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THE PRESENCE OF PLEISTOCENE MAMMALS IN LESVOS ISLAND (E. AEGEAN)*

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ABSTRACT

In this preliminary study are described the first findings of Pleistocene mammals in Lesvos island.

The sedimentological characteristics of Fluvial-Torrential deposits of the area of Vatera in the South part of the island, are studied. The including findings of mammals belong to *Equus cf. stenonis*, *Cervus*, *Vulpes*, e.t.c. Based on the findings their possible age is

Σύνοψη

Στην εργασία αυτή που αποτελεί πρόδρομη ανακοίνωση, περιγράφονται τα πρώτα ευρήματα θηλαστικών του Πλειστοκαίνου στη νήσο Λέσβο. Εξετάζονται τα ιζηματολογικά χαρακτηριστικά των ποταμοχειμάριων αποθέσεων της περιοχής Βατερών στη νότια Λέσβο και μελετώνται τα ευρήματα των θηλαστικών που ανήκουν στα: *Equus cf.stenonis*, *Cervus*, *Vulpes* κλπ. Με βάση τα ευρήματα των θηλαστικών θεωρείται ως πιθανή η Ανω-Πλειστοκαινική ηλικία των περιγραφόμενων ιζημάτων και γίνεται αποδεκτό ότι κατά την διάρκεια του παραπάνω γεωχρονολογικού διαστήματος η Λέσβος πρέπει να ήταν συνδεδεμένη με την απέναντι χέρσο της Μικράς Ασίας.

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U.Pleistocene and so, it is accepted that during this interval, Lesvos must be connected with the opposite landmass of Minor Asia.

Introduction

The principal object of this preliminary report is to present the mammals findings of a section of Pleistocene sediments on the island of Lesvos. This investigation was originally intended to aim at an age determination and environmental interpretation of the Pleistocene deposits in southern Lesvos on the basis of sedimentary and mammal findings. The section Vatera that investigated, was assumed to contain the first mammals findings of Pleistocene age on the island of Lesvos.

The fieldwork was performed in the contex of a stratigraphical and paleogeofraphical study of the Upper Cenozoic of Lesvos by the department of Historical Geology and Paleontology of Athens University. The authors are indebted to N.Symeonidis for clarifying discussions and critical approach.

The study will be continue in the near future with scope to collect more bone findings from the outcroping bed of Vatera section.

Previous Literature

In this paragraph a summary of papers will be presented dealing with upper Cenozoic sediments of the island.

Since the last century and until now, many geologists have studied the island, in order, either to understand and setting Lesvos in the geological outline of Greece or to study the global known petrified forest as well as its appropriate forming and touristic attraction.

Special emphasis to the upper Cenozoic of Lesvos,has already been given since 1887 by the French geologist De LAUNAY, who investigates the general Geology of the island and separates the sedimentary rocks into limestones of the Miocene and the Pliocene - Pleistocene deposits.The same author for several years published papers on the Geology of Lesvos (as well as it's neighbour islands) and a geological map under the scale 1:240.000 (De LAUNAY 1888, 1889, 1895, 1897 & 1898).

CANDARGY (1889 & 1899) and FLICHE (1898) are studying the flora remains of the island.

In 1902, HAUTERCOEUR concerns about the island and in 1910, PHILIPPSON studies the island and doing some modifications on the De LAUNAY's remarks.

The Greek interest about the island seems to be waken up by K.KTENAS who is working on it between the years 1920 - 1930, whenever he makes and the geological maps of it.

Twenty nine years later, in 1959, VOREADIS examines the petrified forest (and he is giving to it Post - Pliocene age) and after him, KRAUSEL in 1965, while a year later, in 1966, PRAGER gives the geological history of the island during Neogene.

Afterwards, BORSI et al. (1972), JONES (1972), CHATZIDIMITRIADIS (1973), occupy among others, with different studies on the island.

Between the years 1972 and 1975, HECHT describes the geological structure of the SE part of Lesvos and continuously extends his efforts and on the rest island.

Also, in 1972, TASSOS & HOPKINS published a preliminary study (for Nuclearing Center "Democritus"), about Kalloni Gulf and consequently, in 1977, follows a whole study (by the first author) in which he is studying the Holocene sediments of the gulf.

In 1978, testifies in the University of Patras the PE -PIPER's dozent thesis with the subject: " The Cenozoic volcanic rocks of Lesvos

island".

Continuously, in 1980 - 81, four geologists of IGME, KATSIKATSOS, MATARAGAS, MIGIROS & TRIANTAPHYLLIS, are making a geological map 1:50.000.

In 1982, VELITZELOS , PETRESCU & SYMEONIDIS, published their conclusions relatively to the study of Tertiary fossilized flora, whereas SIMEAKIS & SOMERITIS the same year, are doing a Micro - Neotectonic study of the island.

Two years later, KATSIKATSOS, MIGIROS, TRIANTAPHYLLIS & METTOS, include Lesvos among the areas of internal Hellenides that are studied by them, wherever they study the geological structure of it.

Finally, in 1986 published by DERMITZAKIS - IOAKEIM -PAVLAKELLI, a preliminary study relative to the tertiary deposits of Geras Gulf (Southeastern part of the island).

Geological framework

Lesvos island is laying in the Northeast part of Aegean sea, near of the Asia Minor's coasts, between the latitude of 39° N and longitude of 26° W. The maximum lenght of it, is about 70 km and the maximum width is about 45 km. After Crete and Euboea, Lesvos is the third Greek island in size (Fig. 1).

The autochthonous series consists of clastic beds with intercalations and lenses of limestones and dol. limestones. In the carbonate interbeds (HECHT 1972, 1974, 1975 and KATSIKATSOS et al., 1982) refered fauna from Foraminifers, Algae, Bivalves, Gastropods, Echinoderms, Corals, indicated Carboniferous to Permian age. The transition from neopaleozoic beds upwards to Triassic beds occured in the southeast Lesvos. They consist mainly from schists, metasandstones and crystalline carbonates with *Megalodon* .

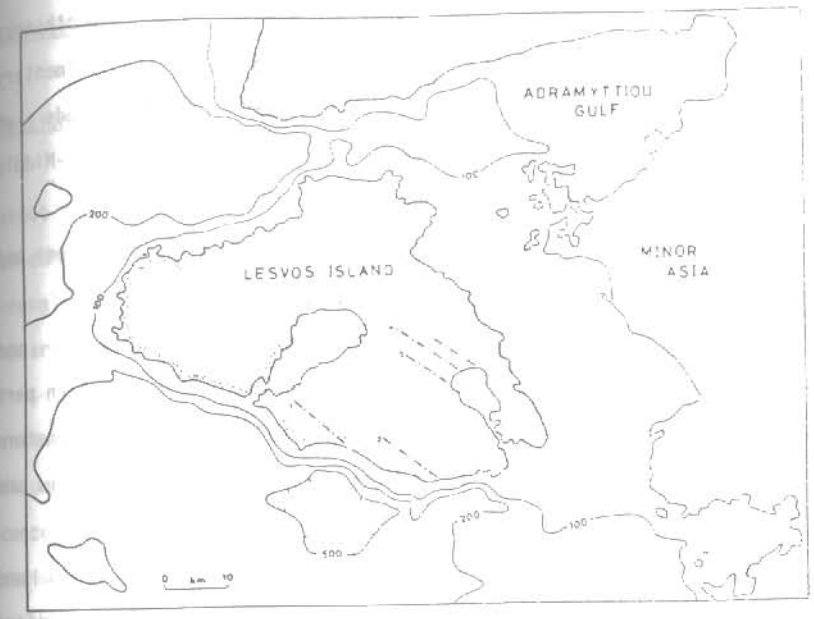

Fig.1. Map of Lesvos and the surrounding sea (after PE-PIPER, 1978).

Fig.2. GEOLOGICAL SCETCH MAP OF LESVOS ISLAND

The previous autochthonous beds are overlaying by allochthonous series which can distinguished in: i) Tectonic nappe of volcanosedimentary deposits, ii) ophiolithic beds.In the carbonate interbeds of volcanosedimentary deposits KATSIKATSOS et al. (1982) refered Lower -Middle Triassic fauna.

The postalpine formations of Lesvos composed of Neogene and Quaternary series (Fig. 2).

The Neogene of Lesvos consists of carbonate sediments and pyroclastic materials. The last one seems in the northern and western part of the island as well as in a triangular belt of country along the eastern Kalloni coast. This formation is also comprising ryolites, andesites and basalts.

The carbonate sediments includes of marles, marly limestones and sometimes between of these beds we can see intercalations of silicified marls containing plant remains.

The Pleistocene of Lesvos is characterized mainly by breccia -conglomerates and a high percentage of arenaceous material which is presented either as the matrix of breccia-conglomerates or as particular interbeds between of the above formations or even between beds of clay. In many cases it is easy to see in the arenaceous beds a cross - bedding as well as graded -bedding. The pebbles have very different ingredients. They are coming from the tuffs, the lavas and the Neogene silicified marls. The main occurrence of these formations is between Vrissa and Vatera that occures a thickness of more than 100 m.

Other Quaternary deposits are in Xiropotamos area two terraces (KATSIKATSOS & DOUNAS, 1960) and finally the Alluvials that are covering the valleys and the small low extensions.

Lithostratigraphy

Section Vatera

The section is located along the main road from Vrissa to Vatera about 1 km south-east of the village Vrissa (see Fig. 2). The section has a thickness of about 20 metres and shows a sucession of breccia -conglomerates which pass gradually into an alternation of sandy clays and upwards sandy breccia - conglo-merates.

UNIT I: The lower 8 metres consist from breccia -conglomerates interbeded by sandy - clay bed 1 m thickness. The lower boundary is not discernible. The lower part of the breccia shows discontinuous concentrations of non rounded limestone pebbles and igneous gravels with maximum diameter of 7 cm mixed with sand and coarse sandgrains. The distinguishing feature of the unit is the absence of internal stratification. Pebbles, cobles and igneous fragments do not show any regularity in their arrangement.

UNIT II: The Unit I is overlaying by 5 metres of interstratified clay marls, sandy clays display a hingly complex superposition and juxtaposition of cross - stratified sets with a thickness of up to 4 cm, irregulerly concave - upward lower boundaries. Another feature of this unit is the indistinctly delimited complex of clay marls with small limestone-pebbles and bone fragments. The uppermost part of the Unit II shows intensely disforted bedding probably due to slumping. Remarkable is the bad fossilization of the bones which make them difficult to collected.

UNIT III: In a lithological sense this unit is similar to the lower part of the preceding Unit I. Badly sorted coarce -medium grained sand with numerous limestone gravels, pebbles, igneous cobbles, with scttered lenses of sandy grains and the appearrance of coarse consituents,

Fig. 3. Panoramic view of Vatera section.

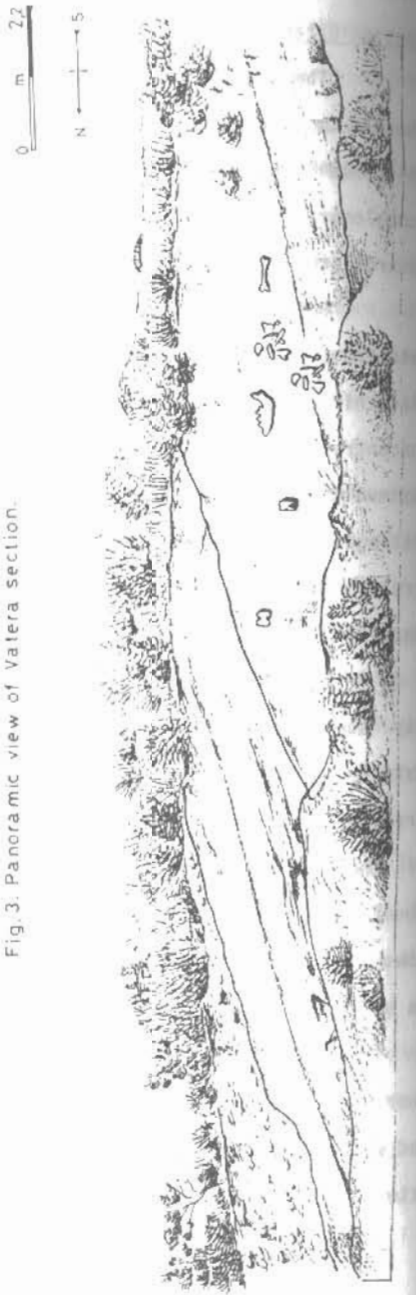

Fig. 4. Scetch of Vatera section which shows the sites of the bones.

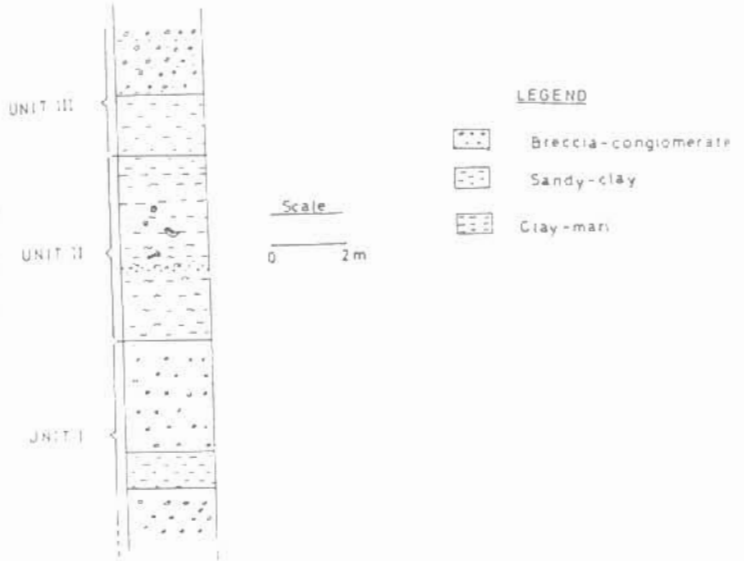

Fig 5 Lithostratigraphical column of Vatera section

		SAINT	VALLIER				LESVOS
Measures	n	x	min	max	s	v	
1	57	66,9	60	73	2,64	3,95	73
2	61	65,8	60	70	2,45	3,72	74
3	62	67,0	60	72	2,64	3,94	74
4	64	31,2	28	34,5	1,35	4,33	34
5	59	54,7	51	58	1,62	2,96	61
6	60	37,5	35	41	1,54	4,11	43,5
7	56	55,4	49,5	59,5	2,04	3,68	61,5
		MOSBACH					
Measures	n	x	min	max	s	v	
1	22	73,4	70	77	1,80	2,45	
2	20	72,7	69	77,5	2,04	2,81	
3	21	73,2	69,5	78	2,20	3,01	
4	21	36,8	34,5	39	1,41	3,83	
5	20	62,2	58,5	65,5	1,65	2,65	
6	20	42,2	40	48	1,81	4,29	
7	17	63,6	60,5	67	1,74	2,74	

Table 1 : Measurements (in millimeters) and statistics for astragali of *Equus stenonis vireti* (Saint-Vallier, France, Upper Villafranchian), *Equus mosbachensis* (Mosbach, Middle Pleistocene), and *Equus stenonis* (Lesvos, Middle Villafranchian ?); 1 = maximal length, 2 = medial length, 3 = maximal width, 4 = trochlear width, 5 = distal articular width, 6 = distal articular anteroposterior diameter, 7 = medial maximal anteroposterior diameter (for the method of measurement, see Eisenmann, 1986, fig.44); n = number of specimens, x = mean, min = minimal observed value, max = maximal observed value, s = standard deviation, v = coefficient of

ultimately leading to a slightly sandy clays bed.

Fauna

The first finding was a right astragalus belongs to a large *Equus*.

It's measurements (Table 1) were compared to that of stenonine and caballine horses. The Lesvos specimen is larger than the average *Equus stenonis vireti* fron Saint - Vallier and about the size of *Equus mosbachensis* . However, the ratio diagrams (SIMPSON, 1941) show that the proportions are closer to that of *Equus stenonis* (Figs.6 & 7).

GROMOVA (1949, vol.1, p.52) remarked that caballine horses had a relatively wider astragalus than stenonie horses. De GIULI (1972, p.39) was unable to fully support this observation. Indeed, the ratio diagrams show that the most striking difference between the two groups is not the relative overall width measure 8) but the relatively trochlear width (measure 9) as tentatively noted by PRAT (1968, p.42).

GROMOVA proposed two other characters which may be used for the discrimination of *Equus stenonis* and *Equus caballus* astragali: in *Equus stenonis* , the lateral condyle does not reach so far downwards and the articular facet for the cuboid is less horizontal. Both characters are stenonis-like in the Lesvos specimen.

The pattern of the articular facets for the calcaneum is as also as frequently observed in typical *Equus stenonis* by De GIULI (1972, fig.1a).

Thus, the Lesvos astragalus certainly belongs to a large stenonis-like horse, but it is difficult to go further than that. Large stenonis-like horses are known from the Middle Villafranchian, (El RINCON, ALBERDI & BONADONNA, 1983), probably up to the Cromerian (Sussenborn), through several Galerian sites (Chagny, Loubieres de Pardines, Seneze,

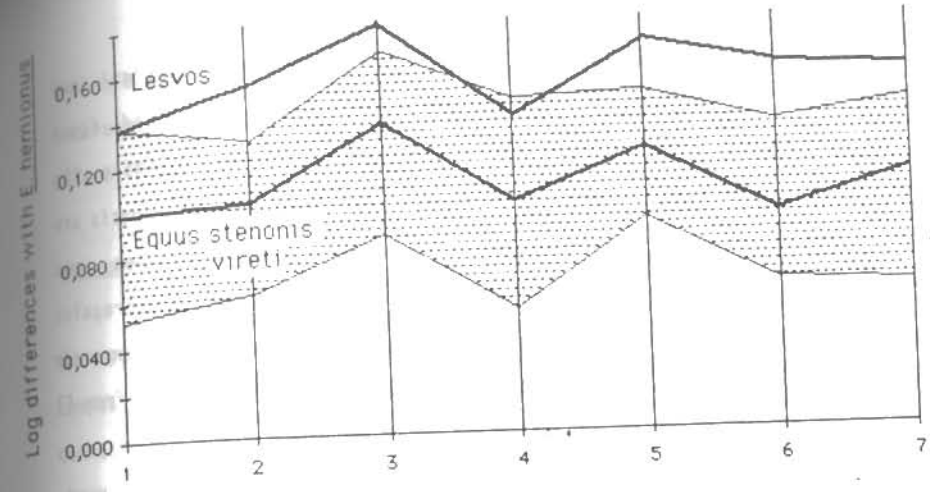

Figure 6 : Ratio diagram comparing the astragalus from Lesvos to the mean and range of variation of about 60 astragali of *Equus stenonis vireti* from the Upper Villafranchian of Saint-Vallier, France. The Lesvos specimen is larger but its proportions are close to that of the average *E. stenonis vireti* from Saint-Vallier.

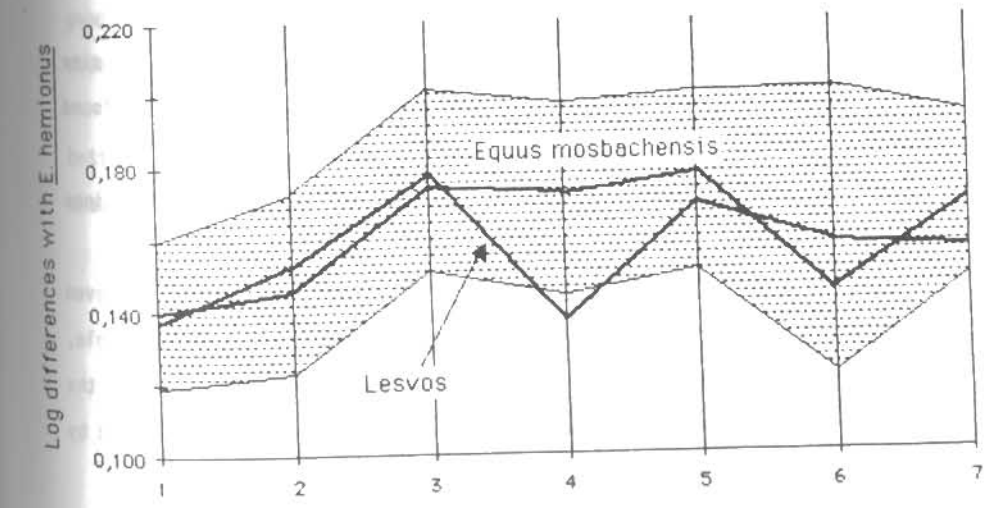

Figure 7 : Ratio diagram comparing the astragalus from Lesvos to the mean and range of variation of about 20 astragali of *Equus mosbachensis* from the Middle Pleistocene of Mosbach, DBR. The Lesvos specimen is close to the average *E. mosbachensis* but its trochlear width (measurement 4) is much smaller.

Ceyssaquet). The problem is that we have really good osteological and stratigraphical data only for the Upper Villafranchian middle sized *Equus stenonis* (Saint-Vallier, La Puebla de Valverde, Olivola,etc.) while the large and very large *Equus bressanus* and *Equus sussenbornensis* are poorly known, often associated (or mixed?) with other equid species, and their age is rather uncertain. It seems however that the Lesvos astragalus would be rather small for an *Equus bressanus* or an *Equus sussenbornensis* ; the size would fit better with that we know about the horse from El RINCON (measures of metapodials kindly communicated by M.T.ALBERDI).

There are two associated right M^1 and M^2 from a Cervid, very worn, for which no precice determination seems possible;

A large fragmentary bone is a left femur from a very large juvenile Felid, there again, no way to go further than that;

A fragmentary small mandible belongs certainly to a small Canid. If it is a *Vulpes*, it is a strange one.

Biostratigraphy-Chronostratigraphy

In as much as one astragalus of *Equus* can be relied, its size and proportions indicate a Middle Villafranchian age for the fossils found at Lesvos.

The rest of the material from Lesvos, far from making things clearer, makes them more complicated.

The problem is that the fossilization is not very strong, not even for the *Equus* astragalus and specially not for the Canid. On the whole, the material could be Upper Pleistocene. That is in contradiction with the reference of the astragalus to a stenonine horse...which is suggested by its proportions and shape of the articular facets.So what?

We are afraid that the Upper Pleistocene is, after all, more probable than the Villafranchian...In that case, it would be still interesting to note that neither the horse nor the Canid look like usual modern forms.

Paleogeographic Interpretation

Based on the models which refered by DERMITZAKIS & SONDAAR (1979) to reconstruct the Paleogeography according to the dispersal and composition of mammal faunas we can say if an area was an island or connected with the mainland.

From the above mentioned fauna as also from the sedimentological feature it is possible that the island of Lesvos was connected with the mainland during the Late Pleistocene period. Though with the interpretation of the scanty faunal composition which shows not endemic characters, a landconnection of Lesvos island with the opposite landmass of Minor Asia during the Late Pleistocene, does not seem excluded. This paleogeogra-phical reconstruction based on the faunal composition is in good accordance with geomorphological, lithostratigraphical and tectonic observations. Lesvos became an island again in the Holocene.

More fieldwork and fossil collecting needs to be done, to get better insight in the combination of tectonics and eustatic sea level changes in the area of Lesvos.

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