2001–2010, and 35 sources were published shortly before the book went into print (2011). The book is both up-to-date and great from an educational point of view. By presenting the particular traits and patterns of the reed warbler family as specific examples or tests of general rules, it shows students how any (behavioral) ecologist and ornithologist should think. In addition to the lively and readable style, *Reed Warblers* includes brilliant life-like drawings by D. Quinn and photographs that are both aesthetically pleasing and document biologically relevant aspects of reed warbler biology.

Many laymen and students think that the most exciting part of science is the discovery of a new species or, say, a first description of a novel bizarre behavior. Leisler and Schulze-Hagen do a great job of showing that the opposite is true; the really exciting part of science comes when various pieces of the puzzle, having been collected over decades, fit together and start to make sense—to remind us that the more we know, the more questions arise. This *understanding*, and not merely discovery or priority of description, is the ultimate meaning—and source of deep excitement—of scientific endeavor.

I found little to criticize in *Reed Warblers*. The book is taxonomically weighted toward temperate *Acrocephalus* warblers that the authors themselves have focused on in their long-term research. This, of course, reflects a general temperate-zone bias in biological research (which is explicitly mentioned by the authors)—there are simply much fewer data from the tropics than from the Palearctic. In addition to rare typos and several unclear figure and table captions, one might quibble about how well specific references fit in particular sections versus others.

Throughout my reading of *Reed Warblers*, a common denominator of various chapters came repeatedly to my mind: this is exactly the book I would have liked to have at hand when starting my own research as an undergraduate student years ago. The authors do a great job of changing gears among natural-history descriptions accessible to any layman (see, e.g., how reed warblers build their nests on p. 143), concrete quantitative results of research papers inaccessible to most laymen, and lucid explanations of general ecological theories. Their clearly written and well-organized masterpiece is to be recommended to both novices of ecological science and its seasoned veterans.—TOMÁŠ GRIM, *Department of Zoology and Laboratory of Ornithology, Palacký University, tř. Svobody 26, 771 46 Olomouc, Czech Republic.* E-mail: [tomas.grim@upol.cz](mailto:tomas.grim@upol.cz)

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#### **Riddle of the Feathered Dragons: Hidden Birds of China.—**

Alan Feduccia. 2012. Yale University Press, New Haven, Connecticut. 368 pp. ISBN 9780300164350. Hardback, \$55.00.—Controversy regarding avian origins originated with the 19th-century discovery of the iconic *Archaeopteryx*. The Urvogel possessed a seemingly dinosaur-like skeleton yet was cloaked in a set of exquisitely preserved, modern-appearing feathers. More recently, discoveries of supposedly “feathered dinosaurs” from Mesozoic lake deposits in China have provided well-publicized support for the notion that birds evolved from the “raptor-like” dromaeosaurid theropod dinosaurs. Indeed, recent conventional wisdom holds that birds are little more than “flying dinosaurs.” Nevertheless, a cadre of respected researchers in this field remain unconvinced. In his latest book, *Riddle of the Feathered Dragons: Hidden Birds of China*, Alan Feduccia has assembled a comprehensive, lucid, and detailed analysis of the importance of these new specimens and what they may, or may not, tell us about avian origins.

Feduccia, an experienced paleo-ornithologist, has gained a reputation for cautious skepticism regarding the dinosaur–bird nexus. In this book he challenges entrenched orthodoxy, drawing sharp focus on some of the sensationalistic, if questionable, science that has been marshaled to support the theropod–bird link. Feduccia cautions against what he and others see as a “verificationist” approach to the complex and rapidly expanding fossil data, noting that the field of bird origins has too often taken an overtly political tone

that smacks of “science by consensus,” embodied by statements such as those by Henry Gee, a senior editor of the journal *Nature*, that “birds are dinosaurs: the debate is over,” and Richard Prum’s assertion that “it is time to abandon debate on the theropod origin of birds” (see p. 7). Rather, Feduccia urges for the application of the traditional approach of proposing and testing viable alternative hypotheses that are indicated by these emerging data, rather than shoe-horning them into support of the existing hypothesis. In *Feathered Dragons*, Feduccia provides the reader with a variety of compelling, but often ignored, data that are at odds with a derived theropod ancestry for birds. Among the examples of contradictory evidence that he showcases is the case of non-homology of the manual digits in theropods and birds—that although the three digits on the hands of theropods and birds often bear remarkable anatomical similarities, multiple developmental studies have indicated that the avian hand comprises digits 2, 3, and 4 whereas the generalized theropod hand is broadly acknowledged to be made up of digits 1, 2, and 3. To account for this discrepancy, bird–dino supporters have invoked a genetic frame-shift mutation that altered the identity of the digits, an unprecedented event in amniotes.

In another example of a report that strains credulity, Feduccia examines the claims of preserved soft tissues from a 75-million-year-old *T. rex* fossil. Several papers published in high-profile journals claimed to have recovered tissues including collagen, blood vessels, and even red blood cells from the femur of a tyrannosaurid, and to have extracted DNA that resembled that of birds—extraordinary assertions that made headlines. As Feduccia points out, follow-up analyses that cast serious doubts on these claims received little fanfare.

Feduccia also discusses the bombshell news from 1997, when the first of many “feathered theropods” began to emerge from China. These reports shook the scientific world and made headlines across the globe. These fossils were heralded as the final “nail in the coffin” for doubters of a close theropod–bird linkage. Feduccia provides a comprehensive treatment of the literature on the subject and shows that although many of the fossils are indeed feathered (and are also birds), a number of key specimens of more basal theropods described as “feathered” or “protofeathered” (i.e., possessing supposed simple filamentous integumentary fuzz) are in reality more likely to represent unusual preservation of dermal (within the skin) collagen fibers. These are just a few of the pieces of possibly dubious evidence that have been used to verify a dinosaurian ancestry for birds. Feduccia argues that these suspect studies should, at the very least, provoke a reexamination of the questions at hand.

Additionally, he provides an excellent treatment of the diverse fossils of enantiornithine (archaic “opposite” birds) and basal members of ornithiurine (modern) bird lineages from northeast China. He also evaluates a number of the curious, small dromaeosaurid microraptors, *Velociraptor*-like animals with arboreal adaptations (which included a perching foot and feathers forming wing surfaces on both fore- and hindlimbs). What to do with this avalanche of data? Feduccia urges that it be reanalyzed without a predetermined conclusion in mind.

That this controversy has become so bitterly fought is a bit of a wonder, in that both sides agree that birds and dinosaurs are closely related—the issue balances on when and where birds diverged from within the archosaurs. Thus, perhaps the most surprising suggestion Feduccia offers, and one that deserves a

much longer look from anyone interested in these questions, is that data drawn from the myriad of new fossils could actually be turning conventional wisdom on its head (literally)—that is, the very birdlike dinosaurs such as the iconic ‘raptors of Jurassic Park (e.g., *Velociraptor* and its relatives), the enigmatic troodontids, and the bizarre beaked oviraptorosaurs—long considered to be among the more derived theropods—are, in fact, members of an extensive adaptive radiation of volant and secondarily flightless birds! Those who have followed Feduccia’s work over the years will recognize that this conclusion is a major shift in his views, and that his ability to deal with the new evidence in such an unbiased and creative manner is the mark of a uniquely sharp and innovative scientific mind. Whether one ultimately agrees with Feduccia or not, *Feathered Dragons: Hidden Birds of China* is a “must read” for anyone interested in these questions and will prod its readers to rethink received wisdom on the subject of the evolution of birds.—NICHOLAS GEIST, *Department of Biology, Sonoma State University, 1801 East Cotati Avenue, Rohnert Park California 94928, USA. E-mail: [nick.geist@sonoma.edu](mailto:nick.geist@sonoma.edu)*

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**Living Dinosaurs: The Evolutionary History of Modern Birds.**—Gareth Dyke and Gary Kaiser, Editors. 2011. Wiley-Blackwell, Chichester, United Kingdom. xv + 422 pp., 8 color plates, 115 text figures, 5 tables, 5 appendices. ISBN 9780470656662. eBook 9781119990451. Cloth, \$129.95.—This volume comprises 16 invited chapters authored by 29 contributors. As noted by the editors, the chapters represent “seemingly unrelated approaches to the study of avian evolution.” The stated purpose is to “help bridge a gap that has developed between those who study birds as fossils and those who study the living animals.” Once one gets beyond the inexplicable title and the first three chapters, to which I will return, one finds several interesting and thought-provoking chapters that work toward the editors’ goal. Others are less successful.

The book is divided into four parts of unequal depth, with each chapter comprising a review of its topic. In this sense it is a useful tool, in that one can find an updated list of references for each topic, although the lists are often as notable for what is left out as for what is included. The three themes that I found most interesting are the reviews of specific avian groups, the evolution of certain avian traits, and the discussions of current methodologies for understanding avian evolution. Of the first, a review of the giant, presumably marine “pseudo-toothed,” or “false-toothed,” odontopterygiform birds by E. Bourdon and a review of penguins by D. Ksepka and T. Ando are highlights. Focusing on a cladistic analysis instead of possible life-history traits and functional morphology, the chapter by H. Alvarenga et al. on phorusrhacids, the “terror birds” of South America, is disappointing. Finally, F. Barker presents hypotheses of phylogeny and diversification of passerines, with a heavy emphasis on molecular models.