

A classic in the making

VERTEBRATE PALAEOLOGY (4th edition). By Michael J. Benton. Wiley Blackwell, 2015, 480 pp. ISBN: 978-1-118-40755-4. Paperback £ 39.95 / € 54.00, hardcover £85.00 / € 114.80, e-book £ 35.99 € 48.99

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When the first edition of Mike Benton's *Vertebrate Palaeontology* came out in 1990, sauropods still dragged their tails on the ground, the closest relatives of whales were mesonychids, and Mesozoic birds consisted essentially of *Archaeopteryx*, *Ichthyornis* and *Hesperornis*. Twenty-five years later, the book, now in its fourth edition, is a third longer, in a larger format and sports fine colour plates – in addition to a companion website. Sauropods still drag their tails on the ground on some of the figures, but hippos are now the closest relatives of whales, and the chapter on birds, replete with recent and spectacular Chinese discoveries, has grown from 15 to 44 pages. These are just a few examples to illustrate how the book has evolved over time – while retaining its original qualities as a successful textbook. Numerous, high-quality illustrations (including the spectacular reconstructions by John Sibbick that grace the first page of each chapter) are still a strong point. More significantly, Mike Benton's whole approach finely balances a global phylogenetic treatment of the diversity of fossil vertebrates with due attention to all kinds of palaeobiological issues, from scavenging in Cretaceous sharks to the colour of dinosaur feathers, from the Great American Biotic Interchange to the diet of the giant bird *Gastornis*, and many more. The author thus avoids the boring dryness of a purely systematic enumeration; after all, fortunately and contrary to what some may think, palaeontology is not just about phylogenetic systematics. As a result, the book offers the reader an evolutionary history of vertebrates through geological time, all the way from early chordates to hominids, that is both appealing and readable.

A comparison with earlier editions is instructive, as it illustrates how research on fossil vertebrates has evolved and changed its focus (or foci) over time. To cite but a few examples, in the first edition, some reluctance about the cause(s) of the mass extinction at the Cretaceous-Paleogene boundary was clearly to be felt, whereas the fourth edition states (p. 263) that 'the Chicxulub impact was clearly instrumental as the main driver of the KPg mass extinction'. As already mentioned, the tremendous recent progresses in our understanding of bird

origins and evolution receive due attention. Also worth noting is the welcome focus on new investigation techniques, many of which were still in their infancy back in 1990. Palaeohistology, CT-scanning and studies on fossil DNA are duly mentioned and illustrated by examples. So is isotopic geochemistry, although its range of applications might have been explored more fully (it is not only about the body temperature of fossil vertebrates, it also provides information about their diet).

The book is clearly aimed at students, although it can obviously serve as an excellent introduction to vertebrate palaeontology for whoever is interested in the topic, and its extensive bibliography makes it a useful literary reference as well. An interesting new addition is the introductory chapter entitled 'How to study fossil vertebrates', the aim of which is to summarise the main approaches used in that field of research; again, a nice balance is struck between the various sub-disciplines of vertebrate palaeontology. Mike Benton goes even farther in terms of sound practical advice when he explains how to write a scientific paper and what the options are for a career in vertebrate palaeontology. The short personal accounts of Karen Moreno, Steve Brusatte and Lindsay Zanno that complement that section are an original way of transmitting a first-hand experience of what palaeontological research really is to aspiring palaeontologists, who often have a rather hazy idea of the whole thing.

A book that has gone through four editions over a period of 25 years is definitely on its way to becoming a classic. Because of its clarity and wealth of information, Mike Benton's textbook, which currently has no equivalent, definitely deserves that enviable destiny. However, unlike literary classics, which by definition are intangible, scientific classics are required to evolve if they are to keep up with advances in their discipline. Over a quarter of a century, Mike Benton has definitely done an excellent job of continuously updating his *Vertebrate Palaeontology* and certainly will continue to do so. No doubt, to cite but one example, that in the next edition the section about the diet of *Gastornis* will no longer end with a question mark!