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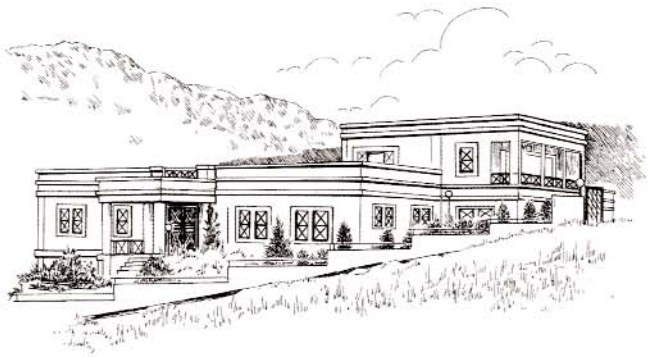
The Newsletter of the INSTAP Study Center for East Crete

Volume 9 (Fall 2006)



"Ritual Killing" at Mochlos, Summer 2006

By Jerolyn E. Morrison and Douglas P. Park

During the early LM IIIA1 to late LM IIIA2 period of reoccupation at Mochlos, the Limenaria cemetery was large and wealthy. The architecture and the vessel assemblages found in Tomb 15 are exceptional, which suggests that it belonged to an elite individual. Here four objects from the tomb artifact assemblage were identified by Jeffrey Soles (1999) as being ritually killed: (1) a ladle with a detached handle, (2) a conical rhyton with a detached pouring spout, (3) a collared jug with a detached spout and handle, and (4) a bronze dagger snapped in half. The unique occurrence of three ritually killed ceramic vessels found in Tomb 15 is an important variation within the larger theme of ritual breakage.

This summer the Mochlos team busily prepared for publication. During this preparation, discussions took place over much-needed coffee breaks. One hot topic was the ritual killing of ceramic vessels, such as those identified by Jeffrey Soles at Mochlos. Ritual killing is a specific form of ritual breaking where a vessel's apparatuses that are crucial to its functioning (e.g. handles, spouts, etc.) are purposefully broken off and discarded. Furthermore, it differs greatly from ritual smashing, as the bulk of the ritually killed vessel remains intact (Soles 1999, 788). To understand the social meaning of the act of ritual killing further requires the accurate reconstruction of the ritual activity conducted by the burial participants at the time of internment. Was the instrument used to kill the vessel sharp or blunt? Was the vessel during the killing ceremony held in hand, placed upon an anvil of sorts, or on the ground?

Figure 1: Experimental Vessel Assemblage.

These discussions inspired us to develop our experimental problem. If the fracture patterns of the vessels indicate that they could have been ritually killed, then what physical evidence do we look for on the vessel? This sparked a creative debate on how the executioner could have killed the vessels in Tomb 15. We decided the best way to discover how the vessels were ritually killed was to produce experimental vessels and break them in a variety of ways. Our goal was to create a dynamic physical analogy, through experimentation, that would allow us to understand the interactive relationships between artifact and ritual activity.

Theory of Proximate Causality

One of the most exciting aspects of the experiment was the development of the theory of Proximate Causality (Morrison and Park, forthcoming). This theory focuses on technological and sociological/ideological factors that include options from which choices have to be made; i.e. human agency. These choices manifest themselves in artifactual patterns that we see as archaeologists. In other words, a ceramic fracture pattern can tell us about choices made in both the production of the vessel and its method of breaking. This experiment creates an analogy that allows us to link physical human action with social and ideological meaning in the archaeological record.

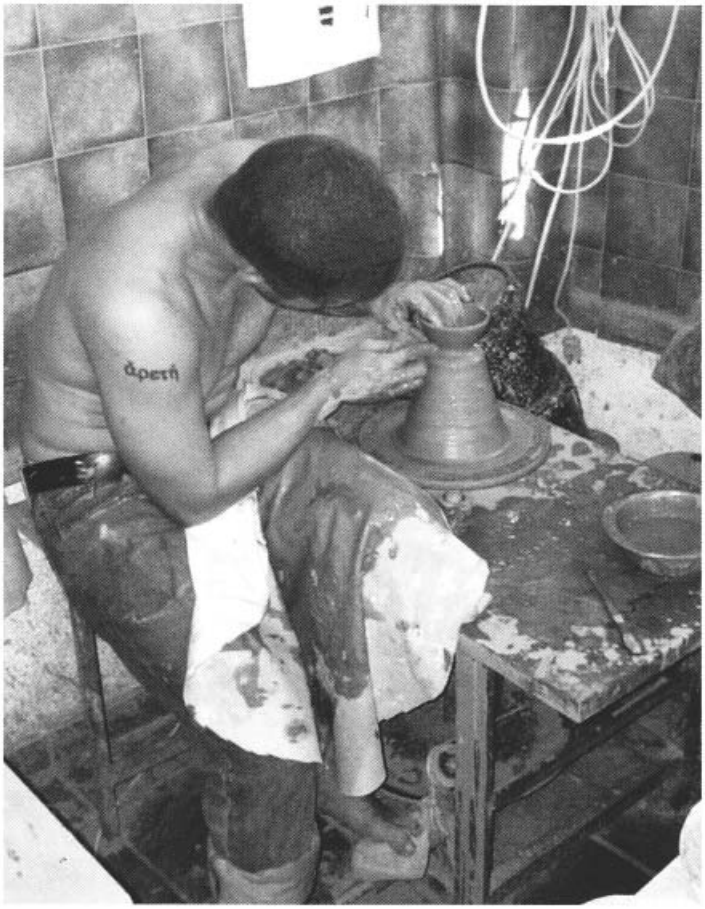


Figure 2: Doug Park works on the creation of the Mochlos experimental vessels.

Figure 3: Jerolyn Morrison creates a handle for her experimental collared jug.

Experimental Procedure and Results

To utilize our theory of Proximate Causality, we needed a large number of vessels to experimentally break. After many trips to tourist shops and closed potter's studios in East Crete, we spoke with Myrsini's potter Nikos Makrinakis. He was unable to make the needed vessels, but generously offered his ceramic studio and supplies. Graciously we accepted his offer and put our potting skills to work. We worked there in the evenings and on weekends to produce conical rhyta, collared necked jugs, and ladles (Figures 1,2, and 3).

Once the experimental vessels were fired, we held a ritual breaking ceremony for the Mochlos team at the potter's studio. We tested the various options laid out in our theoretical framework (Figure 4). After testing all possibilities, we came to three conclusions as to how the Tomb 15 vessels were ritually killed. By analyzing the experimental fracture patterns in comparison to the archaeological fracture patterns we were able to interpret the manner in which each vessel type was broken.

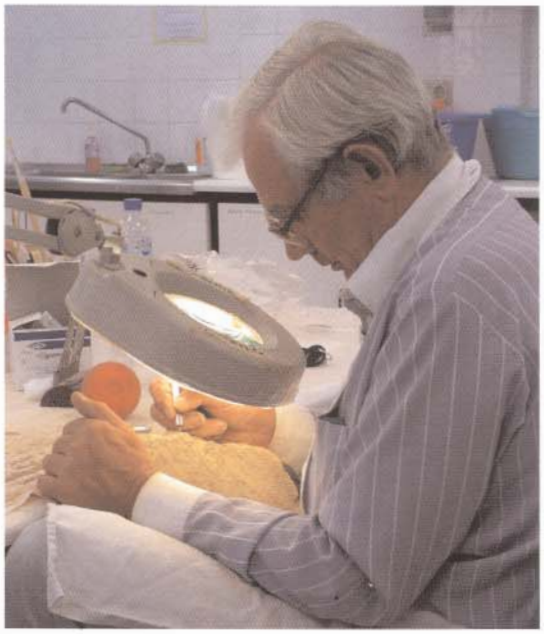
The first discovery was that a sharp instrument, perhaps the bronze blade found in the tomb, was used by the executioner to ritually kill the conical rhyton and collared jug (Figures 5-7). The sharp experimental killing instrument cleanly removed the appendages from the experimental vessels, while the blunt instrument completely destroyed every vessel. This ruled out any possibility that a blunt object was used to ritually kill the vessels.

The second discovery was that placing the vessel on the ground allowed the experimental executioner more control of the killing action. While the fracture patterns of those vessels held in hand do not differ drastically from those broken while placed on the ground, it is easier to mimic the archaeological example when the experimental vessels were held in the latter method. It is speculative to state that the Tomb 15 vessels were placed on the ground. However, based on the realization that it was easier for us to break the pots in that manner, it is an observation that deserves consideration and further research.

The third discovery was that the executioner used two methods to ritually kill the vessels. The conical rhyton and the collared jug were killed with blows from a sharp instrument, while the ladle was killed by using one's hand to snap off the handle (Figure 8). This was a complete surprise.

Message from the Director

This year the Study Center supported a wide range of archaeological work including the ongoing excavations at Azoria, Halasmenos, and Priniatikos Pyrgos and study of material from Mochlos, Gournia, Pseira (both on the island and from the new underwater excavations), Hagios Charalambos, Vrokastro, Kavousi, Vronda and several sites around Petras. Among the new projects was work at the site of Aphroditi's Kephala above Episkopi. At the same time, our library continued to host numerous individuals, including students finishing doctoral work. Melissa Eaby of the University of North Carolina at Chapel Hill is studying Mortuary Variability in Early Iron Age Burials, and Kostas Chalikias of Heidelberg University used the Center's facilities to begin a historical survey of the landscape around Ierapetra.



John Lewis working in the Conservatory.

Rita Roberts works on pottery.

Our staff was again busy developing the resources and services of the Study Center. Among the highlights was the work of Dr. Andrew Koh with our conservation department (Dr. Stephanie Chlouveraki, Kathy Hall and Michel Roggenbucke) to establish an intensive sampling program for organic residue analysis as part of the regular conservation procedures of the William D.E. Coulson Conservation Laboratory. The equipment is mobile and can be operated by members of the Publication Team. By the end of September, more than 1,000 objects had been sampled from 10 projects, including 500 from recent excavations at Mochlos. Dr. Antonia Stamos now spends five months of the year on the Publication Team providing subsurface analysis with the Study Center's Ground Penetrating Radar unit and mapping with the Study Center's EDM total station. The Publication Team's photographer, Chronis Papanikopoulos, has transformed the Photography Laboratory into a digital facility, and he shot more than 6,970 photos last year. Artist Doug Faulmann was equally prolific with his preparation of digitized drawings and a few superb color reconstructions. Dr. Eleni Nodarou reports on three successful years of work in the William A. McDonald Petrography Laboratory, where she has undertaken 22 projects, preparing more than 2,000 thin sections and 16 final reports. Finally, the construction of an archival repository for both the paper and electronic records of the staff and our projects is the most important work that will be completed this winter, and its preparation is the focus of a special report by our library intern, Dr. Eleftheria Daleziou.

I would also like to mention the continuing efforts of our staff and members to reach the wider public. We provide tours to local schools throughout the year and have installed eight new site signs at Gournia in June. During the summer, Prof. Donald Haggis and I delivered lectures in Greek at the villages of Mochlos and Kavousi on the recent excavations at Mochlos and Azoria, while later Prof. Donald Haggis and Dr. Metaxia Tsipopoulou led tours of the sites of Azoria and Halasmenos for the general public. The events proved popular, drawing hundreds of visitors. We would also like to congratulate Dr. Tsipopoulou for the creation of an

Level IV. In the back of the balcony overlook is a small, semicircular stalactite formation that forms a shaft about three m. tall. On the west and south "walls" of this shaft were small crevices that opened onto a tiny chamber roughly one m. in diameter. This tiny chamber led down to Level V via an extremely narrow passageway that was partially blocked by a stalagmite "column" which necessitated the EDM's passage without the protection of its case since the case would not fit through the opening (even we had to go in sideways). Despite the difficulties inherent with working in a cave, the completed overall plan of the cave as a whole helps to visualize the relationship of the main entrance chamber (Level I) with that of the two corridors and their ritual areas in Level II, as well as the relationship of the darker and more secluded Levels III-V.

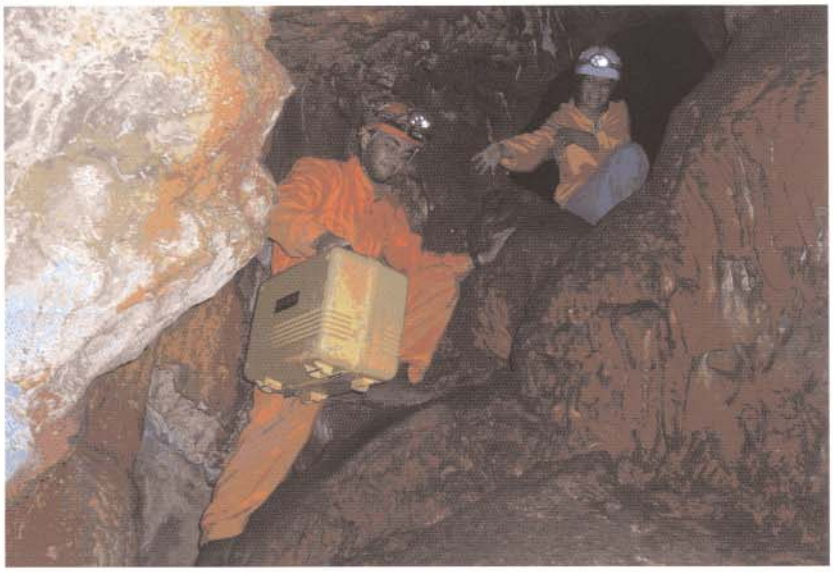


Figure 2: Antonia Stamos and Miltos Belidis passing the EDM equipment through the opening of the "adyton" in Level III.

After the Skoteino cave experience, the survey project at Mycenae proved to be much easier. Earlier in the year, four acres south of the Citadel were purchased by Dickinson College. Parts of these acres had been surveyed with GPR in previous years, and plans for a systematic excavation in this area are currently underway for 2007. Since the survey area fell within the boundaries of the Atlas of Mycenae's 500 by 500 m. grid squares D4-E4, the main goal was to create an excavation grid based on the Atlas of Mycenae's grid in order to maintain continuity. The two terraces, identified as South West Bank I (SWB I) and South West Bank II (SWB II) (Figure 3), were cleared of all vegetation and rubble. SWB I and SWB II were further cleared for survey activities with the help of a tractor, and then the Dickinson students cleared the areas of loose stones.

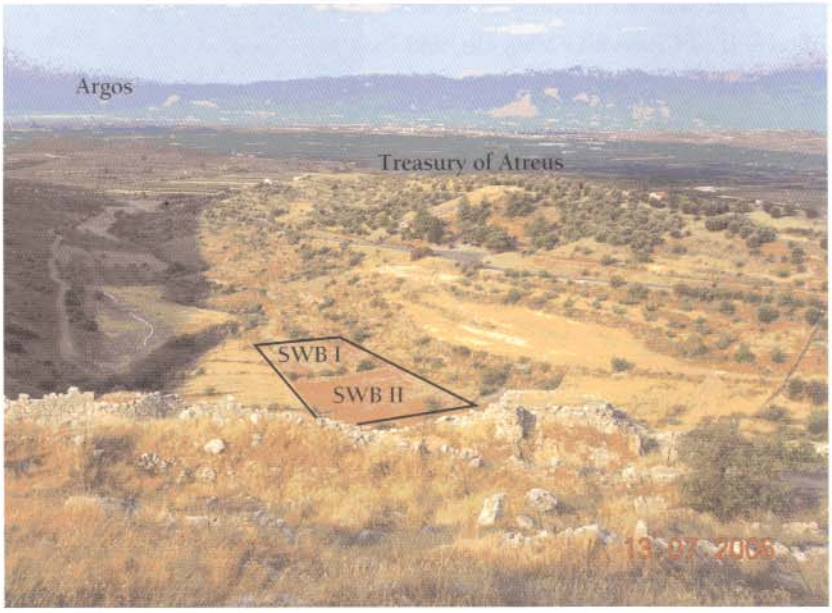


Figure 3: View SSE from the palace at Mycenae of the survey area showing the location of the cleared terraces SWB I and SWB II.

The geophysical portion of the survey was able to commence once the terraces were cleared and prior to the placement of the excavation grid on terrace SWB II. Although portions of the terrace had been surveyed with radar the previous three years, this year's acquisition of the property and the preliminary results to date suggest that there is much more to be explored in this area.

At Kynos, the third survey project of the summer, was the first of the new projects this year. Directed by Fanouria Dakoronia who was assisted by Petros Kounouklas, this coastal site is located in Boeotia, and excavations have produced evidence for almost continuous occupation from the Neolithic through the Hellenistic periods. As such, there was expressed interest in testing the areas outside the excavation area for the continuation of walls and the clarification of other features found within the trenches. Two grids were placed adjacent to the trenches, with a third placed just outside the chain-link fence marking the boundary of the excavation zone. A fourth grid was placed on the road below the site in order to locate traces of the ancient mole that is believed to continue inland based on the identification of associated features in the scarp.

The second new project of the season involved GPR survey and systematic contour mapping for Xrisa Sofianou at Papadiokampos, just west of Siteia on Crete. Although the GPR survey in itself was relatively easy due to the almost flat surface,

Archaeochemistry at the INSTAP Study Center for East Crete

By Andrew Koh

Organic residue analysis has been a useful tool in archaeology for decades, culminating in Aegean studies with the exhibition and publication of Minoans and Mycenaeans: Flavours of Their Time in 1999 by the Greek Ministry of Culture and the National Archaeological Museum in Athens. Archaeology naturally benefits as analytical tools continue to advance in chemistry, and it is no different with the burgeoning archaeochemistry research developing at the INSTAP Study Center for East Crete.

Until recently, it has been all but impossible to safely and efficiently extract organic residues while in the field. Constraints of time, finances and methodology dictated that only a select few objects, chosen at the discretion of excavators almost always after conservation, were sent to distant laboratories for residue extraction and subsequent chromatographic analysis by chemists. Thanks to the support and vision of Thomas Brogan, Director of the INSTAP Study Center for East Crete and the staff of the William D.E. Coulson Conservation Laboratory, new methods in archaeochemistry have been developed in Pacheia Ammos over the past several years from which we are just beginning to see the results.

Beginning in 2003, steps were taken to test the viability of extracting organic residues on site at the William D. E. Coulson Conservation Laboratory at the Study Center. The ultimate goal was to develop an extraction protocol that would be comprehensive, non-destructive, and fully integrated at the earliest stage possible (i.e. immediately after excavation) with the Center's conservation process. Once the viability of on-site organic residue extractions was verified with a high degree of certainty, the next step was to put this extraction protocol into practice at an archaeological site. We chose the Mochlos Excavation Project. Hundreds of extractions (which took hundreds of hours) were followed by subsequent gas chromatography/mass spectrometry (GC/MS). These studies were undertaken at the Mass Spectrometry Facility and Roy and Diana Vagelos Laboratories at the University of Pennsylvania. As a result, the typological and spatial functions of a Late Minoan I Perfumed Oil "wing" at Mochlos started revealing themselves through careful interpretation of the archaeological evidence with the help of archaeochemistry.

Not resting on its laurels, the Study Center purchased a Büchi Syncore Polyvap system this past May. This sophisticated instrument allows for a tremendous leap in the efficacy and safety of organic residue extractions. Four fully-enclosed 1liter beakers work under a vacuum in parallel to efficiently extract residues through the gentle heating and agitation of objects. Not only is contamination and the danger of volatilized solvents virtually eliminated, but extractions can now occur at over five times the previous pace. The instrument's relatively small size allows for the transport of the system to any remote site that has access to electricity and water. The simplicity of the instrument and the standardization of the extraction protocol allowed us to subsequently develop a written manual in order

Azoria 2006: Investigation of the Early Iron Age-Archaic Transition

By Donald C. Haggis and Margaret S. Mook

The Azoria Project completed five years of excavation in 2006. The aims of our fieldwork have been to document parts of a nascent Greek city that are relevant to reconstructing sociopolitical and economic organization in the sixth and early fifth centuries B.C. on Crete, and to identify the stages of development of the Azoria settlement from 1200 to 500 B.C. The central focus of excavation has been to recover evidence for subsistence and surplus production that relate to the restructuring of kinship relationships and the emergence of corporate groups ca. 700 to 500 B.C. The objectives of work in 2006 were (1) to study the nature of food provisioning and consumption in the public buildings on the South Acropolis in the Archaic period; (2) to examine the topography and spatial organization of the urban center, the distribution of civic, cultic, and domestic activities, and the configuration of Archaic civic building complexes; and (3) to explore stratigraphically earlier Early Iron Age (EIA) levels at the site within both civic and habitation areas in order to study changes at the end of the Early Iron Age and during the establishment of the city from the eighth to the sixth centuries B.C.

In 2006, we continued to explore the western slopes of the South Acropolis where both public buildings and domestic architecture of sixth and early fifth century date

Figure 2: B3000: Late Geometric-Early Orientalizing building from the south.

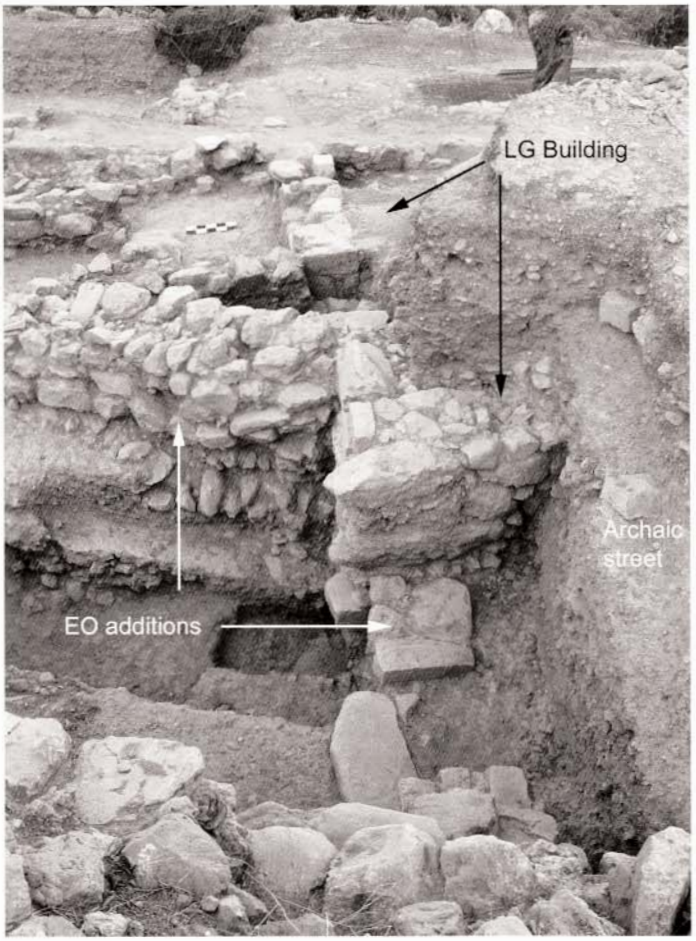


Figure 1: B3000/B3900: Late Geometric-Early Orientalizing building from the east.

were found during the past four field seasons. We set out to complete the excavation of the Archaic civic complexes and to conduct a series of stratigraphic soundings that might expose the Early Iron Age phases. Ultimately, we are interested in understanding how and precisely when the Archaic form of the settlement was established, including its public architecture, and the nature of the transition from Late Geometric to Archaic periods.

While Late Minoan IIIC to Late Geometric remains have been exposed across the site, the clearest stratigraphy was exposed in 2003 and 2004 in the well-preserved deposits underlying the Service Complex of the Monumental Civic Building on the southwestern slope. Here it was noticed that the foundations for Archaic structures

the floor to a single schist-slab capstone (Figure 5). The stomion is constructed of a monolithic lintel and jambs. The walls are corbelled using both dolomite and sideropetra, or limestone, field stones. The floor is partially paved with three sideropetra and five schist pavers (Figure 5). On preliminary analysis, it appears that there were three inhumations with the earliest burials pushed to the back of the tomb, and the latest extending into the stomion (Figure. 6). The finds included a handmade juglet, a flask, a stirrup jar fragment, a skyphos, a juglet and a bowl, two conical ceramic whorls, and a bronze ring fragment. While some sherds on the floor of the tomb are LM IIIC in date, the vessels associated with burials are Protogeometric (Figure 7).

Figure 5: B3700: Tholos tomb interior.

Thus, in the seventh century, the modification of the southwest slope involved the deliberate filling and burial of a Late Geometric-Orientalizing building and an LM IIIC-Protogeometric tomb in order to accommodate a new street, probably connected to the construction of the civic buildings to the west. We think that this effective erasure of Early Iron Age structures is characteristic of a broader process of renovation and the reorganization of private and public space in the settlement in the Archaic period. We see signs of this urban renewal across the site, usually in the appearance of deep pebble and cobble fill deposits that conceal earlier constructions and contain displaced Early Iron Age occupation debris. This Archaic foundation fill is often found associated with the construction of massive-sometimes megalithic-spine walls that run along the natural contours, serving to structure habitation space and communication routes. The physical transformation of space, involving the alteration, obliteration, or complete concealment of the Early Iron Age topography, must also reflect changing social identities and a new political consciousness: the construction of a new urban environment required a deliberate disengagement from the Early Iron Age past.

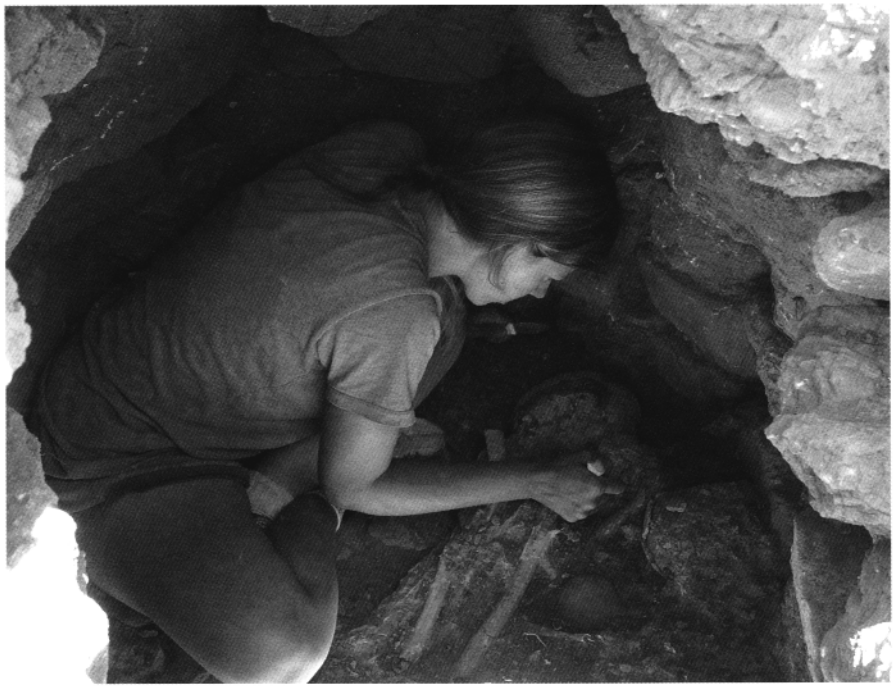


Figure 6: B3700: Melissa Eaby excavating within the tholos.

On the west slope of the South Acropolis, immediately north of the Monumental Civic Building and west of the Andreion Complex, two cult places came to light in 2006, allowing further reflection on the transition between the Early Iron Age and Archaic occupation phases. Immediately west and below one of the Andreion storerooms is a segment of wall 8 m. long, running north-south, and built against an outcrop of bedrock. The long wall is preserved to three courses and is bordered by a long low bench (ca. 0.27 m. high and 0.42 m. wide) constructed of cobblestones. The bench is preserved to a length of about 5.50 m. where a cut bedrock bedding along the wall face indicates the continuation of the bench up to the south wall of the room. The southern return wall is extant ca. 2.00 m. to the west. A bedrock/clay floor is preserved along the west side of the bench for about 1.0-

ders-perhaps work platforms-surrounding a small quern. Burning on the floor and a fallen roof beam in the south half of the room are indications of the Late Archaic destruction, which left a well-preserved assemblage including a pithos, a Geometric krater (Knossian PGB) (Figure 10), three transport amphorae, a lamp, an Attic exaleiptron, a bronze awl, an iron knife blade, an iron nail or obelos, a loom weight, and a schist lid.

Three things are intriguing about the shrines exposed on the west slope of the South Acropolis. First, their proximity to the main Archaic civic buildings-they occupy a space between the Andreion Complex and the Monumental Civic Building-suggests a cognizance or recognition and historical memory of a place of local significance or community cult, surviving the Early Iron Age. Second, the close juxtaposition of two shrines of very different date is probably evidence of continuity of cult activity in this area of the site. Finally, the condition of the LM IIIC shrine indicates that it had been respected and perhaps even avoided or maintained throughout the Archaic building phases. Contrary to the usual pattern of destruction, burial, or conscious concealment of Early Iron Age structures on the southwest slope, the shrine was probably left intact if unused throughout the Orientalizing renovation phase, during which the small two-room Archaic shrine was built on the terrace immediately below it. The finds from the Archaic shrine itself further demonstrate continuity. Geometric figurines (Figure 9) are found alongside seventh and sixth-century types on the altar of the south room, while in the north room, a whole Geometric krater (Figure 10) was recovered in the same floor deposit as a fifth century exaleiptron and lamp. This is to say, in the context of cult, both architecture and ritual equipment survive the urbanization phase. Objects were recycled for reuse in new contexts of ritual display, while EIA cult buildings are respected, if not effectively incorporated into the new urban topography.

Figure 9: D900: Geometric figurine from altar.

Figure 10: D1000: Geometric krater from the north room of the Archaic shrine.

In the seventh century at Azoria, differential responses to the Early Iron Age topography may reflect different kinds of social and political behavior in the emergent city. In general, the Archaic context of the EIA remains indicates a conscious effort to conceal the past by means of constructing a new civic material culture. Early Iron Age buildings and objects had a strong symbolic value requiring that they be carefully controlled and reintegrated into a new systemic context that emphasized new public venues of aristocratic display at the expense of visible references to local lineage connections-such as ancestral tombs (Figures 4-6). EIA objects were also selected and recycled (Figures 9-10). As antiques that had been removed from their original context, their meaning was perhaps connected not to specific places, people, or kinship groups, but to generic notions of antiquity; their meaning in the Archaic city was possibly general and intrinsic, formed independent of their specific origin in the new systemic context of the civic center. By way of contrast, because the EIA shrine and ritual artifacts were tied to ancient community cults, they could be maintained, preserved, and reintegrated into the fabric of the new Archaic city.

Financial support for the Azoria Project in 2006 was provided by the National Science Foundation (BCS-0438073), the National Endowment for the Humanities (RZ-20812; RZ-50334), the Institute for Aegean Prehistory, the College of Arts and Sciences, the Office of the Vice Chancellor for Research and the Department of Classics of the University of North Carolina at Chapel Hill, and the INSTAP Study Center for East Crete (in kind). ❑

The Preservation of Archaeological Metal Artifacts in Storage

By Kathy Hall

Metal artifacts contain much information that is unlikely be entirely revealed at the time of excavation. For example, microscopy can reveal information on casting and finishing processes, and elemental analysis provides data on alloy types. To avoid destroying evidence, conservators now avoid many of the more invasive treatments of the past. Heat treatments, for example, are no longer used, and even cleaning can remove information. Corrosion products may contain evidence of a surface treatment such as plating or a deliberate patination, or perhaps preserve traces of an organic component which was once an integral part of the artifact. They may even preserve residues from use. For this reason many conservators try to leave in place at least some corrosion product.

Conservators also try to ensure that collections of metal artifacts remain available for study for many years after excavation. Unfortunately, some archaeological metals are vulnerable to new corrosion. This is particularly damaging in iron artifacts, which can be reduced to piles of flakes on museum shelves. New corrosion can also be very destructive in artifacts of copper, bronze or other alloys of copper (henceforth copper alloy), on which it is sometimes called 'bronze disease'. The corrosion of archaeological metals is catalyzed by salts collected during burial and is vastly speeded up by the process of excavation (which provides more oxygen to the metals). During conservation, cleaning reveals preserved metal cores, and this can also accelerate corrosion.

Part of my work over the past three years has focused on preserving three major collections of metal artifacts; the collection at the Study Center, that at the BSA Knossos, and the material from the Lefkandi Toumba cemetery, which is stored in the Eretria Archaeological Museum. My experience working with these three different collections has helped me to clarify basic issues such as the likelihood of artifacts to corrode, and the most effective methods of stabilization.

For archaeological ironwork, the likelihood of massive destruction mostly depends on how much metal remains at the core. This is revealed by a simple calculation of weight: volume. Much work remains to be done on chemical methods of passivation of remaining iron cores.

Figure 1: Partially cleaned copper/alloy artifact.

Figure 2: Corroding iron artifacts.

In copper alloy artifacts, the likelihood of new corrosion depends on burial soil chemistry, soils with high levels of soluble salts being the most damaging. Since soil chemistry varies over sites, it is difficult to determine stability without having a soil sample for every metal artifact. Broad patterns were noted, such as the likelihood of severe corrosion in artifacts from certain sites, or even specific areas of sites,

2006 Report on the Friends of the INSTAP Study Center for East Crete

I am happy to announce that our goal of $20,000 for the creation of an Archive for the Study Center has been met, thanks to all of your generous donations. Construction will be finished this spring, and we are all very excited with the prospect of increased storage space for records and an improved plan of space usage for the Library.

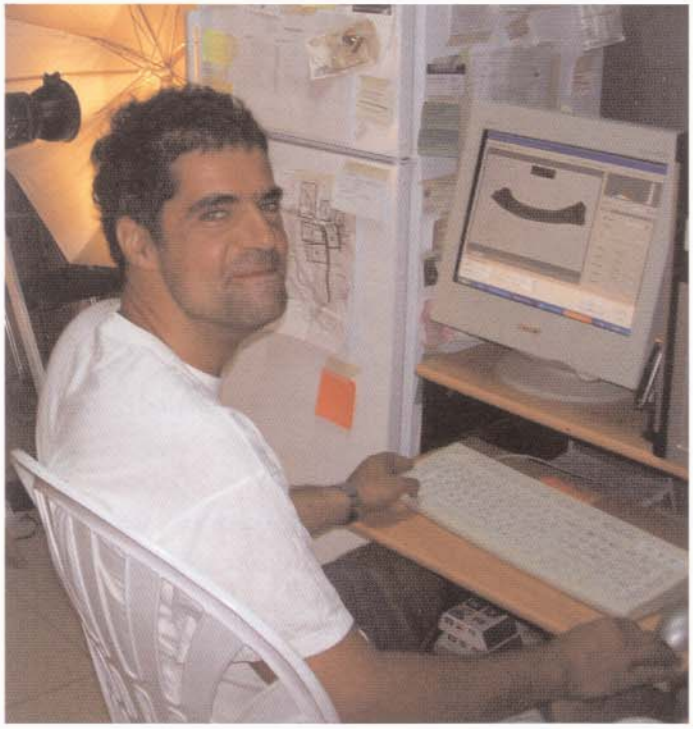
The Friends of the INSTAP Study Center for East Crete have hosted three Aegean Bronze Age lectures at the University of Pennsylvania Museum this past year. Our first lecture was held on April 6 and featured Nanno Marinatos who spoke of the controversial Ring of Minos and Minoan Afterlife Beliefs. Andreas Vlachopoulos spoke on April 18 in a lecture titled "The Wall Paintings from Xeste 3, Akrotiri, Thera in their architectural context." Finally, on October 23 Colin Macdonald presented a paper titled "From Palace to Monument or Vice Versa? Aspects of the Archaeology of the Palace of Minos at Knossos." All three lectures were very well attended, and all were followed by a gala dinner during which interested participants could meet the speakers.

Our next lecture will be held in the spring, and the date is yet to be announced. The speaker will be Clairy Palyvou, a top specialist in Aegean Bronze Age Architecture, who has recently published her book Akrotiri, Thera: An Architecture of Affluence 3,500 Years Old. Invitations will be mailed out this spring. I look forward to seeing all of you who can attend in the spring!

In conjunction with the annual AIA meetings, this year in San Diego, the Friends of the INSTAP Study Center will host a party for the Study Center on January 5, 2007 at the San Diego Marriott Hotel and Marina from 8:00 to 10:00 pm. All of you are invited to attend and catch up with colleagues and friends.

Elizabeth Shank

Azoria team members hard at work on pottery from the site.



Chronis Papanikolopoulos in the Photography Laboratory.

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Tina McGeorge, David Reese, and Jane Hickman with several bones from the Hagios Charalambos Cave.

Crete

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