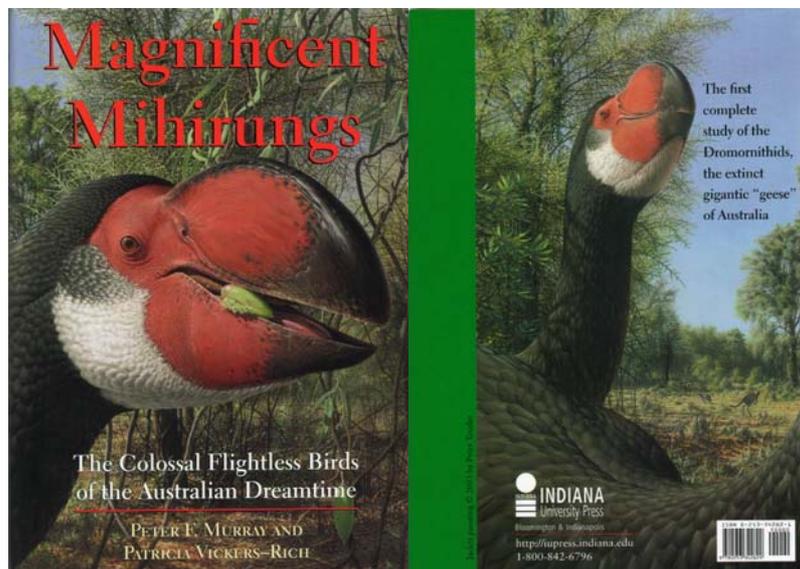


**Murray, P.F. & P. Vickers–Rich. 2004. Magnificent Mihirungs. The colossal flightless birds of the Australian dreamtime. – Bloomington, Indiana University Press**

Book review by H.J.M. Meijer



Finally! That was my first thought when I saw this book by Murray & Vickers–Rich. Finally a book that provides us with much–needed osteological data on a family of birds long gone extinct! Chapeau! Although the chance of finding a mihirung in Europe can be considered small (but hey, who knows...), I was pleased to see the detailed photographs, drawings and diagrams which provide a wealth of knowledge on avian anatomy.

The class Aves is, together with the class Insecta, thought to be the largest and diversified taxon known in the animal kingdom. For ecologists, taxonomists and nature lovers, this is a wonderful thing, as beautiful and fascinating specimens can be spotted over the entire globe. However, for avian palaeontologists it is less convenient. Being left only with the skeletal remains of these creatures, the scientists are challenged with the daunting task to determine which one of the numerous species of birds matches the fossils. Although books like ‘Avian osteology’ by Gilbert *et al.* (1981) can provide a preliminary determination at the family level, more specific descriptive and comparative osteology on birds is needed.

Australia has been separated from the rest of the world for quite some time. That has resulted in a unique fauna, both presently and in the past. Around 55 million years ago, giant flightless birds, Dromornithidae, first roamed the land of the outback. This book by Peter F. Murray (Museum of Central Australia) & Patricia Vickers–Rich (Monash University) represents the first and major study on this unique group of birds. The book is divided into 4 parts: ‘The discovery of Dromornithids’, ‘Systematics and Morphology’, ‘Paleobiology’ and ‘Paleoecology’ respectively, and an appendix with a basic but thorough description of avian skeletal morphology.

In the first part, a historical account is given of the discoveries of these birds. Despite the presence of ‘giant emus’ in the oral traditions of the aborigines, the first expedition to uncover bones of these animals was not set up until the 1830s in the caves of what is now New South Wales. One fragment of a femur was found and studied by Sir Richard Owen. The first complete skeleton was discovered in 1892 in the sediments of Lake Coballa. Many more remains were found by expeditions in the 19<sup>th</sup> and 20<sup>th</sup> century, dating from as early as the Eocene until the Pleistocene era. Three major localities are known: Lake Callabonna (Pleistocene), Alcoota (late Miocene) and Bullock Creek (middle Miocene).

The second part deals with systematics and morphology. Despite their overall similarity to emus, Mihirungs are classified as Anseriformes, within their own family of Dromornithidae. Five genera are recognised: *Barawertornis*, *Bullockornis*, *Ilbandornis*, *Dromornis* and *Genyornis*, together comprising eight species. Although Mihirungs can be generally described as large flightless birds with a reduced forelimb, large differences exist between the different species in size, morphology and degree of fusion of skeletal elements. In describing dromornithid anatomy, *Genyornis newtoni*, is used for a general description, and deviations from this pattern are individually treated. Although the authors meant to give a ‘general overview’, dromornithid anatomy and morphological diversity is discussed extensively and many pictures and drawings are used to show anatomical similarities and differences. The exact phylogenetic relationship within the Anseriformes is in dispute; the character states of dromornithids place them close to the Anseranatidae, but some other characters

show an affinity with the Anhimidae. The inclusion of cladistic character matrices and dendograms based on different assumptions nicely illustrates the confusion regarding dromornithid origins. Murray & Vickers-Rich tentatively adopt the Galliform-origin theory, but admit that future research might prove them wrong.

In the third section of the book, the palaeobiology of dromornithids is discussed. This starts with the more functional-anatomical questions regarding these birds. The earliest reconstructions were based on ratite anatomy rather than on an anseriform bird or goose-like bodyplan. The latter brings about a thicker and more S-shaped neck and a more muscular body. An analysis of the range of motion suggests that dromornithids were not strict ground feeders but their anatomy also permitted reaching up for food. Questions have been raised whether or not dromornithids had the ability to run. A detailed functional analysis of limb ratios and muscle estimations certainly shows that their anatomy permitted running, although their weight might have limited their speed. However, what function did running serve? Their large 'overdesigned' beak was once thought to be too powerful for herbivores and thus indicative of a carnivorous diet. But as a member of the Anseriformes, dromornithids are thought to be vegetarians. In addition, many other non-predatory characteristics point towards herbivory. Therefore, their ability to run (although not very fast) is now considered an adaptation to cover large distance in search of food.

In the last part of the book, titled 'Paleoecology', the authors place the dromornithids in context with other elements of the Australian fauna and flora. Vertebrate evolution in Australia has been characterised by the progressive increase in body mass of its terrestrial marsupials and dromornithid birds. The authors hypothesise that this was a response to increasing scleromorphy and a more patchy, less nutritious vegetation. Dromornithids seemed to be pre-adapted to this: greater height gave the birds more access to nutritious fruits, seeds and flowers. In the Pliocene, the scleromorphic woodlands started to retreat and by the late Pleistocene, increased fire frequency, probably accelerated by the presence of humans, might have pushed the birds over the edge of extinction.

This book provides an amazingly detailed and extensive amount of information on an enigmatic and fascinating family of birds. Despite the sometimes patchy fossil record, the authors have gathered every piece of information that exists on these birds. Those tremendous efforts have resulted in a book that is probably the most complete work on any fossil bird family in the world. This book is not only a valuable piece of information for (palaeo)ornithologists, but also serves the non-expert with an interest in the history of the Australian fauna. The text is very well-written and both the pictures and drawings can tell the story by themselves. Marvellous!

Murray, P.F. & P. Vickers-Rich. 2004. *Magnificent Mihirungs. The colossal flightless birds of the Australian dreamtime.* – Bloomington, Indiana University Press. 416 pp. ISBN 0-253-34282-1. Price \$75.00 (clothbound).

#### **Cited literature**

**Miles Gilbert, B., L.D. Martin & H.G. Savage. 1981.** *Avian Osteology.* – Columbia, Archaeological Society.