T Ü R K T A R İ H K U R U M U

BELLETEN

Cilt: XVII Ekim 1953 Sayı: 68

HORN-CORES OF OIOCEROS FROM THE PONTIAN OF KÜÇÜKYOZGAT

MUZAFFER SÜLEYMAN ŞENYÜREK, Ph. D.

Professor of Anthropology and Chairman of the Division of Palaeoanthropology
University of Ankara

During the course of the excavations which I conducted at the fossiliferous locality of Küçükyozgat in 1951,[1] I found the remains of seven horn-cores belonging to the genus *Oioceros*. All these horn-cores, described in the present report, were found in the whitish calcareous marls of lacustrine origin, south of Küçükyozgat (Elmadağ)[2] which had been first visited by Tschachtli in 1941.[3] The fauna from the whitish calcareous marls, located just south of Sarıkaya Ağılı (the corral of Sarıkaya), I have designated as "Küçükyozgat fauna" to distinguish it from the "Karacahasan fauna"

1 I wish to express my thanks to the Turkish Historical Society for giving me a grant to carry out these excavations and to the Faculty of Language, History and Geography of the University of Ankara for financing the field trips to this region and the soundings I made there prior to the excavations. For these grants see Şenyürek, 1953 (a), p. 1.

2 For the history of the researches made at Küçükyozgat and the location of this place see Şenyürek, 1953 (a), pp. 1-2.

3 Tschachtli, 1942. In his report Tschachtli (1942, p. 324 and p. 327) noted the presence of only *Mastodon* sp., *Hipparion gracile* Kaup, *Sus erymanthius* Roth and Wagner, *Tragocerus* sp. and *Gazella* sp. at this locality.

discovered during the field work of 1951, in the heterogeneous, calcareous clays of light brown color nearer to the village of Karacahasan in this neighborhood. [4]

To date, in addition to the remains of *Oioceros*, I have determined the presence of the following genera and species in the Küçükyozgat fauna: [5] *Mastodon pentelici* Gaudry and Lartet, *Hipparion gracile* Kaup, *Sus erymanthius* Roth and Wagner, *Giraffa* sp., *Tragocerus amaltheus* Roth and Wagner, *Palaeoryx pallasi* (Wagner sp.), *Helicotragus rotundicornis* Weithofer, *Gazella gaudryi* Schlosser (*Gazella pilgrimi* Bohlin), *Gazella eleanorae* Şenyürek, [6] *Gazella capricornis* Rodler and Weithofer (*Gazella rodleri* Pilgrim and Hopwood).

Thus, it is evident that the Küçükyozgat fauna belongs to the Pontian Age, [7] that is, to the Lower Pliocene. [8]

FAMILY BOVIDAE GRAY, 1821 [9]

SUBFAMILY CAPRINAE GILL, 1872 [10]

GENUS OIOCEROS GAILLARD, 1901 [11]

OIOCEROS ROTHII WAGNER

All the available horn-cores belonging to the genus *Oioceros* in the Küçükyozgat collection are broken. The best preserved specimen is that shown in figs. 1 and 2, in which the larger part of the horn-core is retained; only the tip portion is missing. A careful study of these seven horn-cores has shown that there are two different forms represented, which I have called forms A and B.

Form A (Figs. 1-9) :

"Form A" is represented by six fragmentary horn-cores in the

[4] Şenyürek, 1953 (a), p. 2. The Karacahasan fauna has not yet been studied. I will publish a full report on Karacahasan fauna, after the extensive excavations I intend to carry out at this place in the summer of 1954.

[5] Şenyürek, 1953 (a), p. 2 and 1953 (b).

[6] The name of this new species (see Şenyürek, 1953a, p. 3) should be spelled as *Gazella eleanorae* Şenyürek.

[7] Tschachtli, 1942, p. 324 and p. 327; Şenyürek, 1953 (a), p. 2.

[8] Zittel (1925, p. 300), Lewis (1937, p. 194), Romer (1946, Table 4), Thenius (1949), Papp and Thenius (1949, Table VI) and Şenyürek (1952, p. 474, 1953a, p.2) attribute the Pontian Age to the Lower Pliocene.

[9] Simpson, 1950, p. 157.

[10] Ibid., p. 161.

[11] Gaillard, 1901, p. 93.

Küçükyozgat collection. In four of these only the basal parts of the horn-cores are preserved (figs. 3-7), while in two the largest part of the horn-core is represented (figs. 1, 2, 8 and 9).

In two of the specimens parts of the orbits are preserved and in one the supraorbital foramen is retained intact (figs. 4-5). Regarding the position of the supraorbital foramen in *Oioceros rothii* Wagner from Pikermi Gaudry states: "*Les trous sous-orbitaires sont placés en avant de la base des cornes.*" [12] A comparison of the specimen from Küçükyozgat with those of *Oioceros rothii* Wagner from Pikermi and Maragha, depicted respectively by Gaudry [13] and De Mecquenem, [14] shows that in the Anatolian form this foramen is somewhat more medially placed. In this feature the specimen from Küçükyozgat resembles the two specimens of *Oioceros rothii* Wagner from Gökdere, in both of which the supraorbital foramen also is, relatively speaking, medially placed. [15] Both of the available specimens from Küçükyozgat exhibit, above the postero-external corner of the orbit, a deep fossa which, as has been described by Gaudry, [16] is also present in *Oioceros rothii* Wagner from Pikermi.

All the horn-cores from Küçükyozgat show an oval cross section at the base. In this feature they differ from the typical examples of the horn-cores of *Oioceros rothii* Wagner in which the cross section is more rounded. [17] It would appear that in this feature the specimens from Küçükyozgat come closer to the specimen of *Oioceros rothii* Wagner from Salonika, the cross section of which is also described by Arambourg and Piveteau as being oval [18]. In all the

[12] Gaudry, 1862, p. 298.

[13] Ibid., pl. LII, fig. 2.

[14] De Mecquenem, 1925, pl. VII, fig. 4.

[15] In one of these horn-cores from Gökdere the supra-orbital foramen is single (fig. 13), while in the other one it is double (fig. 14). For these horn-cores from Gökdere see Şenyürek, 1952, pp. 472-473.

[16] Gaudry, 1862, p. 298 and pl. LII, fig. 3.

[17] Gaudry (1862, pp. 297-298) describes the horn-cores of *Oioceros rothii* Wagner from Pikermi as follows: "*...près de leur base, elles sont arrondies et se rapprochent l'une de l'autre: arrivées à* 0^{m}, *04 environ de hauteur, elles s'éloignent en se tordant; à leur partie supérieure, elles cessent de s'écarter et s'aplatissent.*" Regarding the horn-cores of *Oioceros rothii* Wagner Pilgrim and Hopwood (1928, p. 24) state: "*Horn-cores rounded, about 15 mm. apart at the base, flattened and subparallel at the tip.*"

[18] Arambourg and Piveteau, 1929, p. 113.

horn-cores from Küçükyozgat, as one proceeds from the base toward the tip, the cross section becomes flatter, as is a characteristic of *Oioceros rothii* Wagner.[19]

On the internal side of the horn-cores is seen a slight keel which follows the twist of the horn-cores. In this feature the specimens from Küçükyozgat resemble the two horn-cores of *Oioceros rothii* Wagner from Gökdere, in which the inner side also presents a slight keel. [20] Gaudry has depicted the cross section of the horn-core of *Oioceros rothii* Wagner from Pikermi, at a level slightly above the middle. [21] From this it is seen that the section of the horn-core from Pikermi is rounded even at this level and that there is no keel whatsoever on the inner side, which is rounded. Similarly in the cross section of the horn-core of *Oioceros atropatenes* Rodler and Weithofer from Maragha also, the inner side is rounded and is devoid of a keel. [22] Thus it appears that "Form A" of *Oioceros rothii* Wagner from Anatolia differs from typical examples of *Oioceros rothii* Wagner and also *Oioceros atropatenes* Rodler and Weithofer, in presenting a slight keel on the inner side, as a result of which this side of the cross section is more angular.

All the horn-cores from Küçükyozgat show the torsion characteristic of *Oioceros rothii* Wagner, the direction of which, as has already been stated by Arambourg and Piveteau, is opposite to the torsion of the horn-cores of *Heliocotragus rotundicornis* Weithofer. [23] As can be seen from the best preserved specimen (fig. 1), the torsion and the curvature of the horn-core from Küçükyozgat come close to those of the specimen of *Oioceros rothii* Wagner from Salonika, depicted by Arambourg and Piveteau. [24]

In all the six horn-cores from Küçükyozgat there is a groove at the postero-lateral corner of the base, which is seen also in other specimens of *Oioceros rothii* Wagner. [25] In all the horn-cores this

[19] See Gaudry, 1862, p. 298; Pilgrim and Hopwood, 1928, p. 24.

[20] Şenyürek, 1952, p. 472.

[21] See Gaudry, 1862, pl. LII, fig. 2.

[22] See Rodler and Weithofer, 1890, pl. VI, fig. 5.

[23] Arambourg and Piveteau, 1929, p. 111.

[24] Ibid., pl. VIII, fig. 5.

[25] See Wagner, 1860, pl. VIII, fig. 20; Gaudry, 1862, pl. LII, fig. 2; De Mecquenem, 1925, pl. VII, fig. 4; Andree, 1926, pl. XI, fig. 1; Arambourg and Piveteau, 1929, pl. VIII, fig. 5.

groove, following the torsion of the horn-core, is, although noticeable in some specimens, on the whole considerably weaker than in the typical examples of horn-cores of *Oioceros rothii* Wagner from Pikermi [26] and Maragha. [27] In this feature, the horn-cores from Küçükyozgat resemble the specimen of *Oioceros rothii* Wagner from Salonika, in which, as far as can be judged from the picture published by Arambourg and Piveteau, this groove is also relatively weak. [28] The two horn-cores from Gökdere also resemble the specimens from Küçükyozgat in having a lateral groove, which, although noticeable, is still relatively weak.

In all the horn-cores from Küçükyozgat, lateral to the groove just described, is seen a slight thickening or weak keel which follows the torsion of the horn-core, but is still not so twisted as the horn-core itself, as is also a characteristic of *Oioceros rothii* Wagner. [29] In this respect the horn-cores from Küçükyozgat closely resemble the two specimens of *Oioceros rothii* Wagner from Gökdere, described by me, in which also this keel is very slight. [30] In all the horn-cores of "Form A" from Küçükyozgat, as well as in those from Gökdere, this keel at the postero-external corner of the base is much weaker than the strongly developed keel seen in the typical examples of horn-cores of *Oioceros rothii* Wagner from Pikermi [31] and Maragha. [32]

Regarding the keel in the horn-cores of *Oioceros rothii* Wagner from Pikermi Gaudry states: "*Une carène qui part de leur bord externe les suit dans toute leur longueur; sur deux crânes de ma collection, elle est très-marquée; dans un troisième, elle l'est moins; sur deux autres, on l'aperçoit à peine; ces derniers appartiennent peut-être à des femelles.*" [33] Thus it is evident that the keel formation in "Form A" from Küçükyozgat is still within the range of *Oioceros rothii* Wagner which is rather

[26] See Wagner, 1860, pl. VIII, fig. 20; Gaudry, 1862, pl. LII, fig. 2; Andree, 1926, pl. XI, fig. 1.

[27] De Mecquenem, 1925, pl. VII, fig. 4.

[28] See Arambourg and Piveteau, 1929, pl. VIII, fig. 5.

[29] See Gaudry, 1862, p. 298 and Pilgrim and Hopwood, 1928, p. 24.

[30] Şenyürek, 1952, p. 472.

[31] See Wagner, 1860, pl. VIII, fig. 20; Gaudry, 1862, pl. LII, fig. 2; Andree, 1926, pl. XI, fig. 1.

[32] See De Mecquenem, 1925, pl. VII, fig. 4.

[33] Gaudry, 1862, p. 298.

variable in this feature. The keel formation also appears to be relatively weak in the horn-core of *Oioceros rothii* Wagner from Salonika, depicted by Arambourg and Piveteau, although it still appears to be somewhat better developed than that of "Form A" from Küçükyozgat. [34]

The surfaces of all the horn-cores are covered with longitudinal furrows of variable width and depth, but in most of the specimens the furrow behind the lateral keel[35] is usually the strongest and in some of the specimens is quite conspicuous (see figs. 1 and 4). A similar deep furrow behind the lateral keel is also seen in the specimens of *Oioceros rothii* Wagner from Pikermi, [36] and Maragha. [37]

The measurements of the horn-cores from Küçükyozgat are listed in Table 1. Although the measurements of the horn-cores from Küçükyozgat are variable, the average maximum diameter at the base, including the measurements of the smallest specimen which probably belongs to a young individual, is quite near to that of *Oioceros rothii* Wagner from Pikermi, measured by Gaudry. [38] The horn-cores of *Oioceros rothii* Wagner from Küçükyozgat and also Pikermi are much slenderer than that of *Oioceros wegneri* Andree from Samos, measured by Andree. [39] As far as can be judged from the pictures published by De Mecquenem and Rodler and Weithofer, the specimens from Küçükyozgat and Pikermi are much stouter than the horn-cores of *Oioceros boulei* De Mecquenem [40] and *Oioceros atropatenes* Rodler and Weithofer [41] from Maragha.

In robustness value one of the two horn-cores of *Oioceros rothii* Wagner from Gökdere is within the range of the horn-cores from Küçükyozgat, and the other comes very near to the maximum of the Küçükyozgat series, being only slightly in excess. In morphology

[34] See Arambourg and Piveteau, 1929, pl. VIII, fig. 5.

[35] At the base. This furrow follows the torsion of the horn-core.

[36] See Wagner, 1860, pl. VIII, fig. 20, Gaudry, 1862, pl. LII, figs. 2-3 and Andree, 1926, pl. XI, fig. 1.

[37] See De Mecquenem, 1925, pl. VII, fig. 4.

[38] Gaudry, 1862, p. 298.

[39] Andree, 1926, p. 171.

[40] See De Mecquenem, 1925, figs. 10-11 and pl. VIII, fig. 2

[41] See Rodler and Weithofer, 1890, pl. IV, fig. 8, and pl. VI, figs. 3, 4 and 5; De Mecquenem, 1925, pl. VII, fig. 3.

the horn-cores from Gökdere and Küçükyozgat are very similar, indicating that they belong to the same form (Form A) of *Oioceros rothii* Wagner.

The horn-cores of "Form A" of *Oioceros* from Anatolia differ from those of *Oioceros atropatenes* Rodler and Weithofer and *Oioceros boulei* De Mecquenem in being much more robust and from those of *Oioceros wegneri* Andree in being much smaller and slenderer. In size and also morphology of the horn-cores the Anatolian form approaches *Oioceros rothii* Wagner. However, they still differ from the typical examples of horn-cores of *Oioceros rothii* Wagner in having a weak keel on the internal side, a more oval cross section, and having constantly a weaker postero-lateral keel. [42] In addition to these, in the Anatolian specimens the supraorbital foramen is more medially placed. From these it is clear that, as I stated before, [43] the Anatolian "Form A" probably represents a new variety of *Oioceros rothii* Wagner. The Salonika form of *Oioceros rothii* Wagner comes closer to "Form A" from Anatolia in some features. But still, the horn-cores from Salonika, as far as can be judged from the photograph published by Arambourg and Piveteau, [44] differ from the Anatolian "Form A", in being slenderer and also in having a relatively stronger postero-lateral keel.

Form B (Figs. 10-12) :

"Form B" from Küçükyozgat is represented by a fragmentary horn -core of the right side, to which is attached a part of os frontale including the upper margin of the right orbit which is directly under the horn-core (Figs. 10-11). In this form also the supraorbital foramen is more medially placed than in typical examples of *Oioceros rothii* Wagner from Pikermi [45] and Maragha. [46] Above the postero-external corner of the orbit is again observed the deep fossa

[42] Although, as noted before, this feature is variable in the Pikermi form of *Oioceros rothii* Wagner, in all specimens of "Form A" from Anatolia this keel is weakly developed and hence must be considered to be a characteristic feature of "Form A".

[43] Şenyürek, 1952, p. 473.

[44] See Arambourg and Piveteau, 1929, pl. VIII, fig. 5.

[45] See Gaudry, 1862, pl. LII, fig. 2.

[46] See De Mecquenem, 1925, pl. VII, fig. 4.

seen in the specimens of "Form A" and in *Oioceros rothii* Wagner from Pikermi. [47] A part of the medial portion of os frontale is preserved together with a section of the frontal suture joining the right and left frontal bones. From this it is seen that os frontale rose toward the frontal suture and formed a longitudinal elevation there. In this feature the specimen from Küçükyozgat resembles the specimen of *Oioceros rothii* Wagner from Maragha which, as can be seen from the photograph published by De Mecquenem, [48] displays a similar elevation along the frontal suture and differs from the specimen from Pikermi which is devoid of such a ridge. [49]

In this Anatolian form the horn-cores, as calculated from the preserved part of os frontale, were separated by about 16 mm. at the base. In this the Küçükyozgat form approaches *Oioceros rothii* Wagner from Pikermi in which, according to Gaudry, this measurement is 15 mm. [50]

This horn-core also presents an oval cross section, which, at the base, is interrupted by the deep and wide lateral groove to be described later. The cross section on top, where the horn-core is broken, is flatter than the section at the base, with a flat anterior surface. In having an oval cross section this horn-core also differs from the typical examples of horn-cores of *Oioceros rothii* Wagner, in which the cross section is rounded, [51] and approaches those of "Form A" from Anatolia and the Salonika form of *Oioceros rothii* Wagner, in both of which the cross section shows an oval shape. [52]

The internal surface of the horn-core is rounded and displays no internal keel in which this specimen differs from "Form A" and resembles other examples of *Oioceros rothii* Wagner. This horn-core also shows the torsion, the lateral groove and the keel at the postero-external corner of the base, which are all characteristics of *Oioceros rothii* Wagner.

The lateral groove of this horn-core is very deep and wide at

[47] See Gaudry, 1862, pl. LII, fig. 3.
[48] See De Mecquenem, 1925, pl. VII, fig. 4.
[49] See Gaudry, 1862, pl. LII, fig. 2 and Andree, 1926, p. 170.
[50] Gaudry, 1862, p. 298.
[51] Ibid., pp. 297-298 and pl. LII, fig. 2; Pilgrim and Hopwood, 1928, p. 24.
[52] For Salonika form see Arambourg and Piveteau, 1929, p. 113.

the base, unlike that of "Form A". The lateral groove widens toward the upper end of the horn-core and presents, relatively speaking, a smoother surface than the more rugose surface of the horn-core internal to the groove. On the medial side the lateral groove is separated from this surface by a slight edge. This conspicuous lateral groove in the Anatolian specimen appears to be wider than the corresponding formation of the examples of *Oioceros rothii* Wagner from Maragha, [53] Salonika [54] and Pikermi. [55] The right horn-core of a specimen of *Oioceros rothii* Wagner from Pikermi, depicted by Gaudry, [56] approaches the Anatolian specimen in the width of lateral groove, but still that of the Anatolian form appears to be somewhat wider.

The postero-external keel, which is a characteristic of *Oioceros rothii* Wagner [57] is strongly developed in this horn-core from Küçükyozgat, unlike that of the horn-core of "Form A". This keel, which is less twisted than the horn-core itself, consists, on the postero-external corner of the base, of two flaps, divided by a shallow groove. Further up, these two flaps fuse and continue upward as one keel. The keel is very strong at the basal part of the horn-core and becomes weaker upward and, at the place where the horn-core is broken, it almost fades out. As can be seen from the pictures published by various authors, in the specimens of *Oioceros rothii* Wagner from Pikermi, [58] Salonika [59] and Maragha, [60] the keel does not fade out at a corresponding part of the horn-core and indeed is quite strong even above this level. For instance, as can be seen from the cross section of the right horn-core, taken above the middle of the horn-core, in the Pikermi specimen of *Oioceros rothii* Wagner the keel is quite conspicuous even at this level. [61] Thus the Anatolian "Form

[53] See De Mecquenem, 1925, pl. VII, fig. 4.

[54] See Arambourg and Piveteau, 1929, pl. VIII, fig. 5.

[55] See Wagner, 1860, pl. VIII, fig. 20 and Andree, 1926, pl. XI, fig. 1.

[56] Gaudry, 1862, pl. LII, fig. 2.

[57] Ibid., p. 298; Pilgrim and Hopwood, 1928, p. 24; Arambourg and Piveteau, 1929, p. 113.

[58] Wagner, 1860, pl. VIII, fig. 20; Gaudry, 1862, pl. LII, figs. 2-3; Andree, 1926, pl. XI, fig. 1.

[59] Arambourg and Piveteau, 1929, pl. VIII, fig. 5.

[60] De Mecquenem, 1925, pl. VII, fig. 4.

[61] Gaudry, 1862, pl. LII, fig. 2.

B" differs from the typical examples of *Oioceros rothii* Wagner in this feature.

The surface of the horn-core presents a number of longitudinal furrows, but there is no conspicuous furrow behind the lateral keel in which this horn-core differs from most specimens of "Form A" and also the typical examples of *Oioceros rothii* Wagner. As a result of the deep and conspicuous furrow behind the keel, the keel formation in the specimen of *Oioceros rothii* Wagner from Pikermi [62] is more differentiated from the surface of the horn-core itself than that of "Form B" from Anatolia.

The horn-core of "Form B" of *Oioceros rothii* Wagner is somewhat robuster than the maximum of "Form A" from Anatolia. The Anatolian form also exceeds in the maximum basal diameter the specimen of *Oioceros rothii* Wagner from Pikermi. As far as can be judged from the pictures published by various authors, the horn-core of "Form B" from Anatolia is stouter than those of the specimens of *Oioceros rothii* Wagner from Salonika [63] and Maragha [64] and than those of *Oioceros boulei* De Mecquenem [65] and *Oioceros atropatenes* Rodler and Weithofer. [66] On the other hand, the horn-core of "Form B" is still slenderer than that of *Oioceros wegneri* Andree from Samos (see Table 1).

While "Form B" from Anatolia belongs to *Oioceros rothii* Wagner, which is a variable species, the Anatolian form differs from the typical examples of this species especially in having a horn-core with an oval cross section, a somewhat wider lateral groove, a postero-external keel that fades out toward the middle of the horn-core and also in displaying a somewhat more medially placed supraorbital foramen. Thus "Form B" probably represents a second and different variety of *Oioceros rothii* Wagner.

The presence of a more medially placed supraorbital foramen and a horn-core with an oval cross section indicates that forms "A"

[62] See Wagner, 1860, pl. VIII, fig. 20 and Gaudry, 1862, pl. LII, figs. 2-3.
[63] Arambourg and Piveteau, 1929, pl. VIII, fig. 5.
[64] De Mecquenem, 1925, pl. VII, fig. 4.
[65] Ibid., figs. 10-11 and pl. VIII, fig. 2.
[66] Rodler and Weithofer, 1890, pl. IV, fig. 8 and pl. VI, figs. 3-5; De Mecquenem, 1925, pl. VII, fig. 3.

and "B" are related to each other. It may perhaps be asked whether "Form B" represents the male and "Form A" the female of the same variety of *Oioceros rothii* Wagner. But aside from the differences in the lateral groove and postero-external keel, the two forms are distinct also in that "Form A" presents a weak keel on the internal surface of the horn-core, which is lacking in "Form B". Also while the largest specimens of "Form A" come close to "Form B" in size, still their morphology is quite different. These differences in morphology indicate that Forms A and B probably represent distinct varieties of *Oioceros rothii* Wagner.

The genus *Oioceros*, which is a characteristic Pontian genus of limited geographical distribution, had so far been reported only from Pikermi (*Oioceros rothii* Wagner), [67] Salonika (*Oioceros rothii* Wagner) [68] in Greece, from the island of Samos (*Oioceros proaries* Schlosser and *Oioceros wegneri* Andree)[69], from Iraq (*Oioceros rothii* Wagner), [70] and from Maragha in Iran (*Oioceros rothii* Wagner, *Oioceros atropatenes* Rodler and Weithofer and *Oioceros boulei* De Mecquenem), [71] that is from southeastern Europe and the Near East. Among the species of *Oioceros* described, only *Oioceros rothii* Wagner is common to most of the localities and has the widest area of distribution, extending from Maragha, in Iran, to Pikermi, in Greece, respectively to the east and west of Anatolia. In view of this it is not surprising to find that the Anatolian forms of *Oioceros* belong to *Oioceros rothii* Wagner, representing probably different and new varieties of this species. However, as Samos and Maragha are near Anatolia, it is not at all unlikely that the species found to date only in these places may in the future also turn up in at least the neighboring parts of Anatolia.

SUMMARY AND CONCLUSION

The horn-cores of Pontian Age from Küçükyozgat studied belong to *Oioceros rothii* Wagner but probably represent two new

[67] Wagner, 1860, p. 154; Gaudry, 1862, p. 297.
[68] Arambourg and Piveteau, 1929, p. 113.
[69] Schlosser, 1904, p. 73 and Andree, 1926, p. 170.
[70] Piveteau, 1935, p. 469.
[71] Rodler and Weithofer, 1890, p. 767 and De Mecquenem, 1925, pp. 12-13.

varieties of this species which I have labelled as "Form A" and "Form B".

LITERATURE CITED

ANDREE, J. 1926. *Neue Cavicornier aus dem Pliocän von Samos.* Palaeontographica. Siebenundsechzigster Band, Stuttgart, pp. 135-175.

ARAMBOURG, C. and PIVETEAU, J. 1929. *Les vertébrés du Pontien de Salonique.* Annales de Paléontologie, Vol, XVIII, pp. 57-140.

BOULE, M. and PIVETEAU, J. 1935. *Les fossiles. Éléments de Paléontologie.* Paris.

DE MECQUENEM, R. 1924—1925. *Contribution à l'étude des fossiles de Maragha.* Annales de Paléontologie, Vol. XIII, 1924, pp. 133-160 and Vol. XIV, 1925, pp. 1-36.

GAILLARD, C. 1901. *Le Bèlier de Mendès ou le Mouton Domestique de l'Anciènne Égypte.* Bulletin de la Société d'Anthropologie de Lyon, Vol. XX, pp. 69-103.

GAUDRY, A. 1862. *Animaux fossiles et Géologie de l'Attique. D'après les recherches faites en 1855—1856 et en 1860, sous les auspices de l'Academie des Sciences.* Paris.

LEUCHS, K. 1949. *Zur Pikermifauna von Ilhan bei Ankara (Anatolien).* Sitzungsberichten der Österr. Akademie der Wissenschaften. Mathem.-naturw. Kl., Abt. I, 158. Bd., 9. u. 10. Heft, pp. 655-656.

LEWIS, G. E. 1937. *A new Siwalik correlation.* American Journal of Science, Vol. XXXIII, pp. 191-204.

PAPP, A. and THENIUS, E. 1949. *Über die Grundlagen der Gliederung des Jungtertiärs und Quartärs in Niederösterreich, unter besonderer Berücksichtigung der Mio-Pliozän -und Tertiär-Quartär-Grenze.* Sitzungsberichten der Österr. Akademie der Wissenschaften, Mathem.-naturw. Kl., Abt. I, 158. Bd., 9 u. 10. Heft, pp. 763-787.

PILGRIM, G. E. and HOPWOOD, A. T. 1928. *Catalogue of the Pontian Bovidae of Europe in the Department of Geology.* British Museum (Natural History), London.

PIVETEAU, J. 1935. *Mammiféres du Pontien de l'Irak.* Compte Rendu

Sommaire et Bulletin de la Société Géologique de France. Cinquième Série, Tome cinquième, pp. 468-470.

RODLER, A. and WEITHOFER, K. A. 1890. *Die Wiederkäuer der Fauna von Maragha.* Denkschriften der Kaiserlichen Akademie der Wissenschaften. Mathematisch-Naturwissenschaftliche Classe. Siebenundfünfzigster Band, Wien, pp. 753-771.

ROMER, A. S. 1946. *Vertebrate Paleontology.* Chicago.

SCHLOSSER, M. 1904. *Die fossilen Cavicornia von Samos.* Beitrage zur Palaeontologie und Geologie Oesterreich-Ungarns und des Orients, Bd. XVII.

ŞENYÜREK, M. S. 1951. *Gökdere (Elmadağı) fauna'sına dair bir not. A note on Gökdere (Elmadağı) fauna.* Ankara Üniversitesi Dil ve Tarih-Coğrafya Fakültesi Dergisi (Revue de la Faculté de Langue, d'Histoire et de Géographie, Université d'Ankara), Vol. IX, Nos. 1-2, pp. 63-67 and 68-73.

ŞENYÜREK, M. S. 1952. *A study of the Pontian fauna of Gökdere (Elmadağı), south-east of Ankara.* Belleten, Vol. XVI, No. 64, pp. 449-492.

ŞENYÜREK, M. S. 1953 (a). *A note on a new species of Gazella from the Pontian of Küçükyozgat.* Ankara Üniversitesi Dil ve Tarih-Coğrafya Fakültesi Dergisi (Revue de la Faculté de Langue, d'Histoire et de Géographie, Université d'Ankara), Vol. XI, No. 1, pp. 1-14.

ŞENYÜREK, M. S. 1953 (b). *Küçükyozgat'da bulunan Gazella Capricornis Rodler ve Weithofer'e ait bir boynuz. A horn-core of Gazella Capricornis Rodler and Weithofer found at Küçükyozgat.* Türkiye Jeoloji Kurumu Bülteni (Bulletin of the Geological Society of Turkey), Vol. IV, No. 2, pp. 141-145.

SIMPSON, G. G. 1950. *The principles of classification and a classification of mammals.* Bulletin of the American Museum of Natural History, Vol. 85, New York.

THENIUS, E. 1949. *Über die Säugetierfauna aus dem Unterpliozän von Ilhan bei Ankara (Türkei).* Sitzungsberichten der Österr. Akademie der Wissenschaften. Mathem.-naturw. Kl., Abt. I, 158. Bd., 9. u. 10. Heft, pp. 656-661.

TSCHACHTLI, B. C. 1942. *Küçük Yozgat civarında bulunan memeli hay-*

vanat fosilleri. Fossile Saeugetiere aus der Gegend von Küçükyozgat. Östlich Ankara. M.T.A., No. 2/27, Ankara, pp. 322-324 and 325-327.

WAGNER, A. 1860 (1857). *Neue Beiträge zur Kenntniss der fossilen Säugthier-Ueberreste von Pikermi.* Abhandlungen der Mathemat.-Physikalischen Classe der Koeniglich Bayerischen Akademie der Wissenschaften, Achter Band, München.

ZITTEL, VON K. A. (REVISED BY A. S. WOODWARD) 1925. *Text-book of Palaeontology*, Vol. III, London.

EXPLANATION OF THE FIGURES

(Scale in millimeters)

Fig. 1. Antero-lateral view of the horn-core of *Oioceros rothii* Wagner from Küçükyozgat. No. 1, Form A. The amount of reduction is about the same as in fig. 2.

Fig. 2. Internal view of the horn-core of *Oioceros rothii* Wagner from Küçükyozgat. No. 1, Form A.

Fig. 3. Anterior view of the horn-core of *Oioceros rothii* Wagner from Küçükyozgat. No. 2, Form A.

Fig. 4. Anterior view of the horn-core of *Oioceros rothii* Wagner from Küçükyozgat. No. 3, Form A.

Fig. 5. Antero-internal view of the horn-core of *Oioceros rothii* Wagner from Küçükyozgat. No. 3, Form A.

Fig. 6. Antero-internal view of the horn-core of *Oioceros rothii* Wagner from Küçükyozgat. No. 4, Form A.

Fig. 7. Anterior view of the horn-core of *Oioceros rothii* Wagner from Küçükyozgat. No. 5, Form A.

Fig. 8. Antero-internal view of the horn-core of *Oioceros rothii* Wagner from Küçükyozgat. No. 6, Form A.

Fig. 9. Internal view of the horn-core of *Oioceros rothii* Wagner from Küçükyozgat. No. 6, Form A.

Fig. 10. Lateral view of the horn-core of *Oioceros rothii* Wagner from Küçükyozgat. No. 7, Form B.

Fig. 11. Antero-internal view of the horn-core of *Oioceros rothii* Wagner from Küçükyozgat. No. 7, Form B.

Fig. 12. Internal view of the horn-core of *Oioceros rothii* Wagner from Küçükyozgat. No. 7, Form B.

Fig. 13. Antero-lateral view of the horn-core of *Oioceros rothii* Wagner from Gökdere. Specimen found in 1948, Form A.

Fig. 14. Anterior view of the horn-core of *Oioceros rothii* Wagner from Gökdere. Specimen found in 1951, Form A.

TABLE 1

Measurements of the Horn-Cores of Genus Oioceros

(Measurements in Millimeters)

			The Greater Diameter (At the base)	The Smaller Diameter (At the base)	Robustness Value [1]	Length-Breadth Index [2]
Oioceros rothii Wagner from Küçükyozgat	FORM A	No. 1	31.00	26.00	806.00	83.87
		No. 2	32.00	26.50	848.00	82.81
		No. 3	28.00	23.00	644.00	82.14
		No. 4	29.00	23.00	667.00	79.31
		No. 5	30.00	24.00	720.00	80.00
		No. 6	26.00	19.00	494.00	73.07
		Average of six specimens	29.33	23.58	696.50	80.20
	FORM B	No. 7	33.50	28.00	938.00	83.58
Oioceros rothii Wagner from Gökdere (Şenyürek, 1952)	FORM A	Specimen found in 1948	32.00	25.00	800.00	78.12
		Specimen found in 1951	33.00	26.00	858.00	78.78
		Average of two specimens	32.50	25.50	829.00	78.45
Oioceros rothii Wagner from Pikermi (Gaudry, 1862)			30.00	—	—	—
Oioceros wegneri Andree from Samos (Andree, 1926)			52.00	51.00	2652.00	98.07

[1] Robustness value = The Greater Diameter × The Smaller Diameter.

[2] Length-Breadth Index $= \frac{\text{The Smaller Diameter} \times 100.}{\text{The greater diameter}}$

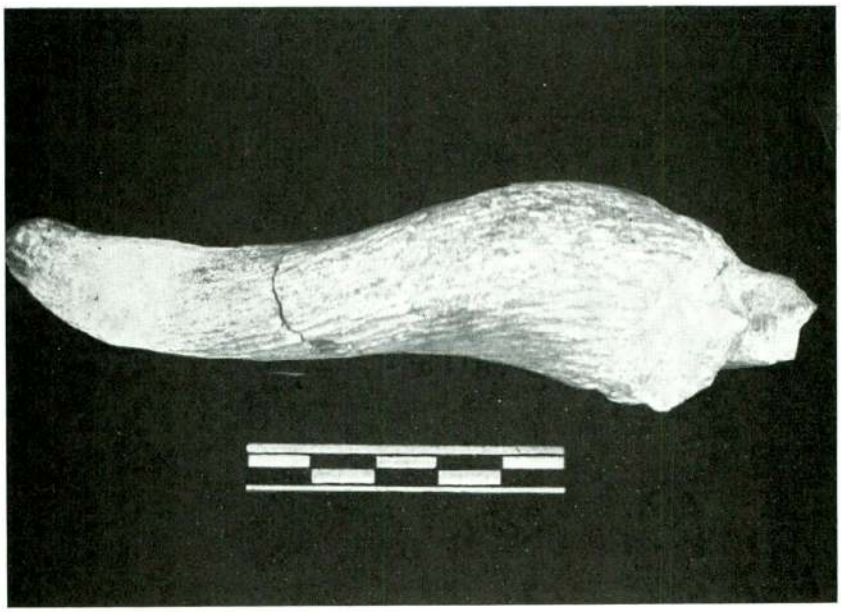

Fig. 2

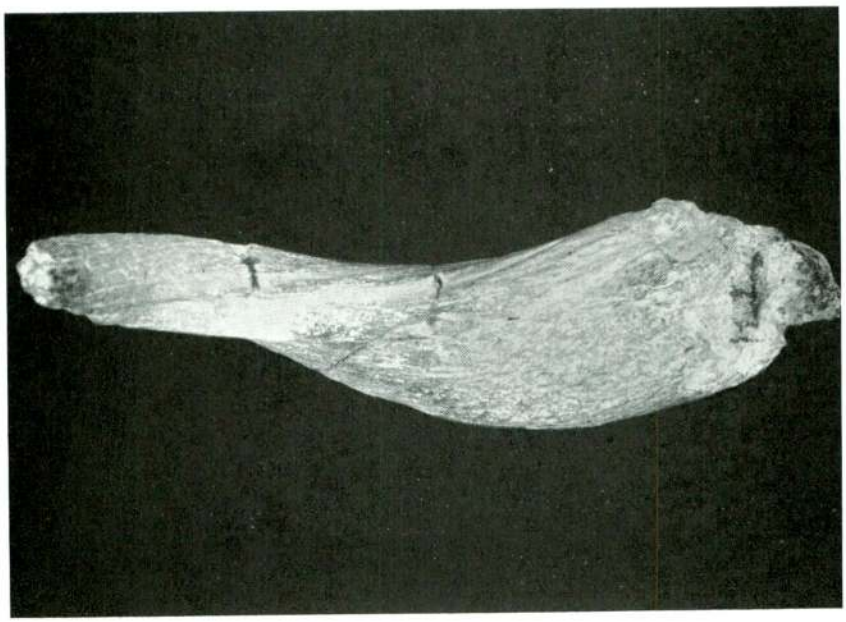

Fig. 1

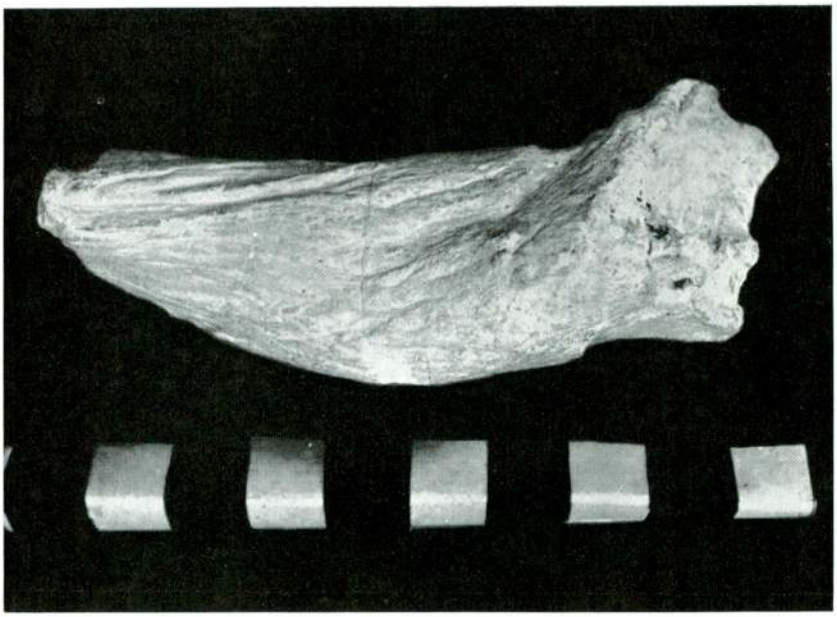

Fig. 4

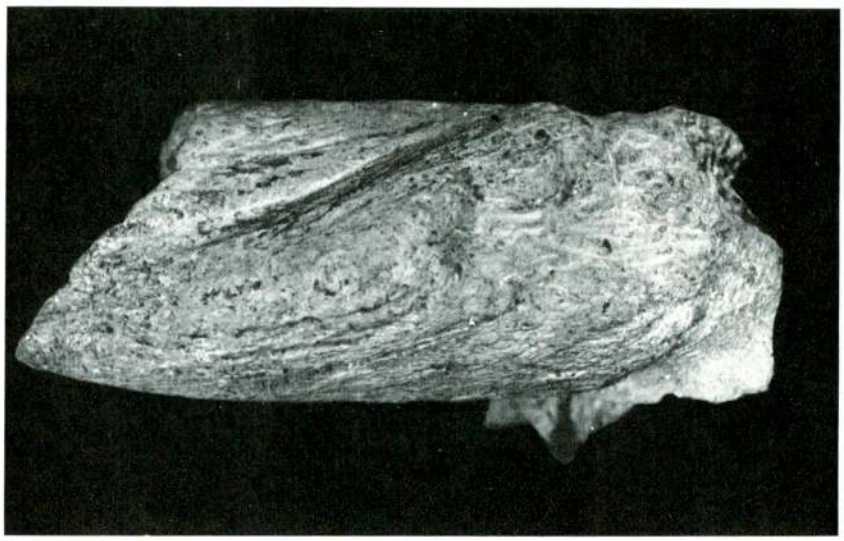

Fig. 3

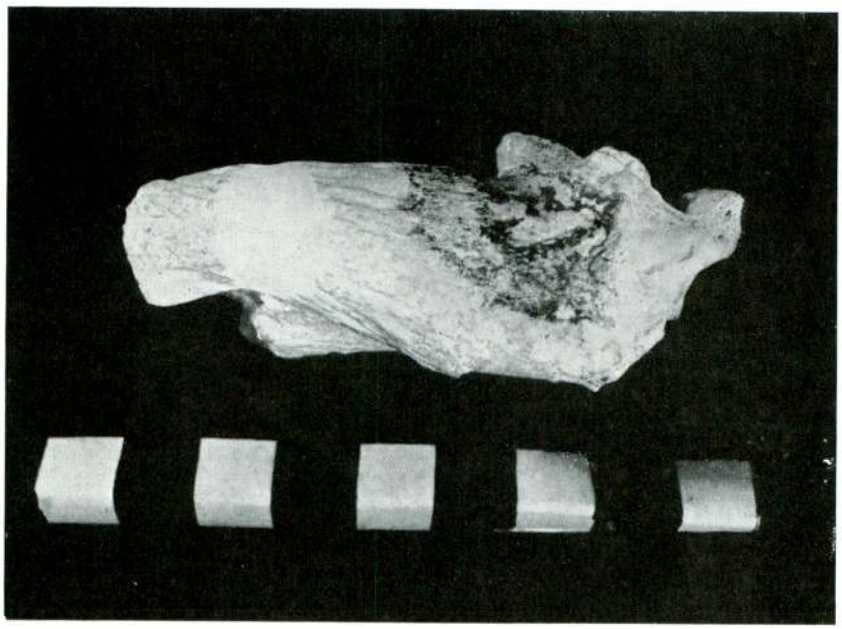

Fig. 6

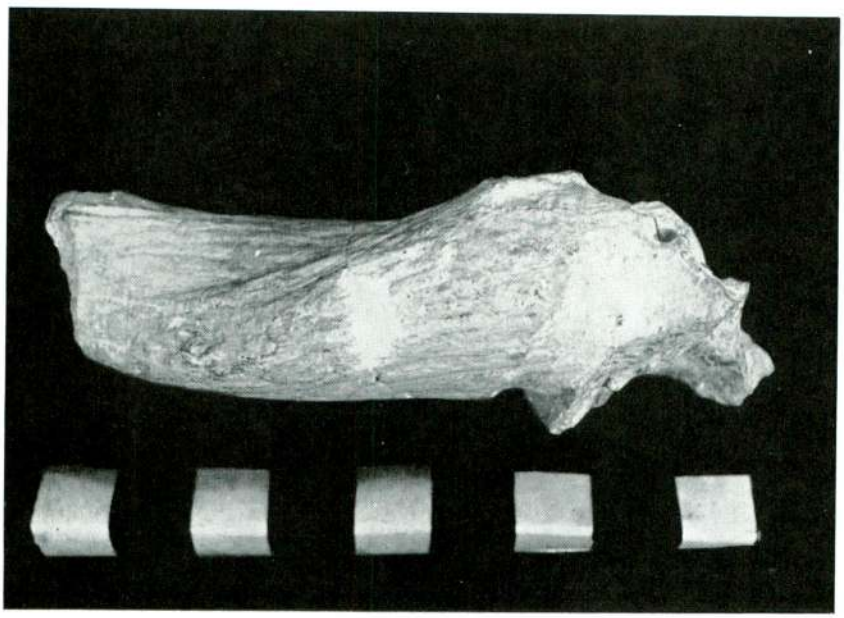

Fig. 5

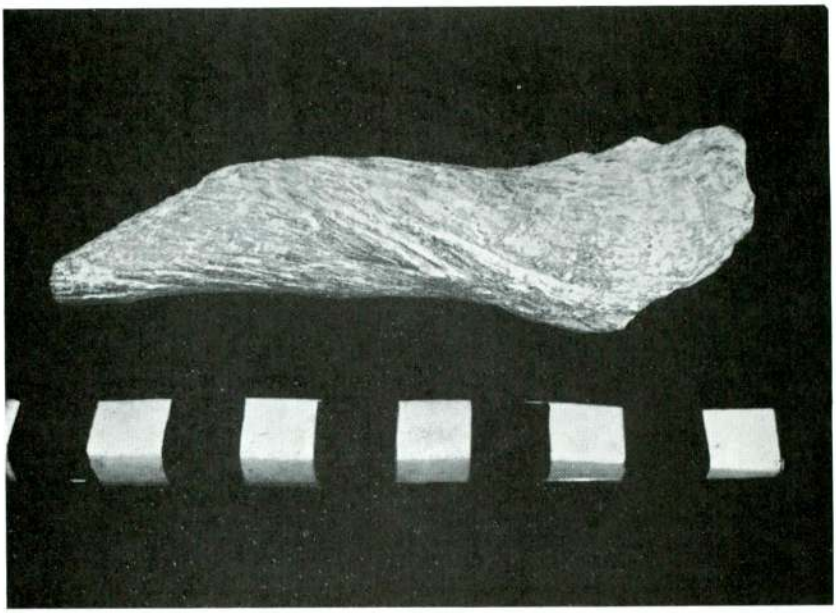

Fig. 8

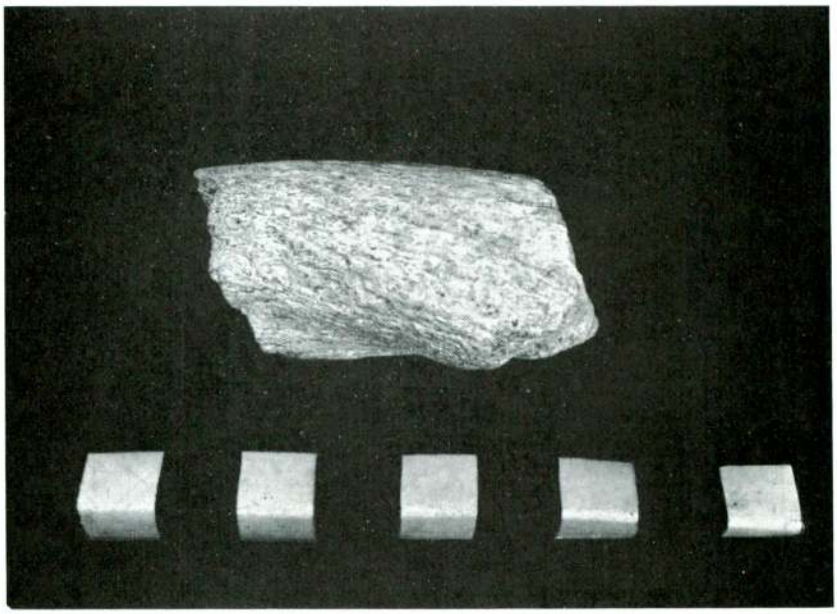

Fig. 7

Fig. 10

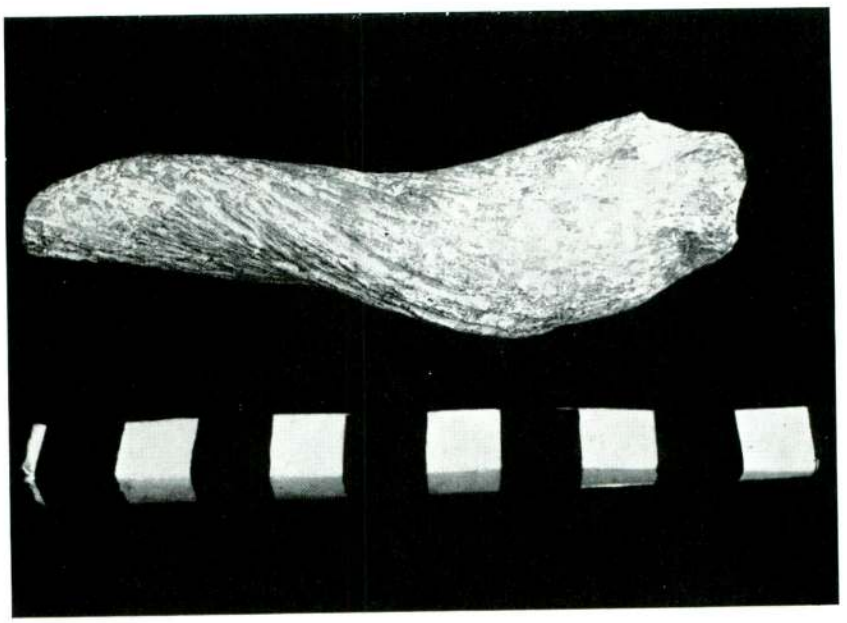

Fig. 9

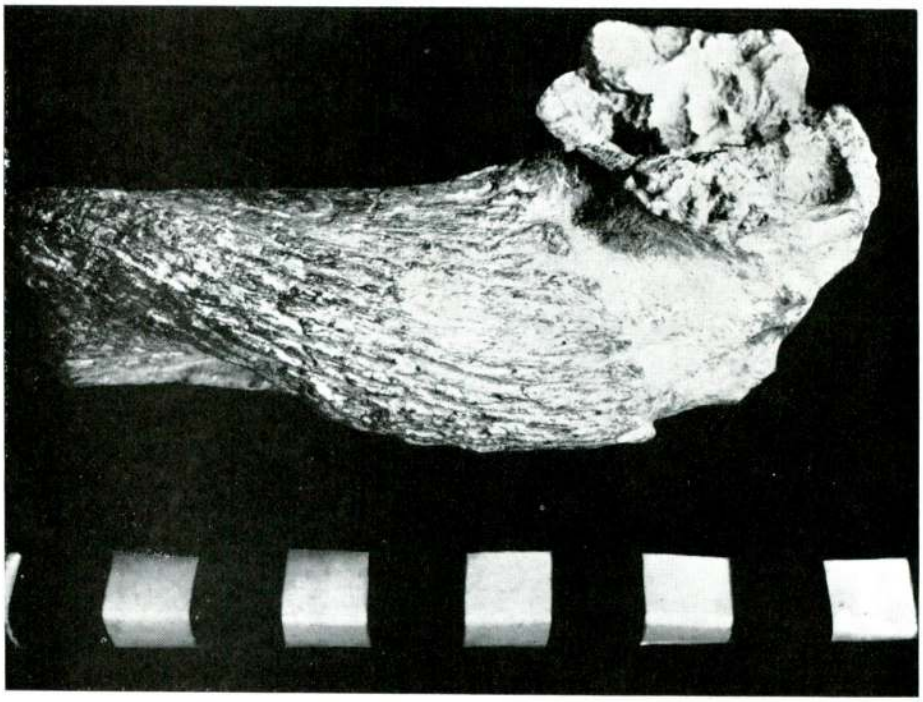

Fig. 12

Fig. 11

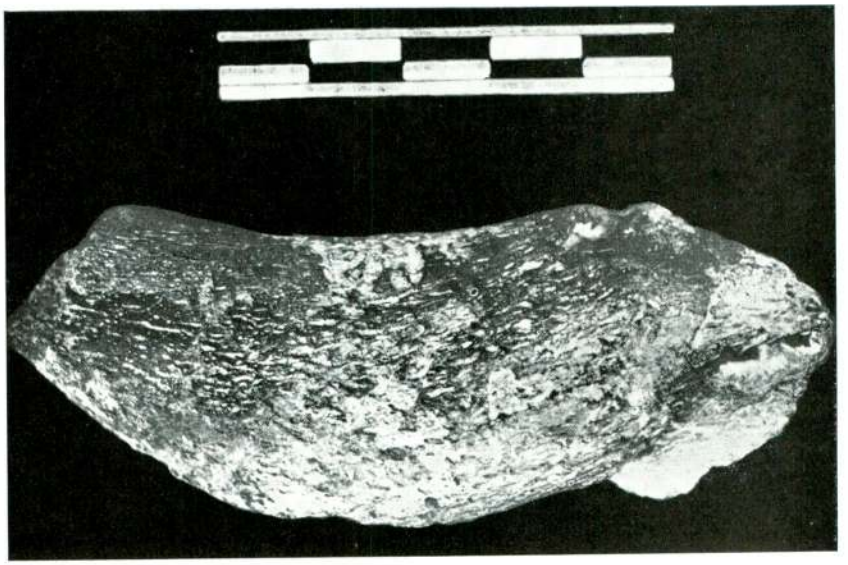

Fig. 14

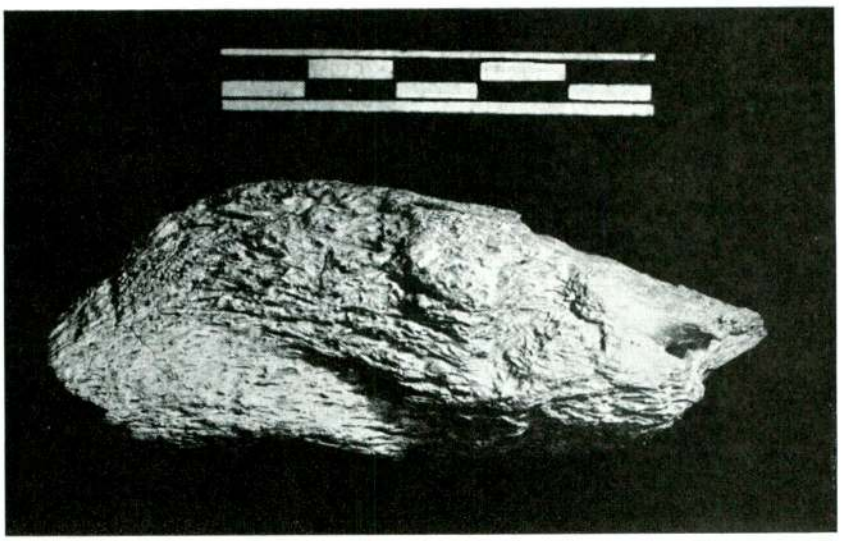

Fig. 13