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ON THE PLEISTOCENE OCCURRENCE OF *ELEPHAS (PALAEOLOXODON) ANTIQUUS* IN THE TUSCAN ARCHIPELAGO, NORTHERN TYRRHENIAN SEA **(ITALY)**

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RIASSUNTO – Sul ritrovamento pleistocenico di *Elephas (Palaeloxodon) antiquus* nell'Arcipelago Toscano, Mar Tirreno settentrionale (Italia) – Il recente ritrovamento sull'isola del Giglio (Arcipelago Toscano) di un frammento di molare riferito ad elefante delle foreste pone alcuni interrogativi sulla presenza nell'isola del Proboscidato e sulla via percorsa per raggiungere l'ambiente insulare.

Key words: Pleistocene, straight-tusked elephant, island of Giglio.

The straight-tusked elephant, *Elephas (Palaeloxodon) antiquus* Falconer & Cautley, 1847, inhabited Middle and Late Pleistocene continental Europe. Elephants presumably derived from this taxon are described from many Mediterranean islands, where they evolved in a rather peculiar way, becoming dwarfed (Kurtén, 1968). The factors which are responsible for the dwarfing of island mammals are thought to include a reduction in the availability of food, predation and competition (Sondaar, 1977; Heaney, 1978; Davis, 1984). Pygmy elephants are known among the Quaternary faunas of Cyprus (Bate, 1903, 1904a, 1904n, 1904c; Vaufrey, 1929; Boekschoten & Sondaar, 1972), Rhodes and Tylos (Bachmayer et al., 1976; Bachmayer et al., 1984; Symeonidis et al., 1973), Naxos, Delos and Serifos (Johnson, 1980; Davis, 1987), Crete (Kuss, 1970; Sondaar, 1971; Schlager, 1991), Malta (Falconer, 1862; Leith Adams, 1870, 1875; Vaufrey, 1929), and Sicily (Ambrosetti, 1968; Ambrosetti et al., 1980). The dwarf elephant, recorded from Sardinia, is reputed not to

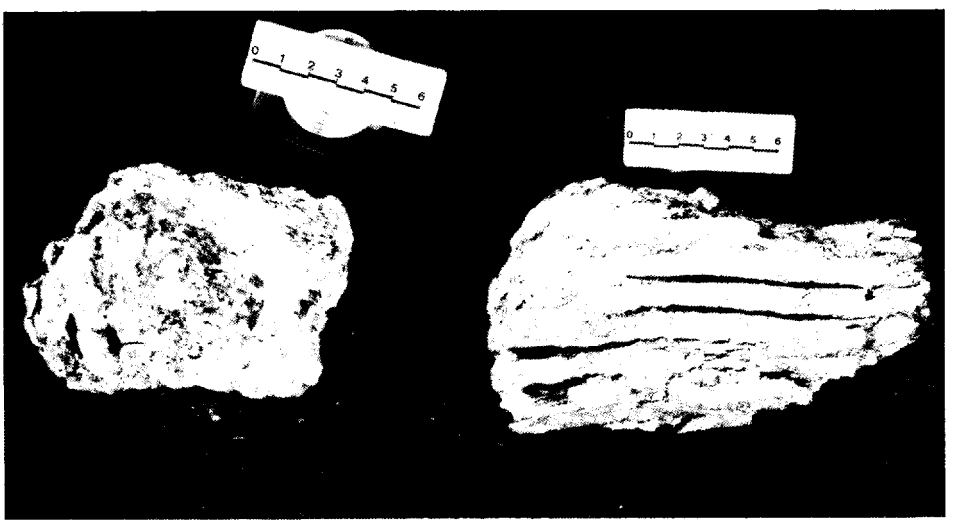

Fig. 1 – *Eleplias (Palaeoloxodon) antiquus*, fragment of molar; occlusal and lateral view. Photograph courtesy Museo di Geologia e Paleontologia, Università di Firenze.

belong to the lineage of *E. (Palaeoloxodon) antiquus* and is described as *Mammuthus* (?) *lamarmorai* F. Major (Azzaroli, 1978; 1983).

It is communly assumed that, before becoming dwarfed, all these elephants reached the Mediterranean islands from the mainland by temporary land-bridges that originated as a result of the lowering of the sea-level during the Ice Ages. According to Azzaroli (1971; 1977; 1983), this may have happened in Sardinia and Sicily. On the basis of tectonic factors, Malatesta (1980) observes that Crete also may have been joined to continental Greece during the Pleistocene. However, as noted by Davis (1987), it is difficult to explain why the Pleistocene faunas of the latter islands are relatively rich, compared to that of Cyprus. It may be that only a few species migrated to this western Mediterranean island, which was relatively difficult to reach (cf. Azzaroli, 1977). Some years ago, Sondaar (1977) supposed that continental mammals reached by swimming most islands, and pointed out that island faunas were dominated by good swimmer taxa such as elephants, hippopotami and deer. Indeed, some authors have recently suggested that elephants perhaps swam to at least some of the islands (Johnson 1980). New evidence today shows unequivocally that elephants are excellent swimmers. As observed by Johnson (1979; 1980), their swwimming speeds have been measured up to 2.70 km/h, and maximum distances estimated at 48 **km.** For these reasons, Johnson (1980) suggests re-appraising the origin of land vertebrates on all the islands that held elephants, as well as the geological reconstructions that assumed that land bridges once connected these islands to the mainland. Records are also known of the swimming abilities **of** hippopotami and deer (Dermitzakis & Sondaar, 1978), though perhaps the latter do not swim as well as elephants and hippopotami. For Davis (1987) this may explain why deer never managed to make the crossing to Cyprus while elephants and hippos did. The reason may consist in the distance occurring, too great for deer, between the island and the closest mainland.

Recently, a fragment of a molar of Proboscidean, referable to *E. (Palaeoloxodon) antiquus* was recorded from the island of Giglio, in the Northern Tyrrhenian Sea (Italy)

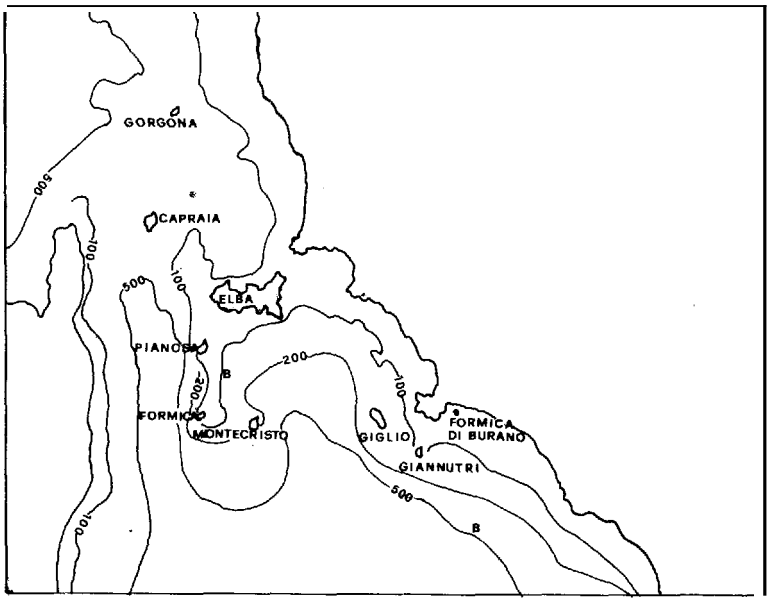

Fig. 2 – Map of the Tuscan Archipclago with the major isobates that indicate the marine deep between the Italian coast and the islands. Drawing by Silvia Cantagalli, after Azzaroli et al. (1990).

(Rustioni, 1990). It represents the first record of Pleistocene mammals on the island and probably the only paleontological evidence of the occurrence of elephants on the islands of the Tuscan Archipelago (Fig. 1). In fact, many Pleistocene mammalian fossils had previously been collected in this area, from the islands of Elba, Pianosa, Giannutri and Formica di Burano, but none of them belonged to elephants. The characters of the sediment that provided the Giglio specimen suggest that this elephant probably arrived on the island sometime during the Würm glacial episode (Azzaroli et al., 1990). However, the question is how did it get there? Did it cross the temporary land bridge that once connected the island with the mainland or instead did it swim through the marine channel that separed Giglio from the continental coast, at a time of the lowering of the sea-level? Along much of the Giglio coast the sea-bed slopes so deeply that, even with the lowering of the Pleistocene sea-level, the island must still have remained isolated. In fact, the island of Giglio lies geographically between the isobates of 100 m and 200 m, which run in an east-west line between the Italian coast and the middle of the Tyrrhenian Sea. Most of the Tuscan islands that provided Quaternary continental fossils of mammalian species are located instead between the isobate of 100 m and the mainland: Elba, Pianosa, Giannutri and Formica di Burano may have been more easily joined to Italian mainland due to the relatively shallow sea-bed that surround them (Fig. *2)*.

In any case, however the Proboscidean reached the island of Giglio, it may be that the straight-tusked elephant did not find adequate biological conditions to become dwarfed there and probably did not long survive because of the small size of the island.

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