

## **Evolution of Tertiary Mammals of North America Volume 2: Small Mammals, Xenarthrans, and Marine Mammals**

Reviewed by P. David Polly

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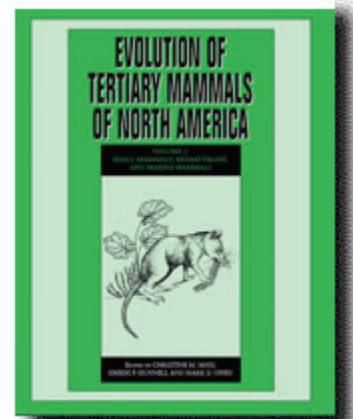
This encyclopaedic volume assembled by Janis, Gunnell and Uhen describes the animals left off the ark, the ark in this case being Volume 1 of *Evolution of Tertiary Mammals of North America*, which was published in 1998. All mammals great were included in the first volume, namely terrestrial carnivores and ungulates, and all mammals small are included in this second volume, along with xenarthrans and marine mammals, the later of whose swimming capabilities would have made them low priority for Noah's ark, but whose burgeoning relevance makes them an important component of Janis *et al.*'s second ship. Gathering these mammals one by one was a feat of biblical proportions – between the two volumes they fill more than 1,400 pages, 8.25 cms thick, which is nearly 20% of a cubit just for the North American mammals, not even including the ones from the Mesozoic or Quaternary.

Together, these volumes provide a comprehensive overview of the fossil mammals from North America between 65 and 2.5 million years ago (mya). The chapters are divided taxonomically, each following a common template that includes an introduction to the group, a list of defining morphological features, a history of the ideas about the relationships of that taxon to other mammals, a discussion of diversity within the taxon (including a consensus cladogram of their relationships), a list of all genera included in the taxon, each with its own brief description, a listing of the valid species

and the localities at which they are found, and the average length for the genus of the lower second molar (a paleomammalian proxy for body size).

In addition to these usefully standardized taxonomic, biogeographic, and stratigraphic data,

each chapter ends with a synthesis of the biology and evolutionary patterns of the group. These sections put the life into the fossils, animating the data points that punctuate the rest of the chapter. The biology sections also make the most interesting reading of the book (along with the introduction sections) and are the most variable among authors. Depending on the author and the taxon, these sections treat evolving biogeographic patterns, the life habits and histories of the taxon's constituents, and sometimes a discussion of the coevolution of the taxon in the context of its diet and community interactions. A representative of each taxon is illustrated and each section starts with an artist's reconstruction by Marguette Dongvillo.



The second volume covers a taxonomically and biologically diverse set of animals. Multiuberculates (covered by Anne Weil and David Krause) and marsupials (covered by William Korth) open the book. Multituberculates are usually thought of as Mesozoic mammals, but twenty five genera are known from the Cenozoic, most of which lived during the Paleocene but the last of which persisted almost halfway through the Cenozoic. Marsupials had a comparatively low North American diversity through the same period, but were present from the beginning of the Cenozoic until only 17.5 mya. The marsupial *Didelphis* recolonized from South America 2.5 mya. The next groups in the volume are the “insectivores”, which are themselves a phylogenetically and biologically heterogeneous group. Palaeoryctids, cimolestids, pantolestids, apatemyids, leptictids, and lipothyphlans are covered by a large group of authors coordinated by Gregg Gunnell and Jonathan Bloch in what is probably the most useful critical, synthetic review of these groups in 50 years. Difficult to understand phylogenetically and biologically, there is still a lot of fruitful work to be done on these animals. The “edentates” – palaeonodonts, pholodotes, and xenarthrans – are covered by Gregg Gunnell, Kenneth Rose, Greg McDonald and Virginia Naples. The archontans – primates, dermopterans, and bats – are covered in a long series of chapters, also a much-needed synthesis given the massive amount of work that has been done on these groups in the

last two decades. Glires – rabbits and rodents – take up nearly one-third of the book, as would be expected given the extraordinary diversity of this most speciose group of mammals. Marine mammals, both the pinnipeds, who left their kin in Carnivora paraphyletically stranded in the first volume, the whales, and the sirenians round out the volume in chapters written by Mark Uhen, Larry Barnes, Irina Koretsky, Ewan Fordyce, and Daryl Domning. The book ends with addendums that update taxa included in the first volume.

For anyone looking for a window into current understanding, historical treatment, and relevant literature of a group, these volumes are invaluable. The standardization of chapter layout, locality information, and stratigraphic occurrences give sense to what would otherwise be a complicated and diffuse literature. The comprehensive detail about the taxa, which includes genus authorship, type species, type specimen, generic characteristics, and a list of included species is information that is not available in any other single resource. Perhaps due to the invaluable nature of the data, the books themselves are extremely valuable, costing nearly \$400 if you purchase both the paperback of Volume 1 (\$90) and the hardback of Volume 2 (\$276). That said, there is a lot of data per dollar in these books: with 71 individual contributions between the two volumes, that’s only \$5 per chapter. Anyone working with Cenozoic mammals of North America will find these books well worth the cost.