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BOOK REVIEW

Birds before there were no dinosaurs

Mesozoic Birds: Above the Heads of Dinosaurs. Edited by Luis M. Chiappe and Lawrence M. Witmer. University of California Press, Berkeley. 2002. 520 pages. Cloth $95.00.

This dense, collected volume comes with all of the summits and declivities expected of the genre. Because of the pace of new discoveries, particularly in China, the manuscript was out of date well before it reached the hands of a printer, and by the editors' own admission the book is incomplete for lacking treatment of important groups such as Ichthyornithiformes and most of the Hesperornithiformes. For certain omissions, however, the editors may be praised as sparing us from further exposure to futility. Regarding the origin of avian flight, for example, they take the position that ''so much has been written on the subject, with so little positive outcome, that another dedicated review was not warranted.''

By comparison with other collections of papers on early birds, this volume is commendable for sticking pretty closely to the subject of actual birds rather than dinosaurs. Nevertheless, the sustaining ichor flowing through it is the cladistic hypothesis of the origin of birds from theropod dinosaurs. This is not without detractors and the debate is usually never less than rancorous.

The opening chapter by Larry Witmer summarizes the conflict with a measured and sedate tone sure to win plaudits from those weary of the usual plangent clangor, yet for all of his seeming moderation, Witmer, too, descends into bombast and propaganda. Speaking of the early Cretaceous *Caudipteryx* from China, he says (p. 14): ''The presence of unambiguous feathers in an unambiguously nonavian theropod has the rhetorical impact of an atomic bomb, rendering any doubt about the theropod relationships of birds ludicrous.'' But *Caudipteryx* is anything but an unambiguous theropod and the theropod origin can only be sustained if one wishes away the differences in the homologies of the digits of the hand and totally ignores the fundamental differences in tooth replacement pattern and ankle structure, as Witmer does here.

Adherents of the theropod origin have attempted to bolster their views with diverse ratiocinations, to which Witmer has now added what I will term the ''incompetence argument.''

> The list of taxa that have bounced back and forth between birds and theropods is quite long: Alvarezsauridae, *Archaeopteryx* (Eichstätt specimen), *Archaeornithoides*, *Avimimus*, *Avisaurus*, *Bradycneme*, *Caenagnathus*, *Caudipteryx*, *Limnornis*, Oviraptoridae, *Palaeocursornis*, *Protarchaeopteryx*, *Protoavis*, *Wyleia*. It would seem to be simple common sense to think that birds and dinosaurs must have *some* close relationship if we have such trouble telling them apart. (p. 22)

First, who is ''we''? Second, what role does common sense play in phylogenetic hypotheses? After all, common sense once categorized whales as fish. Some of the taxa in the preceding list are based on undiagnostic fragments that should never have been named in the first place. Others were misclassified by the very supporters of the theropod theory who have the most to gain from the confusion ensuing from the descriptions of dinosaurs as birds and birds as dinosaurs in pages of *Nature*. If mistaking the Eichstätt specimen of *Archaeopteryx* for a theropod proves that birds and theropods are related, does the fact that the Maxburg specimen of *Archaeopteryx* was originally described as a pterosaur also make a case for a relationship between birds and pterosaurs? Clearly Witmer's ''incompetence argument'' is a double-edged sword, and one that is best quickly hung up on a wall for decoration.

In passing, Witmer (p. 19) makes the important observation that although there have been repeated tests of the theropod origin of

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birds, ''to be fair, it must be pointed out that they rarely include nondinosaurian taxa in the analysis.'' For precisely this reason, the succeeding chapter by Clark, Norell, and Makovicky on ''Cladistic approaches to the relationships of birds to other theropod dinosaurs'' is but another doctrinaire addition to an as yet unhelpful literature in which cladistic methodology is successful only because it is never really put to the test.

The next section of the book on ''Taxa of Controversial Status'' contains three chapters on Alvarezsauridae and *Avimimus*, which here and elsewhere are admitted to be dinosaurs, not birds, and should therefore have been omitted.

Leading off the ''Mesozoic Aviary'' is the obligatory chapter on *Archaeopteryx*, or Archaopterygidae I should say, because more than one genus is admitted. But instead of the stale, well-kneaded, gray old dough that is usually rolled out when this subject comes up, Elzanowski serves up a fresh-baked loaf of highly original, comprehensive, and intellectually stimulating insights into what is still the oldest and most important of fossil birds. This chapter should become the starting point for all future discussions of the quintessential ''Urvogel.'' Another book, or maybe two, the size of this one could be devoted to the early Cretaceous birds of China. Therefore the adequate but perfunctory chapter about them by Zhou and Hou may be accepted for what it is—a reminder that much more is yet to come.

Only specialists will be able to appreciate much of the rest of the contents, which tend heavily toward description and knotty cladistic analyses. The book reflects Chiappe's long interest in the so-called opposite birds (Enantiornithes) and similar dead-end taxa that branched off somewhere between *Archaeopteryx* and modern birds and have no living descendents. Many of the chapters are merely expanded versions of publications that have appeared previously, with recycled illustrations as well.

On the other hand, numerous illustrations are new and of excellent quality, adding great value and utility to the final product. But this assessment need be tempered by the realization that a monumentally stupid decision by some uncomprehending editor has rendered the legends to the illustrations (as well as tables and much text) all but indecipherable even to someone with profound knowledge of the subject matter. Throughout, all binomials have had the generic name reduced to its initial. I figure that this decision must have been done rather late in the production process, as it would have been nearly impossible to construct the excruciatingly detailed index unless the generic names in the legends were once spelled out fully, as they should have been.

Another severe drawback of the book for which UC Press deserves censure is the lack of any kind of abstract, summary, or other distillation of the contents of the individual chapters. Even some of the discussion sections do not do an adequate job of summarization.

On a happier note, especially for readers of this journal, the volume editors appear to have constrained authors to include a section titled ''Paleobiology'' in each of the chapters for which this is appropriate. The results are mixed, however, ranging from superb and thought provoking (Elzanowski on *Archaeopteryx*) to a mere rehash of anatomy from which little about biology can be derived (Sereno et al. on *Sinornis*).

Chapters in addition to those on dead-end taxa include treatments of Mesozoic feathers, Mesozoic bird tracks, and a perhaps too hopeful review of late Cretaceous birds of modern aspect, almost all of which are known from material too fragmentary to permit much confidence in the determination of their precise relationships with living birds.

The terminal chapter by Chiappe on ''Basal Bird Phylogeny'' is an inscrutable justification for the accompanying character matrix, which would perhaps be an entirely suitable finale if the end product of evolution were a cladogram. But by this point the reader cannot help but wish to garner a few more insights into biological questions concerning Mesozoic birds as living organisms.

If the Cretaceous was as long as all subsequent time, what role did birds have in Cretaceous ecosystems? Just how diverse were Mesozoic birds compared with the Cenozoic radiation? What trophic levels did Mesozoic birds occupy and which ecomorphs known to-

day were absent then and why? What limitations were placed on the evolution of Mesozoic birds by the constraints of their environments, the choice of nest sites and food afforded by the plants of the day, other potential food sources, potential competitors, predators, etc.? The most essential characteristic of the Class Aves, one that will never appear in a cladogram, is that birds survived past the end of the Cretaceous and dinosaurs, regardless of size, did not. Why? Although such inquiries would necessarily entail much that is in the realm of speculation, any sort of a best-guess discussion would have greatly enlivened an otherwise excessively pedantic tome.

Overall I would rate the volume as an honest effort that will have some persisting value as a reference for a few specialists. It may be considered a milestone only in the sense of marking an unremarkable distance along a path of knowledge whose terminus lies much farther ahead than its origin. Thus it is virtually certain that much more interesting books on Mesozoic birds will be written in the years to come.

Storrs L. Olson
Division of Birds
National Museum of Natural History
Smithsonian Institution
Washington, D.C. 20560
E-mail: olson.storrs@nmnh.si.edu