

d17 Cenozoic mammal fossils < plantigrade insectivore >

Apropos of the origin of man I see no ground at present for pinning my faith to one theory or another. My purpose in mentioning the matter was simply that I might have an occasion of claiming my right to follow withersoever Science should lead and over and through whatever dares to stand in the way. After all it is as respectable to be modified monkey as modified dirt.
—Huxley, in a letter to Frederick Dyster, 1859.¹

Cenozoic mammals are animals that, at all times, have looked superficially like those that live today (that is in their reconstruction they seem no more strange than do living exotic animals that a casual observer may see for the first time in a museum of Natural History). Their known variety is vast however and the evolution of different lines have been well enough documented that the search for ancestors of the many species of living land mammals, including cats, cattle, dogs, elephants, horses, humans, and aquatic mammals that range from otters to whales, can proceed. All mammal lines when traced back converge on rodent appearing mammals that existed at the beginning of the Cenozoic. The typical ancestor is plantigrade and with a long jaw and a long tail. Most were insectivores. Hedgehogs retain these primitive features except for the long tail. Along with shrews they remain eating insects and worms in the leaf litter. Moles eat the same (not roots) in the ground. Primitive primates moved to eating insects in the trees and developed binocular vision that enables precision in reaching, catching, brachiation, leaping, and pouncing. Bats pursued insects into the air.



Huxley in 1880 first suggested that shrews, moles, hedgehogs (order: Lipotyphla, suborder: Insectivora) bear a close resemblance to his putative ‘ur-eutherian’ ancestor.² **William Diller Matthew** (1871-1930)³ of the American Museum of Natural History gave momentum to this notion,⁴ and this remains useful for comparative studies.⁵

Some lines of descent would have benefitted by the lack of competition within ecological niches that end-Cretaceous extinctions of formerly resident reptiles had made vacant. Mammals that were quick off the start, gained a competitive edge and caused other lines of descent to dwindle and decline even from the beginning of the Cenozoic. However, a diversity bottleneck continued to eliminate the evolved to large size post-extinction “winners.” That is, survival of an extinction event, even as great as the one that wiped out the Dinosaurs, is no guarantee of success of a lineage. Discussing the doomed as though they were reluctant to face their fate, David Jablonski called them “Dead Clade Walking”⁶ in homage to the 1995 film, *Dead Man Walking*, about a death-row inmate who is reluctant. □

Footnote d16.1 Two proxies for the partial pressure of the greenhouse gas CO₂ are:¹³

- 1) alkenones (organic compounds produced by some photosynthetic plankton) that have carbon isotopes fractionated as a function of ambient CO₂ concentration at the time of assimilation and that undergo little alteration after burial. Present-day CO₂ levels before the Ice Age are found in samples studied from the past 15 million years.
- 2) the spatial density of leaf stomates (pores through which gases pass to and from leaves) that decreases in a way known for *Ginkgo* and *Metasequoia* (from greenhouse experiments and a study of museum specimens collected at various times since the start of the Industrial Revolution). Present-day CO₂ levels before the Ice Age are evidenced by fossil leaves of these genera for the past 50 million years.