ANTHROPOLOGIE • XXXIV/1 – 2 • pp. 89 – 97 • 1996

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THE HELLENIC LATE PLEISTOCENE FOSSILS

ABSTRACT: The Pleistocene human remains in the Hellenic peninsula are sparse. Although archaeological and palaeoanthropological research has been developed during the recent decades, the results from several caves and open-air sites are not satisfying. The Middle Pleistocene is represented by the famous Petralona skull. The Late Pleistocene has demonstrated several uncertain [for their absolute dating] specimens. These are: the Apidima specimens (I, II & III) and the Crete Homo s. sapiens *human remains. In this paper an attempt to summarize the available information about these fossils and to discuss several problems about their dating and their phylogenetic position has been made.*

KEY WORDS: Hellenic fossils – Late Pleistocene – Apidima caves – Crete Homo sapiens sapiens remains – Theopetra cave

INTRODUCTION

Palaeoanthropological and archaeological research in Greece has been in progress for the past 35 years, but the results are not satisfying yet (Bailey 1995). It is a common belief between the Greek and foreign researchers that the Hellenic territory will deliver in the future much more palaeoanthropological material. This optimism originates from the fact that the Middle Pleistocene is represented by the PETRALONA Skull and probably by the APIDIMA II & I skulls [this depends on the definite dating]. It is possible that the latter skulls will be dated also to the Late Pleistocene, but certainly APIDIMA III, THEOPETRA I and probably the Crete *Homo s. sapiens* human remains belong to that era.

On the other hand the recent theories about the origins of modern humans, i.e. the Afro-European Hypothesis (Bräuer 1984, 1989, 1992) or "Eve" Hypothesis (Stonecking, Cann 1989, Templeton 1993), or the recent african evolution model (Stringer, Andrews 1988), adopted that *Homo sapiens sapiens* has expanded from Africa to Near East and then to Asia and Europe (with total replacement or not, with genetic admixture or not). The hypothesis that they inhabited the Hellenic peninsula during their expansion – dispersion in the "Old World", seems plausible. Therefore, we believe that some other specimens must be unearthed in the next years [if the palaeoanthropological work will be continued with a growing tendency].

THE AVAILABLE MATERIAL

In *Figure 1* all the Pleistocene sites are cited and in *Table 1* the available Hellenic fossils are presented.

Middle/Late Pleistocene: The unique representative of the Middle Pleistocene is the well known ***Petralona Skull.*** I will not attempt another presentation because there are several papers about this specimen and its phylogenetic position in the European evolutionary sequence (Stringer 1993). I refer to Petralona because Pitsios & Liebhaber (1995) presented the result of a preliminary comparison in morphological and metrical terms of Apidima II and this specimen. Although there is a general morphological similarity, there are great differences in biometric and some specific morphological characters. The same results were shown by the Principal Component Analysis cited below.

Systematic palaeoanthropological research of the Anthropological Museum of the University of Athens (under the supervision of Dr. Th. Pitsios) in the Acropolis

FIGURE 1. The Pleistocene sites of Greece.

area in Laconia (Peloponnesos) has revealed a unique Palaeolithic site: ***Apidima Caves***. The research in these caves has brought to light several specimens of Palaeolithic man. The findings are two skulls (APIDIMA I, II) and an almost complete skeleton (APIDIMA III). Pitsios & Liebehaber (1995) claimed that the discovery of several Palaeolithic human skeletal remains (about 6-8) is something that occurred for the first time in our country and this fact marks out Apidima cave-site as the most important palaeoanthropological site in Greece.

Apidima I: This is an incomplete skull found in a hard breccia in the Apidima Cave A. It is fragmented in the mid-sagittal plane and until now, as far as I know, it is inside the block of the breccia. In this block another skull has also been found, in a more or less good state of preservation (APIDIMA II).

Apidima II: This skull has been cleaned and is under study by Dr. Th. Pitsios, published (Coutselinis *et al.* 1991, 1995) and analysed from the forensic anthropological point of view. In these publications a brief morphological description and some traditional anthropological measurements without any other treatment, are presented.

The age estimation based on cranial suture closure is of 21± 4 years. The sex determination is a very difficult procedure for the fossil specimens and Trinkaus (1981) stated that all the efforts for this are generally uncertain. The cranial capacity of this specimen, estimated by using various formulas (e.g. Poissonet *et al.* 1978) of the metric variables has a value of nearly 1600 ccm.

No absolute dating exists. In the present state of our knowledge, the only dating was based on the geomorphological and geological observations of the extended area of the findings, and considered that the Apidima II skull most probably belongs in the range between 70,000 and 250,000 years B.P. (Pitsios 1985, Rondoyianni 1995).

Lax (1995: 149) claimed that: "If these crania are in fact those of *archaic Homo*, then this deposit must be older than the young Wurm, because their location is stratigraphically between the two palaeo-sea levels; it might be inferred that crania are more than 50,000 years old and less than 70,000 years B.P."

Apidima II has a strong development of the supercilliary arches, which are well separated from the glabelar region. The supraorbital sulci are not well defined, but the supraorbital arches are extended clearly to the outer corners of the orbits.

Coutselinis *et al.* (1995: 115) wrote in the brief morphological description: "In the facial portion of the skull, an oblique antero-inferior projection of the maxilla is observed (curb-like). This feature, in combination with the posterior-superior slant of the frontal, forms a projection referred to as Upper Alveolar Prognathism."

The orbits are large and ovoid, the interorbital area is relatively wide but the nasal skeletal aperture is medium and the upper facial height is lesser than in classical Neanderthals. Generally, the face is not as robust as in the Neanderthals.

An attempt to compare the metrical data of Apidima II [by Principal Component Analysis] with the available Middle and early Late Pleistocene specimens (Manolis, in prep.) has been made, but this work cannot be finished yet, because a complete morphological description is missing. However, as Trinkaus (1983) stated, though the measurements alone would give an incomplete description of the specimen, the morphometric analysis permits a systematic comparison of the studied material to other specimens (i.e. the position of the APIDIMA II skull within the range of variation of the contemporary sample and other Pleistocene specimens *(Table 2)*.

It is however possible to give the preliminary result of a Principal Component Analysis based on nine cranial variables (GOL, XCB, BBH, ZYB, NPH, NLH, NLB, OBB and OBH – abbreviations after Howells 1973).

APIDIMA II takes a position near the Qafzeh/Skhul group (Qafzeh 6, Skhul 9, Skhul 4 & 5), and thus presents a similar morphometric pattern. It is worth mentioning that the Arago specimen is also very near to this group *(Figure 2)*. This supports the view cited in Pitsios & Liebhaber (1995) that APIDIMA II is probably an archaic *Homo sapiens*. I will not discuss this result any further, since I think that we firstly need a better set of specific measurements for statistical analyses, and secondly a more detailed morphological description which is difficult to be extracted from the published photographs.

Late Pleistocene: In the rock-shelter (***Apidima Cave C***) a female human skeleton was uncovered during the excavation of 1984. It was found deposited in a position transversal to the entrance of the cave, in a depth of 25-30 cm under the present-day floor (**APIDIMA III** - LAO 1/S3 – Pitsios 1985). The state of preservation of the skeleton

TABLE 1. The Hellenic Pleistocene human fossils.

Fossil	*Sex*	Age	Geological epoch (approx. date)	Year of discovery	References
Petralona Skull	male	young adult	Middle Pleistocene (400-250 Kya)	1960	Marinos *et al.* 1965, Stringer *et al.* 1979, etc.
Apidima I (LAO 1/S 1)	??	??	??	1978	Pitsios 1985, Coutselinis *et al.* 1991, 1995.
Apidima II (LAO 1/S 2)	??	17-25	Middle/Late Pleistocene (300-100 Kya)	1980	Pitsios 1985, Coutselinis *et al.* 1991, 1995.
Crete *Homo s. sapiens* remains	female	young adult	Late Pleistocene (51 Kya ?)	1893	Simoneli 1897, Facchini *et al.* 1989, 1992.
Apidima III (LAO 1/S 3)	female	20-26	Late Pleistocene (40-30 Kya)	1984	Pitsios 1985, Mompheratou , Pitsios 1995.
Theopetra 1	male	18-20	Late Pleistocene (16 Kya)	1990	Stravopodi *et al.* 1994, Manolis submitted.

TABLE 2. Summary statistics (means, s.d., No of individuals and range) of the studied groups (MIDPL, ENEA, NEA, ASNEA and S/Q group).

	MIDPL				ENEA				NEA				ASNEA				S/Q Group				APIDIMA II
Measurements	Mean	s.d.	No	Range	Mean	s.d.	No	Range	Mean	s.d.	No	Range	Mean	s.d.	No	Range	Mean	s.d.	No	Range	
Maximum cranial lenght (GOL)	201.00	11.10	4	185.0 - 209.0	188.62	10.42	5	174.1 - 198.0	201.52	5.53	9	190.0 - 208.0	201.67	16.65	3	183.0 - 215.0	201.00	8.43	5	192.0 - 213.0	197.0
Maximum cranial breadth (XCB)	144.42	12.37	6	130.0 - 164.0	146.10	9.08	5	132.5 - 156.0	149.08	6.40	9	138.0 - 158.0	149.67	7.51	3	141.0 - 154.0	144.10	2.92	5	140.0 - 148.0	148.0
Porion - bregma height (PBH)	110.00	8.16	4	100.0 - 120.0	110.67	10.01	3	101.0 - 121.0	112.37	2.97	8	108.0 - 118.0	111.67	12.09	3	98.0 - 121.0	117.80	3.11	5	114.0 - 121.0	125.0
Bizygomatic breadth (ZYB)	153.00	5.29	4	148.0 - 160.0	145.00	8.66	3	140.0 - 155.0	142.42	10.23	6	126.0 - 153.0	144.75	12.79	4	130.0 - 160.0	147.50	8.66	4	140.0 - 160.0	130.0
Upper facial height (NPH)	85.37	8.86	4	75.0 - 93.0	85.50	1.50	3	84.0 - 87.0	81.92	7.89	6	68.5 - 90.0	88.25	6.50	4	79.0 - 94.0	74.60	2.70	5	72.0 - 79.0	81.0
Nasal height (NLH)	59.37	5.71	4	52.0 - 65.0	57.67	3.21	3	54.0 - 60.0	61.87	3.12	4	58.5 - 66.0	63.42	4.44	4	58.0 - 68.5	53.80	1.30	5	52.0 - 55.0	57.0
Nasal breadth (NLB)	33.42	4.75	5	29.0 - 39.1	32.67	1.53	3	31.0 - 34.0	34.62	0.95	4	34.0 - 36.0	34.17	3.39	4	30.2 - 38.5	30.00	1.41	5	28.0 - 32.0	31.0
Alveoral height (MXH)	26.00	7.03	4	18.5 - 35.0	27.83	1.89	3	26.5 - 30.0	24.12	1.93	4	21.5 - 26.0	26.12	4.13	4	21.0 - 31.0	20.80	2.58	5	18.0 - 24.0	24.0
Orbital breadth (OBB)	43.14	2.89	5	41.0 - 48.0	44.50	4.43	4	39.0 - 49.0	44.33	3.12	6	40.0 - 49.0	44.60	2.06	4	42.0 - 47.0	44.60	1.95	5	42.0 - 47.0	41.0
Orbital height (OBH)	34.00	2.47	5	31.5 - 38.0	39.12	1.43	4	37.5 - 41.0	38.50	1.87	6	37.0 - 42.0	36.27	2.35	4	33.0 - 38.0	33.10	3.24	5	29.5 - 37.0	41.0
Indices																					
Cranial Index 1	69.35	3.49	4	64.3 - 71.8	77.36	1.33	5	75.8 - 78.8	73.95	2.61	9	68.0 - 76.0	74.33	2.70	3	71.6 - 77.0	71.76	2.53	5	68.1 - 74.5	75.1
Cranial Index 2	54.70	2.15	4	52.6 - 57.7	57.50	3.37	3	55.5 - 61.4	55.68	1.52	8	53.8 - 57.8	55.27	1.53	3	53.5 - 56.3	58.72	3.68	5	54.5 - 63.0	63.4
Cranial Index 3	79.02	5.47	4	73.3 - 84.6	74.10	5.72	3	70.5 - 80.7	75.32	3.43	8	71.6 - 80.4	74.46	4.61	3	69.5 - 78.6	81.78	3.74	5	77.0 - 86.4	84.4
Cranial Module	151.35	4.63	4	147.3 - 156.3	152.57	6.97	3	144.8 - 158.3	149.88	13.60	8	117.3 - 159.2	143.33	21.09	3	120.3 - 161.7	154.56	4.30	5	150.3 - 159.7	147.6
Neurocranial Module	170.17	9.59	4	158.7 - 179.5	167.34	9.68	5	153.3 - 177.0	175.30	5.26	9	167.0 - 182.7	175.67	12.00	3	162.0 - 184.5	172.54	5.12	5	167.5 - 179.0	172.5
Mean Porion - Height Index	64.63	3.03	4	61.3 - 68.0	64.78	4.29	3	62.1 - 69.7	64.03	1.95	8	61.5 - 67.0	63.44	2.64	3	60.5 - 65.6	68.35	3.67	5	64.4 - 72.2	72.5
Upper Facial Index	57.50	4.19	4	52.6 - 62.8	58.17	5.61	2	54.2 - 62.1	56.66	5.75	5	46.9 - 61.2	60.60	1.94	4	58.0 - 63.2	51.05	1.50	4	49.4 - 52.8	62.3
Spanchnocranial Module	116.95	9.68	4	103.5 - 126.3	115.23	3.71	3	112.7 - 119.5	114.08	6.39	5	107.0 - 119.5	116.75	7.57	4	109.5 - 127.0	111.37	5.55	4	107.0 - 119.5	105.5
Cranio - Facial Trans. Index	106.71	8.36	4	99.6 - 118.5	99.36		1		94.98	2.86	6	91.3 - 98.6	93.28	3.07	3	90.9 - 96.7	101.59	4.81	4	96.55 - 108.1	87.8
Nasal height as % of Up. facial height	69.79	6.05	4	62.4 - 77.2	67.41	2.71	3	64.3 - 69.0	71.96	1.48	4	70.4 - 73.3	71.95	2.38	4	68.3 - 73.4	72.18	2.62	5	69.3 - 75.0	70.4
Nasal Index	53.40	4.99	4	46.4 - 57.7	56.76	4.30	3	53.5 - 61.1	56.00	2.06	4	54.5 - 59.0	53.90	4.44	4	48.5 - 58.6	55.76	3.35	5	52.8 - 61.5	54.4
Alveolar height / Nasal breadth Index	0.797	0.229	4	0.64 - 1.13	0.850	0.06	3	0.79 - 0.91	0.695	0.062	4	0.62 - 0.76	0.770	0.151	4	0.62 - 0.91	0.692	0.079	5	0.60 - 0.80	0.80
Orbital Index	77.46	2.16	5	75.0 - 80.1	88.51	8.45	4	79.6 - 96.0	85.70	8.18	5	75.5 - 97.7	81.27	2.39	4	78.6 - 84.4	74.24	7.15	5	65.2 - 84.1	100.0
Orbital Surface	1543.60	238.1	5	1323.0 - 1824.0	1742.4	196.1	4	1462.5 - 1911.0	1742.5	90.28	5	1591.0 - 1813.0	1621.2	173.9	4	1386.0 - 1786.0	1477.6	171.3	5	1239.0 - 1645.0	1681.0
Orbital Surface (x p/4)	1211.70	186.9	6	1038.5 - 1431.8	1367.7	153.9	4	1148.1 - 1500.1	1367.9	70.88	5	1248.9 - 1432.2	1272.6	136.5	4	1088.0 - 1402.0	1159.9	134.5	5	972.6 - 1291.3	1319.6
Cranial Capacity	1209.80	114.5	6	1070.0 - 1390.0	1391.7	127.9	3	1245.0 - 1480.0	1480.0	130.81	9	1270.0 - 1640.0	1536.6	241.3	3	1270.0 - 1740.0	1556.4	23.90	5	1520.0 - 1585.0	1620.0

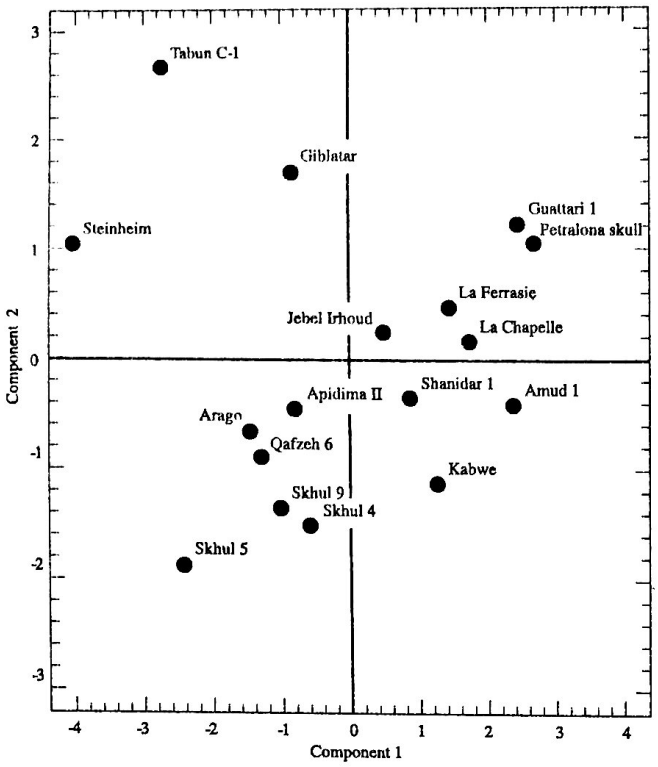

FIGURE 2. Plot of the first two principal Components (based on 9 variables). PC 1: 54,6%; PC 2: 18,9%.

is quite good and the completeness of the skeleton is striking, but unfortunately the cranium is missing, except for some mandibular fragments. There is no doubt that this is a primary burial, based on the study of the 41 marine shells which were found and possibly are parts of an ornament (Karali-Giannakopoulou 1995). The dating, based on the study of the lithic tools found near the female skeleton, leads to the conclusion that these belong to a lithic industry of the Upper Palaeolithic and could be characterised as Aurignacian (in terms of the West European classification) (Darlas 1995). This observation gives a chronological frame of 40-28 Kya (Strauss 1995).

The sex determination was based on several distinctive features of the fragmented pelvis, e.g. greater sciatic notch, and the age at death estimation was mainly based on the detailed odontological study that has been carried out. The estimated age at death is 23 ± 3 years, considering the eruption of the third molar (M3) and the degree of teeth wear (Ligoni, Papagrigorakis 1995). The most characteristic find is the presence of artificial grooves in the inter-proximal surface. This is a common find in the Upper Palaeolithic specimens (Formicola 1988, Frayer, Rusell 1987, etc.). The explanation given is one of the current views (functional usage of teeth).

The only thing that can be inferred after a cautious reading of the paper by Mompheratou & Pitsios (1995), in which the authors present an extensive description of the postcranial bones, is the possible length of the right humerus and tibia. Applying the Trotter & Gleser formula (1952) an estimation of the average stature can be done. This is estimated (with reservation) to range between 162.7 - 164.5 cm. This range, when compared to other Upper Palaeolithic specimens, is relatively high. Indeed, only Parabita 2 and Paglicci 25 female individuals are taller than Apidima III. The rest of the sample which consisted of Grotta dei Fanciulli 5 and Předmostí IV, X have lower values than that of Apidima III. This comparison is based on collected data and unpublished ones (Mallegni *et al.*, in prep.).

Theopetra Cave: In this cave a human calva and several post-cranial bone fragments have been found, which are dated to about 16,500 B.P. (**THEOPETRA I**) (Stravopodi *et al.* 1994). An extensive description of this specimen has been submitted for publication (Manolis, n.d.), but I can present some information about this specimen and the similarities with other available material of the European Upper Palaeolithic. The ^{14}C dating of the human bone fragments, gave a calibrated date of 14,620-14,380 B.C. (Dem 241) (Facorellis *et al.* 1994).

The exact location of the human remains is unknown because the probable primary burial had been disturbed since this excavational square was unfortunately first dug by smugglers (Kyparissi 1994).

A calva and fragments of a few long bones were preserved. The calva, partly restored, consists of the frontal bone, parts of the parietals and the upper part of the occipital bone. The form is ovoid and slightly high. The frontal is narrow, long and steep. The supraorbital region is relatively robust and prominent and is divided into two parts. The superciliary ridges are weak, kidney-like shaped and divided from the glabellar region. The parietals are fragmented and the temporal bones are missing. The occipital bone has preserved its upper part. The high nuchal line is well developed. There is no lambdoidal depression and the occipital ridge is well developed and pronounced.

The cranial capacity was estimated to be approximately of 1465 ± 101 ccm according to Poissonnet *et al.* (1978).

The post-cranial skeleton consists of severely damaged fragments, most of them unidentifiable, due to the post-depositional processes.

The sex determination was based on cranial morphological features, as the superciliary ridges, and the occipital protuberance as referred to in the recommendations of the workshop of European anthropologists (Ferembach *et al.* 1980). The remains probably belonged to an adult male individual.

The age at death estimation was very difficult, because only the cranial sutures and the morphological characters of the frontal and occipital bone were available. The best estimation led to an age of 18-20 years, based on the degree of cranial sutures closure – these are still open (Meindl, Lovejoy 1985, Key *et al.* 1994).

Theopetra I shows similarities in some characters, when compared to the Early Upper Palaeolithic specimens, i.e. the high value of the cranial length (GOL) in combination with the cranial vault thickness, the relatively high value

of the parietal chord (PAC) and parietal *subtence* (PAS). These are typical features of the Upper Palaeolithic population in Europe and fit well with the description of Frayer (1984).

The affinities shown in the Principal Component Analysis do not mean that there are ethnohistoric relationships between Theopetra I and the Early Upper Palaeolithic European specimens, but simply similarities.

Taking into account: 1) the given homogeneity of the Late Upper Pleistocene – Early Holocene population (Henke 1989, Mallegni in this volume); 2) the speculations extracted from the theory of mating networks in which a high degree of genetic exchanges existed (Wobst 1976); and 3) the palaeodemographic considerations for small populations (Boquet-Appel 1985); all this leads to the conclusion that genetic and/or phenetic differences should not be expected among the European Late Pleistocene human remains.

Crete *Homo s. sapiens* remains: I leave this specimen to be discussed as the last one, because it is a special case and we must handle it seriously. If this specimen which has been published by Facchini & Giusperti (1989, 1992), is really so early as the authors claimed, then we are facing new interesting evidence for modern human origins.

The authors wrote exactly the following: "At the Centre des Faibles Radioactivite de Gif-Sur-Ivette Yuji Yokoyama chronometrically dated a sample of the breccia in direct contact with the bones by using the Protactinium/Uranium method. This method produced an age of 51,000 ± 12,000 years."

The authors' statement that these human remains are the most ancient ones from the island of Crete was based on the dating of the beach-rock (littoral bench) and not on any specific anatomical-morphological description, nor any palaeontological, geological and archaeological observations. They also tried to enlighten how anatomically modern humans migrated to this island, and to connect this early (?) specimen to the problem of the modern human origins. It must be noted that if this specimen is so ancient then the Afro-European hypothesis has another support, because the missing evidence (in the Balkans) is between the Qafzeh/Skhul group and the Early Upper Palaeolithic populations in Europe, and this specimen somehow fills the gap.

Generally there are no doubts about their view and hypothesis, theoretically it is a possible one, but there are several major problems, such as: 1) the date; 2) the morphology; 3) the archaeological context; 4) the palaeontological evidence; and 5) other geological observations. I will briefly refer to each of these five major issues.

1) To my knowledge it is very difficult to accept a date established by using samples of the connecting material for dating purposes, and not a bone-sample itself. It is well-known that there are some severe problems with the dating methodologies. Professor Facchini, when asked whether there is something new with the dating of the human bone itself, answered that bone-samples had been sent for such a dating to the University of Pavia and that he was waiting for the results. Thus, until the new dating-results will be obtained, we must exclude the supporting evidence of the Afro-European hypothesis (Facchini 1992: 203).

2) The described morphological traits and the reconstruction of the skull (as viewed from the published photographs) remind me of a very recent craniofacial morphology. It is difficult to accept such morphological description and view as ancient (ca 50 Kya), while the Early Upper Palaeolithic specimens, e.g. Paglicci 25, Cro-Magnon 2, have a very robust and characteristic craniofacial organization, the so-called Cro-Magnoid. Mallegni (this volume) gives an outline of this morphology. Anyway, the Crete *Homo sapiens sapiens* specimen has not the common Early Upper Palaeolithic morphology, even for a female which might have been more gracile.

3) Nevertheless, it cannot be ignored that up to now the archaeological research has given poor results about the Palaeolithic Man in Crete. The archaeologists who have worked in the recent decades on Crete (e.g. Zois 1973) basically agree that human presence in the island is very recent (probably from the Mesolithic, ca 8,000 B.P.).

Broodbank & Strasser (1991) wrote: "Here the empirical evidence is clear enough: despite nearly a century of archaeological excavation and some 57 palaeontological excavations, no reports of pre-Neolithic cultural material on the island have stood up to scrunity (Cherry 1990). Crete in this way contrasts with the large western Mediterranean islands of Corsica and Sardinia, where pre-Neolithic material is well attested (Cherry 1990).

It has also to be mentioned that in the surface survey carried out by the Canadian Archaeological Institute in Samaria, Gorge did not find any traces of land-use during the Palaeolithic era (Panagopoulou, pers. comm.).

On the other hand, the above authors (Broodbank, Strasser 1991) mentioned: "Early Holocene extinctions of pygmy hippopotamus, elephant and deer on Crete could indicate human predation, despite the lack of cultural remains in pre-Neolithic levels containing Pleistocene deer (*Praemegaceros cretensis*) at the Gerani caves (de Vos 1984, Dermitzakis, de Vos 1987, Tzedakis 1970). Since no land bridge to Crete existed even at the time of the greatest eustatic regression during the Wurm glaciation, access to Crete by *Homo s. sapiens* had always required sea-going abilities (Van Andel, Shacleton 1982). Finds of Melian obsidian and tunny bones at the Franchthi cave in the southern Argolid first appear in the Late Upper Palaeolithic and Mesolithic contexts respectively, and provide clear indication of sea-going and two-way crossings well before the advent of agriculture (Payne 1975, Perles 1987). Given that Crete constitutes the first land due south of the Cyclades, it is worth assessing the probability that it too was known and visited by pre-Neolithic groups. In addition, the high endurance of humans in temperate seas suggests that hunter-gatherers could survive the crossing and make landfall alive (Irwin *et al.* 1990: 83). We doubt, however, that any such hunter-

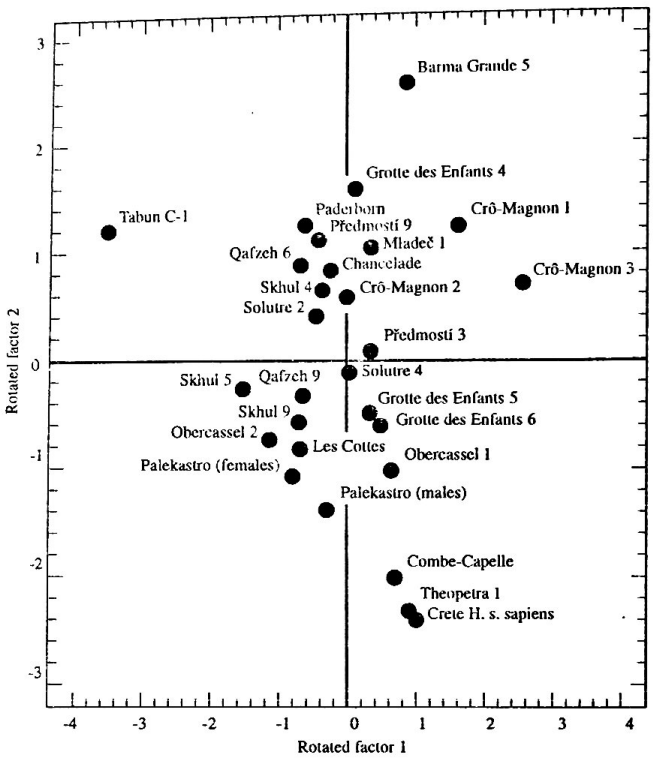

FIGURE 3. Plot of the first two rotated factors (based on 6 variables). PC 1: 62,3%; PC 2: 22,8%.

gatherer groups remained on Crete in sufficient strength to colonize the island successfully and constitute the ancestors of the first farmers. The completely negative results from Cretan caves and rock-shelters surely do reflect a genuine absence of long-term and sizable hunter-gatherer occupation."

4) Dermitzakis *et al.* referred to the possibilities of colonization of the Mediterranean islands, in their article. They mention that "a model can be made why some islands were suitable for settlement of Pleistocene Man, and others were not". They claimed that the hunter-gatherers were more dependent on animal protein, which means that in an insular endemic unbalanced fauna, with low diversity, the presence of a mammal large enough in size, with a high reproductive rate was essential for a possible permanent settlement of Pleistocene Man.

In our case the authors set the question whether Crete fulfilled the requirements mentioned above and if the supposed colonization of Crete by Pleistocene Man can be traced.

The results of the palaeontological research in the Mediterranean islands lead to suppose that it is very unrealistic to suppose that Crete island could be such a place for permanent settlement of the Pleistocene humans. The only islands suitable for this purpose are Sardinia and Corsica. They also claimed that man had colonized the Mediterranean islands relatively recently, probably in the Neolithic. And they conclude: "Islands are only suitable for permanent colonization by Pleistocene Man if the exploitation of natural resources on the island can support a viable human population over a longer period, without exhausting these resources."

As far as Crete is concerned, it is clear that Pleistocene fauna of Crete consisted only of cervids, hippopotamuses, murids, shrews, elephants and reptiles, while large carnivores were missing. A fauna with a restricted group of mammalian species (mostly endemic) is an unbalanced one (Sondaar 1971, 1977). The mammals found on Crete were certainly endemic, and this means that they were restricted to Crete itself. The endemic unbalanced fauna points out to the isolation of Crete during the Pleistocene (Sondaar 1971, 1977). Pleistocene artifacts of Crete are not known, and also there are not large enough murids that could support Pleistocene humans. Furthermore, there are not indications that humans lived together with endemic insular fauna, nor any indication that they would have tried to domesticate these insular mammals – in later Pleistocene phases (Dermitzakis *et al.*, submitted). The extinction of the endemic *Candiacervus* must have been caused by the Neolithic inhabitants of the island. This can be deduced from the findings of Gerani 2; above the main layer Ge2, in which only remains of *Candiacervus* have been found, there is a layer without species, but there are traces of human activity. In this layer, *Mus minotaurus* is still present. There is no sedimentary break between this layer and that of Ge2. The extinction of *Candiacervus* must have taken place in the Holocene, with the arrival of Mesolithic/ Neolithic Man in about 8,000 B.P., who might have navigated the Aegean Sea (see the relevant publications for Franchthi Cave). Based on the data quoted above it is very unlikely that *Homo sapiens* might have colonized Crete before 8,000 B.P. This conclusion is in accordance with the current archaeological view.

5) Another problem is the formation of the littoral benches, the so-called "beach-rocks". Marinos & Symeonides (1979) gave an outline for the "beach-rocks" formation in the Aegean. They stated that in most of the coast-line of the Aegean (in the continental and also in the insular) slow upward and downward movements of the sea-shore have been noted, from the Neolithic until recently. This phenomenon resulted in the appearance of the "beach-rocks", i.e. paving stones consisting of the stacked sand of the old sea-shore. The current position of the beach-rocks higher or lower of the present-day sea level, gives an estimate for the shifting of the sea-shore. Under this view it has been ascertained that the formation of the beach-rocks dates back to the Late Neolithic (3,000 B.C.). It is worth mentioning that the beach-rocks of the historic era bear evidence of both remains of marine fauna and flora, and both human cultural artifacts, and/or rarely burials of human beings (inside the sand). Such a case has been described by Dermitzakis & Theodoropoulos (1975).

Thus, the anthropological study made by Facchini & Giusberti is not convincing for the antiquity of the specimen, because they did not take into account the 5

main issues commented on above. I will not discuss the post-cranial skeleton not only because of the restricted size of this article, but also because, in my opinion, it is very difficult to assess the recent phases of human evolution (Late Pleistocene) by using the post-cranial skeleton only.

Their PCA results are surprising too; the authors mentioned that the Crete frontal lies in the range of variation of the Upper Palaeolithic specimens and is differentiated from Neanderthals, Předmostí and Quafzeh. This is surprising, indeed, because it was expected that this specimen would distinctively belong to the range of the Early Upper Palaeolithic sample if it was an early one, but this specimen is very near to Arene Candide 1 (Gravettian), and the Neolithic-Early Helladic sample, and this can be interpreted as a sign of its later dating (i.e. Neolithic, or at least Late Upper Palaeolithic).

In the biometric data analysed by Factor Analysis based on six variables (M9, M10, M26, M29, FRS and FRF), the most ancient sample of Palekastro (Late Neolithic) has been included. From the plot of the first two Factors *(Figure 3)*, it is evident that the Crete skull is very near to the Late UPL Theopetra I, Combe-Capelle [which is reconsidered by Gambier (1989) as relatively recent], Obercassel I and the Late Neolithic Palekastro (males). This, of course, does not mean that the Crete specimen is an Upper Palaeolithic or a Neolithic one; it has only the same morphometric pattern of frontal bone but it cannot be excluded from the Late Upper Palaeolithic range of frontal variation.

In my opinion (based mainly on the five issues mentioned above), this specimen is a recent individual, probably a Neolithic one, though there are not very well established affinities with the Late Neolithic Palekastro, but the Crete specimen is fully modern in morphology and resembles Palekastro skulls. Another support for my current view about the antiquity of the Crete specimen is the information given by Marinos & Symeonides (1979) for the possibility of included later burials in the "beach-rocks". Another case, not in a "beach-rock", but in the current sea-shore is the excavation of the Trianta (Rhodes) cemetery, in which several skeletons were unearthed in 1988. The burials were in the sand some meters from the present-day sea-shore (Manolis, unpublished data). This was probably a similar case (burial in the littoral bench).

Ending this discussion for the Crete Homo s. sapiens specimen, I think that it is difficult, on the basis of morphological and morphometric comparisons and analyses, to clarify whether it is dated to the Classical Times, the Neolithic and/or finally in the Late Upper Palaeolithic. As a result, we must wait for the dating of the bones, because the dating of the connecting material does not mean anything for the human skeletal remains.

CONCLUDING REMARKS

Having presented the Hellenic Late Pleistocene fossil specimens, and in some cases an extensive discussion of some results and views (especially for Apidima II and Crete *Homo s. sapiens* remains), it is obvious that this part of Europe, with its particular geomorphological position, will contribute to solving the problems of modern human origins. When the study of the Apidima I & II specimens will be finished and will give to the anthropological community the expected very important results, it will possibly change the view of the later phases of human evolution. Indeed, Apidima II is a very peculiar specimen, probably slightly different from Petralona, but almost as complete as the latter, and when a definite date will be obtained it will elucidate some of the evolutionary events in Europe.

Also the later Pleistocene phases (e.g. the Upper Palaeolithic cultural period) which are now represented will contribute to our knowledge of the very recent evolutionary phases of *Homo sapiens sapiens.* When the study of the Aurignacian (?) female skeleton of Apidima III will be finished, some other pieces of knowledge will be added to the general anthropological view of this period, which is crucial for the biocultural evolution of the *Homo sapiens sapiens* populations.

Lastly, I hope that my point of view on the problem of the Crete *Homo sapiens sapiens* specimen, will contribute to a better consideration of this finding, until a definite dating will end the uncertainty, and then possibly another Hellenic specimen will help with the interpretation of European evolutionary events, one of the major issues of human evolution.

ACKNOWLEDGEMENTS

I am very grateful for the information obtained from Prof. M. Dermitzakis (Athens University), Dr. A. Sarpaki (Crete University, Herakleion) and Dr. E. Panagopoulou (Ephory of Speleology and Palaeoanthropology, Ministry of Culture). I must also thank Mrs E. Karetsou (Director of the Herakleion Archaeological Museum) and Mrs Serpetzidaki (archaeologist in the same Museum) for the permission and help in studying the Palekastro skeletal material, and Mr A. Neroutsos (anthropologist) for his help in studying the above material. This research was supported by a grant of the National & Kapodistrian University of Athens (No 70/4/132).

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