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A STUDY OF THE REMAINS OF SAMOTHERIUM FOUND AT TAŞKINPAŞA

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During the course of the field work and excavations I carried out in 1952 and 1953 in the fossiliferous deposits of tuff in the vicinity of the village of Taşkınpaşa, which is about 16 kilometers south-southeast of the town of Ürgüp in central Anatolia, [1] I found two astragali, a skull and the lower teeth belonging to genus *Samotherium* of the family Giraffidae. The fauna from Taşkınpaşa includes *Hipparion gracile* Kaup, *Sus erymanthius* Roth and Wagner, *Tragocerus amaltheus* Roth and Wagner, *Tragocerus sp.,* Gazellinae and Rhinocerotidae, [2] in addition to the remains of *Samotherium* [3] described in this report. From these it is evident that this

[1] 1 wish to extend my thanks to the office of the Dean, the Professors' Council and to the Eastern and Central Anatolian Research Stations of the Faculty of Language, History and Geography of the University of Ankara for extending me the necessary grant which made this field work and excavations possible.

On these trips I was accompanied by Dr. Enver Bostancı, assistant of Palaeoanthropology in the University of Ankara and also by Mr. Cemal Ünal from the village of Taşkınpaşa (For the field work and discoveries made in this region see Şenyürek, 1958b, pp. 172-174).

[2] The remains of Gazellinae and a few limb-bones belonging to Rhinocerotidae. have not yet been determined.

[3] During the field work at Taşkınpaşa, in addition to the remains of *Samotherium,* six limb-bones (a metacarpus, two fragments of metatarsus, one astragalus, a centro-tarsal bone and a phalanx)of a heavier member of Giraffidae were discovered in the guUy of kızılasma,"which is beside; the village of Taşkınpaşa, being slightly southwest of it, and at a place called Paşabağı which is located about 1 .5 kilometers east-southeast of the village of Cemil in this neighborhood and about 2.5 kilometers north-Tnortheast of Taşkınpaşa (see

fauna from Taşkınpaşa belongs to the Pontian Age, that is to the Lower Pliocene. [4]

A representative Pontian mammalian fauna, including one genus of Giraffidae, had been found earlier by E. Chaput, H. N. Pamir and S. Erk in a deposit of tuff at Karain, which is about 12 kilometers north-northeast of Taşkınpaşa. Chaput states, regarding this fauna from Karain: *"A l'altitude de 1.225 metres, dans un banc de tuf â grain fin, nous avons recueilli de nombreuses dents d'Hipparion gracile Kaup et quelques dents brise'es de Machairodus; mes compagnons Hamit Nafiz Pamir et Suat Erk ont exrait en outre une mâchoire inferieure de Giraffide determine par M. Piveteau comme Alcicephalus Neumayri Roodler et Weithoffer, identigue â des echantillons provenant du Pontien de Maragha. L'ensemble de la faune indiaue que les tufs dacitiaues de Kara In datent du Pontien (s.l.). Ces tufs s'elevent jusqu'â 1.450 metres; une corniche de laves de 50 metres de hauteur les domine, jusgu'au bord du plateau situe ici â une altitude de 1.500 metres"*[5] However, as the genus *Alcicephalus,* first described by Rodler and Weithofer in their study of the Pontian fauna from Maragha, [6] is now included in genus *Samotherium*[7], first described by Forsyth Major from Samos,[8] the name of the species *Alcicephalus neumayri* Rodler and Weithofer, reported from Karain by Chaput, [9] is now written as *Samotherium (Alcicephalus) neumayri.*[10]

Şenyürek, 1953b, P. 173). Of these bones five were found at Kızılasma and one (a fragment of a metatarsus) at Paşabağı. These remains, belonging to the same form, have not yet beeri completely determined.

[4] Zittel (1925, p. 300), Lewis (1937, p. 194), Romer (1946, Table 4), Thenius (1949), Papp and Thenius (1949, Table VI) and,Şenyürek (1951, p. 70, 1952, p. 474; 1953a, P. 2; 1953b, p. 174 and 1953c, p.460) have attributed the Pontian Age to the lower Pliocene period.

[5] Chaput, 1936 p. 113.

[6] Rodler and Weithofer, 1890, p. 754.

[7] Şee Major, 1891b, p. 319; Bohlin, 1926, pp. 47 and 93; Simpson, 1950, p. 156.

[8] Major, 1888 (cited by Major, 1891b, p. 317, 1891c, p. 95 and Bohlin, 1926, P. 175).

[9] Chaput, after Piveteau, See Chaput, 1936, p. 113.

[10] Bohlin, 1926, p. 93.

FAMILY GIRAFFIDAE GRAY, 1821 [11]

SUBFAMILY PALAEOTRAGINAE PILGRIM 1911, [12]

GENUS SAMOTHERIUM MAJOR, 1888 [13]

SAMOTHERIUM MAJORI BOHLIN, 1926 [14]

1926. *Samotherium boissieri* var. *major* Bohlin. Die Familie Giraffidae, Palaeontologia Sinica, Series C, Vol. IV, Fascicle 1, p. 87.

Samotherium majori Bohlin, which had been described by Bohlin as *Samotherium boissieri* var. *major* from Samos [15] is represented by a skull and the right lower cheek-teeth found during the excavation, in 1953, at Bayramkalesi, which is just above the western edge of the village of Taşkınpaşa.[16] The lower teeth were found directly below the skull, which was lying in the ground with the palate facing upward. The two astragali, described in this report, were found during the sounding made at the same place in 1952, near the spot where later the skull was discovered.

In the skull are preserved the frontal bones, the largest part of the nasal bones and the maxillae. In norma lateralis, the preserved part of the brain-case is relatively shallow, while the face is vertically deepened (see figs. 1 and 2). This skull, which is devoid of horns, probably belongs to a female animal. [17] The top of the orbits are, relatively speaking, thin. The upper profile of the skull, in mid-sagittal section, is straight from the anterior tip of the preserved portion of the nasal bones to a place between the distal half of the orbits. Between the distal portions of the orbits is seen a slight swelling, on the mid-sagittal plane, behind which the upper profile of the skull inclines gently downward and backward to the coronal suture. The upper surfaces of the orbits are considerably higher than the mid-sagittal part of the upper surface of the skull between them, which thus appears sunken. When the distal parts of the upper surfaces of the right and left orbits are connected with a line, it is observed that the top of the slight swelling on the mid-sagittal plane, already referred to, remains 10 mm. below this line. In having upper surfaces of the orbits at a higher level than the mid-sagittal part of the skull between them the specimen from Taşkınpaşa resembles *Samotherium boissieri* Major from Samos [18] and also other members of the subfamily Palaeotraginae. [19]

[11] Simpson, 1950, p. 156.

[12] Ibid., p. 156.

[13] Ibid., p. 156 and Major, 1888.

[14] Bohlin, 1926, p. 87.

[16] Ibid., p. 87.

[18] For the texture of the deposit of tuff at this and at other fossiliferous localities in this region and for their geological age see: Şenyürek, 1953b, pp. 172-174.

[17] For sex differences in horns *of Samotherium* and *Palaeotraginae* see: Major, 1891b, p. 317; Pilgrim, 1911, p. 27; Bohlin, 1926, p. 98.

[18] Major, 1891b, p. 318.

[19] Bohlin, 1926, p. 98.

The orbits are of oval shape and the lowest point of the inferior margin of the orbit, on the right side, is about 80 mm. higher than the alveolar margin. According to Bohlin, the corresponding measurement is about 70 mm. in *Samotherium cfr. neumayri* (Rodler and Weithofer) from the Kansu Province of China,[20] and about 100 mm. in *Samotherium sinense* (Schlosser).[21] When a line perpendicular to the alveolar process is drawn from the most forward point of the orbit, it is observed that in the skull from Taşkınpaşa the anteriormost point of the right orbit is 45 mm. behind the distal face of the right third upper molar. In this feature the skull from Taşkınpaşa differs from that of *Helladotherium duvernoyi* Gaudry and Lartet from Pikermi, in which, as can be seen from the drawing published by Gaudry[22] the anteriormost point of the orbit is above the distal portion of the third upper molar, that is, it is more antenorly placed than in the Anatolian skull. In having posteriorly placed orbits the skull from Taşkınpaşa also conspicuously differs from those of *Samotherium neumayri* (Rodler and Weithofer) from Maragha,[23] *Samotherium cfr. neumayri* (Rodler and Weithofer) from China[24] and *Samotherium boissieri* Major from Samos,[25] in all of which the orbits are more anterior in position than in the Anatolian specimen. In this feature *Samotherium majori* Bohlin from Samos, described by Bohlin as *Samotherium boissieri* var. *major,*[26] comes closer to the Anatolian specimen. According to the figures given by Bohlin, in 3 specimens (Nos. 5,9 and 11) of *Samotherium majori* Bohlin from Samos the anteriormost point of the orbit is from 1 to 3 cm. behind the third upper molar.[27] Bohlin describes the position of the orbits in one specimen (No. 10) of *Samotherium majori* as behind *(hinter)* and in another as being far behind (*weit hinter)* the upper third molar.[28] In this feature *Samotherium sinense* (Schlosser) from China approaches *Samotherium majori* Bohlin from Samos and Taşkınpaşa.

[20] Bohlin, 1926, p. 47.

[21] İbid., p. 51.

[22] Gaudry, 1862, pl. XLI, fig. 1.

[23] As can be seen from the picture published by Rodler and Weithofer (1890, pl. 1, fig. 1) in the specimen of *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer) from Maragha a perpendicular line dropped from the anteriormost point of the left orbit passes through the anterior part of the third upper molar.

[24] According to Bohlin (1926, p. 48) in *Samotherium cfr. neumayri* (Rodler and Weithofer) from China the anteriormost point of the orbit is above the second upper molar.

[25] According to Bohlin in *Samotherium boissieri* Major from Samos, the anteriormost point of the orbit may either be above the third upper molar or may extend as far as the second upper molar (See Bohlin, 1926, p. 89). As can be seen from the drawing published by Major (1891b, fig. 1), in the male skull of *Samotherium boissieri* Major the anteriormost point of the right orbit is above the middle of the third upper molar.

[26] Bohlin, 1926, p. 87.

[27] ibid., p. 89.

[28] ibid., p. 89.

Regarding the position of the orbits in this species from China Bohlin states: *"Die Vorderkante der Orbitae liegt i his 2 Zentimeter hinter M^3."* [29]

In the skull from Taşkınpaşa the tip of the preserved portion of the nasal bones is slightly in advance of P^2 (see figs. 1 and 2). As a considerable portion of the anterior part of the nasal bones is broken, it is evident that the tip of ossa nasalia was considerably ahead of P^2. In this feature the skull from Taşkınpaşa resembles *Samotherium boissieri* Major from Samos in which, as can be seen from the drawing published by Major, [30] the tip of the nasal bones is also far ahead of P^2. According to Bohlin, the tip of the nasal bones is also ahead of P^2 in *Samotherium cfr. neumayri* (Rodler and Weithofer) and *Samotherium sinense* (Schlosser) from China. [31]

The form of the preserved part of the skull, in norma verticalis, is nearly triangular (fig. 3). The surface of the maxilla is somewhat depressed below and along the nasal bones on each side. Behind the orbits the skull narrows rapidly to the coronal suture. Thus while the width of the skull above the distal end of the orbits is 253 mm., its width is reduced to about 110 mm. at the level of the coronal suture.

In norma basilaris, the tooth rows converge gently toward the anterior part of the palate (fig. 4). The choanae have a maximum width of 42.00 mm., and their anteriormost point stops between the second and third upper molars. As can be seen from the pictures published by Rodler and Weithofer and Bohlin, the anterior margin of the choanae is considerably more antetiorly placed in the skull from Taşkınpaşa than in those of *Samotherium neumayri* (Rodler and Weithofer) from Maragha, [32] *Samotherium cfr, neumayri* (Rodler and Weithofer) from China [33] and *Samotherium sinense* (Schlosser).[34] The choanae of *Samotherium sinense* (Schlosser) from China also differ from those of the Anatolian specimen in being very narrow. [35] As can be seen from the photograph published by Bohlin [36] in *Samotherium majori* Bohlin from Samos the anterior margin of the choanae stops between the second and third upper molars. Furthermore, in this skull from Samos the choanae are also wide, as is the case in the Anatolian specimen. Thus, in this feature the skull from Taşkınpaşa resembles closely that of *Samotherium majori* Bohlin from Samos.

The measurements of the skull from Taşkınpaşa are listed in Table 1 and they are contrasted with those of *Samotherium majori* Bohlin from

[29] Ibid., p. 51.
[30] Major, 1891b, fig. 1.
[31] Bohlin, 1926, pp. 48 and 52.
[32] Rodler and Weithofer, 1890, pl. II, fig. 2.
[33] Bohlin, 1926, pl. V, fig. 2.
[34] Ibid., pl. VI. fig. a.
[35] Ibid., pl. VI, fig. 2.
[36] Ibid., pl. IX, fig. 8.

Samos and other species of the same genus in Table 2. As can be seen from Table 2, the width of the skull of the Anatolian specimen, measured over the orbits, is smaller than that of *Samotherium boissieri* Major and is in the range of *Samotherium majori* Bohlin. Indeed, in this dimension the Anatolian specimen comes close to the average of *Samotherium majori* Bohlin from Samos. In the length measurement of the orbit the Anatolian specimen exceeds *Samotherium boissieri* Major from Samos and also *Samotherium cfr. neumayri* (Rodler and Weithofer) from China. Although, the orbit length of *Samotherium majori* Bohlin from Samos is considerably shorter than that of the skull from Taşkınpaşa, stili in this measurement the Samos form of *Samotherium majori* Bohlin comes closer to the Anatolian specimen than do *Samotherium boissieri* Major and *Samotherium cfr. neumayri* (Rodler and Weithofer). The height of the orbit in the skull from Taşkınpaşa is considerably smaller than that of *Samotherium cfr. neumayri* (Rodler and Weithofer) from China. As far as can be judged from the photograph of one skull published by Bohlin, [37] the orbit of the Anatolian specimen, in addition to being longer, also appears to be relatively lower than that of *Samotherium majori* Bohlin from Samos. Although the tip portions of the nasal bones are broken in the Anatolian specimen, its nasal bones appear to be somewhat longer than those of *Samotherium majori* Bohlin from Samos, [38] which in turn exceed those of *Samotherium boissieri* Major from the same island. In short, although there are some differences, in the measurements available for comparison, the skull from Taşkınpaşa comes closer to that of *Samotherium majori* Bohlin from Samos than to *Samotherium boissieri* Major from the same island.

In the skull from Taşkınpaşa all the right upper premolars and molars are preserved *in situ*. On the left side of the upper jaw M^2-M^3 and parts of the crowns of M^1 and P^4 are retained. Of the left upper P^2 and P^3 only the roots have been preserved. All the preserved upper teeth are worn, the degree of attrition being the greatest in M^1.

The enamel of all the teeth displays fine striations or rugosities, which are also characteristic of other members of Giraffidae. [39] When the three upper premolars are examined in occlusal view (figs. 4 and 5), it is seen that on their external surfaces the anterior, middle and posterior folds are well-

[37] Ibid., pl. IX, fig. 10.

[38] The length of the nasal bones of the Anatolian specimen listed in Tables 1 and 2 has been measured from nasion, that is the middle of the naso-frontal suture. On the other hand, the nasal lengths given by Bohlin are measured along the naso-maxillary suture. Bohlin (Bohlin, 1926, p. 89) describes this measurement as follows: *"Vom Hinterende-Vorderende der Sutur gegen das Maxillare."* Although the tip portions of the nasal bones are broken in the Anatolian specimen, the nasal length measured along the naso-maxillary suture is 190 mm.

[39] See Gaudry, 1862, p. 254; Rodler and Weithofer, 1890, pp. 758-759 and Pilgrim,

developed. In this skull P^3 and P^4 are in general of similar form. In this feature *Samotherium majori* Bohlin from Anatolia differs from *Helladotherium duvernoyi* Gaudry and Lartet in which these two teeth to some extent differ in occlusal view, [40] and resembles *Samotherium (Alcicephalus) neumayri* (Rodler and and Weithofer) from Maragha. [41] At the base of the internal surface of P^3 is observed a slightly thickened band, which represents a remnant of cingulum.

In the second and third upper molars which are not so badly worn as the first molar, it is seen that the anterior and middle folds are well-developed. The posterior fold is also well-developed and is as large as the middle fold in the third upper molar, while it is, although stili distinet, smaller than the middle fold in the second upper molar. In both the second and third upper molars the external surface of the anterior lobe displays a well-formed rib, which is much less distinct in the external surfaces of the posterior lobes of these teeth (figs. 4 and 5). At the basal part of the mesial surface of the posterior lobe of the third upper molar a small basal pillar is observed (figs. 4-5). In the first upper molar this formation is represented by only a small scale-like thickening at the same spot, while there is no basal pillar in the second upper molar.

The postero-external corner of the third upper molar is prolonged backward, so that in occlusal view the posterior margin of the chewing surface slopes forward and imvard, that is, it converges toward the anterior margin on the inner side. Furthermore, in this third upper molar the width of the posterior lobe is considerably less than that of the anterior lobe. In these features, the third upper molar of the Anatolian specimen differs from the correspondirig tooth of *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer) from Maragha, in which, as can be seen from the drawing published by Rodler and Weithofer, [42] the posterior margm of this tooth is almost parallel to its anterior margin and also there is not much difference between the widths of anterior and posterior lobes. On the other hand, in these two features the third upper molar of *Samotherium majori* Bohlin from Samos, as far as can be judged from Bohlin's photograph, [43] seems to approach that of the Anatolian specimen.

The measurements of the upper teeth of the Anatolian specimen are listed in Table 3 and they are compared with those of other forms of *Samotherium* in Tables 5 and 6. In absolute P^2-M^3, P^2-P^4 and M^1-M^3 lengths the skull from Anatolia exceeds *Samotherium boissieri* Major from Samos, *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer) from Maragha,

[40] De Mecquenem, 1924, p. 158 and Gaudry, 1862, pl. XLI, fig. 2.
[41] Rodler and Weithofer, 1890, pl. II, fig. 2 and De Mecquenem, 1924, p. 158.
[42] Rodler and Weithofer, 1890, pl. II, fig. 2.
[43] Bohlin, 1926, pl. IX, fig. 8.

Samotherium cfr. neumayri (Rodler and Weithofer) and *Samothenum sineme* (Schlosser) from China and falls within the range of *Samotherium majori* Bohlin from Samos (Table 5). In the index expressing P^2-P^4 length as a percentage of M^1-M^3 length, the Anatolian specimen falls within the range of *Samotherium boissieri* Major from Samos and *Samotherium sinense* (Schlosser) from China (Table 5). In this index the Anatolian specimen is surpassed by *Samotherium cfr. neumayri* (Rodler and Weithofer) from China, but greatly exceeds *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer) from Iran which appears to have the smallest upper premolars, relative to the upper molars, in the genus *Samotherium.* The specimens of *Samotherium majori* Bohlin from Samos slightly exceed the Anatolain specimen in this index, that is they have, relatively speaking, slightly larger upper premolars.

As can be seen from Table 6, in the size of the individual teeth, expressed by the robustness value, *Samotherium majori* Bohlin from Anatolia exceeds *Samotherium boissieri* Major from Samos and *Samotherium cfr. neumayri* (Rodler and Weithofer) from China in all the upper teeth. The upper teeth of the skull from Taşkınpaşa have bigger robustness values and greater lengths than, those of *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer) from Maragha and *Samotherium sinense* (Schlosser) from China, with the only exception of M^1 which is strongly worn and thus reduced in size in the AnatoHan specimen.

Bohlin has published the measurements of the individual upper teeth of only one specimen (No. 11) of *Samotherium majori* Bohlin from Samos. [44] The teeth of this one specimen from Samos happen to be smaller than those of the Anatolian specimen, again with the only exception of M^1 which is extremely worn in the skull from Anatolia. But stili it is notevrorthy that in size, the teeth of this specimen of *Samotherium majori* Bohlin from Samos come closer to those of the Anatolian specimen than those of *Samotherium boissieri* Major, *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer) from Maragha and *Samotherium cfr. neumayri* (Rodler and Weithofer) from China. It may also be said that in the size of most of the teeth this specimen of *Samotherium majori* Bohlin from Samos comes closer to those of the Anatolian skull than those of *Samotherium sinense* from China. However, the AnatoHan specimen differs from the single example of *Samotherium majori* Bohlin from Samos in having much lower crown indices in P^2, P^3, M^2 and M^3, In crown indices of P^4 and M^1 the Anatolian and Samos forms are almost equal, there being a very imperceptible difference in favor of the Anatolian specimen.

In summary, it can be stated that in absolute P^2-M^3, P^2-P^4 and M^1-M^3 lengths and in the sizes of the individual upper teeth the skull

[44] Ibid., p. 91.

from Taşkınpaşa comes closer to *Samotherium majori* Bohlin from Samos than to other species of the genus *Samotherium*. The Anatolian specimen differs from the Samos form of *Samotherium majori* Bohlin in having, relative to M^1-M^3 length, a slightly shorter P^2-P^4 length. The skull from Anatolia also differs from one specimen of *Samotherium majori* Bohlin from Samos in having lower crown indices in most of its upper teeth, but as we have only one specimen of each form for this index it is difficult to say with certainty whether this represents an individual variation or an important difference between the two forms.

The right lower premolars and molars shown in fig. 6 were found isolated but in a row below the skull. Of the corpus mandibulae only a part under M_3 is preserved, its remainder having disintegrated. I have set these lower premolars and molars, which belong to the same individual, in Plaster of Paris. All the lower teeth are worn to various extents. Of these P_3, P_4 and M_1 are extremely worn, while P_2, M_2 and M_3 are worn to a lesser extent, although they stili exhibit an advanced stage of attrition. Like the upper teeth, these lower teeth also show the striations or rugosities characteristic of Giraffidae.[45]

P_2 of this specimen shows a relatively well-developed metaconid, or inner cusp. In this feature the specimen from Taşkınpaşa differs conspicuously from P_2 of *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer) from Maragha. Regarding P_2 of this Maragha species Rodler and Weithofer state: *"Beim votdersten Pramolaren —Pr_3—fehlt der Innenhöcker meist vollstandig oder ist nur schwach angedeutet."* [46] In P_2 of the specimen of *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer) from Maragha, depicted by Rodler and Weithofer, [47] the inner cusp is rudimentary and is much smaller than that of *Samotherium majori* Bohlin from Anatolia. In P_2 of the specimen of *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer), published by De Mecquenem, [48] as far as can be judged from the photograph, the metaconid is absent or at the most extremely rudimentary. P_2 of *Samotherium majori* Bohlin from Taşkınpaşa also differs from the corresponding teeth of *Samotherium sinense* (Schlosser) [49] and *Samotherium sp. II.* Bohlin[50] from China, in having a much better developed metaconid.

On the antero-internal corners of the anterior lobes of M_2 and M_3 is seen, in occlusal view, a noticeable anterior fold, which extends to the vicinity of the base of the crown on the internal surface of the tooth. In ,this

[45] At the same place were found two isolated lower incisors and a lower canine belonging to a member of Giraffidae, very probably to genus *Samotherium*.

[46] Rodler and Weithofer, 1890, p. 759.

[47] Ibid., pl. III, fig. 4.

[48] De Mecquenem, 1924, pl. II, fig. 2.

[49] See Schlosser, 1903, pl. IX, fig. 10.

[50] See Bohlin, 1926, pl. V, fig. 11.

feature the Anatolian specimen approaches *Samotheriunı (Alcicephalus) neumayri* (Rodler and Weithofer) from Maragha. Regarding the anterior fold of the lower molars of *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer) De Mecquenem states: *"les arriere-molaires inferieures de l'Alcicephalus Neumayri (pl. II. fig. 2) presentent chez l'adulte un pli anterieur tres fort de la muraille interne qui ne se retrouve pas chez le Samotherium."*[61] However, it is evident that this statement of De Mecquenem does not apply to *Samotherium majori* Bohlin, or at least to the Anatolian form of this species.[52] But stili as the teeth of the Anatolian specimen are badly worn, while those of the Maragha species depicted by Rodler and "Weithofer[53] and De Mecquenem[54] are much fresher, it is difficult to say with certainty whether the anterior fold in the lower molars of the Anatolian form reached the same size as that of *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer) or not.

The last lower molar of the Anatolian specimen possesses a well developed third or posterior lobe ofoval shape (fig.6). Regarding the third lobe of the third lower molar of *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer) from Maragha, De Mecquenem states: *"le talon de la deniere molaire inferieure est moins important que celui du Samotherium, que cem de l'Helladotherium Duvernoyi et de l'Alcicephalus sinensis Schlosser."*[55] In this feature the third lower molar of the Anatolian specimen conspicuously differs from that of *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer) in which, as can be seen from the pictures published by Rodler and Weithofer[56] and De Mecquenem,[57] the third lobe of the last lower molar is much smaller than that of *Samotherium majori* Bohlin from Anatolia.

The relative size of the third lobe of M_3 in *Samotherium majori* Bohlin from Taşkınpaşa is about the same as that of *Samotherium sinense* (Schlosser) from China, depicted by Schlosser[58]. But the third lobe of M_3 of the Ghinese species differs from that of the Anatolian specimen in that it is joined to the second lobe by a broad isthmus, whereas in the Anatolian species the place of junction of the second and third lobes is much narrower because of a deep but very narrow slit between the second and third lobes on the inner side. As can be seen from the picture published by Schlosser,[59] this extra slit is lacking in *Samotherium sinense*. As can clearly be seen

[51] De Mecquenem, 1924, p. 157.

[52] As the teeth of *Samotherium boissieri* Major and *Samotherium majori* Bohlin from Samos have not yet been fully described, it is not possible for me to say whether the anterior fold also occurs in the lower molars of Samos form of *Samotherium majori* Bohlin or not.

[53] Rodler and "Weithofer, 1890, pl. III, fig. 4.

[54] De Mecquenem, 1924, pl. II, fig. 2.

[55] Ibid., pp. 157-158.

[56] Rodler and Weithofer, 1890, pl. III, fig 2.

[57] De Mecquenem, 1924, pl. II, fig. 2.

[58] Schlosser, 1903, pl. IX, fig. 7.

[59] Ibid.

from the drawing published by Rodler and Weithofer,[60] a similar slit between the second and third lobes, on the inner side, is also found in *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer) from Maragha, in which the Maragha species appraoches *Samotherium majori* Bohlin.

There are no median basal pillars, on the external side between the first and second lobes in second and third lowef molars. [61] At the base of the inner surface of the second lobe of the third lower molar is observed a swelling. Similarly the basal par t of the inner, posterior and external surfaces of the third lobe of the last lower molar is surrounded by a continuous swollen band, which forms a distinct ridge on the inner side. This swollen band on the third lobe and the swelling on the basal part of the external surface of the second lobe of M_3 represent remnants of a cingulum. At the basal part of the external surface of the third lobe of M_3 is seen a tiny tubercle or pillar, which probably is a derivative of the cingulum surrounding the base of this lobe.

The measurements of the lower teeth of *Samotherium majori* Bohlin from Taşkınpaşa are listed in Table 4 and are contrasted with those of other forms of the genus *Samotherium* in Tables 7 and 8. As can be seen from Table 7, in P_2-M_3 length the Anatolian specimen exceeds those of *Samotherium boissieri* Major from Samos, *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer) from Maragha, *Samotherium cfr. neumayri* (Rodler and Weithofer) and *Samotherim sineme* (Schlosser) from China and falls in the range of *Samotherium majori* Bohlin from Samos. The P2-P4 length of the Anatolian specimen is larger than those of *Samotherium boissieri* Major and *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer) and is near those of *Samotherium cfr. neumayri* (Rodler and Weithofer) and *Samotherium sineme* (Schlosser) from China. In this measurement, also, the Anatolian specimen is within the range of *Samotherium majori* Bohlin from Samos. In M_1-M_3 length the specimen from Taşkınpaşa surpasses *Samotherium boissieri* Major, *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer), *Samotherium cfr. neumayri* (Rodler and Weithofer), *Samotherium sineme* (Schlosser) and also *Samotherium majori* Bohlin from Samos. However, if one specimen of *Samotherium* from Samos with a P_2-M_3 length of 250 mm., listed by Bohlin,[62] belongs to *Samotherium majori* Bohlin, then it would not at all be unreasonable to suppose that in this measurement, too, the Anatolian specimen may fall within the range of *Samotherium majori* Bohlin from Samos.

In the index expressing P_2-P_4 length as a percentage of M_1-M_3 length, the specimen from Taşkınpaşa is within the range of *Samotherium majori* Bohlin from Samos. On the other hand, *Samotherium boissieri* Major from

[60] Rodler and Weithofer, 1890, pl. III, fig. 1.

[61] As in M_1 the enamel margin between the first and second lobes is completely worn away, it is not possible to say whether this tooth had a median basal pillar or not.

[62] Bohlin, 1926, p. 91.

Samos, *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer) from Maragha, *Samotherium cfr. neumayri* (Rodler and Weithofer) and *Samotherium sinense* (Schlosser) from China exceed the Anatolian specimen in this index. It appears that in genus *Samotherium* this index is highest in *Samotherium sinense* (Schlosser) and tends to be the smallest in *Samotherium majori* Bohlin. It is also interesting to observe that *Samotherium majori* Bohlin, both from Samos and Anatolia, differ from *Samotherium boissieri* Major in having a relatively larger upper and a smaller lower premolar row.

As for the measurements of the individual teeth (Table 8), P_2 of *Samotherium majori* Bohlin from Anatolia is longer than that of *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer), and is near to that of *Samotherium sinense* (Schlosser) in both length and width, being very slightly larger. The P_3 of the Anatolian specimen, which is a strongly worn tooth, stili slightly exceeds in length the maximum of *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer) from Maragha. The P_3 of the Anatolian specimen is shorter than that *of Samotherium sinense* (Schlosser), and is near to that of this Chinese form in width, being very slightly wider. The robustness value of P_3 in *Samotherium majori* Bohlin from Taşkınpaşa is slightly smaller than that *ot Samotherium sinense* (Schlosser). The length of the badly worn P_4 of the Anatolian specimen is within the range of *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer) and is shorter than that of *Samotherium sinense* (Schlosser). In both width and robustness value P_4 of the Chinese species also exceeds that of the Anatolian specimen.

M_1 of the Anatolian specimen, which is again badly worn, is within the range of *Samotherium (Alcicephalus) neumayri* (Rodler and "Weithofer) in length, but in spite of the heavy attrition it has suffered it exceeds that of *Samotherium sinense* (Schlosser) in both length and width. M_2 and M_3 of the Anatolian specimen surpass those of *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer) in length and those of *Samotherium sinense* (Schlosser) in both length and width measurements.

Regarding the lower teeth of *Samotherium* from Samos Bohlin states: *"An den Unterkieferzahnreichen ist der Grössenunterschied nicht so offenbar wie an den Oberkieferzahnreichen. Ausser den in die Tabelle aufgenommenen existieren drei Kleinere Kiefer in München (M_3 46,50 und 50+ ; an den beiden ersten in der Tabelle enthaltenen Kiefern des Senkenbergischen Museums misst M_3 56, bzw. 58 mm.)"* [63] Thus the maximum length of the third lower molar of the larger form of *Samotherium* from Samos, viz., *Samotherium majori* Bohlin, comes quite close to that of the Anatolian specimen.

To summarize the account of the lower teeth, it can be stated that in size of the teeth and in the relative length of its lower premolar series the Anatolian specimen comes close to *Samotherium majori* Bohlin from

[63] Ibid., p. 92.

Samos. *Samotherium majori* Bohlin differs from *Samotherium boissieri* Major from Samos in having longer lower teeth and, relatively, a somewhat shorter lower premolar row. *Samotherium majori* Bohlin is distinguished from *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer), which is another Pontian species in the Near East, in having a better developed metaconid in its P_2, a larger third lobe, or talonid, in its third lower molar, larger lower teeth and a relatively shorter lower premolar series.

The right and the left astragali were found at Bayramkalesi near each other and probably belong to the same individual. Of these two astragali the left one (figs. 7, 8, 9 and 10) is preserved intact, while the right one is considerably corroded. The left astragalus, which is better for descriptive-purposes, agrees with that of *Samotherium*[64] in having a thicker internal side (Table 9), and a depression in the distal part of the plantar surface, slightly internal to the lateral margin, with a small process below and internal to it. Furthermore, in this astragalus the articular area for os centrotarsale (scapho-cuboid), on the distal part of the dorsal or anterior surface, is quite extensive which is again a characteristic *of Samotherium.* [65]

The measurements of the astragali from Taşkınpaşa (see Table 9) are within the range of those of *Samotherium sineme* (Schlosser) from China, the range of measurements of which, given by Bohlin, are as follows: External length 103-120 mm., internal length 93-105 mm., distal width 66-77 mm. and internal thickness 56-67 mm.[66] In length, proximal width and distal width the Anatolian specimens exceed those of.four astragali of *Samotherium (Alçicephalus) neumayri* (Rodler and Weithofer) from Maragha, measured by Rodler and Weithofer (length 94-102 mm., proximal width 60-69 mm. and distal vvidth 59-68 mm.).[67] Rodler and Weithofer have attributed to *Samotherium (Alcicephalus) neumayri* a fifth and larger astragalus with a length of 120 and a proximal width of 79 mm.[68] If this large astragalus belongs to *Samotherium (Alcicephalus) neumayri,* then the astragali from Taşkınpaşa would fall in the range of this species from Maragha. But in my opinion the attribution by Rodler and Weithofer [69] of this large astragalus to *Samotherium (Alcicephalus) neumayri* is extremely doubtful.

Schlosser, in his study of 1921, has given the measurements of the astragali of a *"small"* (length 92, proximal width 62, distal width 62 mm.) and a *"large"* form of *Samotherium* from Samos (length 100, proximal width 72, distal width 72 mm.). [70] It is evident that the astragali of even the

[64] Ibid., p. 69.
[65] Ibid., p. 69.
[66] Ibid., p. 69.
[67] Rodler and Weithofer, 1890, p. 765.
[68] Ibid., p. 765.
[69] Ibid., p. 765.
[70] Schlosser, 1921, p. 34. Bohlin (1926, p. 87) lists Schlosser's (Schlosser, 1904, p. 114 and 1921, p. 34) *"large"* form as a synonym *ot Samotherium boissieri* var. *major.*

large form of *Samotherium* measured by Schlosser [71] are smaller than the specimens from Taşkınpaşa. [72]

The post-cranial skeleton of *Samotherium majori* Bohlin from Samos is not well-known. Regarding the skeleton of this Samos form Bohlin makes only the following statements: *"In den Masstabellen für Samotherium sinense habe ich auch Masse für einige Skeletteile von S. boissieri aufgenommen, die bedeutend grösser sind als die auf S. 84-87 behandelten, weshalb ich sie zu der Varietât major stelle. Das skelett deutet auf ein Tier von der Grösse des S. sinense. ."*. [73] The radius, metacarpus, tibia and metatarsus of this *Samotherium,* preserved at Münster and measured by Bohlin, [74] are bigger than those of the *large* form measured by Schlosser. [75] Judging by the size of these bones, it is only reasonable to suppose that the astragalus of this form may also have been bigger than that of *Samotherium* described as *"large"* by Schlosser [76] and may have been near the Anatolian specimens in size. If Bohlin's attribution of the bones at Münster to *Samotherium boissieri* var. *major* is correct, then it would be reasonable to attribute the bones of the so-called *"large"* form of Schlosser [77] to *Samotherium boissieri* proper.

In summary it can be stated that the astragali from Taşkınpaşa belong to genus *Samotherium.* Furthermore, it is possible, but by no means certain, that they may appertain to *Samotherium majori* Bohlin, described as a variety of *Samotherium boissieri* Major by Bohlin. [78] The question as to whether these two astragali definitely belong to *Samotherium majori* Bohlin or not will only be settled when additional specimens are found in association with the skull.

From the account given above it is clear that the skull and the lower teeth found at Taşkınpaşa come closer to a form of *Samotherium* from Samos, described as *Samotherium boissieri* var. *major* by Bohlin, [79] than to other species of the genus *Samotherium.*Taking into consideration the material described by Bohlin [80] and the remains from Taşkınpaşa, this form described as a variety of *Samotherium boissieri* by Bohlin differs from *Samotherium boissieri* proper in the following features :

[71] Schlosser, 1921, p. 34.

[72] The astragali of *Samotherium boissieri* Major from Taraklia, measured by Khomenko (max. length 94-99 mm., width 62-68 mm.), are also smaller than those of the Anatolian specimens (see Khomenko, 1913, p. 118). According to Khomenko (1913, p-118) the length of the Münich specimen of *Samotherium boissieri* Major is 100. 8 mm. and its width 76 mm.

[73] Bohlin, 1926, p. 93.

[74] Ibid., pp. 61, 65-66, 67 and 72.

[75] Schlosser, 1921, **p.** 34.

[76] **Ibid.,** p. 34.

[77] **Ibid., p. 34.**

[78] **Bohlin,** 1926, **p.** 87.

[79] **Ibid., p. 87.**

[80] **Ibid., pp. 87-93.**

Samotherium boissieri Major	*S. boissieri* var. *major* (according to Bohlin, 1926) *S. majori* Bohlin (according to Şenyürek)
Witdh of the skull measured above the orbits is larger.	Width of the skull measured above the orbits is smallei.
Orbits are more anteriorly placed.	Orbits are much more posteriorly placed.
Length of orbits is smaller.	Length of orbits is larger.
Nasal bones are shorter.	Nasal bones are longer.
Teeth are smaller.	Teeth are larger.
Post-cranial skeleton is probably smaller.	Post-cranial skeleton is probably larger.

Although the *Samotherium* material from Samos is unfortunately not yet fully described, [81] from the above list it is seen that the form described as *Samotherium boissieri* var. *major* by Bohlin [82] is distinct from *Samotherium boissieri* Major. For this reason I have elevated the new variety created by Bohlin to the rank of a species, viz., *Samotherium majori* Bohlin.

The skull from Taşkınpaşa differs from the Samos form of *Samotherium majori* Bohlin in having a longer and probably relatively lower orbit, somewhat longer nasal bones and relative to M^1-M^3 length a slightly shorter P^2-P^4 length. But whether these are merely individual variations or are indicative of different varieties of the same species is difficult to determine at the present time as the material from Taşkınpaşa is stili limited. This question will be settled only when additional and more complete material is found in Anatolia.

Among the Pontian localities of Turkey, [83] the members of the genus *Samotherium* have so far been found at two places, viz., Karain and Taşkınpaşa, which are near eaeh other. The species reported from Karain

[81] The skull of *Samotherium boissieri* Major from Samos has been too briefly and sketchily described by Major (see Major 1888 and 1891a,b,c). Khomenko (1913) has described two teeth and has given the measurements of some post-cranial bones. Schlosser (1921) has also listed the measurements of some post-cranial bones of *Samotherium* from Samos. Bohlin (1926), in his extensive treatise on the family Giraffidae, has given a short account of the skull and post-cranial skeleton of *Samotherium boissieri* and of the skull of *Samotherium boissieri* var. *major,* with only a brief reference to the post-cranial skeleton of the latter.

It is greatly hoped that our colleagues in Europe will restudy and describe in detail the *Samotherium* material from Samos preserved in several European museums.

[82] Bohlin, 1926, p. 87.

[83] For these Pontian localities see: Chaput (1936), Malik and Nafiz (1933), İzbırak and Yalçınlar (1951), Ozansoy (1951), Şenyürek (1951, 1952, 1953a and c), Thenius (1949) and Yalçınlar (1946, 1947 and 1952).

is *Samotherium (Alcicephalus) neumayri* (Rodler and Weithofer), [84] which had been found earlier at Maragha in Iran, [85] and that from Taşkınpaşa is *Samotherium majori* Bohlin which until now was known only from Samos. [86] As Maragha and Samos are, respectively, just to the east and west of Anatolia, it is thus not surprising to find these two species in central Anatolia.

SUMMARY AND CONCLUSION

The skull and the lower teeth found at Taşkınpaşa belong to a form of *Samotherium,* originally described by Bohlin as *Samotherium boissieri* var. *major* from Samos. [87] However, as this form is distinct from *Samotherium boissieri* Major proper, I have elevated this new variety created by Bohlin [88] to the rank of a species, viz., *Samotherium majori* Bohlin.

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[84] Chaput, 1936, p. 113.

[85] Rodler and Weithofer, 1890, pp. 754 and 758.

[86] Bohlin, 1926, p. 87.

[87] Ibid., p. 87.

[88] Ibid., p. 87.

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EXPLANATION OF THE FIGURES

(The scale is in centimeters)

Fig. 1. The skull of *Samotherium* from Taşkınpaşa, seen from the right side.
Fig. 2. The skull of *Samotherium* from Taşkınpaşa, seen from the left side.
Fig. 3. The skull of *Samotherium* from Taşkınpaşa, seen from above.
Fig. 4. The skull of *Samotherium* from Taşkınpaşa, seen from below.
Fig. 5. The occlusal view of the right upper teeth of *Samotherium* from Taşkınpaşa.
Fig. 6. The occlusal view of the right lower teeth of *Samotherium* from Taşkınpaşa.
Fig. 7. The left astragalus of *Samotherium* from Taşkınpaşa. The posterior side.
Fig. 8. The left astragalus of *Samotherium* from Taşkınpaşa. The anterior side.
Fig. 9. The left astragalus of *Samotherium* from Taşkınpaşa. The medial side.
Fig. 10. The left astragalus of *Samotherium* from Taşkınpaşa. The lateral side.

TABLE 1

Measurements of the Skull of *Samotherium majori* Bohlin from Taşkınpaşa [1]

Length (antero-posterior diameter) of the frontal bone	190.00
Width of the skull measured above the orbits (at the middle)	222.00
Width of the skull measured above the orbits (at the back)	253.00
Length (antero-posterior diameter) of the orbits	82.00 (Left)
Height (vertical diameter) of the orbits	51.00 (Right)
Interorbital width	200.00
Vertical distance of the lowest point of the orbit above the alveolar process	80.00 (Right)
Horizontal distance of the anteriormost point of the orbit behind the distal face of M^3	45.00 (Right)
Length measurement of nasal bones	219.00+
Width of palate (at the level of the middle of the lingual surfaces of right and left M^3)	94.00
Width of palate (at the level of the middle of the lingual surfaces of right and left P^2)	65.00

[1] In this study all measurements of the skull, teeth and limb-bones are given in millimeters.

TABLE 2

Measurements of the Skull in Genus *Samotherium* Major

	Length (Ant.-Post. Diameter) of Frontal Bone	Width of Skull Measured above Orbits	Length (Ant.-Post. Diameter), of Orbits	Height (Vertical Diameter) of Orbits	Length Measurement of Nasal Bones	Width of Palate (at level of M^3)	Width of Palate (at level of P^2)
Samotherium majori Bohlin from Taşkınpaşa	190.00	253.00	82.00	51.00	219.00 +	**94.00**	65.00
Samotherium majori Bohlin *(Samotherium boissieri* var. *major* Bohlin) from Samos. Bohlin, 1926	' —	254.60[1] (240-265)	76.50[2] (76-77)	—	177.50[3] (170-185)	"—	—
Samotherium boissieri Major from Samos. Bohlin, 1926	—	266.00	67.00	—	157-50[4] (154-161)	—	—
Samotherium cfr. neumayri (Rodler and Weithofer) from China. Bohlin, 1926	—	—	.65.00	62.00	—	90.00	53.00
Samotherium sinense (Schlosser) from China. Bohlin, 1926	175.00 [5]	240.00+	—	' —	300.00?	—	—

[1] Average of 5 specimens calculated from Bohlin, 1926, p. 89.

[2] Average of 2 specimens calculated from Bohlin, 1926, p. 89.

[3] Average of 2 specimens calculated from Bohlin, 1926, p. 89.

[4] Average of 2 specimens calculated from Bohlin, 1926, p. 89. ;

[5] By subtracting the distance from crista occipitalis to the coronal suture (133 mm.) from the distance of crista occipitalis to the nasofronal suture (308 mm.), given by Bohlin (1926, p. 53).

TABLE 3

Measurements of the Upper Teeth of *Samotherium majori* Bohlin from Taşkınpaşa

	Length 1	Max. Width [2]	Widths	
			First (Anterior-most) Lobe [2]	Second Lobe [2]
p2.M^3	205.00	—	—	—
P^2-R^4	36.00	—	—	—
M^1-M^3	126.50	—	—	—
P^2	28.60	28.00	—	—
P3	29.10	31.00	—	—
P^4	29.10	33.50	—	—
M^1	35-20 (33-70)	40.00	37.40	40.00
M^2	46.50 (44.00)	44.50	44.50	43-50
M^3	49.20 (43.70)	39.50	39.50	36.00

[1] P2-M^3, P^2-P^4 and M^1-M^3 lengths and the lengths of the individual teeth are the maximum measurements taken on the external side of the teeth. In case of the individual upper molars, the length measurements shown in parentheses are the mesio-distal diameters measured along the middle of the occlusal surfaces.

[2] Width measurements are the maximum bucco-lingual diameters measured at the basal part of the crown.

TABLE 4

Measurements of the Lower Teeth of *Samotherium majori* Bohlin from Taşkınpaşa

	Length [1]	Max. Width [2]	Widths		
			First (Anterior-most) Lobe [2]	Second Lobe [2]	Third Lobe [2]
P_2-M_3	213.00	—	—	—	—
P_2 P4	76.00	—	—	—	—
M_1-M_3	137.00	—	—	—	—
P_2	23.60	14.20	—	—	—
P_3	25.60	17.20	—	—	—
P4	27.80	20.40	—	—	—
M_1	36.40	27.30	24.60	27.30	—
M_2	43.40	29-50	29.20	29-50	—
M_3	59-20	28.60	28.60	26.40	14.50

[1] P_2-M_3, P2-P4, M_1-M_3 lengths and the lengths of the individual teeth are measured along the middle of the occlusal surface.

[2] Width measurements are the maximum bucco-lingual dimensions taken at the basal part of the crown.

TABLE 5

Upper P^2-M^3, P^2-P^4 and M^4-M^3 Lengths in Genus *Samotherium* Major [1]

	P^2-M^3 (Length)	p2_p4 (Length)	M^4-M^3 (Length)	P^2-P^4 X 100 / M^4-M^3
Samotherium majori Bohlin from Taşkınpaşa	205.00	86.00	126.50	67.98
Samotherium majori Bohlin *(S.boissieri* var. *major* Bohlin) from Samos. Average (calculated from Bohlin, 1926)	200.60 [2] (195-208)	85.00 [3] (84-86)	122.80 [4] (118-128)	70.65 [5] (69.42-72.88)
Samotherium boissieri Major from Samos. Average (calculated from Bohlin, 1926)	174-75 [6] (168-180)	73.00 [7] (70-78)	109.25 [8] (104-118)	67.64 [9] (61.73-70.47)
Samotherium (Alcicephalus) neumayri (Rodler and Weithofer) from Maragha. De Mecquenem, 1924	200.00	75.00	125.00	60.00
Samotherium cfr. neumayri (Rodler and Weithofer) from China. Bohlin, 1926	180.00	78.00	110.00	70.90
Samotherium sineme (Schlosser) from China *(Alcicephalus sinensis* Schlosser, 1903). Schlosser, 1903	ca. 190-200	ca. 80.00	ca. 120.00	66.66
Samotherium sineme (Schlosser) from China. Bohlin, 1926	187-190.00	79.00	116.00	68.10

[1] Indices and averages of the material taken from the literatüre have been calculated by me. Figures in parantheses show the range.

[2] Average of 5 specimens measured by Bohlin, 1926, p. 90.

[3] Average of 3 specimens measured by Bohlin, 1926, p. 90.

[4] Average of 5 specimens measured by Bohlin, 1926, p. 90.

[5] Average of 3 specimens calculated from the figures given by Bohlin, 1926, p. 90.

[6] Average of 8 specimens measured by Bohlin, 1926, p. 90.

[7] Average of 7 specimens measured by Bohlin, 1926, p. 90.

[8] Average of 8 specimens measured by Bohlin, 1926, p. 90.

[9] Average of 7 specimens calculated from the figures given by Bohlin, 1926, p. 90.

TABLE 6

Measurements of the Permanent Upper Teeth in Genus *Samotherium* Major[1]

		Length	Width	Robustness Value[2]	Crown Index[3]
P^2	*Samotherium majori* Bohlin from Taşkınpaşa	28.60	28.00	800.80	97-90
	Samotherium majori Bohlin (*Samotherium boissieri* var. *major* Bohlin) from Samos. No. 11. Bohlin, 1926	25.00	29.00	725.00	116.00
	Samotherium boissieri Major from Samos. No. f. Bohlin, 1926	24.00	25.00	600.00	104.16
	Samotherium (Alcicephalus) neumayri (Rodler and Weithofer) from Maragha. Rodler and Weithofer, 1890	24. 00[4] (23-26)			
	Samotherium cfr. neumayri (Rodler and Weithofer) from China. Bohlin, 1926	26.00	24.00	624.00	92-30
	Samotherium sinense (Schlosser) from China. Schlosser, 1903	26.00	27.00	702.00	103.84
	Samotherium sinense (Schlosser) from China. Bohlin, 1926	24.00	22.00	528.00	91.66
P^3	*Samotherium majori* Bohlin from Taşkınpaşa	29.10	31.00	902.10	106.52
	Samotherium majori Bohlin (*S. boissieri* var. *major* Bohlin) from Samos. No. 11. Bohlin, 1926	27.00	31.00	837.00	114.81
	Samotherium boissieri Major from Samos. No. f. Bohlin, 1926	25.00	29.00	725.00	116.00

[1] Indices and averages of the material taken from the literature have been calculated by me. Figures in parentheses show the range.

[2] Robustness value=Length xWitdh.

[3] Crown index=$\frac{\text{Width}}{\text{Length}} \times 100$

[4] Average of 4 specimens (skull and Nos. a, d, and e), mcasured by Rodler and Weithofer ,1890.

TABLE 6 (Continued)

Measurements of the Permanent Upper Teeth in Genus *Samotheriurn* Major

		Length	Width	Robustness Value	Crovvn Index
	Samotheriurn (Alcicephalus) neumayri (Rodler and Weithofer) from Maragha. Rodler and Weithofer, 1890	25-50[5] (24-27)			
P^3	*Samotheriurn cfr. neumayri* (Rodler and Weithofer) from China. Bohlin, 1926	26.00	26.00	676.00	100.00
	Samotheriurn sinense (Schlosser) from China. Schlosser, 1903	29.00	28.50'	826.50	98.27
	Samotheriurn sinense (Schlosser) from China. Bohlin, 1926	27.00	29.00	783.00	107.40
	Samotheriurn majori Bohlin from Taşkınpaşa	29.10	33.50	974.85	115.12
	Samotheriurn majori Bohlin *(S. boissieri* var. *major* Bohlin) from Samos. No. 11. Bohlin, 1926	27.00	31.00	837.00	114.81
	Samotheriurn boissieri Major from Samos. No. f. Bohlin, 1926	-25.00	31.00	775.00	124.00
P4	*Samotheriurn (Alcicephalus) neumayri* (Rodler and Weithofer) from Maragha. Rodler and Weithofer, 1890	26.70[6] (24.5-28)	29.37[7] (28-31.5)	775.62' (686-850.5)	III.51[7] (103.57. 116.66)
	Samotheriurn cfr. neumayri (Rodler and Weithofer) from China. Bohlin, 1926	26.00	32.00	832.00	123.07
	Samotheriurn sinense (Schlosser) from China. Schlosser, 1903	27.00	31.00	837.00	114.81
	Samotheriurn sinense (Schlosser) from China. Bohlin, 1926	25.00	34.00	850.00	136.00

[5] Average of 4 specimens (skull and Nos. a, d and e), measured by Rodler and Weithofer, 1890.

[6] Average of 5 specimens (skull and Nos. a, b, d and e), measured by Rodler and Weithofer, 1890.

[7] Average of 4 specimens (skull and Nos. a, d and e), measured by Rodler and Weithofer, 1890.

TABLE 6 (Continued)

Measurements of the Permanent Upper Teeth in Genus *Samotherium* Major

		Length	Width	Robustness Value	Crown Index
M^1	*Samotherium majori* **Bohlin from** Taşkınpaşa	35.20	40.00	1408.00	110.79
	Samotherium majori **Bohlin** *(S. boissieri* var. *major* **Bohlin)** from Samos. No. 11. Bohlin, 1926	38.00	42 .00	1596.00	110.52
	Samotherium boissieri Major from Samos. No. f. Bohlin, 1926	34.00	36.00	1224.00	105.88
	Samotherium (Alcicephalus) neumayri (Rodler and Weithofer) from Maragha. Rodler and Weithofer, 1890	38.40[8] (35-42)			-
	Samotherium cfr. neumayri (Rodler and Weithofer) from China. Bohlin, 1926	34.00	38.00	1292.00	111.76
	Samotherium sinense (Schlosser) from China. Schlosser, 1903	37.00	34.00	1258.00	91.89
	Samotherium sinense (Schlosser) from China. Bohlin, 1926	39.00	43.00	1677.00	110.25
M^2	*Samotherium majori* **Bohlin** from Taşkınpaşa	46.50	44.50	2069.25	95.69
	Samotherium majori **Bohlin** ***(S. boissieri* var.** *major* **Bohlin)** from Samos. No. 11. Bohlin, 1926	44.00	45.00	1980.00	102.27
	Samotherium boissieri Major from Samos. No. f. Bohlin, 1926	41.00	39.00	I599-00	95.11
	Samotherium (Alcicephalus) neumayri (Rodler and Weithofer) from Maragha. Rodler and Weithofer, 1890	44.00[9] (42-46)	41.66[10] (40-44)	1844.66[10] (1800-1886)	94.25[10] (88.88-104.76)

[8] Average of 5 specimens (skull and Nos. a, b, c and d), measured by Rodler and Weithofer, 1890.

[9] Average of 4 specimens (skull and Nos. a, b and c), measured by Rodler and Weithofer, 1890.

[10] Average of 3 specimens (skull and Nos. a and b), measured by Rodler and Weithofer, 1890.

TABLE 6 (Continued)

Measurements of the Permanent Upper Teeth in Genus *Samotherium* Major

		Length	Width	Robustness Value	Crown Index
M^2	*Samotherium cfr. neumayri* (Rodler and Weithofer) from China. Bohlin, 1926	40.00	42.00	1680.00	105.00
	Samotherium sinense (Schlosser) from China. Schlosser, 1903	42 .00	40.00	1680.00	95.23
	Samotherium sinense (Schlosser) from China. Bohlin, 1926	40.00	46.00	1840.00	115.00
M^3	*Samotherium majori* Bohlin from Taşkınpaşa	49.20	39.50	1943.4.0	80.28
	Samotherium majori Bohlin *(S. boissieri* var. *major* Bohlin) from Samos. No. 11. Bohlin, 1926	46.00	41.00	1886.00	89-13
	Samotherium boissieri Major from Samos. No. f. Bohlin, 1926	40.00	38.00	1520.00	95.00
	Samotherium (Alcicephalus) neumayri (Rodler and Weithofer) from Maragha. Rodler and Weithofer, 1890	42.66 [11] (41-44)			
	Samotherium cfr. neumayri (Rodler and Weithöfer) from China. Bohlin, 1926	38.00	35.00	1330.00	92.10
	Samotherium sinense (Schlosser) from China. Schlosser, 1903	45.00	42.00	1890.00	93-33
	Samotherium sinense (Schlosser) from China. Bohlin, 1926	39.00	40.00	1560.00	102.56

[11] Average of 3 specimens (skull and Nos. b and c), measured by Rodler and Weithofer, 1890.

TABLE 7

Lower P_2-M_3, P_2-P_4 and M1-M3 Lengths in Genus *Samotherium* Major [1]

	P_2-M_3 (Length)	P_2 P4 (Length)	M_1-M_3 (Length)	P_2-P_4X 100 / M_1-M_3
Samotherium majori Bohlin from Taşkınpaşa	213.00	76.00	137.00	55.47
Samotherium majori Bohlin *(S. boissieri* var. *major* Bohlin) from Samos. Average (calculated from Bohlin, 1926)	213.66 [2] (198-250)	80.75 [3] (71-84)	131.00 [3] (129-133)	57.80 [3] (53-78-63-15)
Samotherium boissieri Major. De Mecquenem, 1924	181.00	70.00	118.00	59.32
Samotherium boissieri Major (?) from Samos. Average of 2 specimens [4] (Calculated from Bohlin, 1926)	198.00 (195-201)	74.00	127.00 (124-130)	58.29 (56.92-59-67)
Samotherium (Alcicephalus) neumayri (Rodler and Weithofer) from Maragha. De Mecquenem, 1924	195.00	74.00	125.00	59-20
Samotherium cfr. neumayri (Rodler and Weithofer) from China. Bohlin, 1926	209.00	77.00	131.00	58.77
Samotherium sinense (Schlosser) from China *(Alcicephalus sinensis* Schlosser, 1903). Schlosser, 1903	190.00	ca. 78.00	ca. 115-120	65.00-67.82 [5]
Samotherium sinense (Schlosser) from China. Bohlin, 1926	198.00	76.00?	122.00	62.29

[1] Indices and averages of the material taken from the literature have been calculated by me. Figures in parentheses show the range.

[2] Averages of 6 specimens [M 2439, Shadel, Kiefer, MGML 13 (s), WNSS and MHMW], given by Bohlin, 1926, p. 91.

[3] Averages of 4 specimens [M 2439, Shadel, MGML 13 (s) and WNSS], given by Bohlin, 1926, p. 91.

[4] The specimens BM M3868 and MHNP, given by Bohlin, 1926, p. 91.

[5] Obtained from the two $M1$-M_3 lengths, given by Schlosser, 1903, p. 107.

TABLE 8

Measurements of the Permanent Lower Teeth in Genus *Samotherium* Major [1]

		Length	Width	Robustness Value	Crown Index
p_2	*Samotherium majori* Bohlin from Taşkınpaşa	23.60	14.20	.335. 12	60.16
	Samotherium (Alcicephalus) neumayri (Rodler and Weithofer) from Maragha. Average [Calculated from Rodler and Weithofer, 1890]	17.50 [2] (15-20)	—	—	—
	Samotherium sinense (Schlosser) from China [*Alcicephalus sinensis* Schlosser, 1903]. Schlosser, 1903	23-50	14.00	329.00	59.57
P3	*Samotherium majori* Bohlin from Taşkınpaşa	25.60	17.20	440.32	67.18
	Samotherium (Alcicephalus) neumayri (Rodler and Weithofer) from Maragha. Average [Calculated from Rodler and Weithofer, 1890]	22.50 [2] (20-25)	—	—	—
	Samotherium sinense (Schlosser) from China [*Alcicephalus sinensis* Schlosser, 1903]. Schlosser, 1903	27.00	17.00	469.00	62.96
P4	*Samotherium majori* Bohlin from Taşkınpaşa	27.80	20.40	567.12	73.45
	Samotherium (Alcicephalus) neumayri (Rodler and Weithofer) from Maragha. Average [Calculated from Rodler and Weithofer, 1890]	27.70 [3] (21 .5-31)	—	—	—
	Samotherium sinense (Schlosser) from China [*Alcicephalus sinensis* Schlosser, 1903]. Schlosser, 1903	32 .00	21.00	672.00	65.62

[1] Indices and averages of the material taken from the literature have been calculated by me. Figures in parentheses show the range.

[2] Average of 2 specimens (e and g), given by Rodler and Weithofer, 1890.

[3] Average of 5 specimens (a, b, d, e and g), given by Rodler, and Weithofer, 1890.

TABLE 8 (Continued)

Measurements of the Permanent Lower Teeth in Genus *Samothenum* Major

		Length	Width	Robustness Value	Crown Index
M_1	*Samothenum majori* **Bohlin from** Taşkınpaşa	36.40	27.30	993.72	75.00
	Samothenum (Alcicephalus) neumayri (Rodler and Weithofer) from Maragha. Average [Calculated from Rodler and Weithofer, 1890]	34.16[4] (24-38)	—		—
	Samothenum sinense (Schlosser) **from** China **[** *Alcicephalus sfhensis* Schlosser, 1903]- Schlosser, 1903	33 .00	22 .00	726.00	66.66
M_2	*Samotherium majori* **Bohlin from** Taşkınpaşa	43.40	29.50	1280.30	67.97
	Samotherium (Alcicephalus) neumayri (Rodler and Weithofer) from Maragha. Average [Calculated from Rodler and Weithofer, 1890]	39.00 [4] (28-42)	—	—	—
	Samotherium sinense **(Schlosser) from China [** *Alcicephalus sinensis* Schlosser, 1903]. Schlosser, 1903	38.00	26.00	988.00	68.42
M_3	*Samotherium majori* **Bohlin from** Taşkınpaşa	59.20	28.60	1693.12	48.31
	Samotherium (Alcicephalus) neumayri (Rodler and Weithofer) from Maragha. Average [Calculated from Rodler and Weithofer, 1890]	52.33 [4] (45-57)	—		—
	Samotherium sinense **(Schlosser) from China** *[Alcicephalus sinensis* Schlosser, 1903] Schlosser, 1903	51.00	27.00	1377.00	52.94

[4] Average of 6 specimens (a, b, c, d, e and f), given by Rodler and Weithofer, 1890.

TABLE 9

Measurements of the Astragali of *Samotherium* from Taşkınpaşa

	Right Side	Left Side
Maximum External Length	106.00 +	107.00
Maximum Internal Length	96.00 +	97.00
Maximum Proximal Width	74.00	75.00
Maximum Distal Width	72 .00	72.50
Maximum External Thickness	62,00	58.00
Maximum Internal Thickness	—	66.00
Proximal Width x 100 / External Length	69.81	70.09
Distal Width x 100 / External Length	67.92	67.75
Distal Width x 100 / Proximal Width	97.29	96.66
External Thickness x 100 / External Length	58.49	54.20
Internal Thickness X 100 / Internal Length	—	61.68
Internal Thickness X 100 / External Thickness	—	113.79

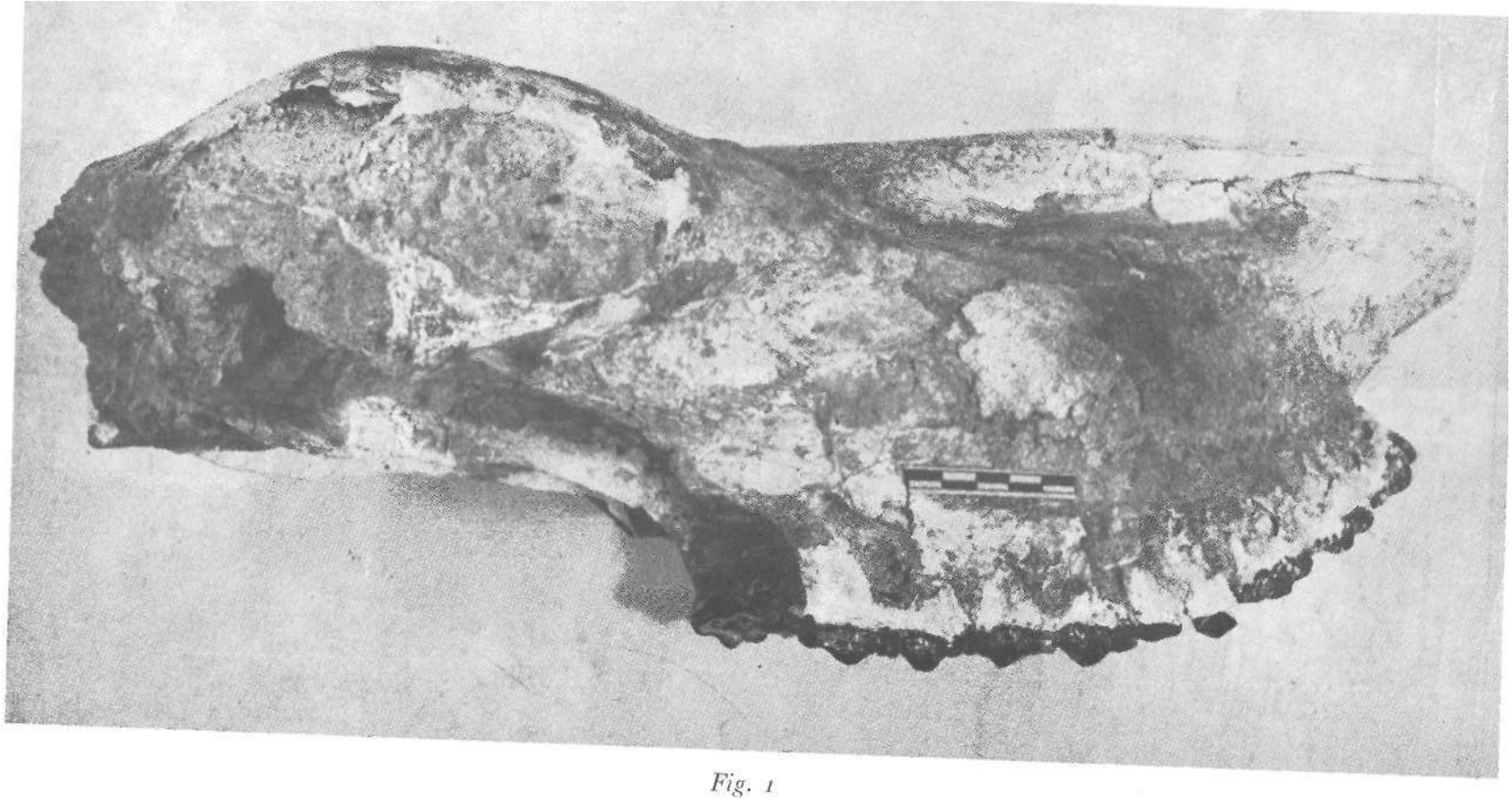

Fig. 1

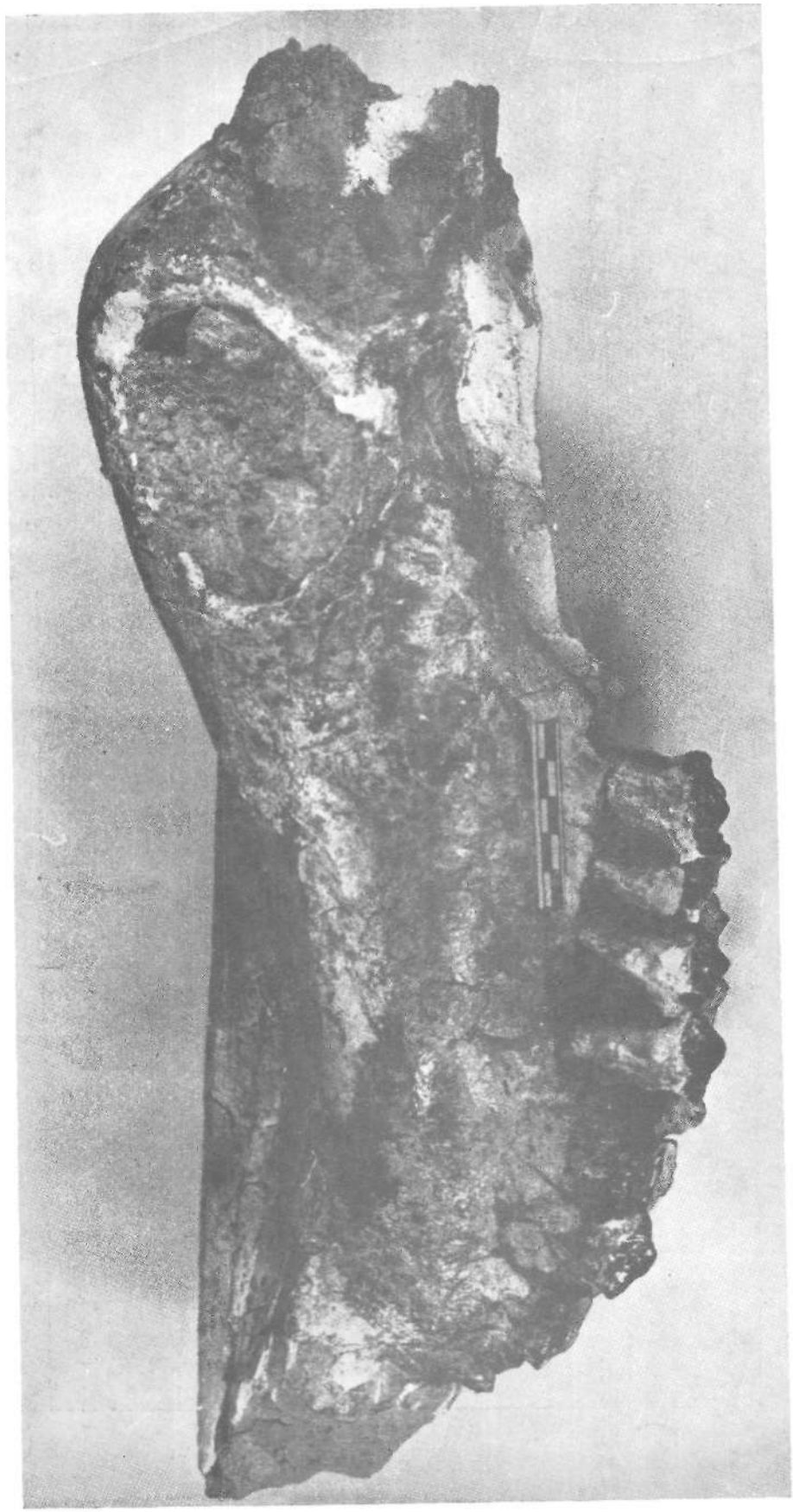

Fig. 2

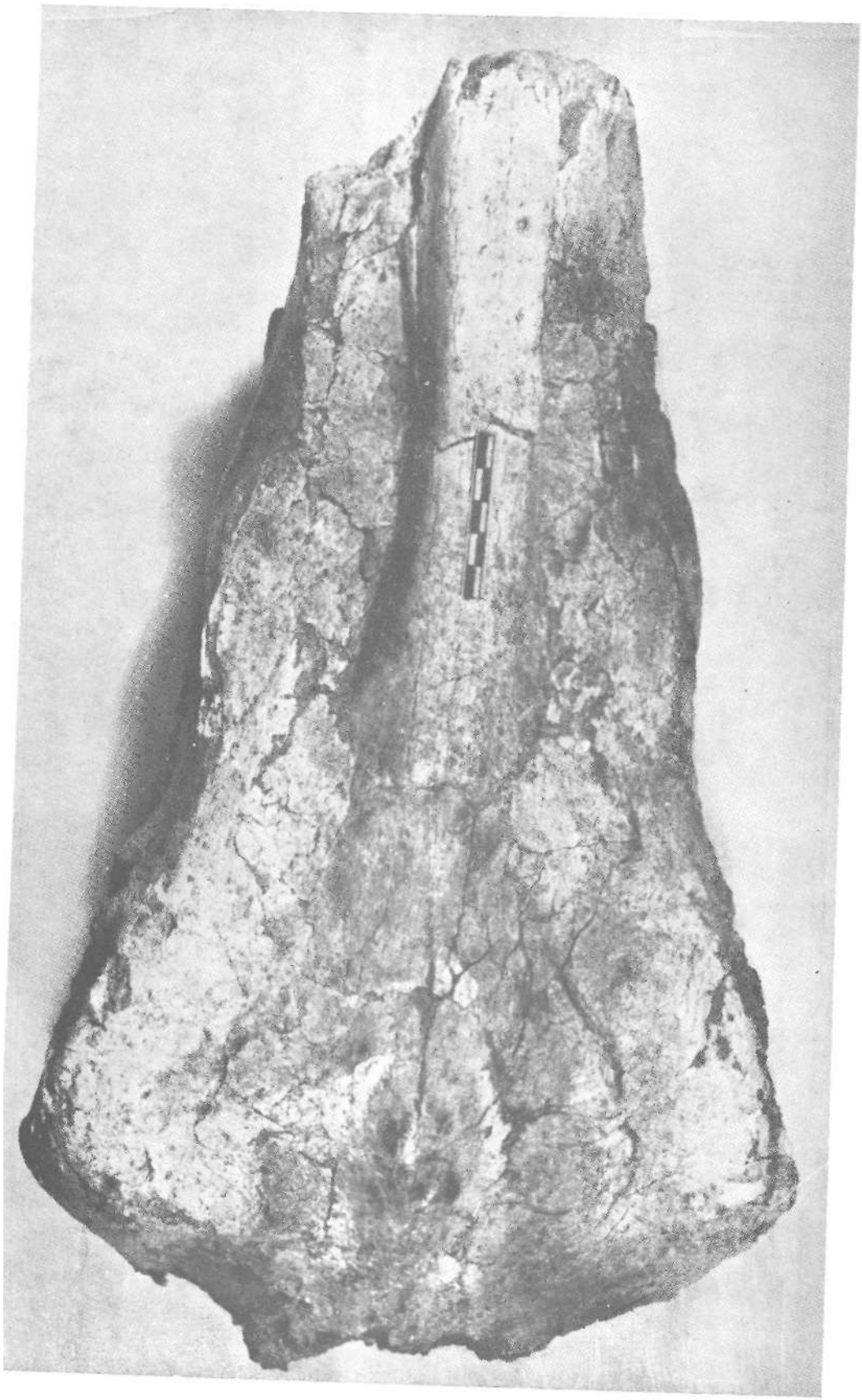

Fig. 3

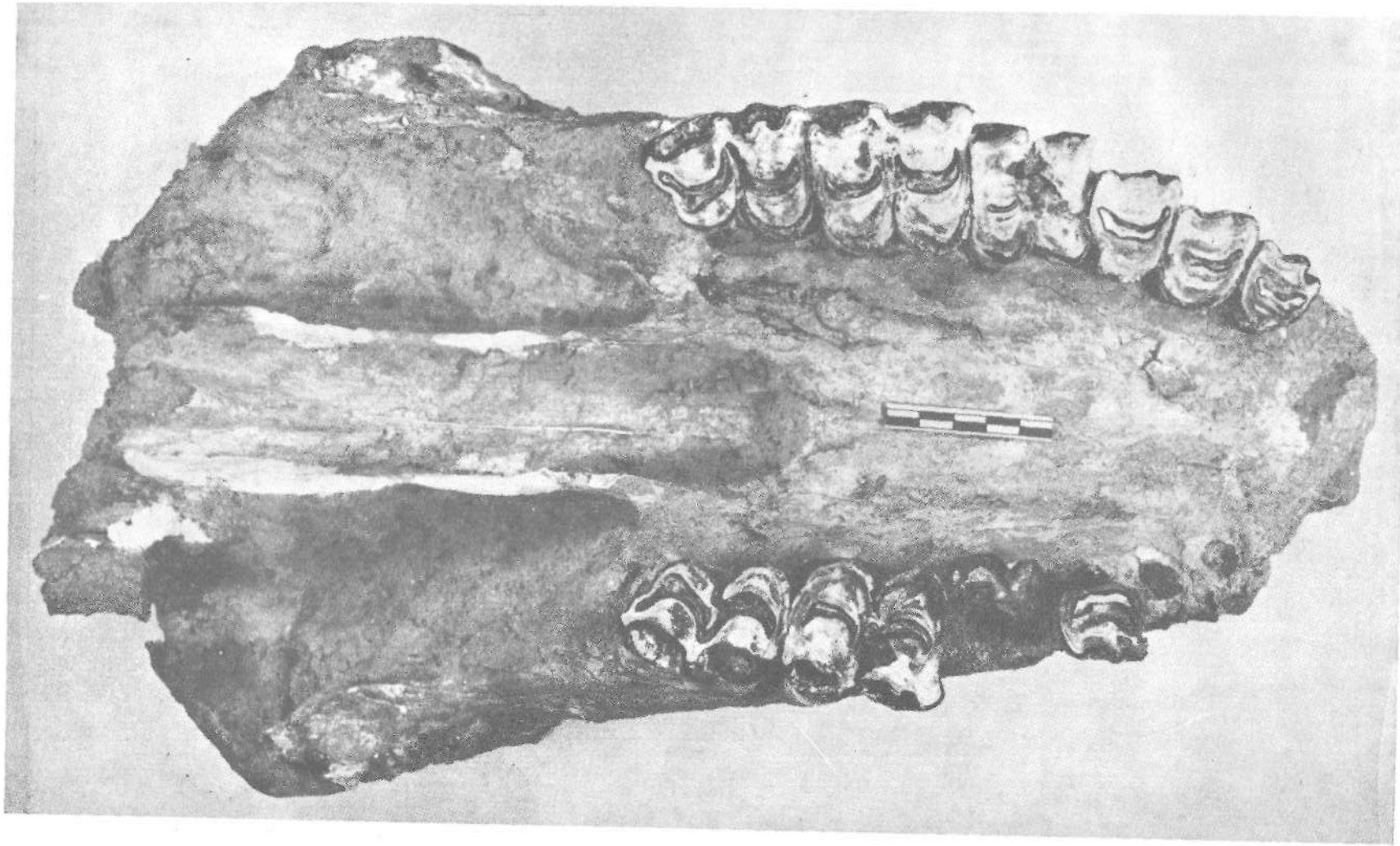

Fig. 4

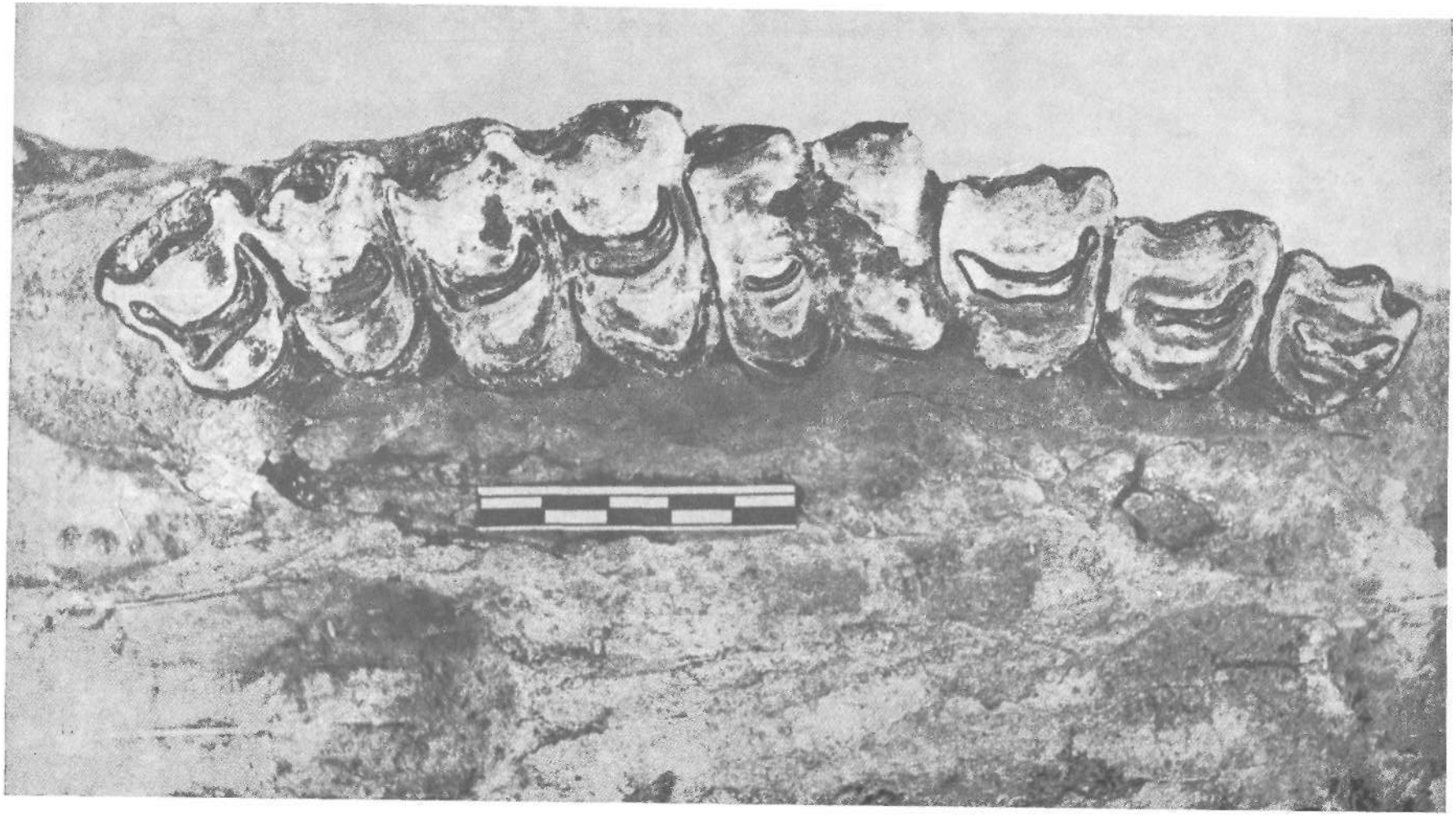

Fig. 5

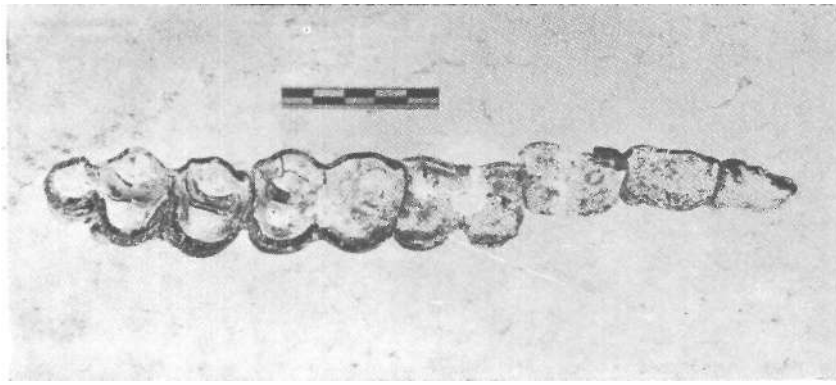

Fig. 6

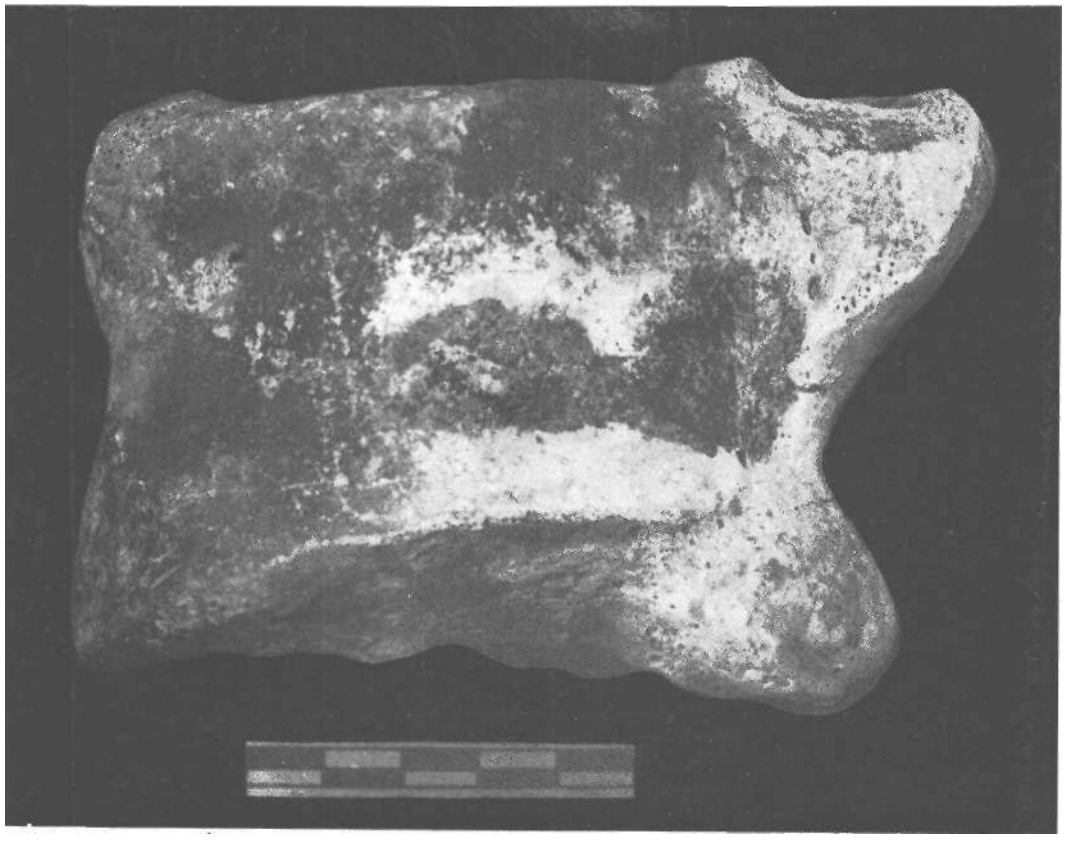

Fig. 7

Fig. 8

Fig. 9

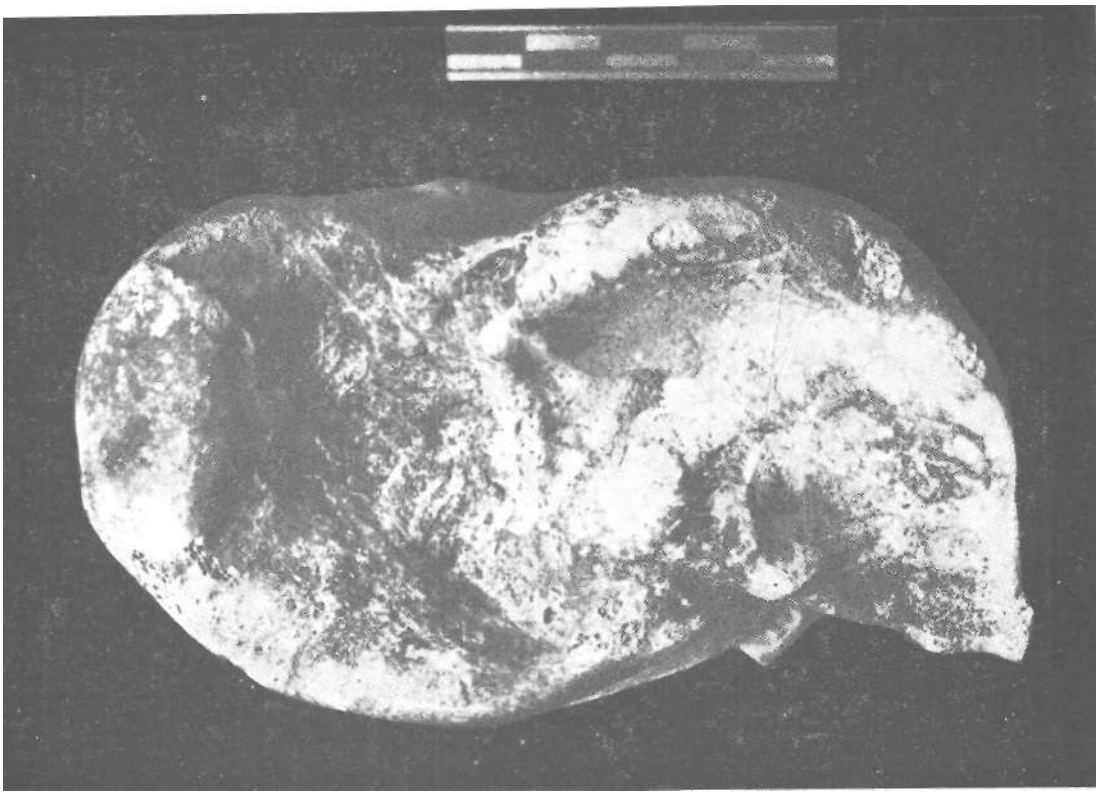

Fig. 10