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The Newsletter of the INSTAP Study Center for East Crete

Volume 13 (Fall 2010)

2010 GREEK-AMERICAN EXCAVATIONS AT MOCHLOS

By Jeffrey S. Soles and Costis Davaras

The 2010 Greek-American excavation at Mochlos was carried out during the months of June, July, and August. Its main goal was to reveal earlier settlement remains, particularly Prepalatial remains lying beneath the Neopalatial settlement on the site, in order to answer questions about state formation. To reach these remains at Mochlos, however, it is necessary to dig through multiple layers of later occupation: Hellenistic, Mycenaean, Neopalatial and Protopalatial, all of which are stacked on top of each other (Soles, *Kentro* 12, 2009, fig. 1). While digging through the Hellenistic levels at the western side of the site, in the area Richard Seager identified as Block A in his 1908 excavation (designated as Area 4 in this year's excavation), the project made a spectacular and wholly unexpected discovery. A large Hellenistic building, which appears to have been used as a public dining facility, was located here lying just below surface. In 2004 the project excavated its kitchen and found a coin of P. Canidius Crassus lying on its floor (Soles and Davaras, *Kentro* 8, 2005, p. 11, fig. 2). Dating to 34–32 BC, it provides a good date for the end of the Hellenistic occupation at Mochlos. This year we excavated the building's dining room, and then digging beneath this room we encountered wall collapse of a LM IB building on top of which the Hellenistic building sat. The remains of an ivory pyxis (Figure 1) and ten ivory hair pins lay inside this wall collapse. They originally sat on an upper floor of the Minoan building along its eastern wall facade, and when this wall collapsed at the time of the LM IB destruction, they fell with the wall into a basement room located beneath. They were broken in the collapse and the ivory pyxis also showed traces of burning, but many pieces survived, and Stephie Chlouveraki, Chief Conservator of the INSTAP Study Center, was able to do an excellent job reconstructing the pyxis and the pins.

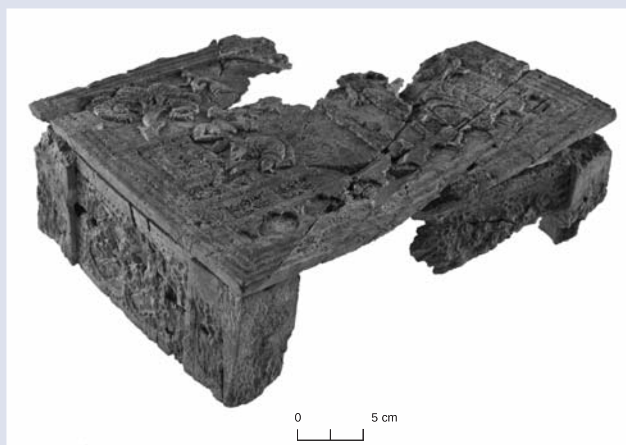

Figure 1. The Ivory Pyxis.

The pyxis was a rectangular box with its sides and lid made of elephant ivory and its base made of wood. Its lid measures ca. 0.11 by 0.14 meters and was designed to be lifted on and off the box below. The side panels were carved in low relief with a seascape while the lid was carved with a scene showing the epiphany of the Minoan Goddess. It is a well-known scene shown on many contemporary gold signet rings, including the Ring of Minos, where the goddess appears twice, both descending from the sky and then seated after her arrival (Dimopoulou and Rethemiotakis 2004). It resembles other depictions, including the fresco of crocus gatherers from Xeste 3 at Akrotiri, in that the scene is set on a stage supported by incurved altars. As C. Palyvou has recently noted (2006), this was a prefabricated stage that could be assembled, disassembled, and moved around. It was used for the performance of religious spectacles, like the one depicted in Xeste

3 or the one on the Mochlos pyxis. On the pyxis, the goddess sits enthroned beneath a tree shrine and appears to hold a lily in her left hand. A procession of four figures approaches her from the right, two men and two women. The figure of the goddess survives virtually intact, but unfortunately, the upper part of the figures to the right was lost during the building's destruction, so it is unclear exactly who they are or what is happening. It appears, however, to be a presentation scene in which the first male figure, who is larger than the other figures, introduces a male-female couple to the goddess, while a female attendant stands at the rear. The first figure is recognizable by his pose with his left arm lying at rest behind him and by the elongated proportions of his legs: he resembles the figure on the gold ring from Poros who stands and addresses the goddess with outstretched arm (Dimopoulou and Rethemiotakis 2000). He is sometimes identified as a god or king, but he might also be a hero or ancestor figure who has the ability to communicate with the goddess. Whoever he is, the scene depicts a real event, one of a number of spectacles that were performed around the island of Crete and dominated Minoan society. Eighty amethyst beads lay inside the pyxis, many of them in situ with traces of string still preserved so that it was possible to identify two necklaces, one of small and another of larger beads. Other beads included a silver pendant in the shape of a bull's head, an assortment of carnelian beads, including one in the shape of a figure-of-eight shield, glass paste beads, including one in the shape of a lily, and other beads of lapis lazuli.

The project excavated in three additional areas of the Neopalatial settlement (Figure 2), and in the course of this work uncovered a more complete plan of the LM IB town, exploring its limits on the northeast, and excavating areas that had been incompletely excavated in the past. It also uncovered earlier phases of the Neopalatial town and evidence for the way it (and Minoan civilization with it) was destroyed.

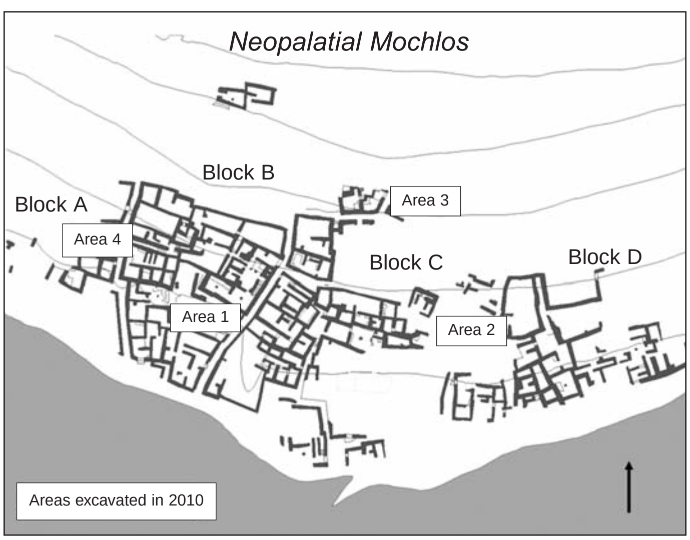

Figure 2. Plan of the LM I Town and Areas of the 2010 Excavation.

The project continued excavation along two of the town's major streets. To the north of Block C we excavated along the street that led up through the center of the settlement separating Blocks B and C (Area 3). This was the major street in the town, and certainly the longest. It employed cobbles as pavement but more often used simple bedrock, and both surfaces were worn smooth from frequent foot traffic. It was not possible to follow the road to its end, but it appears to have been heading toward a small cave located along the eastern side of the island. During the summer a fresh water spring was discovered below this cave lying about 2 meters below sea level, and it is thought that a natural spring may have been located in the cave above during the late Bronze Age, providing a water source for the Neopalatial town. The project also continued the excavation of the house that lay along the east side of this street, the southwest corner of which was exposed in 2009. The house was constructed at the beginning of the MM IIIA period, when the town's street system was laid out, and appears to have been occupied and remodeled through the whole course of the Neopalatial period. The town's major street runs along its west facade, turns to the east along its north facade and continues beyond it to the northeast.

We also explored the area between Blocks C and D (Area 2) where we found the continuation of the street that runs north-south separating Blocks C and D, the southern part of which was discovered in 1989 (Soles and Davaras 1992, p. 439, fig. 15, pl. 101C). A large stone-vase workshop was discovered in this area. It dates to the LM IB period and is remarkable for its size and the quality of its products, including a large unfinished vase of gypsum imported from Knossos and a large stone lamp with four spouts and a low pedestal that would have been a worthy product of a palatial workshop (Figure 3). At the time of the LM IB destruction, one spout of the lamp was broken off with a hammer stone and thrown across the room in an act of malice. It is an act characteristic of a lifelong enemy and one of several that can be documented on the site at the time of its destruction.

The project also continued excavating along the south side of the town's ceremonial building in Area 1 (Soles, *Kentro* 12, 2009, p. 12, fig. 2) where a paved terrace led to a small hypaethral shrine, the Theatral Area, which is thought to have been used for ceremonies involving ancestor worship (Soles 2010). Excavating in this area last summer, we uncovered a MM IIIA cooking space with a great hearth and a three-sided prism from Malia. This summer we removed the remaining slabs of the terrace and found four more closed deposits of the MM II, MM IIIA, MM IIIB, and LM

IA periods. Most of them belonged to kitchens and contained hearths with a rich array of organic material, including short-lived floral remains that should produce a good sequence of C-14 dates. The area is especially significant, however, because it was preserved, encased behind stone walls and paved over; it provided the only access to the Theatral Area that lay at its west end and one had to walk over the houses of earlier inhabitants on the site in order to reach this area.

In many places underneath the Neopalatial remains, the project came upon the Prepalatial remains it was seeking. EM IIB deposits were widely scattered across the site, one located toward the west beneath the LM IB House of the Lady with the Ivory Pyxis in Block A (Area 4), another located toward the northeast above Block C (Area 3), and still others in the area between. As a result, it is possible to estimate the size of EM IIB Mochlos at 6000 square meters, about four times that of the contemporary village at Myrtos (Fournou Korifi). The extensive overlay of later occupation will probably prevent us from ever uncovering an EM II town plan. What we have, however, are the extent of the town, a number of streets that may indicate a very different plan than that of Myrtos, and parts of several houses, two of which include workshop areas. One reported on last year, which contained a very small crucible for melting precious metals, a piece of gold sheet metal, obsidian blades for cutting sheet metal and a bronze tool for producing dot repoussé, was apparently used to make gold jewelry (Soles, Kentro 12, 2009, pp. 9-10). Another found in 2005 (Soles and Davaras, Kentro 8, 2005, p. 13, figs. 6, 7) was producing stone vases. The finds from these workshops resemble those from the Prepalatial cemetery that Seager excavated and provide sufficient evidence to refute any revisionist dating of that cemetery.

The most surprising of the early remains uncovered this summer, however, was a building complex located along the eastern edge of the Prepalatial cemetery. It was used during the EM I, EM IIA, and EM IIB periods, which makes it the oldest building ever uncovered at Mochlos. During this time it underwent several changes in design and apparently also in function. Initially in the EM I period it was occupied as a dwelling and used as an obsidian workshop. Part of its southwest room was actually excavated in 1989 and identified as part of Building Ξ (Soles and Davaras, *Hesperia* 61, 1992, p. 424, pl. 92); the small Building N also discovered in 1989 with over 10 kg. of obsidian cores, blades, burins and retouched flakes lies a short distance to its east (Soles and Davaras 1992, p. 424, pl. 91) and served as a waste depot for the workshop's production. At a later point in its history the building complex was used for a new purpose: several rooms were blocked and terrace walls were erected above, at least one burial was made in a small cist grave, the earlier southeast room of the building was reopened and redesigned for offerings, and the terrace walls were designed to accommodate cooking and feasting areas.

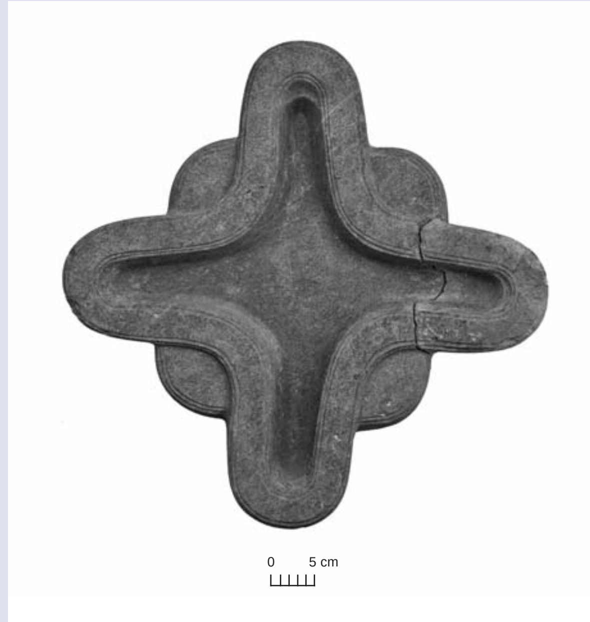

Figure 3. The LM IB Stone Lamp.

Bibliography

N. Dimopoulou and G. Rethemiotakis. 2000. "The Sacred Conversation Ring from Poros," *CMS Beheft* 6, 2000, pp. 32–56.

N. Dimopoulou and G. Rethemiotakis. 2004. *The Ring of Minos and Gold Minoan Rings, the Epiphany Cycle*, Athens.

K. Palyvou. 2006. "Οικοδομικές παρατηρήσεις μέσα από την τέχνη της Εποχής του Χαλκού: Τυποποιημένες, λυόμενες κατασκευές," in Y. Kazazi and N. Papapetrou, eds., *Πρακτικά: 2° Διεθνές Συνέδριο Αρχαίας Ελληνικής Τεχνολογίας. Proceedings: 2nd International Conference on Ancient Greek Technology*, Athens, pp. 417–424, fig. 7.

Soles, J.S. 2010. "Evidence for Ancestor Worship in Minoan Crete: New Finds from Mochlos," in O. Krzyszkowska, ed., *Cretan Offerings: Studies in Honour of Peter Warren*, Oxford, pp. 331–339.

Soles, J.S., and C. Davaras. 1992. "Excavations at Mochlos, 1989," *Hesperia* 61, pp. 413–445.

EXCITING TIMES FOR THE EARLY PREHISTORY OF CRETE: THE RESULTS OF THE PLAKIAS "MESOLITHIC" SURVEY

By Thomas Strasser

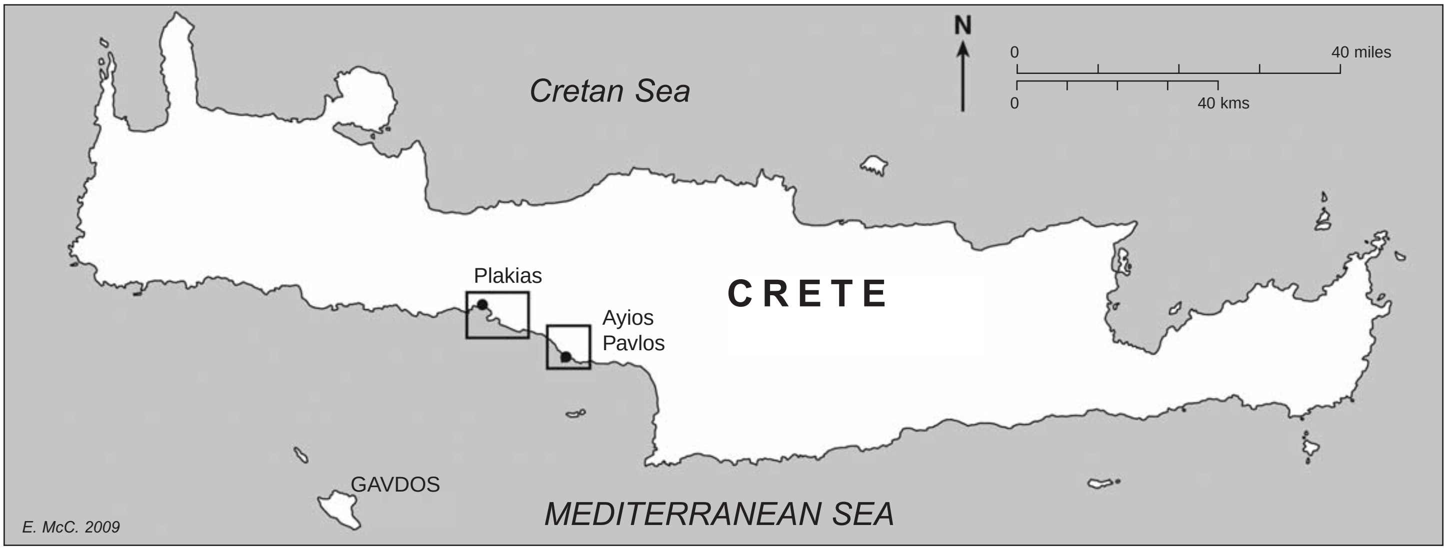

Figure 1. Map of Crete showing the survey areas.

In 1992 when I completed my dissertation on the Neolithic of Crete, I would have scoffed at claims of Palaeolithic on the island. The conventional wisdom and entrenched paradigms blinded me to the possibilities of early hunter-gatherers in the Aegean archipelago. I only thought that perhaps there might be some Mesolithic since data from other islands sites convincingly demonstrated occupation.

In 2005 at the AIA meetings in Boston, I listened to Curtis Runnels' talk on a model that he, Eleni Panagopoulou, and Priscilla Murray had developed to find Mesolithic sites in the Argolid. I asked him to join me on Crete where we conducted a survey (with generous funding from INSTAP) and not only found Mesolithic artifacts, but, astonishingly, Lower Palaeolithic tools. To our amazement, what we all had been taught in graduate school—no Palaeolithic occupation of the islands—was wrong.

There had been claims of Palaeolithic artifacts on Crete, but none were convincing. Based on recent discoveries on other islands such as Cyprus (Akrotiri-*Aetokremnos*) and Kythnos (Maroulas), I thought, however, that a Mesolithic presence on Crete was likely. Crete is a large island, and I did not know where to start. Morever, Mesolithic artifacts are notoriously difficult to recognize due to their small size. Runnels suggested a directed survey where the surveyors did not walk every possible field but got to where Mesoliths lived, and where the environmental factors allowed for artifact preservation.

The Plakias and Hagios Pavlos coastal areas in the Rethymnon *nomos* (Figure 1) were selected for a targeted survey because they have environmental characteristics that closely approximate the preferred site locations of Mesolithic foragers as demonstrated by discoveries in Epirus, the Argolid, the Sporades, Cyclades, and Cyprus. The survey areas have numerous gorges with perennial rivers incising them to the south and out to the Libyan Sea. There would have been extensive wetlands in the early Holocene as the sea level was rising. In addition, local fault scarps have numerous caves and rock-shelters, usually associated with springs, which would have been suitable as shelters for hunter-gatherers. The site-location model concentrates on limestone caves near fresh water estuaries in regions where the present shoreline is near the sea level in the early Holocene, which is determined by the existing bathymetry and application of models for eustatic sea-level curves. These regions proved fruitful for the predictive site-location model.

Using this method, 29 lithic scatters were found and sampled (Figure 2). Because the goal of the project only was to determine the presence or absence of assemblages of Mesolithic type, we made small collections of representative lithics—typically 100 pieces but sometimes 500. We collected cores, core-working pieces, complete flakes, and microliths (Figure 3). In short, our method was to take non-random judgmental grab samples from each site.

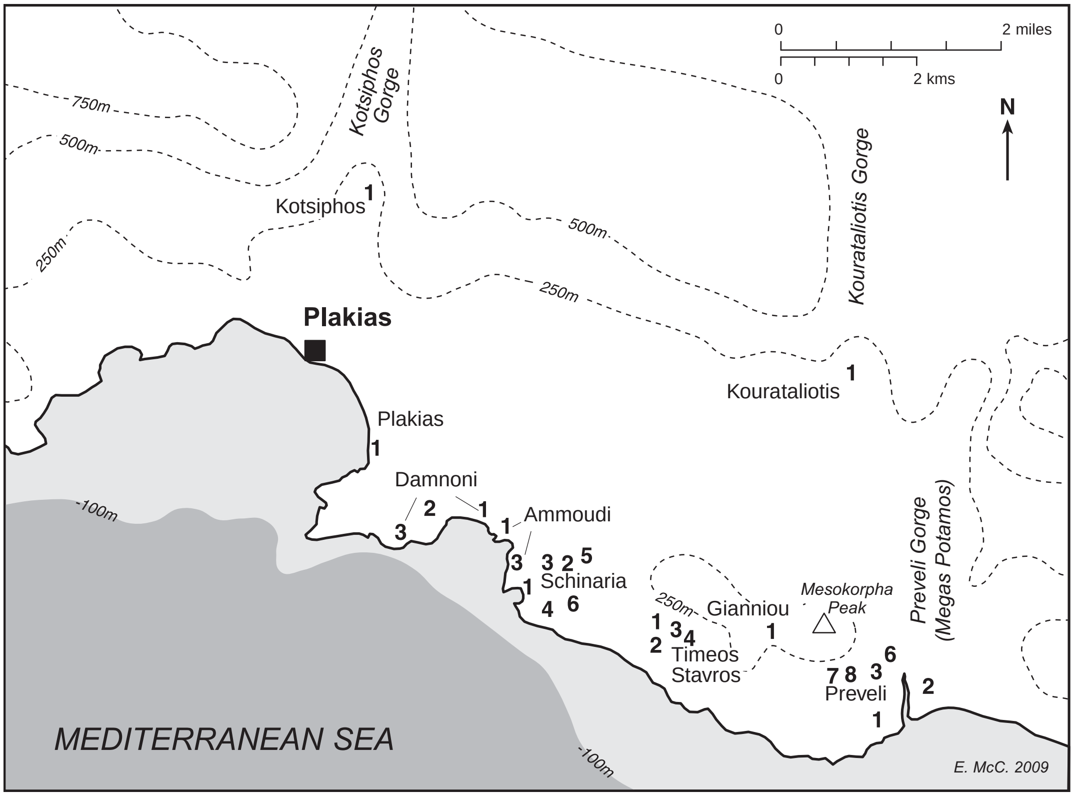

Figure 2. Map of the Plakias region where many of the sites were found.

Unexpectedly, we found Lower Palaeolithic sites. They are located in areas similar to Mesolithic sites to facilitate hunting strategies and to give access to fresh water and outcrops of raw material. The southern-facing cliffs of the Preveli gorge had several scatters. The Lower Palaeolithic assemblage is made of massive quartz, mostly dull, opaque, and blocky. The assemblage is similar to the Acheulean assemblages and is distinguishable from the Mesolithic by the larger size of the cores, debitage, flakes, and tools, which are typically 8 to more than 15 cm in length. The bifaces (i.e., hand axes) are variable in form, ranging from double pointed to ovate (Figure 4).

Figure 3. Mesolithic Microliths.

The implications of these finds are very significant. Since Crete has been an island since the Messinian Event, almost six million years ago, early hominins had to reach Crete by sea. This is, by far, the earliest indication for seafaring in the Mediterranean.

The priority for the 2009 season was to establish a date. Luckily, we found Karl Wegmann, who had just completed his dissertation on the tectonic uplift rate around Preveli Gorge. Our dating pushes back the evidence for sea-faring in the Mediterranean to more than 125,000 years ago, and most likely much earlier. The *terminus ante quem* of 125,000 years is a very conservative estimate. Moreover, the data demonstrate that the first hominin migration out of Africa involved the crossing of the open sea. We have published the artifacts (*Hesperia* 79, pp. 145–190), and now we are working on an article to explain our dating techniques based on Karl's important research.

We are planning to excavate one of the Mesolithic sites in 2011 with the hopes of finding stratified deposits with organic remains that can be dated by C-14. These are exciting days for the early prehistory of Crete. Now that we know where to look and what to look for, I believe that the upcoming decades will change drastically our understanding of hunter-gatherers on Crete. The Greek archaeologist Antonis Zoïs predicted this a long time ago, well before I was in graduate school. At that time, the rest of the scholarly world was against him, but now it seems he was right.

Figure 4. Quartz hand axe as found.

REPORT FROM JEROLYN E. MORRISON 2010 RIP RAPP DOCTORAL FELLOW

By Jerolyn E. Morrison

A potter's note about the use of raw materials to produce Minoan cooking pots

"A potter's prime need is good clay. Whether he be industrial, peasant or studio potter the raw material of which pots are made is of fundamental importance. Upon the quality of the clay depends the strength and still more the character of the finished pot."

— Bernard Leach, 1976, p. 43

As a potter, the more I study ceramics from an archaeological point of view, the more I come to understand better the relationships between craft production, the potter's community, and the creative process. How a potter develops tool kits and workspaces, produces vessels, and decides which vessel types to carry in his repertoire all reflect the community in which he lives and works. These cultural and environmental aspects of a potter's life inherently affect the appearance of each vessel.

Most ceramicists are taught that there are six basic steps for pottery production: (1, 2) locating and processing the potting materials, (3, 4) forming the vessel and applying a surface finish, and (5, 6) drying and firing the vessel. Within these six steps there is a wide range of variability that are dependent upon the following: environmental conditions in which the potter works, the technology and the techniques used to produce pottery, the physical nature of the potting materials, as well as the potter's preferences, skill levels, and imagination.

The ceramic specialist endeavors to reconstruct as many aspects of an ancient potter's life by using methods of environmental reconstruction and archaeological data to reconstruct the natural world in which the potter lived. For example, a potter would organize his workspace and activities dependent on the climate where he worked. Environmental reconstruction can help to identify resources for compiling the potter's tool kit. I take a potter's tool kit to contain anything that facilitates pot making. The most obvious components are the clay(s) and the tempering material(s). Actual tools would include: vessel-forming devices (scrapers, wooden paddles, molds, and fast and slow potters' wheels), tools for applying surface finishes (pieces of leather and cloth), implements for polishing the surface (bone, shell, wood, and stone), tools for coating and decorating the surface with slip and/or paint (brushes and sponges), and equipment for cutting out and/or impressing designs on the surface (knives and stamps).

Once aware of the parameters of the ancient environment, an archaeologist can better interpret the archaeological record to identify the types of tools, techniques, and technologies used by a potter. Usually, a ceramics specialist will use both a detailed fabric analysis and a macroscopic stylistic examination of a vessel to determine the stages of its production and tools that were used. To gain a better understanding of how the cultural and the practical aspects of potting practices and technologies are linked, the specialist can include ethnography (studying similar products in modern society) and experimental archaeology (recreating the circumstances and techniques employed in antiquity) in their studies.

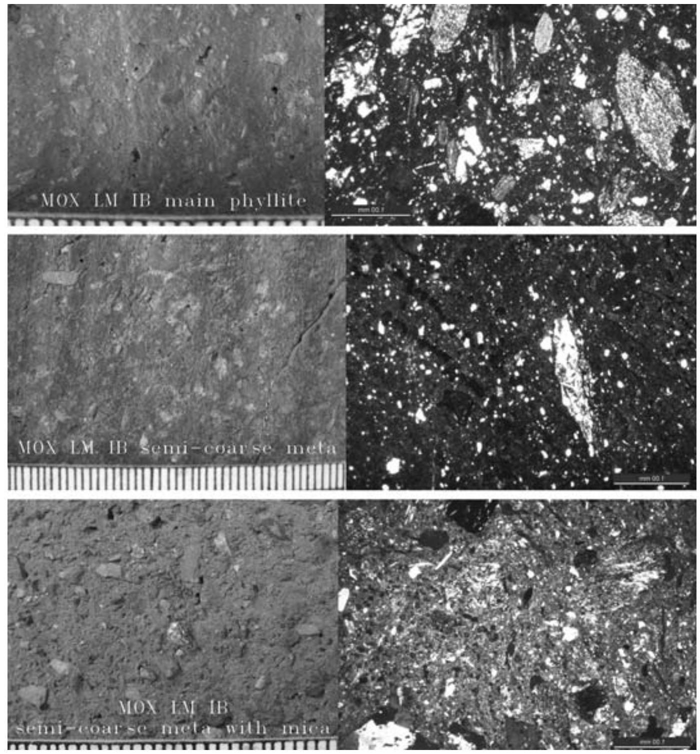

Figure 1. Mochlos LM IB cooking pot fabrics, macroscopic image is on the left and the petrographic image is on the right. Top panel: main phyllite. Middle panel: semi-coarse metamorphic. Bottom panel: semi-coarse metamorphic with mica.

The Experimental Background and Procedure

In my doctoral thesis, "The Art and Archaeology of Cooking: The Case of Mochlos, Crete," I am investigating the production and the use of cooking pots. I am using an interdisciplinary program that combines the use of previous archaeological research, environmental reconstructions for Bronze Age Crete, written accounts and images, and experimental work based on my experiences in the ceramic studio as a formally trained potter. The common element throughout is the relationship between the potters and their clays. This relationship is important since the material limitations of the clay affect the potter's choices throughout the steps in the production process. By developing an experimental

Figure 2. Mochlos Purple Phyllite Hill clay.

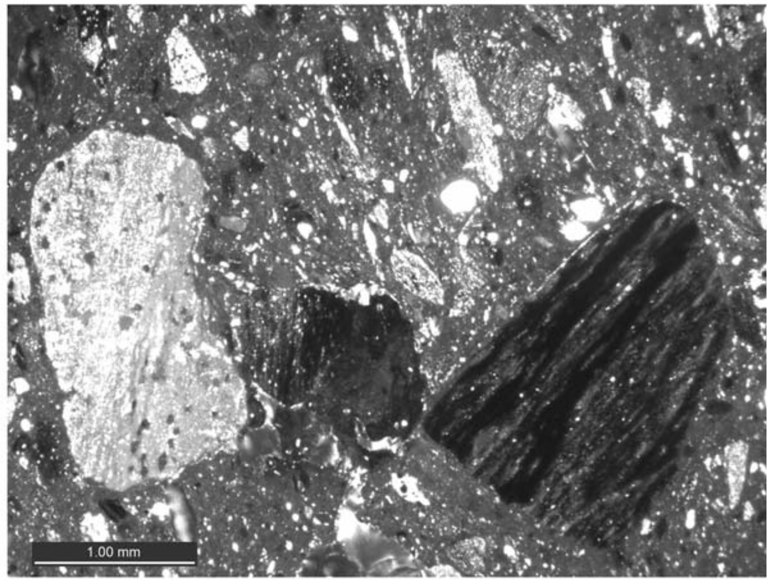

Figure 3. Mochlos Development Red clay.

program, I am able to experience what issues an ancient potter would have faced, from gathering the clay to firing the finished pot. To demonstrate how experimental archaeology can assist in understanding ancient pottery techniques, I can use my own work on recreating the first three steps of the potting process based on pottery from the site of Mochlos in East Crete. These preliminary findings are presented here.

Step 1: Locating and Collecting Potting Materials

Fabric studies of the medium-to-coarse wares indicate that Late Minoan (LM) IB Mochlos potters used materials from the East Cretan Phyllite-Quartzite series to produce a range of vessels from cups to cooking pots. In terms of cooking pot production, the LM IB potters used three types of clay bodies: a main phyllite, a semi-coarse metamorphic, and a semi-coarse metamorphic with silver mica (current collaboration between Barnard, Nodarou, and Morrison) (Figure 1). It is unclear whether these fabric types are a result of natural variation within the geological deposits, or if the clay was manipulated intentionally by the potters.

The closest outcropping of these sorts of potting materials (e.g., clays and tempering agents) to the Minoan town and the LM IB Artisans' Quarters at Mochlos is in the nearby Limenaria Cove (Soles 2003; Barnard and Brogan 2003; Nodarou et al. 2008); two clays also have been located.

The Purple Phyllite Hill (PPH) is residual clay that is derived from the purple shale and phyllite that comprise a significant portion of the East Cretan Phyllite-Quartzite series in the Mochlos region. The clay is purple with red and purple phyllite, quartzite, milky-white quartz, and metamorphic aplastics (Figure 2). The Development Red (DR) is most likely secondary terra rossa clay derived from limestone that "picked up" metamorphic materials from the East Cretan Phyllite-Quartzite series as it "moved" from its original location to the Limenaria deposits. The clay is red-orange with silver and green phyllite, milky quartz, and other metamorphic aplastics (Figure 3). Because the PPH and the DR clays closely match the archaeological material, I collected quantities of each.

Step 2: Processing Potting Materials

The 2–3 mm round and the sub-angular inclusions in the LM IB Mochlos cooking pot fabrics suggest that the aplastic inclusions occurred naturally in the clay. In the collected clay samples from Limenaria, the same type of aplastics measure well over 3 mm. In fact, the inclusions are so large and plentiful that many must be removed to form a pot. If the LM IB potters used outcrops similar to these, then they would have had to sieve out the larger inclusions with a basket or netting with 2–3 mm holes. Working from this assumption, I wet sieved the PPH and the DR clays through a 2 mm screen to remove the unwanted larger inclusions and organics, such as twigs and leaves, and stored the clays in large ceramic jars.

There is little archaeological evidence to suggest that Minoan potters wet sieved their clays, but they had access to materials necessary to make sieves and large jars to store clay. I used the wet sieving method to clean the clays to prevent the removal of the finer clay particles by the strong Cretan winds. If a dry sieving process was used, a significant amount of potting material would have been lost.

Wet sieving and storing the clays for a long period in water helps the aging process. The clays became completely hydrated, and micro plants and bacteria that were present in both the clay and the water had time to grow and settle between the microscopic clay platelets, thus making it more plastic. Aging is one way to improve the plasticity of a clay so that it can be formed and hold its shape through the drying and the firing processes. You can also make clays more plastic by adding temper; however, the current theory holds that the Mochlos LM IB fabrics do not have tempering. At this stage of the experimental study, aging the clay in water for a significant period was my most viable option.

The clays were aged for about three years. In 2007, the clays were collected, wet sieved, and left to soak in water for five months. In 2008 and 2009, the clays were soaked in water from five to seven months. In 2010, the clays were removed from the jars and left to dry to a workable consistency. Once they were the proper consistency, I kneaded the clays to remove unwanted particles that had passed through the screen during the cleaning process, to take away air pockets that could endanger the drying or the firing of the vessel, and to align the clay particles so I could more easily throw the clay for potting on the wheel.

Figure 4. Throwing Mochlos clay on the wheel using slip-slurry. Photograph by S. Kaminis.

Figure 5. Throwing Mochlos clay on the wheel using slip-slurry. Photograph by S. Kaminis.

Step 3: Forming the Vessel

There is much evidence for the use of the potters' wheel in the LM IB Artisans' Quarters (Soles 2003), yet how this tool type was assembled and used for pottery production remains an open debate with several plausible options (Evely 1988). In terms of cooking pot production, the wheel-throwing rills on the interiors of the Mochlos LM IB tripod cooking pots indicate that the vessels were produced using some form of wheel technology. With this in mind, I picked up a lump of kneaded clay and began working it using a kick-wheel.

As a potter, at first I thought that throwing the clay on a wheel was not going to work. The majority of the time, after I had opened up the centered lumps of clay to form a shape, they would crack. The few times I was successful, the centered lumps of clay cracked the moment I squeezed clean water from a sponge onto them for the needed lubrication to form the vessel wall. The clay was simply not plastic enough to form a vessel with the speed and pressure that I was using. Quickly, I remembered two key points from my experience with forming vessels on the replicated LM wheel (Morrison and Park 2007; Evely and Morrison 2010). For that exercise, I had used a much slower speed. Each time I moved the clay to form the shape, the movement had to be direct and swift. If I did not approach the clay in this manner, it was impossible to manipulate it to form a pot.

With this in mind, I kneaded more clay to throw. I turned the kick-wheel using a much slower speed. This approach worked better than my previous attempts. I was able to make small cylinders, but when I used fresh water to lubricate the vessel wall to pull it out to form a more rounded shape, the clay still cracked. I decided that the clay was simply too short (not plastic enough to be formed into and hold a shape) to throw on the wheel. Knowing that the Limenaria clay samples match the fabric of the LM IB cooking pots, I could not give up. I decided to try another type of construction technique. I have collected experimental and archaeological evidence that supports the theory that LM IB potters could have used a construction method referred to as "coil and wheel-fashioning" to form tripod cooking pots and cooking jars (Courty and

Roux 1995). Using this technique, I was able to produce several small spouted pots. The coil-and-wheel fashioning technique worked better, yet minor cracks still appeared when fresh water was applied to the vessel's surface.

Confused, I revisited the archaeological cooking pots to look for answers. Finally, it occurred to me that perhaps what archaeologists identify as a self-slipped or a slipped surface was really a by-product of throwing the vessel on the wheel, rather than a separate process intentionally applied to the pot after it was formed. If this were the case, then the potter would have used a slip-slurry to lubricate the clay to throw the vessel rather than fresh water. For my next round of pot making, I used a slower wheel speed and a slip-slurry rather than fresh water to lubricate the centered lumps of clay for throwing (Figures 4 and 5). This combination solved the problem. The clay no longer cracked, and I was able to produce small spouted pots (Figure 6).

Figure 6. Prototype of LM spouted tripod cooking pots. Photograph by S. Kaminis.

The Conclusion

Producing pottery is a sensory experience, meaning that trained potters use their eyes, fingertips, ears, and even nose and tongue to "listen" to the clay during all stages of the production process. The more one pots, the more sensory knowledge is gained, allowing a potter to intuitively problem solve through the production of each pot. In archaeology, a potter's knowledge is apparent in the final form of the vessel; however, there are other processes that cannot be detected. Without this missing information, a specialist might jump to inaccurate conclusions when trying to solve the puzzle of technological problems in antiquity. This is why I believe that the experimental work is an important component along with the material properties of the clay to define technologies.

In this case study, I have shown the important role of hands-on investigation. When this type of "re-enactment" is combined with the detailed study of ceramic fabrics and macroscopic stylistic analysis, we can at last begin to glimpse more of the life and work of potters at LM IB Mochlos.

When I applied my findings to archaeological cooking pots, I shed light on two important aspects of the production process. First, throwing the small spouted pots at a much slower speed on a modern kick-wheel is similar to the experience I had throwing small pots on a replicate of a Minoan potter's wheel (Morrison and Park 2007; Evely and Morrison 2010). This suggests that since large lumps of the clay are needed to throw medium sized vessels, it would be difficult, if not impossible, to do this with a clay that was not very plastic. Secondly, I realize that the Mochlos potters probably used a coiling- and wheel-fashioning construction method, rather than only wheel throwing their pots.

In terms of creating ceramic cooking pots that are able to hold liquids and other sorts of foodstuffs, most require some sort of surface pre- or post-firing treatment. Using a slip-slurry as lubrication to throw the clay into a form naturally creates a slipped surface on both the interior and the exterior of the vessel's wall while it is being formed. This is an important observation, since most ceramic specialists identify the surface of LM vessels as having either a self-slipped or slipped surface. The process of self-slipping and the application of a slip to the vessel's surface are methods that potters use once the pot is completely formed. These approaches are very different and require the potter to organize the production process accordingly.

Personal experience and experimentation combine to elucidate the relationship between human behavior and material culture. If we only examine the archaeological material, we can identify certain clues to ancient potting practices. If we add experimental archaeology and ethnography to the mix, however, the past becomes much more dynamic.

Bibliography

Barnard, K. and T. Brogan. 2003. *Mochlos IB: Period III. Neopalatial Settlement on the Coast: The Artisans' Quarter and the Farmhouse at Chalinomouri. The Neopalatial Pottery*. Philadelphia, INSTAP Academic Press.

Courty, M. A. and V. Roux. 1995. "Identification of Wheel-throwing on the Basis of Ceramic Surface Features and Microfabrics," *Journal of Archaeological Science* 22, pp. 17–50.

Evely, D. 1988. "The Potters' Wheel in Minoan Crete," *Annual of the British School at Athens* 83, pp.83–126.

Evely, D. and J.E. Morrison. 2010. "The Minoan Potter's Wheel: A Study in Experimental Archaeology," in *Proceedings of the 6th International Congress on the Archeology of the Ancient Near East,* vol. I, Harrassowitz: Weisbaden. Matthiae, P., F. Pinnock, L. Nigro, and N. Marchetti, eds., pp. 283–288.

Leach, B. 1976. *A Potter's Book*. London, Faber and Faber.

Morrison, J. and D. Park. 2007. "Throwing Small Vessels in the LM IB Mochlos Potters' Pit," *Kentro* 10, pp. 6–10.

Nodarou, E., C. Frederick, and A. Hein. 2008. "Another (Mud)brick in the Wall: Scientific Analysis of Bronze Age Earthen Construction Materials from East Crete," *Journal of Archaeological Science*, 35.11, pp. 2997–3015.

Soles, J. 2003. *Mochlos IC: Neopalatial Settlement on the Coast: The Artisans' Quarters and the Farmhouse at Chalinomouri*., Philadelphia, INSTAP Academic Press.

Acknowledgments

I owe a debt of gratitude to Jennifer Moody, Ian Whitbread, Jeff Soles, Philip Betancourt, Eleni Nodarou, and Carl Knappett for inspiring discussions and willingness to exchange ideas. Tom Brogan allowed me to "set-up shop" as a working potter at the Kentro. Sherry Fox granted me access to the Wiener Laboratory in Athens. Stephanos Kaminis captured the beauty of throwing pots in his photographs. I would especially like to thank Jim and Jerolyn T. Morrison for their unyielding support and love. My research would not have been possible without generous funding from: INSTAP, The American School of Classical Studies at Athens, The Fulbright Foundation, and Leicester University.

INTERNATIONAL SYMPOSIUM IN ATHENS PETRAS 1985-2010: 25 YEARS OF EXCAVATIONS AND STUDIES

By Metaxia Tsipopoulou

An international two day symposium to celebrate the 25th anniversary of excavations and studies at Petras, Siteia was held in Athens at the Danish Institute on the 9th and 10th of October 2010, supported by INSTAP. The aim of the symposium was to present to the archaeological community the various aspects of the archaeological site of Petras, including its long history from the Final Neolithic to the Byzantine period, its relations with neighboring sites, and the recent finds from the excavations of the Prepalatial cemetery on the Kephala hill. Twenty-four scholars from six different countries (Greece, the United States, Canada, Italy, England, and Denmark) presented very interesting papers. Nine scholars acted as chairpersons. As the Director of the excavation, I opened the symposium with an overview of the excavations, studies as well as the public outreach at Petras since 1985. Our final discussion was chaired by Alexander MacGillivray.

More than 100 people attended the Symposium and contributed significantly to the lively discussions. The speakers and chairpersons enjoyed two more events, a reception at the house of Metaxia Tsipopoulou and David Rupp on the eve of the Symposium and a dinner at the Cretan restaurant *Katzourbos*.

I wish to express my warmest thanks to all the speakers and chairpersons, and also to the participants of the symposium. My deep gratitude goes to INSTAP and to Philip Betancourt in particular, for his support and his encouragement. Last but not least I wish to acknowledge the significant efforts by Garyfalia Costopoulou and Maria Psallida, who with their hard work, patience, humor, and persistence, assured the success of the Symposium, and made possible the web-site.

The next step will be the publication of the proceedings of the Petras Symposium, and I am pleased to announce that The Danish Institute has accepted to include the volume in its series.

The Harbor of Gournia: Fieldwork in 2008 – 2009

By L. Vance Watrous

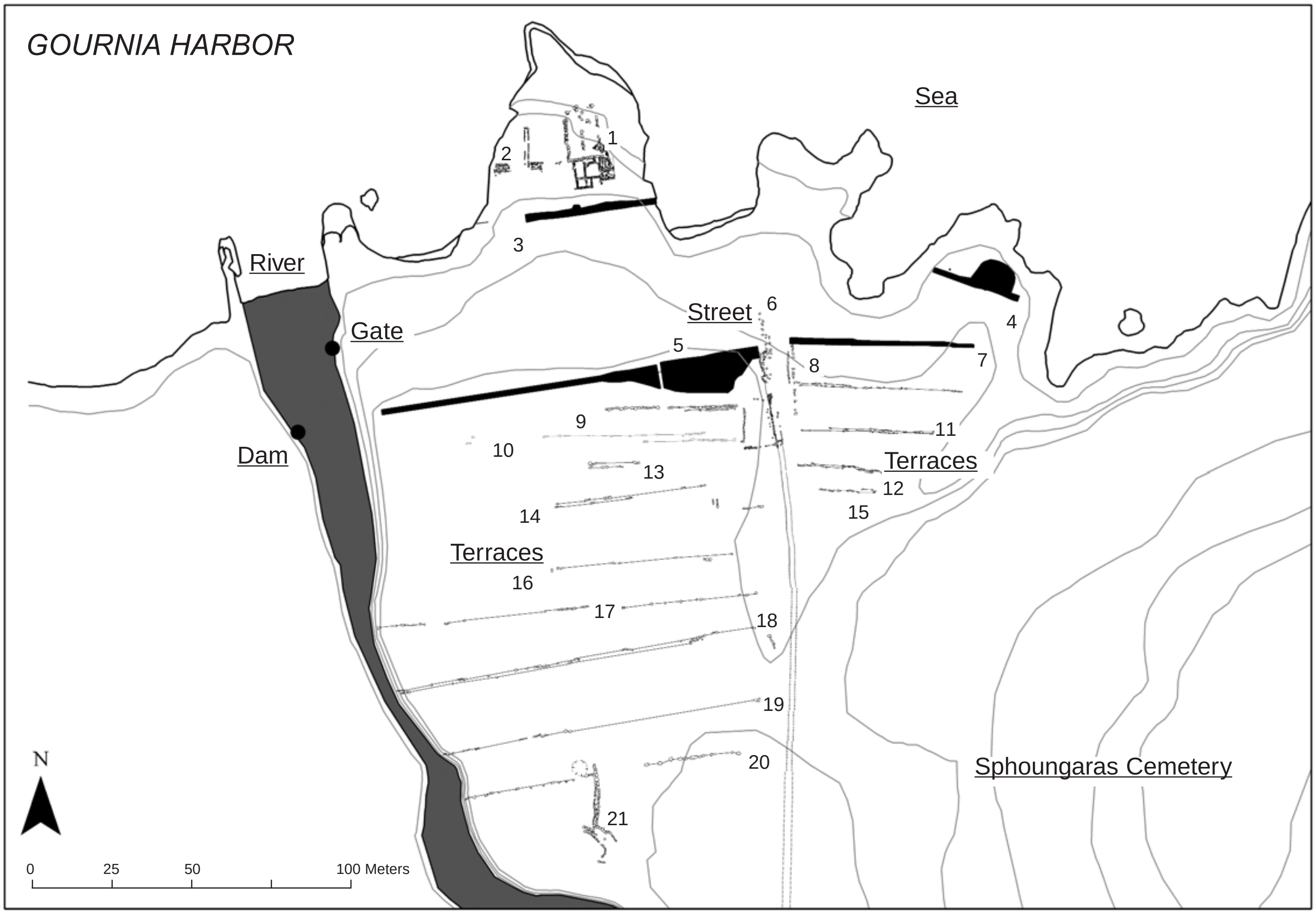

Figure 1. General Plan of Minoan Remains along Coast at Gournia. Plan by Matthew Buell.

In 1992, Costis Davaras and Vance Watrous, co-directors of the Gournia Archaeological Project, carried out a survey around the site of Gournia, including along the coast (Figure 1). Bounded on the west by the river and on the east by the steep slope of Sphoungaras, this area extends southward from the sea 400 meters to the settlement of Gournia. We found numerous long walls there, noted by Harriet Boyd (1908: p. 20) in 1901 that did not seem to be part of the urban settlement. Our interest piqued, in 2008 and 2009, we applied for, and with the support of the 24th Ephorate of Prehistoric and Classical Antiquities, obtained a permit to make a plan of these walls. Our cleaning and mapping revealed the harbor facilities of Gournia, consisting of a natural wharf, a monumental ship-shed, a system of fortification walls with towers, a cobbled street, and, farther inland, a series of agricultural terraces.

The shoreline north of the Gournia town and east of the river ends in four promontories. Counting from the river, the first and third ones have high cliff faces. The second and fourth promontories slope gently down to the shore, allowing easy access from the sea. It was only on these two that the Minoans built.

The second, largest promontory is covered by a monumental structure that Boyd called the Shore House (Figure 1: 1). In 1901, she excavated the west façade (Figure 2) of this building and three

Figure 2. View of the west façade of the ship-shed (Shore House). Photograph by Janet Spiller.

rooms adjoining it to the south. Cleaning showed that the building is a ship-shed consisting of two large galleries running northward out toward the sea and at least three rooms partly extending under its south wall. Built of specially chosen pale gray limestone boulders, the ship-shed measures at least 25 meters north-south and 10 meters east-west. Similar in material, masonry, and monumental scale to the palace at Gournia, the ship-shed galleries seem to have been built at roughly the same time as the palace, probably in MM III A. Pottery recovered from the Shore House is predominantly large and medium-sized storage jars. Two of the south rooms already had been constructed by MM II. When the galleries were destroyed, probably by the effects of the Theran eruption, their walls collapsed inwards filling the interior with rubble. North of the ship-shed, the bedrock promontory juts out into the sea. Holes cut into the edge of bedrock would have allowed moored ships to be tethered to the promontory.

Some ten meters directly west of the Shore House, two walls (Figure 1: 2) form a right angle along the cliff edge. An east-west casement construction runs from the cliff towards the Shore House as if to block access from the sea. Although poorly preserved on the east, the wall probably connects to another wall that runs northward along the edge of the promontory sealing off the cliff edge. A second section of the east-west casement wall continues eastward, separated by a narrow corridor. At the west edge of the Shore House, traces of a third east-west wall suggest that the casement wall may have stretched from the cliff all the way to the Shore House.

About five meters directly south of the ship-shed a long wall (Figure 1: 3) runs east-west across the promontory. Some 50 meters to the south, two north-south parallel lines of large upright stones, ca 1.40 meters apart, form the edges of a cobbled street (Figure 1: 6) that runs southward connecting the harbor with the town. The largest of the fortification walls (Figure 1: 5) runs from the street westward to the river's edge, a distance of 135 meters. A rectangular tower forms the thickest part of this wall (Figure 3). Sherds collected around this tower were all Neopalatial in date.

The easternmost promontory along the shoreline at the base of the Sphoungaras slope has a heavy wall (Figure 4), 27 meters in length, constructed across the promontory, effectively blocking any

Figure 3. View of wall 5. Photograph by Janet Spiller.

entrance from the sea. A large (diameter 8.70 meters) semi-circular platform of stones was built up against the north face of this wall, forming a foundation for a mudbrick tower or bastion buttressing the north face of the wall. An earlier and smaller version of such semi-circular bastions or towers on a fortification wall can be found at Hagia Photia (Tsipopoulou 1988). South of the wall and tower, a long east-west wall (Figure 1: 7) runs from the gully at the base of the Sphoungaras slope westward for a distance of 52 meters parallel to the coast.

Farther south of the two fortification walls on either side of the street, two series of east-west Minoan agricultural terraces (Figure 1) extend southward toward the town. Given the differing alignments of the terrace walls vis-a-vis the Neopalatial coastal fortification walls, it seems likely that the terrace walls predate the fortification walls.

During the 2008–2009 fieldwork, we discovered that the town of Gournia was protected from seaborne invaders by a system of four main fortification walls and towers. The deep river, with its vertical banks 12–18 meters high, would have afforded protection from the west as the ridge of Pera Alazzomouri did from the east. The system of coastal fortification walls at Gournia is presently unique on Crete (and the Aegean) in that it is well defined, complete, and physically separate from the town.

Figure 4. The semi-circular platform of stones. Artwork by D. Matthew Buell.

References

Hawes, H. Boyd et al. 1908. *Gournia, Vasiliki and Other Prehistoric Sites on the Isthmus of Hierapetra*, Philadelphia.

Tsipopoulou, M. 1988. "Ayia Photia Sitieas: To neo evrima," in E. French,ed., *Problems in Greek Prehistory*, Bristol, pp. 31–47.

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Konstantinos Chalikias

The 2011 Richard Seager Doctoral Fellowship

Thanks to the generous donations of the supporters of the Friends of the INSTAP Study Center for East Crete, we were able to raise the $4,000 needed to create our second fellowship for a doctoral candidate. The fellowship has been named in honor of Richard Seager and has been awarded to Konstantinos Chalikias. Kostas is a candidate at the Ruprecht-Karls Universität, Heidelberg, and he will use the fellowship to work at the Center this summer on his dissertation entitled "Settlement patterns and socio-economic change in the Ierapetra region from the Bronze Age to the Roman Period. Chryssi Island—a case study."

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We would very much like to offer a third $4,000 fellowship for the year 2012, with the goal of enabling another doctoral candidate to use the Study Center's resources to help bring their dissertation closer to completion. If you would like to help fund the 2012 fellowship, please make a check payable to the INSTAP Study Center and send it to the address below. If a donor would like to fund a fellowship in full, then the fellowship can be named for the donor or a person of his or her choice. All donations are tax deductible to the full extent of the law.

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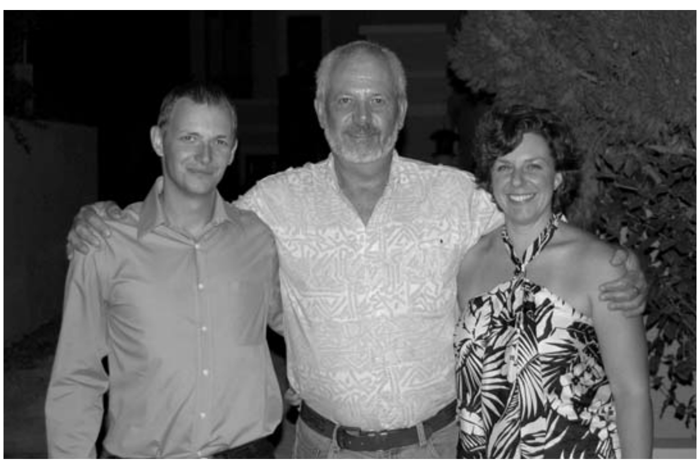

Scott Gallimore, John Younger, and Jerolyn Morrison all gave lectures at the Study Center on June 25th. For more information about these lectures, please visit our website at www.instapstudycenter.net.

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