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THE BERBATI-LIMNES ARCHAEOLOGICAL SURVEY. THE 1988 SEASON

BY

BERIT WELLS, CURTIS RUNNELS AND EBERHARD ZANGGER

Abstract

The 1988 field season demonstrated that site location, preservation of monuments and artifacts, and land use are dependent upon the geological setting. Thus architectural remains such as the Mycenaean road is only preserved on the hard limestone, whereas the softer rocks such as marl and flysch, once stripped of their soil cover, have lost their archaeological record. Within the geological framework economic and political factors governed the settlement pattern. Trade and pastoralism attracted people to the Miyio valley northeast of Limnes in Final Neolithic/Early Helladic and Mycenaean times, while in Middle Helladic, Late Geometric and Classical to Roman times, good, arable soils in the lower Berbati valley were preferred. It is suggested that the discontinuous and highly variable low-density distribution of artifacts in our area results from past human activity such as land clearance and agriculture, pastoralism, dumping, manuring and artifact loss rather than from geomorphological processes.

INTRODUCTION

The Berbati valley is strategically located on the edge of the Argive plain forming a hinterland to the great Mycenaean centers of the Argolid (*Figs. 1–3*). Within this area are several natural passes over the mountains between the Argive plain and the Corinthia which would have constituted strategic routes of communication in the past. The archaeological knowledge of the area is still rudimentary, but the existence of the Bronze Age Mastos, the Roman bath, and a Mycenaean road point to the potential significance of the valley and it is expected that a regional archaeological study could help remedy this situation. For example, in the case of the Berbati valley several questions present themselves: was the Berbati valley a center in its own right with a hierarchy of settlements or was it a satellite to greater powers? To what extent are archaeological settlement pattern and past land use practices controlled by bedrock geology and geomorphology?

Some ten years ago, during a field trip to the Argolid of the Classics Department, Lund University, the idea of carrying out an archaeological survey in the Berbati valley was first conceived. The drastic agricultural changes taking place at the entrance of the Kleisoura, the gorge connecting the valley with the Argive plain, triggered the idea. The lower slopes of the gorge had up till then, if at all cultivated, been planted solely with tobacco, but now bulldozers cut into the slopes and wells were being drilled in the dried-up stream bed to prepare for the cultivation of orange trees. It was not hard to imagine what would happen next. As the trees grew and started bearing fruit, the orchards would be fenced in and gates locked with the ensuing difficulty of access for archaeological field work.

Archaeological field work in the valley in the 1930s and the 1950s was concentrated around the Mastos, the limestone cone in the western sector, approximately 6 km from Mycenae, leaving the rest of the area unexplored, a further incentive for attempting to disclose the cultural history of the region over the millennia. While working at the Swedish Institute at Athens in 1984, Berit Wells resumed her idea of carrying out a survey in the Prosimna valley and as the volume on the Berbati pictorial pottery went to press in 1986 the plans were begun in earnest.

As this was the first venture of the Swedish Institute at Athens into the field of archaeological survey, the director of the project approached colleagues with experience in that specific field for assistance. Thus Curtis Runnels was invited to serve on the team and Eberhard Zangger, extending his geological investigation of the Argive plain into our survey area, was asked to collaborate as a scientific advisor to enable a completely integrated study of the cultural and geomorphological changes in the proposed field area. The publication of the archaeological survey is a joint effort of the three principal scientists.[1]

[1] The Berbati-Limnes Archaeological Survey is carried out under the auspices of the Swedish Institute at Athens, with permission from the Ministry of Culture and Science and under the supervision and support of the Ephorate of Argolido-Korinthia. The geoglogical field work is supported by the Greek Institute of Geology and Mineral Exploration in Athens. We wish to express our warm thanks to these institutions for their services and for their cooperation, and especially to Dr. Fanny Pachiyanni, the Director of the Ephorate at Nauplion and our liasion at the Archaeological Museum of Nauplion, Mrs. Nicoletta Divari-Valakou.

Financial support from various sources rendered the project possible. Two private foundations, Gunvor och Josef Anérs Stiftelse and Marcus and Amalia Wallenbergs Stiftelse, most generously covered the major part of our costs, with the Swedish

Fig. 1. The Berbati valley seen from the northwest with the Kleisoura in the background.

Fig. 2. The village of Limnes seen from the north.

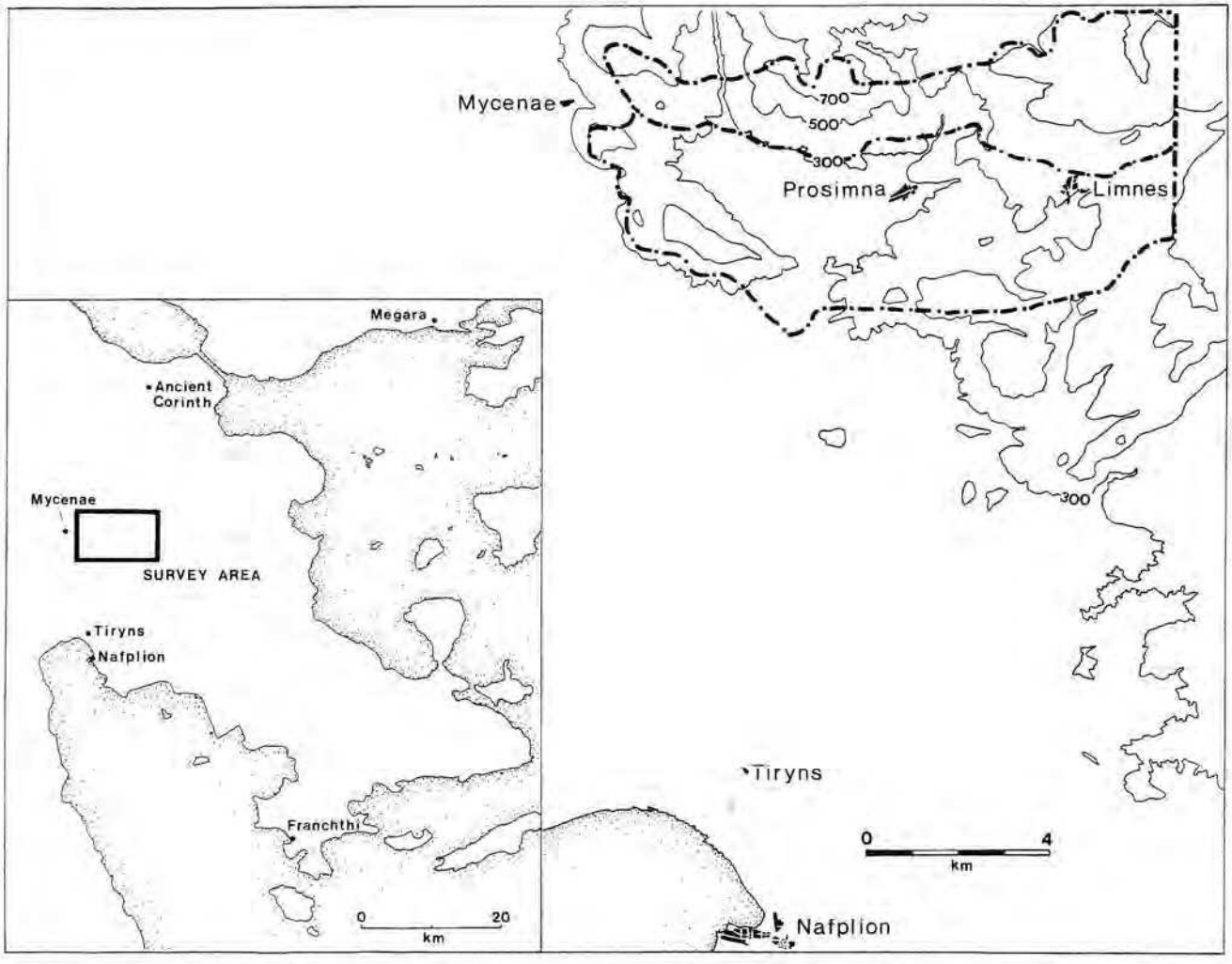

Fig. 3. Map of the Berbati-Limnes area. The northern section was walked in 1988.

The Berbati-Limnes Archaeological Survey has been planned for two seasons in the field, 1988 and 1989, followed each year by a preliminary processing of the material. A comprehensive study season is envisioned for 1990 with the aim of completing the study of the artifactual evidence.[2]

OBJECTIVES

The primary objective of the Berbati-Limnes survey is to search systematically the entire valley and the Limnes uplands for remains of human activity and to collect archaeological samples from the surface in the hope of being able to demonstrate function and date of human activity. Furthermore we aim to determine the interdependence of site distribution, land use patterns, monument preservation, and the landscape.

Systematic archaeological reconnaissance, or surface survey, is an important method for the study of regional, cultural and environmental history.[3] Surface surveys are not focused upon the study of individual archaeological

Institute contributing through scholarships for the Swedish Students and the Institute for Aegean Prehistory, Boston University and a private donor towards expenses for our American team members.

While the authors have collaborated on all parts of the report and the conclusions, Berit Wells is responsible for the parts on previous research, the Mycenaean period, and the Geometric to Roman, Curtis Runnels is responsible for the sections on methods, early prehistory, and the Medieval to Modern, and Eberhard Zangger is responsible for all contributions regarding geology and geomorphology.

[2] The survey team comprised the following members: Gunnel Ekroth (Stockholm University), Renée Forsell (Lund University), Priscilla Murray (Archaeological Institute of America), Jeannette Ohlson (Göteborg University), Arto Penttinen (Stockholm University), Laurie Roberts (Boston University), Curtis Runnels (Boston University), Ann-Louise Schallin (Göteborg University), Thomas Tartaron (Boston University), Berit Wells (Göteborg University), and Stavros Zabetas (Uppsala University).

[3] J. Bintliff & A. Snodgrass, 'Off-site pottery distributions: a regional and interregional perspective', *Current Anthropology* 29, 1988, 506–513; S. Dyson, 'Archaeological survey in the Mediterranean basin: a review of recent research', *American Antiquity* 47, 1982, 87–98; A. Snodgrass & J. Cherry, 'On *not* digging up the past', *The Cambridge Review* 109, 1988, 9–13; C. Runnels & Tj. H. van Andel, 'The evolution of settlement in the southern Argolid, Greece. An economic explanation', *Hesperia* 56, 1987,

sites, as is the case with excavations, but are directed to the study of whole regions. The analysis of archaeological sites, low-density distributions of artifacts (non-site data), and geomorphology, when taken together, can be used to interpret regional social and economic systems in antiquity. Attention within a given region is also directed to individual sites, usually defined by the presence of features and concentrations of artifacts, but the objective of intensive survey is to investigate entire landscapes to reconstruct settlement history and land use.

Other surveys in Greece (e.g. Nemea, Melos, and the southern Argolid) have identified significant variations in settlement patterns, namely periods when the numbers of settlements changed considerably. These changes have been plausibly connected to population fluctuations, reflecting periods in Greek history when there were system collapses with serious consequences for local populations.[4] Periods of settlement growth and expansion in one area are not reflected in others, showing that settlement growth and decline were uneven processes. Although the Berbati-Limnes survey is not yet complete, the preliminary results have revealed a pattern of human settlement similar to that seen in the southern Argolid, but different in several important respects from that seen in the nearby Nemea valley. A detailed discussion of similarities and differences between Berbati-Limnes and other areas must wait until after our 1989 field season.

Archaeological surveys are necessary to detect low-density artifact distributions that are not associated with any sites. Interest is in the landscape itself, however, as much as in isolated artifacts and monuments, because the interpretation of human activities cannot be studied independently from the natural context in which they took place. The current settlement pattern does not necessarily reflect the original distribution of sites since secondary geological processes such as erosion and superposition may have destroyed or covered archaeological remains. Therefore every archaeological survey needs to be fully integrated with a study of the evolution of the landscape. The importance of having a geologist on archaeological survey teams has been recognized by others before. Contributions of scientists, however, were relegated to appendices, prefaces or individual chapters.[5] Since the preservation of prehistoric remains and ancient land use patterns are to a large degree controlled by the geological setting, we decided to interweave archaeological and geological findings in the present publication, striving towards a holistic approach of reconstructing landscape and cultural evolution.

CURRENT STATE OF KNOWLEDGE

The western part of the Prosimna basin is the only part of our area to have been explored archaeologically. A Mycenaean road on Kondovouni was first documented by Steffen and later investigated by Mylonas and by Hope Simpson.[6] Monuments in the western part of the valley have been noted before. A Mycenaean chamber tomb was observed by Wrede[7] and a possibly Classical/Hellenistic square tower is to be seen on the modern road. The Roman bath is indicated on Lehmann's map[8] and this as well as the cistern are described in a recent publication by "Asterion", the Society of the People of Prosimna.[9]

Systematic investigation began in the spring of 1934 when Professor A.W. Persson wrote a letter to Kostas at Mycenae, his foreman during the previous excavations at Dendra, asking him to prospect for sites of archaeological interest for excavation in the area. Later in the summer he went to Greece with a friend and was joined in Athens by Gösta Säflund and Erik Holmberg. All of them, together with Kostas, went exploring east of Mycenae. For a day they walked through the valley of Berbati, doing a kind of survey. Richest in archaeological surface material were the slopes of the Mastos, by the foot of which was a cave where, according to Kostas, an inscription dealing with the Nereids had been found. Some distance away, on the road to Berbati, modern Prosimna, a suspected chamber tomb was sighted on a slope.

Excavations started in June 1935. Holmberg investigated the suspected chamber tomb which turned out to be robbed. The exact location is not known today, as it has been totally obliterated, but it was situated by the old road leading from the Mastos to the village of Berbati, approximately one kilometer from the former. Persson went in search of a tholos tomb and actually found it. A short report on that

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303–334; for Mediterranean surveys, *Archaeological Survey in the Mediterranean area*, ed. D. Keller & D. Rupp (*BAR* International Series 155), Oxford 1983.

[4] For a discussion of recent findings in settlement history from surface surveys see J.F. Cherry, J.L Davis, A. Demitrak, E. Mantzourani, T. Strasser & L.E. Talalay, 'Archaeological survey in an artifact-rich landscape: a Middle Neolithic example from Nemea, Greece', *AJA* 92, 1988, 159–176; Runnels & van Andel (supra n. 3); Tj.H. van Andel & C. Runnels, *Beyond the acropolis: A rural Greek past*, Stanford 1987; M. Wagstaff & J.F. Cherry, 'Settlement and resources' in *An island polity. The archaeology of exploitation in Melos*, ed. C. Renfrew & M. Wagstaff, Cambridge 1982, 246–263.

[5] W.A. McDonald & G.R. Rapp, Jr. (eds.), *The Minnesota Messenia Expedition: Reconstructing a Bronze Age regional environment*, The University of Minnesota Press, Minneapolis 1972; G. Rapp & S.E. Aschenbrenner (eds.), *Excavations at Nichoria in southwest Greece. Site, environs, and techniques*, The University of Minnesota Press, Minneapolis 1978; C. Renfrew, M. Gimbutas & E.S. Elster (eds.), *Excavations at Sitagroi: a prehistoric village in northwest Greece* (Monumenta Archaeologica 13), Los Angeles 1986.

[6] Steffen, *Karten von Mykenai*, Berlin 1884; G. Mylonas, *Mycenae and the Mycenaean age*, Princeton 1966, 86f.; R. Hope Simpson, *Mycenaean Greece*, Park Ridge, N.J. 1981, 15–17.

[7] This piece of information was kindly supplied by Prof. Robin Hägg who, in his turn, received it from Prof. Walter Wrede with a permission to make use of it.

[8] H. Lehmann, *Argolis* I. *Landeskunde der Ebene von Argos und ihrer Randgebiete*, Athen 1937.

[9] *Simvoli stin istoria tou lekanopediou tis Prosimnas*, ed. by the Society of the People of Prosimna, "Asterion", 1979, 21–23. Prosimna is the modern name for the village at the eastern end of the valley. We will use Berbati to denote the site around the Mastos which means that either name can be associated with the name of the valley.

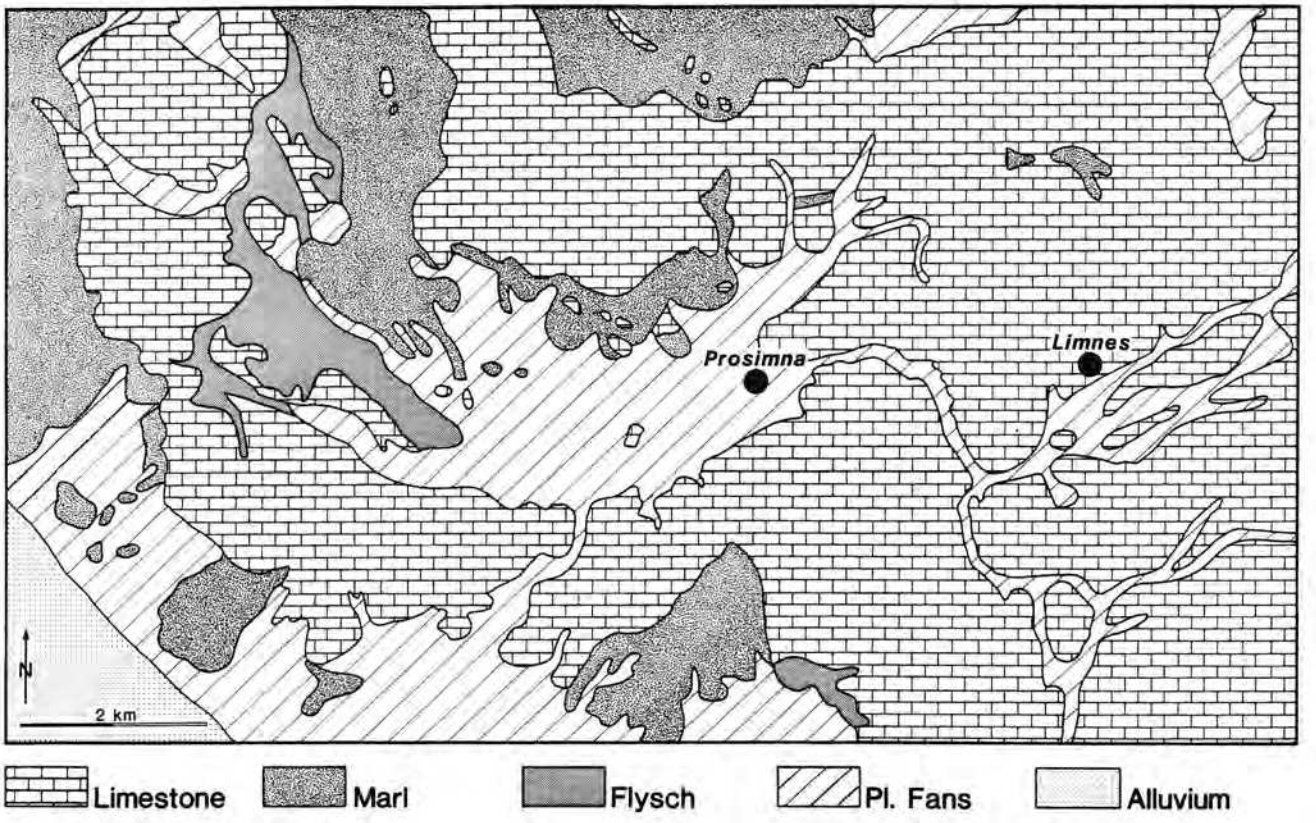


Fig. 4. Bedrock distribution in the survey area according to the geological map of Nauplion by A. Tartaris, G. Kallergis & G. Kounis. Mesozoic limestone forms the Limnes uplands in the east and deeply eroded marl and flysch around Prosimna form the Berbati valley.

season appeared in the *Illustrated London News* of the 15th of February the following year, 1936.[10] That summer work continued at Berbati with Gösta Säflund exploring the Western Necropolis and Persson himself working in the area of the Potter's Quarter,[11] where Åke Åkerström joined him in 1937–1938.[12] In 1937 Säflund investigated the Early Helladic settlement on the south slopes of the Mastos. According to the original plans the final reports were to appear simultaneously but because of a lack of funds the studies of the material had not been finished before the outbreak of the war and then for nearly ten years the material that had not gone astray was inaccessible. Säflund had, however, written up preliminary reports on his excavations after the campaigns, and in 1964 he decided to publish them in their original form.[13] Holmberg had handed in his manuscript to Persson for final publication in the late 40s, but in 1951 Persson died without having finished his part of the publication. Towards the end of the 1970s the papers left by Persson were sorted out and both the chamber tomb manuscript and a first draft by Persson on the tholos surfaced. Holmberg now published his study of the chamber tomb, with slight additions.[14] Barbro Santillo Frizell undertook to restudy the material from the tholos tomb, revising and translating into English Persson's descriptions of the finds.[15]

Excavations were resumed at Berbati in 1953 by Åke Åkerström, then director of the Swedish Institute at Athens which had been inaugurated five years previously as a permanent base for Swedish archaeological activities in Greece. A final field campaign took place in 1959 and the first volume of the publication, the one on the pictorial pottery, appeared in Stockholm in 1987.[16]

[10] See also *AA* 1935, 200f.

[11] A short preliminary report for 1936 appeared in *AA* 1936, 138–141.

[12] In *AA* 1938, 552–557 another report was published; the potter's kiln received closer attention in Å. Åkerström, 'En mykensk krukmakares verkstad. Från de svenska utgrävningarna i Grekland åren 1935–1938', in *Arkeologiska forskningar och fynd. Studier utgivna med anledning av H.M. Konung Gustav VI Adolfs sjuttioårsdag*, Stockholm 1952; *idem*, 'Das mykenische Töpferviertel in Berbati in der Argolis', in *VI. Internationaler Kongress für Archäologie, Berlin 1939. Bericht*, 1940, 296ff; and *idem*, 'A Mycenaean potter's factory at Berbati near Mycenae' in *Atti e memorie del I. congresso internazionale di micenologia*, Roma 1967 (1968), I, 48ff.

[13] G. Säflund, *Excavations at Berbati 1936–1937*, Uppsala 1965.

[14] E.J. Holmberg, *A Mycenaean chamber tomb near Berbati in Argolis* (Acta Regiae Societatis Scientiarum et Litterarum Gothoburgensis. Humaniora 21), Göteborg 1983.

[15] B. Santillo Frizell, 'The tholos tomb at Berbati', *OpAth* 15, 1984, 25–44.

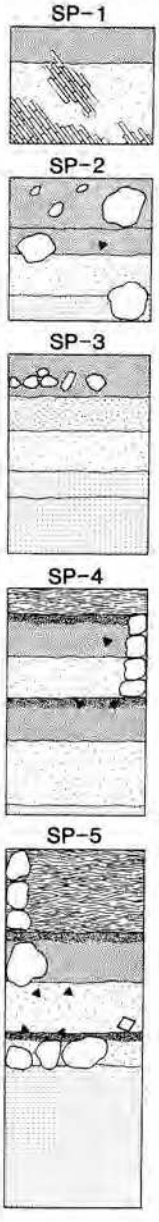
[16] Åke Åkerström, *Berbati*. Vol. 2. *The pictorial pottery* (Skrifter utgivna av Svenska Institutet i Athen, 4°, 36:2), Stockholm 1987.

REGIONAL GEOLOGY AND PHYSIOGRAPHY

The modern geomorphology of the Berbati-Limnes area is to a very large degree controlled by the bedrock setting (*Fig. 4*). Three quarters of the total survey area consist of a metamorphic limestone including the whole eastern part with Limnes in its center as well as the mountain ranges around the Berbati valley (Prophitis Elias, Delokormo, Charvati, and Psili Rachi) up to 796 meters above sea level (masl). The bedrock west of Prosimna, however, contains marl and flysch—both rock types weather much faster than the limestone. As a consequence the marl/flysch area is deeply eroded and forms the Berbati valley with its deepest point at about 140 masl.

The survey area is located on the western border of the Pelagonian Platform (or Subpelagonian Zone) which embraces three main rock units in this area.[17] (1) The Pantokrator Limestone originated during a tectonically stable phase in the Lower Triassic to Middle Liassic as a shallow marine deposit on an extensive carbonate platform. On fresh surfaces the limestone shows a greyish, white, or

[17] G.H. Bachmann & H. Risch, *Die geologische Entwicklung der Argolis-Halbinsel (Peloponnes, Griechenland)*, Geologisches Jahrbuch Reihe B 32, 1979; D. Bannert & H. Bender, 'Zur Geologie der Argolis-Halbinsel (Pelponnes, Griechenland)', *Geol. et Paleontol.* 2, Marburg 1968, 151–162; V. Jacobshagen (ed.), *Geologie von Griechenland* (Beiträge zur regionalen Geologie der Erde 19), Berlin 1986.



SP-1								
A	0—0.2	5YR3/3	5YR3/2	c	c sbk 3	vh/vs		clay films: vl n cc
B3	0.2—0.7	7.5YR5/6	7.5YR4/4	gsc	none	so/s	es	dissiminated carbonate
SP-2								
Ap	0—0.3	10YR3/2	10YR3/2	sic	vc cr 1	sh/s	ne	artificial fill behind terrace
A	0.3—0.55	10YR4/2	10YR3/2	sl	vc cr 1	sh/ss	ne	
B2	0.55—0.7	10YR6/4	10YR5/3	sil	c cr 2—3	h/ss	ne	weathered greenstone
C1	0.7—0.85	5Y7/1	2.5Y6/2	c	none	vh/s	e	mottled with 5GY6/1, 10YR4/2
SP-3								
A	0—0.25	7.5YR3/4	7.5YR3/4	sic	vf-f sbk 1	sh/vs		
B1	0.25—0.45	10YR4/3	10YR4/3	sil	m sbk 2	h/s		
B	0.45—0.7	10YR7/3	10YR5/3	sil	vf sbk 1	so/ss		
C1	0.7—0.85	10YR8/2	10YR6/2	sil	none	so/ss		
C3	0.85—1.2	10YR7/2	2.5Y5/4	ls	none	h/s		weathered marl
SP-4								
	0—0.15	10YR5/3	10YR3/3	sil	m sbk 2	h/ss	ev	
A	0.15—0.4	10YR3/2	10YR3/2	sil	f sbk 1	sh/ss	e	
B	0.4—0.65	10YR4/3	10YR3/3	sl	m sbk 2	sh/ss	es	max. boulder size 35—40 cm
Ab	0.65—0.9	10YR4/3	10YR3/3	sl	f sbk 2	sh/ss	es	
B1b	0.9—1.3	10YR5/3	10YR4/3	sl	m sbk 2	h/ss	es	
C3	1.3—1.35	white	2.5Y6/2	cl	none	—/s	ev	weathered marl
SP-5								
	0—0.5	10YR4/3	10YR4/4	scl	vf sbk 1	sh/ss	es	
A	0.5—0.8	10YR4/3	10YR4/3	c	f sbk 2	sh/s	es	
B1	0.8—1.1	7.5YR6/4	7.5YR4/4	sc	f sbk 2	sh/s	es	
B3b	1.1—1.3	7.5YR6/4	7.5YR5/4	c	2 sbk c	h/s	es	
C	1.3—2.2	white	white	c	f sbk 1	sh/—	ev	

Fig. 5. Characteristic soil profiles from the Berbati-Limnes area: SP-1 = autochthonous soil on limestone; SP-2 = artificial fill behind terraces on greenstone soil; SP-3 = *in situ* soil on marl; SP-4 = soil behind old terraces on south slope of Charvati; SP-5 = several phases of soil disturbances on marl.

yellowish color; exposed surfaces, however, are typically dark grey due to weathering and lichen overgrowth. The whole sequence of medium to thick limestone beds is up to 1000 m thick. It is intensely folded with axes striking in an E-W direction. During the Eohellenic phase in the Upper Jurassic to Lower Cretaceous, oceanic crust was overthrusted onto the Pelagonian Platform. (2) A trough developed in front of the nappe in which a 300 m thick flysch formed which is called "Eohellenic Flysch". The flysch is intercalated with calcite shales, reddish marls, sandy marls, sandstones, conglomerates, and clastic limestones. (3) The third bedrock unit is an Upper Pliocene to Pleistocene marl which is interlayered with conglomerates.

The central Berbati valley consists of alluvial fans and cemented torrential conglomerates. The fans are mostly of Pleistocene age and consolidated. In places, however, they seem to have experienced recent sediment aggradation as well. Fan surfaces feature red well developed fertile soils.

Today the Berbati valley is an exclusively erosional area with essentially no recent deposits in it. All eroded material is carried through the Kleisoura gorge. Depending on grain size it accumulates as an alluvial fan or as floodplain deposits in the Argive plain.[18] Except for the immediate vicinity of the Kephalari Rema near the Mastos, there are no Holocene floodplain deposits in the valley, although some redeposition of eroded soils as colluvia might have occurred at the bottom of the hill slopes during the Holocene.

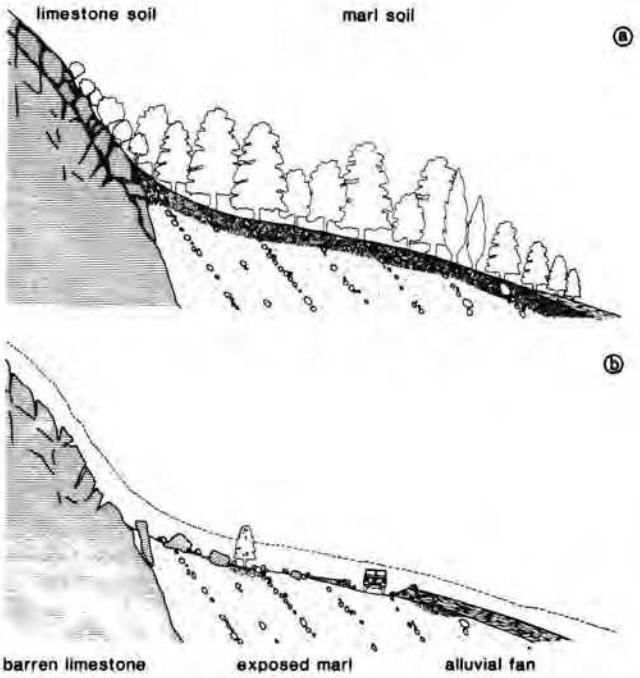


Fig. 6. The effect of soil erosion on the archaeological record is shown in this sketch from Tract 89. a) Dense vegetation protected the soils in the early Holocene. b) Today, limestone and marl are stripped of their soils and exposed. The survey team was searching the area between the tree and the jeep, where they found patches of white, brown, and red soil with square limestone blocks and well-rounded limestone pebbles. Some team members found many sherds, some few, and others none. Explanation: the square limestone blocks have fallen down the hill, while the well-rounded pebbles were interlayered in the marl and have weathered out. Some of the brown marl soil is preserved under the tree, where one survey member found a number of sherds. The team member on the right walked on exposed marl (white) and found just a few sherds which have moved down from the area below the tree. The persons to the left and the right of the jeep walked on alluvial fan deposits (red soil), while one person on the road track walked on exposed marl again—none of the latter three team members reported any finds.

The characteristic geomorphology of the limestone areas can be recognized by the smooth contour pattern on the 1:5,000 topographic maps which show undulating hills with pronounced rounded spurs, whereas the marl and flysch is more deeply dissected, rugged, and uneven. The limestone areas are distinguished from the flysch and marl areas not only through topography and rate of erosion but also through soil type and quality, vegetation, and land use.

Autochthonous soils are preserved on the limestone in many places, especially in depressions and on shallow slopes (*Fig. 5*). The soils are rich in clay and pebbles and are typically dark reddish brown in color (Munsell color 2.5YR 3/4). Only steep slopes and hill tops are barren and without soil. Essentially all the gentle slopes below 600 m (comprising *c.* 80 % of the surface around Limnes) are terraced. Only 30 % of the terraced fields are in use at any given time. Ten percent of these used fields have grain, the rest tobacco with almond orchards occurring only sporadically. Individual bushes are kept on the fields, perhaps to support the soil. Maquis dominates the unterraced limestone areas.

The surface of the marl is deeply weathered as seen in sections. Due to the weathering, the marl has become very soft which, of course, improves its tillage properties. On the other hand, marl soils are quickly eroded, once the vegetation cover is removed, and they do, in fact, occur in the Berbati valley only in patches.

The flysch does not show traces of soil cover, and there are no indications of how much of the marl and flysch surfaces have been eroded since prehistoric times, and whether this erosion occurred naturally or whether it was induced by man. There has been a massive impact by the present inhabitants on the Berbati valley. Soil improvement and terrace construction are nowadays carried out by bulldozers. Essentially all the marl surfaces have been bulldozed, often over and over again. Most of the marl is stripped of its soil and exposed and no sites are preserved on it.

In the Berbati-Limnes area we distinguish between bedrock (marl, flysch, limestone) with soil cover and without soil cover (exposed bedrock). The temperature gradient and the movement of water and ions through the surface layers of any natural deposit with time cause the formation of soil horizons. The time needed for the development of a mature soil depends on the climate and the bedrock. A one meter thick soil on a marl in Greece would probably form within a few thousand years. Thus, if a prehistoric site was orig-

[18] E. Finke (Zangger), *Landscape evolution of the Argive plain, Greece: Paleoecology, Holocene depositional history, and coastline changes*, Ph.D. dissertation, Stanford University (University Microfilm International, publ. no. 88–26140, Ann Arbor, Michigan).

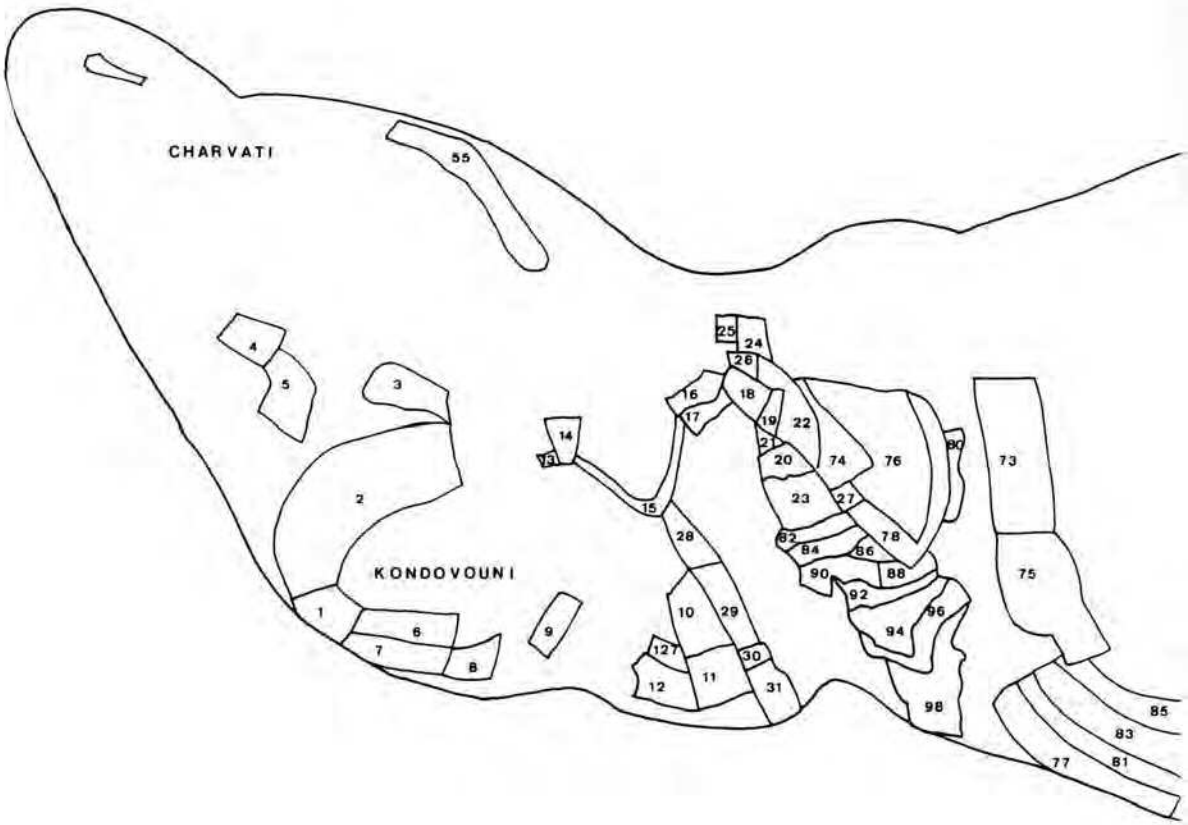


Fig. 7a. Map of tracts walked in the Berbati valley.

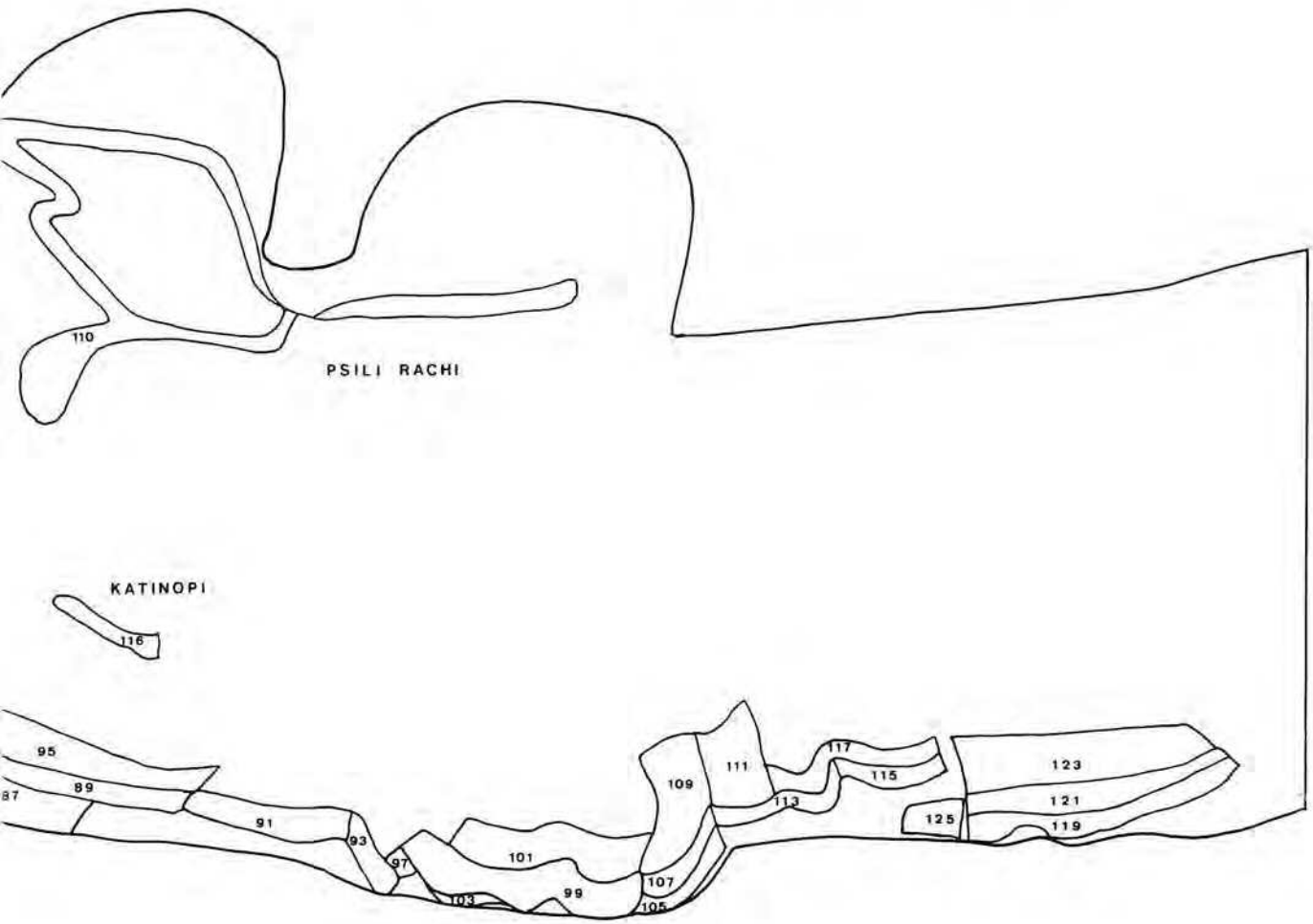
inally placed on exposed marl, the time elapsed since the establishment of the settlement would be sufficient for the formation of a soil underneath and around the site. As a consequence, the site, although established on stripped marl, would be found on marl soil. If a site was established on a marl soil to begin with, but the soil eroded afterwards disclosing the bare marl underneath, the site would have been eroded away with the soil surface. In any case: exposed marl and prehistoric sites are mutually exclusive and the survey teams could not find any in situ material on exposed marl. Where soil patches remained, however, a large number of artifacts from later periods indicated to what extent the prehistoric site pattern on marl and flysch has been destroyed.[19] *Figure 6* is based on a sketch drawn during the search of Tract 89 to illustrate how surface coverage and erosional history are related.

Even though the Berbati valley, at first sight, appears to be an idyllic Greek landscape, hidden away from the exponential path of technological development, and despite the evidently rich fauna and peaceful ambience of the valley, the place has already been altered to a substantial degree by its inhabitants. Whatever the rate of erosion, its importance for an archaeological survey cannot be overestimated. The finds on the marl and on the flysch are probably only a fraction of what was once there.

METHODS

The field methods employed were developed for use in surveys by members of the American School of Classical Studies and the British School at Athens.[20] Our principal alteration to earlier methods was to simplify the method of counting and recording of artifacts during fieldwalking. In the Berbati-Limnes survey two teams of five persons systematically walked small (150 × 250 m) parcels or "tracts", examining features and monuments, and counting and collecting samples of artifacts. A tract was defined on the spot and consisted usually of single fields, terraces, or orchards with more or less uniform vegetation and

[19] Compare with reports by Cherry et al. (supra n. 4).
[20] Supra n. 3 and n. 4.



visibility. Fieldwalking was conducted in closely-spaced parallel lines about 10–15 m apart. This spacing allowed each walker to see artifacts in front as well as those to either side. The spacing was increased or decreased according to the visibility in the tracts. An effort was made to walk tracts of the same size. Each tract was given a control number and one or more samples, each with its own control number, was collected from every tract.

As the tract was walked each person counted the artifacts in their line of walk, using a counter to record the number of sherds, rooftiles, flaked and ground stones. At the end of each tract the artifact counts were recorded on a printed form along with other relevant observations, such as the size of the tract, the direction of walking, the location of the tract, the average surface visibility, present land use, and vegetation. The individual members of each team kept the same order so that it was easier to account for individual variation in the counting and identification of artifacts. Soil descriptions of the areas covered by the tracts and of all the findspots were made separately. All tracts were drawn on a topographical base map at 1:5,000 scale (*Figs. 7a—b*).

Samples were taken in the field in order to determine the function and age of the artifacts and the use of different parts of the area in different periods. In addition to counting the artifacts, each team collected one or more selected or subjective "grab" samples from each tract that was walked. This is a very useful way of collecting material as the teams progress in their fieldwalking. In practice each fieldwalker collected all bricks, tile fragments, and sherds that preserved decoration, shape, or any other feature. All stone tools, metal, glass, or otherwise unidentified artifacts were also collected. Featureless body sherds, pan-tile fragments, and duplicate sherds were discarded after being inspected in the field. For those unfamiliar with this field technique it should be noted that all artifacts in the tract were counted and classified before a sample was taken or any material discarded. The artifact sample that was kept was given a control number and bagged.

A spatially well-defined concentration of sherds, tiles, or other cultural materials (e.g. bricks or building-stones) was designated a findspot. Such findspots were examined up to three times, first when they were walked as part of a tract, second when they were intensively searched and sampled for materials that allow us to date the sites and to determine

their functions, and third by the present authors. The term "findspot" includes occurrences traditionally called "sites". The term "site" connotes to most archaeologists a habitation or settlement. Findspots have fewer connotations and we assume that they may have had a wide variety of functions. Artifacts recorded while walking a tract were not assumed to belong to a findspot unless they appeared to be concentrated in a particular place. The artifacts noted in fieldwalking, whether or not they were associated with a findspot, are used here to determine the use of the survey region for any given period. It is the tract, and not the findspot, that is the basic spatial unit of recording past activity. Findspots were usually defined in the course of tract-walking and the first sample of artifacts belonging to each findspot were collected at that time. Findspots were recorded separately on a printed form noting the size, location, and relevant characteristics. A separate grab sample was made by carefully re-walking the findspot with the team and collecting all diagnostics. Features such as roads or bridges were designated "standing monuments" and documented on separate forms, measured, photographed, and drawn.

The area north of the villages of Prosimna and Limnes representing the high, rocky, and barren part of the region (*c.* 40 %) was searched in 1988 (*Fig. 3*). The terrain dictated the areas to be fieldwalked, because some slopes and the many deep ravines that dissect the landscape could not be walked. For this reason intensive fieldwalking was carried out on approximately 4.5 km^2 or 25 % of the 1988 survey area. On the remaining 75 % of the area extensive inspection by teams of 2–3 persons was carried out as circumstances permitted.

A total of 32 findspots and 2 standing monuments[21] was identified (*Fig. 8*) ranging in date from the Final Neolithic (late fourth millennium BC) to the Early Modern period (18th and 19th centuries). In 22 days of fieldwalking with two teams of five persons 121 tracts were walked. A total of 31,700 artifacts was counted, 95 % of them sherds and rooftiles. Because the area seen by any fieldwalker is only part of the area of the tract, not all of the cultural materials could be effectively counted, and the true total in the survey tracts is likely to be on the order of 95,000 objects.[22] A total of 155 samples was collected from the tracts and findspots. These samples produced 2,217 artifacts, approximately 7 % of the artifacts observed and counted in the field. Sherds and rooftiles account for 93 % of this total, and lithic artifacts for 6.3 %. A few artifacts of metal, glass, plaster, bone, and cement were also found.

THE PALAEOLITHIC

The earliest evidence for human visitation was found in the mountainous area north of the Berbati valley. The relevant artifacts are Greek Mousterian flaked-stone tools of the Middle Palaeolithic period. It is worth noting that these artifacts do not belong to sites but are isolated stray finds, picked up in the course of fieldwalking tracts. The value of intensive survey is readily apparent in this instance. Only where all artifacts in each tract are examined is it possible to identify a period that may be represented by very few artifacts. Other than the stray finds reported here no remains of the Palaeolithic or Mesolithic periods were identified. The Nemea Valley Survey produced similar results. Human presence in the Nemea valley during the Palaeolithic, as in the much later Final Neolithic, was indicated by the discovery of isolated flaked-stone tools in the southern part of that area.[23]

Three artifacts in the Berbati-Limnes area were identified as Greek Mousterian, and another two (in Tract 77) are probably Mousterian (*Fig. 9*). The Greek Mousterian industry dates to *c.* 50,000 BP.[24] Dated Mousterian deposits have been found in Epirus, Thessaly, and the southern Argolid.[25] Excavations in the Kephalari cave 20 km to the SW near Argos brought to light in 1974 a stratified Mousterian industry.[26] The Berbati-Limnes artifacts (*Fig. 10*), which are made of weathered siliceous stones that are entirely alien to this region, could be tools dropped by hunting parties from this cave. In two cases the original material has been altered by extreme weathering to a light-weight, de-natured rock. The artifacts were found at elevations of 600 masl on the slopes of the Charvati above Mycenae in Tract 55, and at 700–750 masl on the west and east slopes of Viglatouri mountain north of Limnes (Tracts 45 and 66). Stray finds of Mousterian artifacts in mountainous areas at elevations of 800–1000 masl have been reported from Macedonia,[27] Thessaly,[28] and the southern Argolid.[29] It is unlikely that humans inhabited the higher elevations on a regular basis in the Pleistocene. Surveys have shown a marked preference for Mousterian sites for lower elevations nearer the present coastline.[30]

Upper Palaeolithic artifacts were not identified in 1988, although the Upper Palaeolithic is well-represented at sites in the Argolid.[31] Survey in the southern Argolid, however,

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[21] The careful reader will look in vain for Findspot 2. This designation was originally given to the Mycenaen road which we later renamed Standing Monument 2. Thus findspot number 2 became void.

[22] This is because the strips between the fieldwalkers are not completely visible to the fieldwalkers, see Bintliff & Snodgrass (supra n. 3), 506f.

[23] Cherry et al. (supra n. 4), 174.

[24] C. Runnels, 'A prehistoric survey of Thessaly: new light on the Greek Middle Palaeolithic', *JFA* 15, 1988, 277–290.

[25] K.O. Pope, C. Runnels & T-L. Ku, 'Dating Middle Palaeolithic red beds in southern Greece', *Nature* 312, 1984, 264–266.

[26] L. Reisch, *Pleistozän und Urgeschichte der Peloponnes*, Unveröffentlichte Habilitationsschrift an der Universität Erlangen, 1980.

[27] S.I. Dakaris, E.S. Higgs & R.W. Hey, 'The climate, environment and industries of stone age Greece: part I', *PPS* 30, 1964, 199–244.

[28] Runnels (supra n. 24).

[29] P. Bialor & M. Jameson, 'Palaeolithic in the Argolid', *AJA* 66, 1962, 181f.

[30] Runnels (supra n. 24).

[31] C. Perlès, *Les industries lithiques taillées de Franchti.* Tome I. *Présentation générale et industries Paléolithiques*, Bloomington 1987.

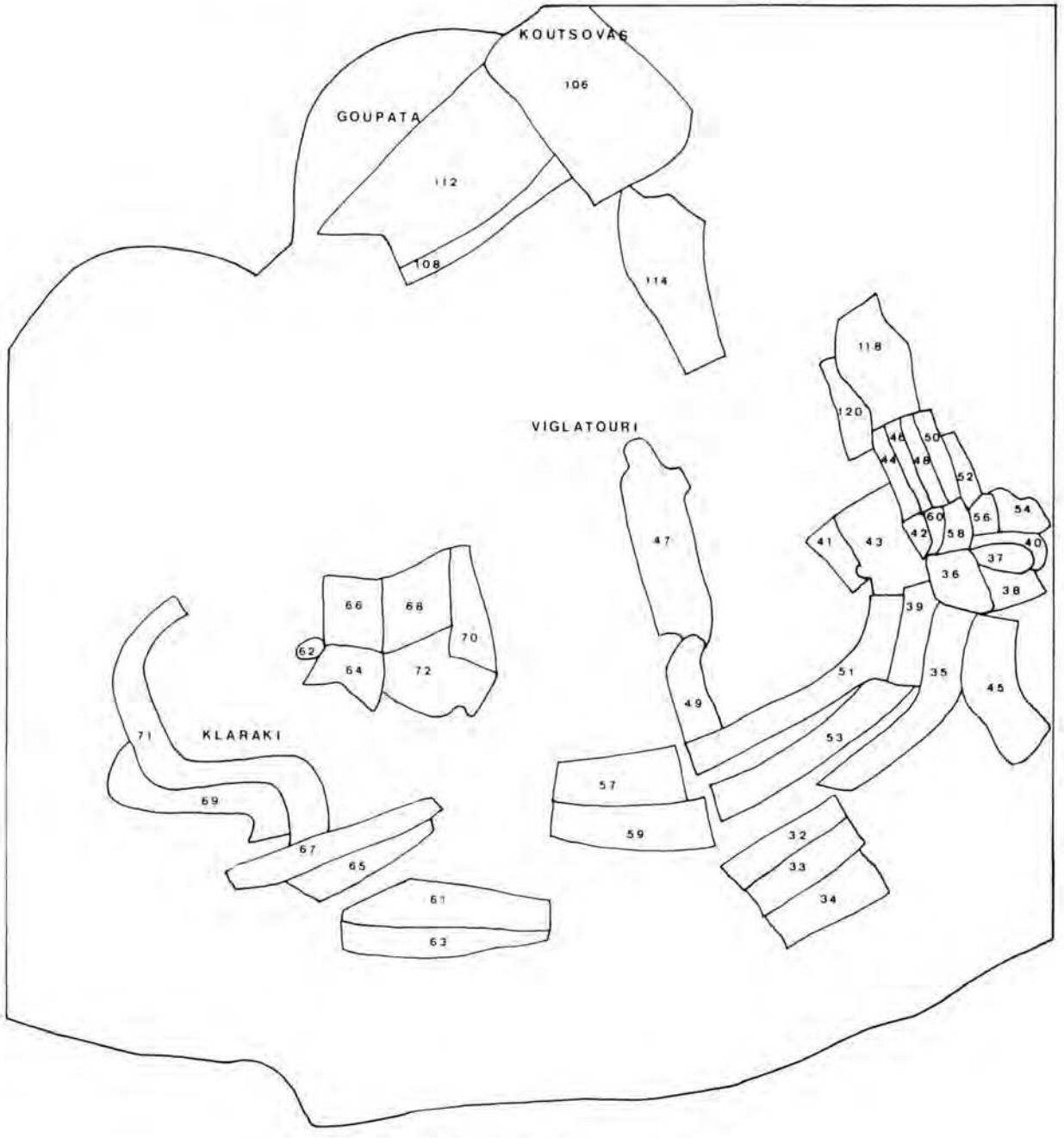

Fig. 7b. Map of tracts walked in the Limnes area.

indicates that Upper Palaeolithic sites are rare on the surface, and are much more common in caves[32] and the lack of caves in the 1988 survey area may account for the rarity of these artifacts. Scattered lithic artifacts were found in Tracts 73, 75, 77, 80, 81, 83, and 85 on either side of the Kephalari Rema. These lithics include plain and retouched chert flakes found on alluvial fans above the present stream bed. Two or three of these artifacts may be Palaeolithic types. They may represent hunting losses, or they are perhaps the remains of highly eroded sites that once existed along the banks of this natural passage through the mountains.

THE NEOLITHIC AND EARLY BRONZE AGE

The only Neolithic remains belong to the Final Neolithic period, roughly the fourth millennium BC. Four findspots or well-defined concentrations of cultural materials belonging to this period were identified, and another five tracts produced artifacts that can be dated to the Final Neolithic (*Fig. 11*). At Findspots 12 and 28, some sherds may be Early

[32] Runnels & van Andel (supra n. 3), 309f.

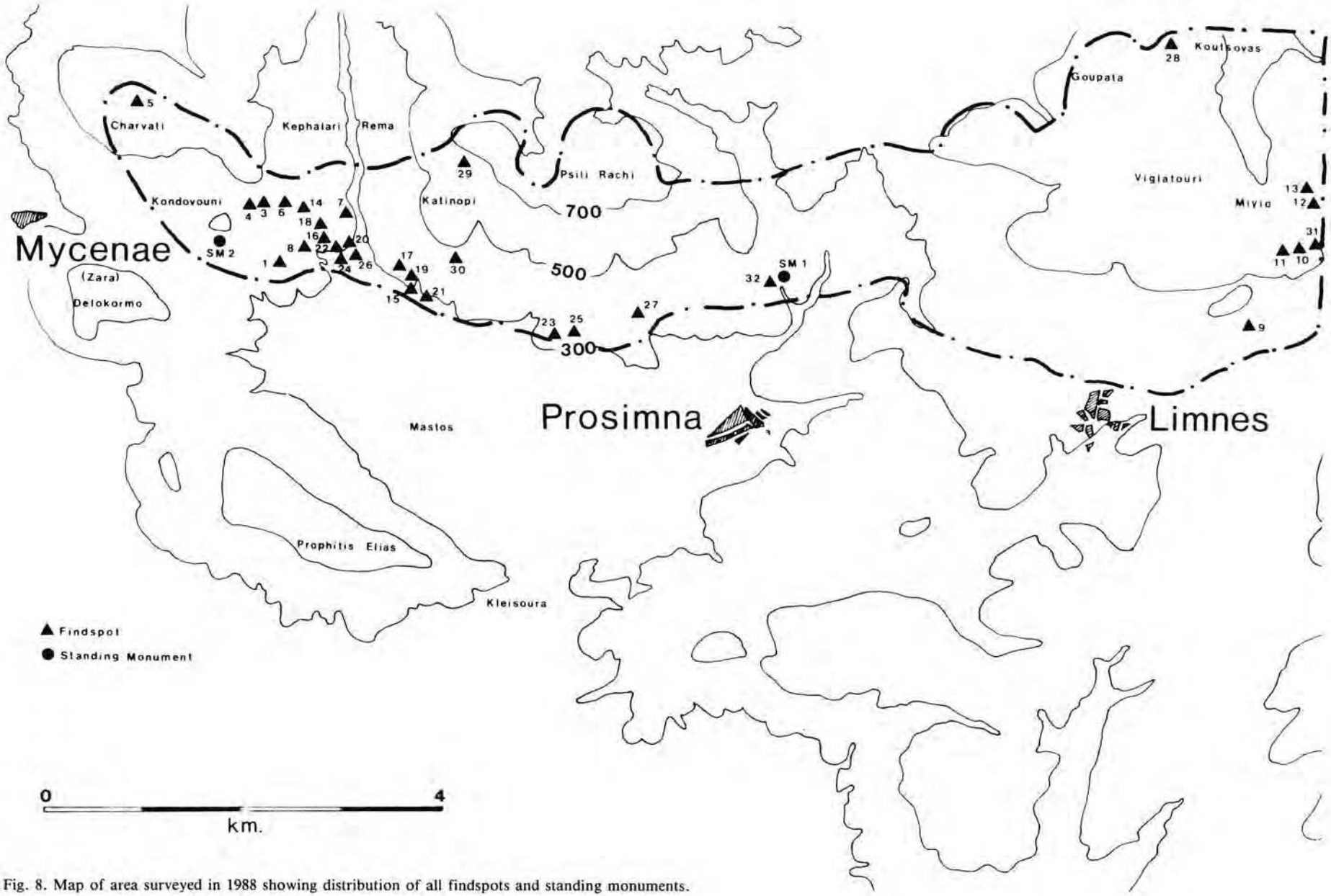

Fig. 8. Map of area surveyed in 1988 showing distribution of all findspots and standing monuments.

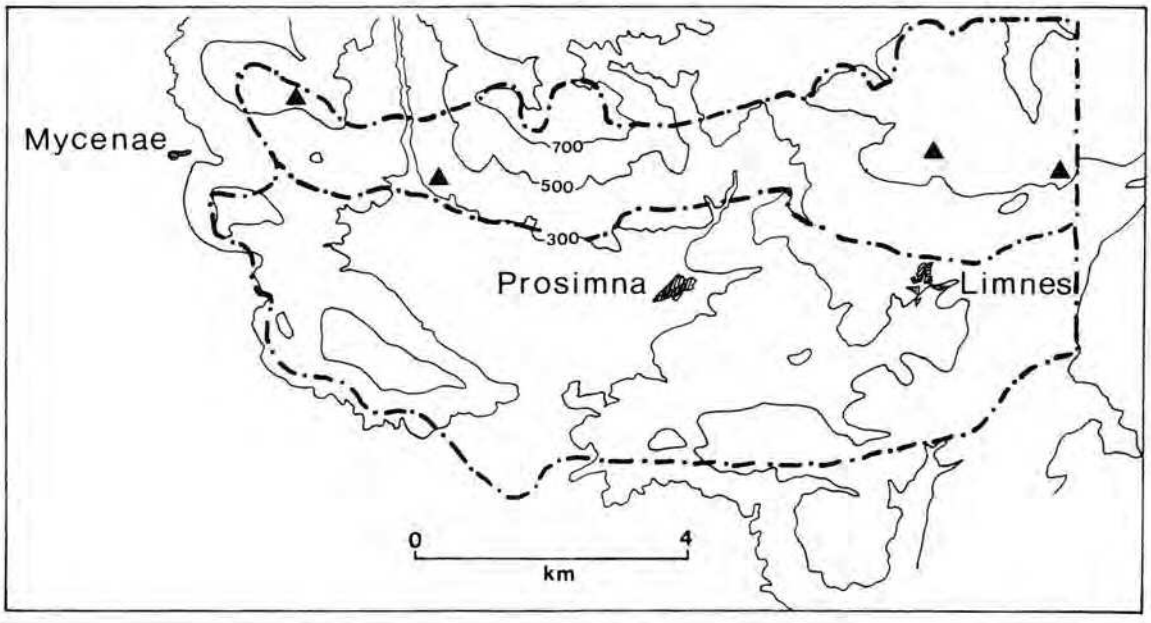

Fig. 9. Distribution map of Middle Palaeolithic tract finds.

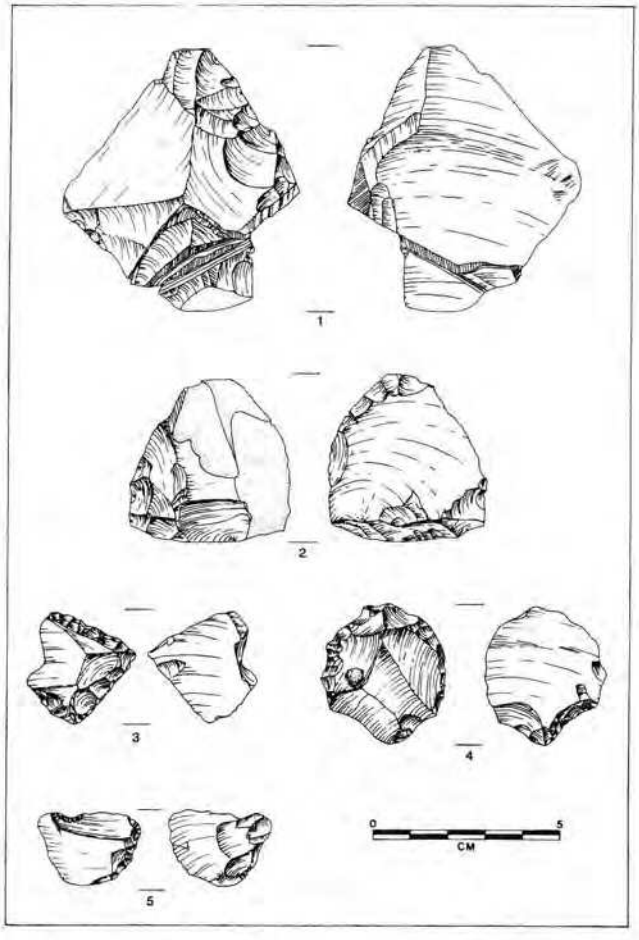

Fig. 10. Middle Palaeolithic Mousterian artifacts: 1) side scraper, Tract 55, sample 15; 2) side scraper, Tract 68, sample 114; 3) side scraper, Tract 77, sample 43; 4) tanged end scraper, Tract 77, sample 43; 5) side scraper, Findspot 31, Tract 45, sample 336.

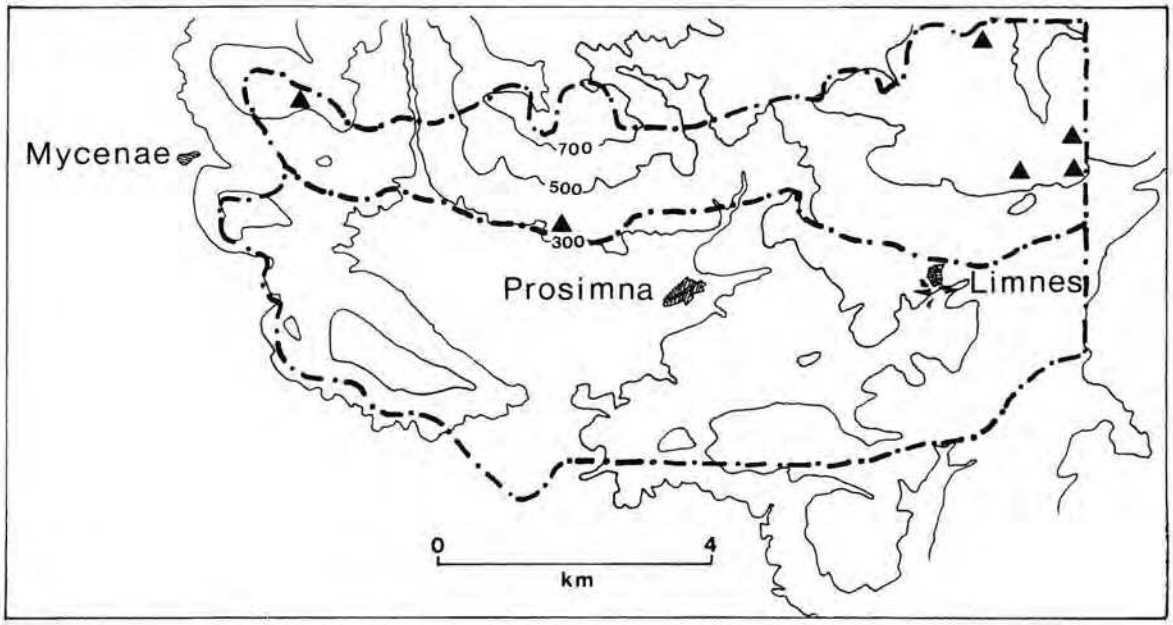

Fig. 11. Distribution map of Final Neolithic/Early Helladic I–II findspots and tract finds.

Fig. 12. Early Helladic I–II hearth rim from Findspot 12 (Kathili) in the Limnes area.

Fig. 13. The limestone hill of Kathili (Findspot 12) in the Miyio valley east of Limnes, seen from the northwest.

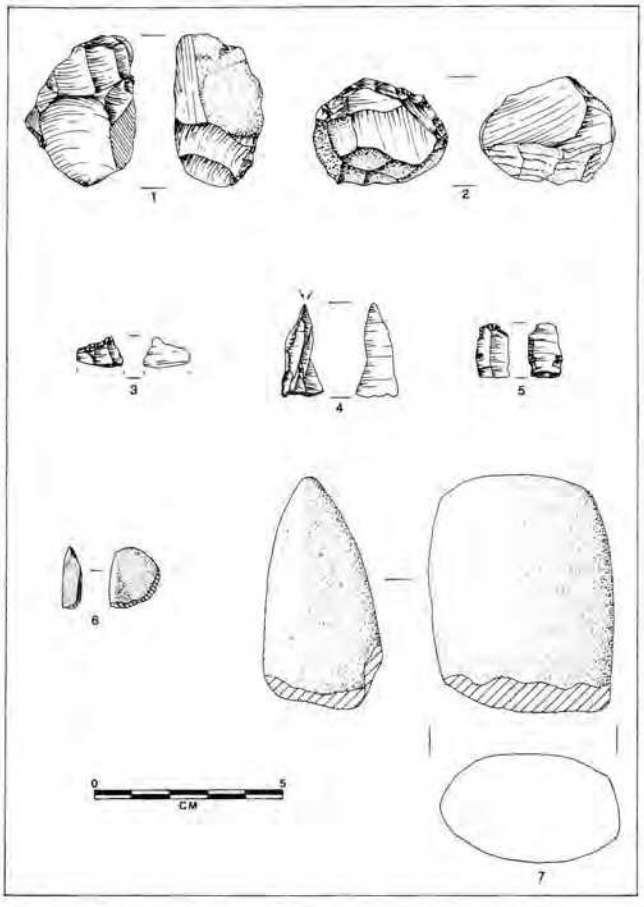

Fig. 14. Final Neolithic/Early Helladic I lithic artifacts (flint, unless otherwise noted). 1) flake core, Findspot 31, Tract 45, sample 336; 2) end scraper on a flake, Findspot 31, Tract 45, sample 336; 3) truncated blade (obsidian), Findspot 31, Tract 45, sample 336; 4) burin, Findspot 32, Tract 45, sample 336; 5) blade or flake with double truncation (obsidian), Tract 53, sample 71; 6) hematite celt, Tract 49, sample 36; 7) greenstone celt, Findspot 12, Tract 37, sample 54.

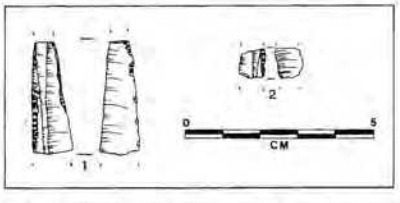

Fig. 16. Final Neolithic obsidian artifacts. 1) retouched blade, Findspot 23, Tract 93, sample 99; 2) retouched flake, Findspot 23, Tract 93, sample 99.

Findspot/Tract	sherds	querns	flint	obsidian	celts	daub
Limnes						
FS12	×	×			×	
Tracts 47, 49 53, 57	×	×		×	×	
FS 28	×		×			×
FS 31			×	×		
Berbati						
FS 23	×		×	×		
Tract 55	×		×			

Fig. 17. Neolithic finds in the Berbati-Limnes survey.

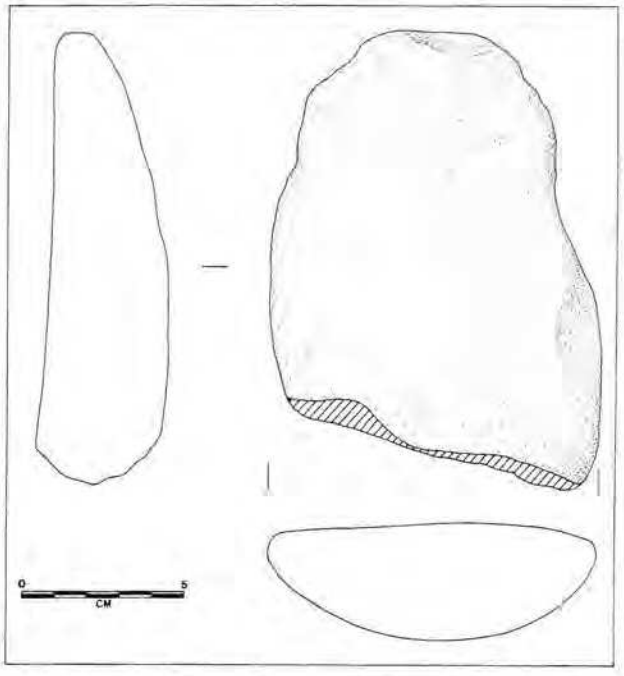

Fig. 15. Final Neolithic sandstone quern from Findspot 12 (Tract 37, sample 12).

Helladic I (early third millennium BC) and a very small number of sherds at Findspot 12 (Kathili) belong to the Early Helladic II period (*Fig. 12*).

The most significant concentration of Final Neolithic materials is centered upon Findspot 12 in the Miyio valley northeast of Limnes. Findspot 12 is a large settlement on the summit of a low limestone hill at the south end of the Miyio valley (*Fig. 13*). Andesite querns, two celts, and plentiful sherds mark the site (*Figs. 14–15*). The flat summit is probably created by infilling the gaps in the weathered limestone. Findspot 31 is directly to the south of Findspot 12 and it is nothing more than a scatter of stone tools on a limestone spur. Some 40 pieces of flint (*Fig. 16*) and obsidian found there are typical of artifacts from lithic scatters in the southern Argolid.[33] The presence of fine pressure-struck obsidian blades, along with the small-scale, rather atypical flint flakes, constitutes the principal evidence for assigning this findspot to the Final Neolithic or Early Helladic period.

Another findspot, FS 28, is located at the north end of the Miyio valley, high on the summit of Koutsovas at an elevation of 840 masl. A small area, no more than 20 × 20 m contains sherds, lithics, and several pieces of burned clay building material ("daub").

Andesite querns of Neolithic type, a miniature hematite celt, obsidian blade fragments and tools, and one Final Neolithic sherd were found on the south slopes of Viglatouri in Tracts 47, 49, 53, and 57 to the west of Findspots 12 and

[33] Runnels & van Andel (supra n. 3), 309.

31 (*Fig. 11*). The artifacts in tracts on the slopes of Viglatouri are unlikely to have reached their finding places by the agency of natural forces, and they possibly represent Neolithic field activity or mark the position of an agricultural storehouse. Flaked-stone tools, possibly of Final Neolithic/Early Helladic I date, were found in very low density in Tracts 118 and 120 downslope from Findspot 12. These tract finds nowhere form a well-defined concentration. Some of the scattered lithics in Tracts 118 and 120 could very well have found their way to the bottom of the valley by erosion or as the result of recent roadwork, but others were found on the slopes above the valley floor, perhaps marking prehistoric field locations.

One Final Neolithic findspot is on the nothern slopes above the Berbati valley. Findspot 23 consists of a cluster of sherds and obsidian blade fragments on a conglomerate spur overlooking the valley floor (328 masl; *Fig. 16*). This site does not have Early Helladic I material, and thus it need not be entirely contemporary with the findspots and tract finds in the Miyio valley.

One more find of Final Neolithic sherds remains to be mentioned. Tract 55 covered the tip of a limestone ridge, part of the range of Charvati, running southeast toward the Kephalari Rema. At an elevation of 600 masl there is a small number of Final Neolithic sherds.

The scattered finds in tracts may well be the remains of highly eroded sites on the hill slopes. A major episode of soil erosion belonging to the beginning of the third millennium BC has been identified in the Argive plain.[34] The Berbati and Limnes basins are major parts of the Argive catchment area and Final Neolithic slope clearance in these basins could have been a factor contributing to the destabilization of these slopes, and thus to an increase in sediment supply to the Argive plain. In the southern Argolid and elsewhere in Greece a destabilization of hillslope soils and a massive period of soil erosion seem to follow the movement of farmers in the Final Neolithic and Early Helladic periods into the hills.[35]

The purpose of this movement onto the more marginal lands of the hillslopes is not known for certain. The cultivation of olives and vines is unlikely to be the purpose because there is little evidence for the significant use of these cultigens in Greece before the Late Helladic period.[36] Olives have never formed part of the economy of the Limnes area. At 700 masl and above, this area is too cold to support olives. Arable agriculture, on the other hand, is a likely candidate. In the Early Modern period, with the precious soil on the slopes held behind thousands of terraces, wheat, barley, and oats were major crops. Support for the practice of arable cultivation in the Neolithic may be derived from the andesite querns found at Findspot 12. *Figure 17*, however, shows that many different kinds of artifacts mark the Neolithic findspots, but querns are found only where celts are present. Thus the querns may not have been used for grinding grain, but instead they could have been used to shape and sharpen celts.[37] The locations of Findspot 28 and some tract finds (e.g. Tracts 49 and 55) are in places that are both quite remote from arable land today and at relatively high elevations for agriculture.

A more economical explanation for the Final Neolithic findspots is that they are the remains of special-purpose activity locations, most plausibly to be explained as sites connected with pastoralism. Chang has shown in her pioneering ethnoarchaeological study of pastoral sites in the Dhidhima basin in the southern Argolid that sheep and goat folds are located in different parts of the landscape.[38] The differences in location are the result of different herd management strategies. Small flocks of sheep are grazed on fodder and field stubble and sheep folds are placed close to the village, typically at low elevation. Flocks of goats are instead grazed on the mountain slopes and their folds are most often found at higher elevations far from the village. The distribution of Final Neolithic findspots and artifacts in the Berbati-Limnes area closely parallels the distribution of late Medieval (*c.* 12th century and after) and Early Modern goat folds in remote mountainous areas. Herding and pastoralism have been important economic activities in the study area for centuries, and it is a plausible hypothesis that the similar Neolithic pattern or artifact distribution resulted from the same activity.[39]

Piecing together the different strands of inference presented here, it is possible to explain the pattern of Neolithic settlement by reference to a model which postulates a shift in agricultural production during the later Neolithic. We envision a movement away from lower elevation, spring-fed fields, which were worked with digging sticks, and a movement to fields at higher elevations for rain-fed agriculture requiring slope clearance. This change in agricultural practice could have been accompanied by an increase in sheep and goat pastoralism in the mountains. These hypothetical changes resemble the complex of changes that has been called the Secondary Products Revolution by Sherratt which occurs in the Balkans and southeastern Europe, and which required a movement of settlements to locations where there was access to trade routes.[40]

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[34] Finke (supra n. 18), 146.

[35] Tj.H. van Andel, C. Runnels & K.O. Pope, 'Five thousand years of land use and abuse in the southern Argolid, Greece', *Hesperia* 55, 1986, 103–128.

[36] C. Runnels & J. Hansen, 'The olive in the prehistoric Aegean: the evidence for domestication in the Early Bronze Age', *OJA* 5, 1986, 299–308.

[37] C. Runnels, 'Trade and the demand for millstones in southern Greece in the Neolithic and the Early Bronze Age' in *Prehistoric production and exchange: the Aegean and Eastern Mediterranean*, ed. A.B. Knapp & T. Stech (Institute of Archaeology, University of California, Monograph 25), Los Angeles 1985, 30–43.

[38] C. Chang, *The archaeology of contemporary herding sites in Greece*, unpublished Ph.D. dissertation, State University of New York, Binghamton 1981.

[39] C. Chang & H. Koster, 'Beyond bones: toward an archaeology of pastoralism', *Advances in Archaeological Method and Theory*, ed. M. Schiffer, 9, 1986, 97–148.

[40] A. Sherratt, 'Plough and pastoralism: aspects of the secondary products revolution' in *Pattern of the Past: Studies in honour of David Clarke*, ed. I. Hodder, G. Isaac & N. Hammond, Cambridge 1981, 261–305; for a discussion of the Secondary Products Revolution in Greece, see Tj.H. van Andel & C. Runnels, 'An essay on the 'emergence of civilization' in the Aegean world', *Antiquity* 62, 1988, 234–247.

The rarity of later phases of Early Helladic II, and of Early Helladic III and the Middle Helladic remains in the Berbati-Limnes area means that settlement in these periods was concentrated in the well-watered valley bottom close to the best arable soils. The main settlement was undoubtedly located at the Mastos in the Berbati valley which is known from previous excavations.

Our working hypothesis is that the settlement pattern in the later Early Helladic and Middle Helladic periods resembles the pattern of the earlier Neolithic, rather than that of the Final Neolithic, and is focused upon spring-fed or irrigated grain cultivation. A similar abandonment of pastoralism and of more marginal lands on the hillslopes for settlement centered upon the valley bottoms near springs has been claimed for the southern Argolid.[41] The causes of this change in settlement pattern are not known, but a contributing factor may have been the catastrophic loss of soils from the hillslopes that resulted from centuries of uncontrolled land clearance and erosion.

THE MYCENAEAN PERIOD

Mycenaean presence in the Berbati area is substantial on the arable flysch and marl soils west of the Kephalari Rema (*Fig. 18*), where the survey teams found several major sites (Findspots 14, 18, and 20; *Fig. 8*) which apparently are associated with the Mycenaean road. East of the Kephalari ravine, the fertile soils are replaced by barren limestone hills and the rugged, maquis-covered higher slopes and ravines of Katinopi and Psili Rachi prevented extensive exploration. However, downslope, along the southern border of our survey area, Mycenaean sherds constitute a background scatter.

Doubtlessly the most prominent construction within our 1988 survey area is the Mycenaean road which is preserved over a distance of 700 m or more along the south slope of Kondovouni (*Fig. 19*). This portion of the road begins in the pass between Kondovouni and Delokormo and once continued westward to Mycenae across the still preserved Drakonera bridge.[42] However, west of the pass the road has completely eroded away as the bedrock changes from limestone to flysch. While the limestone withstands erosion the flysch surface is eroded quickly and constantly, and consequently the road is preserved only where it was built on limestone. Individual Cyclopean blocks can be found downslope on the flysch adjacent to the end of the present road. Obviously the preemptive measures, such as the culverts described below, taken against erosion during heavy rain fall had no effect here.

The 2.20 m wide road follows approximately the 400 m contour on the south slope of Kondovouni. The steep slope necessitated a retaining wall which is sometimes preserved to a height of over 1 m (*Fig. 20*). In this retaining wall we observed frequent drainage holes, counting 25 in the most accessible parts, although many more must be hidden underneath heavy vegetation. These culverts, generally built in lintel fashion (*Fig. 21*), ensured stability to the construction on limestone bedrock and were spaced irregularly, according to need. Below the retaining wall on the eastern slope of Kondovouni we picked up a fragment of a terracotta drain (*Fig. 22*) which indicates that at least some of the culverts were fitted with terracotta outlets. The fact that the road was laid directly upon the exposed bedrock must mean that the limestone was as bare during the Mycenaean era as it is today. Therefore the vegetation on the limestone

[41] Runnels & van Andel (supra n. 3), esp. 325.
[42] See Steffen's map (supra n. 6).

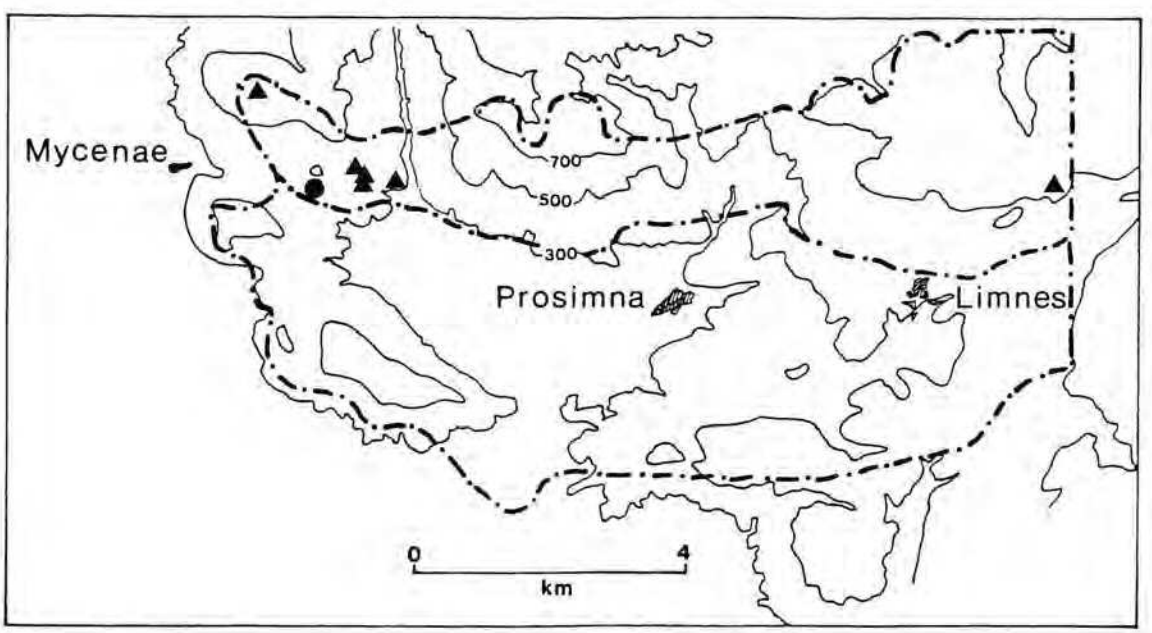

Fig. 18. Distribution map of Mycenaean standing monument and findspots.

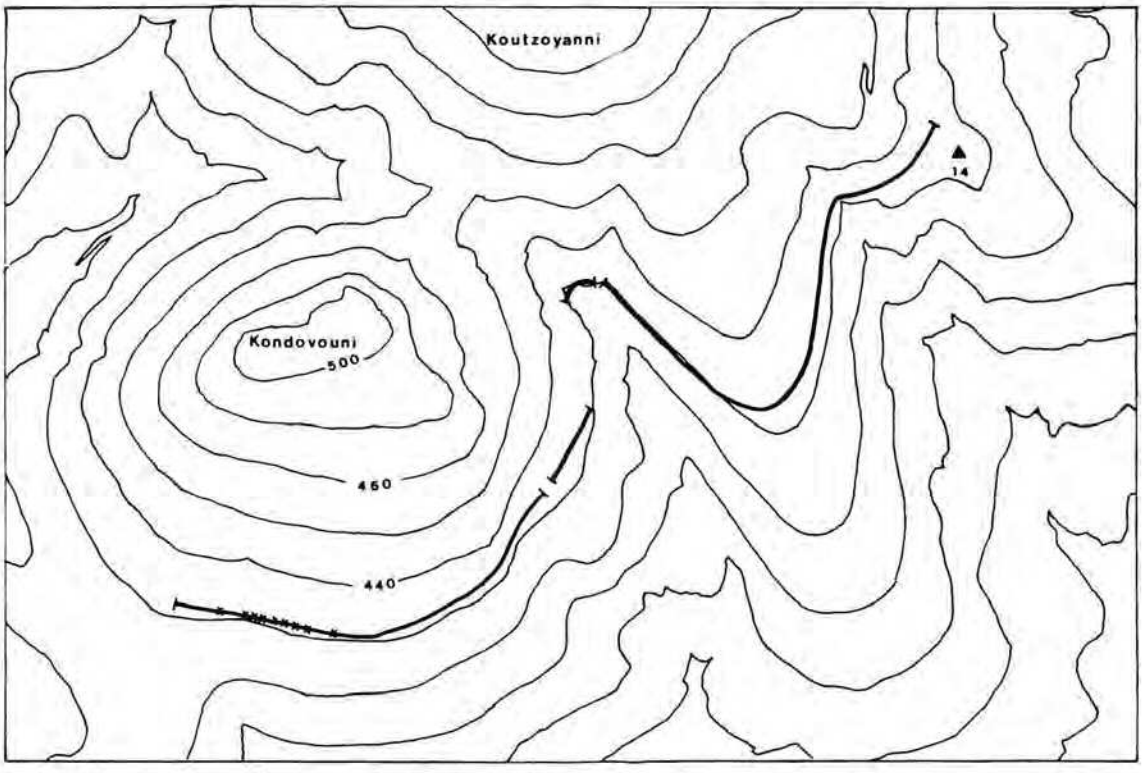

Fig. 19. Mycenaean road. Map of route.

Fig. 20. Mycenaean road bank on Kondovouni.

Fig. 21. Mycenaean road. Culverts on Kondovouni.

Fig. 22. Section of terracotta gutter found below a culvert of the Mycenaean road on Kondovouni, Standing Monument 2, Tracts 7 and 8, sample 4. Scale 1:2.

hills could not have been much different from today's maquis. The building material of the road is the local limestone, cut roughly into blocks of Cyclopean dimensions. In places the original wall has been reconstructed in modern times to buttress terraces cultivated with olives.

After the 700 m stretch of well preserved road, on the eastern slope of Kondovouni, erosion of the unstable marl has once again more or less obliterated the road. Recent bulldozing has speeded destruction in this part. Just before the double ravine between Kondovouni and Koutzoyanni (the eastern peak of Charvati) to the north, the road picks up again and traverses the heads of the ravines on two bridges, the easternmost being the one referred to as Lykotroupi (*Fig. 23*).[43] Thereafter the road climbs the southeastern spur of Koutzoyanni in a gentle gradient, following the contour first towards the southeast and then towards the northeast (a stretch still negotiable by jeep), all in all a distance of approximately 650 m, and then it hits another ravine, perhaps to be identified with what Mylonas called Kalogherikos Mylos.[44] A huge oleander bush here hides a third Cyclopean bridge, from which the road continues for another 150 m towards the northeast, disappearing just northwest of Findspot 14. Mylonas traced the road as far as the "Mill of Rizoyannis" which perhaps is to be identified with a recently collapsed modern structure in the area which we have designated Findspot 6.

Vegetation marks observed from the peak of Psili Rachi seem to support a hypothetical continuation of a road due north across the divide between the Argolid and the Corinthia towards the valley of Ayios Vasileios. This is Mylonas' contention formed during field work along the road in the early 60s. At a place called Mavroneri, where, as the name indicates there is a spring, he came upon archaeological remains which he identified as a Hellenistic guard post and, on a hill overlooking the pass connecting the Argolid with the Ayios Vasileios plain, a Mycenaean fort.[45] Can these remains be any other than the ancient remains noted and described by Wiseman as the Kephalari station to be dated in the 4th century BC?[46] It seems not. But this certainly does not exclude the possibility of a Mycenaean predecessor of a later route and Mylonas may therefore still be right in postulating a northerly direction for the Mycenaean road. Steffen, however, considered the descent much too steep and sought another practicable passage, adopting Lolling's theory of a continuance towards the village of Stephani and

[43] Mylonas (supra n. 6), fig. 79; Hope Simpson (supra n. 6), 15f., fig. 2. Hope Simpson refers to Kondovouni as Agrilovounaki as do Steffen and Mylonas.

[44] Mylonas (supra n. 6), 86.

[45] Mylonas went into the field to try to establish the mode of construction of the road but so far only a preliminary report of his work has appeared in his book, supra n. 6, 86–87.

[46] J.R. Wiseman, *The land of the ancient Corinthians* (SIMA 50), Göteborg 1978, 118–120.

Fig. 23. Mycenaean road. Second bridge east of Kondovouni.

Fig. 24. Mycenaean sherds, Findspot 20, Tract 94, sample 130. Scale 1:2.

Fig. 25. Mycenaean female figurine, Findspot 14, Tract 18, sample 26.

then a linking up with what to him was the Kontoporeia by Ayionori.[47]

Mycenaean activities in the northwestern survey area must have been closely linked to the road. Below the road to the SE, on an almost completely flat conglomerate spur overlooking the whole valley, a terraced area, 175–250 × 350 m, extending from 350 to 420 masl, was identified as another Mycenaean locus of activity, Findspot 14. All slopes around the site seem to have been bulldozed and much erosion has taken place which accounts for the wide scatter of the worn material. Only traces of rubble walls were observed, particularly in Tracts 19, 20, and 22. In Tract 20 the artifact counts were extremely high, decreasing towards the east and north. The nucleus of the activity area is thus fairly well defined. The artifactual evidence from Findspot 14 consists of a number of fragmentary figurines and sherds, which due to heavy erosion and long exposure on the surface are in poor condition.

Moving approximately 150 m down the same spur, Findspot 18 constitutes a concentration, 43 × 50 m large, of sherds, excellently preserved, on a small plateau of exposed marl with a steep scarp to the south. This scarp is 1.2 m high and does not represent *in situ* soil as it is unstratified and contains many Mycenaean and Geometric sherds mixed together. The quality of the surface material indicates that the area has been bulldozed. As the matrix was washed away the sherds stand out. Terracing is evident to the south, and these terraces were probably built in ancient times as old soil fills the interstices between the rocks. Dating of the terraces, however, was not possible.

East of Findspot 18 a 1 m deep and 1.5 m wide trench, filled with branches, and a wall built perpendicular to it against a marl outcrop attracted our attention. No artifacts were associated with the features. Continuing to the west we came upon comparable formations in the landscape but this time scatters of worn Mycenaean sherds lay on the surface. Sherd distribution, artificial features, and depressions filled with brushwood aroused our suspicion and the tentative interpretation of necropolis was given to the area of Findspots 18 and 16. They should be considered as parts of a whole. Fairly dense vegetation in patches bars further inspection and surface investigation alone cannot determine the function of the area.

A further 300 m down the slopes, Findspot 20 (see below) has been interpreted as a Geometric farmstead on almost completely exposed marl which has been bulldozed recently, exposing fresh Mycenaean material in its northernmost section (*Fig. 24*). Findspots 20 and 24 may well be one and the same locus of activity, completely reworked in recent time as is indicated by a scarp with about 3 m of unstratified deposits and abundant sherds.

Mylonas found no sites along the road,[48] but our survey does indeed show that they exist. It is our hypothesis that all the Mycenaean areas of activity here dealt with are closely interconnected. Findspot 14 was no doubt founded to service communication along the road and probably also to control the area militarily because of its commanding view of the landscape. Also, water was plentiful in the area. A spring is located only 50 m to the northwest of the site and yet another one lies to the north surrounded by cypresses. The tentative chamber tomb necropolis at Findspots 16 and 18 probably belongs to Findspot 14.

A word must be added about the date of the road. Mylonas found some LH IIIB sherds in his two trial trenches,[49] and, for other reasons, a date for the road in the latter half of the 13th century BC has been suggested.[50] The pottery and the figurines which we sampled in Findspot 14 tally with this date (*Fig. 25*).

Since all the marl, flysch, and alluvial fan surfaces seem to have been terraced at some point in the past without being actually used at the present, trying to date these terraces gained high priority during the course of the survey. What looked like overgrown terraces on the northern slopes of Kondovouni, as well as on the slopes facing them, on the southeastern spur of Charvati, attracted our attention. On the Charvati (*Fig. 7a*) there are two sets of terraces. The higher terraces (Tract 55) are found at an elevation of nearly 600 masl. Although thoroughly investigated, they were found to consist mainly of aligned bushes with no preserved terrace walls. Only on the margin of the field towards the boundary with the limestone bedrock were some walls kept in place. The boulder size of these walls is much larger (e.g. 57 × 32 × 25 cm) than that of the modern terraces around Limnes. These boulders could not be carried by one person alone. They are used for the support wall on the outside only; behind this row are smaller pebbles. At one place the terrace wall had tumbled down and revealed a scarp 30 cm deep behind it. All of the exposed soil belonged to an A-horizon and produced the impression that good soil was dumped behind the walls when the terraces were constructed. This could also explain why there are so many allogenic rocks (conglomerate, gabbro, stone tools) between the terraces. The fill, which was used to improve the soil, might have contained these exotic rocks, since they are not

[47] Steffen (supra n. 6), frontispiece map. What to Steffen and Lolling was the ancient Kontoporeia certainly was also the modern one until the new road between Prosimna and Ayionori via Limnes was built in 1967 (the year is given by Wiseman (supra n. 46), 123). However, Wiseman is of a different opinion, identifying the Kontoporeia of Ptolemaios Euergetes and Polybios with the road through the Ayios Vasileios pass by the Kephalari station, Wiseman (supra n. 46), 125. His main arguments for the more westerly route are the substantial archaeological remains and the spring, the latter of which seems not to be entirely decisive. Lolling noted, during his topographical investigations, two different springs along the road he prefers to call the Kontoporeia, a fact which Wiseman may not have taken into consideration, as he nowhere refers to Steffen's and Lolling's work. The dilemma may never be solved but the extension of the modern Kondoporeia is unequivocal. North of the village of modern Prosimna still stands the bridge (Standing Monument 1) which carried the road across the deep ravine. The bridge was allegedly built by the Turks, and across it Dramali took his troops in 1822, "Asterion" (supra n. 9), 26–29. Today the former highway is a mulepath and is marked as such on modern maps.

[48] Mylonas (supra n. 6), 87.

[49] Mylonas (supra n. 6), 87.

[50] J.M. Balcer, 'The Mycenaean dam at Tiryns', *AJA* 78, 1974, 141–149, esp. 148f.

present on the limestone; and similarly it might have contained the Mycenaean sherds that were picked up on the terraces. On the other hand, these sherds could have eroded down from the peak or they could have been dropped there by the users of the terraces. Thus, a Mycenaean date for the construction of the higher terraces is possible.

The lower terraces on Charvati also produced sherds of Mycenaean date. Several Archaic tile fragments were found but, as in the previous cases, the presence of these artifacts can be explained in a number of ways. In general the impression of terraces is only given by parallel aligned bushes which most often are not supported by walls. The same force which had stabilized the terraces to the present day has destroyed the original walls—the roots of the bushes support the soil but eventually force the rocks out. Terraces of three different generations were found on top of each other (BV-SP-04; *Fig. 26*).

The westernmost peak of Charvati is the Prophitis Elias above Mycenae. Here, at Findspot 5, an assortment of pottery was picked up, with some Mycenaean, Classical, and Late Medieval to Modern. Heavy masonry to the northeast, below the peak, is not unequivocally Cyclopean. Although a Classical date is possible, Wace's Mycenaean date cannot be ruled out. In the ruins of what he terms an outpost, he picked up LH III sherds and, in accordance with the signalling system so vividly described in Aeschylos' *Agamemnon*, 281–314, he reconstructed a signal post on the peak.[51] The Mycenaean sherds in our findspot sample certainly confirm Mycenaean activity on the peak.

In the mountainous Limnes district Mycenaean activity is limited to one single spot, Findspot 12, on the Kathili (*Fig. 13*), which appears to have been deserted since early in EH II. The hill overlooks a pass, likely to have been an important route of communication, and Findspot 12 may well have had a multiple function in Late Mycenaean, which is where it should be placed chronologically. Today's subsistence pattern suggests that a small community of shepherds could well have lived here in the Mycenaean period, tending their flocks,[52] or in this case we may well imagine a small garrison manifesting Mycenaean power and demonstrating military control of the area. Further, at all times people have taken to the hills in periods of unrest as is evidenced at Findspot 12 for more modern centuries (see below).

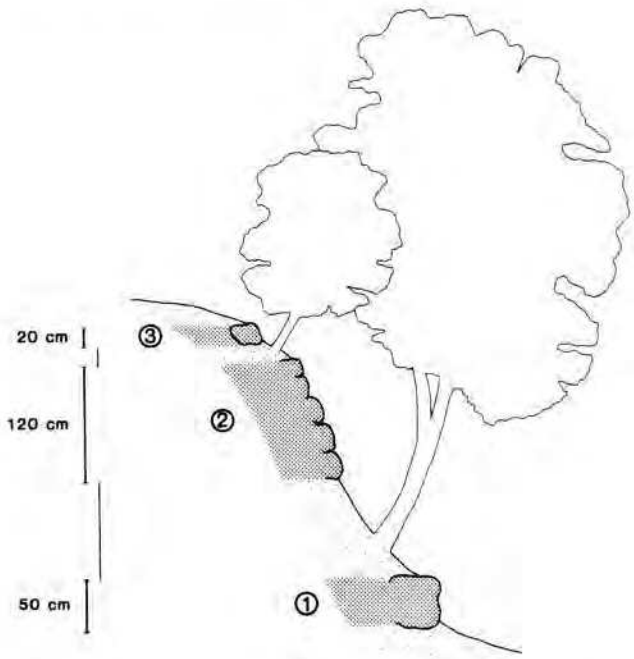

Fig. 26. Different terrace generations on the south slope of Charvati where many Archaic rooftiles were found.

THE GEOMETRIC AND ARCHAIC PERIODS

After LH IIIB there is a substantial hiatus in our archaeological record, down to Late Geometric, a situation which largely corresponds to our previous knowledge of the area. The total absence of Protogeometric material should be noted; on the other hand Middle Geometric pottery was found in the 1936 excavations in the Western Necropolis.[53] This state of affairs could very well be modified during our next field season but the impression of total desertion during the early Iron Age may well hold true. In the southern Argolid, after an extensive cultural gap, traces of occupation in the mid-9th century BC similarly inaugurate a phase of accelerating activities which are in full swing in the latter half of the 8th century.[54] This can be attributed to a marked increase in population during the 8th century BC, a phenomenon noted elsewhere in Greece.[55]

A shift of agricultural production onto marginal lands may be caused by an increase in population, whether or not this can be coupled with a growth of the citizen body, and thus also of the landowning class, as Morris postulates for

[51] A. Wace, *Mycenae*, Princeton 1949, 47, 112.

[52] H. Koster, 'The thousand year road', *Expedition* 19, 1976, 19–28.

[53] Berbati has so far been considered as one of the sites abandoned in LH IIIB, although destruction is not supported by the extant evidence (see e.g. J.T. Hooker, *Mycenaean Greece*, London & Edinburgh 1976, 150). In the Western Necropolis an MG I tomb had been dug down into Chamber Tomb III, Säflund (supra n. 13), 81–90.

[54] Van Andel, Runnels & Pope (supra n. 35), 117; van Andel & Runnels (supra n. 4), 101f.

[55] A. Foley, *The Argolid 800–600 B.C. An archaeological survey. Together with an index of sites from the Neolithic to the Roman period* (SIMA 80), Göteborg 1988, 46; A. Snodgrass, 'Two demographic notes', in *The Greek Renaissance of the eighth century B.C. Tradition and innovation. Proceedings of the Second International Symposium at the Swedish Institute in Athens, 1–5 June, 1981*, ed. R. Hägg (Skrifter utgivna av Svenska Institutet i Athen, 4°, 30), Stockholm 1983, 169–171, where Snodgrass defends his views on the population increase in Attica first presented in his *Archaeology and the rise of the Greek state*. (An inaugural lecture), Cambridge 1977, 10–13 in answer to which J. McK. Camp, in 'A drought in the late eighth century B.C.', *Hesperia* 48, 1979, 397–411 introduced his drought theory.

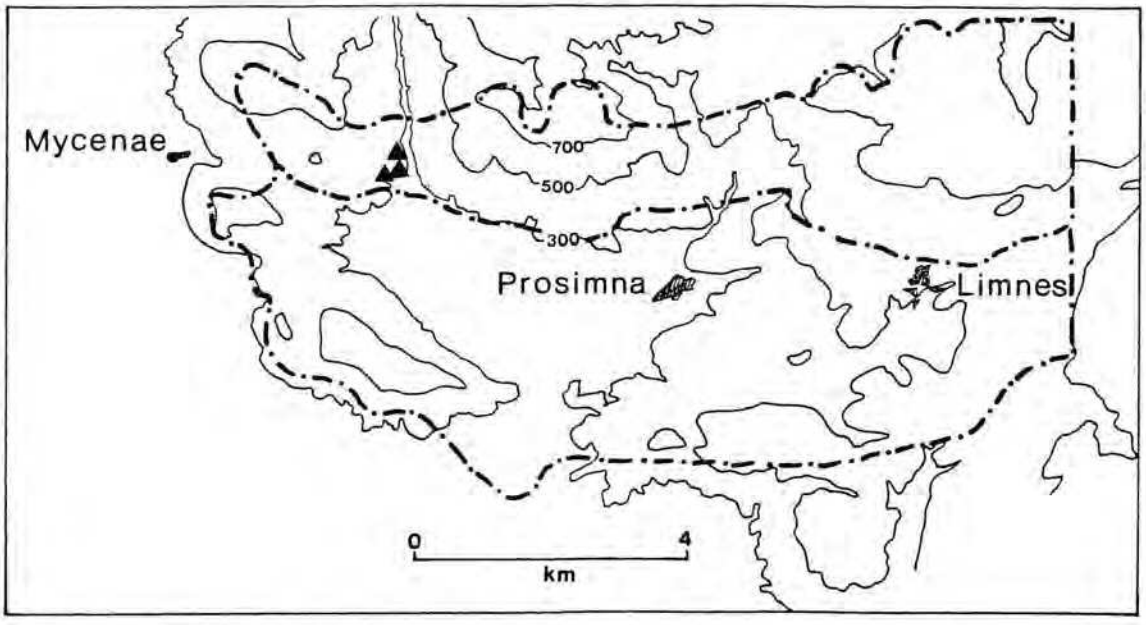

Fig. 27. Distribution map of Late Geometric/Archaic findspots.

Attica in the 8th century BC.[56] In the Berbati valley marginal lands *did* attract settlers at this time which can be illustrated by a pair of findspots (*Fig. 27*) in the northwestern sector of the Prosimna valley, Findspots 20 and 24. The two units lie approximately 125 m apart, Findspot 24 on the tip of a plateau buttressed on the southwest by once substantial walls of large, undressed, roughly hewn blocks. On the eastern side the gentler slope is terraced with less sturdy walls. Findspot 20 lies to the northeast on the edge of the same plateau, at the head of a ravine. Archaeological material in abundance has spilled down the slopes toward the ravines on both sides of the plateau, and this material, consisting mainly of pottery and tiles, is in fresh condition indicative of the fact that it has recently become exposed. There was no doubt in the field that we were investigating a newly bulldozed area, and it appears to us that Findspots 20 and 24 are part of the same nucleus of human activity. The terracing and buttressing of the plateau at Findspot 24 strongly suggest that this was the center of activity. A slab, 0.5 × 0.5 m, was lying on the plateau and another worked block, approximately 0.26 × 0.7 m, was found at Findspot 20 but the latter block had obviously been moved from its original position. This block was cut in a manner strongly suggestive of a technique employed in Classical times and should therefore be associated with pottery of Classical and later date which was present in a small quantity.

The buttress walls on the western side of the plateau at Findspot 24 are built in the same fashion as the Late Geometric fortification walls at Asine and this, together with the pottery, dates the beginning of our site to the second half of the eighth century BC.[57] Large numbers of tile fragments, both of Corinthian and Laconian type, and of pantile type as well as ridge- and cover-tile type, attest architecture of some substance at the findspot. Late Geometric I, Protocorinthian, 7th century, and Classical decorated pottery give the chronological framework within which people lived here (*Fig. 28*). Pieces of large pithoi and basins, and a loom-weight together with several spools (*Fig. 29*), indicate the kind of subsistence economy we may infer: agriculture and herding. The evidence in the Berbati valley with a new beginning in the 9th century BC may be compared with a similar development in Attica.[58]

There are some indications that the terraces a couple of hundred meters up the slope were utilized for other purposes at the same period. At Findspot 7 a narrow strip of archaeological material, 75 × 5 m, in an otherwise findless environment, was found beside a bedrock outcrop. The collected sample, besides the omnipresent Mycenaean sherds, includes some coarse Geometric and Archaic pottery, one fragment of a pithos, and one black-glaze sherd. We cannot verify that what we have in this findspot is a disturbed pithos burial, but the possibility that single burials are scattered over farm country must be considered.

In a newly bulldozed scarp below a tobacco field Archaic Corinthian tile fragments and sherds of the same date were noted during a geological field trip. All the material belongs to the same horizon (*Fig. 5*, 5). Into this had been sunk a cist-like structure with a large slab on top, sticking out of the scarp at its top end. Above the scarp, in the tobacco field,

[56] I. Morris, *Burial and ancient society. The rise of the Greek city-state*, Cambridge 1987, 175–177.

[57] B. Wells, 'Early Greek building sacrifices', in *Early Greek cult practice. Proceedings of the Fifth International Symposium at the Swedish Institute at Athens, 26–29 June, 1986*, ed. R. Hägg, N. Marinatos & G.C. Nordquist (Skrifter utgivna av Svenska Institutet i Athen 4°, 38), Stockholm 1988, 259–266; *eadem*, in a forthcoming study on the sanctuary of the Pythian Apollo at Asine.

[58] Cf. what Snodgrass (supra n. 55, Inaugural lecture), 15, calls the agricultural revolution in Attica in the mid-9th century BC.

Fig. 28. Late Geometric/Archaic sherds, Findspot 24, Tract 94, sample 137. Scale 1:2.

other slabs of large dimensions were found. Only excavation could confirm or refute our suspicion that the structure is a built cist tomb (Mauerkiste), of a type well documented in the Argolid.[59]

THE CLASSICAL AND HELLENISTIC PERIODS

A large portion of the material picked up on Classical and Hellenistic sites consists of rooftiles. Ordinary rooftiles have only recently started to attract scholarly attention for their own sake, but for Greece no comprehensive study has been conducted so far.[60] To place a Corinthian pan-tile fragment in a more precise chronological context in the field, was as a consequence often precarious. Therefore the ensuing remarks on tile material must be taken as preliminary, subject to future review.

Ubiquitous in the Prosimna valley are both Corinthian and Laconian pan-tile fragments. Generally, tiles were only counted, but many were sampled at various findspots in the hope of enabling us roughly to date the sites. That tiles in ancient times were reused seems natural in view of the fact that Corinthian tiles of probable Archaic manufacture are abundant on sites where later pottery is present. The large and unwieldy specimens, once manufactured, must have been reused as long as they were serviceable. Consequently tiles cannot always be employed as a reliable chronological denominator, and in Findspots 15, 17, 19, 21, 26, and 32 (*Fig. 30*) they are not diagnostic. Although often reused the Corinthian tiles may indicate Archaic activity in the areas where they were picked up, but Findspot 26 is the only site where there is any sherd material that can with confidence be assigned an Archaic date. Even so the main period of activity on the sites was in Classical and Roman times. The

Fig. 29. Spool with stamped leaf decoration, Tract 96, sample 152 (found below Findspot 20). Scale 1:2.

findspots listed above offer an interesting pattern of settlement distribution for the Classical period: a string of small Classical farmsteads at approximately 300 masl proceeding from west to east (*Fig. 8*: Findspots 26, 17, 19, 15, 21, 32). Findspot 32, north of the village of Prosimna, was assigned a findspot number after the end of the field season and thus was not sampled according to our established procedure. However, Corinthian and Laconian tiles of Archaic/Classical date had been observed during tract walking. The tiles attest durable architecture in the area.

[59] R. Hägg, *Die Gräber der Argolis. 1. Lage und Form der Gräber* (Boreas 7:1), Uppsala 1974, 129f.

[60] Cf. Ö. Wikander, 'Ancient roof-tiles—use and function', *OpAth* 17, 1988, 203–216.

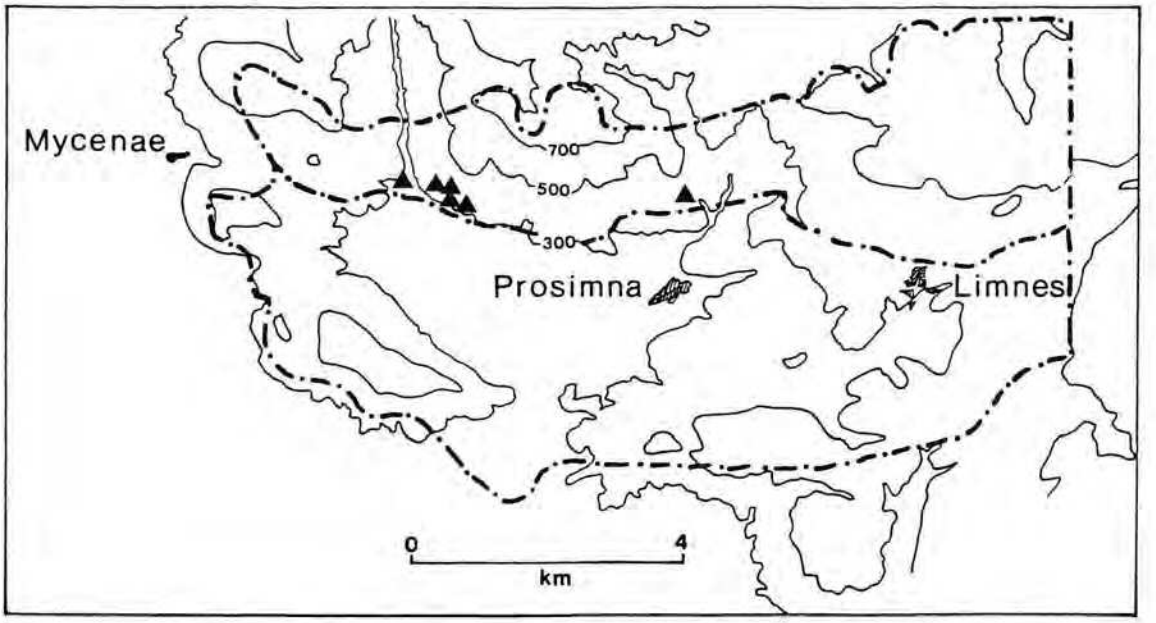

Fig. 30. Distribution map of Classical/Hellenistic findspots.

Fig. 31. Mould-made relief bowl, Findspot 26, Tract 98, sample 153. Scale 1:2.

Fig. 32. Sherd with a stamped E, Tract 81, sample 37 (found below Findspot 17). Scale 1:2.

Findspot 26 was located in a newly plowed olive grove on a slope gently terraced towards the Kephalari Rema. Heavy agricultural machinery had dispersed roughly squared blocks over an area of 51 × 31 m and exposed many pottery fragments. To the east, above the rema, an old terrace wall had recently been undermined through the bulldozing and the removal of soil from underneath it to create a tobacco field. Here a grinding slab of andesite with herring-bone pattern was picked up, datable to the Classical period. Mycenaean, Geometric, Archaic and Modern sherds in almost kiln-fresh condition were scattered in the field. Presumably they mirror long human activity on the spot. Above this tobacco field, Findspot 26 yielded a narrower range of material. Besides the ubiquitous worn Mycenaean pieces, Corinthian and Laconian tiles, fragments of large pithoi and basins, and Classical, Hellenistic, and Roman pottery, were found. A piece of the bottom of a mold-made relief bowl, formerly designated Megarian (*Fig. 31*), and several wheel-ridged Roman pieces were lying about.

East of the Kephalari Rema the remaining findspots are all located on the lower slopes of Katinopi. Architecture is the conspicuous feature of Findspot 17 which lies on a marl hillslope next to an alluvial fan. The soil on the marl seems to have been preserved but much of the area is bulldozed. A 15 m long wall of large cut limestone blocks with only one course preserved extends in an east-westerly direction. To the east, by a bedrock outcrop, lies a structure oriented north-south, with the western and nothern walls preserved. The one-course walls are bonded, with the western one preserved to a length of 7 m. Here conglomerate was used as building material. Sherds and tiles were classified as Archaic/Classical but the most readily datable pottery is no earlier than Classical. A fairly coarse rim sherd with a stamped E (*Fig. 32*) from the tract below may have

originated in Findspot 17 as the matrix of the site has clearly eroded down the slope. For the interpretation of the function of this site the upper stone of an andesite hopper quern of a type assignable to Archaic/Classical times is decisive.

Findspot 19 is characterized by the remains of a structure made of conglomerate blocks, which was built on a stable limestone surface, somewhat to the east of Findspot 17. The preserved architecture is similar to the towers found on Classical farmsteads. Large, roughly dressed blocks form a square, 5 × 5 m, with the northern wall continuing towards the west. Additional blocks lie scattered around the one course foundation. Only a few sherds and some tiles were observed and therefore dating is difficult. What could be securely placed chronologically was either Mycenaean or of post-Classical date such as a wheel-ridged Roman fragment, some Modern, a tile and a brick fragment. Seemingly one of the ancient walls, the western one, had been reconstructed in modern times.

Continuing towards the east, we soon encounter the last two findspots to be considered in this section, Findspots 15 and 21. Findspot 15 is located on an alluvial fan just north of the church of Ayios Dimitrios and constitutes a 185 × 61 m large concentration of tiles, sherds and stone tools. The earliest datable pottery is black-glaze but activity in the area continues into Roman times as evidenced by Roman coarse ware including amphora handles and a fragment of sawn *lapis lacedaemonius*. In a plowed field, 150 m to the east, a large amount of rooftiles and some sherds were assigned to Findspot 21. No structures were identified but conglomerate blocks of varying size and workmanship were lying around in the field. One block with a rectangular cutting could have served as a weight for a press-bed. The architectural fragments are associated with black-glaze pottery and therefore the remains can be plausibly referred to the Classical period. It is very likely that Findspots 15 and 21 are parts of the same unit.

Although remains of foundations were documented only in Findspots 17 and 19, all the loci inhabited in Classical times yielded architectural evidence, especially tiles. The limited extent of each findspot indicates small units of human activity where the archaeological material does not directly point to function. Querns on Findspots 17 and 26 manifest corn production, and the possible press-bed on Findspot 21 likewise indicates production of oil or wine. Therefore, we suggest that the Classical sites constitute small farmsteads scattered on the lower slopes of the mountains enclosing the valley. To judge from their placement in the landscape, the farmsteads were probably linked by a roadway in a manner similar to today's field road system. A similar expansion onto marginal land, with ensuing dispersal of sites, was observed in the southern Argolid in the 4th century BC.[61]

THE ROMAN PERIOD

A background scatter of Roman pottery on the slopes where the Classical farmsteads are located suggests utilization of the slopes in Roman times, although complete continuity cannot be demonstrated. Findspot 1 (*Fig. 33*) is a concentration of tiles, sherds, cement and limestone rubble, 50 × 25 m in extension, which constitutes a remnant of a relatively thick (*c.* 1 m) brown soil on marl bedrock; and ap-

[61] Van Andel, Runnels & Pope (supra n. 34), 117; and Runnels & van Andel (supra n. 3), 326.

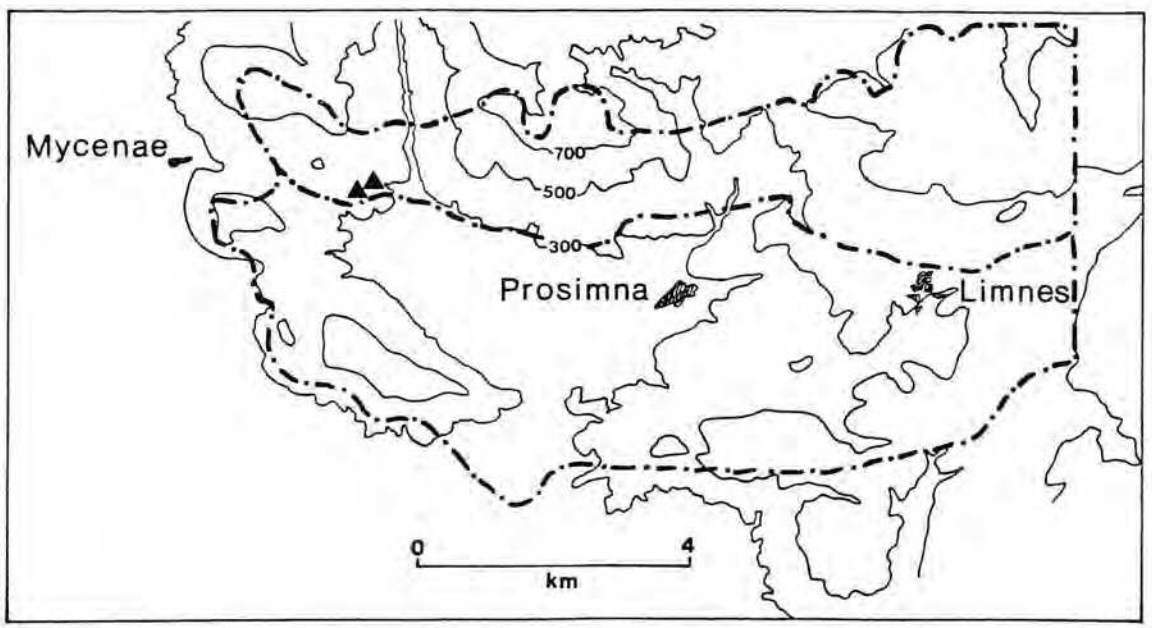

Fig. 33. Distribution map of Roman findspots.

Fig. 34. Late Roman sherds, Findspot 15, Tracts 77 and 79, sample 42. Scale 1:2.

proximately 350 m to the east Findspot 8 was registered as consisting of a worked marble drum with large limestone blocks lying about in the immediate vicinity.

It is as yet too early for any conclusions about the Roman period but it seems obvious that in Roman times people had generally moved onto the valley bottom where the bath is located, and cultivated only the lower fields on the slopes of the mountains (*Fig. 34*). This indicates that subsistence strategies may have changed decisively in late antiquity. Perhaps by then, large farms in the valley were supplemented by small dispersed special-function units such as Findspots 1 and 8.

THE LATE MEDIEVAL AND EARLY MODERN PERIODS

There are numerous findspot and tract finds from the Late Medieval and Early Modern periods in Berbati and Limnes (*Fig. 35*). In previous sections we have shown that the histories of the Berbati and Limnes basins are very different. No trace of occupation or use of the Limnes area was detected by the survey for the millennia that followed the Final Neolithic and Mycenaean periods. These last periods are attested in Limnes only in the Miyio valley. The Miyio valley and other parts of the Limnes area were not reinhabited until the 12th—13th centuries of the present era. After that time the Limnes area underwent an extraordinary transformation.

Today the area is covered with large well-made dry-stone agricultural terraces (*Fig. 36*). These terraces are found on every slope and reach the summits of the hills around Limnes to elevations of 800 and 900 masl. Ravines and gullies have check dams and terraces along their courses, no matter how narrow and steep. A similar degree of terracing is visible in the Berbati valley, and in part the two systems of terraces may be contemporary, but it is clear that there are many differences between them. The Berbati terraces are on marl, alluvial fans, and flysch, and the Limnes terraces are on the limestone only. The Limnes terraces are much larger, higher, and thicker than in Berbati and constructed using a distinctive technique: they have a double wall with rubble fill between the two faces. The faces are constructed with large boulders up to 40 cm in size; the fill consists of small pebbles of 10–20 cm. The maximum size of 40 cm for boulders means that one person alone could build these terraces. They are well maintained, there is no soil between the rocks, and there is no indication that the terraces are more than a few centuries old (*Fig. 37*).

In both areas some of the terraces are no longer in use, and they are dilapidated or overgrown. In the Berbati valley olives are found today on most of the terraces at lower elevations and the older terraces at higher elevations are being cleared by bulldozers to be planted in olives. The higher terraces were probably planted in wheat and barley in the recent past.[62] The terraces in Limnes were also possibly used for wheat and barley. Many of the terraced hillslopes are now overgrown but those terraces nearer the village, or in the bottoms of ravines where there is water, are cultivated with tobacco.

There are abandoned constructions that were used by pastoralists in the same area where there are terraces in Limnes and Berbati. Folds, milking pens, and huts for the herders cover many of the summits and slopes of the moun-

[62] "Asterion" (supra n. 9).

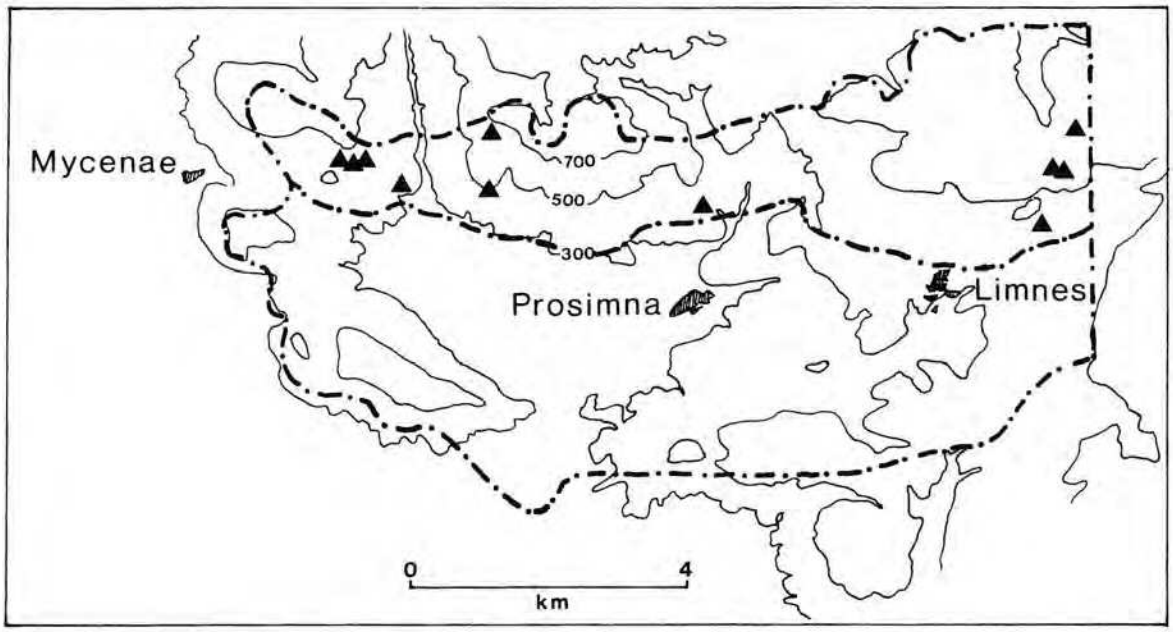

Fig. 35. Distribution map of Late Medieval and Early Modern findspots.

Fig. 36. Limnes area. Terraces and check dams by the road between Limnes and the Miyio valley.

Height [cm]	Width [cm]	Boulder size [cm]	Spacing [cm]
130	100	20–36	11.5
130	150	12–242	24.0
105	100	7–59	34.5
150	95		11.5
150	170		9.0
160	140		15.0

Fig. 37. Table with measurements from the terraces on limestone slopes around Limnes.

tains north of Limnes, for instance on Goupata and Viglatouri. The construction of those folds and huts is similar to the terraces and we believe that they are contemporary. Pastoralism was a significant economic activity in the Berbati-Limnes region until the early 20th century when attention shifted to tobacco as a cash crop.[63] A number of findspots with remains of folds and huts have Early Modern artifacts (Findspots 3, 4, 6, 24, and 30). Pastoralist sites on the slopes of Kondovouni and Katinopi were abandoned in this century.

In the Limnes area the earliest settlement is in the Miyio valley. The remains of an extensive village were found at Findspot 13 (*Fig. 38*). The village is called Katalima or Katalimni by local informants: its original name is forgotten. Foundations of some structures and at least two chapels were detected at the site, and the foundations of three other chapels (Findspots 9, 10, 11) were identified to the south along the road to Limnes. Large numbers of sherds were collected here along with evidence of pottery production (wasters) and iron production (fragment of a bloom or slag). The buildings of this village were pulled down and the materials were re-used for terraces that now cover the site. Some structural walls were incorporated into the terraces but it is not possible to recover a plan for the settlement.

Local informants say that the village was abandoned after the Greek War of Independence (1821–1832) when the inhabitants no longer had to seek refuge in the mountains from the Turks. We have not yet identified any 19th century wares among the sherds. The study of the pottery has only begun, but a preliminary inspection has identified wares of the 12th–14th centuries and some sherds may be earlier (*Fig. 39*).[64] Rooftiles and sherds similar to those found at

[63] "Asterion" (supra n. 9).

[64] These sherds have been dated in a preliminary manner by Margrete Hahn who will also publish the material.

Fig. 38. The Miyio valley by Limnes with Findspot 13, Katalima or Katalimni.

Fig. 39. 13th—14th century sherds, Findspot 13, Tract 48, sample 66.

Findspot 13 occur in tracts in the Miyio valley and on the slopes of Viglatouri to the west. Folds and huts on Goupata, Klaraki, and Viglatouri also produced similar materials. Our conclusion is that these huts and some of the terraces are in part contemporary with Findspot 13. The fact that terraces were built over Findspot 13 indicates that terrace building, presumably in the 19th and 20th centuries, occurred after the abandonment of the settlement. The use of this area for farming and grazing has continued to the present day.

The history of the Limnes region is closely tied to the history of the castle at Ayionori. As Andrews has noted, the history of that castle must itself be related to the history of Acrocorinth.[65] The castle at Ayionori was in existence by the late 13th or early 14th century when it is mentioned in the *Chronicle of the Morea* (line 1498). An analysis of the building techniques and the plan of the castle indicate to Bon that the fortress was constructed at the same time as the castle at Myloi,[66] but the first eyewitness report of Ayionori is by a 15th century Venetian traveller.[67]

The village at Findspot 13 was probably founded at the same time as the castle at Ayionori. The main settlement at this time was located on the site of the modern village of Ayionori on the slopes below the castle. The Medieval village is said to have had at one time 1000 houses and 40 churches.[68] It is likely that the nearby Miyio valley, and probably most of the Limnes area, was controlled by this castle which was strategically placed to command the passages from the Argive plain to the Corinthia along with many small feeder valleys. Miyio is a feeder valley that connects Ayionori to another major valley, the Megalo Rema, that runs east from Limnes. Findspot 13, like Findspot 12 in the Bronze Age, is so placed that it controls the head of Miyio valley at the point where it connects with the Megalo Rema.

The Medieval and Early Modern history of the Berbati valley is more problematical. Bon's map shows that there are no contemporary fortifications between Ayionori and Argos.[69] Bon does not believe that the Franks penetrated the more remote sectors of their realm; this was left to their successors after the middle of the 14th century, most notably the Venetians.[70] The short history of the Berbati valley published by the Prosimnian Society "Asterion" says that, "according to tradition", present day Prosimna was moved from the western part of the valley to its location in the northeast corner in the Frankish period.[71] They left the well-watered part of the valley to be "near to a forest" where residents could take refuge during unsettled times. In the Frankish period the village of Prosimna belonged to the Barony of Akova in Arkadia; in the 17th century it belonged to the Venetians in Nauplion and the Turks gained control of the area after 1715 when the village passed to the possession of the Vilaeti of Corinth. Our survey, confined as it was to the edge of the valley, produced no evidence for the recent history of the Berbati valley.

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[65] K. Andrews, *Castles of the Morea* (Gennadeion Monographs IV, American School of Classical Studies at Athens), Princeton 1953.

[66] A. Bon, *La Morée Franque* (BEFAR), Paris 1969. Cf. also W.E. McLeod, 'Kiveri and Thermisi', *Hesperia* 31, 1962, 378–392.

[67] Bon (supra n. 66), 483f.

[68] Bon (supra n. 66), 658–660.

[69] Bon (supra n. 66), plate 6.

[70] Bon (supra n. 66), 496; but cf. Andrews (supra n. 65), 8–10 and 135–145.

[71] "Asterion" (supra n. 9), 25f.

CONCLUSIONS

To turn to the questions with which we started at the beginning of the paper we have found some evidence to answer the first of these, which was whether Berbati was a completely independent unit or linked to greater powers. We have seen that in certain periods both Berbati and Limnes follow the same path as the great centers at Corinth and Argos. In the Mycenaean period the road and the settlements at Findspots 12 and 14 point to strong connections between our survey area and Mycenae. Another example that illustrates the connections between our area and outside powers is Findspot 13, which shows how the Limnes area was brought into the sphere of influence of Corinth in the Late Medieval period.

Regarding the interrelation of cultural activity and environment our study has led to new insights. The survey has shown that the location of sites, the preservation of monuments, the presence of sherds, and the past and present land use depend on the geological setting. Mycenaean sites, e.g. Findspots 12 and 14, were established on strategically important places where water and some good soil were present to sustain the local inhabitants. These findspots are on prominent places overseeing a large territory. The Mycenaean road is a good example showing that architectural remains are only preserved on solid limestone surfaces. Not a single construction was found on any of the other rock types. Softer rocks such as the marl and flysch which had been stripped of their soil had also lost their archaeological record. No sites were found on these exposed surfaces. All surfaces, including marl, flysch, and alluvial fans were terraced many centuries ago and thus utilized for agriculture. Only the barren limestone hills seem to have been unused until the onset of the Turkish occupation when they too were terraced and used. Whereas the soil quality and the topographic setting have determined the ancient site pattern, the Modern villages (Findspots 29 and 30) were established at remote and often hidden places with no arable land where water was present. The modern and well maintained terraces around Limnes cover almost every part of the limestone hills, which are, despite their remnants of very fertile soil, probably the most difficult and work-intensive fields for agriculture. The old terraces on alluvial fans and flysch in the Berbati valley, however, are not at all fully utilized.

It is a striking fact that the settlement pattern in Berbati and Limnes is very different. The geology in these two places has determined the economic uses. The Limnes area was inhabited only in certain periods, the Final Neolithic, the Mycenaean, and the Late Medieval to Modern. Although today there is a mixed economy with animals and tobacco, in the past pastoralism was the main activity. The folds and huts which belong to the Late Medieval and Modern periods are evidence for the role of pastoralism in the recent past. Pastoralism was probably also the purpose of the Mycenaean settlement at Findspot 12 because the limestone is unsuitable for extensive agriculture. While trade and control of communications were contributing factors, we believe pastoralism was the most important activity. Among the factors for placing a settlement here would be the control of the passes in order to regulate the movement of pastoralists to grazing grounds within their territory. The limestone in the Limnes area determined also the early prehistoric settlement pattern. The Final Neolithic and Early Helladic settlement at Findspot 12 must also have been concerned with trade and pastoralism.

Some periods are manifested only in the Berbati valley and not in the Limnes area: Middle Helladic, Late Geometric, Classical, Hellenistic, and Roman. This suggests that different economic and political forces governed the settlement patterns in those periods. Apparently in these periods settlement was concentrated in the lower Berbati valley because of the presence of good arable soils.

Absent in both areas are sites belonging to the Early Iron Age before the Late Geometric. This fact, if confirmed in future field work, could be interpreted as an indication that rural population was very low in the Early Iron Age.[72] The discovery of farmsteads founded in the Late Geometric and Archaic periods on the lower slopes of the Berbati valley may indicate an increase of population in that period.

Another question to be touched upon must be the causes of the low-density distribution of artifacts in our area. Large parts of the study area are devoid of cultural materials altogether. The patchy distribution and low density of non-site materials can be considered as a tool for interpreting the use of the landscape. The low-density artifact distributions may be attributed to one or more of the following causes. Low-density scatters may mark different activity locations. Such locations could include special-purpose sites, e.g. animal folds or fieldhouses, or they may be the result of non-site behavior, such as manuring of fields or dumping.[73] There may be natural or anthropogenic processes, chiefly erosion, that distribute artifacts over the surface or that obscure parts of the fossil cultural landscape under blankets of soil.[74] Recent human activities, especially the clearance of vegetation with bulldozers on steep hillsides to create new agricultural fields and terraces, may also be causes of artifact dispersal.

In Boeotia, in central Greece, where a team from Bradford and Cambridge has been conducting an intensive survey since 1979, there is a more or less continuous distri-

[72] Morris (supra n. 56) contests Snodgrass' ideas of population increase in the 8th century as well as Camp's drought theory (supra n. 55). Morris explains both the increase and decrease in grave numbers as a result of changing strategies within the burying group, illustrated graphically in fig. 16, p. 61. His contention is that after a long period of discrimination according to rank in EG-LG I, in LG II children and adults are again buried in the same cemeteries (Snodgrass' population increase); then in the Archaic period follows separation of children and adults (by Camp interpreted as a population decrease resulting from drought).

[73] P. Murray & P.N. Kardulias, 'A modern-site survey in the southern Argolid, Greece', *JFA* 13, 1986, 21–41.

[74] K. Pope & Tj.H. van Andel, 'Late quaternary alluvial and soil formation in the southern Argolid: its history, causes and archaeological implications', *Journal of Archaeological Science* 11, 1984, 281–306; van Andel, Runnels & Pope (supra n. 35).

bution of artifacts across the landscape.[75] This distribution is both continuous in space and uniform in density.[76] The low-density distribution encountered in Berbati-Limnes which is discontinuous and highly variable is much more like the distributions observed in Nemea and the southern Argolid.[77]

Manuring is thought to be the principal agent for the creation of an artifact "carpet" in Boeotia, although it is acknowledged that other agents such as geomorphological processes are also relevant.[78] Cherry and Davis, however, assign greater weight to a combination of agencies, both human and natural, to explain the low-density distribution in Nemea.[79] They credit past human behavior not associated with specific sites and geomorphological processes as the causes of this distribution. It is clear that insufficient research into the subject of low-density distributions has hampered our interpretations. It is our contention here that geomorphological processes are more likely to obscure than to create such scatters. In the southern Argolid four phases of soil erosion and deposition occurred in the last 8,000 years. Soils were stripped from the hillsides, often carrying away artifacts from the steeper slopes.[80] Erosional or depositional phases have been identified in the Argive plain and in the Berbati and Limnes basins.[81] Such slope instability is likely to destroy the remains of fossil cultural landscapes, and today when low-density distributions are found on hillslopes at elevations of 300 masl it is clear that they have not been removed by erosion but are only the remnants of once more extensive cultural landscapes. It seems to us that the safest course is to assume that low-density artifact distributions are the remains of past human activity. These activities include: land clearance and agriculture, pastoralism, dumping, manuring, and simple artifact loss. Despite the destructive geological processes, our survey has been able to recover much valuable information from these low-density distributions which in many cases are the only evidence we have of the use of the Berbati-Limnes region.

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[75] J. Bintliff & A. Snodgrass, 'Mediterranean survey and the city', *Antiquity* 62, 1988, 57–71; cf. also T. Gallant, "Background noise' and site definition: a contribution to survey methodology', *JFA* 13, 1986, 403–418.

[76] Cherry et al. (supra n. 4).

[77] M.H. Jameson, C. Runnels & Tj.H. van Andel, *A Greek countryside: the southern Argolid from prehistory to the modern day*, Stanford (in press).

[78] Bintliff & Snodgrass (supra n. 3).

[79] J.F. Cherry & J.L. Davis, 'High-density distributional archaeology: a Mediterranean perspective', unpublished paper presented at the 53rd Annual Meeting of the Society for American Archaeology, 27 April—1 May, 1988, Phoenix, Arizona.

[80] Van Andel, Runnels & Pope (supra n. 35).

[81] Finke (supra n. 18).