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Cover illustration: Finds from the Hellenistic grave at Chalkis, Aetolia.
Photograph by Henrik Frost.

Greek-Danish Excavations at
Aetolian Chalkis 1999-2001.
Third Preliminary Report

*Edited by Søren Dietz, Lazaros Kolonas, Sanne Houby-Nielsen,
Ioannis Moschos and Jonas Eiring*

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The Cave of Hagios Nikolaos near Kato Vasiliki in Aetolia: Flint- Technological Observations

Lasse Sørensen

Introduction

Information on prehistoric activity in mainland Greece is very scattered, and Hagios Nikolaos is one of the first investigated caves in southern Aetolia. The basis of this paper is mixed lithic material from the cave, found by dry sieving random parts of the surface inside the cave. Despite the unfavourable find circumstances, the lithic material can still provide an interpretative challenge. How do we interpret, with a hermeneutical approach, the archaeological record from rock shelters or open-air sites, which through natural erosion or modern or historic destructions, present very mixed deposits of lithic material? Some might say that the material is not useful, because it is impossible to date, even though it contains a vast amount of research potential. The question still remains whether it is possible to use different archaeological methods on the lithic material from these sites.

The Hagios Nikolaos cave is situated on the western side of the mountain

Varassova (914 m) near the coastal village of Kato Vasiliki. The opening of the cave faces west and offers a good view of the Gulf of Patras. Today, the depth in this region of the gulf never exceeds 80 m, but during the periods of low sea level until the last glaciation most of the gulf was land. In the transition between the Late Pleistocene and Early Holocene the sea level rose and the Gulf of Patras emerged.¹ The region around the gulf is well known for its large concentration of caves, due to the strong karstic limestone found in the area.²

Not many of those have been excavated but some lithic material was registered in the cave of Hagios Nikolaos in connection with the 1996 Chalkis field survey.³ Hagios Nikolaos, named after the monastery built inside it, is a very large cave of approximately 400 square metres, containing a large amount of prehistoric lithic material. The monastery was dated by the pottery to the Byzantine period. During the construction of the monastery, the original cultural layers were damaged, but it is possible that there are still

¹ C. Runnels *et al.*, in *BSA Studies* 3, 120-29; T.H. Van Andel and J.C. Shackleton, *Journal of Field Archaeology* 9 (1982), 445-54.

² K.S. Petersen, in *SPR*, 269-75.

³ A. Darlas, in *BSA Studies* 3, 303-10; Dietz and Kolonas, in *FPR*.

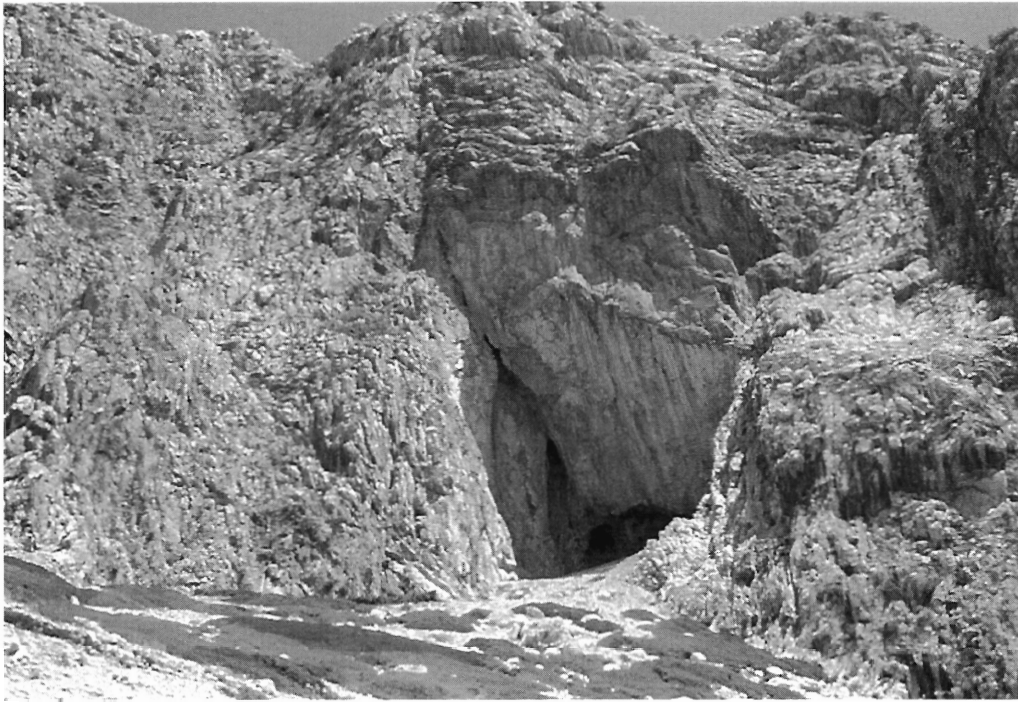


Fig. 1. Cave of Hagios Nikolaos. Photo Lasse Sørensen 2000.

sealed deposits under the foundations. Bedrock has not yet been reached in any part of the disturbed areas. In 1999 and 2000 the Byzantine monastery and its foundations were restored, which meant removal of deposits with a considerable amount of lithic material. Because the material from the 1996 field survey consisted of approximately 50 pieces of *débitage*, it was decided to conduct further surveys in and around the cave in order to get a more accurate picture of the lithic material (Figs. 1-2).

Field surveys

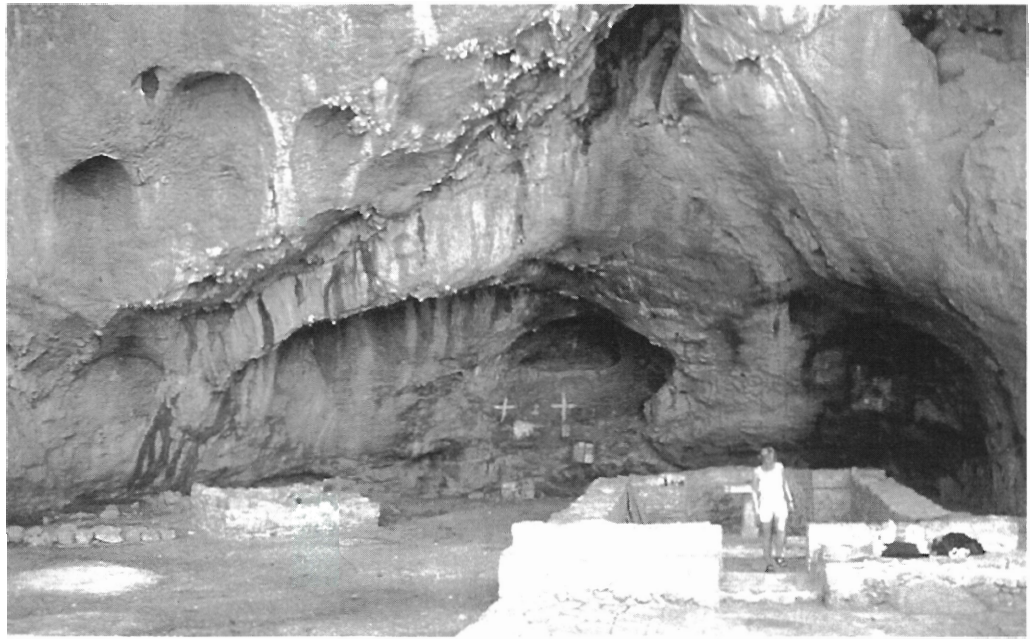
In 1999 and 2000, five field surveys were carried out around and inside the cave. It was observed that the earlier disturbance from the monastery and the current restoration had spread lithic material all over the surface inside

the cave. This caused certain problems to the strategy of the survey. The normal procedure of a survey is for team members to advance in a line, spaced from 1 to 2 m, back and forth as if ploughing a field, until the total surface is investigated. In that way it is possible to cluster the habitation and flint knapping areas. The strategy has been used and revealed several important prehistoric sites in Boeotia, around Nemea in the Argolis, in Euboia, in the Grevena area, and finally some of the many sites in Epirus (Asprochaliko, Kastritsa, Magalakkos, Boila and Klithi). The sites in Epirus were discovered and explored by British teams led by E. Higgs and G. N. Bailey.⁴

In the case of Hagios Nikolaos, this survey method would be pointless since the lithics were not found *in situ*.

⁴ Perlès 2001, 24; T.H. Van Andel and C. Runnels, *Beyond the Acropolis* (Stanford 1987), 33ff.

Fig. 2. Interior of the cave with foundations of the Byzantine monastery. Photo Lasse Sørensen 2000.



The lithics were therefore collected randomly all over the cave. A general problem concerning surveys is the fact that the eye focuses on large objects and that small ones, like small flakes and tools, are often overlooked. The lithic material in the cave was therefore found by dry sieving the soil through a 4 mm mesh. This sieving method has proved its efficiency in finding small stone objects in the detailed survey at the Early Neolithic site of Çatalhöyük in Turkey.⁵

By dry sieving a large amount of worked lithic material was recovered from both inside and outside the cave, including some small flint chips from the cave. Experimental flint knapping shows that such small chips occur in connection with flint knapping areas.⁶

Some burnt lithic material was also found in the cave, indicating the presence of fireplaces or hearths. Organic material inside the cave consisted of bones and a large amount of land snails. The bones were most probably refuse from the Byzantine monastery, but it cannot be excluded that some of the bones could have a much earlier date. The snail shells are particularly interesting, since they have been registered in layers of other sites with Mesolithic and Palaeolithic material.⁷ This particular find situation, together with coastal molluscs, occurs in caves from the southern part of Greece, such as Franchthi, Zäimis, Ulbrich, Sidari and Klisoura. In Klisoura and Franchthi almost all the land snails belonged to the same species, *Helix Figulina*, found in the Late Pleisto-

⁵ D. Baird, in I. Hodder (ed.), *On the surface: Çatalhöyük 1993-95, Çatalhöyük Project 1* (London 1996), 41-46; J. Conolly, *ibid.*, 173-98.

⁶ L. Johansen and D. Stapert, in N.J. Conard and C.J. Kind (eds.), *Aktuelle Forschungen zum Mesolithikum, Urgeschichtliche Materialhefte* 12 (Tübingen 1998), 29-41.

⁷ Perlès, in *BSA Studies* 3, 314; Perlès 2001; Koumouzelis *et al.* 2001, 532.

cene layers. All these sites were interpreted by C. Perlès as indicating the exploitation of diversified and patchy environments, resulting in a diversified diet, with an apparent emphasis on the exploitation of numerous small-sized species. This might also have been the situation for the prehistoric habitants in Hagios Nikolaos. Finally it is important to stress that the only pottery found in the cave was of Byzantine date. The lack of earlier ceramics gives a *terminus ante quem* for the lithics in the Early Neolithic period. Is it possible to achieve an even more detailed date?

Some preliminary questions

The find circumstances give rise to some preliminary questions concerning the lithic material. Is it realistic to recreate a picture of the original function and activities inside the cave, and is it possible to give a preliminary date of the lithic material from a non-excavated settlement just by analysing the lithic material from five surveys?

In order to answer the questions, it is necessary to use archaeological methods such as the *chaîne opératoire*, which includes raw material studies, flint technology and flint typology. The advantage of *chaîne opératoire* is the focus on human intentions, decisions, choices and alternative pathways of technological production as described by Perlès.⁸ It is based on the presumption that lithic industry is one of a num-

ber of technological subsystems, open to and related with other activities, and that technology can be viewed as a series of optional solutions, linked together in the form of a decision-making strategy, aimed at achieving specific objectives.⁹ The results from these analyses make comparisons with lithic industries and settlement models from other parts of Greece possible. In the following passages of this paper, the Hagios Nikolaos material will be analysed according to the same methods.

Raw material studies

The predominant flint type, representing 98 % of the material, is radiolarite, which is dark red or almost chocolate-coloured flint. The quality is mainly good and fine-grained, and radiolarite is a very popular raw material, common in many Palaeolithic and Mesolithic assemblages in Greece and Anatolia.¹⁰ In certain cases, when the site is located near chert sources or far away from the coast, radiolarite is rarer. The fact that there was found a large amount of worked radiolarite material in the cave proves that there was easy access to that type of raw material. Although the exact provenance of the radiolarite remains under investigation, the preliminary surveys indicate that it is procured within a radius of approximately five kilometres from the site. It is possible that the inhabitants of the cave found the radiolarite after it had been washed out of the small stream, which runs down the

⁸ Franchthi 3, 27-84.

⁹ Tixier quoted in Franchthi 3, 26.

¹⁰ E. Adam, in *BSA Studies* 3, 267; M. Otte *et al.*, in *BSA Studies* 3, 82; Koumouzelis *et al.* 2001, 525; Perlès 2001, 202.

side of the mountain in the raining season.¹¹ A similar situation is observed at Upper Palaeolithic settlements in Epirus such as Klithi, Megalakkos and Boïla.¹² These sites rely almost exclusively on locally available flint, which is collected in the form of pebbles from rivers, and in form of nodules from primary contexts or, more commonly, from secondary deposits.

The remaining two per cent of the lithic material from Hagios Nikolaos consists of a dark grey and very coarse-grained flint, and a light yellow fine-grained flint. Exotic flints are present mainly in the form of blades and tools, and less commonly as cores. Although these exotic raw materials are present in relatively small quantities, their presence could be interpreted either as a by-product of visits to the site from further afield, or they could have been introduced as part of a deliberate procurement strategy, aimed at complementing the deficiencies of the local flint for producing longer blades, and for the production of tools made on small flakes and bladelets.

The difference between local and exotic raw materials is also mirrored in the technological *débitage* types, when separated according to type of material. Local raw materials are generally present in all stages of tool production (raw material acquisition, core production and exploitation, tool production, tool maintenance and discard)

as can be inferred from the different morphological types, whereas the exotic materials are generally absent in the earlier stages of tool making, which is raw material acquisition and core production. This makes the radiolarite assemblage ideal for further studies in the *chaîne opératoire*.¹³

Flint technology

The lithic material from Hagios Nikolaos showed evidence of four different flint-knapping techniques. The first technique, which is the hard direct percussion, is a direct blow against the raw flint nodule with a hammer stone made of quartz. Two of these hammer stones were found inside the cave. The flakes produced from hard direct percussion are relatively thick and have clear scars on the surface. The primary ends are heavily curved and often have scars. It is the “oldest” technique, but is known in all prehistoric contexts, being the basis for every flake or blade production.¹⁴

The second technique is the soft direct percussion, which is a direct blow against the raw flint nodule with a soft hammer stone made of chalk or a softer material, e.g. antler, bone or hard wood. This technique is also the starting point for many kinds of lithic productions, but is often associated with Upper Palaeolithic assemblages. The flakes produced in this particular technique are often thin and flat, and fur-

¹¹ Demoule and Perlès 1993, 358.

¹² E. Adam in *Klithi* 2, 482ff; A. Sinclair in *Klithi* 2, 421; C. Roubet in *Klithi* 1, 132ff; W. Shawcross and N. Winder, in *Klithi* 1, 181ff; E. Kotjabopoulou *et al.*, in *Klithi* 2, 427-37.

¹³ L.G. Straus, ‘The Role of Raw Materials in Lithic Assemblage Variability’, *Lithic Technology* 3 (1980), 71; E. Adam, in *Klithi* 1997, 481f.

¹⁴ Inizan *et al.* 1999, 74; Andrefsky 1998, 115ff.

thermore the bulb of percussion is wide and flat. The lithic material from the cave shows a large concentration of flakes and some blades, which are knapped with this particular technique. The technique is also used in many lithic productions throughout prehistory and is therefore not especially useful for dating the lithic material.¹⁵

The third technique is the soft elastic indirect percussion, better known as punch-percussion, which, as the name implies, is an indirect blow against the flint core. Here an antler billet and a hammer made of wood or antler is used. The main products from this technique are blades. The blades are more than 5 cm long and have a characteristic lip at the proximal end. Some of the blades from the cave are knapped in this technique, which emerges in Europe in the later part of the Upper Palaeolithic and continues in Greece until the Middle Neolithic period. The technique is therefore a better option of dating lithic material than the two previous ones.¹⁶

The fourth technique used in the cave is pressure flaking, which applies to the manufacture of blades, especially bladelets, only. Documentation of the technique has lately recently increased. The area of distribution includes the Middle and Far East. Until very recently, it seemed that pressure *débitage* of blades followed the indirect percussion of blades, and ap-

peared only 12,000 years ago in Japan, whereas, its invention can now be traced to the Sibero-Sino-Mongolian region, about 25,000 years ago.¹⁷ Pressure flaking requires the flint knapper to have particular technological skills, which makes this technique more difficult to master than other ones. Instead of resulting from a blow, the microblades are pressed off the microblade core with hard pressure using a pressure flaker. The core is fixed between the flint knapper's feet or can be fixed in a device made of wood. The pressure flaker is often pointed and made of antler or bone. The accuracy with which the pressure point can be positioned leads to maximum precision and standardisation. This makes the recognition criteria on the cores very typical. The cores must have a very rectilinear and regularly parallel arrises and the platforms can be cortical, plain or prepared. There are two basic forms of cores, the pyramid and the parallelepiped. The pyramid cores do not appear in the Hagios Nikolaos material but the parallelepiped do. They are described as flat, have a single *débitage* surface or two successive ones, and the technique could be observed upon a number of microblade cores from the cave.¹⁸

In Europe, pressure flaking on microblade cores is characteristic of the Mesolithic technological tradition, but it can also occur in the transition between the Upper Palaeolithic and Early Mesolithic periods. It is a tech-

¹⁵ Andrefsky 1998, 114ff; Inizan *et al.* 1999, 74.

¹⁶ Andrefsky 1998, 11ff; Inizan *et al.* 1999, 76.

¹⁷ Inizan *et al.* 1999, 76ff.

¹⁸ J. Pelegrin, in J. Tixier (ed.), *Préhistoire de la pierre taillée 2: Économie du débitage laminaire* (Paris 1984), 112; Demoule and Perlès 1993, 383; Inizan *et al.* 1999, 76ff.

nique ensuring the production of straight microblades. The technology was spread to a wide area in very short time, something which must be related to the efficiency of the backed blades, which could be used as arrowheads.¹⁹

Chaîne opératoire

The term *chaîne opératoire* has been widely used in French archaeology for the last twenty years.²⁰ The concept of *chaîne opératoire* did not really come to the forefront in Greece until the excavation of a continuous stratigraphical sequence at Klithi in 1988, along with the definitive publication of the Franchthi cave material.²¹ A detailed method, such as the *chaîne opératoire*, is not normally used on survey material from sites in Greece or Europe.²² This is a shame, because the *chaîne opératoire* can squeeze the maximum research potential out of a material. Sometimes it can even direct the researcher into a different perspective of the material. It can also be a structured guideline of how to analyse and describe a collection of material.²³

On the basis of the four different flint techniques seen in the Hagios Nikolaos material it is now possible to analyse the *débitage* using the *chaîne opératoire*. Since there are no refitting

sequences or any significant area of knapped *débitage*, which would allow one to recognise a true operational *chaîne* in the Hagios Nikolaos material, it was necessary for me to recreate virtual operational chains, by analysing the various categories of cores, flakes and blades. Each lithic specimen was not only counted and individually identified, but was clearly assigned to the different stages of the knapper's sequence of operations. The procedure allows the material to be regrouped and explicitly construct the various operational chains, which make up the industry as a whole, and to identify more precisely the knappers' objectives.²⁴ The *chaîne opératoire* of the Hagios Nikolaos material involved the examination of 1861 artefacts, 176 of which are tools or retouched pieces. It was hereby possible to identify four main stages in the *chaîne opératoire* (Table 1 and Fig. 3).

Initial *débitage*, phases 1-3: The raw nodules were probably carried into the cave to begin the flint knapping, using both a hard direct percussion and soft direct percussion. This corresponds with the flake material and the small chips found in the cave. Certain flake types indicate a preliminary preparation of the cores' reduction sequences,

¹⁹ W. Andrefski, *Lithics* (Cambridge 1998), 194f; Inizian *et al.* 1999, 76ff.

²⁰ E.g. J.-M. Geneste, in J.P. Rigaud (ed.), *La Grotte Vaufrey, Mémoires de la Société Préhistorique Française* 19 (1989), 441-517; E. Boëda, in M. Otte (ed.), *L'homme de Néandertal* 4 (Liège 1986), 13-26; J. Pelegrin *et al.*, in J. Tixier (ed.), *Technologie Préhistorique* (Paris 1988), 153.

²¹ C. Roubet, in *Klithi* 1, 125ff; *Franchthi* 3, 85ff; *Franchthi* 5, 21ff.

²² C. Runnels *et al.*, in *BSA Studies* 3, 127; A. Darlas, *ibid.*, 303ff.

²³ M.A. Dobres, *Technology and Social Agency. Outlining a Practice Framework for Archaeology* (Oxford 2000), 164ff.

²⁴ C. Roubet in *Klithi* 1, 125ff.

Retouched pieces	Artefacts	Percentage
Endscrapers	33	18.8
Perforators	4	2.3
Burins	2	1.1
Scrapers	9	5.1
Backed bladelets	49	27.8
Flakes with retouche	35	19.9
Blades with retouche	12	6.8
Blades fragmented with retouche	31	17.6
Burned blade with retouche	1	0.6
Total retouched	176	100,0

Table 1. Retouched artefacts from the Hagios Nikolaos material.

	Artefacts	Percentage
Unretouched cores	76	4.5
Cores	19	1.1
Microblade cores	51	3,0
Burned cores	6	0.4
Débitage production	1192	70.7
Blade	38	2.2
Microblade	16	0.9
Flakes	743	44.9
Blade fragmented	139	8.2
Microblade fragmented	58	3.4
Burned flake	186	11,0
Burned blade fragmented	12	0.7
Débitage technical	417	24.7
Blade with cortex	7	0.4
Striking platform	7	0.4
Flake with cortex	29	1.7
Small flakes & flint chips	343	20.4
Hinge fractured pieces	8	0.5
Plunging terminated pieces	8	0.5
Crested blade	15	0.8
Total unretouched	1685	100,0

Table 2. Unretouched artefacts from the Hagios Nikolaos material.


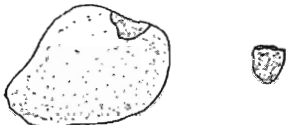

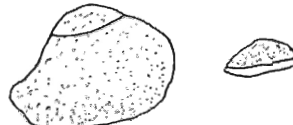
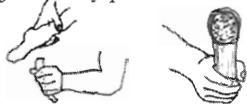

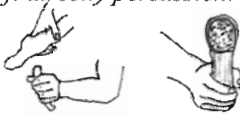




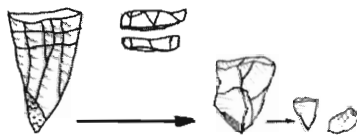


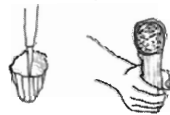

<i>Phase</i>	<i>Action</i>	<i>Technique</i>	<i>Production</i>
<i>Phase 1 Procurement of the raw nodules.</i>	<i>Simple selection and test knapping of the raw nodules.</i>	<i>Hard direct percussion.</i> 	
<i>Phase 2 Preparation of the core.</i>	<i>Preliminary shaping of the core. Knapping an initial flake covered with cortex.</i>	<i>Hard direct percussion.</i> 	
<i>Phase 3 Preliminary blade production.</i>	<i>Shaping of the core. Production of blades which is totally or partly covered with cortex.</i>	<i>Soft indirectly percussion. Soft directly percussion.</i> 	
<i>Phase 4 Main blade production.</i>	<i>Production of blades which is used to produce other tools: Retouched blades, scrapers, burins and perforators.</i>	<i>Soft indirectly percussion. Soft directly percussion.</i> 	
<i>Phase 5 Secondary blade production.</i>	<i>The core is reshaped by knapping crest blades of the core in order to produce blades. Because of a hinge fracture or a plunging termination.</i>	<i>Soft indirectly percussion. Soft directly percussion.</i> 	
<i>Phase 6 Reworking the core.</i>	<i>The core is reused into two different types of microblade cores. It could also be knapped into a small flaking core.</i>	<i>Hard direct percussion.</i> 	
<i>Phase 7 Production of microblades from microblade cores type 1.</i>	<i>The microblades is knapped into backed bladelets type 1.</i>	<i>Hard direct percussion</i> 	
<i>Phase 8 Production of microblades from microblade cores type 2.</i>	<i>The microblades is knapped into backed bladelets type 2.</i>	<i>Pressure flaking and soft directly percussion.</i> 	

Fig. 3. The chaîne opératoire of the Hagios Nikolaos material.

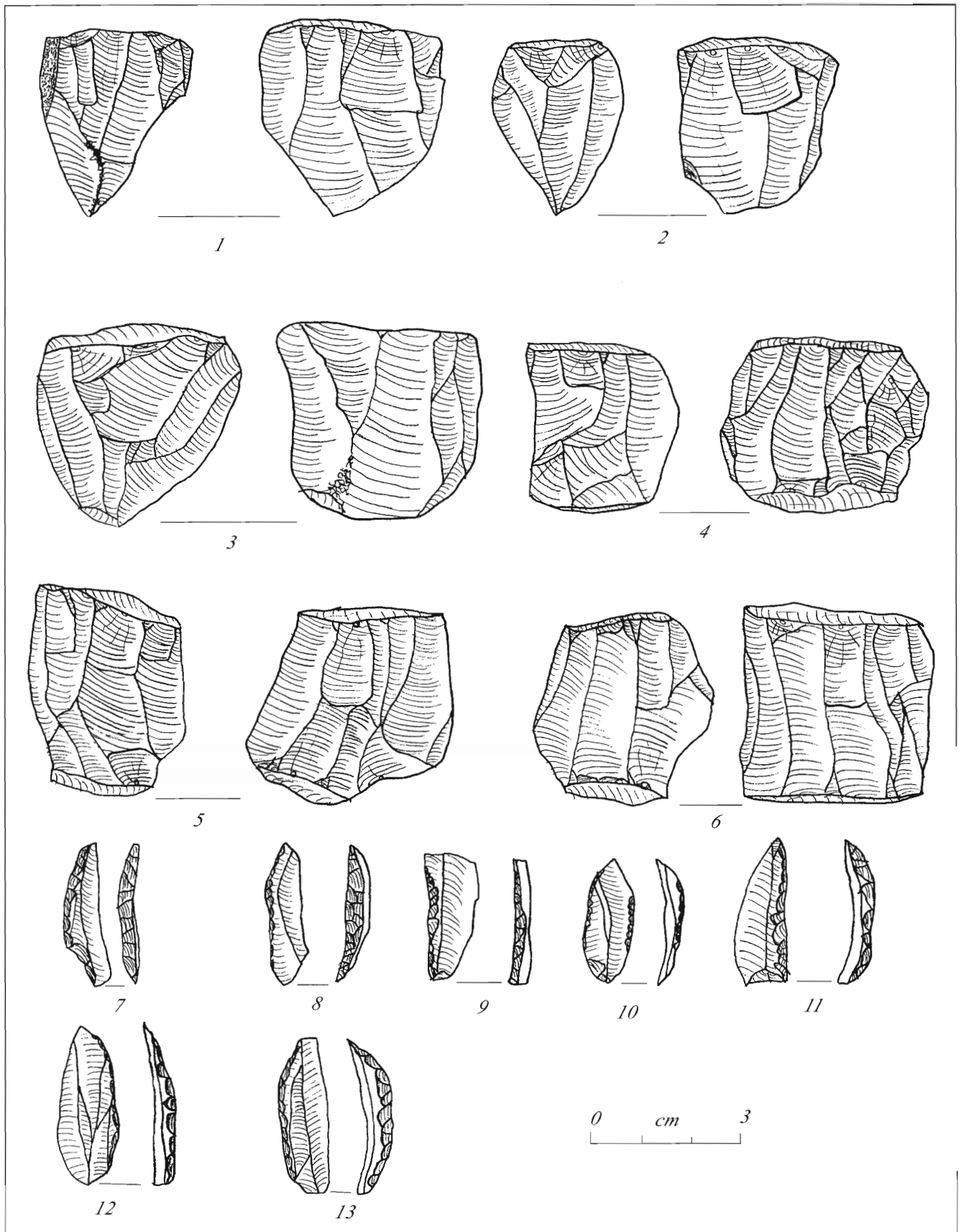


Fig.4. Artefacts from Hagios Nikolaos: 1-6, Microblade cores type I. 7-13, backed bladelets type I. (All drawings by L. Sørensen).

for instance flakes covered with cortex, and blades totally or almost totally covered by cortex. This reduction sequence is normal when the raw material is found near the habitation site. The same initial sequence is registered on prehistoric sites all over Greece, where the dominating flint resource is local.²⁵

Full débitage, phase 4: The lithic material reveals a preliminary and main production of especially blades. The blades are of varying quality and are often thick with a curved angle, which makes a further production of tools difficult. The exploitation continued until the core was exhausted, using soft indirect and soft direct percussion to maximise the full potential of the core. The low frequency of long blades in the *débitage* suggests either that very few cores started large, or that many long blades have been removed from the site. The blade production is a classical dating marker in the Aurignacian, Epigravettian and Early Mesolithic blade production in Greece. Normally it should also be a valid marker in the Late Mesolithic period in Greece but, as proven by Perlès, the assemblage of lithic phase VII Franchthi (ninth millennium B.C.) is dominated by a flake production. The Mesolithic period in Greece reveals distinct technological traditions in Greece, and the area could have been cut off from the widespread techno-

logical trends in European Mesolithic.²⁶

Final débitage, phase 5-6: Flake production is now primary and blade production is secondary. The production sequence includes some reshaping of the core, due to hinge fractures, step fractures and plunging terminations. The actual reshaping of the core is made by a series of core tablets. The core ends up with a multiform irregular shape, which has the size of an egg. The complete knapping of almost all the cores meant that no raw material was wasted. Many small cores are found, which are either cased away or discarded. Although the flake production appears to be irregular and heterogeneous, recent research proves otherwise. A similar production of flakes is the discoid method, described by E. Boëda.²⁷ The method has a wide time frame, as it has been identified in lithic industries from the Mousterian to the Neolithic. The production consists of an intentional *chaîne opératoire*, but it has not yet been thoroughly identified in any lithic industry in Greece, although there are signs of the reduction method at recently discussed Mousterian sites in Greece.²⁸

Reuse débitage, phase 7-8: The cores could also at an earlier stage have been reused and re-knapped into microblade cores, but from observations of

²⁵ C. Roubet in *Klithi* 1, 132ff; W. Shawcross and N. Winder, *ibid.*, 181ff; E. Adam, in *Klithi* 2, 482ff; E. Kotjabopoulou, *ibid.*, 427ff; A. Sinclair, *ibid.*, 421; M. Otte *et al.*, in *BSA Studies* 3, 82; E. Adam, *ibid.*, 267; Koumouzelis *et al.* 2001, 525; Perlès 2001, 202.

²⁶ *Franchthi* 3, 21ff.

²⁷ E. Boëda, *Bulletin de la Société Préhistorique Française* 90 (1993), 392-404.

²⁸ Kourtesi-Philippakis 1986, 150; D. Papagianni, *Middle Palaeolithic Occupation and Technology in Northwestern Greece*, BAR, IS 882 (Oxford 2000), 35ff.

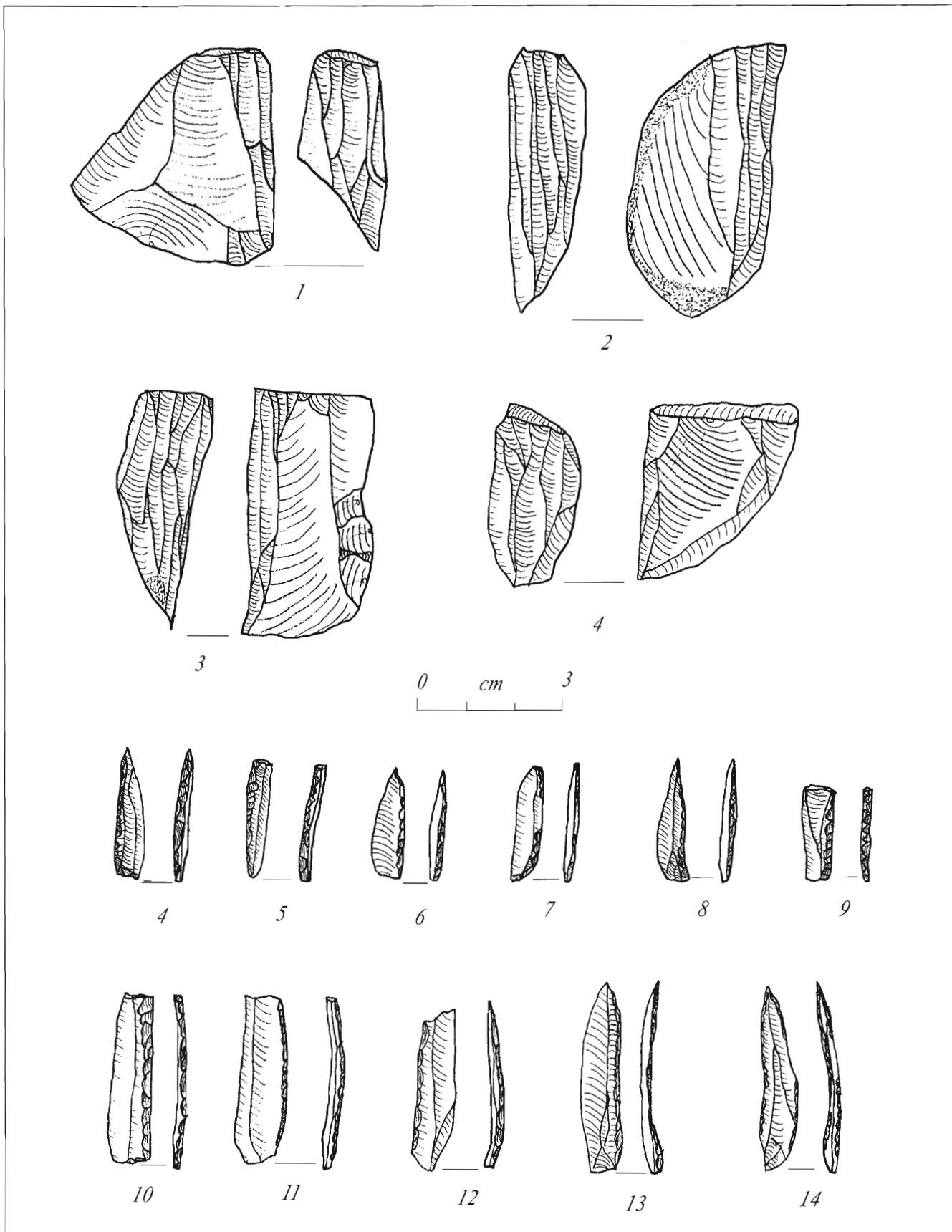


Fig. 5. Artefacts from Hagios Nikolaos: 1-3, Microblade cores type 2. 4-14, backed bladelets type 2. (All drawings by L. Sorensen).

the microblade cores, it was possible to detect a difference in the technique. Microblade cores type 1, which approximately have the size of a fist, mostly are of a conical and one-poled shape, but are sometimes two-poled with a cylindrical shape. They are irregular in shape and have many deep and wide scars, indicating a hard direct percussion with the use of hammer stones made of quartz. Another indication is the many hinge fractures, which are seen on the sides of the core (Fig. 4.). Microblade cores type 2 are of approximately the same size as type 1, but have a high front and are often conical. The type has almost parallel, small and thin scars. The microblades, which are knapped from these microblade cores, represent a totally different technique than type 1. Pressure flaking was probably used, but it cannot be excluded that a soft direct percussion were used on some of the type 2 microblade cores (Fig. 5.).

The *chaîne opératoire*, and in particular the two different microblade cores, give rise to some questions. Are we dealing with a single cultural phase with only slight chronological variations or several, diachronic, phases? Is there any methodological approach that can confirm or invalidate this initial hypothesis? How is this hypothesis to be tested in the absence of any stratigraphical reference sequence for the whole site? Those are the key methodological challenges posed by the Hagios Nikolaos material.

Tool types

Which tools did the occupants of the Hagios Nikolaos cave produce from the blades and can the assemblage help dating the material? One must bear in mind that artefacts could become mixed from trampling or a slow rate of deposition, and prehistoric artefacts are almost always mixed with those of later or earlier periods.²⁹ The Hagios Nikolaos material has been totally mixed, which makes the separation of tools into different categories practically impossible, and is further complicated by the lack of characteristic tools.³⁰ Is it still possible to make a preliminary typological dating of the tools? In order to answer this question, it is necessary to look at the retouched pieces from the Hagios Nikolaos material.

The analysis of the Hagios Nikolaos material includes 176 retouched pieces from a sample of 1861 pieces, e.g. end scrapers, perforators, burins, composite tools, scrapers and backed pieces. The tool inventory is dominated by backed bladelets (28 %). The total scraper index is 24 % and is much higher than the burin index (1 %). End scrapers represent 19 % of the tool assemblage. There are no geometric microliths or shouldered pieces represented in the assemblage. Tools made on bladelets account *c.* 60 % of the core inventory, corresponding to the large amount of microblade cores (51 micro cores, type 1 and 2), which is the most dominant core type in the

²⁹ C. Roubet, in *Klithi* 1, 126; E. Adam, in *BSA Studies* 3, 267; C. Perlès, *ibid.*, 312; *Ead.* 2001, 31f; Koumouzelis *et al.* 2001, 523f.

³⁰ C. Runnels, *AJA* 99 (1995), 702ff.

Hagios Nikolaos material (see Table 2).” The production of the backed bladelets was important, because it is presumed they were hafted either individually or in a group, and may have formed the cutting or piercing elements of composite tools.³¹ Industries of this character have also been found in the Balkans. The backed bladelets could also have been used as microlithic backed bladelets, which is a common element in many Late Upper Palaeolithic assemblages from Europe, Southwest Asia and further afield.³²

All these characteristic tool types, end scrapers, perforators, burins, composite tools and scrapers are typical in several prehistoric assemblages such as Aurignacian (lamelles Dufour), C14-dated at Klisoura between 26,000 and 22,500 BP, and at Franchti (lithic phase I) *c.* 30,000 BP;³³ Gravettian, C14-dated at Asprochaliko between 26,100 +/-900 and 25,100 +/-700 BP, at Franchti (lithic phase II) between 22,330 +/-1270 and 21,480 +/-350 BP, and at Kastritsa between 21,800 +/-470 and 20,200 +/-480 BP.³⁴ Some of the lithic industries and tool types could belong to either of these categories.

In the Hagios Nikolaos assemblage there are two dominant tool types:

backed bladelets and, nosed end scrapers. These tool types dominate the classic Epigravettian assemblage. The dating range of the Epigravettian corresponds to the stratigraphical gap between lithic phases III and IV in the Franchthi Cave, C14-dated from 21,480 +/-1,270 to 12,540 +/-180 years BP. The Late Epigravettian period at Franchthi corresponds to the lithic phases IV to VI and is C14-dated from 12,540 +/-180 to 10,260 +/-110 BP.³⁵

There are also other C14 dates corresponding to the Epigravettian period. For instance at Asprochaliko 18,000 +/-300 to 14,000 +/-600 BP and at Kastritsa 19,900 +/-370 to 13,400 +/-210 BP. Finally, there are the many C14 dates from excavations in Epirus: Klithi, 17,000 +/-400 to 10,420 +/-150 BP; Megalakkos, 16,100 +/-160 to 15,410 +/-210 BP; Voïdomatis, 11,100 +/-200 to 10,700 +/-200 BP, and Boila, 13,810 +/-130 to 10,190 +/-90 BP.³⁶ The C14 results cluster from *c.* 20,000 to 10,000 BP, which is the chronological time frame for the Epigravettian period in Europe and Greece. The Epigravettian has a geological spread from Italy to the Balkans, Eastern Europe, Greece and Anatolia.³⁷ The lithic industry in the Epigravettian period is dominated by blade production, especially of backed bladelets, which corresponds to the *chaîne opératoire*

³¹ P.V. Petersen, *Flint fra Danmarks oldtid* (Copenhagen 1993), 85.

³² Adam 1989, 252ff.

³³ *Franchthi* 3, 89ff; Djindjian *et al.* 1999, 379; Koumouzelis *et al.* 2001, 522.

³⁴ *Franchthi* 3, 98ff; Djindjian *et al.* 1999, 379f.

³⁵ *Franchthi* 3, 108ff; Djindjian *et al.* 1999, 379ff; Koumouzelis *et al.* 2001, 534.

³⁶ J. Gowlett *et al.*, in *Klithi* 1, 27ff.

³⁷ D. Mihailovic, in *BSA Studies* 3, 343ff; M. Otte *et al.*, *ibid.*, 82ff; D. Mihailović and V. Dimitrijević, in A.Thévenin (ed.), *L'Europe des derniers Chasseurs. Epipaléolithique et mésolithique* (Paris 1999), 391-398; Djindjian *et al.* 1999, 282ff; Mussi 2001, 286ff.

and the dominant tool types from Hagios Nikolaos (Table. 1).

Some of the tool types at Hagios Nikolaos, could also belong in the Mesolithic period, which spans from c. 9,500 to 8,000 BP.³⁸ The Mesolithic in Greece is a rarely documented period. Mesolithic finds are more difficult to identify than both earlier and later material. The Mesolithic stone industry is on the whole undiagnostic. The diagnostic microliths are most difficult to spot on the surface. The period is also very short, since the Neolithic process came quickly to the Aegean area.³⁹ As seen above, there is a vast amount of dating possibilities from the different tool types. A more detailed typological dating could perhaps be provided by the backed bladelets.

The production of backed bladelets in the Hagios Nikolaos assemblage is seen not so much from the backed bladelets themselves, but from the large amount of microblade cores, suggesting an abundance of backed bladelets. This can be related to seasonal hunting. One might expect people to arrive at the site with toolkits, already prepared for their first hunting forays. As the various components of the toolkit became broken in the course of use, they would have been discarded and replaced with locally made elements. The production of backed bladelets would therefore represent a major activity at the site.

A typological dating

The typological dating involves a discussion of the last two phases (Phase 7 and 8) of the *chaîne opératoire* analysis of the material from Hagios Nikolaos. The fact that there are two different types of microblade cores indicates that there must have been two different types of microblades, which again were reproduced into backed bladelets. The backed bladelets is a very important group, since the lithic material can be typological dated from the shape of these arrowheads. The amount of flint in a backed bladelet is very small, and would therefore not have been rational to reshape the arrowhead for reuse as another tool.

There were found two different types of backed blades in the cave. Both types had a retouche down along the side of the blade. Type 1 of backed bladelet is thick and wide, the bladelet has been knapped with a hard directly percussion and it was produced from the first type of microblade cores (Fig. 4). Type 2 of backed bladelet is thin, narrow and has a straight back. These bladelets are knapped either with pressure flaking or soft direct percussion, which corresponds with the second type of microblade cores (Fig. 5). The typological analysis of the backed bladelets suggests that there is a technological change in time, but this needs to be validated by a wider range of comparable material, discussed in

³⁸ Perlès 2001, 26.

³⁹ Perlès 2001, 23.

what follows. The two different types of backed bladelets has not only a different appearances, but also a different hafting, deduced from their different shapes (see below), again implying a chronological discrepancy. It is very rare to observe two different arrow-head types, made in two different flint knapping techniques, in use at the same time.

The first type of backed bladelet has similarities with an early phase of backed tool industries (Gravettian-Early Epigravettian), identified at several sites in South-eastern Europe. In the lower layers of Badanj,⁴⁰ in layer IX at Asprochaliko, the early phases at Megalakkos,⁴¹ and lower layers at Kastritsa,⁴² and lithic phases II and III from the Franchthi cave.⁴³ These are assemblages dated over a large time span from the twenty-fifth to the twelfth millennium B.C.

Regional comparisons of the backed bladelets from the Klisoura cave, near Franchthi in Argolis, could reveal a more detailed typological dating of the backed bladelets from Hagios Nikolaos, especially the backed bladelets from the uppermost Aurignacian unit (layer III) to the lower Epigravettian (layer IIB). These bladelets were described as having a concave blunted back, sometimes dou-

ble-backed, and occasionally with a transversal retouche in the form of microlithic rectangles.⁴⁴ The uppermost Aurignacian, layer III, has been C14-dated between 21,720 +/-90 to 16,130 +/-40 BP. The interface between layers IIA and IIB has been C14-dated to 14,280 +/-90 BP. There is some uncertainty about these dates because of the reservoir effect.⁴⁵ The industrial layer of IIB at Klisoura is Early Epigravettian, and may be placed chronologically between the lithic phase III and phase IV at the Franchthi cave. Dated between 21,480 +/-350 and 12,540 +/-180 BP.⁴⁶

The results from the Klisoura cave indicate that these backed bladelets have no parallels in western Greece, although they are identified in the Hagios Nikolaos material. It differs from the shouldered point industries from the lower layers at the Kastritsa Cave,⁴⁷ as well as from the later industries with backed bladelets, having a straight back and often made with the microburin technique at sites such as Klithi.⁴⁸ This description of the later backed bladelets from Klithi corresponds to the second type of backed bladelets in the Hagios Nikolaos material. These backed bladelets belong to the Late Epigravettian period. Especially the material from the upper levels of Klithi (1000-series material)

⁴⁰ R. Whallon, in *BSA Studies* 3, 332ff.

⁴¹ A. Sinclair, in *Klithi* 2, 415ff.

⁴² E.S. Higgs, *ADelt* 21 (1966), Chronika, 292-94; Bailey *et al.* 1983, 15ff.

⁴³ *Franchthi* 3, 98ff.

⁴⁴ Koumouzelis *et al.* 2001, 523.

⁴⁵ Koumouzelis *et al.* 2001, 520ff.

⁴⁶ *Franchthi* 3, 108ff; Djindjian *et al.* 1999, 379.

⁴⁷ Adam 1989, 104ff; Bailey *et al.* 1983, 15ff.

⁴⁸ C. Roubet, in *Klithi* 1, 155ff.

has not only similarities in knapping strategy, but the same dominance of backed bladelets, which is also observed in the Hagios Nikolaos material.⁴⁹ The backed pieces are similar to other Late Pleistocene sites in Greece, Anatolia, the Balkan area,⁵⁰ and Italy,⁵¹ e.g. the upper layers of Badanj,⁵² Asprochaliko,⁵³ Boïla,⁵⁴ Theopatra⁵⁵ and Franchthi, lithic phases IV to VI.⁵⁶ The dating of these backed pieces lies between the twelfth and the end of the ninth millennium B.C. The relatively late dating to the transition between the Late Epigravettian and Early Mesolithic periods can explain why the backed bladelets were produced by pressure flaking. As argued above, the pressure flaking is a flint-technological marker for Mesolithic assemblages. Although there is a slight problem with this assumption, since, along with this backed industry, there has been registered yet another microlithic production in the Franchthi Cave. In the Franchthi cave (lithic phases of V and VI) there was an, in typological terms, already fully Mesolithic assemblage, with numerous geometric microliths such as scalene bladelets, triangles, segments and more rarely tra-

pezes, all manufactured with the microburin technique.⁵⁷ The same microburin technique is seen in the late backed bladelet industry in Klithi.⁵⁸ In the Hagios Nikolaos material no microburins or geometric microliths have been registered, something which should argue against a relative dating of the material in the Late Epigravettian or Early Mesolithic periods, although it is possible to make backed bladelets without using the microburin technique, just by making a retouche along the backside of the blade. This particular microlith production can be detected both in Klithi and Franchthi.⁵⁹ In Europe, there is normally an increased number of microliths produced from the microburin technique during the Mesolithic period. The reverse occurs in Greece, where virtually all microliths and microburins disappear during the Early Mesolithic period (ninth millennium B.C., lithic phase VII at Franchthi). This particular phenomenon has been registered at Franchthi,⁶⁰ Sidari,⁶¹ and Maroula.⁶² The lack of microburins could indicate an even later dating of the Hagios Nikolaos material in the Late Mesolithic period, but the lithic

⁴⁹ C. Roubet, in *Klithi* 1, 156.

⁵⁰ M. Otte *et al.*, in *BSA Studies* 3, 82ff.

⁵¹ Mussi 2001, 286ff.

⁵² R. Whallon, in *BSA Studies* 3, 332ff.

⁵³ Bailey *et al.* 1983, 15ff.

⁵⁴ E. Kotjabopoulou *et al.*, in *Klithi* 2, 427ff.

⁵⁵ E. Adam, in *BSA Studies* 3 (1999), 267ff.

⁵⁶ *Franchthi* 3, 115ff.

⁵⁷ Perlès 2001, 31.

⁵⁸ C. Roubet, in *Klithi* 1, 155ff.

⁵⁹ *Franchthi* 3, 115ff; C. Roubet, in *Klithi* 1, 155ff.

⁶⁰ Perlès 2001, 31ff.

⁶¹ A. Sordinas, *Balkan Studies* 10 (1969), 403ff.

⁶² K. Honea, *AJA* 79 (1975), 278f.

industry in that period argues against the presumption. It is a crude flake industry, which does not occur in the Hagios Nikolaos assemblage. There has also been observed a large amount of trapezes made on flakes in the Late Mesolithic, which are totally absent from the Hagios Nikolaos material.⁶³ Very few Mesolithic sites are known in Greece, since they often are difficult to identify. The Mesolithic period in Greece is dated by the Franchthi cave from the mid-tenth to the late ninth millennium BP – a very short period.⁶⁴ Several Mesolithic assemblages have probably been confused and mixed with Epigravettian material, because they tend to be found at the same sites. Coastal sites are especially indicative of the period, as pointed out by Runnels in Epirus.⁶⁵ Mesolithic material is in general difficult to recognise and differentiate from Upper Palaeolithic artefacts, especially in the absence of dated stratified deposits or diagnostic artefacts such as geometric microliths.⁶⁶ The typological dating of the backed bladelets from Hagios Nikolaos lies mainly in the Epigravettian and in the transition between Late Epigravettian and the Early Mesolithic period.

Type 1 of the backed bladelets and the microblade core corresponds to a dating in the Early/Middle Epigravettian, whereas type 2 of the backed bladelets and the microblade core can be dated

to either Epigravettian or the transition between Late Epigravettian and Early Mesolithic, especially because of the pressure flaking used on the microblade cores. It cannot be excluded that there was a continuous settlement in the cave, implying a relative dating, continuous through both the Epigravettian and the Mesolithic periods. But it is essential not to forget that it is a very mixed lithic material, which most certainly will give some uncertainty in the typological dating.

Comparisons in the lithic industry

Close interregional comparisons with the Hagios Nikolaos material are impossible, since no other sites have been investigated in the surrounding area, although sites are known on the other side of the Gulf of Patras in North-western Peloponnese, e.g. Lakkopetra, Lapa, Kastro, Loutra, Amaliada, Mavri Myti, the Pirois Valley, Kalamaki and Eleochori.⁶⁷ All of these sites, except for Mavri Myti, Amaliada, Kalamaki and Kastro, contained a production of pebble tool industry (Lower Palaeolithic) or *levallois* flakes, which is a Middle Palaeolithic (Mousterian) component. The pebble tool industry or *levallois* method was not identified in the Hagios Nikolaos material, which makes a comparison impossible.

⁶³ Perlès 2001, 31ff.

⁶⁴ Demoule and Perlès 1993, 364ff.

⁶⁵ C. Runnels *et al.*, in *BSA Studies* 3, 126ff.

⁶⁶ G.N. Bailey *et al.*, in *Klithi* 2, 535.

⁶⁷ Kourtesi-Philippakis 1986, 124ff; A. Darlas, in *BSA Studies* 3, 303ff; C. Perlès, *Analecta Praehistorica Leidensia* 31 (1999), 378ff.

Eleochori had an Aurignacian assemblage, unfortunately mixed with the Mousterian artefacts. In Amaliada, Kalamaki and Kastro a mixture of tools from different Upper Palaeolithic periods was identified, including obsidian artefacts and pottery sherds. Furthermore, the sites are only briefly published, which makes a detailed comparison difficult. No detailed investigations of sites from the Epigravettian or the Early Mesolithic periods have taken place in that part of Greece so, once again, we turn to the two best published sites in Greece, *viz.* Franchthi and Klithi.

There seems to be a long Epigravettian sequence in the Hagios Nikolaos material, which allows us to pinpoint both technological and morphological changes, evident in the interchange of different techniques, for the exploitation of microblade cores and modification of microblades. But comparisons in the microblade industry with other settlements during the Epigravettian period are difficult, since they are not defined as a group in Greece.

At Klithi (in the 1000-series material) and Franchthi (lithic phase II to V) there are overall similarities in the first six stages of the *chaîne opératoire*, also seen in the Hagios Nikolaos material.⁶⁸ At both Klithi and Franchthi the knapping strategy includes the creation of a striking platform, followed by the removal of the flawed exterior surface (cortex) of the nodules, and fi-

nally by the extraction of *débitage*. This strategy is deduced from several characteristics of the industry and the presence of chips produced during blade removals. The existence of partially crested pieces used to correct the core front; the presence of opposed platform bi-directional cores indicates maximum exploitation for the production of straight blades and flakes, which follows the longest axis of the nodules. The alteration of the flaking direction on the cores, indicates maximum exploitation of the usable pieces and points, to an economy of raw material imposed not so much by the quantity of the locally available flint as by its quality. The majority of the cores were abandoned, either when the platforms were crushed, or when the core front was beyond repair.

These results from the upper levels of Klithi did not allow Roubet and Kozłowski to identify a precise cultural affiliation, only to include them within a broad Epigravettian grouping.⁶⁹ The C14 dates from Klithi lie between 16,500 and 10,000 BP.⁷⁰ The current interpretation of stratigraphical data and C14 dates, suggests that little of the material can be assigned with confidence to a later date than *c.* 12,500 BP. Most of the assemblage recovered in the excavation belonged to the period from 16,500 to 13,500 BP, but it cannot be excluded that some of the material from the upper levels of Klithi could have a later date, *c.* 11,000 to 10,000 BP, which is on the transition

⁶⁸ C. Roubet, in *Klithi* 1, 125ff; *Franchthi* 3, 98ff.

⁶⁹ C. Roubet, in *Klithi* 1, 129ff.

⁷⁰ Gowlett *et al.*, in *Klithi* 1, 27ff.

between the Late Epigravettian and Early Mesolithic periods.⁷¹ In the Franchthi cave the results are more detailed, but the dating of the lithic phases II to V from the twenty-third or twenty-second to the early twelfth millennium gives the same results as in the Klithi assemblage. This comparison with the Klithi and Franchthi industries suggests overall similarities in the Epigravettian knapping strategy, also seen in the Hagios Nikolaos material. The relative dating of the lithic material in Hagios Nikolaos suggests that the cave was settled some time during the Epigravettian period, but the question is why this particular cave was chosen and why it was abandoned during the Mesolithic period.

Settlement type

When the cave was first occupied, some time in the Epigravettian or in the Early Mesolithic period, the landscape looked totally different from now. First of all there was no sea, since the water level was *c.* 200 m lower than today. But during the Late Epigravettian and the Early Mesolithic periods the water level rose. To take up residence in the Hagios Nikolaos cave would have many advantages in both periods. In the Epigravettian there would have been a good view of the valley. This view was an advantage to the hunters, when they had to go on hunting expeditions in the area. In the Mesolithic period there was easy access to the coastal areas, where marine

resources became an important economic factor during Mesolithic times.⁷² There has furthermore been access to many permanent natural resources near the cave, for instance flint, but also fresh water from the little creeks running down the valley near the cave. The site is well positioned for hunting, and the valley opens up both to the south and to the west. In this case, it would be logical to see the site in several roles. 1) As a hunting station suitably distanced from prey that might otherwise be disturbed. 2) As a monitoring position for observing animals passing through the valley. 3) (Arguably) as a well-placed manufacturing and repair site, especially for projectile shafts.⁷³ All these general observations are present in many caves all over Europe and in Greece.⁷⁴

The lithic evidence concerning the activities which took place inside the cave is very clear. The burnt flint, corresponding to eleven per cent of the total assemblage, shows evidence of fireplaces, and the small chips indicate a massive flint knapping or dumping area inside the cave (Table 2). The cave itself gave the inhabitants shelter from the weather; here the hunters may have completed their cooking, the flint knapping, and other activities in their everyday life.

On the basis of these considerations, I would argue that the assemblage at Hagios Nikolaos, with its predomi-

⁷¹ C. Roubet, in *Klithi* 1, 152.

⁷² Perlès 2001, 25ff.

⁷³ L.R. Binford, *American Antiquity* 45 (1980), 4-20.

⁷⁴ Djindjian *et al.* 1999, 239ff.

nance of micro blade cores to produce backed bladelets of local raw materials, is not indicative of a specialised hunting site, but of a habitation site. Furthermore, the co-existence of local and exotic raw materials also constitutes evidence of contact to a wider area. If the procurement of local raw materials is considered part of a daily routine, the acquisition of non-local materials must indicate an organised plan, either for the procurement of the material itself as the main objective, or in combination with other activities – hunting and investigation of resources – as a complementary activity, or through exchange. However, the exotic raw materials could give the impression of a small hunting party, moving rapidly over the landscape and stopping briefly here and there to kill an animal. But the fact that the majority of the pieces in this assemblage are made of local raw material suggests that the Hagios Nikolaos cave was primarily used for making and repairing tools and not simply for discarding them. It also shows a diverse assemblage used for a wider range of activities, perhaps reflecting the day-to-day maintenance activities of people living in the cave.

Concluding remarks

The analysis of the lithic material gave the following results: local use of flint resources and four different flint techniques, especially used for a systematic blade production. Furthermore it is argued that there is a possible typological dating of the lithic material in two phases: Early to Middle Epigravettian, and between the Late Epigravettian

and Early Mesolithic. The dates are indicated by two different types of micro-blade cores and backed bladelets, the final outcome when hard direct, soft direct and flaking percussion is used. Lack of comparable material from the rest of the region rules out any regional studies and characteristics of the lithic material, something which makes these interpretations preliminary. Overall similarities in the *chaîne opératoire* from Klithi and Franchthi have, however, been observed. Finally, the varied number of tool types and activities, which have taken place inside the cave, such as flint knapping and hearths for cooking, indicates a settlement type with permanent character.

In spite of the unfavourable find circumstances of the lithic material from the Hagios Nikolaos cave, it is still possible to make a detailed analysis using different archaeological methods; raw material studies, flint technology, *chaîne opératoire*, flint typology, tool types and settlement models. Prehistoric sites with chronologically mixed material are often being rejected from the archaeological statistics and sometimes do not have the archaeological value for an excavation, but they can still provide us with some new knowledge. The results from the Hagios Nikolaos material prove that, with a minimum of survey and dry sieving, it is possible to collect, compare and analyse a rather large number of lithics. This gives ideal powers of observations, when dealing with a surveying strategy with a lot of rock shelters or open-air sites, containing only the lithic material.

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A Prehistoric Settlement at Chania-Gavrolimni in Aetolia¹

Efi Saranti Preparations, in late 2000, for the construction of a new town hall for the municipality of Chalkeia, at Gavrolimni in Aetolia, led to the discovery of significant remains of a prehistoric settlement. The ensuing rescue excavation is still in progress at the time of writing. It has revealed a fairly extensive and well preserved prehistoric settlement, flourishing in the Middle and Late Helladic periods.

The most interesting fact is that, with the exception of limited damage in the upper levels from natural erosion and modern activity, the settlement, which consists exclusively of prehistoric remains, is basically undisturbed. It is one of very few settlements of MH-LH date in this area of Western Greece. Evidence elsewhere is restricted to Thermos² and Kato Vasiliki,³ (the hill of Ag. Triadha, ancient Chalkis): in

both instances the prehistoric remains were found beneath later buildings. Fragmentary remains have also been excavated at Naupaktos.⁴ With such meagre evidence from Aetolia generally, it is thought important to give a preliminary report of the excavation before its completion.

The prehistoric settlement at Chania is situated on the slopes of a low hill, referred to by the locals as *Tapia* (= bastion), which is a foothill of the Kaliakouda mountain (height 250 m). This place name is descriptive of the site, which is naturally protected and overlooks the only – in former days – available passage to the northwest, around the mountain masses of Klokova and Varassova, as well as to the Gavrolimni valley, through which communication with the northern interior is possible (Fig.1).

¹ I would like to express my warmest thanks to Mr. Ioannis Moschos for his help with this paper. The archaeologist Miss P. Staikou helped with much success in the early stages of the excavation. The excavation plan was drawn by Mr. I. Theocharopoulos.

The first excavations at Thermos created much confusion about the dates of the buildings beneath and around the temple of Apollo, and the chronology of the MH period is still uncertain. See K. Romaios, 'Εκ του προϊστορικού Θέρμου', *ADelt* 1 (1915), 224-79 and *Id.*, 'Ερευνα εν Θέρμω', *ADelt* 2 (1916), 179-89; R. Hope-Simpson, *Mycenaean Greece*, D75, 97; I. Papapostolou, 'Ζητήματα των Μεγάρων Α και Β του Θέρμου', *AE* 1990, 191-200.

³ *FPR*; *SPR*; and in this volume.

⁴ G. Alexopoulou, 'Naupaktos', *ADelt* 49 (1994), B1, 243-44; L. Kolonas and F. Saranti, 'Naupaktos', *ADelt* 49 (1994), B1, 245; F. Saranti, 'Η αρχαία Ναύπακτος και η ευρύτερη περιοχή της. Τοπογραφικά δεδομένα και πρόσφατες έρευνες', *Proceedings of the First Archaeological Congress of South-Western Greece*, Patras 1996 (in press).



Fig. 1. View from the northeastern part of Tapia.

The valley of Gavrolimni is a fertile area, watered by many streams and cultivated mainly with crops and olive-trees. Its name is interesting as its origin is explained either as *Γαβρολίμνη* ('fish lake'), or *Καπρολίμνη* ('boar lake') or *Καβουρολίμνη* ('crab lake') and probably reflects the memory of the area being once a lake or swamp.⁵

As revealed by an investigation in the area prehistoric habitation is not restricted to the hill of Tapia, but extends further eastwards. The construction of a modern road several years ago revealed traces of buildings which are visible on the south slope of a low hill, about 350 m east of Tapia,⁶ east of the road leading to the village of

Gavrolimni. Signs of prehistoric habitation are even more extensive to the north, reaching as far as the lowest slopes of Kaliakouda.⁷

The hill of Tapia measures approximately 110 m in height and is situated north-west of the modern village of Chania, at a distance of about three kilometres from the sea and the bay of Kato Vasiliki. The slopes of the hill are covered with pine-trees. The top is oblong and flat and carries no signs of artificial fortification, as far as is possible to discern through the thick vegetation of shrubs. Buildings connected with prehistoric pottery are traced on the SW part of the hill, approximately five to six metres from the top. The entire southern face of Tapia has been used

⁵ The name seems to date from the Middle Ages: S.K. Alexandropoulou, *Νότια Αιτωλία, το οδικό δίκτυο* (Athens 1993), 60; G.E. Rapti, *Περιγραφή επαρχίας Ναυπακτίας* (New York 1955), 65-67.

⁶ It is nameless according to the locals.

⁷ Abundant MH pottery and traces of buildings are visible near the NE slope of Tapia, on the east side of a small stream that runs N-S, across the hill.



Fig. 2. Burial II.

for quarrying and a great mass of chipped stones is accumulated at the front.

As is evident from building remains and pottery on the surface, the prehistoric settlement of Chania covered primarily the lowest parts of the south-eastern and eastern slopes of the hill of Tapia. The layout of the settlement shows that the choice of the site depended mostly on the control of the passage. A fact worth noticing is that, prior to the construction of the national road at the foot of the hill of Tapia, the road leading

north passed at the level of the upper plateau. The famous inn,⁸ which gave its name to the village (Chania = inns), was actually located by that road, in line with our excavation site.

The excavated buildings are situated on the south slope of the hill. At this point, approx. 40 metres above sea level, the ground was levelled in the 1970s to form a terrace for a school, which was never built. Fortunately, the work caused only minor damages to the archaeological remains.

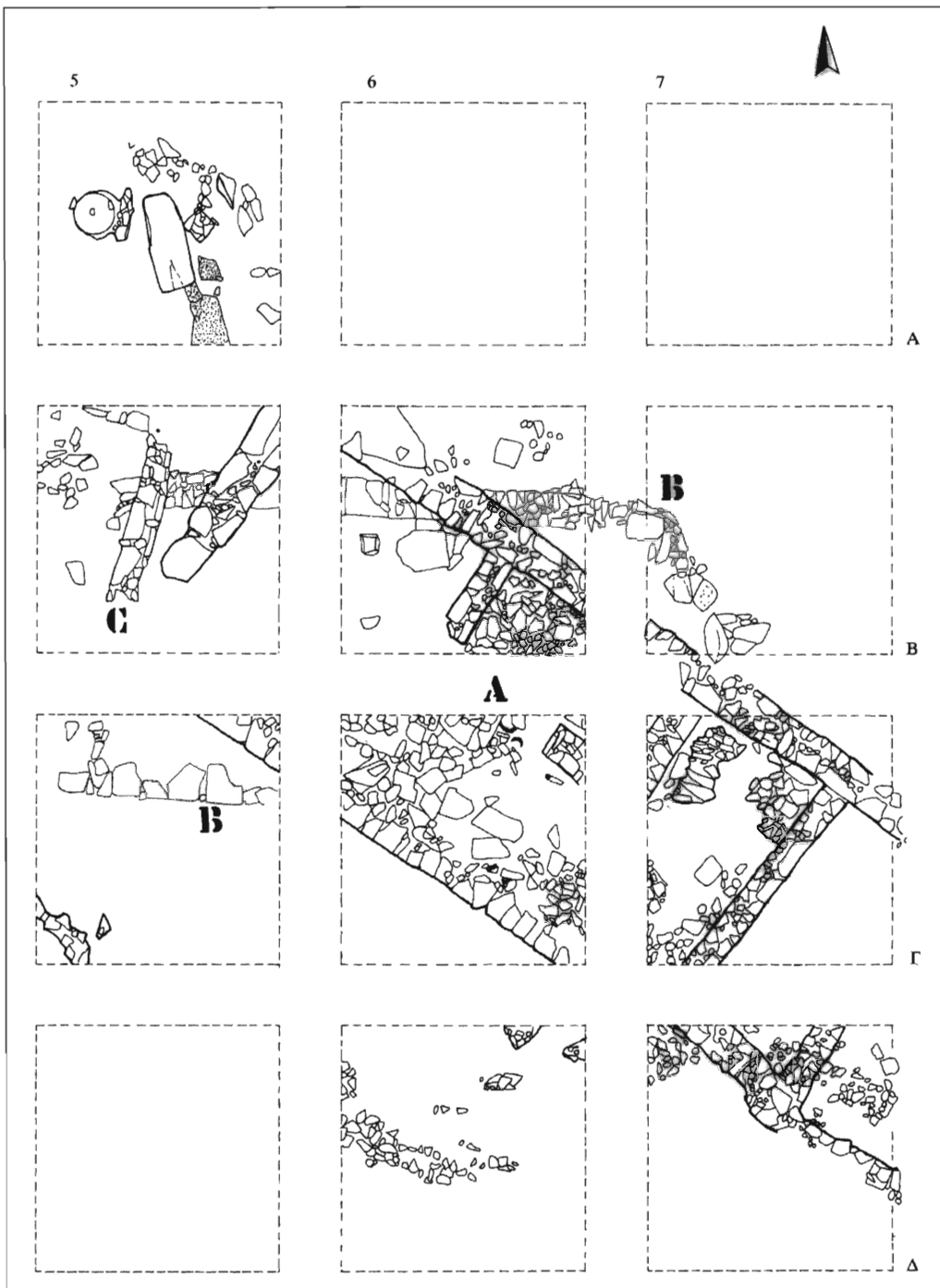
The initial aim of the excavation was to determine the extent and state of preservation of the settlement, on the site where the town hall was to be built, an area of about 500 m². It was soon realised that the archaeological remains covered almost the entire site. It also became evident that they continue north, west and east, whereas it has yet to be determined whether they continued further to the south as well.

Parts of at least four prehistoric buildings (A, B, C, D), evidently from two major phases, have so far been uncovered. The building material is homogeneous, consisting of local sandstone and shale (flysch). Three intra-mural burials of infants were also excavated, two of which were located in what was apparently an open area north of Building A (Fig. 2).

The settlement was built over different levels following the natural slope, the highest traced north of our excavation, at four to six metres above the terrace level. Another level is found

⁸ Chani Skorda/Χάνι Σκορδά.

Fig.3. Excavation plan Chania
 – Gavrolimni Aetolia –
 Eastern part of the excavation.



on the north side of the excavated area, at approximately half a metre below the terrace level, where there are visible traces of a building, or buildings, constructed with large, roughly rectangular blocks. The building(s) were obviously destroyed at an early date by the natural erosion

of the ground. Extensive layers of fallen debris from this level were found covering the north-west side of Building A.

A short description of Buildings A and B will be attempted in spite of the excavation being still in progress. They

Fig. 4. Building A
from NW.



belong to the eastern part of the excavated area, where the excavation has been concentrated in its second phase.

Building A is a large rectangular (?) building resting on top of Building B with an earth fill between them ranging between 0,05 and 0,40 m. It is found at a depth of 1,88 to 2,30 m under the terrace level. It is oriented NW-SE and is of large dimensions, measuring 15,40 by 5,50 m. Its east end extends beyond the original limits of the excavation grid and remains as yet unexcavated. Rough flat stones, usually set in two main rows, with smaller stones filling the intervals, constitute its walls. Mud is used as binding material. The external walls have a width of 0,60-0,80 m, the internal being approx. 0,45 m wide. Because of the ground inclination towards the southwest, the walls of these sides are more strongly built. The interior of the building is divided into five rooms, but until fully excavated it is uncertain whether they all belong to the same

phase. Two possible entrances have been traced, both on the long sides of the building (Figs 3,4).

Building B is oriented exactly E-W, without inclination, at a depth of 2,03 – 2,67 below the terrace level. Its east end appears to be apsidal, but it has yet to be ascertained, since it lies beneath the eastern room of Building A. Its west end was most probably rectilinear, but is fragmentarily preserved. The inner width of the building is 4,20 m and its maximum internal length 8,80 m. Its walls were built of large flattish stones at the bottom and small and medium sized unworked stones, built without any order, on top. The maximum preserved height of the walls is 0,37 m and their width is 0,60 m (Fig 5).

On the south side of the excavated area we have uncovered parts of a largely destroyed wall, constructed as a line of large rough sandstone blocks on a layer of small unworked stones.



Fig. 5. Building B under building A, from NW.

It is preserved to a length of 9,00 m and seems to be a terrace-wall, supporting this level of the settlement. This is also indicated by the fact that the fill south of the wall is devoid of sherds. Excavation below this level has as yet only begun, but a destruction level with large pieces of charred wood and burnt clay has been reached at a depth of 2,65 to 3,28 under the terrace level.

Six main categories of pottery can be discerned in the ceramic material connected with the above remains.

Coarse handmade ware is present in significant amounts at all excavated levels. It is unevenly fired, the surface colour ranging from red to orange, and the core usually being grey or black. The clay contains small stones, visible on the surface. At the level of Building B most of this pottery has a distinctly smoothed surface.

Kitchen ware of semi-coarse clay forms the largest group found at all levels. The clay colour ranges from pink to reddish yellow and contains small white inclusions. Small voids are visible on the surface. The clay is unevenly fired, usually with a greyish core. The ware is used for shapes of varying thickness, the most characteristic being storage pithoi and large pithoid jars with flat bases and triangular handles.

Matt-painted ware appears in significant amounts in the level of Building B. The fabric is semi-coarse and covered with a matt greyish slip, often burnished. Very small silver mica inclusions are sometimes noticeable. The decoration consists mainly of linear patterns, such as simple bands and continuous solid zigzags.⁹

Grey minyan ware also makes its appearance in the level of Building B,

⁹ Clay colour 5YR 7,6, reddish yellow. Slip colour 10YR 8/2, very pale brown.

but in very limited quantities. It is characterised by the absence of well-smoothed surfaces and is reminiscent of Argive Minyan ware.

Fine ware. It is well fired and usually has a reddish yellow colour.¹⁰ The clay has a soft surface and is mostly well-tempered. Slip is not easily discerned.

Polychrome mainland ware appears in small quantities in the level of Building B. The colours are matt black and burnished reddish brown. The clay is medium-tempered, containing black and white inclusions and small voids, as well as small amounts of silver mica.¹¹

Finds, other than pottery, consist of numerous flint chips and a couple of flint cores, various stone implements and tools (axes, grinders, whetstones, "lids"), clay spindle whorls and a large quantity of sea-shells and animal bones found near and in the floor levels. A small number of boar tusks has also been found. Bone tools are rare and metal is completely absent, except for a lead clamp used on a repaired sherd.

The preliminary study of the above material has made a few conclusions possible regarding the phases represented by the excavated remains. We

should, however, note that the excavation, as well as the conservation of the material, is still at an early stage. The sherds are often poorly preserved and the shapes are not easily reconstructed. There is, moreover, no established chronological system for this area.

With these facts in mind, Buildings A and B seem to be dated at the end of the MH period and the transition to LH, whereas earlier habitation at the site cannot yet be excluded. We should also note that the entire fill above Building A had been removed before excavation. On the contrary, in the western part of the excavated area, where buildings appear at a greater depth, decorated pottery has been found in the upper fill dating to the LH III (C?) period, at the time of the last habitation at the site.

The excavation of the settlement of Chania can certainly contribute much to our knowledge of prehistoric habitation in this part of western Greece, as well as of Aetolia in general, known to have been inhabited from an early date. Traces of habitation in the area of Varassova dating from the Final Neolithic/Chalcolithic to the end of Bronze Age have long been known from Pangali,¹² Ag. Triadha,¹³ Kryoneri,¹⁴ and Ano Vasiliki.¹⁵ The settlement of Chania and the survey of its

¹⁰ Clay colour ranges between 7,5 YR 8/6, 7/6, reddish yellow, and 7,5 YR 8,4, pink.

¹¹ Clay colour 7,5 YR 7/6, reddish yellow. Core colour 5YR 6/4, reddish yellow. Slip colour 5YR 6/4, reddish yellow.

¹² S. Benton., 'The Ionian Islands', *BSA* 32 (1931-2), 239; Th. Mavridis and H. Alisøy, *FPR*, 272-79; M. Gazis, *FPR*, 280; T. Mavridis, *SPR*, 277-89.

¹³ E. Mastrokostas, 'Χαλκίς', *ADelt* 22 (1967), B2, 320; *Id.*, *BCH* 94 (1970), II, 1031.

¹⁴ S. Benton., 'The Ionian Islands', *BSA* 32 (1931-2), 239.

¹⁵ K Davaras, 'Νέοι διπλοί πελέκεις εκ της ΣΤ αρχαιολογικής περιφέρειας', *AAA* III 3 (1970), 311-12; E. Mastrokostas, 'Χαλκίς', *ADelt* 22 (1967), B2, 320.

Fig. 6. View of the hill of Hagia Triada from the hill of Tapia.



environment have proved that prehistoric habitation in the area is far more extensive than formerly thought. The full excavation of the settlement will hopefully help to establish a chrono-

logical system for this period in Aetolia and to determine the relationship between this inland settlement and the one partially uncovered on the hill of Hagia Triada near the sea (Fig. 6).

Shellfish from the Excavations at Aetolian Chalkis

Kaj Strand
Petersen¹

Introduction

It has been argued that, among species in the northern Adriatic Sea, we should also find temperate species characteristic of the Eemian, or last interglacial, period in northern waters (130,000-115,000 BP). The faunal assemblage is, however, much more varied than that known in northern waters in the hypsithermal interval of the Eemian period.

Following the development of a glacial period it has been shown that the Mediterranean indeed did have some northern species, such as *Arctica islandica*, *Pecten islandicus* and *Buccinum undatum*. The Mediterranean has been regarded as a faunal unit with a more varied fauna than that of the northern ocean. However, following Ekman (1967), it has become clear that the Straits of Gibraltar do not represent an important zoogeographical boundary, and hence the Mediterranean should not be regarded as a distinct unit.

Ekman goes on to say that the Mediterranean should be one of the

better-known seas, but this is far from the case. Our former knowledge of the Eastern Mediterranean is particularly faulty. Zenetos has, however, recently concluded that the marine bivalvia fauna is as rich in the Eastern Mediterranean as it is in the Western,² which has been confirmed for the entire molluscan fauna by Delatmote and Vardala.³

Hence, when studying the fauna in the Ionian Sea, and the Gulf of Patras in particular, we are looking at a more varied fauna than what we find in northern waters. Therefore it has been a challenge for me to study the molluscan material from the excavations at Chalkis in Aetolia.

An overview of the geology of the coast at Chalkis was given in the *Second Preliminary Report* (2000). Here, the focus will be on the molluscs sampled from the outset of the project in 1995 until 2000. In the final publication, material from the final excavation season in 2001 will also be included, and the whole body of material will, as far as possible, be put in its stratigraphical context.

¹ *The Geological Survey of Denmark and Greenland.*

² A. Zenetos, *Marine Bivalve Fauna in Greek waters. Variety, Distribution, Ecology and Zoogeography*, Abstracts 12th International Malacol. Congress (Vigo 1995), 289-90.

³ M. Delatmote and E. Vardala-Theodorou, *Shells from the Greek Seas* (Athens 1994).

During the six seasons covered in the present report a total of 537 bags containing shellfish were recorded.⁴ The number of specimens – and species – varies greatly between the units.

The over-all dominating species is the cockle, which occasionally has an anthropogenic implication, when perforated by a hole and used as a necklace (Fig. 1). Among the 701 cockleshells recovered in the year 2000 season, 16 were pierced in this way. Other species, described in the list of molluscs below, may also have been used as charms at times.

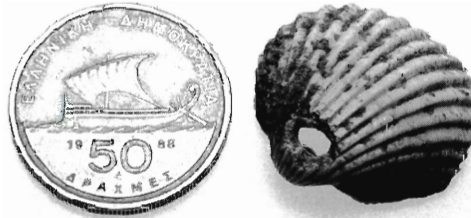


Fig. 1. A cockle with an anthropogenic impact. Notice the different look of the hole when compared with that of a predatory gastropod on Figs. 3 and 11.

The species in order of frequency

The following descriptions are listed in the order of frequency of the species, with the intention of present-

Frequency	Molluscan species	epi	infauna
448	<i>Cerastoderma glaucum</i>		x shallow
	<i>Acanthocardia tuberculata</i>		x shallow
75	<i>Cerithium vulgatum</i>	x	
48	<i>Hexaples trunculus</i>	x	
37	<i>Pinna nobilis</i>		x shallow
48	<i>Patella</i> spp.	x	
14	<i>Spondylus gaederopus</i>	x	
13	<i>Tonna galea</i>	x	
11	<i>Tapes decussatus</i>		x deeper
11	<i>Ocenebra erinaceus</i>	x	
10	<i>Mactra glauca</i>		x deeper
8	<i>Venus verrucosa</i>		x shallow
7	<i>Ostrea edulis</i>	x	
11	Trochidae	x	
5	<i>Glycymeris glycymeris</i>		x shallow
4	<i>Pecten jacobaeus</i>	x	
3	<i>Bolinus brandaris</i>	x	
3	<i>Conus ventricosus</i>	x	
2	<i>Callista chione</i>		x shallow
2	<i>Aporrhais pespelicani</i>		x shallow
1	<i>Arca noae</i>	x	
1	<i>Dosinia lupinus</i>		x deeper
1	<i>Luria lurida</i>	x	

Table 1. Frequency

⁴ 1995: 22; 1996: 46; 1997: 105; 1998: 101; 1999: 129; 2000: 134.

Fig. 2. The fisherman's wife crushing the shell of the common cerith in order to get the hermit crab used for bait.



ing the habitat of each species, as well as its culinary use, based on its rôle in modern gastronomy.

Table 1 presents all the 22 marine species found, with an indication whether it is an epifaunal element, i.e. attached to a hard substrate, or an infaunal element, burrowing in the sandy or muddy seabed.

Cerastoderma glaucum (Poiret, 1789). The Mediterranean cockle, in Greek *κυδώνι* (kydoni), lives in shallow water on sandy or muddy seabed. Here, we may also include *Acanthocardia tuberculata* (L., 1758), which is more solid and thick-shelled, but which lives on the same type of seabed and depth. When harvested today, cockles are 'scooped up' from the seabed. That was presumably the case in Antiquity too, since many other species of molluscs,

not really desirable for food, are found together with cockles in archaeological deposits. In Danish kitchen middens, oysters seem to have been the preferred fare, and cockles are predominant only in periods when oysters are scarce.⁵

Cerithium vulgatum (Brugière, 1792) is not subject to regular harvesting and rarely seen on the market. It is, however, often used as bait for fishing. It ranges second among the species from the excavations at Chalkis. The shells are found on the rocky shore and on sandy and muddy seabed. On the sandy seabed off Chalkis the shell is often occupied by the hermit crab (*Paguristes oculatus*), one of nearly 30 endemic species of decapod crustaceans in the Mediterranean and Atlantic region (Ekman 1967). The hermit crab from shells of *Cerithium vulgatum* is used as bait at modern-day Kato Vasiliki (Fig. 2).

⁵ K.S. Petersen, *Journal of Danish Archaeology* 5, 77-84.

The large number of this species found in the archaeological deposits can, in my view, be explained by it unintentionally being caught when the seabed was trawled for cockles. Occasionally the specimens have been attacked by a predatory gastropod boring the shell (Fig. 3).



Fig. 3. Shells of the common cerith. To the left part of the hermit crab is seen otherwise well protected in the shell - the two other shells both carry the hole made by a predatory gastropod.

Hexaples trunculus (L., 1758), in Greek πορφύρα, found from one to 100 metres of depth on muddy seabed. It is very common but the meat is inferior to that of the purple dye *murex*. The species was used in Antiquity to produce a purple dye of lesser quality (Poppe and Goto 1991). The shells are sometimes inhabited by the hermit crab (Fig. 4), and, as with the previous species, its high frequency in archaeological deposits may be explained as an accidental by-product of cockle fishing.

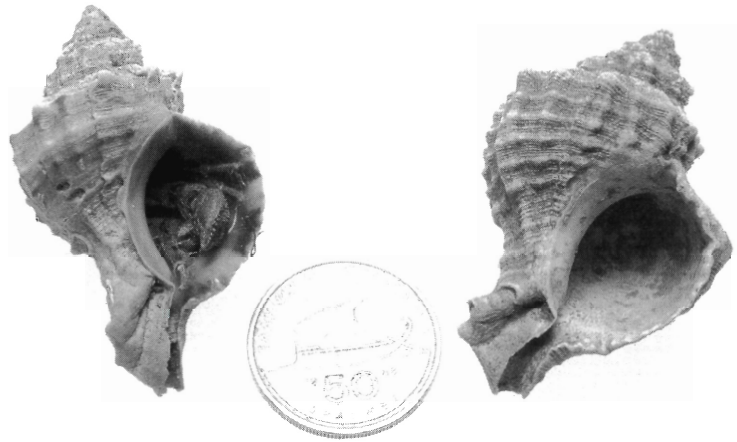


Fig. 4. *Hexaples trunculus* can also be invaded by the hermit crab and be seen moving over the sandy seabed.

Pinna nobilis (L., 1758), or fan mussel,⁶ lives in sand, mud or gravel, from the low tide mark to a depth of 60 metres. Off the coast of Kato Vasiliki, *Pinna* is found in the fields of *Posidonia oceanica* (Fig. 5). Large specimens, up to 90 cm tall, are found at greater depth further out in the sea. The fourth most frequent species from the excavations is still used for its meat, as implied by its French name, *jambonneau de mer*. Its long and resistant byssus (Fig. 6) was used in the textile industry as late as the nineteenth century (Poppe and Goto 1993).



Fig. 5. *Pinna nobilis* "standing" in the field of *Posidonia oceanica* on 3-4 m of depth off Kato Vasiliki. Fibrous sea-balls, formed of the shaggy remains of old leaves (T. Harris, *The National History of the Mediterranean* (London 1982), accumulate near the top of the shore as seen in the little bay at Pangali.

Patella, called πατελίδα in Greek, is represented by the spp. *P. coeruleae* (L.,

⁶ K.S. Petersen, in *SPR*, fig. 52.

Fig. 6. The fan mussels from off the coast of Kato Vasiliki with part of the resistant byssus seen on the edge of the shell to the left. The byssus is used anchoring the animal in the sandy sea bottom.



1758) and *P. rustica* (L., 1758), both common in the Mediterranean as epifaunal on rocky shores. The former is found from the upper tidal mark to a few metres of depth, whereas the latter is restricted to the intertidal zone, which in the Mediterranean is very narrow, measured in tens of centimetres.⁷ Specimens of both species are rather common in the archaeological deposits, and both are found today on rocky shores in the area of Kato Vasiliki (figs 7-8).

Spondylus gaederopus L., 1758. The family of the Spondilydae, also called

thorny oysters, was formerly very common in the Mediterranean. For an unknown reason, the colonies suffered a sharp decline in the 1980s (Poppe and Goto 1993). Occurring in some archaeological samples from Chalkis, its edible flesh must, as today, have been considered a delicacy in Antiquity (Fig. 9). The species belongs to the epifaunal on hard substrates and is infra-littoral from six to 50 metres of depth, cemented to the rock with the lower (right) valve. It is evident from the archaeological specimens that these shells were removed deliberately from their growing position, and not accidentally with other species from the level sandy seabed.

Tonna galea (L., 1758) lives at a depth between 20 and 80 metres, on all kinds of seabed (Poppe and Goto 1991). Here is a species, which was not caught accidentally with the cockle but must have been fished for in its own right. This large predatory mollusc has been eaten around the Gulf of

Fig. 7. To the east of Hagia Triada the sandstone from the Flysh forms the foothill of Klokova forming the firm substrate for the epifauna, here dominated by *Patella* spp.



⁷ T. Harris, *The National History of the Mediterranean* (London 1982).

Patras until recently, but is now rarely seen at restaurants.

Tapes decussatus (L., 1758), in Greek one of the several mollusc species called *αχιβάδα*, lives as an infaunal element from the sandy shore to a depth of few metres. The French regard its meat as “*plus tendre que celle de la praire [Venus verrucosa]*” (Quéro and Vayne 1998, p. 121). Its frequency at Chalkis is much lower than that of the cockle, and it may well be that the northern shore of the Gulf of Patras is too exposed for the species, which is usually found in calm waters (Fig. 10).

Ocenebra erinaceus (L., 1758) is found from the tidal zone to 150 metres of depth, on a mixture of sand, mud and rocks. According to Poppe and Goto (1991) colonies of thousands of individuals are found along the French west coast at low tide. In 1997 I author collected 63 specimens off the mouth of the Gironde. All the shells were occupied by Hermit crabs, which leads to the conclusion that a concentration of the shell in a certain environment is not necessarily a sign of occupation of the gastropod itself. The *Ocenebra erinaceus* is a predatory species attacking mostly bivalves, but also other armoured creatures like crustaceans (Lellák and Cepická 1975).

Macra glauca (Born, 1788), which in Greek has the same name, *αχιβάδα*, as *Tapes decussatus*, lives in sand from the tidal zone to a depth of 40 metres, burrowing 20 to 30 cm, sometimes even 55 cm, deep. Although a frequent species, it is thus natural that it is found on the excava-



Fig. 8. From the place shown on Fig. 7 a tiffin is easily gathered among the gregarious limpets. One might also go for the Trochidae-topshells which are very common here - seen on Fig. 14 - but nearly all gastropods used as shellfish had to be cocked to release the soft part from the shell.



Fig. 9. The thorny oyster from the excavation looks monstrous compared to the recent ones figured in M. Delamotte and E. Vardala-Theodorou, *Shells from the Greek Seas* (1994), figs. on pp. 164-65. They might have been taken as curiosities. As the outer surface of shell often is incrustated with other invertebrates they are almost unseen: A.C. Cambell, *The Seashore and Shallow Seas of Britain and Europe* (1976).



Fig. 10. In the Northern Waters around Denmark *Tapes decussatus* occurred during the early part of the Holocene giving name to the so-called Older *Tapes* beds and is found in the “Ertebølle Køkkenmøddinger” together with the oyster.

tion in fewer numbers than the cockle, a shallow infaunal element.

Venus verrucosa L., 1758, in English ‘warty venus’, is called *praire commune* in French and highly regarded: “*avec sa chair ferme, fruitée et iodie, [il] est l’un de nos meilleurs coquillages*” (Quéro and Vayne 1998, p. 119). In Greek it is called *χάδαρο* or *αχιβάδα*, and is common in the Mediterranean on all kinds of seabed from the shore to *c.* 100 metres of depth. It belongs to the infaunal and is easily caught with the cockle when

Fig. 11 The warty venus as the name of *Venus verrucosa* runs in English has a sturdy shell where even a predatory gastropod has given up as seen by the unfinished hole in the right valve.



Fig. 12. The hard substrate for the oyster to fix upon might be other specimens. Here the oyster themselves are covered by fanworm (Polychaete) and with *post mortem* borings of *Cliona celata* - the boring sponge.



dredging. Being quite commonly found on the beach today and having a sturdy shell, which should be apt for good preservation in soil, it is somewhat peculiar that it should be so rare among the species found during excavation: only 8 specimens were registered (Fig. 11).

Ostrea edulis (L., 1758), the oyster – in Greek *όστρεο* or *στρείδι* – is found all over the Mediterranean (Fig. 12). The oysters live in shallow water fixed

to a hard substrate on all types of seabed. Its popularity as a culinary dish goes back to Antiquity⁸ with connotations of aphrodisiac qualities (Poppe and Goto 1993), and oyster fishing by diving is mentioned in Homer (*Il.* XVI, 854-63):

And, like a diver, from the well-wrought car
Headlong he plunged; and life forsook his
limbs.

O'er whom Patroclus thus with bitter jest:
"Heaven! what agility! how deftly thrown
That somersault! if only in the sea
Such feats he wrought, with him might few
compete,

Diving for oysters, if with such a plunge
He left his boat, how rough soe'er the waves,
As from his car he plunges to the ground:
Troy can, it seems, accomplished tumblers
boast.

(trans. Edward, Earl of Derby, 1865)

The family Trochidae includes three species found at Chalkis: *Monodonta turbinata* (Born, 1780), *Gibbuta divaricate* (L., 1767) and *Callistoma zizyphinum* (L., 1758). These play the same rôle in the Mediterranean as do the Littorinidae, living on rocky shores, in the northern Atlantic. The frequency among the samples (Fig. 13) was low, but these species are common on the shore today (Fig. 14).

Glycymeris glycymeris (L., 1758), in Greek *χοντροή αχιβάδα* or 'thick shell', prefers sand and mud in shallow water out to *c.* 80 metres from the shore. In modern-day France it is cap-

⁸ From the studies of the shellfish from "Køkkenmøddinger" (Kitchen middens) at the Ertebølle settlement - *locus classicus* - in the Limfjord, Denmark it was concluded that the oyster only was eaten as a pleasant change in their diet: K. Strand Petersen, in L.-K. Königsson (ed.) *Nordic Late Quaternary Biology and Ecology*, *Stria* 24, 221-26. From this period - the Ertebølle lasting 1500 years from 5400 to 3900 B.C. - we cannot tell what kind of feeling those people had but it has been suggested "that the chemical content of these shells, in particular iron compounds, zinc, iodine and salts, rather than just their food value, was the indirect reason for the accumulation of the large shell middens": U. Möhl, 'Aggersund-bopladsen zoologisk belyst', *Kuml - Årbog for Jysk Arkæologisk Selskab* 1978, 57-75.

tured, like cockles, by dragnet. The bittersweet clam is regarded as a delicacy in Europe, and its French name, *amande de mer*, hints at its delicious taste when eaten cold. The low frequency among the samples shows that it was not part of the staple diet in Antiquity, although it is common in the Mediterranean.⁹

Pecten jacobaeus (L., 1758), in French *Coquille Saint-Jacques de la Méditerranée* – to be distinguished from *de l'Atlantique*, which is *Pecten maximus* (L., 1758) – the shell famous as the pilgrim shell from Santiago de Compostela.¹⁰ Both are *une des vedettes des menus de la mer* (Quéro and Vayne 1998, p. 100). They are found on sand and gravel seabeds at a depth between 25 and 250 metres (Poppe and Goto 1993). They are not found in shallow water, which may explain the paucity among the archaeological samples of this species, so popular today.

Bolinus brandaris (L., 1758) is common in the Mediterranean on sand and mud seabeds between one and 200 metres of depth (Fig. 15). Known as the purple dye *murex*, it was the basic product in the manufacture of purple dye from Phoenician times (Poppe and Goto 1991). As late as the time of Christ we hear about Lydia “a seller of purple goods...” (Acts 16, 14). A huge number of rotten molluscs were necessary for the production of dye,¹¹ so the frequency of the species at Chalkis

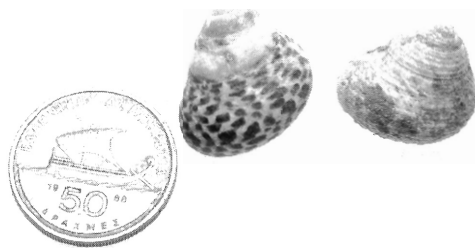


Fig. 13. Here to the left the toothed winkle (*Monodonta turbinata*) from the recent shores of the Patras Bay is compared with one from the excavations where the parallel reddish transverse stripes have vanished.

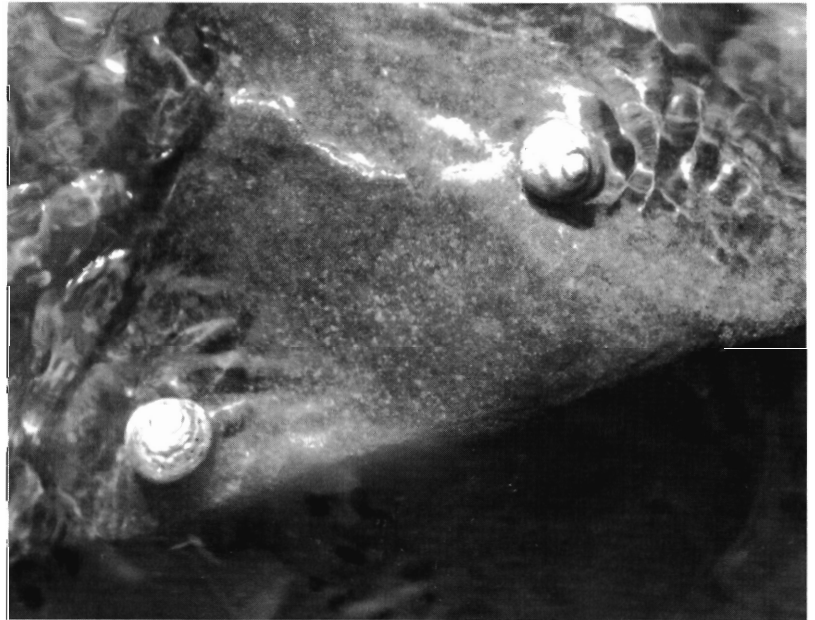


Fig. 14. Two toothed winkle “grassing” on the rocks in the surf zone.

implies that it was rather used for food. The meat has a fine taste, and it is the most popular gastropod fished in the Golfe du Lion, where it is served in its conspicuous shell and called *escargot de mer*.

Conus ventricosus (Gmelin, 1791) is found in shallow calm waters on rocky shores (Poppe and Goto 1991, pl. 36, figs 5-7). This is the only species of *Conus* in the Mediterranean and therefore also called *Conus mediterraneus* (Hwass in Bruguière, 1792). This species has not been caught for food

⁹ S.P. Dance, *Shells* (London 1992).

¹⁰ In this way *Pecten maximus* is the one to be taken off Santiago de Compostela and given to the pilgrims on their stay in town on their pilgrimage to St. Jacques!

¹¹ D.S. Reese, ‘Palaikastro Shells and Bronze-Age Purple-dye Production in the Mediterranean Basin, *BSA* 82 (1987), 201-06.

Fig. 15. In the Levant, where the Phoenicians once lived, large piles of the purple dye murex are found along the coast - like old "Køkkenmøddinger", they are however left there as remnants of the purple dye production invented by the Phoenicians.

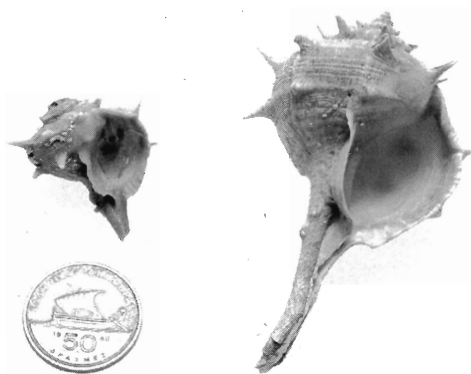
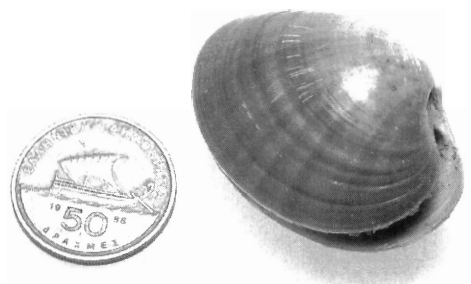


Fig. 16. The venus shell (*Callista chione*) is characteristic by its horny layer covering the shell chestnut - brown and shining which once made our oldest grandchild saying when asking him what to bring home this summer from Greece - the shiny mollusc, he said.



but, thanks to its varied shape and colouration, it may have been used as charms.

Callista chione (L., 1758): the Greek name is μεγάλη αχιβάδα, 'large shell'. This shiny mollusc lives in fine and clean sand as a shallow infaunal element (Fig. 16). Today it is common off Kato Vasiliki from shallow water to great depths. It is caught commercially by trawling and diving. Empty shells are often found in the traces of the hunting octopus (*Octopus vulgaris*: Cuvier, 1797).

Aporrhais pespelicani (L., 1758) is found from ten to 180 metres of depth on muddy sand (Poppe and

Goto 1991). As in the case of *Cerithium vulgatum*, it may be presumed that shells are brought near the shore by the hermit crab, a phenomenon also observed in Denmark.¹² The shells, found on the shore or collected accidentally with the cockles, might have served as charms because of the shape, which "has caught the attention of fishermen and naturalists since ancient times" (Poppe and Goto 1991, p. 116, pl. 16, figs 8-11). This mollusc was described by Aristotle and Pliny,¹³ and it was appreciated as an hors d'oeuvre boiled in a lemon sauce. The quantities registered from the excavations are however not large enough to make it likely to have been used for food at ancient Chalkis.

Arca noae (L., 1758; Fig. 17) lives attached by the byssus on rocks and other hard substrata from the tidal zone to over 100 metres of depth, where direct sunlight is virtually absent (Poppe and Goto 1993). According to Lellak and Cepická (1975, p. 154), "les sujets adultes préfèrent la zone supérieure, bien éclairée, de la bande littorale"! Although it is among the least frequent species among the samples from Chalkis, this mollusc, which is eaten raw, is now common along the shores of the Gulf of Patras.

Dosinia lupinus (L., 1758) lives deeply buried in pure sand and fine gravel from the tidal zone to 200 metres of depth. That fact may explain its

¹² K.S. Petersen, *Geology of Denmark and Greenland Survey Bulletin 3* (2004).

¹³ Etymology: aporrhais (Aristotle), "spout-shell", from aporrhoeo, to flow away. It was only at the time of Linnaeus (1707-78) that the binomial system of scientific nomenclature was established.



Fig. 17. Shells and other faunal remains found along shore near to Hagia Triada:
 1) *Arca noae*,
 2) *Venus verrucosa*,
 3) *Cerithium vulgatum*,
 4) *Hexaples trunculus*,
 5) *Monodonta turbinata*,
 6) *Sepia sp.* and others.

low frequency among the samples but today it is used as seafood.

Luria lurida (L., 1758), with a biometric range from one to 60 metres of depth, lives under stones in a sandy biotope. The species is one of the classic Mediterranean shells (Pope and Goto 1991), but because of its small size, it was not used for food but rather as charms. It is among the *Cypraeidae* whose shells are so beautiful that they were used in the Orient as money, called 'kauri' (Lellak and Cepicka 1975).

Finds of terrestrial gastropods were also recorded from the excavations, among which the following species

have been distinguished: *Zebrina detrita* (Müller, 1774), *Helicigona lapicida* (L., 1758), *Cepaea hortensis* (Müller, 1774), and *Rumina decollata* (L., 1758).

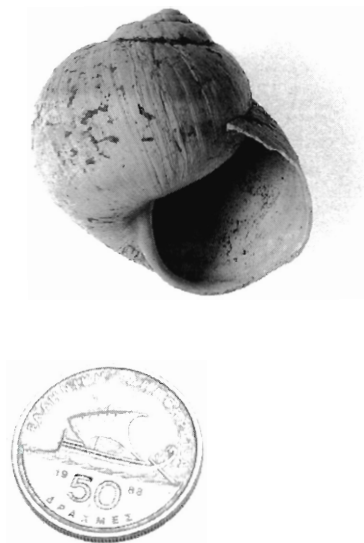
Nineteen specimens of *Rumina decollata* were found. As implied by the name, it is characteristic by the deliberate truncation where the earlier formed whorls are lost.¹⁴ A common Mediterranean species it stills occurs in the northern coastal region of the Gulf of Patras.

Helix pomatia (L., 1758) Fig. 18, with a living range in Central and South-eastern Europe has been cultivated for food since Roman times.¹⁵

¹⁴ M.P. Kerney and R.A.D. Cameron, *A Field Guide to the Land Snails of Britain and North-West Europe* (London 1979).

¹⁵ *Helix pomatia* was for instance introduced also to Denmark in the Middle Ages and was popular among the catholic as Lenten fare.

Fig. 18. The distribution of *Helix pomatia* is very much affected by its culinary reputation. The occurrences in Denmark are regarded as introduced by monks in the Middle Ages.



The molluscan assemblages

All in all 22 species of marine molluscs were recorded, as well as five terrestrial gastropods, including *Helix* and *Cepaea*, which are still sold in Greek markets.

The by far most numerous molluscs from the Chalkis excavations is the cockle, found in great quantities in shallow waters on sandy seabed. A shallow infaunal element, it was most probably dug out or trawled by net, as it is done today in southern Portugal, where the local fishermen harvest shellfish from the sandy seabed with dragnets. Such a method of harvesting would also explain the presence among the samples of species, which cannot be regarded as comestibles, viz. small gastropods like *Columbellidae* and *Cerithium vulgatum*. The latter is the most common gastropod species from the excavations, its shell often

carrying evidence of boring by a predatory gastropod. The shells would therefore have been picked up empty or occupied by the hermit crab, as often is seen today (figs 2-3).

The many bivalves among the samples have one feature in common: as shallow to deeper infaunal species, their habitat is the sandy seabed (table 1). *Venus verrucosa*, *Tapes decussates*, *Pinna nobilis* and *Macra corallina* are all known as seafood. Among the bivalves as whole, thirteen families covering 50 species from the Atlantic and the Mediterranean are recorded as edible. So it is more a customary attitude among the natives which determines what is accepted as seafood.

Pinna nobilis, with a height which can reach nearly a metre, could be called the king of shell fauna.¹⁶ The samples from the excavations are, however, all fragmentary, due to the fragility of the shell when taken out of the water. Large specimens can still be found at depths of four to seven metres in the Gulf of Patras.

The *Mytilidae* are missing from the bivalves found at Chalkis. Mussels are otherwise very common and can form 'bancs de moules' or grow on fishing tackles off Kato Vasiliki (Fig. 19). In Greek, the *Mytilus galloprovincialis* (Lamarck, 1819) is called μύδι Κωνσταντινουπόλεως ('Constantinople mussel') or μαυρομύδι ('black mussel'). An explanation as to why it is not found in the assemblage from Chalkis may be the fragility of the shell

¹⁶ K.S. Petersen, in *SPR*, fig. 52.



Fig. 19. The mussel is found also on the fishermen's sea trout ponds in great quantities, but it has not been recorded from the excavations.

when buried in soil. Another possible reason is that it was not deemed suitable as food in ancient Chalkis. As it grows fixed to the hard substratum by the byssus, it would not be taken accidentally.

Among the molluscs, we have species known from rocky shores, such as *Patella* spp. and Trochidae with genera like *Monodonta* and *Gibbula*. The latter is found in abundance along the shore today. In some way these

species seem to play the same rôle as do the Littorinidae in Northern Europe.

Among gastropods, the impressive *Tonna galea*, with a diameter of up to 25 cm, is an unpitiable predator, attacking starfish, echinoids and large bivalves. Not very common, it can still be found on the menu. Living at greater depths than most of the other species mentioned, it was caught by the population of ancient Chalkis.¹⁷

¹⁷ K.S. Petersen, in *SPR*, fig. 53.21

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The Coins from Hagia Triada II¹

Georgia Z.
Alexopoulou

Ninety-four coins came to light during the excavations at Kato Vasiliki in 1999 and 2000.² The catalogue is arranged according to the geographical order used in numismatic publications. The specimens of each group, which come from the same mint, are catalogued in increasing order according to diameter and weight. Nineteen coins are in such a state of deterioration as to be almost useless for study.

As can be seen from Table I, all the coins are bronze except from four silver specimens. Once again Aetolian League coinage prevails with a total of 37 pieces.³ There are also coins from Amphipolis (Macedonia), from Thessaly (Pelasgiotis: Attrax, Crannon, Eurea, and Phthiotis: Halus, Lamia, Peumata), from Epirus (Ambracia) and Acarnania (Argos Amphiloichicum). There are also issues from Locri Opuntii Phocis, with its federal coinage, and from Euboea (Chalkis, Eretria, Histiaea). Specimens were found even from the Peloponnese (Corinth, Phlius, Sicyon, Aegeira, Dyme, the Achaean

League, Elis, Argos, Hermione and the Arcadian cities, Megalopolis, Cleitor and Pheneus), Ionia (Miletus), and Carthage. Apart from Euboean Chalkis and Sicyon, none of the other areas was represented in the excavations of the previous period. We can observe that the coins from Thessaly and the Peloponnese were circulated simultaneously. The specimens from those areas are limited (one to four patterns) with the exception of Corinth (eight patterns).

The Aetolian League is once again, and quite naturally, the most frequently represented mint. It has been possible to identify the following numismatic types:

1. Atalanta or Aetolia wearing kausia r. / Calydonian boar at bay r., above ΑΙΤΩ (1 pattern) [cat. no. 10]. Olivier Picard dates this type at the end of the fourth century B.C.⁴

2. Atalanta or Aetolia wearing kausia r. / spearhead l., above ΑΙΤΩ, beneath ΑΩΝ, on r. in the field grapes (7 pat-

¹ I wish to express my thanks to Dr. Lazaros Kolonas, General Director of Antiquities, who authorized me to make this preliminary presentation of the coins found at Kato Vasiliki. I would also like to thank the conservator of the 6th Ephoreia, Despina Marinopoulou, and the Surveyor, Charalambos Marinopoulos, who produced the map. I also thank the philologist Sevi Gaitanidou who was kind enough to check the English text.

² In the present preliminary report are also included nineteen coins found during the excavations of the previous year (1998), which were not discussed in *SPR*, since they had not been conserved at the time.

³ During the excavations of 1997 a total of 31 coins came to light, of which twenty were of the Aetolian League, cf. G. Z. Alexopoulou in *SPR*, 259-67.

⁴ Picard 1984, 284.

terns) [nos. 11-17]. This type was, as the previous type, issued at the end of the fourth century B.C. according to Picard.⁵

3. Young male head with wreath r. / spearhead and jawbone of boar r.; above ΑΙΤΩ, beneath ΛΩΝ on 1., in the field grapes (8 patterns) and sometimes in the middle the monogram



(15 patterns) [nos. 18-39]. Picard, having conducted a thorough research of the coins from the Corycian Cave, dated this Aetolian type from 300/290 to 191 B.C.⁶ The specimens of this type represent a majority (22 patterns) of the total (37) of the coins issued by the Aetolian League and are represented in great variety, as it can also be seen in the BMC⁷ and SNG Cop.⁸

4. Head of Athena r. / Heracles standing with club and lion's skin; on r. ΑΙΤΩ, on 1. ΛΩΝ (6 patterns) [nos. 40-45]. Picard dates this type in the early second century B.C.⁹

5. Atalanta of Aetolia wearing kausia r. / owl standing (1 pattern) [no.46].

F. Scheu suggests the year 205 B.C. as the beginning of the bronze issues of the Aetolian League, when Aetolia, exhausted by the wars against Philip V of Macedonia, went through a financial crisis and stopped issuing silver coins.¹⁰ K. Liampi proposes an earlier dating of the bronze emissions in the first half of the third century B.C., and claims that the circulation of the bronze issues was parallel with the silver ones.¹¹

The types **1** to **4** were examined in the previous report.¹² Type **5** is the latest issue according to *SNG Cop*,¹³ whereas it is neither referred to by Head,¹⁴ nor in the catalogue of the British Museum.¹⁵ It is the only type, which has the magistrate's name, while the majority of Aetolian League coins does not carry names of magistrates. The weight of the coins examined here varies from 2.2 to 6.0 gr., with the exception of no. 10, which weighs 1.5 gr. According to Picard they are "chalka" and "double chalka".¹⁶ The common bronze coin of Corinth with Pegasus / Trident is distinguished in Pegasus r. (7 patterns) or 1. (1 pattern), with diameter from 11 to 14 mm. The issues with Pegasus on r. are rare and generally considered early.¹⁷

⁵ Picard 1984, 284.

⁶ Picard 1984, 284.

⁷ *BMC*, Thessaly to Aetolia, 198-99.

⁸ *SNG Cop*, Aetolia: nos. 28-34.

⁹ Picard 1984, 284.

¹⁰ F. Scheu, 'Coinage systems of Aetolia', *NC* 140 (1960), 50.

¹¹ K. Liampi, 'On the cronology of the bronze coinages of the Aetolian League and its members (spearhead and jawbone types)', *Αρχαιογνωσι* 9, 1995-96 (1998), 83-103.

¹² cf *G. Z. Alexopoulou*, *SPR*, 259.

¹³ *SNG Cop*, Aetolia: no. 41. To be more specific, according to the catalogue the attribution of the coin to the Aetolian League is doubted.

¹⁴ Head, *HN*, p. 334-35.

¹⁵ *BMC*, Thessaly to Aetolia, 194-200.

¹⁶ Picard 1984, 285.

¹⁷ N. Bookidis and J.E. Fischer, 'The Sanctuary of Demeter and Kore on Acrocorinth, Appendix: Coins', *Hesperia* 43, (1974), 294.

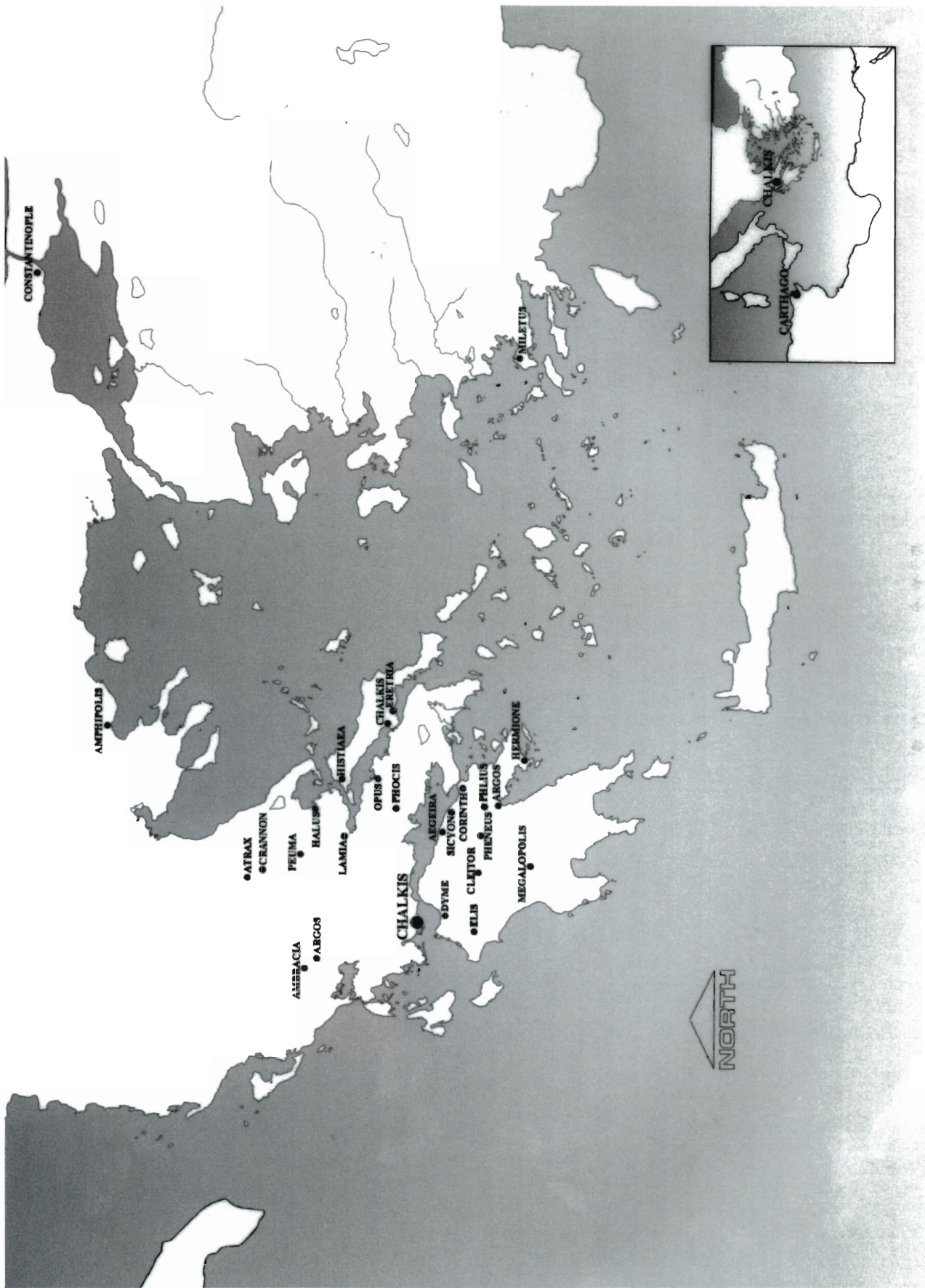


Fig. 1. The cities of origin of the coins found at Aetolian Chalkis.

Sicyon is represented with two silver and five bronze patterns, covering the period from the fourth until the second century B.C. The presence of coins from Sicyon should not surprise us, since its coins circulated before and after the city joined the Achaean League.

The coins from Carthage and Miletus can be considered as tokens of communication with remote regions. The

fact that there were only four silver coins of a total of 113 is completely harmonized with the economic reality of the city, since the silver coins were meant for the exchanges with other cities, whereas the bronze ones were limited to covering local needs. Compared with the finds from the excavations in 1998 the specimens from 1999 and 2000 present a noteworthy variety of types, representing many different cities of Central and Southern Greece.

TABLE 1
Greek Coins

Mint	Number of specimens	Date
1. Amphipolis	1 AE	c. 325 B.C.
2. Atrax (Pelagiotis)	1 AE	c. 300-196 B.C.
3. Crannon (Pelagiotis)	1 AE	c. 400-344 B.C.
4. Eurea (Pelagiotis)	1 AE	c. 344 B.C.
5. Halus (Phthiotis)	1 AE	3 rd century B.C.
6. Lamia (Phthiotis)	1 AE	c. 400-344 B.C.
7. Peumata (Phthiotis?)	1 AE	c. 302-286 B.C.
8. Ambracia (Epicus)	1 AE	c. 238-168 B.C.
9. Argos Amphiloichicum	1 AE	c. 350-250 B.C.
10. Aetolian League	37 AE	c. 279-168 b.C.
11. Locri Opuntii (Epicnemidi)	2 AE	c. 338-300 B.C.
12. Phocis: Federal Coinage	a. 4 AE b. 3 AE	371-357 B.C. and later c. 357-346 B.C.
13. Chalkis (Euboea)	1 AR	c. 369-313 B.C.
14. Eretria (Euboea)	1 AE	c. 369-313 B.C. and later
15. Histiaea (Euboea)	1 AE	c. 369-338 B.C.
16. Corinth	8 AE	4 th -3 rd centuries B.C.
17. Philius (Phliasia)	a. 1 AE b. 1 AE	c. 400-360 B.C. c. 370-280 B.C.
18. Sicyon	a. 2 AR b. 1 AE c. 4 AE	4 th century B.C. c. 330-200 B.C. c. 330-290 B.C. & 2 nd century
B.C.		
19. Aegeira	1 AE	c. 330 B.C.
20. Dyme	1 AE	c. 350 B.C.
21. Achaean League	4 AE	before 251 B.C.
22. Elis	a. 1 AR b. 2 AE	c. 363-343 B.C. c. 271 - 191 B.C.
23. Argos (Argolis)	3 AE	c. 4 th -3 rd centuries B.C.
24. Hermione (?)	1 AE	c. 350-322 B.C.
25. Arcadia (struck at Megalopolis)	1 AR	after c. 370 B.C.
26. Cleitor	1 AE	c. 362-300 B.C.
27. Pheneus	1 AE	after c. 362 B.C.
28. Miletus	1 AE	c. 300-250 B.C.
29. Carthage (Zeugitanae)	1 AE	c. 241-146 B.C.
Byzantine Coin		
30. Constantinople	1 AE	c. A.D. 568/9

CATALOGUE

Greek Coins

Macedonia

1. Amphipolis, c. 325 B.C.

Obv.: Heracles in lion's skin, r.
Rev.: Eagle r. standing on thunder-bolt; ΑΛΕΞΑ [ΝΔΡΟΥ]
AE; h1; 17 mm; 3.4 gr.; j.π.156.
SNG Cop, no. 1025

Thessaly

2. Atrax (Pelagiotis), c. 300-196 B.C.

Obv.: Head of Apollo l., laureate.
Rev.: Horseman r.
AE; h6; 17 mm; 6.6 gr.; j.π.141
SNG Cop, nos. 30-31

BMC, Thessaly to Aetolia, 14, no. 2
3. Crannon (Pelagiotis), c. 400-344 B.C.

Obv.: Head of Poseidon r., laureate.
Rev.: Thessalian horseman r.
AE; h3; 18 mm; 4.7 gr.; j.π.131.
SNG Cop, no. 39

4. Eurea (Pelagiotis?), before c. 344 B.C.

Obv.: Female head facing.
Rev.: Vine-branch with grapes.
AE; h12; 15 mm; 3.0 gr.; N.I.170.
SNG Cop, no. 49.

5. Halus (Phthiotis), 3rd century B.C.

Obv.: Head of Zeus Laphystious l., diademed.
Rev.: Phryxus clinging to ram, r., with chlamys over the shoulders; beneath ΑΛΕΩ[N].
AE; h11; 13 mm; 2.0 gr.; N.I.92.
SNG Cop, no. 64; *BMC*, Thessaly to Aetolia, 13, no. 2; Head, *HN*, 295-96

6. Lamia (Phthiotis), c. 400-344 B.C.

Obv.: Head of Athena r.
Rev.: Philoctetes standing and shooting birds.
AE; h12; 14 mm; 1.9 gr.; N.I.78.

SNG Cop, no. 87.

7. Peumata (Phthiotis?), c. 302-286 B.C.

Obv.: Head of nymph bound with oak-wreath, r., circle of dots.

Rev.: The monogram



around [ΠΕΥ] MA [ΤΙΩΝ]; in the camp on r. indistinct symbol.

AE; h3; 14 mm; 1.5 gr.; N.I.112.
SNG Cop, no. 198.

Epirus

8. Ambracia, c. 238-168 B.C.

Obv.: Head of Dione laureate and veiled, r.
Rev.: Obelisk of Apollo within laurel-wreath; on both sides of the obelisk the letters

A M

B P

AE; h12; 17 mm; 5.0 gr.; N.I.67.
SNG Cop, no. 23.

BMC, Thessaly to Aetolia, 94, no. 5

Acarnania

9. Argos Amphiloichicum, c. 350-250 B.C.

Obv.: Young male head, l.
Rev.: Dog at bay r.
AE; h2; 16 mm; 5.1 gr.; N.I.79.
SNG Cop, no. 319.

Aetolia

10. Aetolian League, c. 279-168 B.C.

Obv.: Atalanta or Aetolia wearing kausia, r.

Rev.: Calydonian boar at bay, r.; above ΑΙΤ [Ω].

AE; h12; 13 mm; 1.5 gr.; N.I.89.
SNG Cop, no. 21.

BMC, Thessaly to Aetolia, 196, no. 27

11. Obv.: Atalanta or Aetolia wearing kausia, r.

Rev.: Spear-head l.; above ΑΙΤΩ; beneath ΛΩΝ; on r. in the camp grapes.
AE; h6; 19 mm; 4.7 gr.; N.I.136.

SNG Cop, no. 24; *BMC*, Thessaly to Aetolia, 197, no. 34
12. Similar to no. 11.
 AE; h9; 19 mm; 4.5 gr.; N.I.148.
SNG Cop, no. 23.
13. Similar to no. 11.
 AE; h9; 18 mm; 5.1 gr.; N.I.142.
SNG Cop, no. 22ff.
14. Similar to no. 11.
 AE; h9; 17 mm; 4.1 gr.; N.I.163.
SNG Cop, no. 23.
15. Similar to no. 11, but spear-head r.
 AE; h9; 14 mm; 2.7 gr.; N.I.83.
SNG Cop, no. 25.
16. Similar to no. 15.
 AE; h9; 14 mm; 2.2 gr.; N.I.158.
SNG Cop, no. 25.
17. Similar to no. 15.
 AE; h12; 13 mm; 3.0 gr.; N.I.86.
SNG Cop, no. 25.
18. Obv.: Young male-head laureate, r.
 Rev.: Spear-head and jaw-bone of boar, r.; above AI [TΩ], beneath ΛΩN; on l. grapes.
 AE; h3; 20 mm; 5.2 gr.; N.I.106.
SNG Cop, no. 28; *BMC*, Thessaly to Aetolia, 198, no. 4ff.
19. As no. 18.
 AE; h8; 19 mm; 5.7 gr.; N.I.84.
SNG Cop, no. 28.
20. As no. 18.
 AE; h3; 18 mm; 5.3 gr.; N.I.155.
SNG Cop, no. 28.
21. As no. 18.
 AE; h6; 18 mm; 3.9gr.; N.I.118.
SNG Cop, no. 28.
22. As no. 18.
 AE; h11; 17 mm; 4.8 gr.; N.I.117.
SNG Cop, no. 28.
23. As no. 18.
 AE; h3; 17 mm; 4.5 gr.; N.I.111.
SNG Cop, no. 28.
24. As no. 18.
 AE; h5; 17 mm; 4.3 gr.; N.I.77.
SNG Cop, no. 28.
25. Obv.: as no. 18.

Rev.: Spear-head and jaw-bone of boar, r.; above ΑΙΤΩ; beneath ΛΩΝ; on l. in the camp grapes, in the middle the monogram



AE; h12; 21 mm; 5.1 gr.; N.I.128.
SNG Cop, no. 29; *BMC*, Thessaly to Aetolia, 198, no. 51.
26. Similar to no. 25.
 AE; h3; 20 mm; 5.7 gr.; N.I.157.
27. Similar to no. 25.
 AE; h3; 19 mm; 6.8 gr.; N.I.91.
28. Similar to no. 25.
 AE; h6; 19 mm; 6.0 gr.; N.I.143.
29. Similar to no. 25.
 AE; h6; 19 mm; 5.5 gr.; N.I.64.
30. Similar to no. 25.
 AE; h3; 19 mm; 4.4 gr.; N.I.113.
31. Similar to no. 25.
 AE; h2; 18 mm; 5.4 gr.; N.I.85.
32. Similar to no. 25.
 AE; h12; 18 mm; 5.0 gr.; N.I.109.
33. Obv. and Rev.: as no. 25, but instead of a monogram there are traces of letters.
 AE; h9; 19 mm; 4.7 gr.; N.I.81.
SNG Cop, no. 31.
34. Obv. and Rev.: as no. 25, but there are no letters or monograms visible.
 AE; h3; 16 mm; 2.1 gr.; N.I.81.
SNG Cop, no. 32.
35. Similar to no. 34.
 AE; h12; 15 mm; 2.4 gr.; N.I.63.
36. Similar to no. 34.
 AE; h12; 15 mm; 2.4 gr.; N.I.129.
37. Similar to no. 34.
 AE; h8; 15 mm; 2.3 gr.; N.I.168.
38. Similar to no. 34.
 AE; h2; 14 mm; 2.6 gr.; N.I.102.
39. Similar to no. 34.
 AE; h3; 14 mm; 1.9 gr.; N.I.76.
40. Obv.: head of Athena r.
 Rev.: Heracles standing with club and

lion's skin; on r. ΑΙΤΩ, on l. ΛΩΝ
AE; h4; 19 mm; 6.0 gr.; N.I.68.
SNG Cop, no. 35; *BMC*, Thessaly to
Aetolia, 199, no. 64ff.

41. Similar to no. 40.
AE; h4; 18 mm; 4.8 gr.; N.I.133.

42. Similar to no. 40.
AE; h1; 18 mm; 3.7 gr.; N.I.73.

43. Similar to no. 40, but no legend is
visible.

AE; h3; 18 mm; 4.6 gr.; N.I.71.
SNG Cop, no. 37.

44. Similar to no. 40.
AE; h12; 18 mm; 4.4 gr.; N.I.62.
SNG Cop, no. 37.

45. Similar to no. 40.
AE; h9; 18 mm; 3.8 gr.; N.I.132.
SNG Cop, no. 39.

46. Obv.: Atalanta or Aetolia wearing
kausia, r.

Rev.: owl standing, traces of letters.
AE; h6; 15 mm; 2.7 gr.; N.I.124.

SNG Cop, no. 41.

Locris

47. Locri Opuntii (Epicnemidi), c.
338-300 B.C.

Obv.: Head of Athena, r.

Rev.: Grapes; on l. ΑΟΚ [P]; on r.
ΕΠΙ [KNA].

AE; h12; 13 mm; 1.5 gr.; N.I.94.
SNG Cop, no. 68-69.

48. Similar to no. 47.
AE; h12; 12 mm; 1.9 gr.; N.I.88.
SNG Cop, no. 75.

Phocis

49. Federal Coinage, c. 371-357 B.C.
and later.

Obv.: head of Athena.

Rev.: Φ within laurel wreath.
AE; h3; 15 mm; 2.9 gr.; N.I.161.
SNG Cop, no. 116.

50. Similar to no. 49, but on the re-
verse the initial letters ΦΩ.
AE; h12; 13 mm; 2.1 gr.; N.I.159.
SNG Cop, no. 117.

51. Similar to no. 49.
AE; h12; 13 mm; 1.9 gr.; N.I.130.
SNG Cop, no. 115.

52. Similar to no. 49.
AE; h12; 13 mm; 1.6 gr.; N.I.121.
SNG Cop, no. 114.

53. Similar to no. 49.
AE; h12; 13 mm; 4.5 gr.; N.I.105.
SNG Cop, no. 114.

54. Similar to no. 49.
AE; h12 (obverse); 12 mm; 1.9 gr.;
N.I.115.

SNG Cop, no. 114.

55. Federal Coinage, c. 357-346 B.C.
Obv.: bull's head with fillets, facing.
Rev.: vanished.

AE; h12 (obverse); 18 mm; 4.5 gr.;
N.I.147.

SNG Cop, no. 127.

Euboea

56. Chalcis, c. 369-313 B.C.

Obv.: head of nymph Chalkis, l.;
above indistinct symbol.

Rev.: flying eagle holding serpent, l.
AE; h12; 15 mm; 2.7 gr.; N.I.65.

SNG Cop, no. 432ff (for the type);
Picard 1979, pl. I, no. 4g.

57. Eretria, c. 369-313 B.C. and later.

Obv.: bull standing, r.

Rev.: Vine-branch with grapes; on l.
the letters Ε Λ.

AE; h12; 14 mm; 1.4 gr.; N.I.93.
SNG Cop, no. 488.

58. Histiaea, c. 369-338 B.C.

Obv.: head of Maenad wearing vine-
wreath, r.

Rev.: front part of bull, r.; above ΙΣΤΙ;
on l. grapes.

AE; h12; 14 mm; 2.7 gr.; N.I.103.
SNG Cop, no. 514.

Corinthia

59. Corinth, 4th-3rd centuries B.C.

Obv.: Pegasus l.; beneath ☉

Rev.: Trident decorated (upwards); on
r. wreath (?).

AE; h9; 14 mm; 2.4 gr.; N.I.101.
SNG Cop, no. 171.

60. Similar to no. 59.

AE; h6; 13 mm; 1.4 gr.; N.I.108.

SNG Cop, no. 186.

61. Similar to no. 59, but on the reverse the letter A is visible on r. of the camp.

AE; h8; 13 mm; 1.3 gr.; N.I.72.

SNG Cop, no. 181.

62. Similar to no. 59.

AE; h9; 12 mm; 1.8 gr.; N.I.98.

SNG Cop, no. 172.

63. Similar to no. 59, but the trident on the reverse is downwards.

AE; h8; 12 mm; 1.2 gr.; N.I.162.

SNG Cop, no. 188.

64. Similar to no. 59.

AE; h12; 11 mm; 2.2 gr.; N.I.97.

SNG Cop, no. 169.

65. Similar to no. 59, but on the reverse on r. of the camp there is an indistinct object.

AE; h8; 11 mm; 1.3 gr.; N.I.167.

SNG Cop, no. 178.

66. Obv.: Pegasus r.

Rev.: trident (downwards).

AE; h6; 11 mm; 1.4 gr.; N.I.74.

SNG Cop, no. 188.

Phliasia

67. Phlius, c. 400-360 B.C.

Obv.: butting bull, 1.

Rev.: :Φ:

AE; h12; 12 mm; 1.5 gr.; N.I.127.

SNG Cop, no. 10.

BMC, Pel., 34, no. 16

68. Phlius, 370-280 B.C.

Obv.: vanished.

Rev.: Φ within ivy-wreath.

AE; h12; 13 mm; 1.5 gr.; N.I.80.

BMC, Pel., 34, no. 18.

Sicyonia

69. Sicyon, 4th century B.C.

Obv.: Chimaera 1.; below ΣΕ.

Rev.: dove flying 1.

AR; h3; 16 mm; 1.8 gr.; N.I.110.

SNG Cop, no. 51; *BMC*, Pel., 38, no. 30.

70. Obv.: as no. 69, but no letters are visible.

Rev.: Dove flying r.

AR; h9; 15 mm; 1.6 gr.; N.I.95.

SNG Cop, no. 64 and 65.

71. Sicyon, c. 330 - c. 200 B.C.

Obv.: dove flying r.

Rev.: Σ in wreath.

AE; h12; 13 mm; 1.9 gr.; N.I.87.

Warren, 37, no. A5, pl. 6.

72. Sicyon, c. 330 - c. 290 and 2nd century B.C.

Obv.: dove 1.

Rev.: EY in wreath.

AE; h12; 17 mm; 3.5 gr.; N.I.69.

Warren, 44, no. 4a, pl. 7.

73. Obv.: as no. 71.

Rev.: laurel-wreath without letters.

AE; h3; 16 mm; 3.2 gr.; N.I.100.

Warren, 45, nos. 5a-c, pl. 7.

74. Similar to no. 72.

AE; h1; 16 mm; 2.9 gr.; N.I.120.

Warren, 44, no. 4a, pl. 7.

75. Similar to no. 72.

AE; h3; 16 mm; 2.3 gr.; N.I.140.

Warren, 44, no. 1 (for the type), pl. 7.

76. Aegira, c. 330 B.C.

Obv.: head of Athena, r.

Rev.: front part of goat in olive wreath.

AE; h12; 12 mm; 1.4 gr.; N.I.135.

SNG Cop, no. 127.

BMC, Pel., 17, nos.1-2.

Achaia

77. Dyme, c. 350 B.C.

Obv.: head of Demeter, r.

Rev.: ΔY in wreath .

AE; h9; 14 mm; 2.0 gr.; N.I.172.

SNG Cop, no. 146.

BMC, Pel., 21, no. 2.

78. Achaean League, before 251 B.C.

Obv.: head of Zeus, r., laureate.

Rev.: Monogram



in laurel-wreath

AE; h1; 15 mm; 3.4 gr.; N.I.114.
SNG Cop, no. 229.

79. Similar to no. 78.

AE; h3; 14 mm; 2.1 gr.; N.I.139.
SNG Cop, no. 229.

80. Similar to no. 78.

AE; h12; 14 mm; 1.7 gr.; N.I.64.
SNG Cop, no. 229.

81. Similar to no. 78.

AE; h12; 13 mm; 2.6 gr.; N.I.107.
SNG Cop, no. 229.

82. Elis, c. 363-343 B.C.

Obv.: Head of Zeus laureate, r.

Rev.: Eagle standing on capital of ionic column; on l. F and on r. A.

AR; h12; 14 mm; 1.9 gr.; N.I.160.
SNG Cop, no. 387; Seltman, 60.

83. Elis, 271-191 B.C.

Obv.: Head of Zeus laureate, r.

Rev.: Thunderbolt; no letters visible.

AE; h6; 15 mm; 1.1 gr.; N.I.90.
Gardner 1879, 264, no.8.

84. Obv.: as no. 83, but the head on l.

Rev.: FA in olive-wreath.

Gardner 1879, 264, no. 3 (silver coin);
BMC, Pel., 73, no. 139.

Argolis

85. Argos, 4th-3rd centuries B.C.

Obv.: head of wolf, r.

Rev.: A (illegible).

AE; h9; 13 mm; 1.9 gr.; N.I.119.
SNG Cop, nos. 62 and 77.

86. Obv.: as no. 85.

Rev.: A. Below Corinthian helmet.

AE; h9; 12 mm; 2.0 gr.; N.I.116.
SNG Cop, no. 64; *BMC*, Pel., 144, no. 100ff.

87. Similar to no.86, but on the reverse beneath the letter A there are traces of illegible symbol.

AE; h12; 12 mm; 1.9 gr.; N.I.96.
SNG Cop, no. 62; *BMC*, Pel., 144, no. 105.

88. Hermione (?), c. 350-322 B.C.

Obv.: female head, r.

Rev.: traces of corn-wreath.

AE; h12; 11 mm; 0.9 gr.; N.I.173.
SNG Cop, no. 143.

Arcadia

89. Megalopolis, after c. 370 B.C.

Obv.: head of young Pan, l.

Rev.: AR below syrinx.

AR; h6; 0.9 mm; 0.3 gr.; N.I.99.
SNG Cop, no. 197.

BMC, Pel., 176.

90. Cleitor, c. 362-300 B.C.

Obv.: Helios radiate facing.

Rev.: monogram K I

AE; h6; 11 mm; 1.3 gr.; N.I.82.

SNG Cop, no. 229; *BMC*, Pel., 180, no. 14.

91. Pheneus, after c. 362 B.C.

Obv.: Demeter wearing corn-wreath, l.

Rev.: caduceus; ΦΕ.

AE; h9; 17 mm; 3.1 gr.; N.I.134.

SNG Cop, no. 276; *BMC*, Pel., 195, no. 17

92. Miletus, c. 300-250 B.C.

Obv.: head of Apollo, r. laureate.

Rev.: lion walking looking back.

AE; h9; 13 mm; 1.4 gr.; N.I.122.
SNG Cop, no. 985.

93. Carthage Zeugitanae, c. 241-146 B.C.

Obv.: Head of Tanit, l.

Rev.: Horse standing r. in front of palm-tree.

AE; h12; 16 mm; 2.0gr.; N.I.104.

Head, *HN*, 879 (for the type, coin of electrum); Plant, no. 1215, 76.

Byzantine

94. Constantinople

Justin II and Sophia, A.D. 568/9.

Obv.: [DNIVS] TIN [VS]. Justin and Sophia enthroned.

Rev.: A

N

N

O



AE; h6; 20 mm; 5.6 gr.; N.I.70.

A.R. Bellinger, *Catalogue of the*

Byzantine Coins in the Dumbarton Oaks Collection and in the Whittemore Collection, I (Washington 1966), 214, no. 47b.

The following coins are so disintegrated and oxidized as to be illegible, for which reason we will

cite only their inventory number, diameter and weight. Also due to the oxidized state of the coins and to their normal wear and tear through handling, the weight cited cannot be taken to represent the original one.

95	AE	h-;	17mm	2.7 gr	N.I. 171
96	AE	h-;	15mm	3.7 gr	N.I. 151
97	AE	h-;	14mm	2.0 gr	N.I. 169
98	AE	h-;	14mm	1.2 gr	N.I. 165
99	AE	h-;	14mm	0.4 gr	N.I. 138
100	AE	h-;	13mm	2.6 gr	N.I. 154
101	AE	h-;	13mm	1.8 gr	N.I. 75
102	AE	h-;	13mm	1.7 gr	N.I. 66
103	AE	h-;	13mm	1.2 gr	N.I. 174
104	AE	h-;	12mm	1.6 gr	N.I. 125
105	AE	h-;	12mm	1.6 gr	N.I. 125
106	AE	h-;	12mm	1.3 gr	N.I. 144
107	AE	h-;	12mm	1.1 gr	N.I. 145
108	AE	h-;	12mm	0.6 gr	N.I. 166
109	AE	h-;	11mm	2.4 gr	N.I. 152
110	AE	h-;	11mm	1.3 gr	N.I. 149
111	AE	h-;	11mm	1.0 gr	N.I. 150
112	AE	h-;	11mm	0.7 gr	N.I. 126
113	AE	h-;	7mm	0.3 gr	N.I. 137



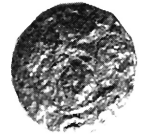
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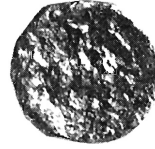
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6 / Obv.



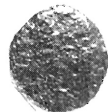
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7 / Rev.



9



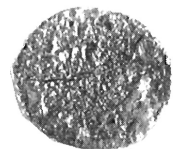
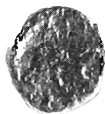
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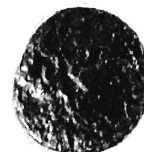
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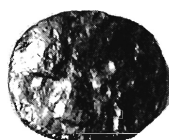
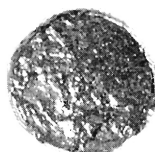
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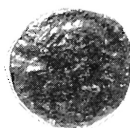
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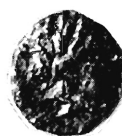
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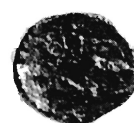
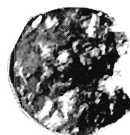
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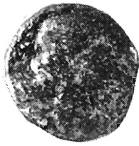
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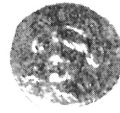




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55/Obv.



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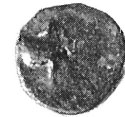
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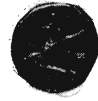




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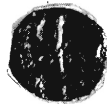
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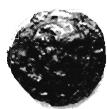


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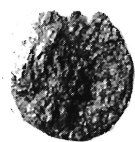


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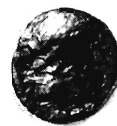
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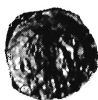
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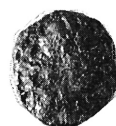
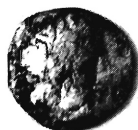
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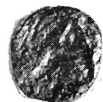
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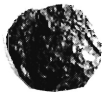


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Additional information on the coins of the catalogue

1. Found 23-10-2000 in trench T30N, stratum 7, F00-1108. The coin is in very good state of preservation. Its weight is less than the specimen of *SNG Cop.*
2. Found 19-7-2000 in trench T30, stratum 5, F00-1042. The coin has a very good state of preservation. It is heavier compared to the specimen of *SNG Cop* and the head of Apollo is turned 1. Furthermore, our specimen can be compared to the coin no. 2 of *BMC Thessaly*, 14 (pl. II,8). According to Head, this type is copied from the coins of Philip of Macedon and is attributed to the city of Atrax.
3. Found 29-6-2000 in trench Tx92, stratum 2, F00-2014. It is moderately preserved and the letters on the reverse are not visible. It is slightly heavier than that in *SNG Cop.*
4. Found 27-10-2000 in trench T2 9, stratum 5, F00-1142. Due to its bad preservation the female head of the obverse and the legend on the reverse are not visible. It is lighter than the pattern in *SNG Cop.*
5. Found 13-7-1999 in trench O27, stratum 3, area I, X-46. Its state of preservation is excellent and it is lighter than the specimen of *SNG Cop.* In our specimen the head of Zeus is turned 1., while on the ones in *SNG Cop* and the *BMC Thessaly* to Aetolia are turned r. That in *SNG Cop* is dated in the third century B.C., and *BMC Thessaly* gives a date range from 300 to 190 B.C. As far as the epithet of Laphystios is concerned, it was a name of Zeus worshipped at Halus as the god of storm and winter. Head believes that the bronze coins of the city may be of two periods: 400-344 and 300-200 B.C.
6. Found 22-6-1998. Surface find. Poor condition. The weight is the same as that of the specimen in *SNG Cop.*
7. Found 15-7-1999 in trench O27, stratum 3, 2nd pass, area I., F99-3041. Our specimen is slightly lighter than the one of *SNG Cop.* Because of its poor condition the legend on the reverse is not visible and there is an indistinct symbol.
8. Found 2-7-1998 in trench T6NA, stratum 5, F98-29. It is very well preserved and it weighs approximately the same as the specimen in *SNG Cop.*
9. Found 22-6-1998. Surface find. The coin is in bad condition and has approximately the same weight as the one in *SNG Cop.*
10. Found 12-7-1999 in trench O27, stratum 3, F99-3007. Very poor condition; the second part [ΛΩΝ] of the legend ΑΙΤΩΛΩΝ is not visible. Weight smaller than the specimen in *SNG Cop.*
11. Found 20-7-2000 in trench T30, stratum 6, F00-1062. Good condition. Smaller weight than the specimen in *SNG Cop.*
12. Found 12-7-2000 in trench Tx92, stratum 5, F00-2038. The coin is very badly preserved and has approximately the same weight as the one in *SNG Cop.*
13. Found 19-7-2000 in trench T30, F00-1036. The weight is similar to the one in *SNG Cop.*
14. Found 17-10-2000 in trench T27B, stratum 6, F00-1065. It is in poor con-

dition and its weight is slightly less than the one in *SNG Cop.*

15. Found in trench O27, without date, stratum 3, area I., F99-3005. It is very well preserved, it weighs a little more than the specimen in *SNG Cop.* No grapes on the reverse.

16. Found 24-10-2000 in trench T30, stratum 7, F00-1115. The coin weighs approximately the same as the one in *SNG Cop.* Well preserved and, as the previous one, has no grapes in the camp on the reverse.

17. Found 13-7-1999 in trench O27, stratum 3, area I., F99-3021. Very poor state of preservation and on the reverse the spear-head is on the r., while the others have it on the left. As the two previous coins it bears no grapes in the camp on the reverse. It is heavier than the one in *SNG Cop.*

18. Found 13-7-1999 in trench O27, stratum 3, area I., F99-3028. It is in very good condition. Its weight is heavier than the one in *SNG Cop.* Excellent features of the young male head on the obverse.

19. Found 12-9-1999 in trench O27, stratum 3, area I., 3604. This coin is also in a very good state of preservation and is heavier than the one in *SNG Cop.*

20. Found 16-10-2000 in trench T29, stratum 5. It is in poor state and is heavier than the one in *SNG Cop.*

21. Found 27-7-1999 in trench T27N, stratum 5e, F99-1020. It weighs less than the one in *SNG Cop.* Worse state of preservation on the reverse than on the obverse. The second part of the legend ($\Lambda\Omega\text{N}$) is not visible on the lower part of the camp on the reverse.

22. Found 27-7-1999 in trench T27N, stratum 5e, X-53. It weighs the same as the one in *SNG Cop* and, as in the previous case, the legend $\Lambda\Omega\text{N}$ is not visible.

23. Found 21-7-1999 in trench O27, stratum 3, area IV, F99-3074. It is in very poor condition and weighs a bit less than the one in *SNG Cop.* Due to its very bad condition there is no visible the legend $\text{AIT}\Omega\Lambda\Omega\text{N}$ or the other symbols.

24. Found 23-7-1998 in trench T6NA, stratum 5d., F98-5010. The coin is very badly preserved and so no inscription is visible on the reverse. Our specimen is a bit lighter than the one in *SNG Cop.*

25. Found 19-7-2000 in trench T30, F00-1034. The coin is in very good state of conservation but the reverse is deteriorated. It weighs less than the one in *SNG Cop.*

26. Found 17-10-2000 in trench T28A, stratum 5, F00-1064. It is in excellent condition and has approximately the same weight as the one in *SNG Cop.*

27. Found 12-7-1999 in trench O27, stratum 3. As the previous it is in excellent condition and is heavier than the one in *SNG Cop.*

28. Found 19-7-2000 in trench T30, F00-1035. It is in relatively good condition and it weighs slightly more than the one in *SNG Cop.* The figures of the reverse are in an incuse.

29. Found 2-7-1998 in trench T6NA, stratum 5e, F98-32. It has the same weight as the one in *SNG Cop.* Furthermore, as the previous, it bears an incuse on the reverse.

30. Found 14-7-1999 in trench O27, stratum 3, area I, F99-3036. It is in very poor condition and the deterioration is more pronounced on the reverse. Due to this, the legend is not visible and we can hardly distinguish the monogram. It is lighter than the one in *SNG Cop.*
31. Found 12-7-1999 in trench O27, stratum 3, area I, F99-3009. As the previous, it is deteriorated, almost the same as the specimen in *SNG Cop.*
32. Found 22-7-1999 in trench 026, stratum 3, area II, F99-3038. It is in poor condition and weighs less than the one in *SNG Cop.*
33. Found 27-6-1999 in trench T6NA. It weighs almost the same as the one in *SNG Cop.* On the reverse, the incuse is hardly distinguishable. The diameter varies from 16 to 19 mm.
34. Found 23-10-2000 in trench T30N, stratum 7, F00-1102. It is in very poor condition and a small part is missing. Due to its remarkable deterioration no legend or monogram is visible on the reverse. It weighs less than the specimen in *SNG Cop.*
35. Found 2-7-1998 in trench T6NA, stratum 5e, F98-19. As the previous it is in poor condition and no symbols are visible on the reverse. It weighs less than the one in *SNG Cop.*
36. Found 12-7-200 in trench 23, stratum 3. It is in a mediocre condition and on the reverse no monogram is visible, while from the second part of the legend $\Lambda\Omega\text{N}$ only the letter Λ is visible.
37. Found 26-10-200 in trench T29, stratum 5, F00-1140. The deterioration is pronounced and no legend or symbol is visible. It weighs less than the one in *SNG Cop.*
38. Found 22-7-1999 in trench T27B, stratum 4, F98-1015. It weighs less than the one in *SNG Cop.*
39. Found 24-6-1998 in trench Tx61, stratum 2, F98-3005. Due to its deterioration the entire legend $\text{AIT}\Omega\Lambda\Omega\text{N}$ is not very well visible. It weighs less than the one in *SNG Cop.*
40. Found 25-6-1998 in trench T6, F98-4001. It is in fine condition and weighs almost the same as the one in the catalogue of *SNG Cop.*
41. Found 4-7-2000 in trench T31, stratum 2, F00-1007. It is in excellent condition and weighs less than the one in *SNG Cop.* On the obverse the head of Athena is on the left side of the camp. On the reverse the second part of the legend is on the edge of the perimeter of the coin.
42. Found 3-7-1998 in trench T6NA, stratum 5, F98-36. Deteriorated with no letters of the legend visible. It weighs less than the one in *SNG Cop.*
43. Found 1-7-1998 in trench TN6A, stratum 6, F98-11. It is in very poor state of preservation and weighs almost the same as the one in *SNG Cop.*
44. Found 6-7-1998 in trench T6NA, stratum 5e, F98-5001. Its condition is excellent and weighs the same as the one in *SNG Cop.*
45. Found 18-7-2000 in trench T29, stratum 4, F00-1032. It is in a mediocre condition and weighs a bit less than the

- one of *SNG Cop.* On the reverse is no visible monogram.
46. Found 29-7-1999 in trench T27N, stratum 4d. Deteriorated and the legend is not visible on the reverse. It weighs more than the one of *SNG Cop.*
47. Found 15-7-1999 in trench O27, stratum 3, 2nd pass, F99-3044. It is in very good condition and has the same weight as the specimen no. 68 of *SNG Cop* and is lighter than no. 69 of the same catalogue.
48. Found 12-7-1999 in trench O27, stratum 3, area I, F99-3008. Almost excellent state of preservation. Approximately the same weight as the one in *SNG Cop.* On the reverse the inscription ΕΠΙΚΝΑ is hardly visible.
49. Found 23-10-2000 in trench T30A, stratum 7, F00-1100. It is in very good condition and is heavier than the one in *SNG Cop.*
50. Found 25-10-2000 in trench T30D, stratum 8, F00-1123. Its condition is almost excellent and it weighs more than the one of *SNG Cop.*
51. Found 19-7-2000 in trench T30, stratum 5, F00-1043. The same state of preservation as the previous and almost the same weight as the specimen in *SNG Cop.*
52. Found 15-7-1999 in trench O27, stratum 3, 2nd pass, area I, F99-3052. Its condition is mediocre and it weighs slightly less than the specimen in *SNG Cop.*
53. Found 15-7-1999 in trench O27, stratum 3, 2nd pass, area I, F99-3047. Very good condition, it has almost the same weight as the one in *SNG Cop.*
54. Found 13-7-1999 in trench O27, stratum 3, area I, X-39. It is very deteriorated and weighs slightly more than the one in *SNG Cop.*
55. Found 20-7-2000 in trench T28, stratum 4, F00-1063. The coin is very deteriorated and the figures on the reverse have vanished. It weighs almost the same as the one in *SNG Cop.*
56. Found 1-7-1998 in trench T6NA, registered ad F98-15. Good state of preservation. On the reverse the inscription (XΑΛ) is not visible. The comparison in *SNG Cop* has the nymph on the obverse and the flying eagle on the reverse r., while our coin has these figures on the l. The indistinct symbol on the reverse probably is a cornucopia. According to Picard 1979, 17, this coin must be a drachma. Our specimen is very similar to his no. 4g., pl. I, which weighs 3.65 gr.
57. Found 15-7-1999 in trench O27, stratum 3, area I, 2nd pass, X-45. Its condition is mediocre and its weight is less than the one in *SNG Cop.*
58. Found 15-7-1999 in trench O27, stratum 3, 2nd pass, area I, F99-3039. Its condition is excellent and it has almost the same weight as the one in *SNG Cop.*
59. Found 13-7-1999 in trench O27, stratum 3, area I, X-38. It is in excellent state and weighs more than the one of *SNG Cop.* The trident on the reverse is placed l.
60. Found 13-7-1999 in trench O27, stratum 3, area I, F.99-3031. Its condition is mediocre. The surface on the reverse is smoothened by deterioration and as a result no symbols or letters are visible. It weighs less than the one in *SNG Cop.*

61. Found 13-7-1998. Surface find. Its state of conservation is fine and it weighs less than the specimen in *SNG Cop*. Coins of this type in the *BMC*, Corinth, 54-55 are dated 400-300 B.C.
62. Found 16-7-1999 in trench O27, stratum 3, area I, 2nd pass, F99-3054. Its condition is very bad and so the raffigurations are hardly visible. It weighs slightly more than the one in *SNG Cop*.
63. Found 23-10-2000 in trench T30N, stratum 7, F00-1101. As the previous one its condition is very bad and as a result the symbols are not visible. Its weight is less than the one in *SNG Cop*.
64. Found 15-7-1999 in trench O27, stratum 3, 2nd pass, F99-3049. It is badly preserved and the deterioration of the coin makes the surface smooth. It weighs a bit more than the one of *SNG Cop*.
65. Found 27-10-2000 in trench T27A, stratum 7, without further indications. Its state of preservation is fine and it has the same weight as the one in *SNG Cop*. The figure of Pegasus is placed on the r. of the camp.
66. Found 23-6-1998 in trench T6, surface find. Its condition is very poor and it weighs slightly less than the one in *SNG Cop*.
67. Found 12-7-2000 in trench Tx92, stratum 5a, F00-2041. It is relatively well preserved and it weighs less than the one in *SNG Cop*.
68. Found 22-6-1998, without further indications. Bad state of preservation.
69. Found 20-7-1999 in trench O27, stratum 3, area II. It is in good state of preservation and it weighs less than the one in *SNG Cop*.
70. Found 13-7-1999 in trench O27, stratum 3, area I, F99-3025. Mediocre state of preservation. It weighs less than the specimens no. 64 and 65 in *SNG Cop*, which are hemidrachms.
71. Found 12-7-1999 in trench O27, stratum 3, area I, F99-3014. Its condition is very bad.
72. Found 10-7-1998 in trench O27, F98-4008. Excellent state of preservation.
73. Found 13-7-1999 in trench O27, stratum 3, area I, X-36. Its preservation is bad and the initials of the magistrate are not visible.
74. Found 21-7-1999 in trench O27, stratum 3, area IV, F99-3073. As the previous it is deteriorated and the initials of the magistrate are not visible.
75. Found 19-7-2000 in trench Tx93, F00-2055. It is in poor condition, especially on the reverse and only the laurel-wreath is visible.
76. Found in trench T30, stratum 5. Its state of preservation is bad and it is lighter than the one in *SNG Cop*.
77. Found 23-10-2000 in trench T30A, stratum 7, F00-1093. It is in a very poor condition and it weighs more than the one in *SNG Cop*.
78. Found 9-7-1999 in trench N27, stratum 2, F99-2018. It is badly preserved, which makes it difficult to understand from which city it is emitted, but it must be one of the League. Our specimen weighs more than the one in *SNG Cop*.

79. Found 20-7-2000 in trench T30, stratum 5, F00-1059. As the previous it is in a bad state of preservation and this specimen must also belong to the first emissions of the League. It weighs more than the one in *SNG Cop.*
80. Found 25-10-2000 in trench T30D, stratum 8, F00-1124. It is deteriorated and also belongs to the first emissions of the League. It weighs almost the same as the one in *SNG Cop.*
81. Found 14-7-1999 in trench O27, stratum 3, area I, F99-3032. It is in poor state of preservation and also must belong to the first emissions of the League.
82. Found 16-10-2000, stray find. Good state of preservation. It weighs less than the one in *SNG Cop.* According to Gardner 1879, 246-49, this type is dated 365-362 B.C. (5th period).
83. Found 12-7-1999 in trench O27, stratum 3, F99-3018. The coin is very deteriorated and no letters are visible on the reverse.
84. Found 15-7-1999 in trench O27, stratum 3, 2nd pass, area I, F99-3045. Its condition is poor. The type of the reverse is found only on silver specimens dated 271-291 B.C., which are presented in *SNG Cop.*, as well as in Gardner 1879, 264, no. 3, and in the catalogue of *BMC Pel.*
85. Found 13-7-1999 in trench O27, stratum 3, area I. Its condition is bad. The reverse has completely vanished. It weighs slightly more than nos. 62 and 77 in *SNG Cop.*
86. Found 14-7-1999 in trench O27, stratum 3, area I, F99-3033. Its condition is mediocre and it weighs more than the one in *SNG Cop.*
87. Found 15-7-1999 in trench O27, stratum 3, 2nd pass, F99-3048. Due to deterioration the symbol beneath A on the reverse is not legible. It weighs more than the one in *SNG Cop.*
88. Found 18-10-2000 in trench T28A, stratum 6, F00-1072. Its state of preservation is very bad. This coin could be part of the mint of Hermione (Argolis), as we can deduce from the features of the face on the obverse. It weighs less than the one in *SNG Cop.*
89. Found 15-7-1999 in trench O27, stratum 3, 2nd pass, area I, FX-44. A small part is missing and its condition is mediocre. It weighs less than the one in *SNG Cop.* The type is dated 280-234 B.C. in *BMC, Pel.*
90. Found 12-7-1999 in trench O27, stratum 3, area I, F99-3019. Its preservation is good and it has the same weight as the one in *SNG Cop.*
91. Found 20-7-2000 in trench T30, stratum 5, F00-1056. It is well preserved and weighs slightly less than the specimen in *SNG Cop.*
92. Found 15-7-1999 in trench O27, stratum 3, 2nd pass, area V, F99-3037. The reverse is in a worse state of preservation than the obverse. It weighs less than the one in *SNG Cop.*
93. Found 15-7-1999 in trench O27, stratum 3, 2nd pass, area I, F99-3050. Excellent state of preservation. According to Head this type of coins is mostly of electron. The female head of Tanit is a Carthaginian form of Demeter.

94. Found 9-7-1998 in trench O27, stratum 1, F98-4006. Its state of preservation is mediocre.
95. Found 23-10-2000 in trench T30B, stratum 7, F00-1096.
96. Found 11-7-2000 in trench T30, stratum 6, F00-1045.
97. Found 26-10-2000 in trench T31, stratum 4, F00-1136.
98. Found 16-10-2000 in trench T27B, stratum 6.
99. Found 18-7-2000 in trench Tx92, stratum 7a.
100. Found 23-10-2000 in trench T30D, stratum 7, F00-1107.
101. Found 21-7-1998 in trench O27, stratum 3, F98-4025.
102. Found 13-7-1998 as a surface find.
103. Found 24-10-2000 in trench T30N, stratum 7, F00-1120.
104. Found 13-7-2000 in trench O27, stratum 3, area I, X-42.
105. Found 19-7-2000 in trench T30, stratum 5, F00-1039.
106. Found 5-7-2000, stratum 2, F00-1010.
107. Found 7-7-000 in trench T29, stratum 2, F00-1015.
108. Found 25-10-2000 in trench T31, stratum 4, F00-1131.
109. Found 19-7-2000 in trench T30, F00-1046.
110. Found 3-7-2000 in trench K29, stratum 1, 3rd pass, F00-5036.
111. Found 5-7-2000 in trench K29, stratum 1, 5th pass, F00-5042.
112. Found 21-7-2000 in trench O27, stratum 3, area IV, F99-3072.
113. Found 12-7-2000 in trench Tx92, stratum 5a.

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Excavations on the Hill of Hagia Triada

Sanne Houby-Nielsen and Ioannis Moschos

The following pages contain a summary of the results of the excavations undertaken from 1999 to 2001 on the hill of Hagia Triada. During the three summer seasons, excavations were continued from previous years in areas located outside the Classical and Byzantine fortification wall (Fig. 1).

Below follows an account of the excavations carried out in areas I-II while a separate account of area III is under preparation. A thorough study remains to be carried out of the structures and the large amounts of often poorly preserved pottery, before the historical development of the site can be fully understood. The account presented here is no more than an outline of the

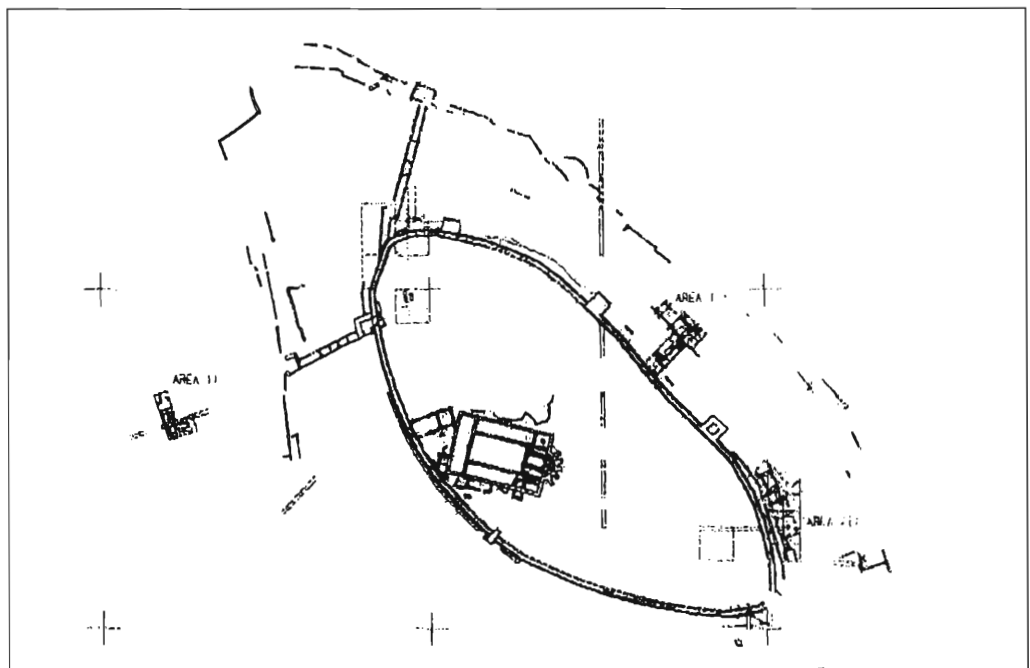
major archaeological horizons of the site, and the conclusions are therefore to be regarded as preliminary.

Area I: Archaic and Classical houses lining a road

During 1999-2000, three trenches (N26-N28) equivalent of 15.5m² and one 12m long and 3m wide trench (Tx20-22, Tx91-93) were opened (Fig. 1: area I; compare *SPR*, 235-238). All in all, approximately 51.5m² have been excavated in this area, in most parts down to the bedrock.

During these excavations, a series of structures was uncovered below a huge stone-fill, which stemmed from the up-

Fig. 1. Hill of Hagia Triada. Areas of excavation 1999-2001 (I, II, III). Charalambos Marinopoulos.



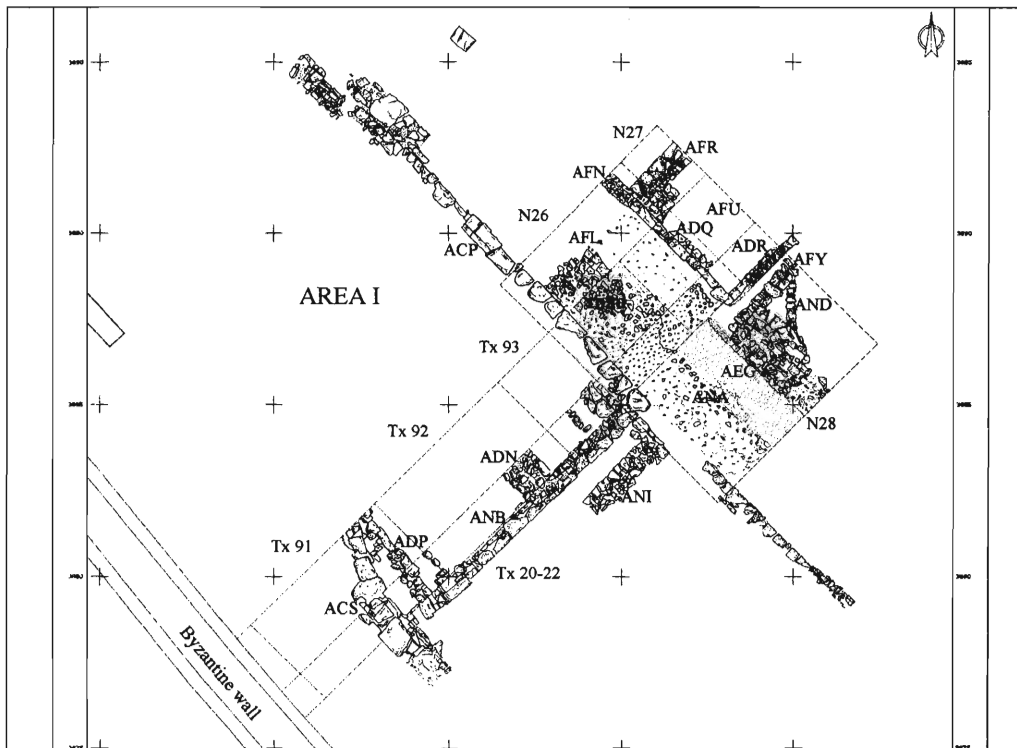


Fig. 2. Archaic and Classical foundation walls lining a road (N26-N28). Classical walls running up towards the road in trenches Tx20-22 and Tx91-93. Charalambos Marinopoulos.

per plateau of the hill. It was ascertained that the structures belonged to Archaic and Classical buildings facing a road. Most of these structures and their associated finds were found in a poor state of preservation, but nevertheless point to the existence, already in Archaic times, of a wide public road, lined with buildings (Fig. 2). The road was in use at least until Classical times, when well-built houses, separated by narrow lanes, were laid out at right angles to the road. A more detailed description of the stratigraphical situation of the structures follows below, with some of the diagnostic finds, and their relation to each other in the area.

The Road

The large ashlar wall ACP, first discovered in 1997, was seen to continue in both trenches N26 and N28. After clearance of the surface soil surrounding the excavation units, the wall could be followed for at least a further



Fig. 3. View of the road lined by Archaic and Classical foundation walls. Henrik Frost.

15m towards the Northwest (Fig. 3). Three dry-stone foundation walls (ADQ, AFZ, AFN) were excavated towards the Northeast forming a slightly irregular row, which ran parallel to the ACP wall at a distance of *c.* 5m. As will appear from the following description, walls ADQ, AFN, AFZ stemmed from buildings preceding the road, but two of the walls (ADQ and AFN) were reused as a support wall for a fill, which served to level the ground for a road.

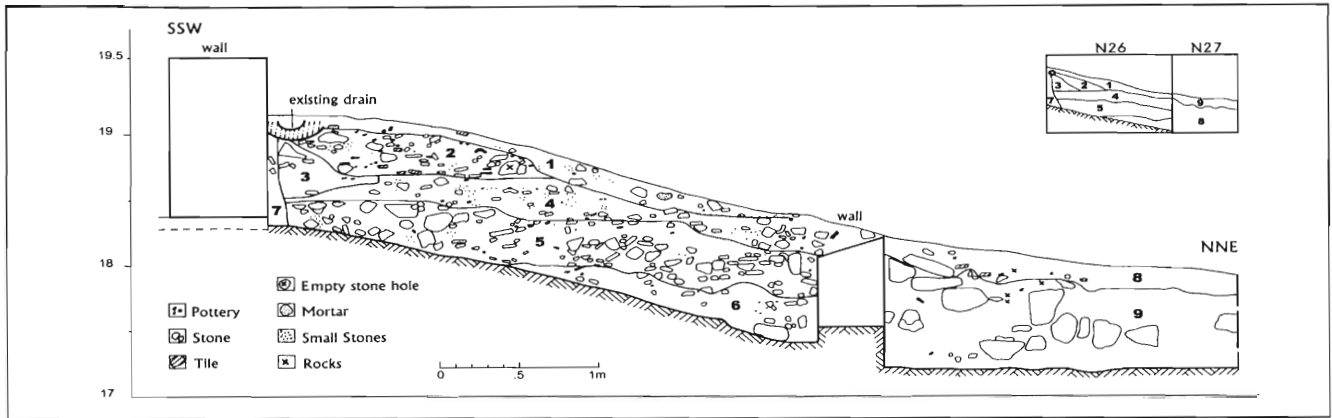


Fig. 4. Profile drawing, NNW side of trenches N26-N27. Anne Hooton.

In excavation units N26-N28, two 1m wide trenches were opened between wall ACP and walls ADQ and AFN. These small trial trenches were excavated down to bedrock, providing a SSE and a NNW profile of what was to be recognized as a road (Fig. 4). Between the two trenches only the surface level was excavated. As seen from the profile drawing, the NNW trench was characterized by stone-packed levels towards the bottom and levels with fewer stones in the upper part.

The two lowermost levels, 5 and 6 on the profile drawing, became thicker towards the Northeast and, when excavated, clearly appeared to have been thrown up against wall AFN in order to make an even surface. Both levels

were heavily packed with sherds of handmade coarse ware.¹ Diagnostic sherds among these date to the EH-MH period.² A handful of sherds, however, dated to the LG – EPC period, among which characteristic bases from kotylai with ray decoration can be mentioned. It is significant that so far only one later sherd has been identified from this level. It dated to the Late Archaic or Early Classical period and was found in the uppermost part of level 5.

Level 4 thinned out towards the Northeast and, since it had been cut away by the surface level, did not reach up to wall AFN.³ It contained some medium-sized stones, pebbles and many sherds, especially in its upper and western parts.⁴ It is important

¹ Level 5 is equal to AFL/A, AFL/B and AFL/C in the diary from 13.07.99, and AFL/B 1st pass from 14.07.99, and AFL/B 2nd pass from 15.07.99. Level 6 is equal to AFL/5B third pass in diary from 16.07.99. The very large bags of sherds from these levels contradict the description and appearance of the levels in the profile drawing according to which they only contain a few sherds.

² Reference is made in particular to bag 3023 from AFL/5b 2nd pass from 15.07.99.

³ Equal to AFL/4 west 2nd pass in diary from 14.07.99, and AFL/4 east from 13.07.99 and AFL/4 west 1st pass.

⁴ These characteristics were clearly observed and noted during excavation (as shows the leveling overview), but were difficult to see in the stratigraphy. Especially, the numerous sherds excavated in this level do not show well in the stratigraphy due to the fact that they were more numerous in the western part of the level.

to note that the pottery from this level was completely different from that in levels 5-6. Thus, contrary to the material from the just described lowermost levels, the majority of the pottery now consisted of medium and fine-ware body sherds, often carrying a fugitive, dull red slip. As we shall see below, this type of pottery soon proved to be very characteristic of Early Archaic Chalkis. Diagnostic sherds consisted on the one hand of a few LG-EPC red-banded kotyle and kalathos sherds, on the other hand of a small number of kotyle bases with ray-decoration and body sherds with polychrome decoration (plain ware with encircling bands in red, white and black or red-slipped sherds with encircling white bands). The general absence of figure-decorated sherds and the presence of diagnostic LG-EPC sherds point to the early seventh century. In the following we will refer to this type of pottery as “seventh-century pottery” acknowledging the fact that a more thorough study is needed to date it more accurately.

Level 3 contained virtually no pottery and should probably be understood as part of the foundation trench for ACP, marked “7” on the profile drawing.

Level 2 was characterized by many stones, pebbles, and a large amount of the just described “seventh-century pottery”.⁵ It had been cut off by the surface level in the NNE, and consequently does not reach wall AFN. In addition to the “seventh-century pottery”, a small amount of very poorly preserved black-glazed sixth- or (early?) fifth-century

sherds was noted. These were definitely absent from the level below (level 4).

Level 2 was covered by a pavement, AFL, consisting of irregular slabstones preserved along the ACP wall. When excavating the pavement in the trial-trenches, a few Early Classical black-figured sherds were found, one of which shows the back of a chariot and a mounting figure.

Almost the same stratigraphical situation was found in the SSE trench.

Again a stone-packed fill was found on the sloping bedrock, resting against wall ADQ, the eastern extension of wall AFN. As in the NNW trench, the stone packing contained much pottery. Again, handmade coarse-ware body sherds made up the majority (80-90%) of the pottery. The diagnostic sherds date in the EH and MH periods. One sherd may be Geometric. Above the stone packing were levels containing fewer stones and sherds, which ran up to wall ADQ but not over it, providing an *ante quem* date of the wall. Just like in the northwestern trench, these levels were characterized by a somewhat higher percentage of LG-EPC sherds (notably red-banded kalathos and kotyle sherds). Still, however, the coarse-ware material was in majority (60-70 %).

In the superseding level (AFL/4d), the proportions of the datable sherd material were reversed, with very few Prehistoric sherds. The “seventh-century pottery” dominated, and the diag-

⁵ Equal to AFL/1, AFL/2 and AFL/3 in the diary from 06.07.99, 02.07.99, and 07.07.99.

nostic material consisted mostly of body sherds with polychrome decoration.

The levels above (AFL/3d, AFL/2d, AFL/1d) were thinner but very rich in sherds. The levels were only preserved along the ACP wall, having eroded down the hill towards the East when the superstructure of the supporting walls collapsed. Again the familiar body sherds with encircling bands in red, black and white, but also black-glazed sixth- or fifth-century sherds dominate.

The stratigraphy and finds indicate that the foundation walls ADQ and AFN were constructed at some time in the seventh century and constituted the outer walls of a row of small buildings, which lay on a natural ridge of the sloping hill. In order to create an even terrace in front of the buildings, to the SE, a stone fill was thrown up against the walls. The fill contained material (EH and MH sherds) from earlier settlements. Apparently, the seventh-century houses were erected in an area, which had not been used since the EH and MH periods. In the Early Classical period, the ACP wall (see below) was erected, and the area between this wall and the old seventh-century walls received a slab-stone pavement constituting part of a road along this part of the hill.

The Archaic houses

In the trenches N26-N28 to the Northeast of the sequence of walls ADQ, AFN and AFZ, two dry-stone foundation walls, ADR and AFR, were excavated. They joined the ADQ wall at a right angle, forming a room at a

lower level than the road. The room was excavated down to bedrock. A hard-packed clay floor (AFU) with tiny pottery fragments was found in the room. A rich amount of “seventh century BC” pottery was found in the level immediately above this floor. Only two sherds may date to the sixth or fifth century but these stemmed from the uppermost part of the level covering the floor. The floor AFU itself was best preserved in the middle part of the room and produced several small bags of EH-MH and LG-EPC sherds, including characteristic Early Helladic T-rims, Grey Minyan, and Geometric *firmis* sherds.

Below floor AFU, a thick level was excavated (AFU/2), which produced several large bags of pottery. Diagnostic sherds were EH and MH, some LG-EPC, and some perhaps from a later date in the seventh century, but generally the prehistoric material outnumbered the Archaic.

In trench N28 to the southwest, excavation among other things revealed an earthen floor, ANA, and a pebble floor, AEG. The pebble floor was found to cover the foundation wall AFZ, and extended into the area later to be used for a road. A foundation wall, AFY, ran parallel to the ADR wall, and met the AFZ wall at a right angle, forming a room. Obviously, the mud-brick superstructure of the room, formed by the AFZ and AFY foundation walls, collapsed or was torn down and covered by floors belonging to a larger, possibly open space (Fig. 2). The floors lay at a level approximately 0.5 m higher than floor AFU in the neighbouring room.

Below these floors, a thick level (N28/3) connected with the AFZ and AFY walls was excavated, which, apart from a few Prehistoric sherds, appeared to contain only seventh-century sherds. In addition, a fireplace (ANC) was found in this level and close to it a complete skyphos and a lekane, a grinding stone, and five identical loom weights (Fig. 5).

In the stratum below (N28/4), beneath walls AFZ and AFY, a drain (AND) was excavated. All the pottery seems to date in the seventh century and, as mentioned earlier, the general lack of figure-decorated pottery points to a date in the early seventh century. A small krater rim- and body sherd is shown in Fig. 6.

The Classical houses

House known from the ANI wall

In trench Tx93 a well-built dry-stone foundation wall, ANI, oriented NE-SW and running at a right angle up to wall ACP and the road AFL was excavated. The wall was built directly on the bedrock (Figs. 2, 7). Pottery in the lowest levels on both sides of this wall appears at the time of writing to provide an *ante quem* date to no later than the fifth century.

The ACP wall

The same levels went below the ACP wall providing a *post quem* date in the fifth century BC for this wall. Further indications for the date of wall ACP may be provided by the excavation of a paved floor (only a few slabs were preserved) lying up against the ACP floor on its southern side. Sherds were



Fig. 5. Loom weight found in situ next to a fireplace in trench N28.
Henrik Frost.



Fig. 6. Fragment of a small crater with encircling bands and a frieze of vertical lines. N28/4a 1st pass, below the floors ANA and AEG. LG-EPC.
Henrik Frost.

found both in the soil above this slab-stone floor and in the stratum below the paving, which also went below the ACP wall. Finally, the ACP wall must have been built when the upper levels of road AFL were constructed in the Early Classical period.

House known from walls ANB, ADP, ADN

In Tx92 and Tx93, foundation walls built of ashlar blocks (ANB, ADP, ADN) (Fig. 7) were excavated, which, to judge from their quality, originally must have formed part of a well-constructed building. The building is ori-



Fig. 7. Classical walls running up to the road in trenches Tx20-22, Tx91-93. Henrik Frost.

ented NE-SW, at a right angle from the road and the ACP wall. It is separated by a narrow lane from the neighbouring house, known from wall ANI described above. The length of the building is 10m, judging from wall ANB, which in the SW terminated in a corner (ADP), and in the NE by the road. At least one cross-wall (ADN) divided the building into two rooms. Another lane was found running along this building in a NW-SE direction along the foot of the acropolis, and thus ran parallel to the road (AFL), a little higher up the slope.

The lowest levels found *in situ* directly on the bedrock in the area outside the corner of the building (ADP), in the southern part of trench Tx91 and along the ANB-wall “in the lane”, demonstrate that the earliest date of

the building must be in the fourth or early third century BC. Excavations inside the building during previous seasons had produced pottery preliminarily dated in the same period.

In conclusion, since this building is oriented towards wall ACP and the road, it must be later than the Early Classical period and, according to associated levels, it is earlier than, or contemporary with, the Late Classical/Early Hellenistic period.

Extension of the “acropolis wall”

In Tx91 an extension of the so-called “acropolis wall” (ACS) was excavated (see *SPR*, 231ff, figs. 4, 9, 15, 28, 30, 31). This wall rested on a thick soil fill, at the bottom of which a fragment of a worked stone (grinding stone?) was found. This was similar to a more complete example found in a clean context of Hellenistic date in area III. From the same fill came diagnostic pottery including fragments of two lamps datable in the second half of the fourth century or the third century BC. The structure ACS is therefore interpreted as a reparation of the Classical “acropolis wall”, which took place in the Late Classical or Early Hellenistic period.

There were many large limestone ashlar blocks in the thick fill covering the Classical houses and lanes. These blocks must stem from the upper courses of wall ACS, and perhaps the “acropolis wall” itself. Pottery from the fill is preliminarily dated to no later than the Early Hellenistic period. This indicates that, by this time, the houses had been abandoned and activ-

ity moved to the western side of the hill instead (area III in Fig. 1).

Area II: Bronze Age structures, seventh- and sixth-century settlement remains and Early Hellenistic cist tombs

At the foot of the hill to the West, four trenches (4x4m) were opened, named K26-K29. Trenches K27 and K28 lie on each side of the trial trench Tx72, excavated in 1998 (see *SPR*, fig. 22; here Figs. 1, 8a-f). Since the stratigraphy was comparatively undisturbed, and the successive phases accordingly easy to define, the finds and structures from these trenches will be summarized in chronological order, starting with the earliest remains. Levels with Neolithic sherd material were excavated in K28/29.

Bronze Age structures

EH-MH evidence

In K28 MH strata were excavated in a roughly 1x1 m large trial-trench (Fig. 8a). The strata consisted mostly of stone packing, with diagnostic sherds ranging in date from the EH to MH, and of a type published in an earlier report (*SPR*, figs. 10, 20).

MH and possible LH structures

A later phase, dating in the later part of the Middle Helladic period, was comparatively well defined and encountered in three trenches (K27-29). A line of large boulders, oriented NNW-SSE, could be followed over a distance of about 12m in all three trench-

es (structures ARJ and AQY). In K29, a patch of a hard-packed pebble floor, mixed with smaller stones, pottery, bones, and shells (ARK and ARM) went up to the line of the boulders on its eastern side. The sherds from this floor were MH in date. A poorly built foundation wall (ARH) ran up towards the boulders in K29 but may be older.

In K27 and K28, traces of a wide foundation wall (AQU and AQN), apparently forming a corner, ran above the MH stone packing. The wall partially traversed the above-mentioned line of boulders at a different orientation (NE-SW). It was built of large, undressed stone blocks and preserved to a length of 7.5m. A floor, consisting of medium-sized stones, was excavated to the west of this wall.

Pottery from associated levels and floors indicated a date in the MH period, whereas LHIIC, and possibly LHIII A-B, sherds were found in the soil above the structure.

Settlement remains from the seventh and early sixth centuries BC

The main period represented in the archaeological remains in the three trenches K27-29 appears, at the time of writing, to be the seventh and early sixth centuries BC (Fig. 8). A complex was excavated, which consisted of comparatively well-preserved house walls, separated by lanes and open spaces, and a series of floors. Pottery from the earliest floor levels is from the LG-EPC period, while the material in the latest floors could be dated in the MC period. The settlement in this area of the hill is therefore more or less con-

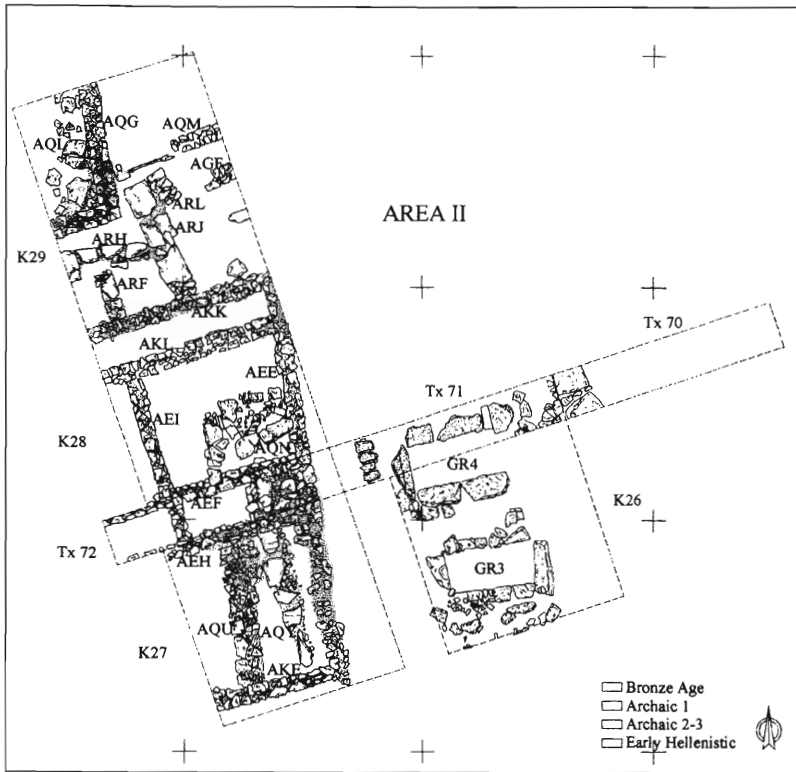


Fig. 8. General plan of trenches K26-29 with cist tombs GR3 and GR4 in area II. Charalambos Marinopoulos.

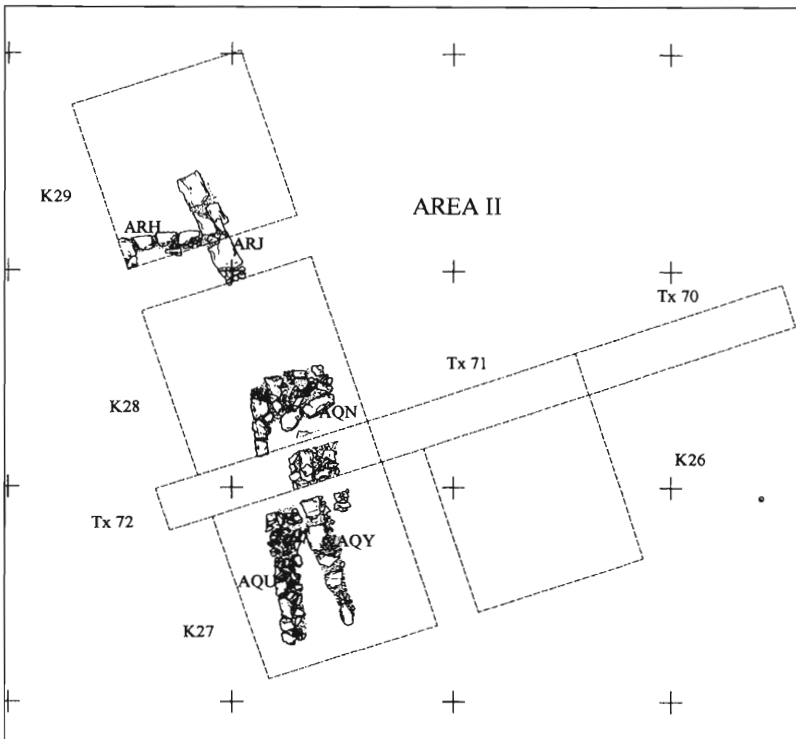


Fig. 9. Bronze Age structures in trenches K27-K29 in area II. Charalambos Marinopoulos.

temporary with the room complex preceding the road on the northeastern side of the hill described above (area I). Another similarity is the fact that the earliest rooms were built directly on top of the Bronze Age remains, as was the case in trenches N26-N28. In fact, one of the earliest walls followed the orientation of the latest Bronze Age building (Fig. 9).

LG-EPC settlement structures

Two wall fragments in K29 rested directly on top of the MH-LH levels (AQM and wall ARF). The orientation of the walls suggested that they once met and constituted a corner in an L-shaped building. In that case, the building is likely to have had several rooms. Flat stones, probably from a doorstep, were found on the suggested extension-line of wall AQM, a couple of metres to the West. This circumstance further supported the presumption that walls AQM and ARF originally met and constituted a corner (Fig. 10). Patches of a pebble-floor (ARL) were found in several areas to the south of wall AQM. The outline of this pebble-floor was clearly seen to stop at the presumed corner of the two walls while conversely no sign of the floor was found “inside” the supposed rooms. Thus, the pebble-floor points to the existence a large open space extending south and west of an L-shaped building.

Among the diagnostic sherds from this pebble-floor (ARL), LG-EPC kotyle bases with rays, and sherds of “eggshell” ware should be mentioned (Fig. 11). An interesting fragment of a horned acroterion also came from this floor. Pottery from the strata associated

with wall ARF included LHIIC sherds as well as the familiar LG-EPC kotyle bases mentioned earlier (Fig. 12).

In trenches K27-K28, a very strong wall (the lower part of AEE), built of flattish, uncut sandstones and preserved to a height of about 1 m and about 8 m long, rested directly on the MH-LH levels. The wall is oriented NW-SE and followed the orientation of the Bronze Age wall AQU. The southern end of this wall is visible in the profile and appears to form a corner. In that case the AEE wall once constituted the western, outer wall of a NW-SE oriented building (Fig. 13).

Settlement remains in the PC period

The whole area (trenches K27-29) became the scene of an intense building activity very soon after – if not at the same time as – the erection of wall AEE. The rooms formed by walls ARF and AQM (mentioned above) fell out of use and instead three or four houses were built, and open spaces defined and paved. Two of the houses were separated by a narrow lane with a drain. Several floors associated with the walls could be defined, which superseded each other over a height of approximately 1m, and pointed to continuous settlement activity, including minor rebuilding. Here, only the most characteristic early and late floor levels are summarized. Walls from this period are shown in Fig. 11, and a general view of the trenches is shown in Fig. 14.

The earliest floor level lay around 2.30-2.5m above sea level, and about 0.2-0.25m above the Bronze Age lev-

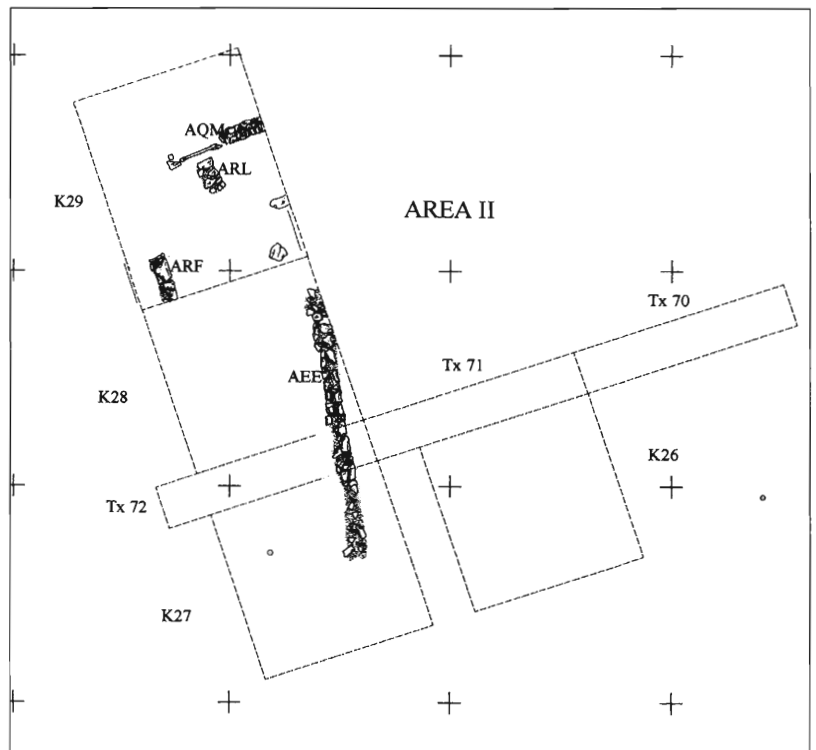


Fig. 10. LG-EPC settlement remains in trenches K27-29 in area II. Charalambos Marinopoulos.

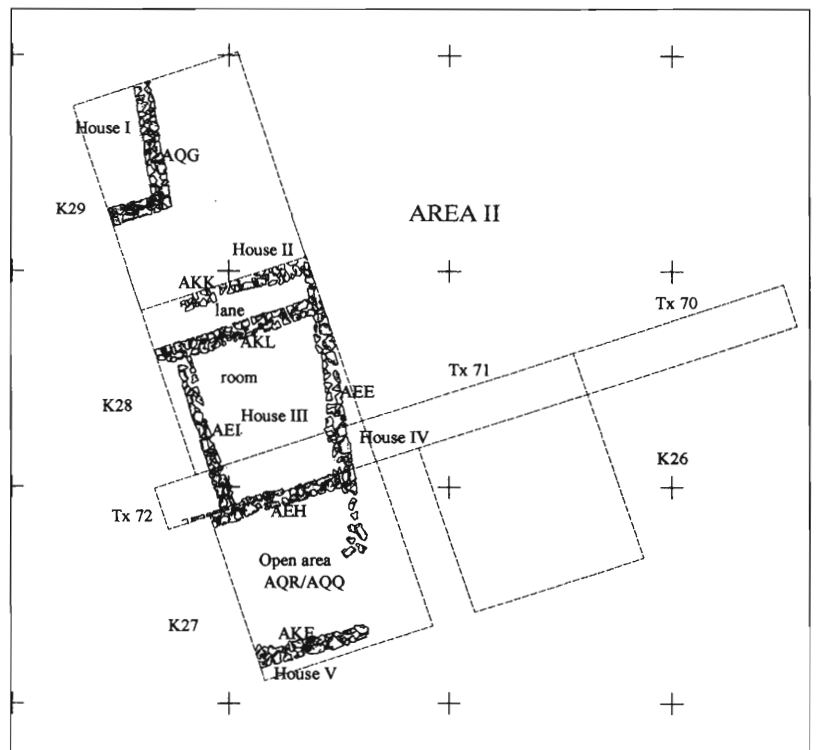


Fig. 11. Building remains dated in the PC period in trenches K27-29 in area II. Charalambos Marinopoulos.

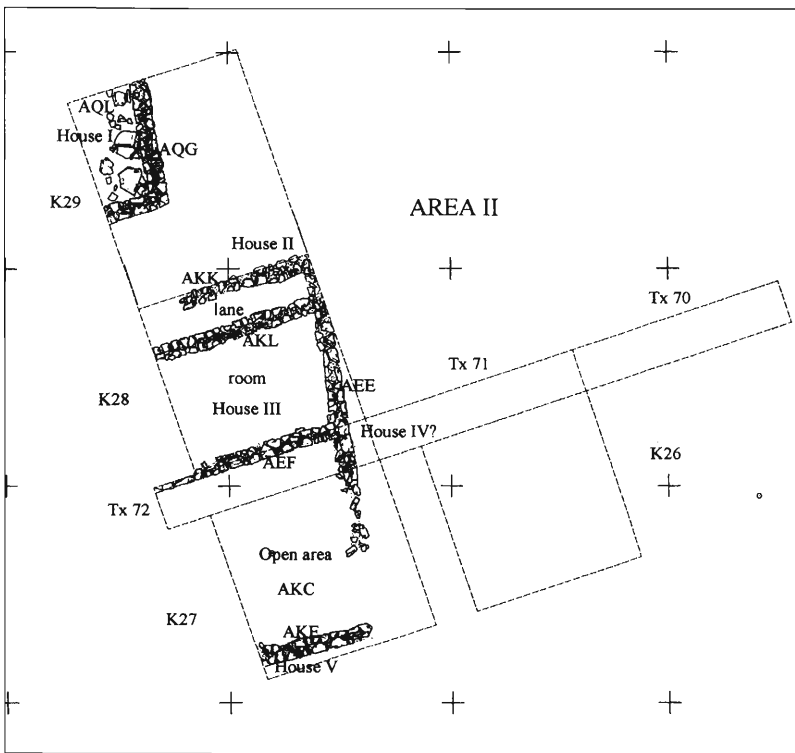


Fig. 12. Building remains dated to the EPC-LPC period in trenches K27-K29 in area II.

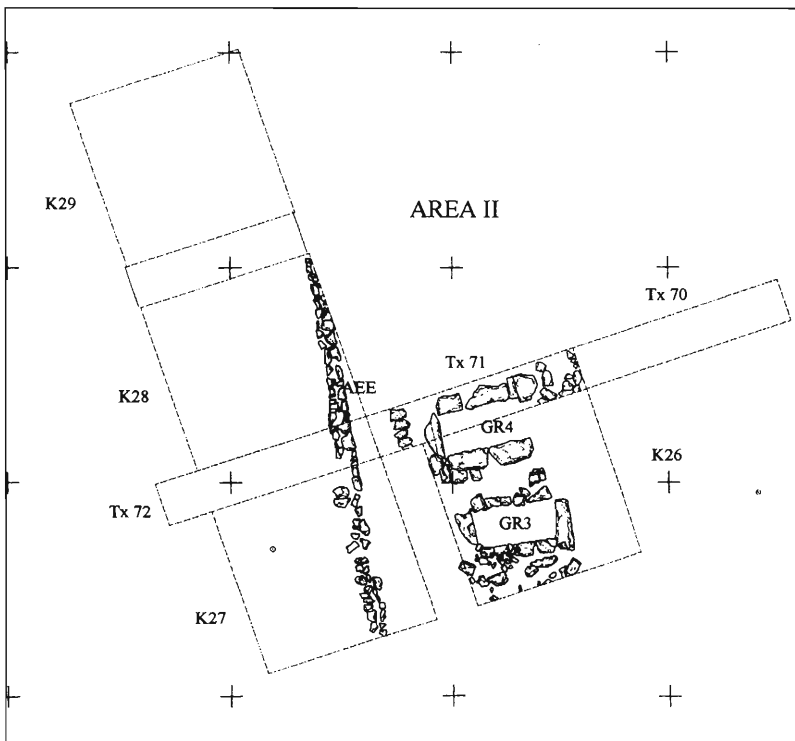


Fig. 13. Early Hellenistic cist tombs and other remains of the same period in area II. Charalambos Marinopoulos.

els. Several floors were found on this level. The large house, known from wall AKK (Fig. 11), replaced the L-shaped building and its open yard. This new building had first a paved floor consisting of stone-slabs (ARD at level 2.35m) and could be entered from the lane. Wall ARF from the preceding period appeared to have been used as a doorstep.

In the narrow lane between walls AKL and AKK, the old pebble floor (ARL) from the previous phase was replaced by a new pebble floor (AQJ/1 on level 2.35m).

Walls AKL, AEE, and AEH (Fig. 11) constituted the outer walls of a house lining the narrow lane on its southern side. An insubstantial foundation wall (AEI), consisting of only one course of flattish stones divided the house into two rooms. The earliest and best-defined floor level associated with these two rooms again lay directly on top of the MH-LH structures. In a corner of the easternmost room, twelve loom weights were found close to one another.

Not much later, the room with the loom was equipped with a more substantial floor consisting of irregular slab stones (AQZ and ARA). Three terracotta spools were found on this level, the type of which has parallels dating in the seventh and early sixth centuries.

In the open area between this building and the one known from wall AKE in trench K27 (see Fig. 11), a level mixed with stones (AQR/1) was found, immediately above the MH-LH remains. It probably served as a foundation for

the floor (AQO) above it. The level contained LHIIC pottery mixed with LG sherds. Floor AQO itself was characterized by tiny sherds, some charcoal, and many mud-brick fragments. Besides pottery, a fine bronze pin was found. The room probably defined by the corner wall AQG in trench K29 was also built in this period.

In conclusion, the finds from this series of floors at *c.* 2.35m above sea level point to a date in the PC period.

Settlement remains from the MC period

A later and likewise easily defined floor-level was found in the trenches at about 2.55-2.75 m above sea level. This level was also characterized by some rebuilding. Furthest to the north in trench K29, the house known from wall AQG received a new slab-stone floor (AQL). A kotyle sherd with letter-imitating decoration was found in the level immediately above this floor.

In the neighbouring house, known from wall AKK, and at approximately the same level, the plain ware jug with threefoil mouth shown in Fig. 15 was found. A sherd from a closed vase, decorated with a siren or bird, is datable in the MC period, and came from the same level. On a slightly higher level in the same house, an earthen floor (BK/4) was found to have replaced the earlier pavement (ARD). From this floor came a Middle Corinthian krater rim with lotus-palmette decoration (Fig. 16), and other diagnostic sherds and finds, likewise indicating a date in the MC period. The floor was soon replaced by another earthen floor



(AQT), characterized by some pebbles, tiny sherds and hard-packed soil, shells and bones. From this floor came among other things two decorated sherds, which still require a more precise dating.

In the lane in between walls AKK and AKL, two terracotta sima fragments were found at level 2.66 m, just below a well-defined floor. In the house constituted by walls AKL, AEH and AEE, minor rebuilding took place. The dividing wall AEI was given up, and the southern outer wall (AEH) was replaced by a new wall (AEF), making the house narrower. Perhaps this happened in order to enlarge the open area between walls AEF and AEK, which was now paved with large, neatly fitting slabs (AKC) (Fig. 17). This pavement was found in the middle area of

Fig. 14. General view of Bronze Age structures and Archaic settlement remains in K27-K29. Henrik Frost.

Fig. 15. Jug (F01-3002) found on the floor in the room formed by wall AKK in trench K29. Henrik Frost.

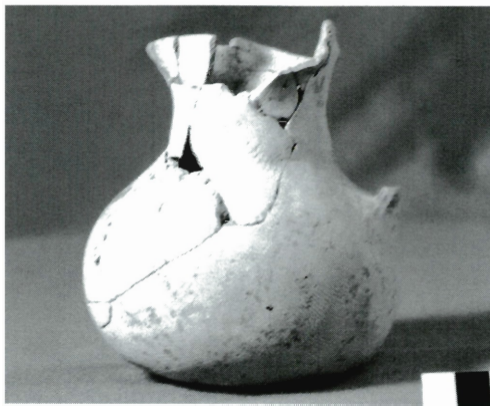
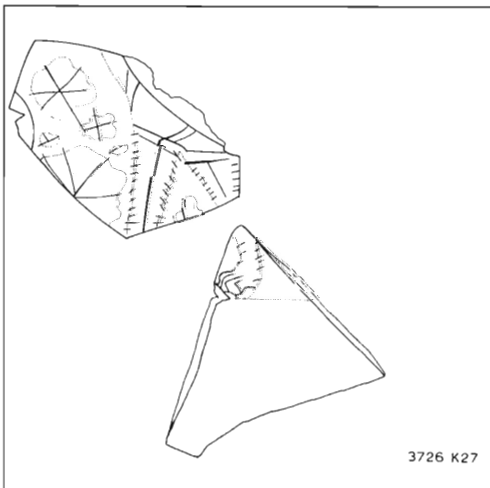


Fig. 16. Rim from crater with lotus and palmette decoration (F00-5987). From floor in room defined by wall AKK in trench K29. Middle Corinthian. Henrik Frost.

Fig. 17. Pavement consisting of stone slabs (AKC) in K27. To the right wall AKE, to the left wall AEH, and in the background wall AEE, the southern part of which has been taken down to the level of the slabs in Antiquity. Henrik Frost.



Fig. 18. Sherds from closed vase decorated with rosettes and forelegs of panther. From the slabstone-pavement (AKC) in trench K27. Middle Corinthian. Anne Hooton.



trench K27. However, since the upper courses of the southern part of wall AEE had been taken down to the level of the pavement, the latter may originally have continued towards the East. In that case, both house AEE and house AKL, AEH and AEF were rebuilt, in order to give way for a larger, open and finely paved area.

Archaic polychrome sherds were found at the level of this pavement, and a lekane sherd, and several pyramidal loom weights came from the level covering the pavement. Excavation of the pavement itself, however, produced among other things sherds from an open vase decorated with rosettes and the forelegs of a panther, the style of which points to a date in the MC period (Fig. 18).

All in all, activities at this level including the pavement of large open area seem to have taken in the MC period.

At a still higher level, around 3m above the sea, several earthen floors with sub-floors consisting of hard-packed medium-sized stones were found. One such sub-floor (AQS) contained a sima-fragment and diagnostic pottery. In the lane in between walls AKK and AKL, yet another earthen floor was found (AQA and AKM), characterized by the usual small pieces of charcoal, pebbles, sherds and tiny potsherds. Finally, in the strata covering wall AKK, a sherd with compass-drawn cable pattern was found (Fig. 19). However, more study is needed of the material from these later closed contexts before a date can be given.

Early Hellenistic tombs

After the last Archaic settlement phase described above, the houses in trenches K26-29 appear to have been given up. The strata immediately on top of the Archaic horizon mainly contained mixed eroded material and no structures. By the Late Classical period, the area was turned into a cemetery for well-to-do inhabitants, something which had already been suspected in 1998 when the limestone structure AFJ in trench Tx71-72 appeared (*SPR*, fig. 25), and it was confirmed in the 1999 season when the trial trench was widened and completely excavated (and called trench K26). Thus, the limestone structure proved to be one of two large, and very finely constructed cist tombs. The construction of the tombs closely resembles GR2 found during rescue excavations earlier in 1999 west of the Kato Vasiliki road at a distance of about 2km from the Hill of Hagia Triada (I. Moschos in *SPR*, 291-301). Both tombs are published in a separate article by Jonas Eiring in this volume, and are therefore only very briefly described here.

The two cist tombs (GR3 and GR4), approximately parallel to each other, are oriented East to West (GR4 slightly more towards NNW-SSE). Only the lowermost courses of GR4 were preserved while GR3 was undisturbed. Both tombs are built of large limestone blocks, which were finely cut and smoothed on the inside. The eastern side of the tombs was formed by huge, roughly square slabs. Two



Fig. 19. Medium fine-ware sherd with compass drawn cable pattern (F00-5074) found in level covering wall AKK in trenches K28-K29. Henrik Frost.

elongated slab stones covered the eastern end of GR3, and a third slab stone must originally have covered its western end. While GR4 was found looted, the burials in GR3 were found undisturbed.

Conclusions

The first use of the Hill of Hagia Triada was a habitation in the Late/Final Neolithic period. Above those early levels there was an important Bronze Age settlement, which ceased to exist in the Dark Ages. In the late eighth or early seventh century, settlers laid the foundations of a new town. The comparatively well-preserved Archaic buildings with associated finds on the western and north-eastern side of the hill indicate a town of a considerable size, which must have come into existence during a relatively short period of time and which was founded, in parts, directly above the Bronze Age remains. The presence of Early Hellenistic graves on top of the Archaic settlement indicates that the extension of the Archaic city may have been decidedly larger than the Hellenistic city.

Preface

*Søren Dietz,
Lazaros Kolonas and
Michail Petropoulos*

The Greek-Danish archaeological collaboration at ancient Chalkis in Aetolia was carried out between 1995 and 2001, with the Danish Institute at Athens and the Sixth Ephorate of Antiquities in Patras as responsible participants. Seven campaigns of fieldwork included surveys, excavations and geological examinations in the area around the present coastal village of Kato Vasiliki. The work was concentrated to the site of Pangali on the eastern slope of Mount Varassova and, in particular, the small hill of Hagia Triada on the coastal plain east of the village. Two preliminary reports have previously been published. The first covered the first two campaigns of 1995 and 1996, and was published in 1998 in the *Proceedings of the Danish Institute at Athens II*, 232-317 (= *FPR*), the second was published in *PDIA III* (2000), 223-305 (= *SPR*) and included the activities of the years 1997 and 1998. The present preliminary report, which is the third and the last in the series, describes the work carried out at ancient Chalkis in 1999, 2000 and 2001.

In addition to the preliminary description of the results from the three years, the final publication of the Hellenistic tombs excavated in 1999 is presented separately in this volume (Eiring). Further results from the project are being studied for final publication during the next four years.

The campaign in 1999 lasted from 28 June to 30 July. Excavations continued on the middle terrace below the Acropolis, towards the northeast, where architectural remains from the Archaic and Classical periods (trenches N26-N28) previously had been attested. Excavations continued also further east on the same terrace (towards the water), where foundations of a row of Hellenistic houses had been uncovered during previous campaigns. The interior walls of these houses were defined by an earlier fortification wall, probably of Classical date.

Already in 1998, trial trenches (Tx70-74) had been opened on the plain west of the hill, where the geological survey had attested a bay in Antiquity. Hence, the area is near the ancient waterfront and, presumably, the harbour mentioned by Thucydides. A series of levels were excavated down to bedrock, almost four metres below the present surface. The main groups of material were given preliminary dates in the Late Neolithic, Bronze Age and Archaic periods. In 1999 three new trenches (K26-28) were opened, and a good stratigraphy of succeeding Archaic levels was uncovered. Two Hellenistic cist tombs were found in trench K26, one of which was undisturbed. The tombs were excavated during the 1999 campaign. In 2001 excavations were restricted to the area west of the hill (trenches K27-29).

The participants in the three campaigns were the following:

1999:

Project leaders: Søren Dietz and Lazaros Kolonas

Field Directors: Sanne Houby-Nielsen, Alexandra Nilsson, Ioannis Moschos and Michail Gazis.

Surveyors: Charalambos and Marinos Marinopoulos.

Pottery registration: Jonas Eiring, Elizabeth Bollen and Hildegunn Borup.

Geologist: Kaj Strand Petersen

Tiles: Claus Grønne

Photographer: Henrik Frost

Conservator: Leonidas Pavlatos

Students: Peter Rose, Lasse Sørensen, Pernille Bangsgaard Jensen, Julia Maria Mortensen, Trine Eltang, Sara Birgitta Engblom, Pernille Andersen, Camilla Schneekloth Sørensen, Mette Kjær Schaldemose

Logistics: Ann Thomas

2000:

Project leaders: Søren Dietz and Michail Petropoulos.

Field Directors: Sanne Houby-

Nielsen and Ioannis Moschos.

Pottery Registration: Jonas Eiring and Camilla Schneekloth Sørensen

Geology: Kaj Strand Petersen

Tiles: Claus Grønne

Photographer: Henrik Frost

Conservator: Leonidas Pavlatos

Students: Pernille Bangsgaard, Peter Rose, Julie Maria Mortensen, Pernille Andersen, Lasse Sørensen, Emma

Ljung, Frederik Olsson, Daniel

Sahlén, Annika Jeppsson

Logistics: Jane Berg Jørgensen and Petra Pakkanen

2001:

In 2001 the main activities were concentrated to Ancient Calydon (sponsored by the Ny Carlsberg Foundation). At Chalkis, Søren Dietz and Michail Petropoulos were project leaders with the participation of the following students: Pernille Andersen, Emma Ljung and Mikkel Mayerhofer. Claus Grønne was responsible for the registration of tiles and Mette Mouritzen, architect, continued registration of the fortification walls on the Pangali.

Acknowledgements

The field work at Ancient Chalkis is a joint project between the Sixth Ephorate of Prehistoric and Classical Antiquities in Patras and the Danish Institute at Athens. We are most grateful to the Greek Ministry of Culture for permission to carry out work at Chalkis and to the Consul General

Gösta Enbom Foundation, which, as during previous campaigns, covered the expenses of the Danish participation. The Council and Mayor of Gavrolimni kindly made the old school in Kato Vasiliki available to the expedition for storage and research.



