

A skeleton of the Southern Elephant, *Archidiskodon meridionalis* (Nesti, 1825), from a sand-pit near Georghievsk, Northern Caucasus, Russia.

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SUMMARY

A nearly complete male skeleton of *Archidiskodon meridionalis*, found in 1960 in the Northern Caucasus, is described and measurements are given.

SAMENVATTING

Een vrijwel compleet skelet van een mannelijke *Archidiskodon meridionalis*, dat in 1960 in de noordelijke Kaukasus is opgegraven, wordt beschreven.



Fig.1: Excavation of the skeleton of *Archidiskodon meridionalis* in a sand-pit near Georghievsk, Stavropol Region, Russia, August 1960. (Photograph: G.A. Ponomareva).

Fig. 1: De opgraving van een *Archidiskodon meridionalis* skelet in augustus 1960 in een zandgroeve in de omgeving van Georghievsk, Rusland. (Foto: G.A. Ponomareva).

Introduction

In August 1960, in the course of industrial work carried out in a sand-pit near the town of Georghievsk, Stavropol Region, Northern Caucasus, the bones of a fossil elephant were found. The director of the quarry, Mr. A. P. Pheodosiadi, ordered the works to stop and informed the Stavropol Regional Museum about the find. A group of museum workers from Stavropol (G.A.Ponomareva and N.V. Stolbtzov) and Pyatigorsk (E.E. Ivashev and V.M. Makritsky) visited the place of the discovery to do excavations. It was ascertained that the bones belonged to the Southern Elephant, *Archidiskodon meridionalis* (SHVYREVA, 1964; SAFRANOV, 1964; GARUTT & SAFRANOV, 1965).

The sand-pit where the skeleton was found lies on the right bank of the Kuma River valley, opposite the village of Podgornoe, 5 km northwest of Georghievsk. The sand-pit is situated on a 45-50 m high, Early Quaternary terrace, which can be traced as a continuous narrow strip down-stream the Kuma River to its confluence with the Podkumok River. In the sand-pit can be seen yellow-brown loams and river gravels of the terrace, with a total thickness of 3.3-4.0 m, and underlying delta deposits. The skeleton, which lay at a depth of 6-7 m, came from the delta deposits.

The skeleton has both paleontological and stratigraphic significance. Most of the fossil mammalian bones known from the Northern Caucasus have been found in secondary position redeposited by water, and can hardly serve to date the deposits (VERESHCHAGIN, 1959). Therefore the skeleton of *A. meridionalis* found in situ in a layer underlain by deposits dating to the paleontologically well-studied Akchagylian is extremely important stratigraphically.

The excavation lasted some ten days and yielded the skeleton of an adult, male elephant (Fig.1). The skull and right front limb had been destroyed before the work began. The excavated bones and bone fragments were transported to Stavropol, but the preparation, conservation, and restoration of the bones were carried out in the Zoological Institute, Academy of Sciences of USSR, in Leningrad under the guidance of the author and with the participation of the sculptors I.N.Khitrov and A.A.Kolokolchikov. The work was finished in 1962 and later the same year the skeleton was assembled and exhibited in the Stavropol Regional Museum (SHVYREVA, 1964)(Fig.2).

Description

Judging by the development of the last molars, M3, the skeleton belonged to an adult animal. The large size of the skeleton, the clearly expressed relief of muscle and ligamental attachments on the bone surfaces, and the presence of thick tusks indicate that it belonged to a male. The skull, as already mentioned, had been destroyed, but several tens of fragments allowed to reconstruct it: the

skull base was made of papier maché supplemented by original bone fragments.

The skull, jaw, and teeth

Many scholars unite the elephants of the genus *Archidiskodon* and their descendants, belonging to the genera *Mammuthus* (Eurasia) and *Parelephas* (America), in a distinct tribe Mammuthini. The skull of the representatives of this tribe is characterized by the following features: The top of the skull when viewed from the front or from the back has a convex semi-circular shape. The occipital condyles are cone-shaped. The temporal fossae are weakly expressed. The frontal bone is strongly narrowed in its middle part; it is concave in sagittal direction and slightly convex in transversal direction. The nasal opening is wide, its lateral rims are sharpened and directed downward in the males, but rounded in the females. The position of the nasal opening is different in different genera of the Mammuthini. In the older forms, belonging to the genus *Archidiskodon*, it is situated above the level of the orbits, while in *Mammuthus* and *Parelephas* it is on a level with the orbits. In *Archidiskodon* the width of the skull in the region of the supraorbital processes is less than the width of the occiput, while in *Mammuthus* and *Parelephas* the opposite is true. The nasal process of the Mammuthini has a sharpened end. The intermaxillary bones resemble the Roman letter X; especially in the males they are narrowed in the middle.

The preserved parts of the skull, i.e. the alveolus of the right tusk, the left supraorbital process, and fragments of the occipital and frontal bones, leave no doubt that they belong to a representative of the tribus Mammuthini. In 1965 two nearly complete skulls of an adult male and female *Archidiskodon meridionalis* were found in another sand-pit near Georghievsk. The male skull is exhibited in the Pyatigorsk Regional Museum and the female skull in the Zoological Museum in St. Petersburg.

In the skeleton the right tusk is preserved intact, its length is 3200 mm.; maximum diameter at the base is 300 mm, minimum diameter at the base is 238 mm. The tusk is twisted, as is characteristic of the Mammuthini. On emerging from the alveoli, the tusk is directed down and outward, then gradually turns up and inward. The twistedness is more strongly expressed in *Mammuthus* and *Parelephas* than in *Archidiskodon*.

The mandible is intact (Fig.3). It is low and elongated longitudinally. The submental process is long, which is characteristic of *Archidiskodon*; in *Mammuthus* and *Parelephas* the process is short. The length of the mandible, measured from the end of the submental process to the glenoid process, is 840 mm. Its width at the condyla is 650 mm.

Tooth replacement in the Georghievsk elephant was not synchronous: in the lower jaw m3 had not yet fully erupted and functioned together with m2. In the skull, the

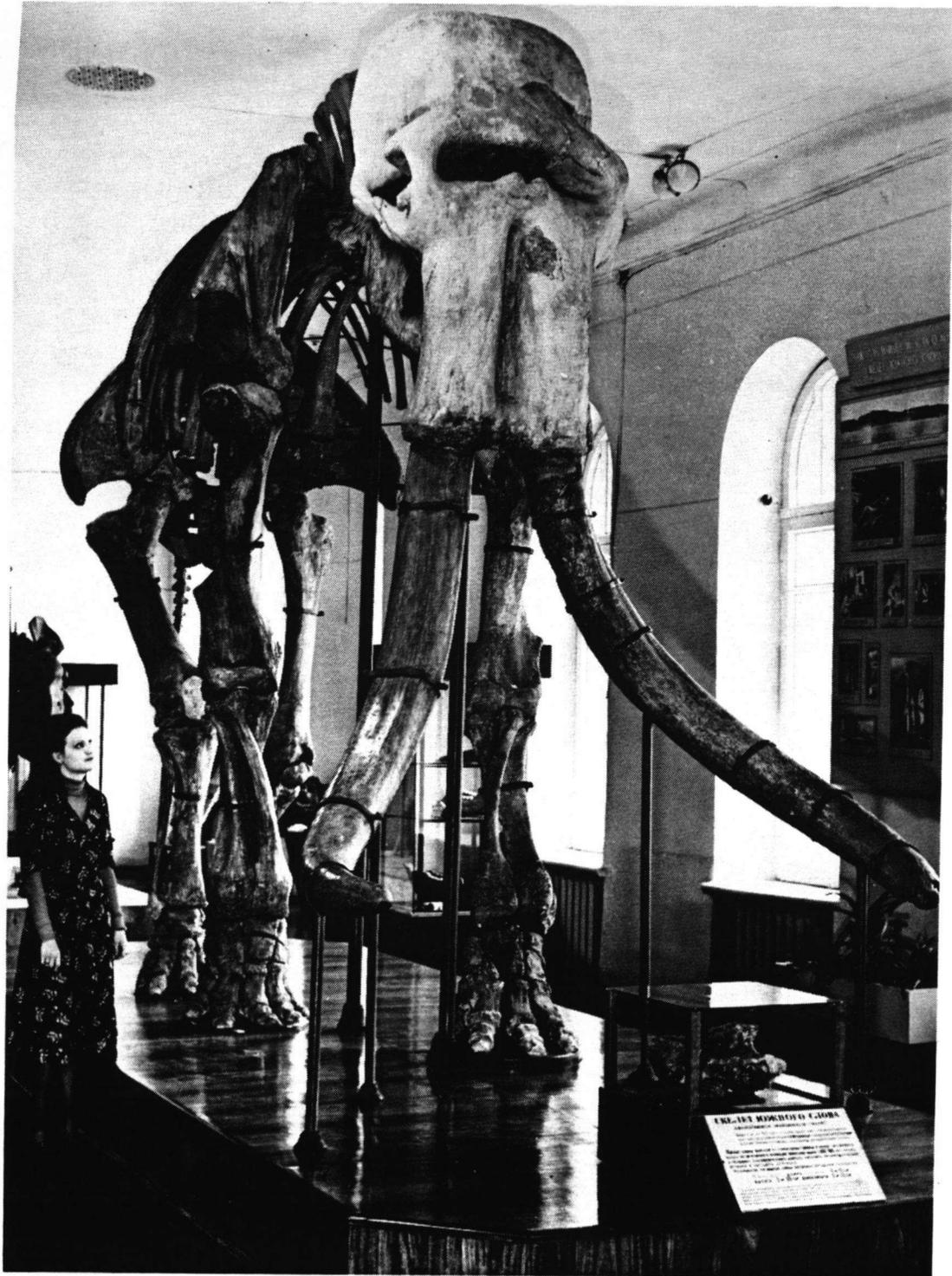


Fig. 2: The skeleton of *Archidiskodon meridionalis* from Georgievsk in the Stavropol Regional Museum (Photograph: A. Gaichenko).
Fig. 2: Het skelet van *Archidiskodon meridionalis* van Georgievsk in het Stavropol Regionaal Museum (Foto: A. Gaichenko).

right M3 had fully erupted and replaced its predecessor M2. Also the left M3 had erupted, but due to the retention of the left M2, its development and occlusion are abnormal (Fig.4). This abnormality probably disturbed mastication and may have caused the death of the animal.

The length of the crown of the right M3 is 267 mm, the width is 104 mm. The length of the left m3 is 252 mm and its width is 98 mm. In the upper tooth there are 14 lamellae, in the lower one 13; the number of lamellae per 100 mm of occlusal surface is 4.5-5.0; the average length of each lamella both in the upper and the lower tooth is 19 mm and enamel thickness is 0.3-0.35 mm. These values are comparable to the values for the type form, *Archidiskodon m. meridionalis*, from the Upper Valdarno, Italy.



Fig. 3: The mandible of *Archidiskodon meridionalis* from Georghievsk (a. top view, b. profile view).

Fig. 3: De onderkaak van *Archidiskodon meridionalis* uit Georghievsk (a. bovenaanzicht, b. zij aanzicht).



Fig. 4: Left M3 of *Archidiskodon meridionalis* from Georghievsk.

Fig. 4: Linker M3 van *Archidiskodon meridionalis* uit Georghievsk.

The vertebral column and rib case

The vertebral column is incomplete, but was reconstructed when the skeleton was assembled. Some vertebrae were lost during the excavations and the available ones are damaged. Preserved are: seven jugular, ten thoracal (of a total of 19-20), three lumbar (of a total of 3-4), and four sacral (of a total of 5-6) vertebrae. The caudals were not preserved.

In the Mammuthini the thoracal vertebrae are characterized by well-developed spinous processes, which are particularly long and massive in the third to seventh vertebrae, but gradually decline toward the lumbar part of the column. This structure determines the peculiar back contour of the elephants of the tribe (GARUTT, 1964).

The ribs are represented only by fragments, but were reconstructed in the exhibited skeleton. The sternum was not preserved.

The front limb

Only the left scapula is preserved. It was reconstructed from several fragments glued together. Its length, measured from the middle of the articular cavity to the top, is 1040 mm. The left humerus, ulna, and radius are preserved. The length of the humerus, measured from the lateral condyle to the top of the caput, is 1225 mm. The length of the ulnar bone, measured from the distal end to the frontal edge of the incisura trochlearis, is 865 mm. The radius measures 945 mm.

The carpus of *Archidiskodon* is characterized by the serial placement of the carpal bones, i.e. each bone in the proximal row has a corresponding bone in the distal row (Fig.5). In *Mammuthus* and *Parelephas* the carpal is asexual as a consequence of the broadening of the lunar bone in the proximal row and the narrowing of the magnum in the distal row. As a result, the lunar bone rests not on one, but on two or three bones in the distal row, which makes the manus more stable (GARUTT, 1951, 1964; DUBROVO & JAKUBOVSKI, 1989)(Fig. 6).

The pelvis

The pelvis was found intact, but was destroyed during the excavations and transportation of the bones. Part of the iliac bone was lost. The pelvis was restored when the skeleton was assembled for exhibition. Maximum width of the pelvis is in the region of the iliac wings and measures 1680 mm. The edges of the iliac wings are straight, which is characteristic of the Mammuthini.

The hind limbs

Both femora and tibiae are preserved. The femur measures 1435 mm from the lateral condyle to the top of caput femoris. The tibia is 820 mm long. Only the left, slightly damaged patella is preserved. Only the distal part of the left fibula is preserved. The approximate length, as compared with the tibia, was 810 mm. The right and left pes are present, as they were glued together by cemented sand; only several phalanges were lost.

The height of the assembled skeleton as measured from the highest point of the vertebral column is 3980 mm. The height of the living animal probably reached some 4200 mm.

Discussion

The Southern Elephant was first described as a distinct species by Nesti in 1825 on the basis of numerous bones, skulls and teeth, found in the upper reaches of the Arno River in northern Italy. Subsequently more material, dated to the Late Pliocene and Early Pleistocene, of this species was found from several fossil sites in Italy, in France, England, Austria, Hungary, Yugoslavia, Bulgaria, Romania, Moldavia, Ukraine, Turkey, Central Asia, and Kazakhstan. In Russia remains of the Southern Elephant



Fig. 5: The manus of *Archidiskodon meridionalis* from Georghievsk.
Fig. 5: De hand van *Archidiskodon meridionalis* uit Georghievsk.

have been found in the Northern Caucasus, in the Southern Urals, and in the southern part of Western and Eastern Siberia.

Palynological analysis of the deposits and of the accompanying fauna indicates that *Archidiskodon meridionalis* lived in open steppe and forest-steppe environments. In Eastern Europe it has been found together with such steppe animals as *Paracamelus* sp., *Gazella* sp., *Equus* sp., *Citellus* sp., *Marmota* sp., *Trogontherium* cf. *cuvieri*, etc. The faunal lists often include also species of such boreal genera as *Capreolus*, *Castor*, and *Clethrionomys*. In general the accompanying fauna varies to some extent from site to site.

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