# Mycenaean Northeastern Kopais (MYNEKO): Annual Report, 2017

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## Contents

# 1 Summary

## 1.1 Introduction

The authors realized a program of digital mapping, stratigraphic excavation, scientific chronometry, and geomorphological sampling at two littoral sites and in the plain around the Late Helladic (L.H.) IIIB fortress of Glas (ca. 1300–1190 BCE) in the northwestern Kopaic Basin (Kopais), Boiotia, mainland Greece, between June 6 and July 16, 2017. The program marked the second year of their archaeological collaboration, titled "Mycenaean Northeastern Kopais" (MYNEKO), in which they act in their individual capacity as professional archaeologists. They share equally in setting research objectives and priorities, as co-principal investigators and field directors. In 2017, document ΥΠ.ΠΟ.Α / ΓΔΑΠΚ / ΔΙΠΚΑ / ΤΕΕΑΕ / 20185 / 890, issued to Dr. Kountouri by the Central Archaeological Council of H.M.C.S. legally authorized MYNEKO. Fieldwork was funded by the Institute for Aegean Prehistory (INSTAP), and a special program of scientific chronometry was funded by a grant to Dr. Lane from the U.S. National Science Foundation (N.S.F.).

## 1.2 Aims and Objectives

The aim of the official collaboration is to link Dr. Kountouri's prior research of the nature and extent of the L.H. III drainage system in the area with Dr. Lane's prior research of the evidence of a system of irrigated agricultural fields covering hundreds of hectares in the plain around Glas. In the L.H., the plain was a cultivable lakebed, drained by the hydraulic works that are the focus of Dr. Kountouri's research, and protected from floodwaters by a dike to the west that is some three kilometers long. That is to say that the plain was a 'polder' in the terminology of hydro-engineering. Hence one objective of MYNEKO is to determine if and how the drainage system was connected with the system of water management within the polder, one topic of Dr. Lane's research. Furthermore, Dr. Kountouri has in mind particularly to clarify the construction characteristics of the mechanisms that appear to have contained and directed the combined flow of the Melas and Kephissos rivers, as well as of the mechanisms that regulated their debouchment in the northeastern bay of the Kopais. Dr. Lane has in mind to clarify the nature and character of certain features in the polder that evidently constituted a network of levees and ditches of precise dimensions. He discovered the latter during the AROURA geophysical survey (2010–2014), a previous collaboration between U.M.B.C. and H.M.C.S., under the auspices of the American School of Classical Studies at Athens and funded by INSTAP. Lane and Kountouri furthermore want to understand more thoroughly the relationship of L.H. settlements on the shores of the Kopais to the drainage system and polder, as well as to the monumental palace-style residence and storehouses at Glas. They plan for MYNEKO to be a three-year (2016–2018) bridging project from their prior respective researches to a more comprehensive, integrated archaeology of L.H. political and economic landscapes in norther Boiotia.

## 1.3 Goals and Accomplishments

MYNEKO's goals in 2017 were to uncover in plan and section, at two locations in the plain, features corresponding to magnetic anomalies detected during AROURA and dated scientifically to the L.H., to date these features more accurately and precisely under controlled conditions, applying side-by-side radiocarbon, luminescence, and amino acid racemization anal-

yses, and to continue stratigraphic excavation of a few methodically selected loci at the ancient littoral settlement sites of Aghia Marina Pyrghos (A.M.P.) and Aghios Ioannis (A.I). The objectives of the latter undertaking were to determine the depth and integrity of deposits and the relative and absolute chronology of both sites, and to learn about these sites' administrative and economic relationship to the drainage system, the polder, and, by proxy, Glas. The co-principals have been largely successful in attaining their goals (results of certain scientific analyses still pending), and there is none that cannot be reached in a couple of weeks, if not actually a few days, of fieldwork in 2018. The major obstacles to completion of tasks in 2017 were the exigency of preventing further grave robbing at A.I. and unexpectedly deep anthropogenic deposition (over two meters) at A.M.P. The foci of fieldwork in 2018 will be limited geophysical survey of the interior of the settlements at both these sites, with an eye to future fieldwork projects, completion of previously proposed fieldwork between the field system and the polder dike, final stratigraphic investigation of the fortification wall at A.M.P., and mapping of the loci of operations at A.I.

### 1.4 Participants and Duties

Except for digital mapping, which Dr. Lane oversaw, field direction at Aghios Ioannis was divided between Dr. Kountouri, Dr. Efterpi Ralli of the National and Kapodistrian University of Athens (N.K.U.A.), and Dr. Konstantinos Theodoridis, L.H. pottery specialist and archaeologist with TAP A.G. Cultural Heritage, and. The crew at this site consisted principally of Greek investigators and field technicians. Dr. Lane directed fieldwork at Aghia Marina Pyrghos and in the polder. The trench supervisors to whom he delegated tasks and authority were Ms. Elizabeth A. Eastlake of the Gothenburg City Museum, Dr. Kyle A. Jazwa of Monmouth College, Mr. Damian V. Koropeckyj of U.M.B.C., and Dr. Laetitia Phialon, Swiss member of the French School at Athens. Mr. Daniel J. Fallu of Boston University and Dr. Nikolaos Zacharias participated in the N.S.F.-funded archaeological chronometry, taking soil and sediment samples and installing radiation dosimeters. Mr. Fallu also sampled for micromorphology. Dr. Lane floated the samples to separate their organic from their clastic constituents for the N.S.F.-funded analyses. Dr. Evi Margariti of the Cyprus Institute floated soil samples from A.I. Architectural drawings at A.I. were made by the architect Vasiliki Savvatianou, who was continuously present in the excavation, while the topographical maps and diagrams were compiled by Mr. Theodoros Chatzitheodorou. Mr. Kostas Xenikakis took aerial photographs of A.I., employing a small unmanned aerial vehicle ("drone"). Not least, twelve Greek undergraduate students from N.K.U.A. or the University of Crete and a total of nine American undergraduates from U.M.B.C. or the University of Virginia received fieldwork training during the six weeks of the program in 2017.

## 2 Methods

### 2.1 Digital Mapping

The project area was plotted in advance using geographic information systems (G.I.S.) (ArcMap). The Hellenic state's official Greek Geodetic Reference System 1987 (G.G.R.S.-87) coordinate–projection was employed. The project area comprises 2,134.26 hectares and consists of two adjoining grids of 30-meter sampling squares. One is that of AROURA, which is aligned with the modern field boundaries enclosed by National Road E-1 (= E-75) to the west, the current Melas River on the north, the scarp of Nisi and alluvial fan of Souvli on the east,

and Mt. Mytikas to the south. The other grid, joining the first to the northeast, near A.M.P., is aligned with the G.G.R.S.-87 cardinal directions. It is enclosed by two arbitrary north–south lines to the west and east (avoiding land claimed by the LARCO mining company) and by Mt. Profitis Ilias to the north (border with Fthiotidha Department) and the tableland of Nisi to the south. As needed, each 30-meter sampling square, originally designed for geophysical prospection and field walking, can be further divided into 225 two-meter squares, to which the basic excavation units ("test trenches") conform in plan. In this manner, particularly within the AROURA portion of the project area, previous surface collection and geophysical results can be compared with topographical precision to new excavation results.

The corner points of the test trenches for 2017 were determined in advance with ArcMap, using the sampling grids and various base maps, including the Hellenic Military Geographical Service (H.M.G.S.) 1-to-5,000-scale relief plan and Worldview-2 and Pléiades satellite data. Their G.G.R.S.-87 coordinates were then uploaded to the Javad Triumph-1 differential global navigation satellite system (D.G.N.S.S.) data recorder. The D.G.N.S.S. base station receiver was set up over the triangulation station on the summit of Glas' outcropping, whose longitude (*x*), latitude (*y*), and elevation (*z*) values, measured to the nearest centimeter, had been obtained from the H.M.G.S. The roving D.G.N.S.S. receiver could thus stake out points with an accuracy of less than three centimeters within a matter of seconds when radio communication between the receivers was clear. Adjustments to the north, south, east, or west in whole units of meters were made as needed using taut horizontal tape measures whenever a previously unnoticed obstacle to excavation had to be avoided or when an annex to an original trench was made. Annexes to the originally laid out test trenches were also staked out with this latter method. The *x, y,* and *z* values of the position of wooden stakes or steel rods marking a temporary benchmark (T.B.M.) near each test trench were also recorded to the nearest millimeter (where elevation was measured above the G.G.R.S.-87 ellipsoid height).

In the first of the six weeks of fieldwork in 2017, after the preceding year's plant growth had been cleared from trenches AMP-T1 and AMP-T2, their corners staked out again, and T.B.M.s established, the American–Swiss crew resumed mapping the Cyclopean fortification walls, interior walls, stone-lined cists, and other extant built features at A.M.P. These features were first cleared of overburden and surface vegetation with either hand tools or a gasoline-powered weed-whip. *X, y,* and *z* values of points along these and at their intersections were recorded to the nearest millimeter in G.G.R.S.-87. The point data were added to the GIS so that two-dimensional and three-dimensional maps of the features could be plotted and produced.

## 2.2 Excavation, Stratigraphy, and Finds

Excavation was conducted according to the "single context" method developed by Museum of London Archaeology and used at several sites in the Aegean (e.g. Corinth and Paliambela Toumba), and stratigraphy was recorded according to the method expounded by Harris in *The Principles of Archaeological Stratigraphy* and subsequent works. In accordance with these combined methods, archaeological deposits, as perceived in the field, are removed in the reverse order in which they were laid down. Hence fills are removed and recorded before their cuts, and separately recorded, and wall courses, such as repairs and rebuilding, are also

removed in reverse sequence and separately recorded. Each test trench at a site or in an area of investigation in the polder was given a sequential number, which was also the first numeral of the three-digit context numbers pertaining to it (expecting there to be no more than 100 separate contexts in a trench). The context number ending in double zero (00) after the leading trench identifier digit was supposed to represent the collection of finds from the surface of the excavation unit. Excavation proceeded with small pointing trowels most of the time, although occasionally hand picks or mattocks and mason's "triangle" tools were employed. To the surprise of the investigators, and reflecting the depth and complexity of deposition, the number of contexts in AMP-T2 ran from 200 through 299 from 2016 till before the 2017 season was finished. Thereafter, context numbers began again at 0 added to 2000, thus "2000," "2001," "2002," etc.

Artifacts and such environmental remains as shell and bone were recovered both during excavation and with a shaker-screen of half-centimeter aperture (supplemented with a 0.2-centimeter nylon mesh when recovering fragmentary human skeletal remains). They were cleaned, recorded, and stored by context number. Occasionally, intact or mostly intact finds whose particular place of deposition was deemed noteworthy were recorded together with a sequential "special small finds" number. Samples of building material, such as stucco and mud brick, were taken from certain contexts and recorded with a special catalogue number. Charcoal was handled and stored according to standard protocols for later radiocarbon dating. Human remains were recorded both as a context and on a separate forensic analysis form. Once thoroughly air dried, all finds were stored in perforated polythene bags in polyvinyl chloride (P.V.C.) crates in the second basement storerooms of the Archaeological Museum of Thebes, marked both on the exterior and on an interior Tyvek tag with all pertinent trench, context, and description information.

## 2.3 Micromorphology

Mr. Fallu removed a single section of the east scarp of AMP-T1 in 2017, in contrast with the four he removed from the same trench, not to mention those from other trenches, in the previous year. Its dimensions were 39 by 10 by 8 centimeters, and it weighed a little over three kilograms. He aimed to sample successive Middle Helladic (M.H.) fills and floors in the eastern half of the trench. The section was removed by careful incision into the scarp with a large Opinel knife, leaving a stratified section on a thin pedestal of sediment, then wrapping the exposed surfaces with plastered bandages. Once the plastered had hardened, the samples were cut away and then stored in the basement of the Archaeological Museum of Thebes, awaiting impregnation with acryloid resin in order to be thin-sectioned for examination under a microscope for stratified deposits and sedimentary inclusions difficult or impossible to see in the field with the naked eye.

## 2.4 Phosphate Sampling

Dr. Lane also followed a procedure for testing the levels of phosphates in sediments, an indicator of a degree of animal metabolic activity, devised by Ms. Sarah Radinsky (B.A., Biological Sciences, UMBC). It involved taking samples from archaeological contexts, as well as, to control, samples from around the root mass of the dominant holm oak (*Quercus ilex*) specimens on the summit of A.M.P. and from the leaves of these trees. The samples between 200 and 300 milliliters by volume, enough for one analysis and a back-up, and stored in glass

jars to await processing. Analysis is to be done using in the MYNEKO field laboratory using the Environmental Concepts 1662 Professional Soil Test Kit. A total of 15 samples was taken, seven from archaeological contexts and four of each type of control.

### 2.5 N.S.F.-sponsored Scientific Chronometry

In addition to the routine collection of material for accelerator mass spectrometry (A.M.S.) radiocarbon analysis from excavations (see 4.2.1 and 4.2.3), a systematic program of side-by-side A.M.S. radiocarbon, optically and thermally stimulated luminescence (O.S.L./T.L.), and amino acid racemization (A.A.R.) dating techniques were applied to horizons and features in the plain. Two locales were chosen for this operation, trench O2-T2, first opened in 2016 and re-opened in 2017 for this purpose, and D1-T1, the cleaned profile of a modern irrigation ditch that dissects an L.H. hydro-engineering feature known at the "Revetted Canal," which runs from the eastern end of Glas toward a sinkhole to the south and appears to have served both to bring fresh water to Glas and divert floodwaters out of the canalized rivers to the north. Blocks of soil approximately ten by ten by ten centimeters (1,000 $cm^3$) were removed from locations in each of several soil horizons at each locus and, in the case of O2-T2, the feature corresponding to a circa 800-meter-long north–south magnetic anomaly. These blocks were meant to provide sufficient sediment for both A.M.S. and O.S.L. dates of each horizon or feature, and sufficient shell, particularly of freshwater gastropods of the genus *Lymnaea,* for relevant T.L. and A.A.R. dates. The blocks were removed with a clean trowel or Opinel knife and stored in clean polythene bags with a label outside and on an interior Tyvek tag, waiting for subsequent flotation. Separate O.S.L. control samples were taken with 20-centimeter-long steel pipes driven with a mallet into the scarp at the location of each horizon or feature. O.S.L. dosimeters were inserted at the end of each of the resulting hollows for removal six months later.

Meanwhile, the blocks of soil were floated in a tabletop tank in which the fine fraction was separated from the coarse with a two-millimeter Nylon mesh. The fine was divided into sub-samples for radiocarbon and O.S.L. analyses, while the coarse was further washed with de-ionized water, and the shell in it was sorted first by size and then by identifiable taxon, the larger pieces identified with *Lymnaea* reserved for A.A.R. analysis and the smaller for T.L. analysis. Pieces smaller than one centimeter in any dimension were generally discarded as too small to be useful. The separate subsamples were packaged in self-sealing polythene bags with a label on the exterior and on an inserted Tyvek tag. Soil samples for radiocarbon were wrapped in aluminum foil before being placed in the bag. These samples will be exported to appropriate laboratories when relevant permits have been obtained, as expected, in late 2017 or early 2018.

## 3 Digital Mapping

### 3.1 Aghios Ioannis (see Figure 1)

The only features completely mapped at AI in 2017 were the ramp ascending from the ancient channel emptying into the Spitia Sinkhole and a newly discovered segment of eastern fortification Wall A. The project's geologist Dr. Leonidas Gouliotis had discovered the ramp in the summer of 2016. While it is difficult to detect in several places where it traverses bedrock, it

is conspicuous in many others because of the rows of boulder-built revetment along the outcroppings that bear a close resemblance to the Cyclopean circuit fortification. The ramp also terminates at a gate of circa three-meter aperture, the dimension of A.M.P.'s principal gate and, as it happens, the Lion Gate at Mycenae, whose upright jambs are extant. (Glas' four gates, like Tiryns', are about five meters wide—not including the jamb bases.) The ramp thus enters the outer enceinte on the east side of the peninsula about 100 meters due south of the present church of St. George (possibly formerly of St. John, viz. Aghios Ioannis; see MYNEKO 2016 annual report). The location of the ramp indicates that the Late Helladic settlement could be approached from the lake's basin, whether by navigation of the streams or on foot or by vehicle on reinforced paths on the claimed land. The presence of the ramp further supports reconstructing the northeastern bay of the Kopais as having been thoroughly drained through reinforced channels in the Late Helladic, as opposed to having merely been a sump for the diverted Melas' and Kephissos' waters.

### 3.2 Aghia Marina Pyrghos (see Figure 2)

The first week of fieldwork at AMP was mainly devoted to staking out trenches, reestablishing benchmarks, and mapping extant walls, cist graves, and other stone features. Knowledge of the extent and configuration of Walls A, B, C, F, and I, initially recorded in 2016, was improved and expanded, and more walls, running mainly north to south interior to the inner enceinte, labeled P, Q, R, S, T, and AD, as well as features U, V, W, and X were discovered. Without the full extent of construction having yet been mapped, the area roughly enclosed by Walls F (south), C (north), Y (west), and T (east) approaches 14,000 square meters (1.4 hectares, or 3.5 acres), more of the apparent lower enceinte within Wall I is included. This already puts the citadel in the same order of magnitude (11,500–16,500 $m^2$) as Iklaina in Messenia and Midea in the Argolid. One interesting observation is that Wall F of the inner enceinte appears both to have bastions and to be battered in its lower courses (see Figure 2 and Figure 3).

Moreover, four cist graves, all evidently robbed out, were mapped on the southern slopes of the hill, outside of Wall F. These are to be added to those prefixed E and G in 2016 as surface evidence of Middle–Late Helladic cemeteries. (E and G are to be re-designated Su for 'summit' and Sa for 'saddle,' while the graves on the slope are to be prefixed 'Sl.') Some of the newly discovered graves may be demarcated as a cemetery with a low precinct wall. The three clusters of graves may represent family or sodality plots.

## 4 Excavation, Stratigraphy, and Finds

### 4.1 Aghios Ioannis [*Dr. Elena Kountouri*]

As has been already noted, the peninsula of Aghios Ioannis is located very close to the sinkholes in the northeastern bay of the former lakebed. It is the middle one of three adjacent and low rocky hills that penetrate, in the shape of a peninsula, into the territory of erstwhile Lake Kopais. The terrain of the hill, which is generally flat, ascends from south to north and from west to east and forms three low rocky outcrops: one at the southwestern edge, where traces of M.H. and L.H. habitations have been found, and two respectively in the middle and at the northern edge of the north side, which appear to have been used for burials during the M.H. period (Figure 4; cf. Figure 1).

### 4.1.1 Trenches on the Southern End of the Plateau (Residential Sector)

The western segment of the fortification wall lies along the southwest ridge, rising on average to a height of 1.20 meters. The excavation in 2016 of trench AI-T6 along the inner face of the defensive circuit wall brought to light a transverse wall joined with it. There are rectangular buttresses approximately every three meters along its southern (inner) face, a feature also attested in the inner enceinte of the acropolis of Glas, four kilometers distant. Three new trenches (AI-T9, AI-T10, and AI-T11) were excavated along its southern side in 2017, in order to understand further the function of the transverse wall. Trench AI-T12, situated at the center of the southwestern low ridge of the hill, approximately 10 meters north of the transverse wall and 9.50 meters east of the "Western House" was also excavated. Finally, exploration of trench AI-T3–5–7–8 in the southwestern part of the lower southern ridge of the hill, opened during 2016, in which said Western House was discovered, continued this year (Figure 5).

*Trench AI-T9*. This trench is located at the western end of the transverse wall and measures 1.20 by 2.40 meters in area and 1.00 meters. in depth. It extends along the southern side of the transverse wall where the wall joins the western section of the fortification enclosure. After cleaning the trench, part of the surface layer (called context **900**), which was 0.42 meters thick, was carefully removed. Context **900** consisted of coarse brown soil that contained roots and sporadic shells. It was observed that the type of the soil found between the first and the second row of the transverse wall's foundation was distinct, and it was therefore named context **901**. Its consistence became harder, texture more clayey, and color whiter. At a depth of 0.35 meters the top of a stone deposit appeared, which measured 1.80 by 0.70 meters in extent and reached a depth of 0.65 meters. It consisted of medium and large coarse stones and contained a large number of shell fragments in comparison with other strata. The stone feature, which was recorded as context **903**, lay between contexts **902** and **904**. The two latter layers appeared to continue the soil matrix of **901**, but they were given different numbering because of the intervention of **903** and to the slight change in the soil's color and texture (light brown and harder than the overlying layer). Contexts **902** and **904**, after the removal of the stone feature **903**, were succeeded by another sedimentary layer, context **905**. Within contexts **901**, **903**, **904**, and **905**, bone and several pottery fragments were found. Finally, at a depth of 0.87 meters, in the east end of the trench (0.92 meters from the west side), the sedimentary characteristics seemed gradually to change and finally gave way to a hard stratum of mud brick (**906**) of whiter shade than the overlying layer (**905**). This stratum was solid, except for some evidence of penetrating bioturbation. The trench was investigated up to a depth of one meter, and it is now certain that the transverse wall joins with the fortification enclosure and, consequently, that it was built at the same time.

*Trench AI-T10*. The trench, measuring 3.30 by 2.20 meters, was opened along the southern side of the transverse wall, right between the westernmost two buttress walls. The investigation of the trench aimed further to clarify the relation between these three masonry features. The upper level of the stones was visible even before removing the topsoil. The depth of the trench was continued to 0.25 meters below the T.B.M. After removing the topsoil from the surface of the trench, the south façade of the transverse wall, as well as the eastern façade of the northwest and the western façade of the northeast buttress walls, were carefully cleaned. A large number of small and medium-size sea shells was collected. The soil had a

light brown to grayish color and contained small and medium-size stones, roots, and plant bulbs. After the removal of the topsoil, a second group of stones came to light, which seemed to form the foundation of the transverse wall and its buttresses. This structure began at a depth of 0.43 meters and descended to a depth of 0.53 meters. Although the color of the soil remained the same, its consistence was much harder, and so it was named context **1002**. Pottery was collected in similar amounts to that collected in the overlying strata, and a few bones and sea shells were also found. Soil layer **1003** was off-white, clayey, and difficult to excavate. It contained small shells and crushed bones. The natural bedrock was revealed below stratum **1003**, and it can be clearly seen on the eastern side of the trench.

The excavation of a sondage along the northwestern edge T10 (1.20 m north–south by 0.70 m east–west) brought to light skeletal remains of a large animal (Figure 6). They were found underneath a deposit of stones which did not seem to be natural. The fact that the bone material was found *in situ* and seemed to continue towards the east led to the decision to extend the sondage 1.80 meters to the north and 1.15 meters to the west. A balk was left unexcavated along the northeastern side of the trench. The bone remains were found at a distance of 0.45 meters from the northwestern edge and at a depth ranging from 0.88 meters to 1.04 meters below the T.B.M. The skeleton, probably of an equine, is in a pit formed on the rocky soil, under the L.H. component and within an M.H. layer. This discovery complicates the stratigraphy and deserves further consideration. Results from the study of the skeletal material by the zooarchaeologist Angelos Hatzikoumis of the University of Sheffield are awaited. A group of conservators from the Directorate of Conservation of Ancient and Modern Monuments of H.M.C.S. worked for twelve consecutive hours to remove the skeleton by mechanical means. After the safe removal of the skeleton it was ascertained that it had been placed directly on the natural bedrock. It seems that an attempt was made to level the surface of the rock by using stones. Finally, at a distance of 0.10 meters from the northeast buttress wall, parallel to its western side and at the same level as the animal bones, a semicircular stone structure was found at a depth between 0.90 meters and 1.06 meters below the T.B.M.

*Trench AI-T11 (eastern buttress wall).* This was the shallow excavation trench of small area (0.80 by 2.00 m). Investigation consisted of surface cleaning of the eastern one of the three cross walls that function as buttresses that abut the transverse wall. These structures were identified during the previous excavation season.

*Trench AI-T12 (segment of a wall).* This was an excavation of small area (1.50 by 1.50 m) and of shallow depth (0.40 m). It is centrally located on a low mound in the southwestern part of the hill's summit, 10 meters north of the transverse wall (T10 and T11) and 9.50 meters east of the Western House (T3–5–7–8). Part of a wall (0.65 m thick) also seems to be oriented from west to east. The wall seems to converge eastwards, towards the transverse wall. For the time being, the investigators are not in a position to determine whether transverse wall is part of a large-scale building project or if it simply functions as an inner enceinte wall, or even as a way to organize residential or circulation zones.

*Trench AI-T3-5-7-8 (Western House).* Trench T3–5–7, which was investigated in 2016, was extended 2.00 meters towards east (Figure 7). The topsoil layer **801** in trench AI-T8 is clayey, and it contains roots, small stones, and a substantial amount of pottery, just as the surface stratum of trenches AI-T3, T5, and T7 had in 2016. The sedimentary matrix of underlying

layer **802** differs in color and texture, being off-white and clayey, comprising small stones and roots. It contains fragments of decomposed mud brick too, probably resulting from the collapse of a building superstructure. Furthermore, the rest of the Wall 2, which was identified in T7 in 2016, was revealed once again in context **802**. The wall's end was most probably uncovered at a distance of 0.35 meters from the eastern edge of the trench. When Wall 2, which runs from west to east across the trench, was fully uncovered, the trench was separated into two parts, the northern underlying context named **803** and the southern **804**. At the same time, two new walls came to light—Wall 1, close to the northern edge of the trench, and Wall 3, parallel to the southern edge—which delimit the interior of a building. The investigation of the trench continued with the removal of a six-centimeter-thick layer of scattered mud bricks from the western half of the southern sector of the trench, which was designated context **805**. The pottery from Walls 1, 2, and 3 was collected separately for dating purposes. An important find was the fragment of a Furumark Shape (F.S.) 69 amphora with scroll decoration (cf. Mountjoy 1986: 140, fig.171), as well as shards of Group B deep bowls. The amphora was found in context **805** by the northern façade of Wall 2 and provides a *terminus post quem* of the abandonment of the building in the L.H. IIIC Early. During 2016, a sondage (AI-TA), of dimensions 0.60 by 1.20 meters, was investigated within trench AI-T7. A large slab that covered almost the whole area of the trench was found along with some other smaller stones on the western side of the trench on the last day of the excavation campaign. Unfortunately for timely excavation, the slab disappeared into the eastern scarp of T3 and under Wall 2. Therefore, it was impossible to complete its excavation before the end of the season. Further investigation commenced in 2017. The cover slab indicated that this was a grave. Therefore, it had to be distinguished stratigraphically, and so it was named context **814.** During the removal of the earth and the collection of pottery from this context this year, several M.H. potsherds were identified, which made it necessary to name the filling layer **815**. Context **815** consisted of dark-brown sediment. It was compact and difficult to remove, and it contained a few bones and marine shells.

The investigation of the tomb ended with context **818** which consisted of a layer of black soil without shells. Shortly before the end of the last year's excavation season, a group of late M.H. – Early L.H. pottery was found below the foundation level of Wall 2. It was deposited close to the wall's exposed western end within context **702** and consisted of five cups and a "feeding bottle" with painted decoration (Figure 8). Taking into account all of the above, we may assume that the M.H. grave was found during the construction of the Wall 2 in the L.H. IIIB. The grave goods were removed from the tomb and then placed under the stone slab. The southern part of trench AI-T8, which presumably coincides with the forecourt of the building, exhibits great variation in stratigraphic sequence, due to the sloping ground, that corresponds to successive chronological phases. The strata of coarse texture found below stratum **801** (30 cm thick) consisted of decomposed mud bricks and sediment, and they date to the L.H. (**804**) and the M.H. (**816,** 0.20 m thick, and **817**, 0.10 m thick) period, respectively.

### 4.1.2 Burial Cluster I

This group of graves is situated at the southern edge of the upper plateau on the summit of the hill. It comprises of at least six cist graves, four of which have already been examined, while the other two bear traces of illicit excavation. The graves are made of local limestone slabs placed along the sides of a rectangular pit dug into the solid ground. They are relatively

large in size, oriented variously, and they are placed one next to the other. The remaining two graves were investigated this season.

*Tomb I-3*. This is a large cist grave. It is located in the center of the cluster and consists of a rectangular pit (1.20 by 2.10 m, 0.85 m deep) dug into the ground and lined on each long side, north and south with two limestone slabs oriented from west to east. There was no slab or other structure to close the west side of the pit, there were several concentrated, though partially disturbed stones at the east end, perhaps fragments of a slab or pillar, which need further investigation, especially in connection with Grave I-2 (excavated in 2016) and the narrow space between them.

No cover slab was found *in situ*. Initially, only part of the north and the south side was visible. Only after the removal of the surface stratum soil, which was brown and contains small and medium-sized stones, modern waste and grass mat, were both sides of the grave, as well as part of the eastern stone feature, fully uncovered. The rest of the eastern side was fully revealed after the removal of the surface fill, to the east of the grave, outside of it. It has not been possible to identify the west end, as it had been removed by looters. In stratum **002** (0.03 cm below grade), the soil was only slightly more compact than at the surface. Within it, pottery fragments were found that probably date to the late M.H. period.

The last stratum investigated within the grave was **004**, since the underlying one was associated with an earlier period. It had a brown color and was solid and compact due to the large accumulation of stone rubble. It seems that this sediment was used to fill the cavities on the natural rock and form a level floor. The archaeological finds were mainly shells and bones, which were also found in all the layers except for layer **005**, where bones were very few. A few shells and obsidian flakes were also collected.

*Grave I-4*. This is the northernmost cist grave so far discovered. It consists of a rectangular pit (1.00 by 1.90 m, 0.95 m deep) delineated by three limestone slabs, two on the long west side and one on the short north one. At the southern end of the grave was no slab or structure. The eastern side was formed by a stone construction preserved to a short height (0.55 m). It seems that floor of the grave consisted of compressed earth. The existence of an earlier residential phase on the site is indicated by the fact that part of a wall was found just below the level of the tomb. No cover slab was found, and the interior of the grave was filled with stones mainly of medium size (0.15–0.30m).

### 4.1.3 Burial Cluster II

This group of graves is situated at the northern edge of the hill, west of its lower outcrop. It comprises of at least six cist graves, three of which are surrounded by a stone enclosure and two of which are covered by a low tumulus. They all consist of a rectangular pit dug into the ground and lined with limestone slabs. They are of a relatively small size, varying in orientation and spaced fairly far apart. All these graves were investigated in 2017.

*Tomb II-1*. This is located in the center of the cluster. It belongs to the cist grave type consisting of a small rectangular pit (0.75 by 1.40 m, 0.65 m deep) and three limestone lining slabs, one along each narrow side (north and south) and one along the east side. The western side is formed by a stone construction preserved in a height of 0.35 meters. The rocky natural

ground was used as floor for the burial, although several pebbles were found under the skulls. No covering slab was found.

*Trench AI-T13*. This is an excavation of large dimensions (4.50 by 5.10 m), ranging in depth from 0.30 to 0.85 meters and reaching bedrock. It is located west of the northern edge of the hill's upper plateau and 35 meters northwest of the aforementioned church of St. George on the summit. It comprises the western burial group of Cluster II. Its western flank seems to have slipped down the hillside. The structure comprises large upright limestone boulders planted in the ground, and it encloses a small grave (Grave II-5), oriented from east to west, and two larger graves (Grave II-3 and Grave II-6), oriented from north to south. The space between the graves is filled with crushed stones of medium (0.15–0.30 m) and large (0.30–0.55 m) size (Figure 9). Cover slabs were found only in Grave II-5.

*Grave II-2 and Grave II-4*. These were covered with a small circular tumulus. The tumulus, which was 4.50 m in diameter and stood between 0.30 and 0.65 meters above the rocky surface, was undertaken. The tumulus is located west of the northern edge of the hill's upper plateau and 30 meters northwest of the church of St. George. It is the southernmost burial group of Cluster II discovered to date. It is a structure made of large blocks of limestone set in a circular arrangement on the solid ground. It encloses a small grave (Grave II-2) and a large cist grave (Grave II-4). As in T13, the space between the graves is filled with rubble of medium to large size. The cist graves did not have cover slabs.

### 4.1.3 General Remarks

A few brief remarks should be made in an attempt to present a synthesis of the available data up till now. Part of a house with stone foundation and mud-brick superstructure was revealed right under the L.H. phase in the western section of the south plateau on the hill of Aghios Ioannis. The pottery from the site, which Dr. Kalliopi Sarri will study, includes mainly coarse and semi-coarse cooking wares, which, based on a preliminary assessment, date to the end of M.H. and the beginning of L.H. period. Beneath the clayey floor of the building, a child burial was found inside a cist grave, reflecting a practice that was very common in mainland until the end of the M.H., with many parallels in Boiotia. The dating of the residential remains to the transition from the M.H. to the early L.H. period coincides with the chronology of the graves that are located in the central and northern plateau of the hill.

Clusters of graves, which occasionally are surrounded by a stone built enclosure and covered by a low tumulus, are found in the middle and northern parts of the peninsula. The graves belong to the typical M.H. stone-lined cist type, with varying orientation and small variations in construction. They are built of limestone slabs, one on each side of the rectangular pit dug into the ground. Outside the graves, unworked stones were placed either at the four corners of the pit or along the long sides to support the slabs. The covering of the graves consisted of one or two limestone slabs. The natural rock formed the floor of the grave on which the burial was deposited. In certain cases, pebbles or rubble was deposited as a pillow for the head of the deceased. The smaller graves are almost square in shape and have a length of approximately one meter. The larger graves are rectangular and oblong, and their length exceeds two meters. It is possible that the size of the graves is related with their chronology, an assumption which remains to be tested.

The burials, at least those found *in situ,* were individual. The bodies were placed in a contracted position on the left side with their hands in front of the chest. The finds are few and limited to pottery vessels and small objects, such as spindle whorls. The circular burial enclosures, as well as tumuli, follow the tradition of the circular burial architecture represented in the Peloponnese, as well as in parts of Fthiotidha (e.g. Androna near Ghlyfa) which neighbor the Kopais. However, there is no parallel to the rectangular burial enclosure, which may have been dictated by the quality of the soil in combination with the burial space available to each family. During the last days of this year's excavation the stratigraphic sequence was examined on the middle and higher outcrop of the hill, which suggests the existence of M.H. II residential occupation at the site. This is based on the pottery found as well as on the remains of walls that were revealed under the floor of Grave I-3 and, especially, Grave I-4.

## 4.2 Aghia Marina Pyrghos

### 4.2.1 AMP-T1 (see Figure 10)

Excavation resumed in Trench 1 in 2017. At the end of 2016's fieldwork season, the excavators had reached construction fills immediately below the level of three graves, Cists α–γ, probably representing an M.H. III–L.H. I children's cemetery on the remains of an abandoned section of an M.H. settlement. Further exploration brought the profile down in places to bedrock and clarified the stratigraphic relationship of the graves to the earlier settlement. Description and discussion of the stratigraphy are most easily managed by treating separately, but in sequence, the fills in which the children's graves discovered in 2016 were found, the buildings and floors into which these fills were deposited, the apparent shoring up of these buildings before the insertion of the graves, and then synthesis of the several phases.

Context **149** appeared to be a lime-plaster floor to the east of Wall M, the topmost preserved course of which was exposed in 2016 (Figure 11). Atop this course, covered with thin layers of silty fill, was empty Cist ß. The surface to the west of Wall M, corresponding nearly in stratification and elevation, was designated **150**. It is, however, grayer (10YR7/2) than **149** and included some large limestone gravel, which **149** did not. Layer **149** lies within the right angle formed by Wall M and a freshly exposed wall course to the south, designated Wall Y, parallel to but offset and separate from Wall K that was discovered in 2016. Hence the layer could represent a floor interior to the house upon which Cist Grave γ was laid, not counting the evident subsequent bioturbation. Context **150** may represent another carefully selected fill, like **146**, **147**, and **148** above it, between Wall M and Wall O to the west, into which cut **128** was made for Cist Grave α. That is, **150** is between the building represented by corner M–Y and that represented by Wall O to the west (or its underlying predecessor). Context **149** had a basal shard of a burnished polychrome vessel in it that may date to the M.H. III – L.H. I period. It also contained several pieces of charcoal that may be used to date the material

Immediately below this phase of construction is a series of layers on each side of Wall M, conveniently called "fills" because of their characteristic relationship to the walls they seal. Those below conjectured floor **149** were different from those opposite it, to the west of M–Y, to a certain depth, while those below **150**, on each side of cut **128**, opposite **149**, resemble each other—again to a point. Explication is clearest if one proceeds from bottom to top. Layer **170**, below **149**, consists of a light yellowish brown (10YR6/4) silt loam with inclusions of large limestone gravel and reddish clayey material, possibly burnt mud brick. It also included

a few charred seeds, evidently of pulses (*Vicia* sp.?). The matrix looks like a largely inorganic fill into which were swept up the burnt remains of a previous habitation phase. Opposite it, albeit up to 30 cm higher in elevation, were two patchy layers, **161** and **164**, overlapped by fills around Cist α's cut, **128**. The former was a brown (10YR4/3–5/4) silt loam containing chert debitage and a shard of burnished polychrome ware exhibiting a black spiral, while the latter is a darker brown (7.5YR3/3) silt loam, also containing pottery consistent with the M.H. III – L.H. I transition, as well as reddish clayey fragments, apparently burnt material like that found in **170**. Both contexts contained small fragments of non-human bone. Thus destruction debris seems to have been piled up not only beneath presumed floor **149** but also in the narrow passage to the north of Cist α, suggesting the possibility that the surface under **150** was meant to be kept a clearer passage between the building enclosing **149** and whatever buildings may lie beneath Wall K. What lies right above these appears to represent the last phase of deliberate preparation before surfaces **149** and **150** were laid down. Throughout the trench, on all sides of the extant walls, at an elevation of between 166.7 and 166.8 m, is a pale brown (10YR6/3) silt loam or silty clay loam containing flecks of unburnt building material and limestone gravel (contexts **160** = **162** = **163**). A large fragment of *Spondylus* shell was also recovered from **160**, the level on the east side of the trench. To the east of Wall M, the conjectural building interior, were two intervening lenses of probable root turbation (**154** and **155**), while to the west, presumably exterior, is a layer of brown (10YR4/3) silt loam on either side of cut **128**. This contained small potsherds, possibly refuse dumped outside. Immediately above it was another relatively clean light brownish gray (10YR6/2) silt loam layer, a subsurface for **150**, into which **128** was cut. The successive layers from **149** downward were sampled from the eastern scarp for microstratigraphy, as well as for phosphate testing.

What lay deeper down seems to confirm the interpretation developed so far. Starting again the east side of the trench, one finds a batch of white (10YR8/1) surface, plausibly a plastered floor (**175**) interior to the angle Wall M forms with Wall Y. Similarly, to the west, but only south of Cist α, one finds a hard, white plaster surface (**173**) containing flecks of mud brick and charcoal. Of considerable importance to the architectural history of the Middle to Late Helladic settlement on the northern slope of AMP, the southern edge of **173** had been cut cleanly through, beside and beneath Wall K, and **175** had likewise been cut through along the eastern, hypothetically interior edge of Wall M. Both cuts descend to bedrock ("**188**" and "**G**" in Figure 10; see also Figure 12) and contained successive fills. Toward the top, these fills were mainly dark grayish brown (10YR4/2) and alternated with deposits of burnt and unburnt limestone, small potsherds, flecks of charcoal, burnt seeds (apparently pulses), and small fragments of non-human bone. The bottom fills were more sterile, consist of a light yellowish (10YR6/4) or brownish gray (10YR6/2) silt loam layer above a distinctly dark (10YR3/3) soft silty one (sequences **174**–**176**–**177**–**181**–**182**–**187** and **178**–**179**–**186**, respectively in Figure 4).The floors into which these filled cuts were made, **173** and **175**, as well as their equivalent to the north of Cist α, layer **132** (discovered in 2016) and layer **164**, all seal Wall M and Wall O, which therefore must antedate them. By the end of the 2017 season, two further layers were uncovered below floor **175**—**189**, which may be the remains of an earlier white (10YR8/1) stucco floor, and **190**, the yellowish brown (10YR5/4) fill containing building debris below it.

Working forward through time now (backward through the stratigraphy), the following architectural history may plausibly be constructed from the contexts uncovered so far. A Middle Helladic settlement (at or before the M.H. II–III transition), perhaps the earliest on the hill, was built on this edge of the summit, within, apparently, a retaining wall and with stone socles that extended down to bedrock. It should be recalled that Wall K was shown to contain a shard of gray burnished "Minyan" ribbed bowl dated tentatively to the M.H. II Final to M.H. III, which provides a *terminus ante quem* for any underlying construction. At some point thereafter, though long enough for more than one floor to have been paved, this side of the settlement, at least, suffered a catastrophe that resulted in burning and the destabilization of the ground—an earthquake being the obvious inference—such that the house wall foundations had to be shored up, the partially burnt building debris providing a convenient fill. A layer of similar debris was laid down on top of the destroyed house floors and a new working surface prepared. At some point thereafter, the surfaces were levelled again with selected fills, although there is no evidence of unevenness or instability of the underlying floors, and yet another floor or, at least, working surface was laid. Then there was some infilling in the southwestern quarter of the trench, perhaps eliminating the previous passage between Wall M and Wall O, which accomplished the sealing of the basal course of Wall K, presumably a later structure to the south. Shortly afterward, the first burial, Cist Grave ß, was inserted in the house presumed to be represented by the intersection of M with O, and Cist γ was installed atop the remains of Wall M, whose upper courses, probably of mud brick, appear to have been torn down. The interior of the house, as well as the space between M and O, were then carefully filled in, and Cist Grave α was inserted into the latter. The *t.a.q.* for any contexts beneath Cist α is now provided by two radiocarbon dates (Beta-470885 and Beta 470886)—viz, 95.4% probability of 1751–1619 calibrated BC. This is consistent in both the high and low Aegean chronologies with the earliest Middle Helladic settlement at AMP dating to the M.H. II, particularly the latter part of it. The stratigraphy of overlying contexts is covered in 2016's report.

### 4.2.2 AMP-T3

In the fifth week of the excavation season in 2017, a new trench was opened to the north (per grid orientation) of AMP-T1. It was designated "T3." Its dimensions were 1.5 meters by 2.0 meters, with a 0.50-meter balk between it and the northern scarp of T1. Its aims were to reveal the construction phases of fortification Wall C and the relationship of north–south Walls M and O to it. AMP-T3 is one of two test trenches, together with AMP-T4, whose excavation will be continued intensively in the summer of 2018.

Five contexts were defined in 2017. Context **300** was a "dummy" context, standing in for the surface collection never taken because of material turned up onto T3's grid square from T1. Contexts **301** and **302** represent topsoil, a soft silt loam ranging in color from brown (10YR4/3) above and pale brown (10YR6/3) below, which contained some 300 potsherds of various periods, evidently washed up against Wall C along the trench's north edge, a phenomenon observed also in T1. In **302** particularly were also some rounded river pebbles and flecks of stucco and mud brick, as well as traces of bioturbation, indicating the weathered and possibly displaced remains of the last construction phase on the summit. Context **303** directly underlay **302** and may represent the last largely intact ancient deposit, where just

the uppermost ruins of intersecting walls appear about 10 centimeters below the ground surface. It contained somewhat less pottery than either of the overlying layers, just 60 pieces, but it did contain some chipped chert debitage and a conical terracotta spindle whorl (small find no. 01), the latter located toward the bottom of the northeastern corner of the layer. The decorated pottery was mainly consistent with Late Helladic IIIC Early/Middle, including what may be fragments of cups or deep bowls (one with running spirals and a flaring rim). There was also body and rim shard whose paste and color are like that of the monochrome deep bowl found in 2016 in AMP-T2 in a likely coeval layer, although in the present instance having straighter sides. Context **304** was a lens of white (10YR8/1) lime stucco in the southwestern corner, sealing one small potsherd and some flecks of charcoal. It likely represents *in situ* collapse of an abandoned building adjacent to the trench. It lay immediately above an alignment of stones that could represent Wall M or its successor. Beneath both **303** and **304**, then, was a gray (10YR5/1) layer containing not only 103 pieces of pottery, again mostly consistent with L.H. IIIC date, but also 43 pieces of chipped stone, including a brown chert denticulate and a fragment of a gray chert (or flint) core (small finds no. 02 and no. 03, respectively). The former is a candidate for the first specific piece of evidence of non-elite economies obtained so far at AMP, since it could have been one of a series of blades inserted into a sickle (Figure 13). By the end of the excavation season, stone alignments were becoming distinct in plan, that in the southeastern corner corresponding in plan to Wall M, that in the northeast to fortification Wall C, and that in the northwest to perhaps a wall yet to be named, parallel to M.

### 4.2.3 AMP-T2 (see Figure 14)

Trench 2 was the other trench whose excavation was resumed in 2017. Superficially, its stratigraphy is more complicated than that of AMP-T1. This appears to be the case because there are more contexts, a total of 109 versus 91. However, the great majority of these defined in both 2016 and 2017 campaigns represented separate, fragmentary elements of a building that had collapsed during and after a catastrophic fire inside it, probably around the beginning of the L.H. IIIB2. Nonetheless, excavations in 2017 did clarify a major stratigraphic relationship—namely that Walls A, J, L, and N all belong to the later, probably L.H. IIIB–C building, while the walls of the earlier L.H. IIIB building, though on the same alignment as those above, are located differently and fully underlie them. Details follow.

Excavation resumed essentially with context **244** (see Figure14), which was defined at the end of the season in 2016. This was a thick pink (5YR7/3), slightly hard silt-loamy layer, in which was embedded a considerable quantity of potsherds, mainly datable to the L.H. IIIB (n=96), non-human bone fragments (n=90), and chunks of stucco and mud brick. Its continuation is essentially to be found in **257**, since **255** was the collection of residual artifacts from the exposed trench bottom at the beginning of work in 2017. It had been construed tentatively as the ground floor of the L.H. IIIB building. It now seems more likely that **244** represents the collapse of wall or even ceiling plaster and stucco onto vessels and animal remains on an upper floor, given not only underlying discoveries but also such overlying contexts as **236**, which appears quite clearly to be a large section of mudbrick wall collapsed onto a surface, the western "leading" edge of which betrays some of the same pink surface treatment (i.e. the plaster peeled away in places first and then the mud-brick wall that still bore part of it collapsed). The first few overlapping series of contexts below **244/257** consisted mostly of spills

of material typical of stuccoed and plastered mud brick in a post-and-beam construction. Contexts **258**, **260**, **268**, and **287** were mud brick spills. Contexts **282** and **283** were spills of stucco, while **262** consisted of chunks of mud brick coated with stucco and facing plaster. Contexts **266** and **281** were ashy concentrations, and **291** looks much like the outline of a fallen burnt timber. Context **289** combined features, being a mix of stucco and mud brick spill with ashy patches at the interface with underlying surface **2005**, the latter possibly traces of joists or floor planks. Other contexts, such as **288** and **296**, may represent a combination of upper-story and lower-story elements, consisting as they do of small stones mixed with other building material. Context **262** contained remains of a Group A deep bowl of L.H. IIIB date (Figure 15), presumably fallen from above.

In contrast, the next several series of overlapping contexts—basically those below **250**, **258**, **266**, **268**, and **296**—consist mainly of tumbled stone (**273**, **275**, **284**, **288**, **299**, **2000**, **2002**, and **2003**), some so aligned as obviously to be fallen wall courses. These came down on a soft, very ashy (10YR4/2 dark grayish brown) layer **292** containing a small quantity of mainly L.H. IIIB potsherds (n=14), which was succeeded by a similarly colored soft ashy layer **2005**, although this one revealed horizontally platy sandy lenses on which horizontal shards of pottery lay, some distinctively of L.H. IIIB2 date. This context also yielded what was probably the least expected find in 2017, a burnt perforated ivory rosette of circa three-centimeter diameter, which is virtually identical to one found in the Lamiospito Tholos Tomb at Dimini some 200 kilometers overland to the north (Figure 16), whose construction is generally dated to the L.H. IIIA2 (ca. 1400 BCE) and which was last used in the L.H. IIIB2 (the last few decades of the 13th century). It could be what is left of an inlaid piece of furniture of more perishable material. Hence **2005** was taken as the very degraded remains of the ground floor of the L.H. IIIB building. It and some of the stone spill contexts described above sealed the *in situ* courses of Wall Z (**2008**–**286**–**293**–**294**) and Wall AA (**2006**–**276**–**277**–**295**). A sedimentary layer **2001** sealing the latter contained a Group B deep bowl dated distinctly to the L.H. IIIB2 (Figure 17, which may have worked its way down from overlying contexts.

At the end of the prior, 2016 campaign it had been assumed that Wall A and Wall J belonged both to the L.H. IIIB and L.H. IIIB–C building, but that Wall L and Wall N belonged only to an L.H. IIIB–C "shoring up" phase. A builder's trench **226** for Wall L had been discovered, and its fills indicated that Wall L was subsequent to Walls A and J. It was conjectured that Wall N, which was aligned parallel with L but on the opposite side of J, also possessed a builder's trench that had gone undetected because of the tumble of sedimentary contexts (layers and lenses of decomposed building material) that sealed the walls. Support for this conjecture was found in 2017 in the form of a stacked mud-brick plinth (or tall socle) directly beneath Wall N (Figure 18), which suggested a closely fit builder's trench packed to a certain level with mud brick before the first stone course was laid. It also suggests that the ruins below were especially unstable at this point, perhaps containing little stone or consolidated material. The jumble of contexts sealing Wall L and Wall N contained material dated provisionally to the L.H. IIIB. However, as work proceeded in 2017, it became clear that Walls A, J, L, and N were all sunk into the remains of an earlier building, Wall A in fact sitting atop burnt upper-story remains, and that for this very reason their lower courses sit in demonstrably earlier material. They may could even all sit in trenches of some depth or other. Furthermore, Wall AA, uncovered in 2017, clearly runs perpendicular to and underneath

Wall A, which would be impossible without an expansive open basement (a purely hypothetical possibility, given what we know of Mycenaean engineering). Moreover, the datable pottery now splits neatly into two groups, that in layer **224** and above, which is characteristically L.H. IIIC, and that in contexts **230**, **232**, **240**, and below, which is characteristically L.H. IIIB, especially IIIB2. Hence the L.H. IIIB–C building was built on the same orientation as its predecessor but not directly on its foundations.

Radiocarbon dates obtained from charcoal sampled in 2016 give a likely *terminus post quem* for the conflagration that destroyed the earlier building evident in AMP-T2 as approximately the classic mid-13th century L.H. IIIB1–2 transition. Charcoal from context **230** has a 78.9 percent chance of dating to the period from 1310 to 1157 calibrated BC and a 64.6 percent chance of dating to the period 1295 to 1209 calibrated BC; and charcoal from context **244** has a 94.3 percent chance of dating to 1297 to 1112 calibrated BC and a 46.6 percent chance1260 to 1190 calibrated BC (2σ = 68.2% chance of 1260 to 1130 cal. BC).

### 4.2.4 AMP-T4

Like AMP-T3, AMP-T4 was opened in the fifth week of fieldwork in 2017. It was located in the two-meter grid square unit immediately to the (grid) north of T2's western two-meter unit, and its dimensions are 1.5 by 2.0 meters, leaving a 0.5-meter baulk between it and T2. The purpose of the test trench was to expose more of Wall A in plan and the contexts to each side of it, as well as to reveal more clearly its relationship with underlying Wall AA.

Eleven contexts were defined in 2017: **400**–**410**. Context **400** was another dummy context, standing in for the surface collection, just as **300** did in T3. Layers **401** and **402** represent the disturbed topsoil, a silt loam ranging in color from dark grayish brown (10YR4/2) above to brown (10YR4/3) below and in consistence from loose to soft. Layer **401** contained 86 potsherds of various periods, among other finds, while **402** yielded 328, some of which were identifiable as belonging to the L.H. IIIB or C (e.g. deep bowls and collar-neck jars). Among the other finds in **401** was a very small fragment of ceramic stapled with lead. Context **402** also contained large limestone gravel and small cobbles, suggesting an equivalence with **202** in Trench 2, nicknamed "rocky pot" for its major contents. As in T2, this lower topsoil layer seems to have accumulated eroded ceramic and small fragments of building debris. The next underlying context, **403**, is the first subsoil layer sealing intact architectural ruins. It was a distinctly mottled (ca. 30% 10YR6/3) dark yellowish brown (10YR3/4) soft silt loam containing larger or smaller fragments of stucco and mud brick, as well as of shell. It contained considerably less pottery than the topsoil (n=28), but what decorated elements could be identified belonged to the L.H. IIIB–C. It sealed the uppermost extant course of what would prove a wall, named "Wall AC" ("AB" having been given already to a stone feature in T2 of dubious architectural integrity = **2007**). Wall AC runs parallel to Wall A and stood about 50 centimeters to the west of it. The gap between Wall A, represented so far by **409** and **410** in Trench 4, and Wall J (discovered in T2), was about 100 centimeters, suggesting that the three walls (AC, A, and J) were not in a regular series that would support a Cyclopean terrace; besides, the space is on the narrow end of the range for terraces, and characteristic large upright boulders were conspicuously absent. However, it soon became clear that the break in slope to the west of T2 was better attributed to Wall AC that to Wall A. Since the space between AC

and A is rather narrow for a corridor, it could yet prove to be the case that AC and A together represent a single bulwark of the inner enceinte of L.H. IIIB–C A.M.P.

Context **404** was the first layer (or "fill") between Wall AC (**405**–**406**) and Wall A (**409**–**410**). It was a distinctly mottled (ca. 30%10YR4/2) layer of soft, brown (10YR5/3) silt loam. It contained red and white fragments of burnt building material. It yielded a large quantity of pottery (n=152), an amorphous piece of lead and likewise of bronze, 48 shell fragments, and 64 pieces of non-human bone. The potsherds are small, but some can be dated to the L.H. IIIB–C broadly. One might wonder about the origin of so much organic detritus in so constricted a space. It could have fallen from a now missing upper floor. Contexts **208** and **224** contained considerable amounts of bone and could also represent collapsed upper stories of the L.H. IIIB–C building (cf. **244** in the L.H. IIIB building). Context **407** was a spill of mixed stucco and small stones that lay atop the first intact course (**409**) of Wall A in T4 (also suggesting an erstwhile upper story). Layer **408** lay directly beneath **404**, between AC and A. It was a light gray (10YR7/1) soft silty clay, distinctly mottled (ca. 30% 10YR5/3 brown), and it included pieces of building material. It contained relatively few finds (e.g. 16 potsherds and five bone fragments), though it did yield a painted bovid figurine (small find no. 01 in this trench; Figure 19). Furthermore, embedded in a chunk of stucco were two large pieces of charcoal (possibly from timbers), from which it is hoped a firm *terminus post quem* for the construction of the provisionally dated L.H. IIIB–C building can be obtained by 2018. Excavation will resume here and in AMP-T3 in the summer of that year.

## 4.3 The Plain (see Figure 20)

Time was found to open only one test trench in the plain, beginning in the fourth week. It was Q1-T2, lying on the southern edge of the ancient raised river channels, about halfway between Kastro and A.M.P. The aim of this excavation was to discover and ground-truth the feature corresponding to a linear magnetic anomaly that runs from the north scarp of Glas nearly 800 meters northward at the point of its intersection with the canalized rivers. This is the same feature revealed in Trench O2-T2 in 2016. It is hypothesized to be a feeder canal for the field system discovered during co-author Lane's AROURA fieldwork between 2010 and 2014. While the excavation did not find traces of this intersection, very likely due to the difficulty of determining the point of intersection with an accuracy of less than 1.6 meters in present survey data, the trench did expose some characteristics of the construction of the retaining walls for the rivers in antiquity. Excavation began as a three-meter (north–south) by two-meter (west–east) trench oriented to the AROURA grid. Its northeastern corner intersected the remains of the Cyclopean retaining river retaining wall, and its western half ran under a segment of the disused modern concrete irrigation conduit. Since the expected and actual stratification was simple, one layer or soil horizon overlying the next, the trench was easily extended in the cardinal directions without intervening balks. In the course of exploration, Q1-T2 was expanded to the north (contexts suffixed with "a"), east (contexts suffixed with "b"), and south (contexts suffixed "c"). Excavation reached sterile subsoil (B horizons) in the central and northern areas. It will be continued in the others and perhaps expanded in the light of geophysical results in the summer of 2018.

The "zero" contexts in each area (main area and annexes) were the surface collections (**200** = **200a** = **200b** = **200c**). They yielded very little, as expected, only a single, recent sheep's tibia.

The main area of Q1-T2 initially divided equivalent contexts on each side of the concrete conduit, which is embedded in the topsoil and continued this practice into subsoil, keeping pedestal (essentially a balk) beneath the conduit to prevent its catastrophic collapse. Likewise, excavation of the southern annex (Annex C) descended with separately designated equivalent contexts on each side of the intervening conduit. Excavation of the main area of the trench began with the plow zone (Ap horizon), **201 = 203**. In the annexes, the major portions of which were closer to the hedgerow, particularly an old fig tree growing out the retaining wall, there was a distinct overburden of only partly decomposed organic matter (O horizon): **201a = 201b = 201c = 202c**. In the annexes, the nominal plow zone consisted either of demonstrable compacted soil or of the plowing ridge from the adjoining, cultivated field.

Below the Ap horizon in the main area was a distinct A2 horizon (**202 = 204**), evidently unmarked by recent artificial disturbance, containing small flecks of shell and a few very eroded pieces of reddish terracotta, probably modern. In the eastern end of the main section and in Annex b, removal of the plow soil revealed the top of unconsolidated stones that appear to have tumbled from the ancient retaining wall. One curious context in the western end of the main area was **206**, at first excitedly thought perhaps to be an ancient lime-stucco surface, possibly waterproofing, and then discovered to run parallel to and directly below the modern conduit. It is therefore very likely carbonate matter that has chemically leached out of the conduit and accumulated on the B1 horizon, which is less permeable than the A2 horizon and holds much of the groundwater during the rainy season.

The B1 horizon—a rough equivalence of **205 = 207 = 203a = 204b = 205c = 206c**—in the eastern annex of the trench (Annex b) appears to seal the topmost intact outer courses of the ancient retaining wall. Some of the overlying stone may have been *in situ* (**203b**), but, in any case, there is no evidence yet of the expected gap in the wall from which a feeder canal would have issued. Investigation behind the extant stones in this horizon at the very end of the season in 2017 revealed two or more distinct lumps of light gray (10YR7/2) faintly mottled (ca. 40% 7.5YR7/2 pinkish gray) consolidated silty matter with small shell inclusions (**205b**), which was construed as deliberately deposited lake-bottom material, possibly fashioned into crude mud bricks, to make up the core of the boulder-revetted retaining wall (Figure 21). It will be further investigated in 2018. In the main area of the trench a third B horizon was defined (**209 = 212**) about a meter below the surface—and therefore lower than the expected elevation of the feature that would connect the canalized river with the north scarp of Glas, which was encountered at about 70 centimeters below grade. Immediately above horizon **212** in the western end of the trench is another concentration of calcareous matter resembling **206**, which could either be natural or artificial. The B1 and B2 horizons especially contained a high concentration of intact or nearly intact freshwater bivalve or gastropod shell, indicating that they represent the ancient lake.

# 5 Micromorphology

(At the time the first version of this report was written, the micromorphological samples taken in 2016 were still setting with resin impregnation, after which they will be thin-sectioned and analyzed; D.J. Fallu, pers. comm., October 2017. Phosphate testing is still planned.)

# 6 Other Radiocarbon Dates from 2016

In addition to the radiocarbon dates obtained from contexts excavated in AMP-T1 and AMP-T2 in 2017 (see 4.2.1 and 4.2.3), three others were obtained from two horizons in core MYNEKO2013SK03, removed with an auger from the mouth of the Spitia Sinkhole (*Katavothra*): 2016SK03RC01 (bulk sediment), 95.4 percent probability of calibrated AD 73–226 (Beta-470890); 2016SK03RC03 (organic sediment), 95.4 percent probability of calibrated AD 432–638 (Beta-470891); and 2016SK03RC03 (shell fraction), 95.4% probability of calibrated AD 597–670 (Beta-471291). These results were unexpectedly recent and curious in their own right. The sample ending in "03" sat about 0.50 centimeters higher, in a horizon described as "A2," than that ending in "01," which was in the immediately underlying horizon, described as "B1." Sample 2016SK03RC02, which appeared to contain degraded ceramic and charcoal, was kept in reserve for future analysis. Nevertheless, one can state confidently that the ceramic, if it be such, dates to the Roman Imperial age. Although a date of 1720–1530 calibrated BC (Beta-331308) obtained from the bottom of a core into the mouth of the Vrystika Sinkhole to the south of Glas, taken in 2011 during the AROURA survey, was from a depth almost a meter deeper than that of 2016's "01" sample (2.40 vs. 1.60 meters), a Roman date for the latter was nevertheless quite unexpected. The 68.2 percent ("one sigma") probability of the date of this material is calibrated AD 82–210 (58.6% cal. AD 82–170), which is compatible with the reign of the Emperor Hadrian, who is known to have invested in hydraulic management in the western part of the Kopaic Basin. One wonders whether his intervention instigated efforts to renovate some of the Helladic hydraulic works around the sinkholes in the northeastern bay of the Basin.

# 7 Conclusions, and Plans for the Future

## 7.1 Conclusions

The types and qualities of the material components of the ancient sites of Aghios Ioannis and Aghia Marina Pyrghos changed little between 2016's and 2017's excavations. However, the scale of inhabitation in every phase of both sites has expanded more than geometrically. It is certain now that both A.I. and A.M.P. had substantial, long-lived M.H. settlements and, especially in the case of the former, cemeteries. Indeed, the cemeteries seem to be segregated into groups, at least two "circles" of stone-lined cist graves at A.I. and at least three clusters of graves (summit, slope, and saddle), along with the intra-ruin children's cemetery, at A.M.P. (see Figure 2). Thereafter follows a massive L.H. IIIB intervention, approximately contemporary with the fortification and storehouses at Glas. What is curiously missing so far in the excavations at both sites is any significant L.H. IIIA or even L.H. IIB component. At A.M.P. to date, there are hints of it from the AROURA surface collection (e.g. possible L.H. IIB Vapheio-style or carinated conical cup with foliate band, from unit 2a1-1410 near AMP-T1, and L.H. IIIA2/B1 kylix with diagonal whorl shells, from unit 2b1-0106, south of AMP-T2) and in the silty fill most clearly evident in AMP-T1 above the M.H. III – L.H. I (or L.H. IIA at the latest) children's cemetery. Dr. Gouliotis, project geologist, hypothesized in 2016 that this fill, clearly not being native, consists instead of imported lake sediment. It is probably also evident in the northeastern corner of AMP-T2, beneath context **269** at nearly the same elevation at which it is first encountered in AMP-T1 (ca. 167.50 m).

This local sequence is suggestive. A plausible, if untested, reconstruction is that the M.H. settlement was succeeded by an early Mycenaean (L.H. II) settlement, traces of which perhaps are yet to be found south of Wall K in AMP-T1, and this persisted into the L.H. IIIA, around the end of which it was filled in (likely having been razed too), for reasons yet unclear, and then multistory buildings erected on top of its remains around the beginning of the L.H. IIIB. The unchanging orientation of the walls from one period to the next suggests continuity, though terrain may have been a determining factor in each phase. Some, if not all, of the L.H. IIIB construction burnt down in the same period. In a short while, there being no obvious intermediate diagenetic layer, another building on the same orientation but with separate foundations was erected, and this building was abandoned at some point after the L.H. IIIC Early–Middle. No convincing L.H. IIIA material has yet come to light from AMP-T2, though stray potsherds of likely M.H.–L.H. I fine gray burnished and burnished polychrome wares have been recovered, probably present due to erosion or bioturbation. The absence suggests no intervening L.H. II–IIIA on this building site at least. At all events, not only does the L.H. IIIB construction roughly coincide with the construction at Glas, but its fiery destruction roughly coincides with one or the other conflagration that evidently consumed the buildings there. One might be left with the impression that, on the one hand, the L.H. IIIB construction at A.M.P. and Glas are part of the same project, but, on the other hand, that the former outlived the latter by a few decades, despite catastrophic fire in both places. This observation may contribute to answering the research question concerning resilience of the drainage and agricultural management systems after the demise of administrative and storage facilities at Glas.

Another fact that continues to impress is the extent of the M.H. settlements in the northeastern bay of the Kopais, given that the rocky uplands above them are intractable to the cultivation of staple crops (being exclusively pastoral or mineral-extraction lands today), because it has been assumed, at least hitherto, that the lake that once filled the Basin was likewise useless. One is hence led to wonder whether the claiming of cultivable land from the lake's margins began earlier than the L.H. IIIB intervention associated with the fortification and storehouses at Glas and the latest, Cyclopean phase of the canalized rivers, overflow channels, and flood-protection dikes. Before the massive intervention, the process may have been more piecemeal. O.S.L. *terminus ante quem* dates of the early 17th century BCE from constituent features of the field system in the polder, obtained during the AROURA survey, are consistent with this hypothesis; the N.S.F.-funded chronometry is meant to pin relevant dates down more precisely. The presence of two or three distinct burial plots at A.I. and A.M.P. suggests colonization by a few founder families, and the presence of a children's cemetery in the ruins of an older part of the settlement at A.M.P. suggests foundation by the M.H. II Late, given evidence of similar burial practices in the region (not to mention provisional *t.a.q.* set by pottery sequences in AMP-T1).

## 7.2 Inter-season Plans

Dr. Lane intends to return from the United States to Greece in January 2018 to accomplish several tasks preparatory to laboratory analyses and finishing fieldwork in the summer of that year. Firstly, expecting that his permits for the export of samples for N.S.F.-funded chronometry will have arrived by then, he will dispatch these to the Oxford Radiocarbon Accelerator Unit and the University of Colorado Amino Acid Geochronology Laboratory as

appropriate. Secondly, he will transport the last of the micromorphological samples taken in 2016, the extraordinarily large MM11 from trench O2-T2, to the Archaeometry Laboratory of the University of the Peloponnese, Kalamata, where it will be assessed for the potential of obtaining an O.S.L date, proceeding accordingly, and thin-sectioned for microscopy. Finally, with the assistance of a student, he will re-crate (and re-label, as necessary) the finds from the previous two MYNEKO seasons, and create a priority list of pottery lots requiring detailed chronotype, functional form, and fabric–paste description.

## 7.3 Plans for the Summer of 2018

The co-principals currently intend to split the summer fieldwork season roughly in half, the first, presumably cooler, part spent in the field and the second in the storerooms and laboratories of the Archaeological Museum of Thebes. Fieldwork will be inaugurated with two or three days of magnetometric prospection of the summit of both A.I. and A.M.P., comprising the existing excavations, and of a 10-by-90-meter strip just south of trench Q1-T2 on the plain. This is a crucial step in preparation for a more intensive focus on the littoral sites and their hinterlands, starting in 2020, it is hoped, with extensive, yet targeted, stratigraphic excavation and intensive surface collections. Trench AMP-T3 will then be reopened in order to complete the stratigraphy beside Wall C, and trench AMP-T4 will be reopened and probably extended two meters to the east, so as to provide stratigraphic context for Walls A and AC in the western two meters. At A.I., trench AI-T1 or AI-T2 or both may also be opened, time permitting.

Museum studies will consist of detailed cataloguing of decorated pottery, development of a fabric–paste typology comparable to AROURA's, X-ray fluorescence of the same, more finds drawing and photography (including pottery sections), and further conservation treatments (such as silica gel packing).

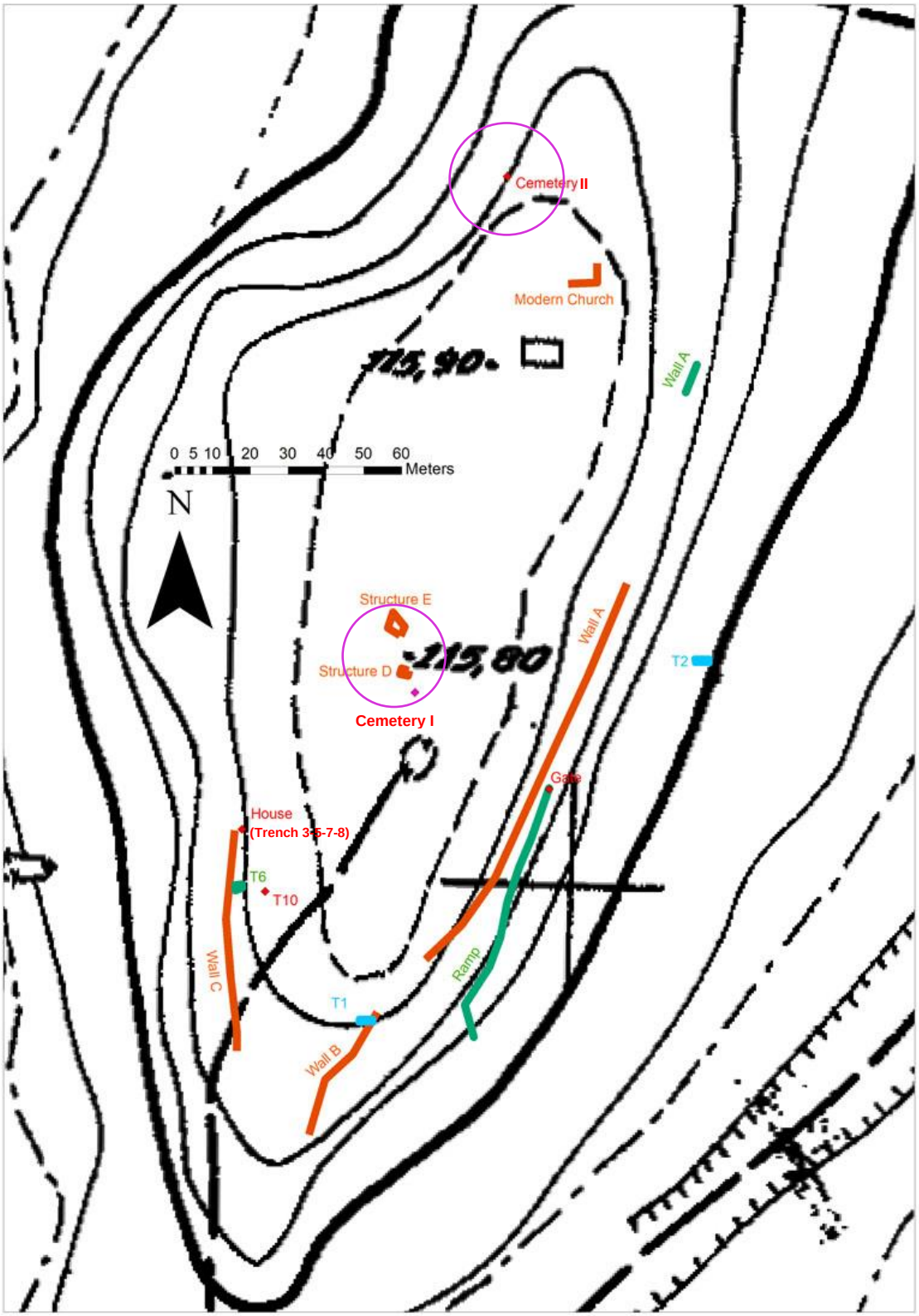


**Fig. 1**. Walls and other features mapped at Aghios Ioannis, 2016 (red) and 2017 (green) (layout by R.D. Thompson).

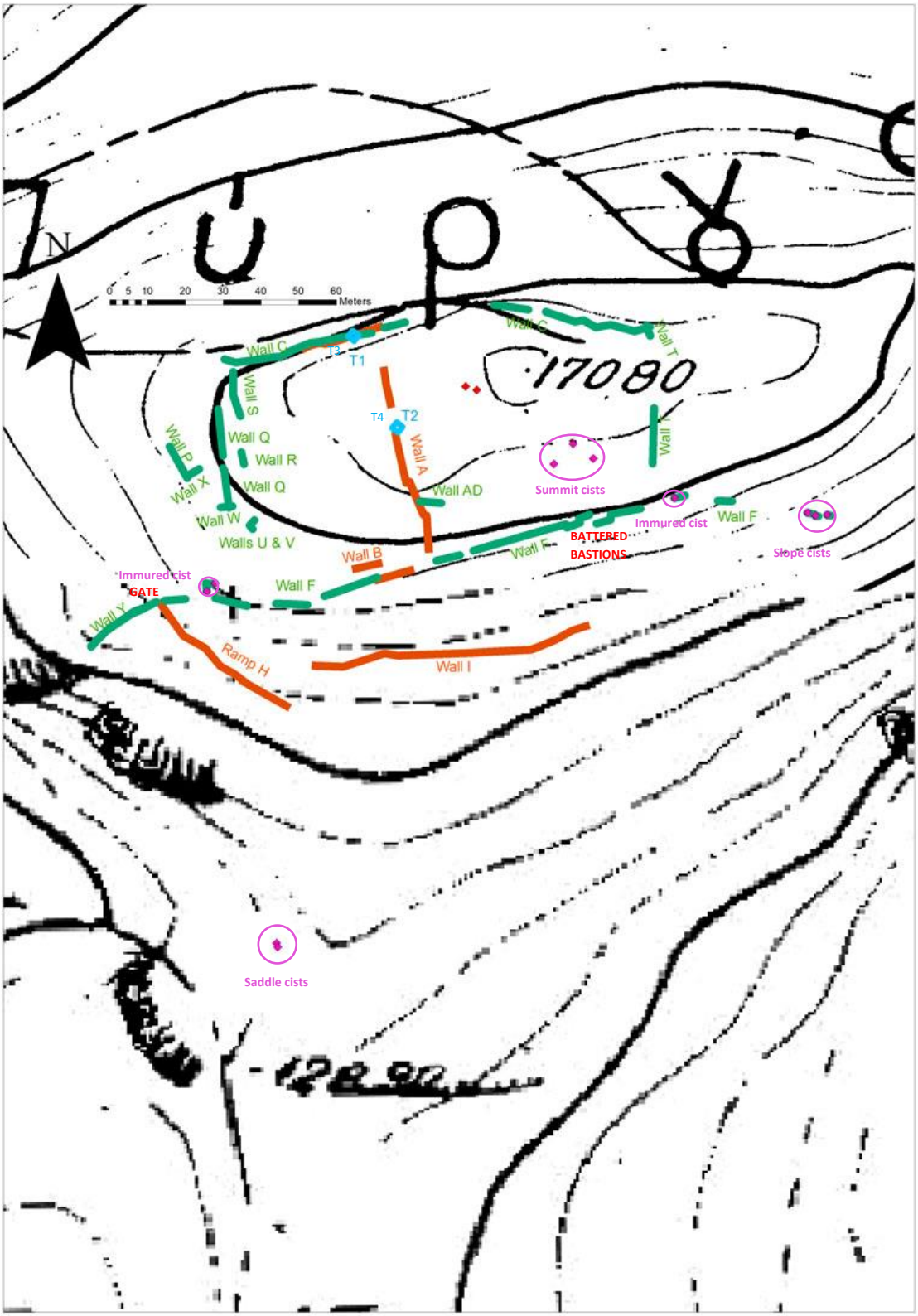


**Fig. 2**. Walls and other features mapped at Aghia Marina Pyrghos, 2016 (red) and 2017 (green) (layout by R.D. Thompson).

**Fig. 3**. Battered bastion toward eastern end of Wall F (photograph by L. Phialon).

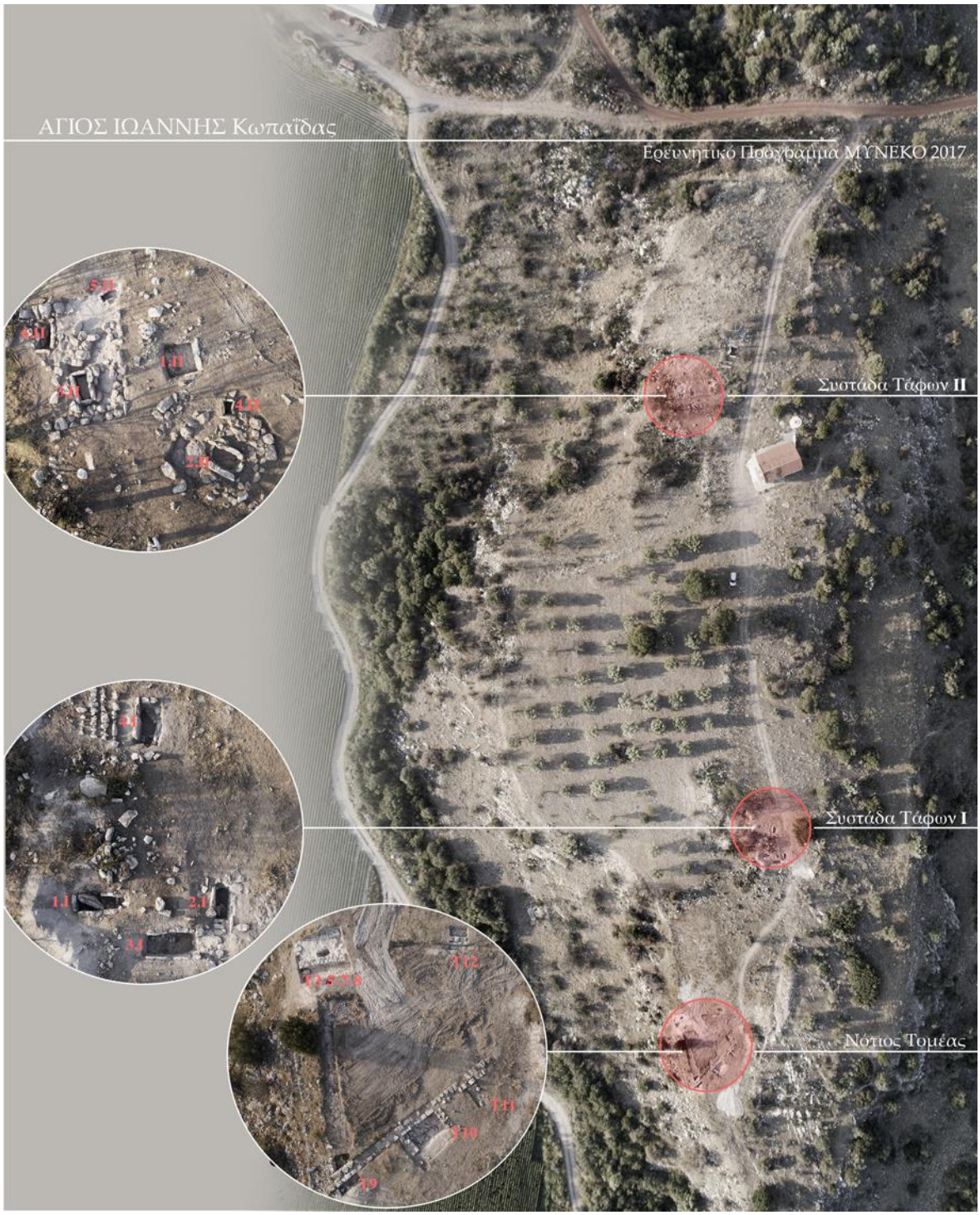


**Fig. 4**. Aerial photographic diagram of Aghios Ioannis, indicating southern residential sector (bottom), Grave Cluster I (middle), and Grave Cluster II (top). North is toward top left corner of diagram. Car appearing right of center provides approximate scale.

**Fig. 5**. Aerial photograph of southern residential sector of Aghios Ioannis. North is toward top of photograph. Adult man appearing in upper right corner provides approximate scale.

**Fig. 6**. Animal skeleton found in trench AI-T10. North is at top of photograph. No scale.

**Fig. 7**. Aerial photograph of trench AI-T3–5–7–8. North is toward right of photograph. Trench is four (north–south) by five (west–east) meters in area.

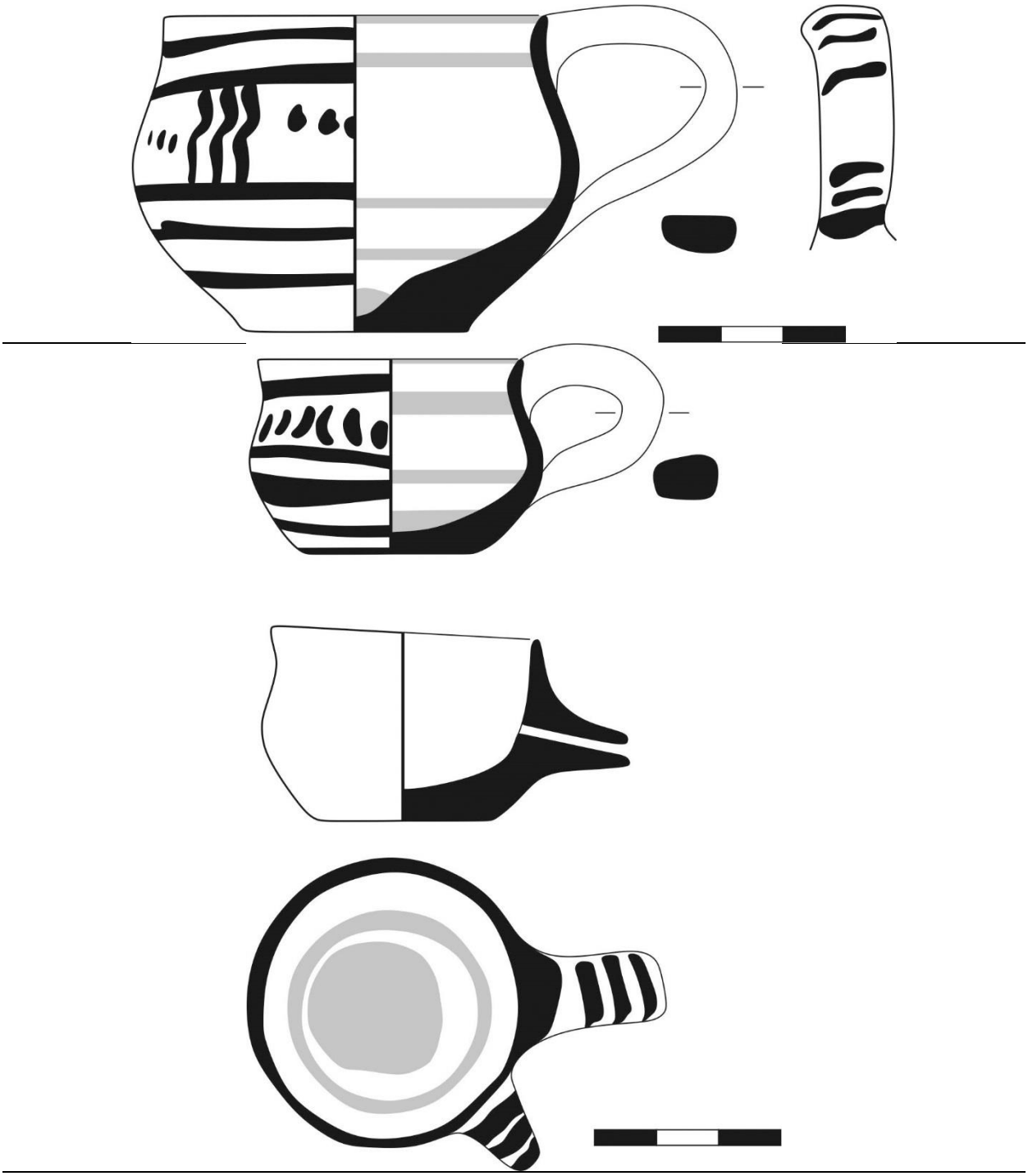

**Fig. 8**. Late Middle Helladic – Early Late Helladic decorated cup (above) and "feeding bottle" (below) from trench AI-T7 (2016). Scale is in centimeters.

**Fig. 9**. Trench AI-T13: Clockwise from top, Grave II-3, Grave II-5, and Grave II-6. North is toward top of photograph. No scale.

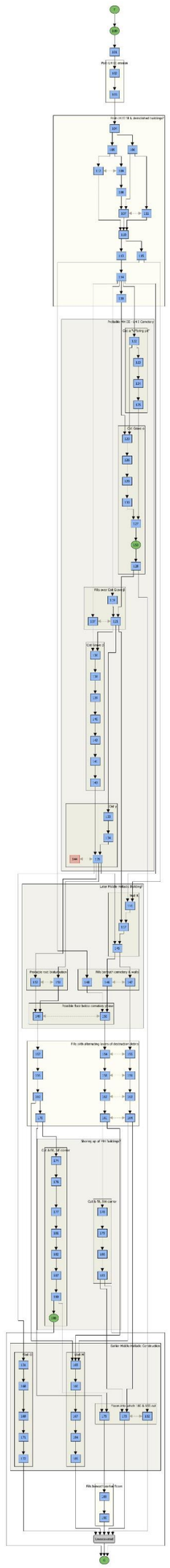

**Fig. 10**. Harris Matrix of trench AMP-T1, 2016 – 2017.(M.F. Lane).

**Fig. 11**. State of trench AMP-T1 in plan at the beginning of campaign, 2017: Wall M runs diagonally through center, context **149** is to lower right, **150** to left, and **128** (cut) above this just left of center. Trench is two by two meters in area. North is toward top of image (photograph by L. Phialon).


**Fig. 12**. North east corner of AMP-T1 in plan at end of campaign, 2017, showing basal bedrock (photographs by E.A. Eastlake).

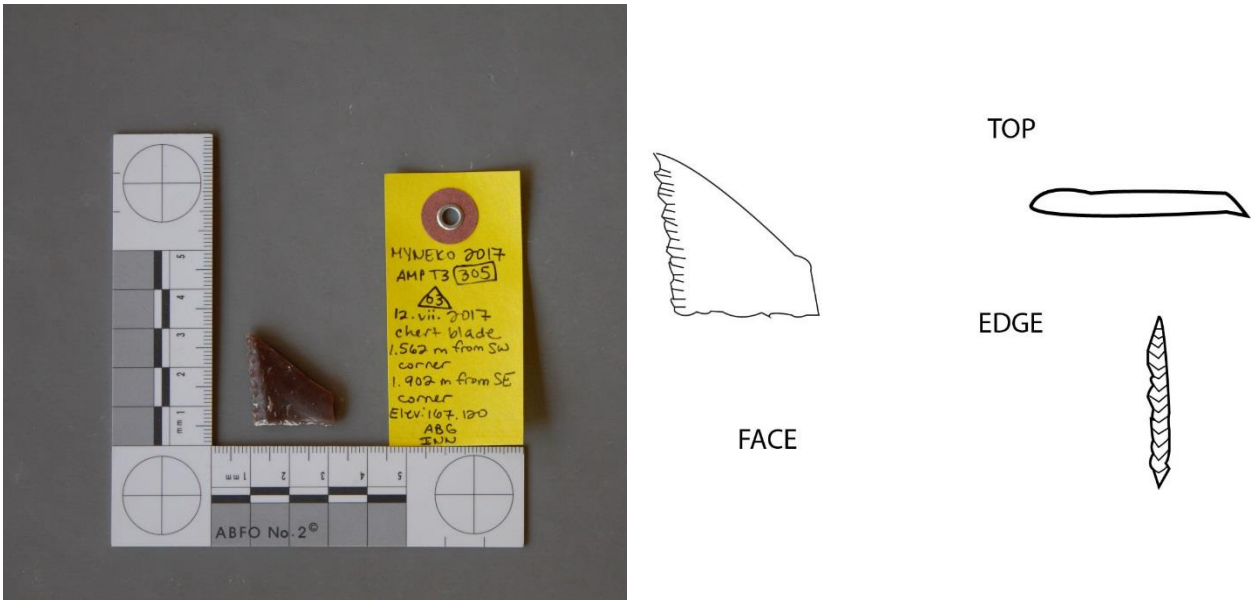


**Fig. 13**. Fragmentary denticulate blade (insert?) from context **305**, trench AMP-T3 (photograph by A.B. Gibson, drawing by V.D. Markellos).

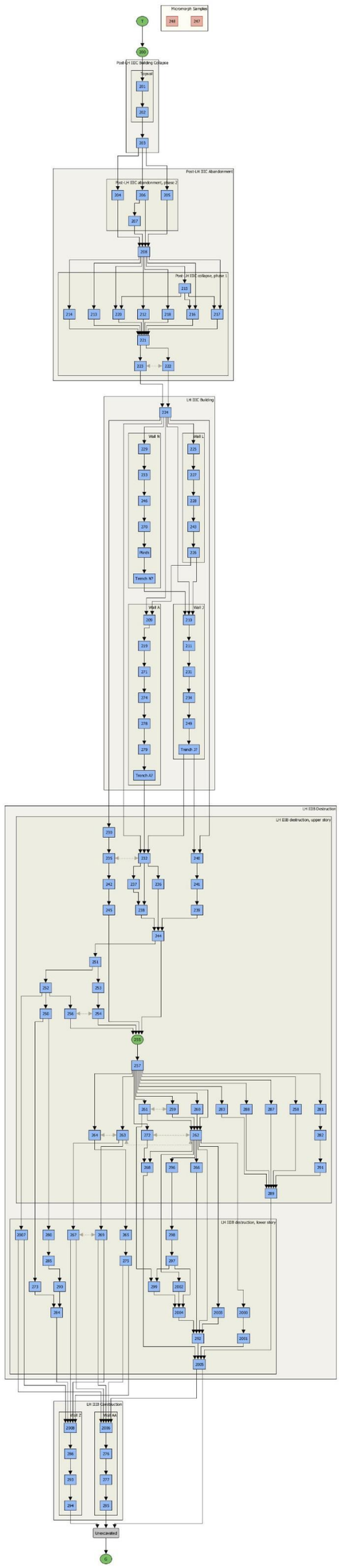


**Fig. 14**. Harris Matrix of trench AMP-T2, 2016–2017.(M.F. Lane).

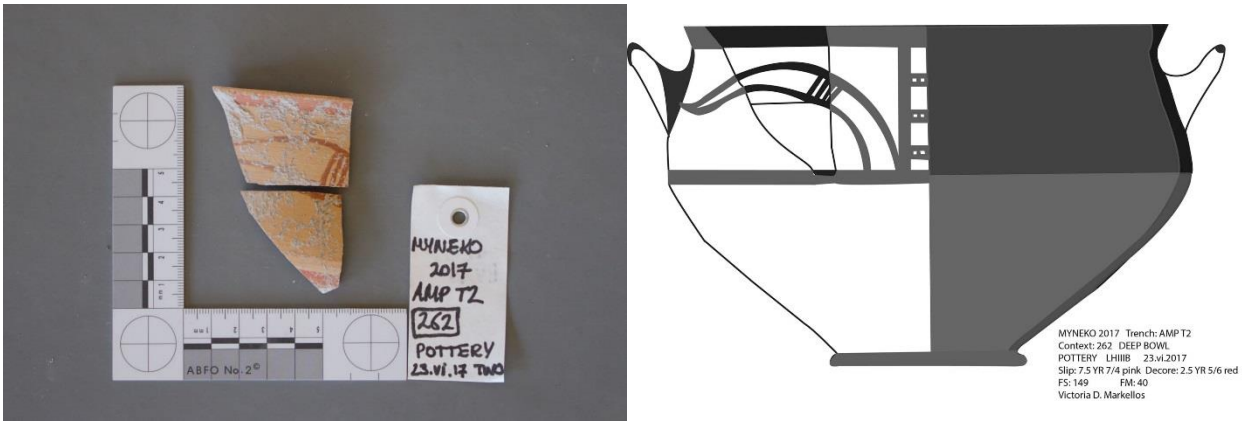


**Fig. 15**. Shard of Group A deep bowl from context **262**, trench AMP-T2 (photograph by A.B. Gibson, drawing by V.D. Markellos).

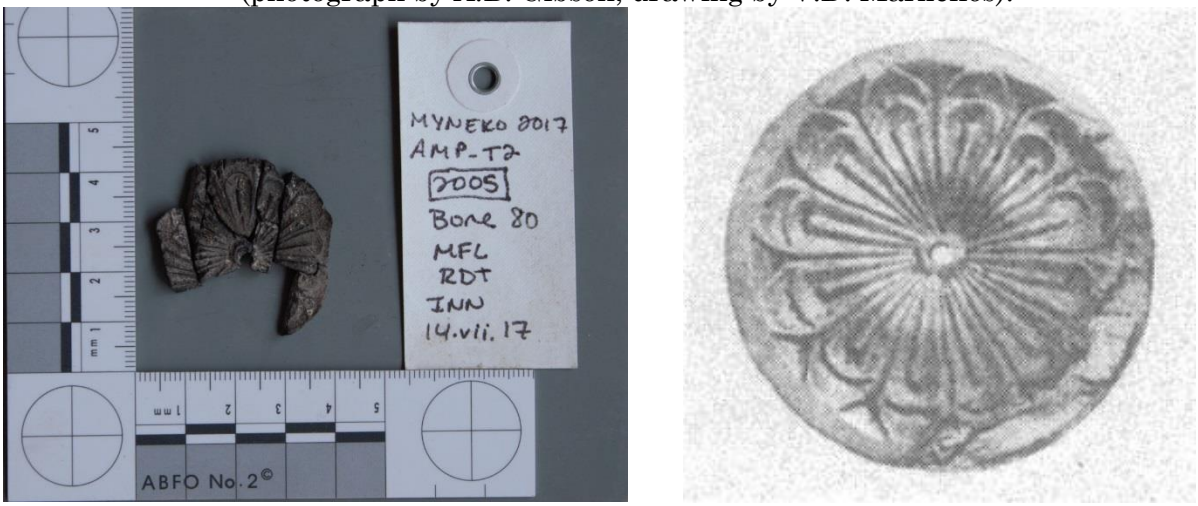


**Fig. 16**. Remains of perforated ivory rosette from context **2005**, trench AMP-T2 (left) and comparandum from Lamiospito tholos tomb, Dimini, Magnesia (right) (photograph by A.B. Gibson, figure from Poursat 1977).

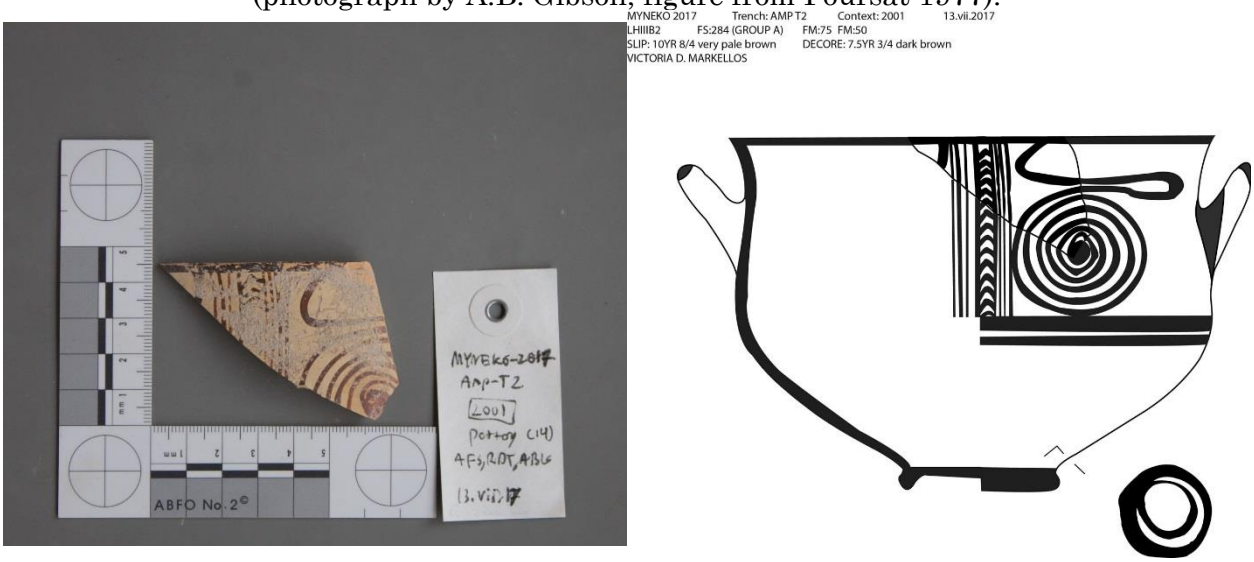


**Fig. 17**. Shard of Group A deep bowl from context **2001**, trench AMP-T2 (photograph by A.B. Gibson, drawing by V.D. Markellos).


**Fig. 18**. Mud-brick plinth beneath Wall N in AMP-T2 (note gaps between courses).


**Fig. 19**. Painted bovid figurine from context **408**, trench AMP-T4 (photograph by A.B. Gibson, drawing by V.D. Markellos).

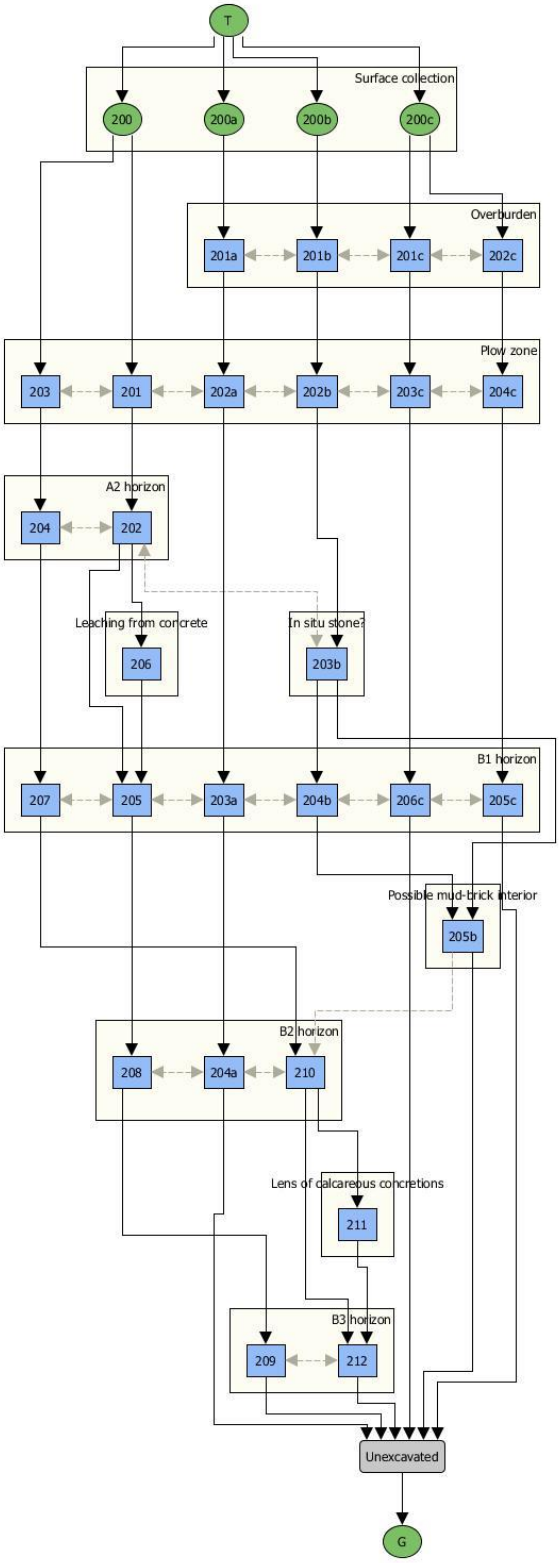


**Fig. 20**. Harris Matrix of trench Q1-T2, 2017 (M.F. Lane).


**Fig. 21**. Photograph of mud brick-like core material (center, right of North arrow) of southern retaining wall of L.H. canalized Melas–Kephissos, context **205b**, trench Q1-T2 (photograph by M.F. Lane).