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A STUDY OF A SKULL OF PROMEPHITIS FROM THE PONTIAN OF KÜÇÜKYOZGAT

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During the course of a visit to the fossiliferous region of Küçükyozgat[1] in the Fall of 1953, with the help of a few workers, I opened a small pit in the fossiliferous locus[2] I had discovered and excavated in 1951, which is just to the southeast of the site first visited by Tschachtli in 1941.[3] During the course of this brief excavation, near the pit I dug in 1951, was found the skull of a small carnivore belonging to genus *Promephitis*, which is the first specimen of this genus reported to date from Anatolia. This skull was found embedded in the whitish calcareous marls of lacustrine origin at this site.

The genera and species from the whitish calcareous marls of lacustrine origin at Küçükyozgat, which have been determined so far are as follows[4]:

[1] For the location of the fosssiliferous region at Küçükyozgat (Elmadağ) see: Tschachtli, 1942, p. 323; Şenyürek, 1953a, p. 1; Erol, 1954, fig. 1.

[2] For the place where this skull was found see Şenyürek, 1953a, fig. 3.

[3] Tschachtli, 1942, p. 325. In his report Tschachtli (1942, p. 326) mentions only the occurrence of *Mastodon sp.*, *Hipparion gracile* Kaup, *Sus erymanthius* Roth and Wagner, *Tragocerus sp.* and *Gazella sp.* at this locus. For the locus visited by Tschachtli see Şenyürek, 1953a, fig. 2.

[4] See Şenyürek, 1953a, p. 2; Şenyürek, 1953b, p. 142; Şenyürek, 1953c, p. 460.

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
Gazalla gaudryi Schlosser *(Gazella pilgrimi* Bohlin)
Gazella capricornis Rodler and Weithofer (*Gazella rodleri* Pilgrim)
Gazella eleanorae Şenyürek
Oioceros rothii Wagner

This list of fossils clearly shows that these lacustrine deposits at Küçükyozgat belong to the Pontian Age, as has been stated previously by Tschachtli [5] and me [6]. In other words, this fauna belongs to the Lower Pliocene [7].

The members of the extinct genus *Promephitis*, first established by Gaudry, [8] have been reported from the Pontian of Pikermi [9] and Samos, [10] from the Maeotic beds of Odessa region, [11] from the Pontian of Ertemte in Mongolia [12] and from the Upper Pliocene of Malusteni in Rumania. [13] However, as will be shown in the following pages, the skull from Küçükyozgat differs in a number of features from all the other species of this genus described so far, thus clearly representing a new species. I have dedicated this new species to the memory of the late Professor Dr. Earnest Albert Hooton, my teacher of Anthropology at Harvard University.

[5] Tschachtli, 1942, p. 324 and p. 327.

[6] Şenyürek, 1953a, p. 2; Şenyürek, 1953b, p. 142; Şenyürek, 1953c, p. 460.

[7] For the authors attributing the Pontian Age to the Lower Pliocene, instead of Upper Miocene, see Şenyürek, 1954, p. 2.

[8] Gaudry, 1862, p. 46.

[9] Ibid. See also Boule and Piveteau, 1935, p. 782; Zittel, 1925, p. 73.

[10] Major, 1891a, p. 608; Major, 1891b, p. 88; Pilgrim, 1931, p. 53;Pilgrim, 1933b, p. 2.

[11] Pilgrim, 1931, p. 54.

[12] Schlosser, 1924, p. 11.

[13] Simionescu, 1930, p. 93 and p. 140; Pilgrim, 1933b, p. 13.

FAMILY MUSTELIDAE SWAINSON, 1835 [14]

SUBFAMILY MEPHITINAE GILL, 1872 [15]

GENUS PROMEPHITIS GAUDRY, 1861 [16]

PROMEPHITIS HOOTONI. NEW SPECIES

The holotype of this new species, preserved in the Division of Palaeoanthropology of the University of Ankara (No. Ky. P. 1), is represented by a broken skull and an associated broken mandible.[17] The mandible, when found, was in normal occlusion with the upper jaw, the two being cemented by whitish calcareous marl, in which the skull was embedded and which also fills the cranial cavity. I have succeeded in freeing the mandible from the upper jaw, with only a small amount of damage to both jaws.

The skull is broken behind the orbits and behind the palate. The greatest part of the face and palate is retained, while the posterior portions of the vault and the base of the cranium are missing. The mandible is broken behind the left P_4 and behind the alveolus of right M_2. Thus the symphyseal region, the right corpus mandibulae and a part of left corpus mandibulae have been preserved.

[14] Simpson, 1950, p. 112.

[15] Pilgrim, 1933b, p. 1 and Simpson, 1950, p. 114. It may however be pointed out here that Zittel (1925, pp. 72-73) and Weber (1928, pp. 334-335) classify *Promephitis* and other skunks in the subfamily Melinae.

[16] Gaudry, 1862, p. 46; Pilgrim, 1931, pp. 52-53; Pilgrim, 1933b, p. 2; Simpson, 1950, p. 114.

[17] On this occasion I wish to extend my thanks to the Peabody Museum of Harvard University, Professor Dr. H. L. Movius of Peabody Museum, Mrs. B. Schevill of the Mammals Department of Harvard University for sending me, upon my request, photographs of the upper and lower teeth of the modern American genera *Mephitis*, *Spilogale* and *Conepatus*, which are the nearest living relatives of the genus *Promephitis*, for comparison, and to Mr. Fred Orchard of the Peabody Museum for photographing them. I also wish to thank Prof. Dr. W. C. Osman Hill of the Zoological Society of London, Prof. Dr. W. K. Gregory and Mrs. R. H. Nichols of the American Museum of Natural History in New York, Mrs. Lilian Takeshita of the Library of Congress of Washington, D. C., Mrs. Elizabeth S. West and Miss L.E. Hoyme of Washington, D. C., and Miss Blythe Ellen Foote of the U. S. Consulate General in Dusseldorf, Germany, for procuring, upon my request, some publications. I also wish to thank Mr. Bırhan Görgüç, photographer of the Faculty of Language, History and Geography of the University of Ankara, for doing the photographs.

All the upper and lower teeth preserved are moderately worn and the tip of the left C^1 is broken, so that all the height measurements listed in Tables 1 and 2 are not of much comparative value. [18] The amount of attrition on the teeth clearly shows that this skull belongs to a fully adult animal.

THE SKULL AND THE UPPER TEETH

The muzzle in *Promephitis hootoni* is relatively short, as is a characteristic of the members of genus *Promephitis*. [19] When the skull is examined in norma verticalis it is seen that the postorbital process, preserved on the left side (fig. 1), is well developed. In this feature *Promephitis hootoni* differs from *Promephitis lartetii* Gaudry from Pikermi, which according to Gaudry lacks the postorbital process[20] and from *Promephitis maeotica* Alexejew from Novo-Elisavetovka (Odessa region), in which this process is relatively feeble.[21] In having a well developed postorbital process the Anatolian specimen approaches *Promephitis majori* Pilgrim from the Pontian of Samos.[22] In the Anatolian skull, however, in norma verticalis, the upper part of the skull is not so abruptly contracted behind the postorbital process as in *Promephitis majori*.[23]

When the skull of *Promephitis hootoni* is viewed in norma lateralis, it is seen that the upper profile of the face behind the superiormost and posteriormost point of the anterior nasal aperture is perfectly straight, rising steadily to a point between the postorbital processes and then turning backward (figs. 2 and 4). In the upper profile of the skull, the Anatolian specimen differs from that of *Promephitis majori*, in which, as can be seen from the drawing published by Pilgrim, the upper profile of the skull is slightly convex rising to a point considerably behind the postorbital pro-

[18] As the upper and lower teeth preserved are enumerated in the following pages, they are not mentioned here.

[19] Gaudry, 1862, p. 47; Pilgrim, 1931, p. 52; Pilgrim, 1933b, p. 4.

[20] Gaudry, 1862, p. 47 and Pilgrim, 1931, p. 52. Regarding this feature of *Promephitis lartetii* Gaudry (1862, p. 47) states: "*Le frontal ne forme point d'apophyse post-orbitaire.*"

[21] Pilgrim, 1933b, p. 4.

[22] Ibid., p. 4.

[23] See ibid, fig. 1.

cesses and then curving backward and downward.[24] Also in the Anatolian specimen the upper profile of the face appears to rise, relatively speaking, more steeply than that of *Promephitis majori*.[25] As can be seen from the drawing published by Gaudry, in *Promephitis lartetii* the upper profile of the braincase and that of the preserved part of the face seem to approach that of *Promephitis majori*.[26]

As the anterior margins of both orbits of the Anatolian skull are damaged, it is not possible to determine the location of the infraorbital foramen, which is found just forward of the anterior border of the orbit in *Promephitis lartetii*[27] and *Promephitis majori*.[28] The anterior nasal aperture in the Anatolian skull is subcircular in outline, with a maximum transverse diameter of 8.40 mm. It faces slightly upward and more forward (figs. 1-5).

In *Promephitis hootoni* the palate ends immediately at the end of M^1, showing that there was no M^2 (fig. 6). In having a palate that ends at the distal border of M^1, the Anatolian specimen approaches *Promephitis majori* and *Promephitis maeotica*.[29] The shape of the dental arch of the Anatolian specimen (fig. 6) also closely resembles that of *Promephitis majori* depicted by Pilgrim.[30]

In the Anatolian skull the left I^1 and the right I^3 have not been preserved, while the right I^1-I^2 and the left I^2-I^3 are retained intact. The crowns of the incisors are separated from each other by short spaces, as also seems to be the case in *Promephitis majori*.[31] All three upper incisors possess high and relatively narrow crowns, as is also stated to be the case in *Promephitis lartetii* by Gaudry.[32] In the first and second incisors the mesial and distal

[24] Ibid., fig. 2.

[25] Ibid., fig. 2. The upper profile of the skull in *Promephitis majori* and other species of skunks is described by Pilgrim (1933b, p. 4) as follows: "*The upper profile is gently arched, little less so than in* Mephitis *and* Conepatus. Spilogale *on the other hand has an almost straight profile.* Promephitis maeotica *seems to be intermediate between* P. majori and Spilogale."

[26] Gaudry, 1862, pl. VI, fig. 5.

[27] Ibid., p. 47; Pilgrim, 1931, p. 52.

[28] Pilgrim, 1933b, pp. 4-5.

[29] Ibid., p. 13.

[30] Ibid., fig. 4.

[31] Ibid., fig. 4.

[32] Gaudry, 1862, p. 46.

sides of the crown, in buccal view, are nearly parallel, while the crown of the third upper incisor, in the same view, gently tapers toward the tip.

Regarding the relative sizes of the upper incisors in *Promephitis majori*, Pilgrim states: "*Incisors increasing in size from* I^1 *to* I^3*;* I^3 *much the largest of the three.*"[33] The same is also true for the upper incisors of *Promephitis hootoni* (see Table 1).[34] In *Promephitis hootoni*, in all three upper incisors, the bucco-lingual diameter exceeds the mesio-distal diameter, as also appears to be the case in *Promephitis majori*.[35] As can be seen from Table 1, the crown index decreases from the first toward the third upper incisor.

In *Promephitis hootoni* the right upper canine is not preserved, while in the retained left canine the tip portion is broken and missing. The left upper canine is separated from the third upper incisor by a diastema which is about 2.4 mm. wide at the base. Although the tip portion is broken, the remainder of the canine still projects considerably below the level of the other teeth. The crown presents an anterior vertical edge, or keel, and a posterior edge, with a small tubercle at its base. There is no cingulum on the buccal face of the crown, while there is a trace of it at the base of the lingual surface. In its morphology this tooth, which presents an oval cross-section, closely resembles that of *Promephitis majori*, as described by Pilgrim.[36]

In size the upper canine of *Promephitis hootoni* is larger than that of *Promephitis majori* and smaller than that of *Promephitis maeotica*, being intermediate between these species (Table 3). In crown index it conspicuously exceeds those of *Promephitis majori* and *Promephitis maeotica*.

The left P^3 is more worn than the right P^3 and in fig. 6, it appears to be slightly more forward than the right P^3, which is

[33] Pilgrim, 1933b, p. 7.

[34] Regarding the upper and lower incisors of *Promephitis lartetii*, Gaudry (1862, p. 46) states: "*Les incisives sont longues et fines ; les latérales sont un peu plus grosses que les mitoyennes.*" From this statement it would appear that in this feature the upper incisors of *Promephitis majori* and *Promephitis hootoni* probably do not differ much from those of *Promephitis lartetii*.

[35] Pilgrim, 1933b, fig. 4.

[36] Ibid., p. 7.

solely due to a distortion on the left side of the skull. That this tooth on the left side is a P^3 and not a P^2 is shown by its size which is the same as that of the right P^3 and also by the fact that it normally occludes with P_4, as is the case also with the right P^3 (see figs. 2-4). Thus in *Promephitis hootoni* there are only two premolars on each half of the upper jaw (P^3 and P^4) and that in this species P^1 and P^2 were missing, as is also true for other species of *Promephitis*.[37] The left P^3 is separated from the canine by a short diastema which is only about 0.9 mm. wide. As can be seen from the drawing published by Gaudry,[38] this diastema is wider in *Promephitis lartetii* than in *Promephitis hootoni*. The Anatolian specimen seems to come closer to *Promephitis majori* in this feature as far as can be judged from the drawings published by Pilgrim.[39]

P^3 of *Promephitis hootoni* is a two-rooted tooth and possesses a main cusp and a lower posterior tubercle behind it. On the lingual surface of the crown there is a slight belt of basal cingulum, which encircles the anterior end of the crown and extends to the mesio-buccal corner of the buccal surface. In the anterior face of the crown this cingulum juts out, thus forming a tiny anterior tubercle. This tooth of *Promephitis hootoni* presents an oval cross-section, as is also the case in *Promephitis majori*.[40] However, it differs from that of *Promephitis majori*, in possessing a relatively better developed posterior tubercle.[41]

In size, as expressed by the robustness value, P^3 of *Promephitis hootoni* is considerably larger than that of *Promephitis majori* and very slightly exceeds that of *Promephitis maeotica* (Table 4). In crown index the Anatolian specimen falls far below those of P^3 of *Promephitis majori* and *Promephitis maeotica*.

In P^4 of *Promephitis hootoni*, which has three main cusps, the paracone is higher than the metacone and the protocone is, in

[37] See Gaudry, 1862, p. 46; Pilgrim, 1931, p. 52; Pilgrim, 1933b, p. 7.

[38] Gaudry, 1862, pl. VI, fig. 6.

[39] Pilgrim, 1933b, figs. 2 and 4. Regarding this diastema in *Promephitis majori*, Pilgrim (1933b, p. 7) states: "*Diastema of about 5 mm. behind the canine.*" However, this relatively wide space mentioned by Pilgrim, is not borne out by his drawings which show only a small diastema.

[40] Pilgrim, 1933b, p. 7.

[41] Compare figs. 2 and 6-7 with figs. 2 and 4 of Pilgrim (1933b).

mesio-distal direction, relatively long, amounting to more than half of the total crown length. In this tooth, the parastyle is small (figs. 6-7). The anterior margin of the tooth is formed by a thin belt of cingulum that extends from the protocone to the buccal surface, being however extremely reduced on the latter face of the crown. The small parastyle referred to is in reality a part of this cingulum. On the disto-lingual corner of the metacone is seen a relatively well developed and vertical strip of cingulum which however does not extend to the distal face of protocone, as is also the case in *Promephitis majori*.[42] On the whole, in the arrangement of cingulum, P^4 of *Promephitis hootoni* approaches that of *Promephitis majori*, as described by Pilgrim.[43] P^4 of *Promephitis hootoni*, however, differs conspicuously from that of *Promephitis majori* in having a protocone that is considerably longer in mesio-distal direction, and a smaller parastyle.[44] This tooth of *Promephitis hootoni* in having a relatively long protocone also differs from that of *Promephitis maeotica* in which, according to Pilgrim, the protocone is of about the same length as that of *Promephitis majori*.[45] P^4 of *Promephitis hootoni* also has, in mesio-distal direction, a longer protocone than that of *Promephitis alexejewi* Schlosser from the Pontian of Ertemte in Mongolia.[46] On the other hand, as far as can be judged from the drawings published by Gaudry,[47] in the length of protocone and in the size of parastyle, P^4 of *Promephitis hootoni* seems to come closer to that of *Promephitis lartetii*.[48]

The size of P^4 of *Promephitis hootoni*, as expressed by the robustness value, is larger than that of *Promephitis majori* and smaller than those of *Promephitis maeotica* and *Promephitis alexejewi* (Table 5). P^4 of the Anatolian species is distiguished from that of *Promephitis*

[42] Pilgrim, 1933b, p. 7.

[43] Ibid., p. 7 and fig. 4.

[44] See Ibid., p. 7.

[45] Ibid., p. 13.

[46] See Schlosser, 1924, pl. I, fig. 31.

[47] Gaudry, 1862, pl. VI, figs. 5-6.

[48] Regarding the present condition of the upper teeth and the size of protocone of P^4 in the holotype of *Promephitis lartetii*, Pilgrim (1931, p. 53) states: "*It has evidently been damaged since it was figured by Gaudry, and has lost the upper canine, P^3 and a part of P^4. The protocone of P^4 may quite easily have extended as far back as it is represented in Gaudry's figure, which is evidently farther than in* P. maeotica *and* P. alexejewi."

lartetii in having a considerably smaller length measurement. In crown index this tooth of *Promephitis hootoni* exceeds those of *Promephitis majori*, *Promephitis maeotica* and *Promephitis alexejewi*.

The first upper molar of *Promephitis hootoni* has three main cusps, of which the paracone and metacone are considerably worn, while the protocone is better preserved. The metacone is near the paracone in length and the protocone is a crescent-shaped cusp, the distal end of which extends to the vicinity of metacone (figs. 6-7). External cingulum of this M^1 is well developed. External to the paracone is seen a rather well developed parastyle, while the metastyle is rudimentary. Lingual to the protocone there exists a strongly developed internal cingulum. The internal cingulum of *Promephitis majori* is described by Pilgrim as follows: "*..pronounced internal cingulum, very faint at the antero-internal angle but widening out posteriorly into a broad basin-shaped valley which extends to the base of the metacone*;.."[49] This description also nearly fits the internal cingulum of M^1 of *Promephitis hootoni*. However, in *Promephitis hootoni* the disto-lingual corner of the internal cingulum is rather angular, at least partly on account of an attrition facet on the lingual half of the distal surface of the crown, which must have been caused by friction against the second lower molar.

The first upper molar of *Promephitis hootoni* differs from that of *Promephitis majori* mainly in having a longer protocone, which is shorter in the Samos species.[50] As far as can be judged from the drawing published by Gaudry, the extension of protocone in M^1 of *Promephitis hootoni* comes near to that of *Promephitis lartetii*.[51] However, M^1 of the Anatolian species differs from that of *Promephitis lartetii* in having a longer external margin to the crown, which is rather abbreviated in the Pikermi species.[52] In the extension of its protocone, M^1 of *Promephitis alexejewi* approaches that of *Promephitis hootoni*, but seems to differ from the Anatolian species in

[49] Pilgrim, 1933b, p. 8.

[50] See Ibid., fig. 4. Pilgrim (1933b, p. 8) describes the protocone in M^1 of *Promephitis majori* as follows: "*...protocone forming a crescentic ridge which terminates at little more than half-way across the crown.*"

[51] Gaudry, 1862, pl. VI, fig. 6.

[52] Ibid., pl. VI, fig. 6. See also Pilgrim, 1931, p. 52.

having a somewhat shorter distal margin.[53] First upper molars of the modern genera of skunks of the Americas differ from that of *Promephitis hootoni* in having usually better developed parastyles and metastyles.[54]

In M^1 of *Promephitis hootoni* the bucco-lingual diameter exceeds the mesio-distal dimension (Table 6), as is characteristic also of other species of Promephitis.[55] M^1 of *Promephitis hootoni* is larger in size than that of *Promephitis majori* and slightly surpasses that of *Promephitis lartetii*. It is somewhat inferior in size to that of *Promephitis alexejewi* and is considerably smaller than that of *Promephitis maeotica*, which has the largest M^1 in genus *Promephitis*. In crown index M^1 of *Promephitis hootoni* exceeds that of *Promephitis majori*, and comes near to that of *Promephitis alexejewi*. In this index *Promephitis hootoni* is far exceeded by *Promephitis maeotica* and *Promephitis lartetii*. It would appear that in this feature M^1 of *Promephitis hootoni* is more advanced than those of *Promephitis maeotica* and *Promephitis lartetii*, but is more primitive than that of *Promephitis majori*, in which the difference between the breadth and length measurements is less.[56]

The length measurement of P^3 relative to the length of M^1 in three species of *Promephitis* are listed in Table 7. In is seen that in this index, expressing P^3 length as a percentage of M^1 length, *Promephitis hootoni* greatly exceeds *Promephitis majori* and also *Promephitis maeotica*, which is intermediate in this index between the Anatolian and Samos species. In the relative size of its P^3, *Promephitis hootoni* is more primitive than *Promephitis maeotica* and *Promephitis majori*.

The length measurements of P^4 relative to those of M^1 are listed in Table 8. In this index *Promephitis hootoni* somewhat exceeds *Promephitis majori*, but falls short, in ascending order, of *Promephitis maeotica*, *Promephitis alexejewi* and *Promephitis lartetii*. It would appear that in this feature *Promephitis hootoni* is more primi-

[53] See Schlosser, 1924, pl. I, fig. 31.

[54] See Hall, 1936, pl. V, fig. 1.

[55] Gaudry, 1862, p. 46; Schlosser, 1924, p. 12; Pilgrim, 1931, p. 52; Pilgrim, 1933b, pp. 7, 11 and 13.

[56] See Pilgrim, 1933b, p. 13.

tive than *Promephitis majori*, but more advanced than *Promephitis maeotica*, *Promephitis alexejewi* and *Promephitis lartetii*.

THE MANDIBLE AND THE LOWER TEETH

In the mandible of *Promephitis hootoni*, the symphysis is moderately receding and the lower margin of the corpus mandibulae is straight from the lower end of symphysis to a point under the hinder part of M_2, where it turns upward (fig. 11). In the right corpus mandibulae there are three main foramina mentalia, arranged in a row, of which the first is under the anterior root of P_3, the second is between P_3 and P_4 and the third is below the distal root of P_4. On the left side the two anterior foramina are preserved but as the bone is broken over the distal root of P_4, the third foramen has not been retained (fig. 13).

The lower margin of corpus mandibulae in *Spilogale*, *Promephitis maeotica* and *Promephitis lartetii* is described by Pilgrim as follows: "*In* Spilogale *the lower border of the ramus is horizontal or slightly convex from symphysis to angle, and apparently the same is the case in* Promephitis lartetii *and* P. maeotica." [57] The lower margin of corpus mandibulae of *Promephitis hootoni* differs from these mainly in turning upward in the hinder part of M_2. As can be seen from the drawing published by Schlosser, [58] the mandible of *Promephitis alexejewi* differs from that of *Promephitis hootoni* in having a strongly convex lower margin under the premolars and molars. In this Mongolian species also the lower margin of the mandible turns gently upward and backward somewhat behind the second molar, that is slightly more posteriorly than it does in the Anatolian species. The lower margin of the mandible of *Promephitis majori* is described by Pilgrim as follows: "*Its lower border is straight up to the hinder end of* M_2 *and then steps up to the angle, as in* Mephitis *and* Conepatus." [59] However, an examination of the drawings published by Pilgrim,[60] shows that it would

[57] Ibid., p. 8. For the configuration of the lower margin of the mandible in *Promephitis lartetii* see: Gaudry, 1862, pl. VI, fig. 5.

[58] Schlosser, 1924, pl. I, fig. 32.

[59] Pilgrim, 1933b, p. 8.

[60] Ibid., figs. 6A and C.

be more appropriate to describe the anterior part of the lower margin of the mandible of *Promephitis majori* as rather wavy. The lower margin of the mandible in the Samos species is slightly concave under the premolars and the anterior half of M_1, then it is slightly convex downward to a point somewhat behind the hinder end of M_2 where it turns upward. Although the configuration of the lower margin of the mandible of *Promephitis hootoni* comes nearer to that of *Promephitis majori* than to those of *Promephitis maeotica*, *Promephitis lartetii* and *Promephitis alexejewi*, still the Anatolian species differs from the Samos species in that the lower margin of its mandible is straight from the symphysis to the hinder part of M_2. Furthermore, in *Promephitis hootoni* the lower margin of the mandible turns upward somewhat more anteriorly than it does in the Samos species.

As can be seen from Table 9, the height of corpus mandibulae of *Promephitis hootoni*, measured below M_1, is the same as those of *Promephitis lartetii*, *Promephitis majori* and *Promephitis malustenensis* Simionescu from the Upper Pliocene of Malusteni in Rumania, but is lower than those of *Promephitis maeotica* and *Promephitis alexejewi*.

In the distance from the posteriormost point of the canine to the anteriormost point of M_1 (Table 10), the mandible of *Promephitis hootoni* exceeds *Promephitis majori* and is surpassed by *Promephitis maeotica*, *Promephitis lartetii* and *Promephitis malustenensis* in which this distance is very great indeed, supporting the suggestion of Pilgrim that this Upper Pliocene species from Malusteni in Rumania may have closer affinities with genus *Trocharion* or with *Mydaus* rather than with *Promephitis* in which the premolars are reduced.[61]

The crowns of left I_1-I_2 and right I_3 are retained intact in the mandible of *Promephitis hootoni*. Right I_1 and I_2 are represented by the lower halves of the crowns, while only the basal part of the crown of left I_3 has been preserved. The lower incisors are somewhat more compactly placed than the upper incisors. When the lower incisors are examined in occlusal view (figs. 8-10), it is seen that instead of standing in a row, on both the right and left

[61] Ibid., p. 14.

side, the second incisor stands somewhat behind the first and third incisors. In all lower incisors the bucco-lingual diameter exceeds the mesio-distal diameter. As is the case in the upper jaw, in the mandible also in going from the first toward the third incisor the size increases, while the crown index decreases in the same direction.

The lower incisors of *Promephitis majori* are described by Pilgrim as follows: "*Incisors of equal size and in the same line.*"[62] In having an I_2 that stands behind the I_1 and I_3, *Promephitis hootoni* conspicuously differs from *Promephitis majori* and resembles some of the modern skunks (fig. 15). As Pilgrim[63] has not listed the measurements of the incisors of *Promephitis majori*, a comparison of the sizes of the lower incisors of *Promephitis hootoni* with those of the Samos species has not been possible.

On both the right and left side, the lower canine is retained intact. The lower canine is separated from the third lower incisor by only a very short space. The tip portions of both canines are slightly worn. The lower canine, in norma lateralis, is much more curved than the upper canine, as in *Promephitis alexejewi*.[64] As far as can be judged from the pictures, the same feature is also seen in *Promephitis lartetii*[65] and *Promephitis majori*.[66] In the lower canine of *Promephitis hootoni* there is no distinct anterior edge, the mesial surface in occlusal view being rounded, while there is a slight distal edge, with a small basal tubercle at its base. There is no buccal cingulum, while the internal cingulum is moderately developed, extending all along the basal part of the lingual surface of the crown. The internal cingulum forms a tiny eminence at the mesio-lingual corner of the crown, at the same place as that seen in the lower canine of *Conepatus mesoleucus mearnsi* shown in fig. 15. In the basal part of the buccal surface of the right lower canine is seen a wide groove, due to wear,that extends upward to the back of the tip. This worn groove must have been caused by

[62] Ibid., p. 8 and fig. 6B.
[63] Ibid.
[64] Schlosser, 1924, p. 11.
[65] Gaudry, pl. VI, fig. 5.
[66] Pilgrim, 1933b, figs. 2 and 6C.

friction against the mesial edge of the upper canine.[67] In the left canine the upper section of this groove is present, but its lower part is completely missing.

The lower canine of *Promephitis majori* is described by Pilgrim as follows: "*Canine very concave behind, slenderer than in living genera, with well marked internal cingulum but practically no posterior cusp.*"[68] In its general morphology the lower canine of *Promephitis hootoni* recalls that of *Promephitis majori*,[69] differing from it mainly in having a small basal posterior tubercle. As far as can be judged from the pictures, a small basal tubercle is present in *Promephitis lartetii*,[70] but is lacking in *Promephitis alexejewi*.[71]

As can be seen from Table 11, in size and also in crown index, the lower canine of *Promephitis hootoni* far exceeds that of *Promephitis majori*. In crown height the lower canine of *Promephitis hootoni* is higher than that of *Promephitis majori* and lower than that of *Promephitis alexejewi*, being intermediate between these two species.

In *Promephitis hootoni* P_1 is congenitally missing, as is a characteristic of genus *Promephitis*.[72] P_2, on both the right and left side, is represented by only its alveolus which is placed close to the root of the canine, showing that there was no diastema between these two teeth (figs. 8 and 10). The distal part of the alveolus of P_2 is close to the anterior root of P_3 and is overhung by the mesial surface of the crown of this tooth. The alveolus shows that P_2 of *Promephitis hootoni* was a small tooth, smaller than P_3, and that it was single rooted. In the presence of a P_2, *Promephitis hootoni* resembles *Promephitis majori* which has three lower premolars[73] and differs from *Promephitis lartetii* and *Promephitis alexejewi* which have only two premolars,[74] viz., P_3 and P_4. In the absence of a

[67] In the left lower canine of *Promephitis majori*, depicted by Pilgrim (1933b, fig. 6C) is also seen a worn groove on the basal part of the buccal surface exactly as in the right lower canine of *Promephitis hootoni*.

[68] Pilgrim, 1933b, p. 8.

[69] Ibid., figs. 6A-C.

[70] Gaudry, 1862, pl. VI, fig. 5.

[71] Schlosser, 1924, pl. I, fig. 33.

[72] Pilgrim, 1933b, p. 2.

[73] Ibid., p. 8.

[74] For these see Gaudry, 1862, p. 46 and Schlosser, 1924, p. 11.

diastema between C_1 and P_2 *Promephitis hootoni* resembles *Promephitis majori*, which is also devoid of a diastema.[75]

P_3 is preserved intact on both sides. This tooth has a main cusp, a tiny anterior tubercle, which is part of the faint internal cingulum, a somewhat larger posterior basal tubercle and two roots. In its general morphology P_3 of *Promephitis hootoni* resembles that of *Promephitis majori*.[76] Regarding the position of the lower premolars in *Promephitis majori* Pilgrim states: "*The premolars lie more obliquely in the jaw than in* Spilogale *or* Mephitis, *but less so than in* Conepatus."[77] The obliquity of P_3 in *Promephitis hootoni*, in occlusal view, is about equal to that of *Promephitis majori*[78] (figs. 8-10). Regarding the position of P_3 in *Promephitis alexejewi*, Schlosser states: "*In the lower jaw we see between the alveole of the canine and the preserved* P_4 *two alveoles, the first of which is detached outward, indicating therefore an obliquely inserted* P_3."[79] As can be seen from the picture published by Schlosser[80] the position of the two roots clearly shows that P_3 of *Promephitis alexejewi* is more oblique than those of *Promephitis hootoni* and *Promephitis majori*.

It is seen from Table 13 that in size P_3 of *Promephitis hootoni* greatly exceeds that of *Promephitis majori* and is slightly smaller than that of *Promephitis maeotica*. In crown index this tooth of the Anatolian species slightly surpasses that of *Promephitis majori*, and falls short of that of *Promephitis maeotica*.

The right P_4 is damaged, while the left P_4 is preserved intact (figs. 8-10). The right P_4 is separated from P_3 by a short diastema that is about 0.5 mm. wide. This tooth has two roots. P_4 differs from P_3 mainly in being larger, in having a relatively higher main cusp, a comparatively wider posterior portion and also in not being implanted obliquely at all. The shape of the crown in oc-

[75] Pilgrim, 1933b, p. 8. In *Promephitis lartetii* a wide diastema intervenes between C_1 and P_3, representing the space formerly occupied by P_2, which has been lost during the course of evolution of this species (see Gaudry, 1862, pl. VI, figs. 5 and 7).

[76] Pilgrim, 1933b, p. 8 and figs. 6 A-C.

[77] Ibid., p. 8.

[78] Ibid., fig. 6B.

[79] Schlosser, 1924, p. 11.

[80] Ibid., pl. I, fig. 32.

clusal view and the relative sizes of the anterior and posterior basal tubercles are about the same as in *Promephitis majori*.[81] In having a long axis nearly parallel to that of corpus mandibulae, P_4 of *Promephitis hootoni* differs from that of *Promephitis majori*, in which this tooth is moderately obliquely set,[82] and also from that of *Promephitis alexejewi* in which it is even more obliquely implanted than that of the Samos species.[83] P_4 of *Promephitis lartetii* is unfortunately damaged. But as far as can be judged from the drawing published by Gaudry,[84] it would seem that the direction of P_4 in this species was similar to that of *Promephitis hootoni*.

P_4 of *Promephitis hootoni* is longer and wider than that of *Promephitis majori* and is very slightly shorter but broader than that of *Promephitis maeotica* (Table 14). In size, as expressed by robustness value, and also in crown index, it far exceeds those of *Promephitis maeotica* and *Promephitis majori*.

M_1 is preserved on the right side and on the left side it is missing as the bone is broken behind P_4 (fig. 8). In M_1 of *Promephitis hootoni* the trigonid section (breadth=4.00 mm.) is narrower than the talonid section (breadth=4.30 mm.). The external side of the trigonid section, in occlusal view, is slightly convex, while the internal side, between paraconid and metaconid, is concave. In the trigonid section of the tooth the length of paraconid is near that of protoconid, and the antero-posterior axis of paraconid is slightly bent inward and forward in relation to that of the protoconid, as is the case in *Promephitis majori*.[85] The protoconid is considerably worn, but is slightly higher than the metaconid, which is also worn, but to a lesser extent than the protoconid. In occlusal view, the metaconid is slightly more posteriorly placed than the protoconid, as is also the case in *Promephitis alexejewi*[86] and *Promephitis maeotica*.[87] In buccal view, the protoconid is only slightly higher than the paraconid, which is due to the consider-

[81] See Pilgrim, 1933b, figs. 6 A-C.
[82] Ibid., fig. 6B.
[83] See Schlosser, 1924, pl. I, fig. 32.
[84] Gaudry, 1862, pl. VI, fig. 7.
[85] Pilgrim, 1933b, p. 9 and fig. 6B.
[86] Schlosser, 1924, p. 11 and pl. I, fig. 32.
[87] Pilgrim, 1931, p. 54.

able attrition suffered by the protoconid (figs. 11-12). In its fresh state protoconid was very probably considerably higher than the paraconid, as is true also for other species of *Promephitis*.[88] In the talonid section, which is shorter antero-posteriorly (length=3.80 mm.) than the trigonid section (length=5.00 mm.), both the hypoconid and entoconid are worn, but the hypoconid is still slightly higher than the entoconid. Although the entoconid is worn, the presence of two worn scars on the upper surface of its lingual side suggests that in the fresh state of the tooth there probably were two small tubercles on this side. There is a third worn scar on about the middle of the distal margin of the crown. The entoconid is separated from the metaconid by a rather deep notch (see fig. 14). In this feature M_1 of *Promephitis hootoni* differs from that of *Promephitis majori*, which is devoid of such a deep notch[89] and approaches that of *Brachyprotoma obtusata* (Cope) from the Pleistocene of North America.[90] In M_1 of *Promephitis hootoni* there is no external or internal cingulum whatsoever.

[88] Pilgrim, 1933b, p. 9 and fig. 6C; Gaudry, 1862, pl. VI, fig. 5; Schlosser, 1924, pl. I, fig. 32.

[89] Pilgrim, 1933b, fig. 6A.

[90] See Hall, 1936, pls. 1, 2 and 3. As far as can be judged from the photographs published by Hall (1936, pl. 4, figs. 3-4 and pl. 5, fig. 2), the same feature is also seen in at least some specimens of modern genera of skunks.

Regarding the genus *Brachyprotoma*, Pilgrim (1933b, p. 13) states: "Brachyprotoma *from the Pleistocene of Pennsylvania and Arkansas, in spite of the absence of* P^1 *and* P^2 *clearly possesses many primitive characters such as the large size of* P^4 *and* M_1*; the large size of the anterior premolars; the smaller protocone in* P^4*; the weaker metaconid in* M_1*; the transverse elongation of* M^1*. It seems to be a survival of a much more primitive form than any species of* Promephitis." In addition to the notch between the entoconid and metaconid in M_1, *Promephitis hootoni* resembles *Brachyprotoma* also in the dental formula, as this North American genus has two upper and three lower premolars (see Hall, 1936, p. 47). The Anatolian species also approaches the North American genus in the length of lower premolars relative to that of M_1 (see footnote 99). On the other hand, *Promephitis hootoni* differs from *Brachyprotoma obtusata* (Cope) in having a larger protocone in P^4 (see Hall, 1936, pl. 2, figs. 3 and 6 and pl. 3, fig. 4) and a higher metaconid in M_1 (see Hall, 1936. pls. 1-2). The Anatolian species also differs from *Brachyprotoma* in having a shorter P^4 relative to M^1 and a lower crown index in M^1. As calculated from the figures (P^4 length=6.0; M^1 length=3.7; breadth=5.7) given by Pilgrim (1933b), in *Brachyprotoma pristina* (included in *Brachyprotoma obtusata* by Hall, 1936), the index expressing the length of P^4 as a percentage of that of M^1 is 162.16 and the crown index of M^1 is 154.05. Although

M_1 of *Promephitis majori* and of the living skunks is described by Pilgrim as follows: "*M_1 length much greater than the depth of the ramus and much exceeding that of the premolar series. In this respect it is strikingly different from all the living genera, in which M_1 is either equal in length to or slightly less than the premolar series; trigonid a little longer than talonid; paraconid not very oblique to protoconid, as long as protoconid but lower; metaconid strong but lower than protoconid and almost on the same level with it. In* Spilogale *and* Mephitis *the position of the paraconid is about the same but the metaconid is somewhat higher. In* Conepatus *the paraconid is shorter and much more oblique; the metaconid is higher and the trigonid is no longer, sometimes much shorter than the talonid. The talonid in* Promephitis majori *is basin-shaped, having a tranchant hypoconid somewhat worn, and an entoconid on which two low cusps are apparent with a trace of a faint one behind them.* Spilogale *agrees with* P. majori *in the lowness of the entoconid, but the single entoconid cusp in* Mephitis *is much higher, and one of the two present on the entoconid of* Conepatus *is equally high.*" [91]

In its general morphology, M_1 of *Promephitis hootoni* comes near to that of *Promephitis majori*, but, aside from its larger size, differs from it mainly in having a slightly more posteriorly placed metaconid. [92] M_1 of *Promephitis hootoni* approaches those of *Promephitis maeotica* and *Promephitis alexejewi* in the posterior position of the metaconid, [93] but differs from these species in the absence of a cingulum. [94] M_1 of *Promephitis hootoni* is distinguished from that of *Promephitis lartetii* mainly in the position of metaconid, which, as stated by Pilgrim, is placed slightly before the protoconid in the Pikermi species. [95] The position of metaconid in M_1

in some features the Anatolian species further shortens the hiatus between *Promephitis* and *Brachyprotoma*, the presence of a larger protocone in P^4, a higher metaconid in M_1, a relatively shorter P^4 and a relatively narrower M^1, which are all advanced characters, shows that *Promephitis hootoni* is not a direct ancestor of the North American *Brachyprotoma*.

[91] Pilgrim, 1933b, pp. 8-9 and 12.

[92] See ibid., fig. 6B.

[93] See Pilgrim, 1931, p. 54 and Schlosser, 1924, p. 11 and pl. I, fig. 32.

[94] See Pilgrim, 1933b, p. 2 and p. 13, and Schlosser, 1924, p. 12 and pl. I, fig. 32.

[95] Pilgrim, 1931, p. 53; Schlosser, 1902, P. 146; Gaudry, 1862, pl. VI, fig. 7.

of *Promephitis majori*[96] appears to be intermediate between that of *Promephitis hootoni*, which has retained a more primitive condition in this feature, and *Promephitis lartetii*[97] which represents an advanced stage in the location of its metaconid.

In length, M_1 of *Promephitis hootoni* exceeds those of *Promephitis majori*, *Promephitis lartetii* and comes near to that of *Promephitis malustenensis* (Table 15). In length of M_1, *Promephitis hootoni* is surpassed by *Promephitis maeotica* and *Promephitis alexejewi*. In robustness value M_1 of the Anatolian species exceeds those of *Promephitis majori* and *Promephitis malustenensis*, but falls far below those of *Promephitis maeotica* and *Promephitis alexejewi*. M_1 of *Promephitis hootoni* exceeds in crown index all species of *Promephitis* listed in Table 15. In the index expressing the talonid length of M_1 as a percentage of the trigonid length of this tooth, *Promephitis hootoni* exceeds *Promephitis majori*, but falls far below *Promephitis alexejewi* in which the talonid section is relatively long (Table 16). In this index the Anatolian species comes nearer to *Promephitis majori* than to *Promephitis alexejewi*.

In *Promephitis hootoni* and in all other species of *Promephitis* listed in Table17, the height of the corpus mandibulae measured below M_1 is less than the length of this tooth.[98] In the index expressing the height of corpus mandibulae as a percentage of M_1 length, *Promephitis hootoni* falls in the range of genus *Promephitis* (Table 17). In this index *Promephitis hootoni* surpasses *Promephitis alexejewi*, *Promephitis malustenensis* and is exceeded by *Promephitis maeotica* and *Promephitis lartetii*.

As for the relative size of the lower premolars, the length of P_3 relative to that of M_1 in three species of *Promephitis* are listed in Table 18. In this index expressing P_3 length as a percentage of M_1 length, *Promephitis hootoni* exceeds both *Promephitis majori* and

[96] Pilgrim, 1933b, fig. 6B.

[97] Gaudry, 1862, pl. VI, fig. 7.

[98] See also Pilgrim, 1933b, p. 8 and p. 11. In this feature *Promephitis hootoni* and all other species of *Promephitis* conspicuously differ from *Trocharion albanense* Major, a primitive member of Mephitinae from the Tortonian stage of La Grive Saint Alban in France, in which M_1 length is smaller than the height of corpus mandibulae below it (according to Pilgrim, 1933a, in *Trocharion albanense* Major M_1 length is 8.5 mm., while the height of corpus mandibulae below it is 10.2 mm.).

Promephitis maeotica. In the index expressing P_4 length as a percentage of M_1 length *Promephitis hootoni* also surpasses those of *Promephitis alexejewi* and *Promephitis majori* (Table 19). *Promephitis hootoni* is more primitive in this feature than *Promephitis majori* and *Promephitis alexejewi*.[99] In conclusion it can be stated that in *Promephitis hootoni* upper and lower premolars are reduced, but not to the same extent as in *Promephitis majori* from Samos.[100]

M_2 is represented on the right side only by its alveolus, of which the hinder part is broken (fig.8). The configuration of the alveolus indicates that this tooth had one root. The top of the alveolus is not horizontal but is seen to be slanting upward, in side view, forming an obtuse angle with the top of the alveolus of M_1. This shows that the crown of M_2 was not horizontally placed, but was slanting upward at the place of junction of corpus mandibulae with the anterior border of ramus mandibulae. The position of M_2 indicates that in this species there was no other molar behind M_2, as is also the case in other species of *Promephitis*.[101] In the slanting position of M_2, *Promephitis hootoni* resembles *Promephitis alexejewi*[102] and *Promephitis majori*,[103] but differs from *Promephitis lartetii* in which M_2 is horizontally placed.[104]

[99] In this index *Promephitis hootoni* is more advanced than the earlier *Trocharion albanense* Major ,in which P_4, relative to M_1, is much longer (according to Pilgrim, 1933a, in *Trocharion albanense* P_4 length is 6.2 mm., M_1 length is 8.5 mm. and the index expressing P_4 length as a percentage of that of M_1, calculated from these figures, is 72.82).

[100] The same result also comes out of the comparison of the index expressing the distance from the posteriormost point of the lower canine to the anteriormost point of the first lower molar as a percentage of M_1 length. The values obtained in three species are as follows :

Promephitis hootoni	86.36
Promephitis majori. Calculated from the figures given by Pilgrim, 1933b.	75.94
Brachyprotoma pristina (*Brachyprotoma obtusata* according to Hall, 1936). Calcultated from Pilgrim, 1933b.	87.83

In this index the Anatolian species exceeds *Promephitis majori* and approaches *Brachyprotoma* from the Pleistocene of North America.

[101] Gaudry, 1862, p. 46; Schlosser, 1924, pl. I, fig. 32; Pilgrim, 1933b, fig. 6.

[102] Schlosser, 1924, pl. I, fig. 32.

[103] Pilgrim, 1933b, fig. 6A and C.

[104] Gaudry, 1862, pl. VI, fig. 5.

DENTAL FORMULA

It is clear from the account given above that the dental formula of *Promephitis hootoni* is as follows[105]:

$$I\frac{3}{3} \quad C\frac{1}{1} \quad P\frac{2}{3} \quad M\frac{1}{2}.$$

In the foregoing pages points have been discussed in which the skull of *Promephitis* from Küçükyozgat resembles and differs from the other species of *Promephitis* and allied genera. We can now summarize the results of these comparisons.

Promephitis hootoni resembles *Promephitis lartetii* Gaudry from the Pontian of Pikermi mainly in the depth of corpus mandibulae below M_1, in size of protocone and parastyle of P^4, in the length of protocone of M^1, in the presence of a small basal tubercle in the lower canine and in the direction of P_4. The Anatolian species differs from *Promephitis lartetii* in the upper profile of the skull, in possessing a well developed postorbital process, in the configuration of the lower border of the mandible and in dental formula, as the Pikermi species has only two lower premolars on each side.[106] *Promephitis hootoni* is further distinguished from the Pikermi species in having a shorter diastema between C^1 and P^3, a longer external border and a lower crown index in M^1, in having a P^4 that is, relative to M^1, shorter, a slightly longer M_1, in the position of metaconid of M_1 and in the slanting position of M_2.

The comparisons with *Promephitis maeotica* Alexejew from the Maeotic beds of Novo-Elisavetovka (Odessa region) have unfortunately been of a limited scope, as I could not obtain the original report of Alexejew (1916).[107] It has been fortunate, however, that Pilgrim, in his excellent studies referred to, has recorded some features, although a limited number, and measurements of *Pro-*

[105] In its dental formula *Promephitis hootoni* differs from the living North American genera *Spilogale* and *Mephitis* which have 3 upper and 3 lower premolars (see Hall, 1936, pp. 55 and 64) and resembles the living genus *Conepatus*, of North and South America, which has also two upper and three lower premolars (see Weber, 1928, p. 335 and Hall, 1936, p. 73).

[106] See Gaudry, 1862, p. 46.

[107] Cited by Schlosser, 1924, p. 11; Pilgrim, 1931, p. 54; Pilgrim, 1933 a, p. 865; Pilgrim, 1933b, p. 12.

mephitis maeotica, which show that *Promephitis* from Küçükyozgat is different from this species. *Promephitis hootoni* approaches *Promephitis maeotica* in having a palate that ends at the end of M^1 and in the position of metaconid of M_1. The Anatolian species differs from the Ukrainian species in having a well developed postorbital process, in the configuration of the lower border of the mandible, in having a lower corpus mandibulae, a longer protocone in P^4 and in lacking a cingulum in M_1. With the exception of P^3 and P_4, the teeth of *Promephitis hootoni* are smaller than those of *Promephitis maeotica*. The crown index of M^1 in *Promephitis maeotica* is higher, that is more primitive. In the Anatolian species, relative to M^1, the P^3 is longer while P^4 is shorter than in the Ukrainian species. In the lower jaw of *Promephitis hootoni* P_3, relative to M_1, is longer than in *Promephitis maeotica*.

Promephitis hootoni approaches *Promephitis malustenensis* Simionescu from the Upper Pliocene of Malusteni in Rumania mainly in the height of corpus mandibulae, in the position of metaconid of the first lower molar [108] and in the length of this tooth. But the Pontian species from Anatolia is distinguished from this upper Pliocene species of Rumania mainly in having a shorter distance between the posteriormost point of C_1 and the anteriormost point of M_1, in the position of the second lower incisor, [109] in lacking a cingulum in M_1 and in having an absolutely, as well as relatively, much broader first lower molar. [110]

Promephitis hootoni approaches *Promephitis alexejewi* Schlosser from the Pontian of Ertemte in Mongolia in having the lower border of the mandible turn upward behind M_2, in the length of protocone and crown index of M^1, in the position of metaconid of M_1 and in the slanting position of M_2. The Anatolian species differs from *Promephitis alexejewi* in having a straight lower border

[108] See Simionescu, 1930, fig. 13.

[109] Simionescu (1930, p. 140) describes the position of I_2 in the Rumanian species as follows: "*I_2 se place en avant des autres comme chez certaines formes du miocène.*"

[110] According to the dental formula given by Simionescu there are two lower premolars in this Rumanian species (see Simionescu, 1930, p. 94). Regarding the missing lower premolar, however, Pilgrim (1933a, p. 859) states: "*With regard to* Promephitis rumana, *I cannot resist the conclusion that the absence of* P_4 *is pathological;....*"

in the mandible between the symphysis and hinder part of M_2 and in having the lower margin of the mandible turn upward more anteriorly. *Promephitis hootoni* is further distinguished from *Promephitis alexejewi* in having a lower corpus height in the mandible, in dental formula, as the Mongolian species has only two lower premolars on each side, [111] in having a small posterior tubercle in C_1, in the position of P_3 and P_4, in lacking a cingulum in M_1, and in having a relatively shorter talonid in M_1. The teeth of *Promephitis hootoni* are smaller than the available teeth of *Promephitis alexejewi* and with the exception of M^1 they possess higher crown indices. Besides in *Promephitis hootoni* P^4 is shorter, relative to M^1, while P_4, relative to M_1, is longer than in the Mongolian species.

Promephitis hootoni approaches *Promephitis majori* Pilgrim, approximately from the middle levels of the Pontian beds [112] in Samos, in possessing a well developed postorbital process, in having a palate that ends at the end of M^1, the shape of the dental arch, in having the lower border of mandible turn up behind M_2, in height of corpus mandibulae below M_1, in dental formula, relative size of upper incisors, shape of upper canine, the size of diastema between C^1 and P^3, in the distribution of cingulum in P^4, in lack of a diastema between C_1 and P_2, in the shape and position of P_3, in shape of P_4, in lack of a cingulum in M_1 and in the slanting position of M_2. *Promephitis hootoni* differs from *Promephitis majori* in having the upper part of the vault of the skull behind the postorbital process not so abruptly constricted, in upper profile of the skull, in the shape of the lower border of mandible between symphysis and the hinder part of M_2 and in having the lower border of the mandible turn up more anteriorly. *Promephitis hootoni* is further distinguished from *Promephitis majori* in the size of the posterior tubercle in P^3, in the smaller parastyle and longer protocone of P^4, longer protocone of M^1, in the position of lower incisors, in having a basal posterior tubercle in C_1, in position of P_4, in the more posteriorly placed metaconid and very slightly longer talonid of M_1. Furthermore, in *Promephitis hootoni* all the teeth are

[111] See Schlosser, 1924, p. 11 and pl. I, fig. 32.

[112] Pilgrim, 1933b, p. 2.

conspicuously larger than in *Promephitis majori* and they, with the only exception of P^3, possess higher crown indices. In *Promephitis hootoni* P^3-P^4 and P_3-P_4, relative to respectively M^1 and M_1, are longer, that is, more primitive than in the Samos species. The length of three lower premolars in *Promephitis majori*, relative to M_1 length, is shorter, that is more advanced than in *Promephitis hootoni*.

The account given above clearly shows that *Promephitis hootoni* is distinct from all the species of *Promephitis* discussed. Thus, *Promephitis hootoni* represents a new species of genus *Promephitis*.

Although *Promephitis hootoni* is clearly a new species, still among all the species of *Promephitis* reviewed, it is more closely allied to *Promephitis majori* Pilgrim from Samos than to any other species of this genus. In most of its features *Promephitis hootoni* is more primitive than *Promephitis majori* but in a few features such as the larger protocone of P^4 and the position of lower incisors it is more advanced than the Samos species. For this reason, neither one of the species from Anatolia or Samos may be considered as the direct ancestor of the other. It would appear more probable that *Promephitis hootoni* Şenyürek and *Promephitis majori* Pilgrim are the modified descendants of a common ancestral form that lived in basal Pontian or Upper Sarmatian Age in the region extending from Samos to Anatolia, which were united at that time.

CONCLUSION

1. *Promephitis hootoni* Şenyürek from the Pontian of Küçükyozgat represents clearly a new species of the extinct genus *Promephitis*.
2. Although a distinct species, *Promephitis hootoni* Şenyürek is more closely allied to *Promephitis majori* Pilgrim from the Pontian of Samos than to other species of the genus *Promephitis*. However, neither of these two species seems to be the direct ancestor of the other. It appears probable that *Promephitis hootoni* Şenyürek and *Promephitis majori* Pilgrim may be the modified descendants of a common ancestral form that might have lived in basal Pontian or upper Sarmatian times in the region extending from Samos to Anatolia, which were united in that remote period.

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EXPLANATION OF THE FIGURES

Fig. 1. The skull of *Promephitis hootoni* Şenyürek from Küçükyozgat in norma verticalis. Enlarged about 1.9 times.

Figs. 2 - 3. The skull of *Promephitis hootoni* Şenyürek from Küçükyozgat in norma lateralis (right side). Enlarged about 1.9 times.

Fig. 4. The skull of *Promephitis hootoni* Şenyürek from Küçükyogzat in norma lateralis (left side). Enlarged about 1.7 times.

Fig. 5. The skull of *Promephitis hootoni* Şenyürek from Küçükyozgat in norma frontalis. Enlarged about 2.5 times.

Figs. 6-7. The palate of *Promephitis hootoni* Şenyürek from Küçükyozgat in norma basilaris. Fig. 6: Enlarged about 1.7 times. Fig. 7: Enlarged about 3 times.

Figs. 8-10. The mandible of *Promephitis hootoni* Şenyürek from Küçükyozgat in norma verticalis. Fig. 8: Enlarged about 1.5 times. Fig. 9: Enlarged about 3 times. Fig. 10: Enlarged about 5 times.

Fig. 11. The mandible of *Promephitis hootoni* Şenyürek from Küçükyozgat in norma lateralis. Enlarged about 2.4 times.

Fig. 12. The mandible of *Promephitis hootoni* Şenyürek from Küçükyozgat in norma lateralis (slightly tilted to show only the teeth of the right side). Enlarged about 2.7 times.

Fig. 13. The mandible of *Promephitis hootoni* Şenyürek from Küçükyozgat in norma lateralis. Enlarged about 2.5 times.

Fig. 14. The mandible of *Promephitis hootoni* Şenyürek from Küçükyozgat in norma lateralis (slightly tilted to show only the teeth of the left side). Enlarged about 2.8 times.

Fig. 15. The mandible of *Conepatus mesoleucus mearnsi*, from Oro Blanco Mts. of Arizona, in norma verticalis (Museum of Comparative Zoology of Harvard University No. 17956). Published through the courtesy of the Peabody Museum of Harvard University. Enlarged twice.

TABLE 1

Measurements of the Upper Teeth of *Promephitis hootoni* Şenyürek, n.sp. [1]

	Maximum Length [2]	Maximum Breadth [3]	Crown Height [4]	Robustness Value [5]	Crown Index [6]
I^1	1.00	1.80	—	1.80	180.00
I^2	1.20	1.8	—	2.16	150.00
I^3	1.50 [7]	2.10	—	3.15	140.00
C^1	4.00	3.10	5.60++	12.40	77.50
P^3	2.80	1.90	2.40 [8]	5.32	67.85
P^4	6.10	5.10	3.30	31.11	83.60
M^1	5.70	7.60	—	43.32	133.33

[1] In this study all the measurements are given in millimeters.

[2] The length measurements of the teeth are the maximum mesio-distal dimensions of the crown.

[3] The breadth measurements of the teeth are the maximum bucco-lingual dimensions of the crown.

[4] In all the teeth the height is measured on the buccal side of the crown.

[5] Robustness Value = Max. Length × Max. Breadth.

[6] Crown Index $= \dfrac{\text{Max. Breadth} \times 100}{\text{Max. Length}}$

[7] Measured at the base, the dimension taken at the tip region being 1.3 mm.

[8] Right side.

TABLE 2

Measurements of the Lower Teeth of *Promephitis hootoni* Şenyürek, n.sp.

	Maximum Length	Maximum Breadth	Crown Height	Robustness Value	Crown Index
I_1	0.80	1.40	—	1.12	175.00
I_2	0.90	1.50	—	1.35	166.66
I_3	1.20	1.50	—	1.80	125.00
C_1	4.00	3.00	6.70+	12.00	75.00
P_3	2.50	1.80	2.00	4.50	72.00
P_4	3.70	2.80	3.00	10.36	75.67
M_1	8.80	4.30	3.00+	37.84	48.86

TABLE 3

Measurements of the Upper Canine in Genus *Promephitis*[1]

	Maximum Length	Maximum Breadth	Crown Height	Robustness Value	Crown Index
Promephitis hootoni Şenyürek from Küçükyozgat.	4.00	3.10	5.60++	12.40	77.50
Promephitis majori Pilgrim from Samos. Pilgrim, 1933b.	3.50	2.30	5.00 (appr.)	8.05	65.71
Promephitis maeotica Alexejew from Elisavetovka. Pilgrim, 1933b.	4.80	3.30	9.70	15.84	68.75
Promephitis alexejewi Schlosser from Ertemte (Mongolia). Schlosser, 1924.	—	—	7.00	—	—

[1] In all the tables, the robustness values and the crown indices of the material taken from the literature have been calculated by me.

TABLE 4

Measurements of P^3 in Genus *Promephitis*

	Maximum Length	Maximum Breadth	Robustness Value	Crown Index
Promephitis hootoni Şenyürek from Küçükyozgat.	2.80	1.90	5.32	67.85
Promephitis majori Pilgrim from Samos. Pilgrim, 1933b.	2.00	1.60	3.20	80.00
Promephitis maeotica Alexejew from Elisavetovka. Pilgrim, 1933b.	2.50	2.00	5.00	80.00

TABLE 5

Measurements of P^4 in Genus *Promephitis*

	Maximum Length	Maximum Breadth	Robustness Value	Crown Index
Promephitis hootoni Şenyürek from Küçükyozgat.	6.10	5.00	30.50	81.96
Promephitis lartetii Gaudry from Pikermi. Gaudry, 1862.	8.00	—	—	—
Promephitis majori Pilgrim from Samos. Pilgrim, 1933b.	5.60est.	4.10	22.96	73.21
Promephitis maeotica Alexejew from Elisavetovka. Pilgrim, 1933b.	7.10	5.30	37.63	74.64
Promephitis alexejewi Schlosser from Ertemte (Mongolia). Schlosser, 1924.	8.00	5.00	40.00	62.50

TABLE 6

Measurements of M^1 in Genus *Promephitis*

	Maximum Length	Maximum Breadth	Robustness Value	Crown Index
Promephitis hootoni Şenyürek from Küçükyozgat.	5.70	7.60	43.32	133.33
Promephitis lartetii Gaudry from Pikermi. Gaudry, 1862.	5.00	8.00	40.00	160.00
Promephitis majori Pilgrim from Samos. Pilgrim, 1933b.	5.60	6.50	36.40	116.07
Promephitis maeotica Alexejew from Elisavetovka. Pilgrim, 1933b.	5.70	9.10	51.87	159.64
Promephitis alexejewi Schlosser from Ertemte (Mongolia). Schlosser, 1924.	5.80	7.60	44.08	131.03
Promephitis alexejewi Schlosser from Ertemte (Mongolia). Schlosser, 1924.	6.00	8.00	48.00	133.33

TABLE 7

The Length of P^3 Relative to that of M^1 in Genus *Promephitis*

	$\frac{P^3 \text{ Length} \times 100}{M^1 \text{ Length}}$
Promephitis hootoni Şenyürek from Küçükyozgat.	49.12
Promephitis majori Pilgrim from Samos.	35.71
Promephitis maeotica Alexejew from Elisavetovka.	42.37

TABLE 8

The Length of P^4 Relative to that of M^1 in Genus *Promephitis*

	P^4 Length × 100 / M^1 Length
Promephitis hootoni Şenyürek from Küçükyozgat.	107.01
Promephitis lartetii Gaudry from Pikermi.	160.00
Promephitis majori Pilgrim from Samos.	100.00
Promephitis maeotica Alexejew from Elisavetovka.	124.56
Promephitis alexejewi Schlosser from Ertemte (Mongolia).	135.59

TABLE 9

Height of Corpus Mandibulae under the Middle of the First Lower Molar in Genus *Promephitis*

Promephitis hootoni Şenyürek from Küçükyozgat (On the inside).	7.00
Promephitis lartetii Gaudry from Pikermi. Gaudry, 1862.	7.00
Promephitis majori Pilgrim from Samos. Pilgrim, 1933 b.	7.00
Promephitis malustenensis Simionescu from Malusteni. Pilgrim, 1933b.	7.00 appr.
Promephitis maeotica Alexejew from Elisavetovka. Pilgrim, 1933b.	8.50 appr.
Promephitis alexejewi Schlosser from Ertemte (Mongolia). Pilgrim, 1933b. [1]	8.00 appr.

[1] According to Schlosser (1924, p. 12) this measurement is 18 mm. However, as can be seen from the picture published by Schlosser (1924, pl. I, fig. 32), the figure given by Pilgrim (1933b, p. 11) seems to be more correct.

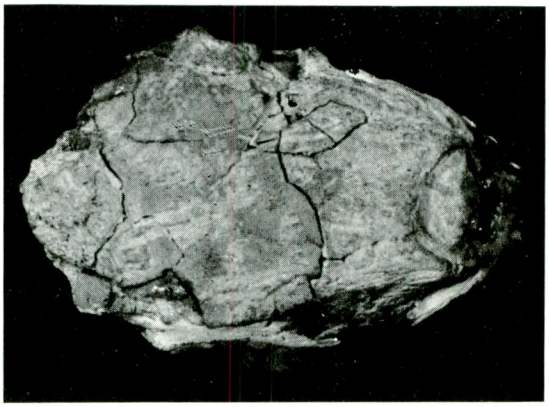

Fig. 1

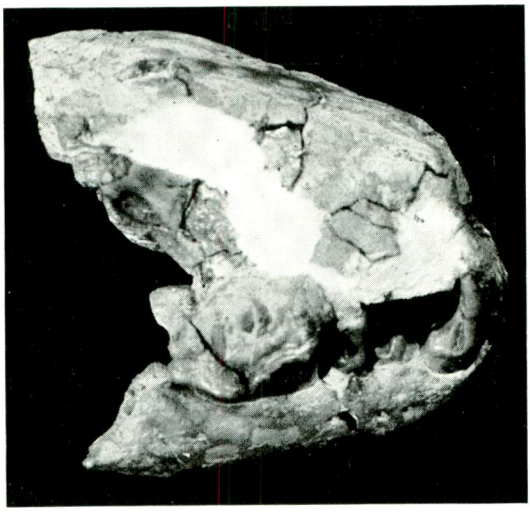

Fig. 2

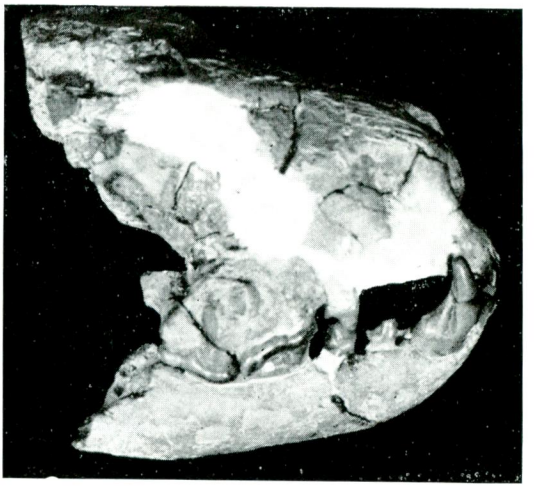

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Fig. 7

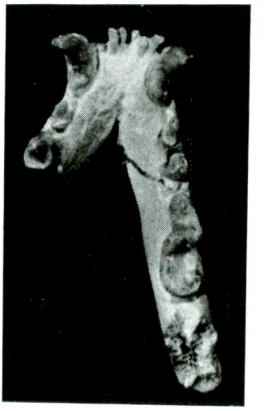

Fig. 8

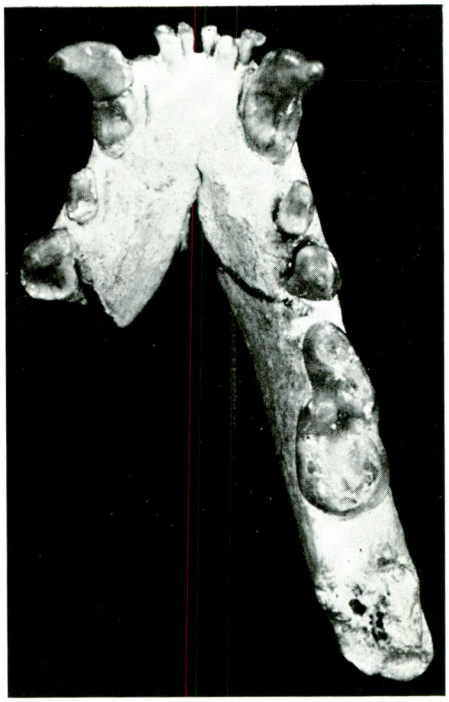

Fig. 9

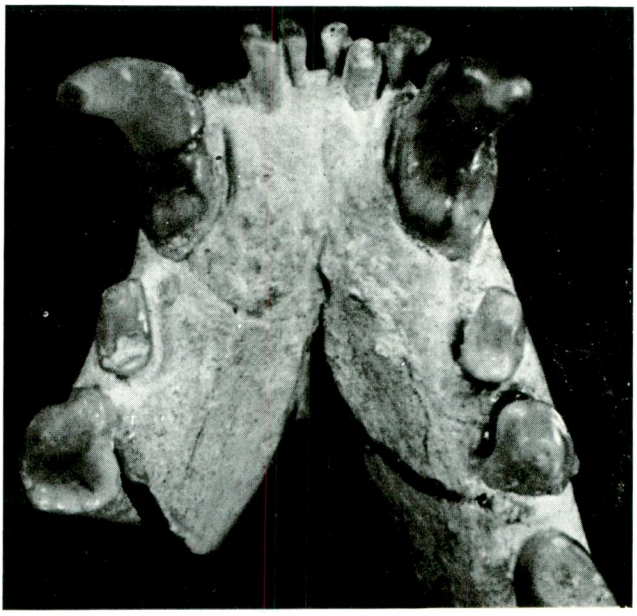

Fig. 10

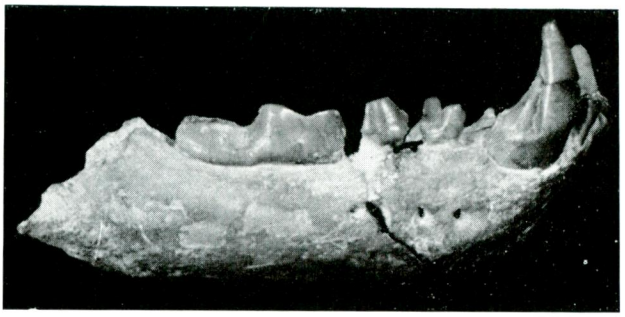

Fig. 11

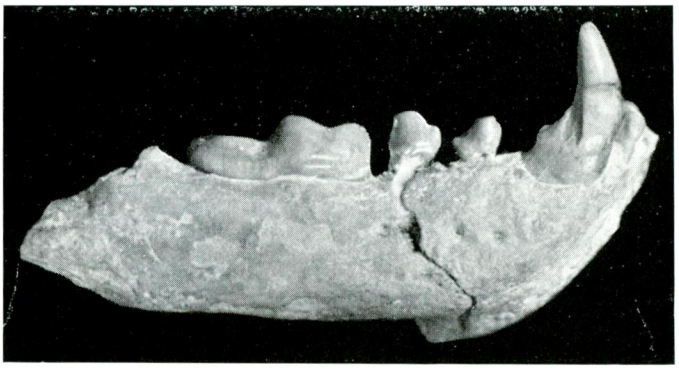

Fig. 12

Fig. 13

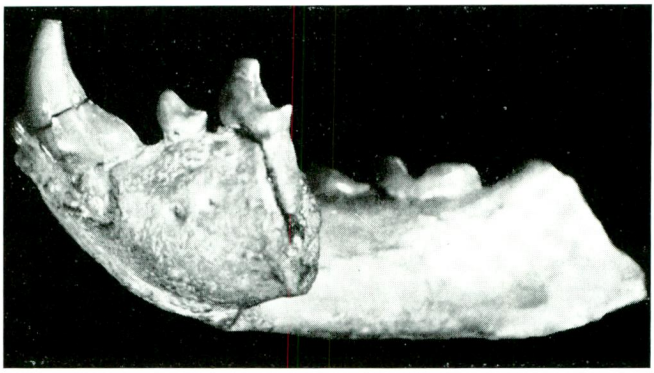

Fig. 14

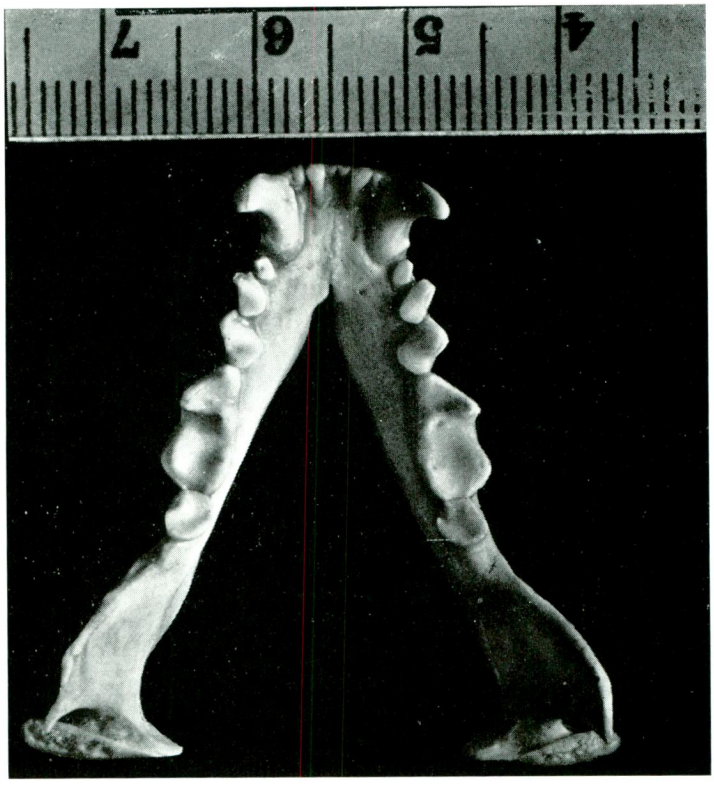

Fig. 15

TABLE 10

The Distance from the Most Posterior Point of the Lower Canine to the Most Anterior Point of the First Lower Molar in Genus *Promephitis*

Promephitis hootoni Şenyürek from Küçükyozgat.	7.60
Promephitis lartetii Gaudry from Pikermi. Gaudry, 1862.	8.00
Promephitis majori Pilgrim from Samos. Pilgrim, 1933b.	6.00
Promephitis malustenensis Simionescu from Malusteni. Pilgrim, 1933b.	14.50 appr.
Promephitis maeotica Alexejew from Elisavetovka. Pilgrim, 1933b.	80.00 appr.

TABLE 11

Measurements of the Lower Canine in Genus *Promephitis*

	Maximum Length	Maximum Breadth	Crown Height	Robustness Value	Crown Index
Promephitis hootoni Şenyürek from Küçükyozgat.	4.00	3.00	6.70+	12.00	75.00
Promephitis majori Pilgrim from Samos. Pilgrim, 1933b.	3.50	1.80	4.50+	6.30	51.42
Promephitis alexejewi Schlosser from Ertemte (Mongolia). Schlosser, 1924.	—	—	9.00	—	—

TABLE 12

Measurements of P_2 in Genus *Promephitis*

	Maximum Length	Maximum Breadth	Robustness Value	Crown Index
Promephitis majori Pilgrim from Samos. Pilgrim, 1933b.	0.90	0.60	0.54	66.66

TABLE 13

Measurements of P_3 in Genus *Promephitis*

	Maximum Length	Maximum Breadth	Robustness Value	Crown Index
Promephitis hootoni Şenyürek from Küçükyozgat.	2.50	1.80	4.50	72.00
Promephitis majori Pilgrim From Samos. Pilgrim, 1933b.	2.00	1.40	2.80	70.00
Promephitis maeotica Alexejew from Elisavetovka. Pilgrim, 1933b.	2.50	2.00	5.00	80.00

TABLE 14

Measurements of P_4 in Genus *Promephitis*

	Maximum Length	Maximum Breadth	Robustness Value	Crown Index
Promephitis hootoni Şenyürek from Küçükyozgat.	3.70	2.80	10.36	75.67
Promephitis majori Pilgrim from Samos. Pilgrim, 1933b.	3.00	2.00	6.00	66.66
Promephitis alexejewi Schlosser from Ertemte (Mongolia). Schlosser, 1924.	3.80	2.00	7.60	52.63

TABLE 15

Measurements of M_1 in Genus *Promephitis*

	Maximum Length	Maximum Beradth	Robustness Value	Crown Index
Promephitis hootoni Şenyürek from Küçükyozgat.	8.80	4.30	37.84	48.86
Promephitis lartetii Gaudry from Pikermi. Gaudry, 1862.	8.00	—	—	—
Promephitis majori Pilgrim from Samos. Pilgrim, 1933b.	7.90	3.50	27.65	44.30
Promephitis malustenensis Simionescu from Malusteni. Simionescu, 1930.	9.00	3.50	31.50	38.88
Promephitis maeotica Alexejew from Elisavetovka. Pilgrim, 1933b.	10.20	4.70	47.94	46.07
Promephitis alexejewi Schlosser from Ertemte (Mongolia). Schlosser, 1924.	10.60	4.80	50.88	45.28

TABLE 16

The Trigonid and Talonid Lengths in the First Lower Molar of Genus *Promephitis*

	Trigonid Length	Talonid Length	Talonid L. × 100 / Trigonid L.
Promephitis hootoni Şenyürek from Küçükyozgat.	5.00	3.80	76.00
Promephitis majori Pilgrim from Samos. Pilgrim, 1933b.	4.50	3.30	73.33
Promephitis alexejewi Schlosser from Ertemte (Mongolia). Schlosser, 1924.	5.60	5.00	89.28

TABLE 17

Corpus Height of the Mandible Relative to the Length of M_1 in Genus *Promephitis*

	Height of Corpus Mandibulae under M_1	Maximum Length of M_1	Corpus Ht. × 100 / M_1 Length
Promephitis hootoni Şenyürek from Küçükyozgat.	7.00	8.80	79.54
Promephitis lartetii Gaudry from Pikermi.	7.00	8.00	87.50
Promephitis majori Pilgrim from Samos.	7.00	7.90	88.60
Promephitis malustenensis Simionescu from Malusteni.	7.00 appr.	9.00	77.77
Promephitis maeotica Alexejew from Elisavetovka.	8.50 appr.	10.20	83.33
Promephitis alexejewi Schlosser from Ertemte (Mongolia).	8.00 appr.	10.60	75.47

TABLE 18

The Length of P_3 Relative to that of M_1 in Genus *Promephitis*

	P_3 Length × 100 / M_1 Length
Promephitis hootoni Şenyürek from Küçükyozgat.	28.40
Promephitis majori Pilgrim from Samos.	25.31
Promephitis maeotica Alexejew from Elisavetovka.	24.50

TABLE 19

The Length of P_4 Relative to that of M_1 in Genus *Promephitis*

	P_4 Length × 100 / M_1 Length
Promephitis hootoni Şenyürek from Küçükyozgat.	42.04
Promephitis majori Pilgrim from Samos.	37.97
Promephitis alexejewi Schlosser from Ertemte (Mongolia).	35.84

TABLE 20

Measurements of M_2 in Genus *Promephitis*

	Maximum Length	Maximum Breadth	Robustness Value	Crown Index
Promephitis lartetii Gaudry from Pikermi. Gaudry, 1862.	3.00	—	—	—
Promephitis majori Pilgrim from Samos. Pilgrim, 1933b.	2.40	2.40	5.76	100.00