



The rise and fall of the American rhinos

Donald R. Prothero 2005. *The Evolution of North American Rhinoceroses*. ix + 218 pp. Cambridge University Press, Cambridge, UK. ISBN 0521832403. Price: GBP 60 (USD 100).

This book provides a thorough treatment for the taxa and North American populations of a family of Tertiary fossils that have long required their systematics to be revised, their data to be compared and contextualized, and the data themselves to be used for a global evaluation. Paradoxically, the author of this book suggests, it was not the paucity of available fossils which thus far undermined the study of this family; (pp. 1–2) “Perhaps it is the sheer size of the specimens, and their enormous abundance that has discouraged workers in the past”.

Donald Prothero reviews all North American Rhinocerotidae, and provides (p. i) “complete descriptions, measurements, and figures of every bone in every species”. In North America, where their presence spans 35 million years, they greatly diversified, “with a variety of ecologies that don’t resemble any of the five living species. They range from delicate long-legged dog-sized forms, to huge hippo-like forms that apparently lived in rivers and lakes”. The short introduction is preceded by a drawing of the evolutionary history of the family in North America, including repeated arrivals. “They have freely circulated between Eurasia and North America since the middle Eocene, and are known from Africa since the early Miocene” (1). “Methods” (Chapter 2) and “History of Investigations” (Chapter 3) are followed by the overdue revised “Systematics” (Chapter 4, pp. 25–131), then “Postcranial Osteology” (Chapter 5), and the enlightening analyses in “Biogeography and Diversity Patterns” (Chapter 6) and “Paleoecology and Evolutionary Patterns” (Chapter 7).

Based on the only evidence for a horn being a rugose area on the top of the skull, most fossil rhino taxa were hornless; “horns (as paired horns on the nose) first appeared independently in two different lineages” (p. 1). Very abundant and widespread in North America, and first reported there in 1850, this family included (p. 1) “by far the most common large herbivores on the continent through most of

the Cenozoic. After the extinction of the brontotheres in the late Eocene (34 Ma), rhinos were also the largest land mammals on the continent for over 18 million years until the immigration of mastodons in the middle Miocene (16 Ma)”. Other ecological niches included the hippo-like, examples of dwarfing, and prehensile-lipped browsers. Postcranial anatomy is now known for most taxa.

“[S]ome remarkable rhino finds have occurred in shallow marine beds, because rhino bones are more durable than those of most mammals” (p. 182). In most of North America (p. 182) “east of the Mississippi River, we have no terrestrial-mammal bearing beds at all”, except in Florida and some other places. “In many areas [...] we often have excellent faunas with large samples including plenty of fossil mammals in the same size range of rhinos, yet the contemporary rhino species have never been found” (p. 182). In the Uintan—i.e., later middle Eocene (40–47 Ma)—(p. 183) “the sparse distribution of *Uintaceras* suggests that it was a rare immigrant”, “a limited incursion”, and it is shown this “is not an artifact of poor sampling” (p. 183). Unlike in the Oligocene, in the Eocene, it was hyracodonts and amynodonts, not rhinos, that were dominant large herbivores in North America. The Chadronian (late Eocene, 34–37 Ma) was (p. 185) “a peak in perissodactyl diversity and disparity”. At its end, rhino diversity more than doubled (p. 184), “the dramatic increase is real”, and (p. 184). “rhinos reached larger body sizes”. All in all, Prothero finds evidence for punctuated equilibrium (pp. 207–208). “[T]he overwhelming pattern is one of stable species” (p. 208).

The history of rhinos in North America rivals that of the horses, for illustrating principles (p. 2). It is fortunate that for the North American rhinos, (p. 1) “we have not only teeth, but often skulls and complete skeletons of most of the species”. Prothero acknowledges Earl Manning, who introduced him to rhinos (p. 2). The most important new specimens in the last half century are in the Frick Collection of fossil mammals in the American Museum of Natural History: the storage of fossil rhinos occupied one floor (the third floor of the Frick Wing) out of seven floors (p. 2). Manning curated them in the early 1970s, and Prothero did so in 1984. Abundance of remains makes Prothero’s book both necessary and very instructive. The book is well produced, and adequately illustrated. I noticed no typos.

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