

REVIEWS

J. Paleont., 76(4), 2002, p. 792
Copyright © 2002, The Paleontological Society
0022-3360/02/0076-792\$03.00

Gregg F. Gunnell (editor). *Eocene Biodiversity: Unusual Occurrences and Rarely Sampled Habitats*. 2001. Kluwer Academic/Plenum Publishers, New York, 432 p.

The early-middle Eocene was the final episode of warm "greenhouse" climates on Earth, when the climate was warmer from the tropics to the poles (alligators could live above the Arctic Circle). Every study shows that the warm early Eocene and early middle Eocene were the highest periods of diversity in the entire Cenozoic. As the planet cooled during the middle and late Eocene, the diverse, warm-adapted fauna began to decline and die out, culminating in a much lower diversity when glaciers came to Antarctica in the early Oligocene.

The early Eocene is important for another reason: many orders of fossil mammals (especially primates, perissodactyls, artiodactyls, rabbits, whales, and bats) make their first appearances in the fossil record. In addition, other orders that first occur in the latest Paleocene (such as rodents and carnivorans) diversified rapidly. By the end of the Eocene, modern orders and families replaced the archaic fauna of mostly extinct groups with no living descendants.

This volume was the result of a 1998 symposium held at the Society of Vertebrate Paleontology meeting in Snowbird, Utah. The symposium focused on a wide variety of extraordinary Eocene non-marine localities (mostly early and middle Eocene), including lagerstätten, under-represented geographic areas, and unique depositional settings or mass death assemblages. As such, it is a welcome contrast to the abundance of studies that have been conducted in the classic areas of the Eocene, such as the Bighorn Basin of Wyoming.

We are treated to a complete update of the Green River fish fauna by Lance Grande, and a summary of the current work on the spectacular Eocene freshwater faunas of Mahenge in Tanzania by Harrison et al. Although the Messel faunas in Germany have been well documented elsewhere, two chapters give updates on recent discoveries in this, the most spectacular of Cenozoic lagerstätten. There is an important chapter by Hartenberger et al. on the new Chambi fauna of Tunisia, which gives us yet another window on the poorly understood Paleogene of the "Dark Continent." Gingerich et al. also document the fossils from Ganhera Quarry, an important new early Eocene locality in Pakistan (which has been the subject of so many recent Eocene discoveries, such as the transitional whale fossils).

The marine strata of the U.S. Gulf Coast produce not only incredibly rich molluscan faunas, but also small but significant mammalian faunas. Separate papers by Beard and Dawson and by Westgate document what is known to date of these scrappy but important faunas. There are also papers from better-studied Eocene localities, such as the Bighorn, Bridger, and Washakie

basins of Wyoming, or the San Juan Basin of New Mexico; however, these focus on unusual taphonomic occurrences, especially mass death assemblages. McGhee documents the taphonomy of Roehler's "Coryphodon catastrophe" quarry in the Washakie Basin, and Williamson describes several mass death assemblages of *Meniscotherium* from the San Juan Basin. Several other papers describe unusual Eocene microfaunas that were heretofore poorly documented and give a different picture of Eocene faunas than surface collecting yields.

Bloch and Bowen briefly describe the taphonomic context of freshwater limestones in the Bighorn Basin of Wyoming, which are beginning to yield extraordinarily complete skeletons of Eocene primates, rodents, and other small vertebrates when subjected to careful acid etching. Unfortunately, this paper was completed before any significant specimens had been extracted. Since then, Bloch and his colleagues have extracted and reported on numerous remarkable specimens, to the extent that enraptured paleontologists have called these discoveries "the Burgess Shale" of fossil primates.

Finally, there is a chapter on the high-elevation basin-margin localities in places like the South Pass Basin, Wyoming, which has produced faunas that are a striking contrast to the famous middle Eocene fossils of the Bridger Basin just a short distance to the south.

Overall, the volume is attractively produced, with only a few typos and photographs that were muddy and dark. Although three years seems a long time to wait for a volume to be produced (especially when new discoveries by several of the authors have outdated their chapters before they were published), for the large technical publishing houses this timeframe is fairly typical. However, it should be noted that in this day of electronic publishing and rapid turnaround of manuscripts, this project might have been completed much more quickly and at less expense. At \$95 this volume will be too expensive for all but libraries and the professional specialists who work on this time interval.

Perhaps the only significant omission is a summary chapter by the editor, which could have placed each of the book's chapters in context, summarized what is known from previous studies and contrasted the new information with the old, and given the reader a state-of-the-art evaluation of where our assessment of Eocene diversity stands. At the very least, the editor could have summarized some of the many studies (such as those by Alroy, Stucky, myself, and several others) that have looked at the Eocene in terms of total diversity changes through the Cenozoic. Instead, the reader must pick through each chapter to find how each individual author has placed their work in context. Given the care that was lavished on the rest of the volume, the amount of time it took to publish it, and its cost, such a summary would have been highly valuable.

DONALD R. PROTHERO
Department of Geology
Occidental College
Los Angeles, CA 90041