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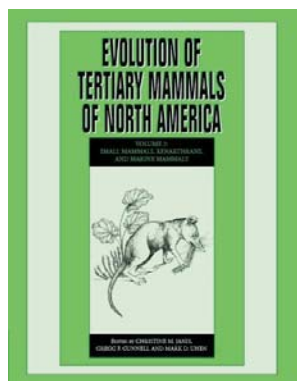
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North American Tertiary micro- and sea-mammals

Christine M. Janis, Gregg F. Gunnell, and Mark D. Uhen (eds.) 2008. *Evolution of Tertiary Mammals of North America. Volume 2: Small Mammals, Xenarthrans, and Marine Mammals*. viii + 795 pp. Cambridge University Press, Cambridge, ISBN 978-0-521-78117-6; Price GBP 150, USD 300.

It has been a decade since I reviewed (Nissan 2000) Vol. 1 (Janis et al. 1998). It has taken that much for Vol. 2 to appear, and in fact, Janis et al. (2008) comprises an important update (Addendum, also containing corrections) for the previous volume. The

Addendum was “an enormous undertaking”, yet “the search for new information was by no means exhaustive” (p. 5), unlike for the rest of Janis et al. (2008). Some chapters, “most notably those by Daryl Domning on sirenians and desmostylians, were among the first ones received almost 20 years ago” (p. 1). The senior editor is the same. The previous volume (Janis et al. 1998) covered *Terrestrial Carnivores, Ungulates, and Ungulatelike Mammals*. Janis et al. (2008) is bulkier, and not as replete with restorations of outer morphology, and it is easy to see why: this time the animals are not as “showy” (the only exception is the giant ground sloth restored on p. 128) and as diverse in “showy” derived traits (e.g., “Where known, fossil lipotyphlans are similar to their living relatives except perhaps in the case of the soricomorph family Nyctitheriidae”, p. 50), but there are a lot of them (“Glires” alone take pp. 263–506). Consider neontology for a parallel: for Audubon and Bachman’s *Quadrupeds* (1846–1854), Audubon “collected what he could tolerate of the extraordinary variety of rodents that dominate the roster of American mammals” (Rhodes 2008: xxii). As to groups that are no more, Multituberculata, “the longest-lived order of mammals” (p. 7), ca. 205 to 35 Ma ago, and “for a long time referred to as the ecological vicars of rodents” (p. 32), were “widespread across environments” and common where occurring (p. 19) until displaced (“Competitive exclusion of multituberculates by rodents can be inferred from inverse correlations of relative abundance and generic richness between the two groups”, p. 35), but the taxa listed in Janis et al. (2008) are not numerous (pp. 24–32, with half a column or more per genus being typical). Only nine xenarthran genera have entries (pp. 151–155), as these are the North American Tertiary known, defined genera, and yet: “By the Miocene, xenarthrans were extremely diverse (over 130 genera) and widespread throughout much of the New World” (p. 129).

Mammals in Janis et al. (2008) “can [...] be grouped into [...] small mammals (aka ‘vermin’) and marine mammals. The only group of large terrestrial mammals considered in this volume are the xenarthrans, which do not appear until the latest Miocene” (p. 1). “[R]elating marine and terrestrial time scales” (p. 5) was tricky. Here is the sequence of parts (whose chapters that follow the respective introductory chapter are given here in parenthesis): “Non-eutherian mammals” (including Multituberculata and Marsupialia), “Insectivorous mammals” (“Proteutheria” [polyphyletic: Palaeoryctidae, Cimolestidae, Pantolestidae, Apatemyidae], Leptictida, Lipotyphla), “Edentata” (Palaeonodonta and Pholidota, Xenarthra), “Archonta” (Chiroptera, Plagiomenidae, and Mixodectidae, Plesiadapiformes, Euprimates), “Glires” (Lagomorpha, Ischyromyidae, Sciuravidae, Cylindrodontidae, Sciuridae, Aplodontioidea, Castoroidea, Dipodidae, Eomyidae, Geomorphidae, Cricetidae, Arvicolidae, Hystrocoognathi, and Rodentia incertae sedis), “Marine mammals” (Otarioidea, Phocidae,

Archaeoceti, Odontoceti, Mysticeti, Sirenia, Desmostylia). Each chapter has its own bibliography. Next, the Addendum is followed by three appendices: “Unified locality listing”, “References for localities in Appendix I”, “Museum acronyms”, and by the index.

Janis et al. (2008) is as detailed and precise as Janis et al. (1998) was (and almost typo-free, yet in the Addendum, “condiiton” on p. 662 should be “condition”). The great contribution of both volumes to palaeontology reaches well beyond their coverage of North America: it is the neat modularity of the organisation. It sets a standard. Typically, a chapter (other than the introductory chapter in each part of the book) has an introduction, a section on defining features (subdivided into: cranial, dental, postcranial), systematics (its history, current classification, and novelties proposed)—e.g., subdivided into supraordinal, infraordinal and lower (or into suprafamilial and infrafamilial) down to a sequence of entries per genus, themselves subdivided into these attributes: name (and historical synonyms), type species, type specimen, characteristics, average length, and included species (these with pointers to localities), and possibly comments. After the genera, a section on biology and evolutionary patterns is followed by a list of cited references. This modularity is why my review (Nissan 2000) of Janis et al. (1998) had “database” in its title. Skeletal illustrations abound, of course, and so do tables (for temporal ranges) and graphs (for clades). In the chapter for Lipotyphla, the sequence of genus entries are interleaved with likewise modular general descriptions for higher-order taxa, e.g., “Talpininae (new)” versus “Desmanini Mivart, 1871 (new rank)” (p. 102). An example of the difficulty of how to treat mammals incertae sedis from North America is *Asiabradypus*, that as the index shows, is only mentioned twice (pp. 129, 130), which is in a general discussion of Edentata: “Extinct edentates may have included palaeonodons, ernanodons, and possibly enigmatic genera such as *Asiabradypus*” and so on (p. 129); “*Asiabradypus*, from the late Paleocene of Kazakhstan, was originally described as a possible sloth [...], but reexamination led [...] to conclude that the single broken specimen is not a xenarthran. A possible *Asiabradypus* specimen from the earliest Eocene of Wyoming [...], therefore, is not an edentate whatever it might otherwise represent” (p. 130, citations omitted). The two volumes together (Janis et al. 1998, 2008) are a masterpiece and a model to follow.

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