

extant elephantine tortoises is represented by gigantic continental relatives. Large carnivores existed in these same continental areas from the Eocene to the Recent<sup>1</sup> alongside several dominant groups of these gigantic tortoises. In fact the presence of such carnivores may have been partly responsible for the gigantism witnessed in several phyletic lines.

The extinction of giant land tortoises in all parts of the world probably cannot be explained by a single theory. Man may have played a role in it, though only near the culmination of a series of climatic changes that had already greatly reduced the ranges of the giant species of many different animals (Webb 1969). Man's repeated visits to those Pacific and Indian Ocean islands formerly harboring innumerable individuals of gigantic land tortoises has certainly caused near or complete extinction in several species. It is also true that in several continental areas the disappearance of some tortoise species can be roughly correlated with the presence of early man. Two important facts not often mentioned bear on this problem: (1) some very small species of land tortoises also became extinct at the same time, and (2) the distribution of land tortoises has been continuously restricted since the Miocene. The extinction of the small species cannot be considered part of the general extinction of large land animals in temperate latitudes that characterized the end of the Pleistocene. The pre-Pleistocene extinction of tortoise species was entirely climate-activated. Near the end of the Pleistocene and during the Early Recent man undoubtedly played a contributory role through habitat modification, as well as through direct predation on relict populations.

The only described extinct tortoise genera considered valid in this contribution are *Floridemys*, *Cheirogastor*, *Kansuchelys*, *Sinohadrianus*, and *Stylemys*. Others are either synonyms of presently recognized tortoise genera or subgenera or are not testudinids.

#### EVOLUTION, PHYLOGENY, AND TRENDS

Extinct species of land tortoises are known from deposits of Middle Eocene to Recent geologic age. Undoubtedly Paleocene and perhaps even Upper Cretaceous members of the family will eventually be found. These prototestudinids will be intermediate between the earliest known tortoises of the Eocene and primitive members of the Emydidae.

In Eocene deposits of both North America and Africa and the earliest Oligocene of North America, Asia, and western Europe all the known

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<sup>1</sup> Lydekker's view that the gigantic tortoises became extinct in all continental areas at the close of the Pliocene is now known to be incorrect. Their presence in the Pleistocene is well documented in North and South America, as well as in Asia, where many gigantic Middle and Late Pleistocene species are known.