Eurasian Prehistory, 7 (2): 5–14.

INTRODUCTION: HISTORY OF THE EXCAVATIONS

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The excavation at Klissoura was planned in 1992, as a joint-project between the Ephoreia of Palaeoanthropology and Speleology of the Ministry of Culture of Greece and the Institute of Archaeology of the Jagiellonian University of Kraków, Poland. Our primary goal was to investigate the circumstances under which the neolithisation of NW Peloponnese came about. For this we needed to locate a cave site with successive layers of Upper Palaeolithic–Mesolithic–Early Neolithic, so that their systematic exploration could clarify the mechanisms by which the change towards food producing societies took place, and the degree to which this modification was rooted in the previous traditions and practices of the Mesolithic and earlier forager societies. For establishing the significance of the role that the pre-Neolithic background played in the formation of the Neolithic, the Argive Plain seemed to be a promising area, since the most ancient Early Neolithic elements had been brought to light at the settlements of Dendra and Lerna. Farther to the north, initial Early Neolithic sites had been excavated at Nemea (Blegen, 1927, 1975; Wright *et al.*, 1990) and Corinth (Weinberg, 1937; Lavezzi, 1978). Mesolithic finds were known from the Ulbrich Cave (exact location unknown), and Upper and Middle Palaeolithic have been excavated at Kephalari Cave (Reisch, 1976), near Lerna. A prerequisite for the accomplishment of our goal would be the reevaluation of the whole sequence in the network of all the Neolithic settlements in the region.

The gorge of Klissoura and its caves was noted in the fall of 1992, when the geologist of the Ephoreia of Palaeoanthropology and Speleology Vassilis Giannopoulos and I undertook a very brief survey around the slopes of the mountains to the north of the Plain of Argos.

Cave 1 lies at the entrance of the gorge, on the right bank of the Berbadiotis River (the ancient Asterion) at a distance of 150 m from it. It is the most conspicuous and easily accessible rock shelter. It is suitably oriented to the southwest, at a strategic point overlooking the Plain of Argos with Nauplia and the Argolid Gulf in the distance.

There were many lithic artifacts visible around the edges of the rubble wall that protected the modern animal fold it housed. Many more were cemented in a layer of breccia just outside this wall. Between the cave and the river there is an orange grove, the property of Dimitris Dimas Katsaris[1]. Located on the eastern slopes of Mt. Euboia (modern Profitis Ilias), the rockshelter lies at a distance of 3 km NE from the Sanctuary of the Argive Heraion, which is located on the south slopes of Euboia. Further up on the same hills, Late Neolithic tombs have been excavated (Blegen, 1937).

Further east, in the Plain of Argos at a distance of 5–6 km from the gorge and visible from it, lies the Mycenaean acropolis of Midea with its necropolis. At its feet, in the village of Dendra, an Early Neolithic settlement had been excavated (Protonotariou-Deilaki, 1992), which at that time was believed to represent the aceramic neolithic in the area. To the south at a distance of 8–9 km is situated the site of Lerna on the western coast of the Argolid Gulf, with its Early/Middle Neolithic and Bronze Age settlements (Caskey, 1957,

1958), and the Kephalari Cave with important Palaeolithic and Middle Neolithic deposits, 2–3 km west of Lerna and 11 km from the Klissoura Gorge. Around the area of Nauplia surveys and small scale excavations by Protonotariou-Deilaki have brought to light Palaeolithic vestiges.

In the opposite direction, to the west, the gorge, which is 2.5 km long, leads to the Valley of Berbati (modern Prosymna) and through the village of Limnes to a mountain road that continues towards Corinth. Researches from the Swedish Archaeological Institute have revealed an important Early and Late Bronze settlement on the Mastos Hill (Saflund, 1965). More recently, in the years 1988–1989, this area has been explored by an Archaeological Surface Survey (Wells and Runnels, 1996) which presents the evidence of the use of the valley and the gorge from the Palaeolithic down to the Byzantine and Modern periods. From all the above, it follows that there was ample evidence about exploitation of this area in all the periods, enough to sustain our hopes for finding a site with transitional components from the Epipalaeolithic to Mesolithic and then to Neolithic.

In November 1993 the Ephoreia of Palaeoanthropology and Speleology organized a systematic surface survey on the slopes of the mountains to the east and west of the Klissoura gorge to confirm that only the Gorge provided the cultural traces that we were looking for. The participants were the archaeologists Sissy Kontaxi and Margarita Koumouzelis, the geologist Vassilis Giannopoulos and the speleologist Lakis Kontrolozos. Indeed, archaeological finds were found in 7 caves in the gorge. To this team were then added the archaeologist Małgorzata Kaczanowska and the geologist Maciej Pawlikowski of Poland and the investigation was expanded in and around the gorge to include 35 caves in total. During that year some trial trenches[2] in the caves 4 and 7, on the left side of the gorge, brought to light neither Neolithic nor Mesolithic layers, but strata with lithic industries produced by the microburin technique and non-geometric backed microliths of the Final Palaeolithic (Koumouzelis *et al.*, 1996, 2004).

The excavation at cave 1 by Małgorzata Kaczanowska, Margarita Koumouzelis, Janusz K. Kozłowski, Krzysztof Sobczyk, Marek Nowak, Barbara Kazior and the geologist Maciej Pawlikowski began in 1994.[2,3] The sediments were tested by three trenches: one, Trench A, at the interior of the rock-shelter, a second in the breccia layer outside the rubble wall, and a third further down the raised platform of the archaeological deposits, in the orange grove. In Trench A, important Mesolithic strata were found in situ, under the upper mixed layer, and provided a radiometric date of 9.150±220 BP. Trenches B and C contained mixed material of all the periods including Roman tiles. In Trench C, below the level of 1 m, some Sauveterrian elements were revealed. These two trenches were backfilled at the end of the season (Koumouzelis *et al.*, 1996).

In spite of the absence of an Early Neolithic layer with polished groundstone tools, pottery, botanical and/or zooarchaeological finds at the site (i.e. signs of a neolithic settlement), some lithic finds in cave 1 such as macroblades of "honey" flint, chips of obsidian and lithic industry techniques imply exchanges between the late foragers in the area and the Neolithic populations living on the Argive Plain.

The absence of Early Neolithic is not limited to the Klissoura gorge alone. Research in the Berbati Valley has not produced but very slim evidence for an Early/Middle Neolithic settlement centrally placed in the Berbati Valley (Johnson, 1996:65; Wells and Runnels, 1996:34). Thus the transition from the Mesolithic to Neolithic remains an open question as of yet unresolved. Anthracological results (Ntinou, this issue) and the phytolith analysis (Albert, this issue) demonstrate a gradual process toward a drier climate from the beginning of the Holocene and onwards in our region. This may imply that the Berbati Valley and the Klissoura gorge were not suitable for the initiation of agriculture, due to the lack of dependable water resources. The Berbadiotis River, the ancient Asterion, is actually a seasonal stream, whose water disappears at the exit of the gorge. This situation is also reflected in the ancient local legend according to which the river Asterion, father of Prosymna, Akraia and Euboia, nurturers of the goddess Hera, was cursed by Poseidon, the rival of Hera for the supremacy over the region of Argos, to lose his waters, because he sided with of Hera. He was allowed to have some water only when the god caused rain (Pausanias

cf. Papahatzis 1989:II 15.5, II 17.1-3) and thus the river flows intermittently. Only the western area of Berbati, where there are some springs, was inhabited from the Middle Neolithic times. More advanced knowledge of agricultural methods were applied in this period and rainwater agriculture could be practiced. To this day, the valley fields are irrigated by artesian wells and mostly by water coming from very deep geological drillings. In contrast, the important EN sites mentioned above (Lerna, Nemea, Corinth) are located in swampy areas or by a river or even on copious springs. The scattered Neolithic and Bronze Age material on the hills around the Berbati Valley, and in the Klissoura gorge to a lesser extent, is probably connected with pastoralism and/or small farms on marginal land.

In respect to the Mesolithic–Neolithic transition our expectations were not met with success. Yet, the Mesolithic and the intriguing subsequent layers that we encountered in Trench A, presented a lot of interest and a new stratigraphic sequence that differed from that of Franchthi Cave, the only comparable site at that time (Jacobsen, 1973; Perles, 1990). In spite of the differences, Franchthi cave offered the possibility for some chronological comparisons and correlations with the sites in the gorge (Koumouzelis *et al.*, 2003a). This made worthwhile the extension of the original trench for investigation. Indeed, the following year 1995 the trench was extended 2 × 2 m to the south, so that the total dimensions measured 2 × 4 m (squares A1-A4, B1-B4).

Under the surface stratum we encountered a sequence of Mesolithic layers (layers 3, 5, and 5a) with no possibility for dating, followed by the Epigravettian layers IIa and IIb with a radiocarbon date 14.280±90 BP (Kuhn, this issue for further discussion). Although this hiatus between the Mesolithic and the Epigravettian added to the complexity of the stratigraphy, the study of the corresponding lithic industries presented a certain degree of continuity between these two cultural horizons. Later research and excavations in mainland Greece and the Aegean (Sampson, 2001; Sampson *et al.*, 2002, 2003; Kyparissi-Apostolika, 2003; Kaczanowska and Kozłowski, 2006) offered important information pertaining to the debate as to the origin of agriculture in Greece. In the Argolid proper, another surface survey specifically planned for locating Mesolithic sites along the coastal area of Kandia and Nauplia in 2003, has shown that this area was exploited by foragers. Several Mesolithic cave sites with industries of the same lower Mesolithic type as in Klissoura and Franchthi were found (Runnels *et al.*, 2005).

The excavation of Klissoura cave 1 went on with some difficulties in distinguishing the multiple phases of the Upper Palaeolithic inhabitations succeeding the Aurignacian and preceding the Epigravettian layers (layers III' and III''). Besides inter-stratification, the dryness of the sediments and the layers of ashy dust and ash in various degrees of combustion produced by numerous hearths made those dense anthropogenic layers a real puzzle and caused a relabelling of the strata. Another drawback was that in spite of so many hearths structures, sufficient amounts of wood charcoal for dating was not available. As a result, initial dating attempted, on carbonates, yielded dates that clearly were too young.

In addition to preliminary sorting on site, washing of the lithic and bone material and sorting and the study of the finds was done at the Primary school of the village of Prosymna, which was kindly placed at our disposal by the then Head of the Community of Prosymna, Christos Petselis, and the Commission for School Buildings of Argolid. The geologist Maciej Pawlikowski, when not at the excavation to "decipher" the sediments, was investigating the area around the cave to locate possible raw material sources. The use of the facilities provided by this school contributed to the efficiency of our work, whose duration was that of three weeks maximum in the first seasons. Preliminary study of the material in our field laboratory facilitated the handling of such a great volume of finds and simultaneously contributed to a better understanding of the issues relating to the continuity or discontinuity between the successive statigraphic layers.

In the season of 1996 Prof. B. Ginter of Jagiellonian University was added to the team and we also had the pleasure to have with us Prof. Ofer Bar-Yosef of Harvard University, who participated in our work and in the preparation of a paper on raw material procurement at Klissoura, which he delivered on our behalf at the 121 Congres national des societes historiques et scientifiques held at Nice that year (Koumouzelis *et al.*,

2003b). In 1996 a 3-year grant has awarded to the Jagiellonian University by the Polish Ministry of Science for the excavation at the Klissoura Cave 1. During excavation the two southernmost squares (A4 and B4) were abandoned as unproductive. Now Trench A measured 2 × 3 m^2. The excavation reached a depth of 2 m below surface, through the multi-facetted layer III (post-Aurignacian layers III' and III'', Aurignacian IIIa-g), Aurignacian IV, the Early Upper Palaeolithic V, Middle Palaeolithic VI and the beginning of VII, a sequence representing what we thought to be the complete transitional phase from the Upper to the Middle Palaeolithic. Besides the lithic industries and the fauna remains, various other cultural elements were exposed, indicating that human presence at this shelter was more intense at times: in Layer IIIc, a curious round structure constructed from river cobbles and measuring 1.5 m in diameter was surrounded by a pavement of small limestone debris. It contained numerous fragments of bone and broken phalanges, flakes and other lithic waste, which might suggest its use as a place for the extraction of bone marrow (Koumouzelis and Kozłowski, 1996: fig.3; Koumouzelis *et al.*, 1996).

More remarkable are a long series of clay-lined and basin-like hearth structures, which were clearly cut in the floor, as shown in the profiles of our trench. These hearths were lined with successive layers of clay and their interiors baked by fires or hot embers. The majority of these hearths occur in the Aurignacian Layer IV. Maciej Pawlikowski undertook the first analysis of these structures and their composition, proving that the material was indeed clay that was brought to the cave from an external source with the intention of creating these hearths (Pawlikowski *et al.*, 2000). Their further study was taken over by the geologist of the Ephoreia of Palaeoanthropology and Speleology, P. Karkanas, who joined our team in 2001 as a specialist in the study of cave sediments (Karkanas *et al.*, 2004).

The layers IIIa-g and IV are the only deep Aurignacian stratigraphic sequence found in situ in Greece. These are especially significant in that they exhibit multiple phases and several cultural and technological aspects of this early hunter-gatherer society, such as simple architecture, clay hearths, bone and antler tools, and shell ornaments (Stiner, this issue). Before the excavations at Klissoura 1, the Aurignacian was scantily known from a concentration of lithic artifacts from Eleochori in Western Peloponnese, near Patras. These were found during a surface survey, and they constituted the only remnants of the Upper Paleolithic period. They are attributed to an "archaic Aurignacian industry conserving some Middle Palaeolithic characteristics", or to a transitional stage from Middle to Upper Palaeolithic on the basis of fragments of artifacts with bifacial retouch (Darlas, 1989, 1999). The in situ Aurignacian assemblage from Franchthi Cave is poorly represented, as is that from the Theopetra Cave in Thessaly (Adam, 1999). To this has to be added a small number of possibly Aurignacian artifacts found with a skull in Laconia (Darlas, 1995). Finally in a surface survey Aurignacian finds were noted in a cave in Epirus (Runnels *et al.*, 2003).

The most important event of 1996, however, was the excavation of Layer V, with its diagnostic industry of arched backed blades that presented affinities with the Uluzzian culture. It posed questions about the origin of its makers and pointed towards Italy rather than to the Balkans as a place of origin.

The following year, 1997, we had reached layer X with a Mousterian industry produced on different raw materials, at a depth of 2.6 m in all six excavation squares. To investigate the Middle Palaeolithic strata we figured that we had to enlarge our trench, whose surface was already slightly reduced at the sides for reasons of safety. In the fall, after the excavations, the geologist E. Kambouroglou and D. Bouzas of the Ephoreia took samples with a geological borer at the base of our trench to give us an idea of the remaining depth of the archaeological deposits. This measurement went down an additional 4.2 m (6.8 m from the surface) without reaching bedrock.

That same year, given the paucity of wood charcoal and the strangely young dates for our Aurignacian levels based on carbonates and one much earlier date based on wood charcoal, we turned to alternative dating methods such as thermoluminescence and multiplication of measurements on organic material. For this reason Dr. H. Valladas of the Centre des Faibles Radioactivites, C.N.R.S. of France, came to the site to plant the first dosimeters in the sediments, in October

1997. Meanwhile, the rich material that had been accumulated over the years could not be studied in its entirety during the excavation seasons. For this reason, it was decided to slow down the excavation while focusing on the study of the material. Accordingly, the 1998 field season was mainly dedicated to the study of material. At the cave, we also prepared the area for an extension to the east by removing a huge pile of stones and leveling the ground, before enlarging the trench 2 × 3 m with the addition of squares AA1-2, BB1-2, CC1-2, and the removal of the surface layer.

During the two following years, abiding to a regulation of the Greek Ministry of Culture for a temporary stoppage of the "systematic" (i.e. non-salvage) excavations, we limited ourselves to the study of the material, which led to the publication of the results up to this time (Koumouzelis *et al.*, 2001a, b). In view of the heavy workloads and depth of the Paleolithic deposits, Valery Sitlivy of the Musees Royaux d' Art et d' Histoire of Brussels joined our team in 1999 to participate in the excavation and the study.

The excavation resumed in 2001. Trench A was now extended 3 × 3 m to the east (squares AA1-3, BB1-3, CC1-3) to cover a total area of 3 × 5 m, in order to investigate the deep deposits properly. From this time on the excavation seasons lasted for at least one month. The same complex stratigraphic sequence was again met in these new squares, with localized inter-stratifications, pits, dry pulverized ashy sediments and a very limited occurrence of charcoal remains to a depth of 1.15 m. At this point P. Karkanas, was called upon to help address stratigraphic problems with the help of micromorphological analysis.

Thanks to a grant from the Institute for Aegean Prehistory (INSTAP) which has been awarded to us from 2002 to today, Karkanas' samples of sediment blocks collected from the profiles over the years could be prepared at the Lab of our Ephoreia and at the Wiener Lab of the American School of Classical Studies at Athens. These were then sent to the Spectrum Petrographics Lab, Oregon U.S.A. or later at the Quality thin Sections Lab, Tucson, Arizona, U.S.A. to be transformed to thin sections for the study of microstructure and the constituents of the archaeological sediments. The micromorpholgical studies have been invaluable, since they showed discontinuities in the sediments that were not visible macroscopically or by the study of the archaeological material alone. Karkanas also initiated a new series of AMS dates, which required much smaller pieces of charcoal than the conventional methods. These charcoal samples were carefully selected by the anthracologist M. Ntinou, who joined us in 2002. Before this, we had only one AMS date (Gif-99168, 40.010±740 BP) on burnt bone from layer V. According to this date, the Uluzzian at Klissoura 1 preceded in time the Uluzzian sites in Italy. In contrast, the analysis of the industries indicated affinities with the middle or even the upper Uluzzian in Italy (Koumouzelis *et al.*, 2001b: 480–482). For this reason we urgently needed a valid radiocarbon chronology for layer V and the other cultural layers. Yet, the new dates done at the Weizmann Institute of Science in Rehovot, Israel, on wood charcoal provided reliable results for all the other layers except for layer V, the results for which still seemed too young (Kuhn, this issue).

That year the excavation lasted five weeks and proceeded to a depth of 2.15 m – through the Aurignacian (Layers IIIa-g and IV), the Early Upper Palaeolithic (Layer V) and Middle Palaeolithic layers VI, VII and VIII. The most remarkable finds were located in Layer IV and consisted of an oval structure 2.3 × 2 m defined by large stones, and surrounded by a great number of red clay hearths, three of which were moved as a block and are now on display at the new archaeological Museum of Nauplia.[4] The stone structure occupied the squares AA2-AA3-BB2-BB3 between the depths of 1.40–1.70 m below the surface. The stones, which were not related to the natural structure of the cave, had been transported from the outside. They were sizeable and along the southern edge lay close together, while others on the northern side lay loose as if they had rolled or shifted. The whole arrangement displayed an intentional planning and not an accidental formation. A hearth (H. 87) was attached to its eastern edge, the ashes of which spread into the structural feature by water action at an elevation 1.50 m below surface. The sediment within this structure was of a distinctly red color, while the surrounding area outside the structure was characterized by a grayish-brown sediment. In the area occupied by the shelter the majority of the ornaments,

fragments of bone points and a high concentration of lithic items were recovered (Kaczanowska *et al.*, this issue; Stiner, this issue). At a depth of 1.55 m in square CC1, about 1m from the stone shelter, lay the three hearths 89A, 89B and 89C that have since been removed to the Museum. They lay one next to the other, "cemented" together with compact, crystallized ashes and many lithics and bone fragments.

In this eastern part of the trench many more clay hearths were well preserved. Several of these are bisected in the northern profile of our excavation. It is of significance that no clay hearth was found in the excavation of the southernmost square AA4 and BB4, despite their abundance elsewhere in Layer IV. The structure and all the red clay hearths were built behind the drip line of the cave, close to the north wall. The potential of Layer IV for behavioral studies is on par with rare cases reported elsewhere in Eurasia, such as the secondary hearths of Aurignacian I phase at Abri Pataud that were suggested by Binford to represent an arrangement of beds between the hearths. Given that at Klissoura 1 there is evidence for possible floor covering inside the structure in Layer IV (Stiner, this issue), it would be tempting to consider some aspect of Binford's (1983) archaeological model at our site. Regarding the stone structure, larger circular habitation structures have been found in the cave of Arcy-sur-Cure in association with the Chatelperronian (around 40,000 years BP), and in the Aurignacian level (around 35,000 years BP), where, according to Leroi-Gourhan (1976), the cave was simply a second roof over human-built habitations. The size of the stone-rimmed feature in Klissoura Cave 1 is quite small and, if truly a dwelling, was a sleeping place for just one, two or at most three individuals. On account of the great number of finds within this feature, it could also have served as a ceremonial place or even as a cache.

In 2003, before the beginning of the excavation season many new dosimeters were added to the Middle Palaeolithic layers by Drs H. Valladas and N. Mercier. Starting from 2.15 m below surface our excavation grid system of 1 × 1 m^2 units was modified to excavation by quarter meter quadrants to increase the precision of spatial recording. In addition to dry-sieving in the field, the sediments from all of these sub-squares were water-sieved under the supervision of the anthracologist M. Ntinou. This procedure permitted systematica collection of all minuscule seeds, charcoal, and the smallest microfaunal remains. The excavation for that year ended at 3 m below surface. Another borehole ascertained that the thickness of the archaeological deposits below this level exceeded 3.5 m in depth.

At this point, it seemed to us preferable to proceed to the publication of the Upper Palaeolithic and Mesolithic at Klissoura without waiting for the end of the excavation of all the Middle Palaeolithic layers. Following this decision J. Kozłowski, M. Kaczanowska, K. Sobczyk agreed to conduct the analysis of the Upper Palaeolithic and Mesolithic lithic industries and prepare it for publication. T. Tomek and Z. Bochenski would treat the bird bones and P. Wojtal the mammal bones coming from the original Trench A (squares A1-3, B1-3). The excavation and study of the Middle Palaeolithic layers was agreed to be continued by V. Sitlivy and K. Sobczyk. At this point our group was expanded to include the expertise of specialists from the University of Arizona: S. Kuhn would join in the study of lithics and organize further efforts at radiocarbon dating using new pretreatment methods in collaboration with J. Pigati, M. Stiner and their PhD student, B. Starkovitch, would study the fauna, dietary changes and economy of the site. M. Stiner also undertook the study of the shell ornaments. In the following years work continued as planned with the two teams working at their tasks. Additionally, the final publication of the Late Palaeolithic material from Caves 4 and 7 appeared in the Fall of 2004 (Koumouzelis *et al.*, 2004).

In 2005, due to some discrepancies in the succession of the upper layers and to the problematic relation between layers IV, V, and below with regard to the sedimentary transition from the Middle to Upper Palaeolithic layers, we decided to reinvestigate these strata geologically, from the Mesolithic down to the Early Upper Palaeolithic. Another reason for this investigation was to collect as many pieces of wood charcoal as possible, with the application of our finer excavation grid and the water sieving of all the sediments. The new extension was an area of 1 × 1.5 m to the south, in squares AA4 and BB4. The archaeologist of the Ephoreia of Palaeoanthropology and

Speleology, Georgia Tsartsidou, a specialist in georchaeology and particularly in phytolith analysis, undertook the excavation of this trench for the years 2005–2006. The results were positive, as long-awaited charcoal pieces for reliable C_{14} dates were recovered. We were thus well equipped with a new series of wood charcoal remains from almost all the layers up to VII, to attempt AMS dating with an ABOX pretreatment at the Laboratory of the University of Arizona. This method of pretreatment had been used recently with satisfactory results at other sites containing Middle to Upper Palaeolithic industries, including the key site of Fumane Cave in Northern Italy, where a reevaluation of the radiocarbon corpus pushed back the Proto-Aurignacian to 35.000 BP and the Uluzzian to 40.1–41.6 Ka BP (Higham *et al.*, 2009), thus surpassing the usual limits of 35 Ka BP. Once more, this effort did not resolve the age of layer V at Klissoura 1, although it did help to clarify ages for some of the other layers (Kuhn, this issue).

In 2006 and 2007 the studies continued in all the fronts: the lithic industries and the shells were studied at the school at Prosymna, which served as our "headquarters" for the various teams of scholars in May–June and others in September. From 2006 to 2008 the Polish participation in the study was funded by another research grant of the Polish Ministry of Sciences and the American participation by a grant from the National Science Foundation. The faunal remains were studied at the Wiener Laboratory of the American School of Classical Studies at Athens through 2009. At the same time the sample processing for phytolith analysis continued at the Laboratory of Prehistory, Ancient History and Archaeology of the University of Barcelona and they were studied by R.M. Albert. M. Ntinou worked at the Wiener Laboratory of the American School of Classical Studies at Athens and at the Laboratory of the University of Valencia, Spain. As far as pollen analysis is concerned, although Dr. K. Kouli, a specialist of the Department of Geology and Geoenvironment of the University of Athens collected a large number of samples, only few of them were found to contain extremely low pollen concentrations, due to bad preservation in the sediments. The second volume will contain the Middle Palaeolithic and some complementary studies on the Upper Palaolithic, which could not be included in this volume.

In June 2008 all the scholars were ready to have a meeting in Athens for a small conference leading to publication. The meeting was held on June 3rd and 4th at the Stathatos building of the Museum of Cycladic Art, courtesy of its Director, Prof. N. Stambolidis.

Immediately after the meeting we were called to participate in the RESET (Response of Humans to Abrupt Environmental Transitions) project of tephra chronology by a Research Consortium of four Institutions of the U.K. Samples from the Klissoura sediments were collected in September 2008. Initial scans of the samples indicated the presence of at least one, possibly two, tephras at the site. Of particular interest is that the highest shard counts come from directly above the uppermost Uluzzian level. This tephra could be the same as has been identified at Franchthi Cave, and perhaps the Campanian Ignimbrite or Y-5, previously dated to 39.3 ka BP (Higham *et al.*, 2009). If so, then our layer V must be older than this.

Now that all the papers have been finished and the general conclusions presented in a synthesis, I am in the very pleasant position to present this volume to the Academic community, and I am confident that all the efforts of so many people for so many years have brought useful and valuable information to light.

Acknowledgements

The excavation at Cave 1 of the Klisoura Gorge was supported by the Ephoreia of Palaeoanthropology and Speleology of the Ministry of Culture of Greece and the Jagiellonian University – Kraków. From 1996 was obtained the grant of the Polish Ministry of Higher Education and Science and from 2002 to today this project has received generous grants from the Institute for Aegean Prehistory (INSTAP). The research of the American team was funded by a grant from the National Science Foundation. We wish to thank the successive Directors of the Ephoreia Drs. Yannis Tzedakis for issuing the permit, and Stavroula Samartzidou and Nina Kyparissi-Apostolika for constant material and moral help. We would like to express our gratitude to Prof. B. Ginter for his participation in the excavation and in the study of the lithics for many years and to Dr. Jarosław Wilczyński for his assistance in the study of lithics from the Upper Palaeolithic layers during the

last two study seasons. The topographer of the Ephoreia Theodoros Hatzitheodorou did the plan and the profile of the cave and fixed the steady point for the elevation measurements.

Besides the local workers that were hired every year, the students from the Archaeology Department of the University of Athens Christos Koutsothanassis, Vassilis Marinis, Nicholas Papazarkadas, Nicholas Konstas, Dimitris Kritharas and Dimitris Hatzilazarou participated in our project from 1994 to 1997. They did the dry-sieving of all the sediments, helped the conservator of our Ephoreia Panagiota Gioni in washing and curating the material, they did the sorting under the supervision of the archaeologists, and helped the technician Irene Provatou in water-sieving. We wish to thank the Head of the Community of Prosymna for these years Mr. Christos Petselis for assuring food and lodging for these students. Among the workers of Prosymna Panagiotis Stamatis, Giorgos Kakouros, Takis Dimas and the late Giorgos Kremmidas offered their services to us for many years and were readily available for help.at any time.Nelly Skoumi did a lot of sorting for microfauna bone and charcoal from the dry residue of the water-sieve.

Thanks are also due to Ritza Tsihlakis-Koumouzelis and Nicholas Thompson for proof-reading and correcting this text and Mary Stiner for major editing. I also want to thank my brother Tassos Koumouzelis, who has stood by me through good and bad times, for multiple trips to and from Prosymna transporting material from the Storeroom to the researchers and back. Last but not least, I wish to thank Aspasia Lagopodis, the secretary of the Ephoreia, for typing all the pages of administrative and other texts concerning Klissoura over the years, including these.

REFERENCES

ADAM E. 1999. Preliminary presentation of the Upper Palaeolithic and Mesolithic stone industries of Theopetra Cave, Western Thessaly. In: G.N. Bailey, E. Adam, E. Panagopoulou, C. Perlès, K. Zachos (eds) *The Palaeolithic Archaeology of Greece and Adjacent Areas, Proceedings of the ICOPAG Conference*. BSA Studies 3, London, 266–270.

BINFORD L.R. 1983. *In Pursuit of the Past: Decoding the Archaeological Record*. Thames and Hudson, New York.

BLEGEN C.W. 1937. *Prosymna*: *The Helladic Settlement preceding the Argive Heraeum.* Cambridge University Press, Cambridge.

BLEGEN C.W. 1927. Excavations at Nemea 1926. *American Journal of Archaeology* 31, 421–440.

BLEGEN C.W. 1975. Neolithic remains at Nemea. *Hesperia* 44, 251–279.

CASKEY J.L. 1957. Excavations at Lerna 1956. *Hesperia* 26, 142–162.

CASKEY J.L. 1958. Excavations at Lerna 1957. *Hesperia* 27, 125–144.

DARLAS A. 1989. I Orinakia Lithotechnia tou Elaiochoriou Achaias. *Archaiologike Ephemeris* 128, 137–159.

DARLAS A. 1995. Ta lithina ergaleia tou skeletou LAO 1/S3 (Apedema-Mani). *Acta Anthropologica* 1, 59–62.

DARLAS A. 1999. Paleolithic research in western Achaia. In: G.N. Bailey, E. Adam, E. Panagopoulou, C. Perles, K. Zachos (eds) *The Palaeolithic Archaeology of Greece and Adjacent Areas, Proceedings of the ICOPAG Conference*. BSA Studies 3, London, 303–310.

HIGHAM T., BROCK F., PERESANI M., BROGLIO A., WOOD R., DOUKA K. 2009. Problems with radiocarbon dating the Middle to Upper Palaeolithic transition in Italy. *Quaternary Science Reviews* 28, 1257–1267.

JACOBSEN T.W. 1973. Excavations in the Franhthi Cave, 1969–1971. *Hesperia* 42, 253–283.

JOHNSON M. 1996. The Neolithic Period. In: B. Wells, C. Runnels (eds) *Berbati-Limnes Archaeological Survey 1988–1990*. Paul Astroms Forlag, Jonsered, 37–73.

KACZANOWSKA M., KOZŁOWSKI J.K. 2006. Palaeolithic Traditions, Mesolithic adaptations and Neolithic industries (in Greek). In: A. Sampson (ed.) *I Proistoria tou Aigaiou:Paleolithike-Mesolithike-Neolithike*. Atrapos, Athens, 67–87.

KARKANAS P., KOUMOUZELIS M., KOZŁOWSKI J.K., SITLIVY V., SOBCZYK K., BERNA F., WEINER S. 2004. The earliest evidence for clay hearths: Aurignacian features in Klisoura Cave 1, Southern Greece. *Antiquity* 78, 513–525.

KOUMOUZELIS M., KOZŁOWSKI J.K. 1996. Oi Proistorikes Thesseis sto Pharangi tes Klissouras. *Archaeologia* 60, 58–62.

KOUMOUZELIS M., KOZŁOWSKI J.K., NOWAK M., SOBCZYK K., KACZANOWSKA M., PAWLIKOWSKI M., PAZDUR A. 1996. Prehistoric settlement in the Klisoura Gorge, Argolid, Greece (excavations 1993, 1994). *Prehistoire Europeenne* 8, 143–174.

KOUMOUZELIS M., GINTER B., KOZŁOWSKI J.K., PAWLIKOWSKI M., BAR-YOSEF O., ALBERT M., WOJTAL P., LIPECKI P., TOMEK T., BOCHEŃSKI Z.M., PAZDUR A. 2001a. The Early Upper Paleolithic in Greece: The excavations in Klisoura gorge. *Journal of Archaeological Science* 28, 515–539.

KOUMOUZELIS M., KOZŁOWSKI J.K., ESCUTENAIRE C., SITLIVY V., SOBCZYK K., VALLA-

DAS H., TISNERAT-LABORDE N., WOJTAL P., GINTER B. 2001b. La fin du Paleolithique moyen et le debut du Paleolithique superieur en Grece: la sequence de la Grotte no 1 de Klisoura. *L'Anthropologie* 105, 469–304.

KOUMOUZELIS M., KOZŁOWSKI J.K., GINTER B. 2003a. Mesolithic finds from Cave 1 in the Klisoura Gorge, Argolid. In: N.Galanidou, C. Perles (eds) *The Greek Mesolithic. Problems and Perspectives*. BSA Studies 10, London, 113–122.

KOUMOUZELIS M., KOZŁOWSKI J.K., KACZANOWSKA M., PAWLIKOWSKI M., BAR-YOSEF O. 2003b. Contrasting Raw Materials Procurement Systems in the Upper Palaeolithic, Mesolithic and Neolithic of Argolid (Greece). In: B. Vandermeersch (ed.) *Échanges et diffusion dans la préhistoire méditerranéenne*. *Actes de Congres nationaux des Societes historiques 121 Nice 1996*. Éditions du Comité des Travaux Historiques et Scientifiques, Paris, 7–13.

KOUMOUZELIS M., KOZŁOWSKI J.K., KACZANOWSKA M. 2004. End of the Paleolithic in the Argolid (Greece): Excavation in Cave 4 and Cave 7 in the Klisoura Gorge. *Eurasian Prehistory* 2(2), 33–56.

KYPARISSI-APOSTOLIKA N. 2003. The Mesolithic in Theopetra Cave: new data on a debated period of Greek prehistory. In: N. Galanidou, C. Perles (eds) *The Greek Mesolithic. Problems and Perspectives.* BSA Studies 10, London, 189–198.

LAVEZZI J.C. 1978. Prehistoric investigations at Corinth. *Hesperia* 47, 402–451.

LEROI-GOURHAN A. 1976. Les structures d'habitat au Paléolithique supérieur. In : H. de Lumley (ed.) *La Préhistoire Française*. Centre National de la Recherche Scientifique, Paris, 656–663.

PAPAHATZIS, N. 1989. *Pausaniou Hellados Periegessis* Book II and III. Ekdotike Athenon, Athens, II 15.4-6; II 17.1–3.

PAWLIKOWSKI M., KOUMOUZELIS M., GINTER B., KOZŁOWSKI J.K. 2000. Emerging Geramic Technology in Structured Aurignacian Hearths at Klisoura Gave 1 in Greece. *Archaeology Ethnology and Anthropology of Eurasia* 4, 19–29.

PERLÈS C. 1990. *Les industries lithiques taillées de Franchthi (Argolide, Grèce), Vol. II: Les industries du Mésolithique et du Néolithique Initial (Excavations at Franchthi Cave, Greece*, *Fasc. 5)*. Indiana University Press, Bloomington & Indianapolis, IN.

PROTONOTARIOU-DEILAKI E. 1992. Paratereseis sten Prokeramike (apo te Thessalia sta Dendra tes Argolidos). In: *Diethnes Synedrio gia ten archaea Thessalia ste mneme tou Demetriou R. Theochare*. TAPA, Athens, 97–111.

REISCH L. 1976. Beobachtungen an Vogelknochen aus der Spatpleistozen der Hohle von Kephalari. *Archaologisches Korrespondenzblatt* 6, 261–265.

RUNNELS C.N., KARIMALI E., CULLEN B. 2003. Early Upper Paleolithic Spilaion: an artifact-rich surface site. In: J. Wiseman, K. Zachos (eds) *Landscape archaeology in Southern Epirus, Greece I (Hesperia Supplement 32)*. American School of Classical Studies at Athens, Princeton, 135–156.

RUNNELS C., PANAGOPOULOU E., MURRAY P., TSARTSIDOU G., ALLENS S., MULLEN K., TOURLOUKIS E. 2005. A Mesolithic landscape in Greece: Testing a site-location model in the Argolid at Kandia. *Journal of Mediterranean Archaeololgy* 18, 259–285.

SAFLUND G. 1965. *Excavations at Berbati 1936–1937*. *Stockholm Studies in Archaeology 4.* Almqvist et Wiksell, Stockholm-Uppsala-Göteborg.

SAMPSON A. 2001. *Archaeologike erevna stis Vories Sporades*. Demos Alonnisou, Alonnisos.

SAMPSON A., KOZŁOWSKI J.K., KACZANOWSKA M., GIANNOULI B. 2002. The Mesolithic settlement at Maroulas, Kythnos. *Mediterranean Archaeology and Archaeometry* 2, 45–67.

SAMPSON A., KOZŁOWSKI J.K., KACZANOWSKA M. 2003. Mesolithic chipped stone industries from the Cave of Cyclope on the island of Youra (northern Sporades). In: N. Galanidou, C. Perles (eds) *The Greek Mesolithic. Problems and Perspectives.* BSA Studies 10, London, 123–141.

WEINBERG S.S. 1937. Remains from Prehistoric Corinth. *Hesperia* 6, 487–524.

WELLS B., RUNNELS C. 1996. *The Berbati-Limnes Archaeological Survey 1988–1990*. Paul Astroms Forlag, Jonsered.

WRIGHT J.C., CHERRY J.F., DAVIS J.L., MANTZOURANI E., SUTTONS S.B. 1990. The Nemea Valley Archaeological Project. Preliminary report. *Hesperia* 59, 579–645.

Notes

1. We wish to thank Dimitris Dimas-Katsaris for giving us permission to excavate on his property. In all these years he has been helpful in allowing us entrance to his fields even at times when the excavation was not going on, and in providing running water and electricity when needed.
2. These trial excavations were funded by the Community of Prosymna. The head of the Community of Prosymna (Berbati) at that time was Mr. Panos Soteriou, who kindly provided workers but also food during those days and a lot of help to our speleologists, for the investigation of the two varathra – caves high on the mountains to the south of the valley of Prosymna. Mr. Soteriou has offered constant

help in many ways and good advice during all these years.

3. Excavation at the site was conducted by the archaeologists mainly with the use of the trowel. Only in cases of very compacted soils we made use of small hoes and handpicks. The workers did the dry-sieving and washing, the water sieving and the sorting of the material by category (bones, shells, lithics, ochre, etc.) under the supervision of archaeologists. During the field work these standardized methods were applied:

– detailed topographic analysis;
– establishment of the grid 1×1 m up to a depth of 2,15m below surface in all the excavation units. Starting from this depth in 2003 a new grid of quarter-meter squares was applied to the deepest Middle Palaeolithic layers and in the Upper Palaeolithic sediments of the trench AA4-BB4;
– each arbitrary level, in each square meter was excavated by spits of 5 cm with systematic use of the theodolite and the stadia rod;
– the stratigraphic analysis of the archaeological layers by the horizontal and vertical axis;
– at the base of each 5cm spit the excavated surface was photographed and drawn. All the profiles of the trench were also drawn and photographed after the establishment of a grid system of 0.50 x 0.50 m;
– macroscopic analysis while digging (texture, color, constituents etc.) and detailed drawing of the geological and archaeological stratigraphic plans;
– sampling for micromorphological analysis: Blocks of sediments were collected from all the excavated profiles with undisturbed and oriented samples, which preserve the original geometrical relationship of the constituents. Micromorphology has been shown to be an essential tool for the study of site formation processes, palaeoenvironmental changes in regional and micro-regional scale and for addressing geoarchaeological questions related to post-depositional modifications;
– water-sieving: sampling from entirely undisturbed areas, ash layers, hearth units and areas with distinct archaeological features, in the original trench and all the other levels up to a depth of 2,15m. From this point on, all the sediments were dry and water sieved.

Charcoal analysis (anthracology) : site sampling was applied to all the excavated units and along the vertical sequence. Once the fragments had been water sieved and dried they were examined microscopically and identified (thanks to the anatomy of the wood) normally to the genus level and sometimes even to species level was possible.

4. The conservator Panos Polydoropoulos, aided by Lakis Kontrolozos, did all the preparation of the three clay – lined hearths for their removal as a block and for their transpotatation to the Storeroom of the Museum of Argos first. Then he worked to set them up for exhibition at the new Museum of Nauplia.