

REVIEW

Feathered dinosaurs. The origin of birds.

John Long & Peter Schouten

Illustrated by P. Schouten. CSIRO Publishing, Collingwood, Victoria. 2008. ISBN 9780643094345 193pp. Hard Cover AU\$49.95

This book by the prolific Australian palaeontologist John Long and the wildlife artist Peter Schouten is one of several that describe the transition from non-avian to avian dinosaurs (e.g. Paul 2002; Currie *et al.* 2004; Chiappe 2007; Chang *et al.* 2008), but to my knowledge is the first that is structured largely around individual species of feathered theropods. The heart of the book is the illustrations by Peter Schouten, whose previous work includes other books on extinct animals. Given the volume of literature on feathered dinosaurs in both the technical and popular literature, it is something of a surprise that the status of these animals is still seen as controversial by some scientists.

The relationship between birds and dinosaurs has always been hotly debated, despite the fact that since the mid-1980s phylogenetic analyses have consistently shown birds to be deeply nested (no pun intended) within the theropod dinosaurs (Gauthier & Padian 1985). Papers in high profile journals persistently criticized this relationship throughout the 1990s, although very few of these offered alternative phylogenetic hypotheses. Those interested in the history of this heated phylogenetic debate should see Padian and Chiappe (1998). One of my favourite articles from this period suggests that the presence of crocodylian hepatic-piston diaphragmatic lung ventilation in non-avian theropods poses "fundamental problems" for a relationship between these dinosaurs and birds, as transitional forms between this mode of respiration and the avian system of abdominal air sacs powered by costal muscles would not be functionally viable (Ruben *et al.* 1997). The authors were aware that the pubis was rotated posteriorly in some coelurosaurian theropods, but felt that this was not functionally equivalent to the marked opisthopubic condition seen in birds. Ruben and colleagues did not discuss the mode of lung ventilation in ornithischian dinosaurs, in which, as their name suggests the pubic bone lies posteriorly against the ischium as in birds (Benton 1997), but presumably these animals did breathe somehow! This failure to consider the

broader ramifications of functional hypotheses, let alone the lack of supporting phylogenetic evidence, is typical of much of this work.

The format of "Feathered dinosaurs" involves 9 short text chapters followed by the individual species section. These text chapters are illustrated with miniature versions of the reconstructions from the species section. The 1st chapter, which is entitled "Dinosaurs, Darwin and fossils", touches only briefly on the evolutionary relationships of dinosaurs and birds. I agree with the authors that the dinosaur-avian relationship is overwhelmingly supported by the majority of both the evidence and the scientific community, but alternative viewpoints are still surfacing in reputable journals (e.g. Feduccia *et al.* 2005; 2007). Some of these alternatives (e.g. Feduccia *et al.* 2005) even question the existence of feathered dinosaurs, arguing that birdlike forms such as *Velociraptor* form a clade with birds that arose independently from the rest of the theropods. This line of reasoning resembles that of intelligent design by focusing on missing detail while ignoring overwhelming contrary evidence.

The remaining 8 text chapters focus on the main clades of coelurosaurian theropods. The rate of new fossil discoveries, especially from China, is such that any new publication is likely to contain novel information, but the authors appear to have made every effort to include recent work that in many cases has changed our understanding of several groups. For example, the first tyrannosaurs were both much smaller and more widespread than previously thought, while some compsognathids achieved much larger sizes than their better known relatives. Groups that were once considered to be depauperate evolutionary oddities, such as therizinosauroids and oviraptorosaurs, have turned out to be speciose and ecologically diverse. The text in these chapters includes fascinating detail on some of the fossils themselves, such as the oviraptorid that died while brooding a clutch of eggs, and the tiny troodontid *Mei long* that was fossilized in a birdlike sleeping pose.

The largest section of the book is titled "The dinosaurs illustrated." This section covers about 80 species, and involves a double-page spread format in which the bulk of the space is taken up by a single reconstruction. The text for each species is informative but brief, and includes an artist's note explaining the reconstruction. Details on taxonomic groupings, age and fossil locality are also provided. The reconstructions avoid the garishness and hyperactivity of those from some other recent dinosaur books, and are the feature that most sets

this book apart from its contemporaries. In my view the most convincing reconstructions are those of the more birdlike forms, and consequently I felt that the illustrations improved through the species section. Some of the larger species such as tyrannosaurs and therizinosaurs appear static, unbalanced and too broad across the hips, whereas the reconstructions of smaller forms such as the troodontids and dromaeosaurids are dynamic and more satisfying as a result. This may be partly a result of the extent to which the dinosaurs can be visualized in comparison to living animals, but some of the bizarre forms such as the oviraptors are also beautifully realised. The page format inevitably means that the gutter bisects the illustrations; for example, the focal point of the illustration of *Nemegtomaia* is severely disrupted by the gutter and I would have preferred the compromise of smaller 1-page illustrations.

Overall, my main criticisms of the book relate to its format. I think that the text chapters could have contained more detail, both in terms of the text and supporting diagrams (e.g. osteological drawings), and more advanced readers may be disappointed. The inclusion of some photographs of feathered fossils would have been particularly helpful to demonstrate the process of reconstruction, and this could have avoided the duplication of illustrations seen here. The species section could have been improved by direct referencing to the relevant literature for each species, and providing size information in the listing of taxonomic and locality details.

Reports of feathered dinosaurs continue to appear on a regular basis. Even some well known forms, including *Velociraptor* of Jurassic Park fame, have now been shown to have had feathers (Turner *et al.* 2007). Most recently, Zhang *et al.* (2008) describe the Middle to Late Jurassic avialan theropod *Epidexipteryx*, which had 2 pairs of elongate ribbon-like feathers on the tail but lacked pennaceous limb feathers. The phylogenetically basal position of this form indicates that, unless *Epidexipteryx* was secondarily flightless, display feathers evolved before flight feathers in theropods. "Feathered

dinosaurs" does a good job of capturing the excitement of these new discoveries and bringing these extraordinary animals to life. The evolution of birds from dinosaurs was more complex than we could have imagined, and further twists in the story are certain to come!

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