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Giants and elephants of Sicily

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Abstract: In Sicily, the great abundance of fascinating and impressive natural phenomena, have fed the imagination of men, who have interpreted them as the manifestation of the existence of supernatural and fantastic beings giving rise to myth and legend. Amongst these many myths, that of the cyclops Polyphemus, is closely linked to the geopalaontological history of Sicily. The discovery, often inside caves, of the fossil skulls of elephants, in which there is a great nasal hollow (in the frontal part) where there was a trunk in life, gave rise to the belief that one-eyed giants had existed, in the past. The nasal hollow was wrongly interpreted as the orbit of a single frontal eye that characterized these monstrous beings, and the gigantic size was inferred by the notable dimensions of the skulls and the bones that are frequently found. In 1830 Giorgio Cuvier, attested to the fossil nature of the bones and put an end to the different inferences formulated about their origin.

Situated in the centre of the Mediterranean sea, a land of meeting and clash of civilizations of different peoples and cultures, Sicily has been seen as a fantastic country, characterized by a great wealth of environments and landscapes, due to the complexity of its geological structure and to the extremely varied geomorphological assessment of the island. The great abundance of fascinating and impressive natural phenomena, such as the active volcanoes, the thermal springs, and earthquakes, have fed the imagination of men, who have interpreted them as the manifestation of the existence of supernatural and fantastic beings giving rise to myth and legend.

Amongst these myths, that of the cyclops Polyphemus is closely linked to the geopalaontological history of the island. Sicily, in the last few million years, has witnessed a succession of different animal populations. They reached the island when it was connected with continental Italy because of the eustatic oscillations of the sea level. Among the fossil remains that characterize the Quaternary faunas, it is possible to distinguish those of the elephants that, coming from Asia, populated continental Europe during the Quaternary period, even travelling to Sicily and the surrounding islands. Here, the biogeographic isolation caused the development of a dwarf size that represents a palaeontological peculiarity of Sicily, Malta, and some other islands of Mediterranean Sea.

The discovery of the skulls of such elephants, that have a large nasal hollow where the trunk was during life gave rise to the belief that one-eyed giants had existed. However, the nasal

hollow was wrongly interpreted as the orbit of a single frontal eye that characterized these monstrous beings, and the gigantic size was inferred by the notable dimensions of the skulls and the bones that are frequently found.

Within the calcareous rocks in Sicily are numerous caves. These caves became preferential places of 'preservation' of the fossil remains of the vertebrates that during the Middle and Upper Pleistocene populated the Sicilian-Maltese archipelago. The different migrations are reflected by a sequence of different faunal complexes, characterized by the presence of different kinds of elephants that were localized around 500 000 years BP (complex to *Elephas falconeri*) and around 200 000 years BP (complex to *Elephas mnaidriensis*), before man's presence in Sicily.

The last migratory wave continued up to the Upper Palaeolithic (11 000 years BP) when, depending of the lowering of the sea level, due to the Würmian's glaciations, *Homo sapiens* reached Sicily following the great herbivores. The human presence of the Upper Palaeolithic and of the subsequent periods (Mesolithic and Neolithic) is well documented in the deposits recovered in many Sicilian caves. In addition to the burials and the skeletal rests, the remains of meals, represented by animal bones, hulls of terrestrial and sea molluscs occur in abundance as do the remains of ancient hearths with coal fragments as well as flint, in quartzite and obsidian tools. Therefore the caves had been inhabited since the Upper Palaeolithic and the Pleistocene deposits, in which the fauna was limited to great mammals. The caves were thus known to the first inhabitants of the island, who,

coming into contact with the fossilized skulls of these elephants, began to elaborate the myth of gigantic beings endowed with single eye, precisely the Cyclops (Fig. 1).

The Odyssey: Ulysses and Polyphemus

Giants are present in the myths of almost all ancient civilizations. Nevertheless, it is certainly due to Homer that the figures of Polyphemus, have entered collective imagination. One of the principal episodes of the *Odyssey* is based on the meeting of Ulysses with one of these monstrous beings, described in the Book IX. The Greek victors, who had conquered Troy after a long siege, prepared the fleets with the sole desire to return to their country. On the way home, Ulysses' ship, surrounded by fog and darkness, ran on to some cliffs, the Cyclops' island. These giants were beings characterized by a physical particularity that, besides their strength and the superior stature, differentiated them from other human beings: they possessed only one eye in the centre of their forehead; a characteristic that, even if not clearly said by Homer, could easily be deduced from the description of the subsequent events. The event of Ulysses' dramatic meeting with

Polyphemus, of his friends' tragic death, devoured by the monster, his blinding and the final escape is too well-known to recount here (Fig. 2). It is sufficient to note that the place of this fantastic meeting was situated on the eastern coast of Sicily, on the slopes of Etna so that one had identified in the stacks of Acitrezza the enormous blocks cast into the sea by Polyphemus, made insane by his blindness and by anger in the vain attempt to sink Ulysses' ship.

The charm of the whole story is such that it is easy to understand that Virgilio, several centuries later, could not resist the temptation to speak about it in his work *Aeneid*, inventing an improbable travelling companion of Ulysses (Achemenide), forgotten by the Homeric hero in the agitated escape from Polyphemus. Achemenide lives afraid of being found out and eaten by Polyphemus; he was reassured by the pious Aeneas who rescued him, and he narrates those terrible events in a story of strong pathos, where the central scene is the blinding of the monster (Fig. 3). Apart from Homer and Virgil, many other authors of antiquity treated the myth of the Cyclops.

Hesiod (seventh century BC) speaks of it in the *Teogonia*, Empedocles from Agrigento (492–433 BC) affirms that an extinct race of gigantic men existed

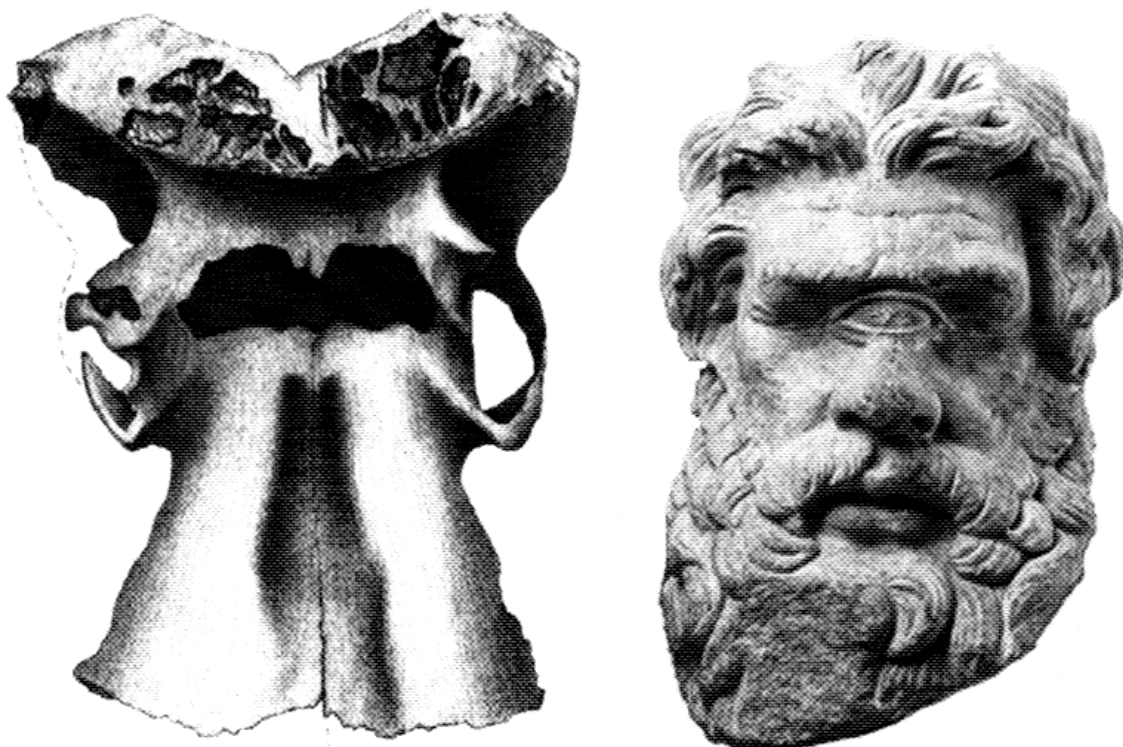


Fig. 1. Comparison between *Elephas mnaidriensis* skull (by Pohlig 1893) and Polyphemus' head (Second century BC, Boston, Museum of Fine Arts).



Fig. 2. Ulysses offers the wine to Polyphemus Mosaic of the Villa del Casale (Piazza Armerina, Enna).

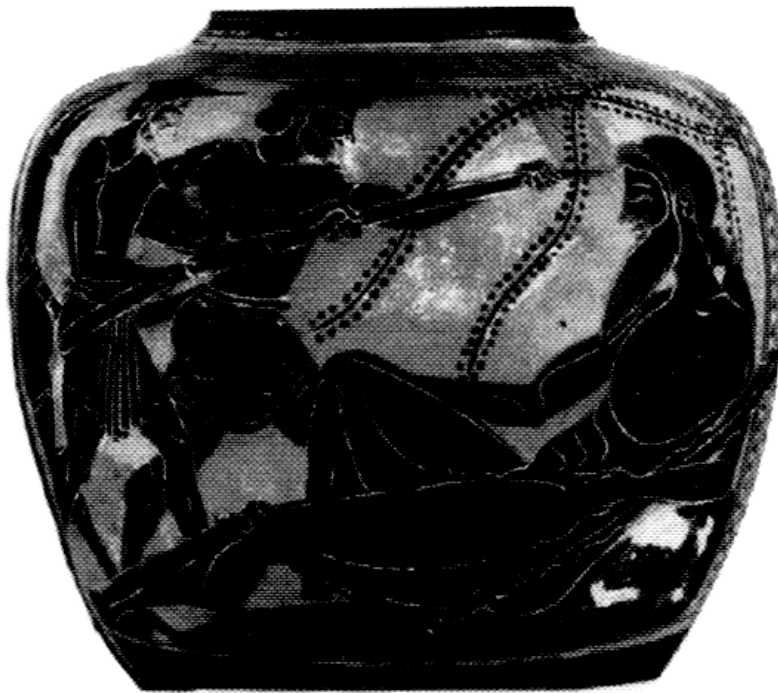


Fig. 3. Blinding of Polyphemus, vessel with black figures, 500 BC.

in the caves near the coasts of Sicily; Euripides (485/484–405/403 BC) devotes a satiric drama *The Cyclops to the Myth*, Thucydides (460–400 BC) in his *Histories*, and Ovid (43 BC – 18 AD), in his *Metamorphoses*, offer us the image of a Polyphemus refined in manners because he was in love with the nymph Galatea.

Giants of Sicily

During the Middle Ages the myth of the Cyclops was mixed with that of the existence of giants that had populated the island in ancient times. This gave birth to the myth of a stock of giants, ancestors of the present inhabitants, who lived before the Flood, whose bones can be found frequently in Sicilian caves. Giovanni Boccaccio (1313–1375), in the *Genealogia degli Dei* (1365) tells us about some remains, dating back to 1342, of a giant found in a cave situated at the foot of Mount Erice, overlooking Trapani. Some citizens were astonished by these remains and took up arms at the sight of that huge man; everything turned into dust and everyone believed they were the remains of Polyphemus or the legendary King Erice (Fig. 4).

In 1558 Tommaso Fazello (1498–1570) published a monumental history of Sicily in Palermo, in which he asserted, without hesitation, that the first inhabitants of the island after the Flood were giants that might be identified with the Cyclops who, in memory of that great flood, started living in the mountain caves, in particular on Etna. Fazello lists numerous other Sicilian places where bones of giants had been discovered: Maredolce (near Palermo), where the remains of a giant measuring 18 cubits were discovered; Gerate (Syracuse) '*un cadavere di un uomo alto 20 cubiti* (a dead body of 20 cubits)'; Petralia Sottana (Palermo) where '*dove si trovarono resti di giganti alti 8 cubiti* (the rests of giants tall 8 cubits were found)'. Other discoveries were made in the cave of Piraino (today Cave of Puntali or Armetta) near Carini (Palermo), at Calatrasi, a fortress not far from Entella (Palermo), at Mazzarino (Caltanissetta) and at Melilli (Syracuse). The authority of Fazello adds credibility to the existence of an affirmed progeny of giants that are said to have lived in Sicily before the Flood; no Sicilian researcher has doubted this belief, and the news about new recoveries of 'giants' bones' have multiplied.

The mythical culture spread, characterized by the belief that the Sicilians descend from a remote stock of giants, and that such heroic and extraordinary progeny constituted a *gloria gentium* for the whole Sicilian people. In 1614 Mariano Valguamera (1564–1634) claimed as 'evident proof' of the antiquity of Palermo the recovery of bones of giants of immoderate greatness and Di Giovanni

(1615) individualized the place '*Maredolce ... essere stata abitazione de' primi giganti, che in questa nostra piana abitarono* (Maredolce has been the residence of the first giants, that lived in our plain)'.

Vincenzo Auria (1625–1710) reported in 1663 that many bones were extracted from the earth and prepared on the ground from the Cave of St. Ciro '*formò l'intero corpo umano e gigantesco* (they formed the whole gigantic human body)'. In 1742, Antonio Mongitore (1663–1743) spoke of histories and of giants in Sicily. He went back to earlier stories about the recoveries of Mount Erice and narrated how the inhabitants of Erice preserved three enormous and heavy maxillary teeth of that body that were set at the foot of the Crucifix of the church of the Virgin Mary. He also told that in the village of Giuliana, the head of giant had been found inside the Convent of the Olivetani but that the boys of the place had totally destroyed it. For the author this was enough to show the existence of the giants as the first inhabitants of Sicily. Also the Villabianca (1720–1802), wrote: '*Contrada di Maredolce ... celebre perchè stimata sepoltura de' giganti* (the country of Maredolce is famous because it is the esteemed burial place of giants)'; and he added '*riguardo poi alle anticaglie che assai nobilitano questo bel fonte (Maredolce), sono le grotte della sua sorgiva per esservi ritrovato sotto l'anno 1547, ... fortunatamente un cadavere di quei giganti che un dì abitarono la nostra Isola, di statura dell'altezza forse di due uomini* (as far as old curiosities are concerned these give dignity and beauty to that beautiful source [Maredolce]. Among these curiosities there are the caves of its spring where a dead body was found in 1547 ... fortunately the dead body of a giant that once lived on our Island, he had the stature and the height perhaps of two men).'

Nevertheless, with the advent of Illuminism, these certainties started to change and Carlo Castone di Rezzonico (1742–1796), who visited Sicily in 1793 and 1794 represents this change. In the account of his trip he wrote how, near the village of Capaci, there were some caves where numerous bones of giants were recovered but he avoided going in because he was convinced that they were the remains of a whale or of some other sea monster.

From myth to science

On 1 April 1830 in the *Giornale Officiale di Palermo* '*La Cerere*' an article appeared marking the birth of vertebrate palaeontology in Sicily and it marked the passage from mythology to science. The article was by Baron Antonino Bivona Bernardi (1830). He reported the fraud that happened in

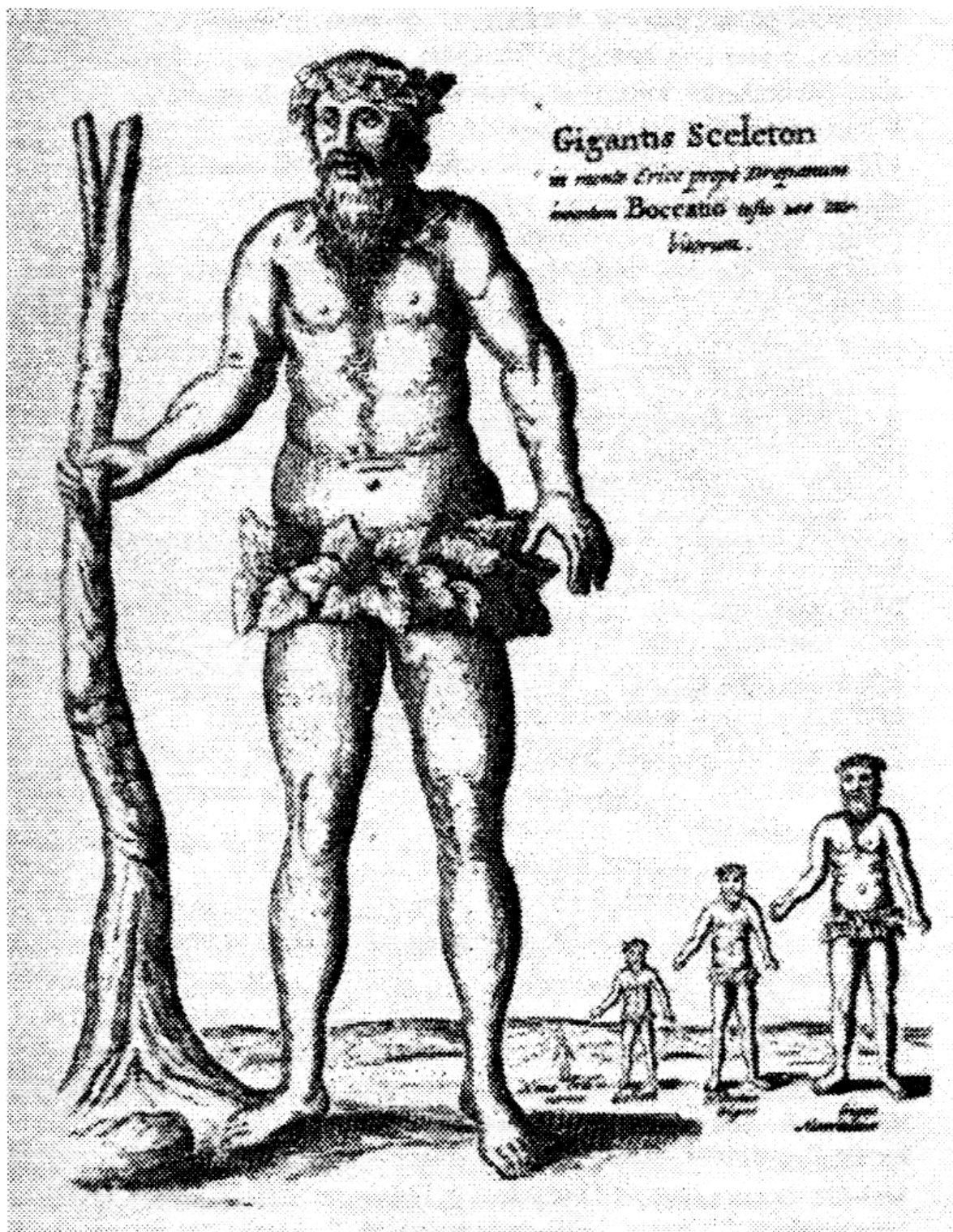


Fig. 4. The giant of Erice by Atanasio Kircher, *Mundus Subterraneus*, Amsterdam, 1678.

those months in some Sicilian fossiliferous places. For several months great quantities of fossilized bones were extracted from a deposit of bones discovered in Palermo, at Maredolce (cave of St. Ciro). They were resold with a discreet profit.

Although creationist, Bivona Bernardi realized that such bones belonged to animals that had become extinct at 'che al tempo del gran cataclismo, il quale estinse tutti questi animali per dar luogo a quei della creazione attuale (the time of

the big cataclysm, leaving way to those of the actual creation). In his subsequent articles he gave a list of recovered animals (remains of a hippo, of an elephant, of a gigantic buck, of an animal similar to the tapir, of an *elasmotherium*, a kind of horse, and of an ox similar to those of today) delineating a first scientific study. But the determinations show the effects of the lack of knowledge of the time; in fact, the only scientific works which Bivona Bernardi could find to compare the discoveries, were the works of George Cuvier and the study of Blumenbach on the primitive elephant.

Few believed the theory of Bivona Bernardi, because the legend that remains were those of hippos brought to the lake of Maredolce by the Arabs for their *naumachies* seemed more reasonable, whereas the remains of elephants were attributed to the animals used by Hasdrubal in the battle against Metello fought near Palermo in 251 BC during the first Punic War.

The bones found together with those from other caves were sent through the consul of France in Palermo to Giorgio Cuvier, who attested the fossil nature of the bones and put an end to the different inferences formulated on their origin. Cuvier, in fact, was considered a second new Aristotle whose decisions to put an end to the dispute of 1830 without the possibility of discussion. The Bourbon Government, when it knew the facts, tried to put an end to the dispersion of the fossil remains and it entrusted the Committee of Public Education to effect an excavation in the Cave of St. Ciro '... *potendo quelle ossa ad oggetto servire di studio, e formare l'ornamento del museo di storia naturale nella Regia Università di Palermo* (because those bones could be used for a study, and they could form the ornament for the museum of natural history in the Royal University of Palermo)'.

The direction of the excavation was entrusted to the abbot Domenico Scinà (1764–1837) who in 1831 published '*Rapporto sulle ossa fossili di Maredolce e degli altri contorni di Palermo*', the first true scientific study on the fossil bones of St. Ciro. Scinà attributed the remains of the elephant to the *Elephas primigenius*, the mammoth, the only elephant recognized by Cuvier, even if, in fact, Nesti had discovered the species *Elephas meridionalis* in 1825.

Although the mystery had been solved, the bones of the giants still stimulated the imagination of writers and poets. In fact, the news of the discovery of the bones of giants had gone beyond the island borders and in 1864 Jules Verne (1828–1905), in his *Voyage au centre de la terre* tells of a fossilized human skeleton 'of the quaternary era' whose bones have deceived scientists for centuries: '*Io ho letto la relazione sullo scheletro scoperto a Trapani*

nell' XI secolo in cui ognuno ha riconosciuto in esso Polifemo, e la storia dei giganti rinvenuti nel XVI secolo nei dintorni di Palermo ... —Osteologia dei giganti! ... e io so che Cuvier e Blumenbach hanno riconosciuto in questi resti semplicemente ossa di mammoth e di altri animali dell'era quaternaria (I have read the relationships on the skeleton in Trapani, discovered in the XI century when everyone recognized in it Polyphemus, and the giant's history exhumed in the XVI century in the outskirts of Palermo ... —*Osteology of the giant! ... And I also know that Cuvier and Blumenbach have recognized in those remains simply bones of mammoths and other animals of the quaternary era*).

The fascinating history of the elephants

In 1867 Baron Francesco Anca, an eclectic and crude amateur naturalist, and Gaetano Giorgio Gemmellaro, Professor of Geology at the University of Palermo, faced a problem related to the Sicilian fossil elephants. They believed that among the remains preserved in the collection of the Geological Museum at the University of Palermo, they could identify four kinds of elephantine. Among them was the living African elephant (*Loxodonta africana*), a species recognized in various parts of Italy and of Europe and that, together with the hippo (*Hippopotamus pentlandi*), would have represented the proof of a connection between Sicily and Africa (this theory was developed by many researchers of the time) which would have allowed the transit of these mammals.

Hans Pohlig (1893) and Raimond Vaufrey (1929) attributed the Sicilian elephants to the Asian kind *Elephas maximus*. They hypothesized, that such faunas had originated on the Italian continent, through connections that occurred during the lowering eustatic phases of the Pleistocene sea level, between Italy and Sicily, in the Straits of Messina. The attribution to the group *Elephas*, of the Sicilian fossil remains had already been completed by H. Falconer (1868), who had been in Sicily in 1859. He effected an excavation in the cave Maccagnone near Carini (Palermo) and found both the kind *Elephas antiquus* and the Maltese dwarf kinds, the *Elephas melitensis*. As far as the finished excavations were concerned, in 1929, in the cave of Luparello (Baida, Palermo), Vaufrey formulated a theory according to which the Sicilian fossil elephants, belonged to four different kinds, *Elephas antiquus*, *Elephas mna-driensis*, *Elephas melitensis* and *Elephas falconeri*: they descend, in a decreasing order, from the European elephant: *Elephas antiquus*. He was convinced that he had found the stratigraphical proof

of this progressive reduction: in fact, according to the French researcher, the *Elephas mnadriensis* lay from a stratigraphical point of view below the *Elephas falconeri*, and thus was more ancient than the latter. Such a theory of the progressive reduction of size, connected with the insularity, well explained the existence of the different sizes of fossil elephants, and besides, it was framed in the gradualist Darwinian vision of the linked evolution to a narrow insular environment, characterized by the absence of predators, from the redoubled alimentary resources and from the limited genetic exchange. This theory has conditioned most of the following studies, conducted by numerous authors who have analysed the Sicilian fossil mammal faunas and particularly the elephants, often only on bibliographical bases. Osborn (1942) and Aguirre (1968–1969), proposed an African descent for the Sicilian elephants. In 1959 in the cave of Spinagallo (Syracuse), a rich layer of dwarf elephant bones was discovered; the great quantity of material allowed a detailed study of the smallest elephantine kind so that in 1968 Ambrosetti reached the conclusion that the two smallest kinds actually belonged to a single kind denominated for priority by the name of *Elephas falconeri*. This kind was characterized by an ample dimensional variability, probably due to a marked sexual dimorphism. According to these last studies the phylogenetic succession of the Sicilian elephants was fixed, from the most ancient to the most recent, in the following kinds: *Elephas antiquus*, *Elephas mnadriensis*, *Elephas falconeri*, characterized by a progressive reduction in size. In 1985 Bada and Belluomini effected an absolute dating, based on the racemization dating method of the amino acid on some elephants' molars coming from different Sicilian places. The results were confusing and they led to the overturn of the theories that had existed until then: according to the dating obtained the *Elephas falconeri* (the smallest) lived around 500 000 years ago, a long time before the *Elephas mnadriensis* (Fig. 5), which resulted of an age of about 230 000 years. The definitive confirmation of the exact succession of the elephants came in 1988, thanks to the discovery made by Burgio and Cani (1988) who studied the fossils and the stratigraphic succession in the travertine quarry of Alcamo. The travertine of Alcamo has been known from 1928, for the great abundance of the fossils of 'dwarf' elephants, but beginning from the 1970s, periodic investigation has led to new discoveries that have enriched the list of Sicilian fossils with a terrestrial giant turtle. In 1988, the demolition of a thin strip that divided two adjacent quarries brought to light a big fracture filled with red earth that formed after the deposition of travertine. The red earth contained remains of



Fig. 5. Skeleton of *Elephas mnadriensis*. Geological Museum 'G. G. Gemmellaro', University of Palermo.

Elephas mnadriensis, the travertine that contained the remains of *Elephas falconeri*. It was therefore an incontestable stratigraphical proof that confirmed the dating of (Belluomini & Bada 1985), sweeping away any hypotheses of progressive reduction of size. This discovery put the different Sicilian elephantine faunas in the correct chronological succession and proposed a different reading of the presence of mammals in Sicily during the middle and upper Pleistocene. It delineated, in a more articulate way, a new evolutionary scenery of the Sicilian environment and of the different phases of population that have existed. In fact, in the last 800 000 years, in relation to the sequence of the geological phenomena, like tectonic rise and eustatic oscillations of the level of the sea, there has been a radical change in the animal population in Sicily. From insular faunas characterized by endemic kinds, with evident phenomena of dwarfism and gigantism and with the almost total absence of predators it passed to a very balanced fauna, in which there were predators of continental and endemic kinds. The long trip for the dwarf elephants of Sicily, from the Homeric myth to the most modern views of the palaeontological sciences seems, therefore, to have come to the end but the study of such faunas certainly does not end here; it will keep on developing new and stimulating themes of research to answer the questions that the most recent scientific discoveries have set.

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