

NEW FINDS OF MASTODONTS FROM MACEDONIA (GREECE)

by
GEORGE D. KOUFOS

(Institute of Geology and Paleontology of the University of Thessaloniki)

(Received 26.5.77)

Abstract: *The present work is mentioned to the studying of the teeth of three species of mastodonts from Macedonia. A fragment of the skull of *M. pentelici* with dp^{2-3} dex. (in situ) is examined. This species is well known from the U. Miocene-L. Pliocene beds of Greece. On the other hand, studies are made regarding two fragments of m^3 of *Tetralophodon longirostris*. This species was found in many regions of Greece in Pliocene deposits. *Anancus arvernensis* is represented by a fragment of lower jaw with m_{2-3} sin. and one m_2 sin. It displays a great distribution in Europe and it lived during U. Pliocene.*

INTRODUCTION

In the present work five specimens of mastodonts from Macedonia, are studied which belong to three different species.

The specimens Thes. N° 1977/1,3 were found near the village Sani of Kassandra (Chalkidiki). In this region there are (GARDIKAS, 1939) sandstones and terra rossa. The first specimen shows that it has been found in the terra rossa, the second one in the sandstones. The specimens Thes. N° 1977/2,4 are coming the first one from the region of Agia Trias (Thessaloniki); the second one from the region of the river Axios. Both were found in sands-sandstone's beds. The above two regions are known for their fossiliferous deposits (ARABOURG-PIVE-TEAU 1929, BONIS-BOUVRAIN-KERAUDREN-MELENIS 1973). The specimen Thes. N° 1977/5 was found in the region of the village Milea (Grevena).

All the afore mentioned specimens are exhibited in the Museum of the Institute of Geology-Paleontology of the University of Thessaloniki.



Fig. 1. Sketch map indicating the exact points of site, where the fossils were found.
1. Sani, 2. Agia Trias, 3. Axios, 4. Milea.

I wish to deeply thank Prof. Dr. J. K. Melentis who placed the above material at my disposal and kindly helped me to study it.

Methods. I have used for teeth the nomenclature of ORLOV (1968, Vol XIII), (Fig. 2). The length and width were measured at the base and the height from the cingulum. For the measurements I have used vernier with an accuracy of 0,1 mm.

Paleontological part

Order	: <i>Proboscidea</i> ILLIGER, 1811
Suborder	: <i>Elephantoidea</i> OSBORN, 1921
Family	: <i>Gomphotheriidae</i> CABRERA, 1929
Subfamily	: <i>Gomphotheriinae</i> HAY, 1922
Genus	: <i>Gomphotherium</i> BURMEISTER, 1837 (= <i>Mastodon</i> CUVIER, 1806)
Subgenus	: <i>Choerolophodon</i> SCHLESSINGER, 1917

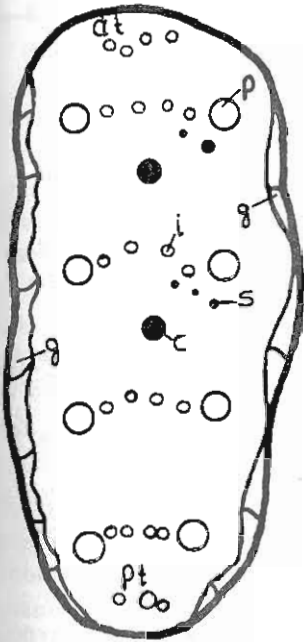


Fig. 2. Nomenclature of mastodont's cheek teeth.

at = anterior talon
 pt = posterior talon
 p = principal tubercles
 i = intermediate »
 c = central »
 s = supplementary »
 g = eingulum

(After ORLOV, 1968)

Mastodon (Choerolophodon) pentelici GAUDRY and LARTET, 1856

Synonyms

1856, 1859, 1862	Mastodon pentelici GAUDRY and LARTET
1857	Mastodon atticus WAGNER
1857	Turricius atticus WAGNER
1936	Trilophodon pentelici OSBORN

Description

*Fragment of maxilla with dp²⁻³ dex(in situ), Thes. N° 1977/1
 Tab. 1, Fig. 3, Pl. I.*

In a piece of the upper jaw are preserved the teeth dp²⁻³ dex. (in situ). From the dp³ only the tops of the two first rows of tubercles have appeared. The dp³ is elongated, with circular anterior and posterior ends and it has a deep embracing in the internal and external side at the point of the valleys.

It has three transverse rows each composed of two tubercles. The tubercles are distinguished between each other from shallow notches. There are not central tubercles, except of a small one, between the second and third row. The tubercles of each row, are situated, in such

a way, that the line, which joins their tops, is forwardly convex. The anterior talon is well developed.

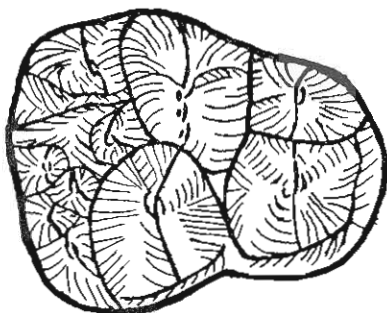


Fig. 3. Mastodon pentelici GAUDRY and LARLET. dp² dex. Thes. N°1977/1. Occlusal view. 3/4 Nat. size.

The tubercles have conical form and the enamel has many shallow, elongated grooves. This pattern is characteristic for the subgenus *Choerolophodon* and called by SCHLESSINGER (1917) «choerodont».

The length of the tooth is 64,0 mm and the width of transverse rows is as follows: Ist row = 41,6 mm, IInd row = 48,5 mm, III^d row = 44,8 mm. The height of the tooth varies on the internal side from 13,0 to 23,7 mm and on the external side from 16,7 to 24,5 mm. These measurements characterize the tooth as brachyodont (ORLOV, 1968).

Diagnosis

The characters for the diagnosis are:

1. Three transverse rows of tubercles on the dp².
2. Central tubercles rare; there is only a small one between IInd and III^d row.
3. The tubercles are situated in a line forwardly convex.
4. The teeth are brachyodont.
5. The dimensions.

Relations and comparisons

As far as we know up to the present time, the species which is examined, is known only by their deciduous teeth. Gaudry was the first to find at Pikermi the skull of a young animal, with deciduous dentition and he gave the following characteristics of it (OSBORN, 1936, Vol. I, pag. 346): 1) The dp² has three transverse rows of tubercles. 2) The structure of the tubercles is bunolophodont and choerolopho-

dont. 3) The milk molars of the upper jaw are intermediate in character between *M. angustidens* and *Tetralophodon longirostris*.

ORLOV (1968) referring to *M. pentelici* says, that it has possibly

four rows of tubercles on m_1^1 and m_2^2 and $\frac{?}{5+t}$ on m_3^3 . Central

tubercles are stout and situated somewhat outwardly on the cheek teeth of lower jaw and inwardly on the upper one. The tubercles form forwardly convex lines. The teeth are brachyodont.

M. pentelici shows similarities with the following species with which we shall compare it to find out the differences.

M. angustidens. This species is known from a well preserved milk dentition of the upper jaw from Guntersdorf of Austria (SCHLESSINGER 1917, pag. 11). The teeth of this specimen deviate from the examined species. a) The dp^1 has 1 1/2 rows and a basic tubercle on the anterior end. b) The dp^2 has 2 rows and a rudiment for the III^d one. c) The dp^3 has 3 rows of tubercles and a rudiment for the IVth. d) The dimensions are smaller than in *M. pentelici*.

T. longirostris. A well preserved upper jaw of this species with milk dentition from Laaerberg of Austria was described by SCHLESSINGER (1917, pag. 84-85). The differences between the teeth of this species and *M. pentelici*, are: a) The dp^1 is formed from one series of tubercles without any arrangement in transverse rows. b) The dp^2 has 3 rows and a rudiment for the IVth. c) The dp^3 has four rows; 2-3 small tubercles on the anterior and 4 on the posterior end. d) There is not any choerodont pattern on the teeth.

The rows of tubercles which appear on the milk teeth of the above species, are indicated in the following table (OSBORN 1936, vol. I, pag. 346).

	dp^1	dp^2	dp^3
<i>T. longirostris</i>	1 1/2	3	4 1/3
<i>M. pentelici</i>	1 1/2	3	3 1/3
<i>M. angustidens</i>	1 1/2	2 1/2	3

M. (Zygod.) tapiroides. A well preserved upper jaw of this species with dp^{1-3} (in situ) from Halmyropotamos (Evia-Greece) was described by MELENTIS (1967, pag. 314). Its differences from *M. pentelici* are: a) The dp^1 has a triangular shape and three principal tubercles. b) The dp^2 has 2 rows of tubercles with a rudimentary tubercle in the anterior end and a well developed posterior talon. c) The dp^3 has 3 rows and it is angular. d) The dimensions are smaller.

TABLE 1

	<i>Mastodon</i>	<i>pentelici</i>	<i>M. (zygcol.) tapiroides</i>	<i>T. longirostris</i>	
	Sani (Chalkidiki)	Samos	Halmiropotamos (Evia)	Laaerberg AUSRITIA	
	Museum of the University of Thessaloniki	Naturhistorisches Hofmuseum Wien.	Museum of the University of Athens	Naturhistorisches Hofmuseum Wien.	
	Thes. No 1977/1	After SCHLESSENGER (1917)	Ath. No 1967/93	After SCHLESSENGER (1917)	
Length (mm)	64,0	52,0	41,5	45,7	
	dex.	pag. 200.	pag. 316.	pag. 84-85	
dp ³	Ist row	41,7	35,0	31,3	26,5
	IInd row	48,5	45,0	36,4	—
	IIIrd row	44,8	—	—	32,3
Height	24,5	22,3	24,0	18,0	

Taxonomic position - Geological and Geographical distribution

M. pentelici is classified into mastodonts with 3 rows of tubercles on cheek teeth and especially in the genus «*Trilophodon*» (OSBORN 1936). Because of the structure of its cheek teeth SCHLESSINGER (1917) was of the opinion that it constitutes the special subgenus *Choerolophodon*. This subgenus was mentioned by Osborn. SIMPSON'S (1945) genus *Gomphotherium* comprises all these genera and subgenera.

The study of the teeth of *M. pentelici* shows that it has an intermediate position between *M. angustidens* and *T. longirostris*. This transition is especially evident from the dp^3 , where the rows of tubercles increase successively from 3 to 4 $1/3$. *M. pentelici* is in the middle with 3 rows and a rudiment for the IVth row. It seems that *M. angustidens* of the Miocene was the ancestral type of the two others which were developed in the U. Miocene-L. Pliocene.

M. pentelici lived in W. Europe (France-Spain), in Central (Germany-Russia) and reached as far as India. It occurs in U. Miocene-L. Pliocene. In Greece it was found in beds of the same age at Pikerimi, Samos, Vathylakkos (Thessaloniki).

Genus: *Tetralophodon* FALCONER and CAUTLEY, 1857.

Tetralophodon longirostris KAUP, 1832

Synonyms

1832 *Mastodon longirostris* KAUP

1832 *Tetracaulodon longirostris* KAUP

1834 *Mastodon dubius* KAUP and SCHOLL

1834 *Mastodon grandis* KAUP and SCHOLL

1917 *Mastodon* (*Bunolophodon*) *longirostris* SCHLESSINGER

Description

Fragment of m^3 sin., *Thes.* N° 1977/4

Tab. 2, Fig. 4, Pl. I

In this specimen only the three last transverse rows of tubercles with the posterior talon are well preserved. Each transverse row consists of two principal tubercles, situated one against the other. Between principal tubercles the intermediate ones were developed, discerning from the principals by shallow notches and they are almost the same height with them. The central tubercles are poorly developed although we can distinguish some of them in the valleys of the tooth which are in complete contact with the rest ones (principals and intermediates).

The tubercles have conical form and their enamel is very thick, while the cement is poorly developed or absent. The cingulum and posterior talon are well developed. The latter was formed by seven small tubercles, pressed one to the other. The tooth does not display any wear.

The length of the preserved tooth is 140,0 mm and the transverse rows have the following width: III^d row = 91,0 mm, IVth row = 88,0 mm, Vth row = 84,0 mm. The height of the tooth on the internal side is 49,0 (IV) — 60,0 mm (II) and on the external 45,0 (IV) — 56,0 mm (II).

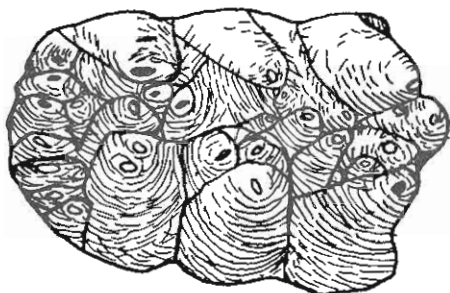


Fig. 4

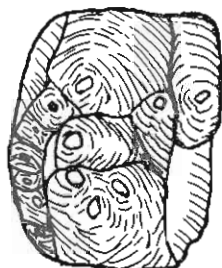


Fig. 5

Tetralophodon longirostris KAUP

Fig. 4. Fragment of m^3 sin., Thes. N° 1977/4. Occlusal view. 1/3 Nat. size.

Fig. 5. Fragment of m^3 dex., Thes. N° 1977/5. Occlusal view. 1/2 Nat. size.

Fragment of m^3 dex., Thes. N° 1977/5

Fig. 5, Pl. I.

It concerns the anterior piece from a m^3 dex which preserves the anterior talon, the first and a part of the second transverse row.

The morphology and the arrangement of tubercles, is the same as in the above specimen. A small central tubercle is discernible pressed between the first and second row. The anterior talon is less developed than the posterior one and it consists of a series of small tubercles pressed one to the other. The cingulum is well developed. The width of the first row is 76,0 mm and the external height is 66,0 mm while the internal is 60,0 mm.

Diagnosis

1. The principal tubercles are situated one against the other.
2. The central tubercles are poorly developed.
3. The posterior talon is well developed while the anterior one is not.
4. The enamel is very thick and the cement is usually absent.
5. Low-medium crowned teeth (ORLOV, 1968).
6. The dimensions.

Relations and comparisons

ORLOV (1968, Vol. XIII, pag. 360-61) referring to *T. longirostris* states that it has cheek teeth with low-medium height. The transverse rows of tubercles on m^3 are 4-?. The central tubercles are little developed while the intermediate and supplementary ones developed near them in different degrees. Cement is poorly developed or absent.

A fragment of m^3 sin. from the Pliocene of Haslach (Austria) was described by SCHLESSINGER (1917, pag. 101, Taf. XVII, Ab. 1). The three last rows and the posterior talon are preserved in this specimen. It shows significant similarities with the examined specimen. Their morphology and dimensions are similar. There is a little difference on the posterior talon, which has smaller width and it consists of four small tubercles not situated in a row, while in our specimen the posterior talon has seven small tubercles in one row.

Besides SCHLESSINGER (1917, pag. 101, Taf. XVII, Ab. 2) described a fragment of m^3 dex that it preserves the posterior end, from the Pliocene of Teschen (Germany). It differs from our specimen in the following points: a) It has slightly smaller dimensions. b) The posterior talon it consists of only 2 small tubercles. c) The central tubercles are absent. Schlessinger regards that this specimen is a new form called «*sublatidens*».

The species that are similar to *T. longirostris* are the following.

T. grandincisivum. A well preserved m^3 sin. of this species from Mannersdorf (Austria) was described by SCHLESSINGER (1917, pag. 121-23, Taf. XV, Ab. 2).

It is about a species with large dimensions. Its differences from *T. longirostris* are: a) The very large size. b) The tubercles are more stout. c) It is older.

TABLE 2

	<i>Tetrarhodon longirostris</i>	<i>Tetr. grandincisivum</i>	<i>Mastodon angustidens</i>	<i>A. arvernensis</i>
	Region of Axios Thessaloniki Museum of the University of Thessaloniki	Taschen Germany Naturhistorisches Hofmuseum Wien	Mannersdorf Austria Naturhistorisches Hofmuseum Wien	Eibiswald Austria Inst. of Paleontology University of Wien Museum of the University of Thessaloniki
m^3	Thes. No 1977/4 sin.	Alter SCHLEISSINGER (1917) pag. 101	pag. 122	pag. 31 After SAKELLARIOU-MANE (1972)
Total length (mm)	—	230.0	126.0	242.0
Preserved length	140.0	—	—	—
Maximum width	91.0	87.0	75.0	98.0
» height	60.0	55.0	48.0	65.0

M. angustidens. This species differs from *T. longirostris* in the following points. a) It has smaller size. b) The m^3 has $4 \frac{1}{3}$ rows. c) The central tubercles are massive and are situated in the middle of the valleys. d) There are not supplementary tubercles except those of cingulum.

Taxonomic position- Geological and Geographical distribution

T. longirostris also belongs to the mastodonts with four transverse rows on cheek teeth. All these mastodonts supposed to have as their ancestor an Oligocene form of the genus *Phiomia*. SCHLESINGER (1917) states that this species constitutes a new subgenus called «*Bunolophodon*», while OSBORN (1936) and SIMPSON (1945) classifies it to the genus *Tetralophodon*. It is an ancestral form of *Anacus arvernensis*. It was an animal with big dimensions, with tusks in the upper and lower jaw, and it lived in warm areas.

Its distribution comprises all Europe and Asia from W. Europe, Germany, Hungary to China and India. It was also found in N. America. It lived in the Pliocene and the subgenus «*Morrillia*» (OSBORN, 1936) was found in the middle Pleistocene beds of Nebraska. In Greece it was found at Pikermi, Samos, Halmyropotamos of Evia and Vathyakkos (Thessaloniki).

Subfamily: *Anancinae* HAY, 1922

Genus: *Anancus* AYMARD, 1855

Anancus arvernensis CROIZET and JOBERT, 1826

Synonyms

1846 *Mastodon brevirostre* GERVAIS and de SERRES

1855 *Anancus macroplus* AYMARD

1858 *Mastodon dissimilis* JOURDAN

1917 *M. (Dibnodon) arvernense* SCHLESSINGER

1922 *Mastodon gigantarvernensis* KLÄHN

1922 *Mastodon minutoarvernensis* KLÄHN

Description

Fragment of the mandibula with m_{2-3} sin. (in situ), Thes. N° 1977/2 Tab. 3, Pl. II.

In the posterior end of the left ramus of lower jaw the second and third molar have been preserved. The anterior talon and the inter-

nal side of the m_2 , have been destroyed. From m_3 only the two first rows have appeared. The m_2 is worn enough a fact which shows that it belongs to an old animal.

There are four transverse rows of tubercles on m_2 , which divided by shallow valleys. Between the principal tubercles the intermediate ones, are developed, while the central ones are absent. Each transverse row is composed of a pair of principal tubercles. These tubercles are arranged alternately, and not one against the other. By grinding the enamel of each tooth gets, originally, the form of a trefoil but, gradually, becomes circular. The enamel is very thick and the cement is limited in the center of the circle. The posterior talon is well developed and it is composed by two small tubercles.

The length of the preserved tooth is 144,0 mm and the width on the fourth row is 77,0 mm. The height of the tooth increases from the front to the back end and on the external side is from 20,0 to 33,0 mm. According to these measurements of height, the tooth is brachyodont. The part of m_2 that appeared, shows the above described morphology and arrangement of tubercles. The length and the height of m_2 cannot be measured but the width is 68,8 mm in the first and 76,0 mm (?) in the second row.

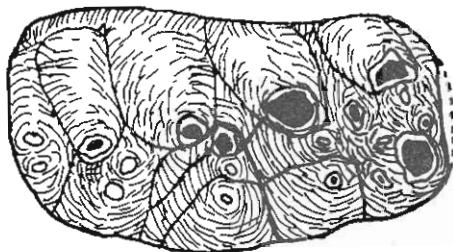


Fig. 6. *Anancus arvernensis* CROIZET and JOBERT
 m_2 sin., Thes. N° 1977/3. Oclusal view. 1/2,5 Nat. size

m_2 sin., Thes. N° 1977/3
Tab. 3, Fig. 6, Pl. II

It is about a second molar of lower jaw in a good state of preservation. Only the anterior talon was destroyed. It seems the same morphology of the above described m_2 . The grinding of the tooth is little, only the first two rows have been worn. By grinding, the principal tubercles were gradually joined with intermediate ones.

TABLE 3

	<i>Anancus arvernensis</i>		<i>M. angustidens</i>		<i>T. longirostris</i>	
	Agia Trias Thessaloniki	Sani Chalkidiki	Dornbach	Austria	Sandgrube	
	Museum of the University of Thessaloniki Thes. N° 1977/2		Naturhistorisches Hofmuseum Wien After SCHLESSINGER (1917)			
	sin.	sin.	pag. 28		pag. 96-98	
Length (mm)	144,0	135,0	111,4		136,4	
m _a Maximum width	77,0	76,8	63,0		75,0	
» height	33,0	53,0	28,0		36,0	

The length of the tooth is 135,0 mm and the transverse rows have the following width:

I st row = 64,2 mm	IV th row = 73,2 mm
II nd » = 71,8 »	Posterior talon = 42,7 mm
III ^d » = 76,8 »	

The height of the crown from the anterior to the posterior end is:

a) on the external side 40,5 - 53,0 mm and b) on the internal side 32,0 - 51,0 mm. Consequently it belongs to the brachyodont type.

Diagnosis

1. Four rows of tubercles on m_2 .
2. Well developed intermediate tubercles while the central are absent.
3. Alternating arrangement of tubercles, which incline to the front.
4. Much worn teeth show a joining between priuciples and intermediate tubercles.
5. Low crowned teeth.
6. The dimensions.

Relations and comparisons

OSBORN (1936, Vol. I) states that *A. arvernensis* has four rows of tubercles on m_2^2 and 5 1/2 on m_3^3 . Also, that m_3 has long length and that the tubercles incline to the front. The enamel is thick and by grinding gets in the begging a trefoil form. Also the internal and external principal tubercles are alternated.

According ORLOV (1968, Vol. XIII) *A. arvernensis* has four rows of tubercles on m_1^1 and m_2^2 and $\frac{5+t}{5+t}$ on m_3 . Central tubercles are absent but there are intermediates. Cement is very poorly developed. The same description has been given by SCHLESSSINGER (1917). He states that there are four rows on m_{1-2} and 5 1/2 on m_3 ; the m_2 has a double posterior talon. According PIVETEAU (1958, Vol. VI₂) the dimensions of the teeth of *A. arvernensis* are:

$$m_2 \frac{120-174 \times 65-84 (1,46-2,17)}{138-149 \times 70-74 (1,86-2,04)} \quad m_3 \frac{160-222 \times 80-102 (1,86-2,40)}{161-248 \times 64-95 (2,59-2,94)}$$

Below we will mention the species that shows similarities with *A. arvernensis* and the differences between them.

M. angustidens. The differences between this species and *A. arvernensis* are: a) The size is smaller. b) There are 3 rows on m_{1-2} and $4 \frac{1}{2}$ on m_3 . c) There are well developed central tubercles. d) The tubercles are situated one against the other. e) There are not other supplementary tubercles except those of the cingulum.

M. sivalensis. This species is similar with the examined one, but we can find the following differences: a) It has a greater size. b) There are 5 rows of tubercles on m_2^2 and $6 \frac{1}{2}$ on m_3^3 . c) The degree of tubercle's alternation is greater and the form of the crown more complicated.

Taxonomic position- Geological and Geographical distribution

The species *A. arvernensis* belongs to the mastodonts with four transverse rows of tubercles. SCHLESSINGER (1917) classifies this in the subgenus «*Dibunodon*». Later OSBORN (1936) gives it the name *A. arvernensis* (Subfam. *Brevirostrinae*). SIMPSON (1945) mentions all the above names as synonyms and classifies it to the genus *Anancus* (Subfam. *Anancinae*).

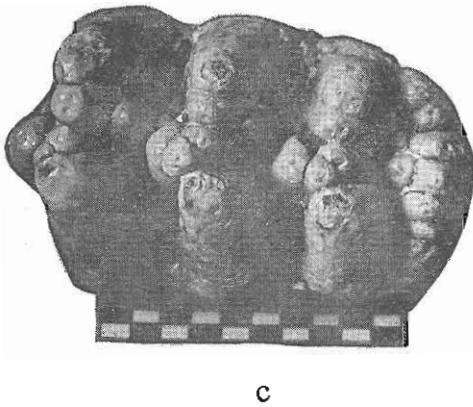
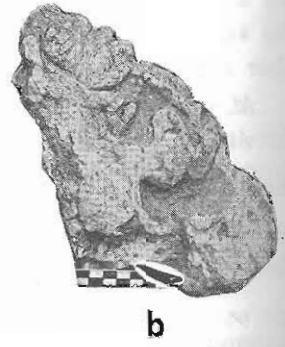
Fossils of the examined species have been found between 30th and 40th parallel, namely, in the zone of the warm climate. It was spread from France, NE. England, Central Europe, Russia to India.

It occurred in the «newer Pliocene fauna» of English authors (OSBORN, 1936. Vol. I). In this fauna *Hipparion* disappeared and was replaced by *Equus stenorhinus* and *Rhinoceros leptorhinus* by *R. etruscus*. The proboscideans of this fauna are represented, except of *A. arvernensis*, by *M. (Zygalophodon) borsoni*, and 3 species of elephants *Archidiskodon planifrons*, *A. meridionalis* and *Elephas (Paleoloxodon) antiquus ausonius*. Generally its age is U. Pliocene, although it was found in L. Pleistocene in Africa.

In Greece it was found in many regions,, as for example, at Scoura of Sparta by GEORGALAS (1944), at Pylos (Peloponnesus) by MITSOPOULOS (1967) and in the area of the river Axios (Thessaloniki) by SAKELLARIOU-MANE (1972). The beds in which it was found. belong to the U. Pliocene.

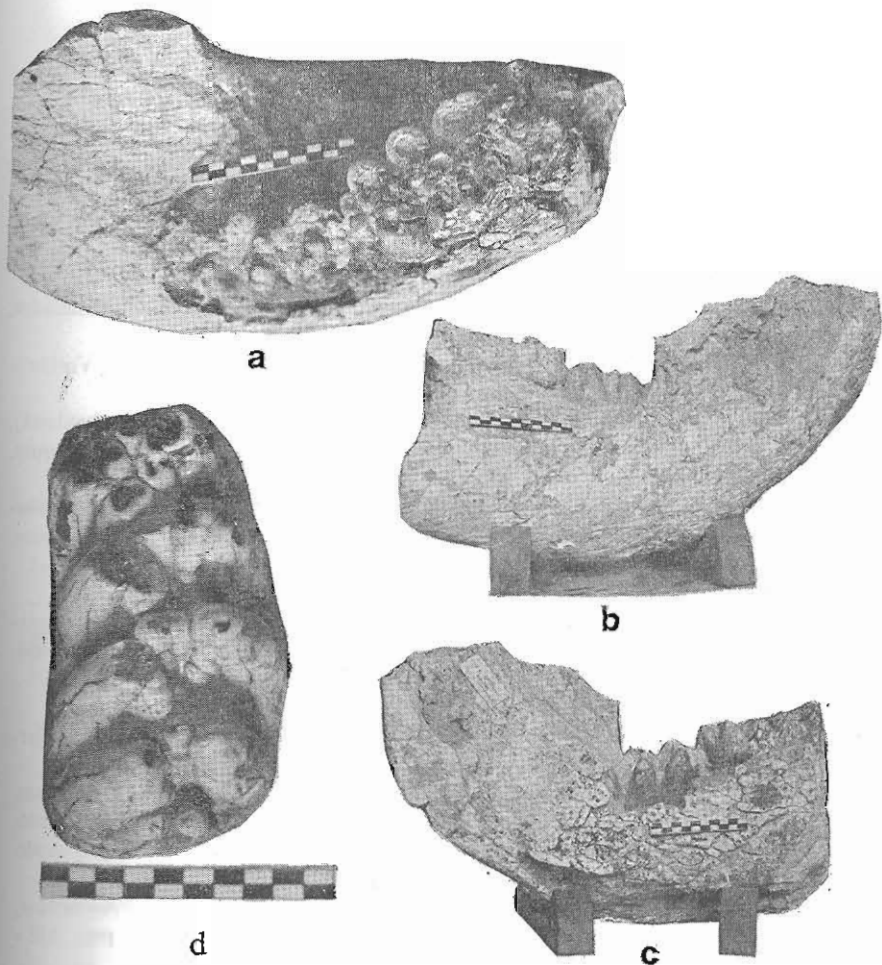
A. arvernensis was a mastodont with great dimensions and it had strong tusks in the upper jaw. Its teeth were adapted to soft food (fruits, sprouts). The warm climate of that period favoured the development of forests in which it had lived and found its food.

PLATE I



Mastodon pentelici GAUDRY and LARTET a, b, Fragment of the skull with dp^{2-3} dex. Thes. N° 1977/1. a) occlusal, b) external view.
Tetralophodon longirostris KAUP.
c. Fragment of m^3 sin. Thes. N° 1977/4. Occlusal view.
d. Fragment of m^3 dex. Thes. N° 1977/5. Occlusal view.

PLATE II



Anancus arvernensis CROIZET and JOBERT

a, b, c. Fragment of the mandibula with m_2-3 sin.

Thes. N° 1977/2. a) occlusal, b) external

c) internal view.

d. m_2 sin. Thes. N° 1977/3. Occlusal view.

REFERENCES

- ARABOURG, C., et PIVETEAU, J.: Les Vertébrés du Pontien de Salonique. *Ann. de Paléontologie*, Vol. 18, Paris 1929, pag. 1-82.
- BONIS, M.-BOUVRAIN, G.-KERRAUDREN, B.-MELENTIS, J.: Premiers résultats des fouilles récentes en Grèce septentrionale (Macedoine). *C.R. Acad. Sc. Paris* 1973, Vol. 277, Serie D, pag. 1431-34.
- GARDIKAS, Ch.: Petrological and geological map of the peninsula of Kassandra, Thessaloniki, 1939.
- MELENTIS, J. : Paläontologische Ausgrabungen auf der Insel Samos (Eine Vorläufigemitteilung), *Prakt. Acad. of Athens*, Vol. 43, 1968.
- MELENTIS, J. : Die Pikermifauna von Halmyropotamos (Euböa, Griechenland). Teil I. Odontologie und Kraniologie. *Ann. Geol. de Pays Helleniques*, Vol. 19, Athenes 1968, pag. 283-411.
- MITSOPOULOS, M. : *Zygalophodon borsoni* und *Anancus (Bunolophodon) arvernensis* aus Oberpliozän von Griechenland. *Ann. Geol. de Pays Helleniques*, Vol. 18, Athenes 1967, pag. 436-446.
- ORLOV, Y. : *Fundamentals of Paleontology*. Vol. XIII, 1968, pag. 1-422.
- OSBORN, H. F. : *Proboscidea. A monograph of the Discovery, Evolution, Migration and Extinction of the Mastodonts and Elephants of the World*. Vol. I, New York 1936, pag. 1-802.
- PIVETEAU, J. : *Traité de Paléontologie*. Vol. VI₁, 1958, pag. 1-957.
- SAKELLARIOU MANE, H.: *Precence d'Anancus arvernensis dans de la Valée du Vardar*. *Fol. Bioch. et Biol. Graeca*, Vol. 9, Athens 1972, pag. 31-36.
- SCHLESSINGER G. : *Die mastodonten des k. k. Naturhistorisches Hofmuseum*. *Denkschriften d. k. k. Naturhist. Hofm.*, Vol. 1, Wien 1917, pag. 1-230.
- SIMPSON, G. : *The Principles of Classification and a Classification of Mammals*. *Bull. Amer. Mus. Nat. Hist.*, Vol. 85, New York 1945, pag. 1-350.
- TOBIEN, H. : *Zur Paläontologischen Geschichte der Mastodonten (Proboscidea, Mammalia)*. *Mainzer Geowiss. Mitt.*, Vol. 5, Mainz 1976, pag. 143-225.
- ZAPPE, H. : *Ein bedeutender Mastodon-Fund aus dem Unterpliozän von Niederösterreich*. *Neues Jb. Geol. u. Paläont. Abh.*, Vol. 104, 1957, pag. 382-406.

ΠΕΡΙΛΗΨΗ

ΝΕΑ ΕΥΡΗΜΑΤΑ ΜΑΣΤΟΔΟΝΤΩΝ ΑΠΟ ΤΗ ΜΑΚΕΔΟΝΙΑ (ΕΛΛΑΣ)

Ἵπὸ

ΓΕΩΡΓΙΟΥ Δ. ΚΟΥΦΟΥ

(Ἐργαστήριον Γεωλογίας καὶ Παλαιοντολογίας τοῦ Ἀριστοτέλειου
Πανεπιστημίου Θεσσαλονίκης)

Μελετῶνται τὰ δόντια ἀπὸ τρία διαφορετικὰ εἶδη μαστοδόντων ἀπὸ τῆ Μακεδονία. Ἀπὸ τὸ *M. pentelici* ἐξετάζεται ἓνα τμῆμα τοῦ κρανίου, πὺ διατηρεῖ τὰ δόντια dp^{2-3} dex. (in situ). Τὸ *T. longirostris* ἐξετάζεται ἀπὸ δύο θραύσματα τοῦ m^3 καὶ τὸ *A. arvernensis* ἀπὸ ἓνα τμῆμα τῆς κάτω γνάθου μὲ m_{2-3} sin. (in situ) καὶ ἀπὸ ἓνα m_2 sin. Τὰ παραπάνω δείγματα βρίσκονται σ' ἄρκετὰ καλὴ κατάστασι διατηρήσεως καὶ δείχνουν τὴ μεγάλη ἐξάπλωσι, πὺ εἶχαν οἱ μαστόδοντες στὴν Ἑλλάδα.