Cover image:
Stone Lion dating to the 9th-8th century BCE (Neo-Hittite Period) uncovered at Tell Tayinat.
Courtesy Tayinat Archaeological Project
Photo credit: Jennifer Jackson

Chronika, Volume II
Table of Contents

Editor's Introduction

Does interdisciplinary research advance scholarship in any concrete way, or is it just another trendy buzzword used by archaeologists to refer to superficial connections between disparate disciplines, ultimately of little practical value?

Volume 2 of Chronika contains articles from graduate students in departments of Anthropology, Classics and Visual Studies that demonstrate the benefits of interdisciplinary research in concrete terms. Each article incorporates themes that supersede disciplinary boundaries and invite multidimensional interpretations of the past. Prominent themes in this volume include technological choice, landscape studies, monumentality, power, and ritual practice. By studying how these themes are manifest in a number of different archaeological contexts across time and space, we can experience the tangible benefits of interdisciplinary research.

Chronika aims to be a top graduate student journal for European and Mediterranean archaeology, and in this volume we took steps toward reaching this goal by accepting outside submissions for the first time, expanding our Editorial Board, securing sponsorship from additional sources, and updating our layout and design. In the future we plan to expand our national and international influence by reaching out to new audiences, and making the full content of the journal available online, at chronikajournal.com.

Interdisciplinary research is compelling because it fosters fresh perspectives on archaeological material and stimulates intellectual advancement in new and unprecedented ways. At Chronika, we aim to publish cutting edge research in a timely fashion and make it widely available to the scholarly community. We hope this structure will incite collaborative thinking, encourage novel intellectual dialogues, and ultimately bolster the development of our shared area of inquiry, European and Mediterranean archaeology.

Laura Harrison
Editor in Chief

Technological Choice and Change in the Southwest Bath in the Athenian Agora

James Artz

During its five architectural phases, the Southwest bath in the Athenian Agora changes from a Greek-style bath into a Roman-style bath. This article will focus on the first two phases, when Roman elements begin to be incorporated into the traditional forms of Greek bath architecture – particularly, a hypocaust floor system and a concrete vaulted ceiling built into a traditional Greek tholos bath. After describing these architectural features and analyzing the techniques used in their construction, I will examine possible sources of influence on the design and construction of the Southwest baths. The Roman army, citizenry, and workmen could all have potentially affected the incorporation of Roman bathing technologies and building techniques into the Southwest bath. The available evidence, however, indicates that the most likely source of influence is Roman workmen, who were employed in large numbers for the numerous building projects underway in Augustan Athens.

Introduction

The building known as the Southwest bath is located outside the southwest corner of the Athenian Agora.[1] Two major roads define the northern and eastern boundaries of the bath complex and its environs. Retaining walls on the east and west sides of the site are the earliest datable architecture, dating to the fourth century B.C.E.[2] The first phase of the baths, however, dates to the second century B.C.E. This phase was followed by four subsequent phases, ending in the sixth century C.E.[3]

During Phase A, from the second to first centuries B.C.E., the Southwest bath displays architectural features characteristic of a Greek bath – a circular room built of conglomerate blocks, within which individual bathtubs were placed around the edges. Starting in Phase B in the late first century B.C.E., however, the bath begins to change into a Roman-style bath, with a hypocaust floor heating system and a vaulted ceiling built into the circular room, and perhaps the construction of additional buildings adjacent to the circular room. In the middle of the first century A.D., the Southwest bath was torn down and completely remodeled. The new building had 13 rooms, and all the elements of a Roman bath: heated floors and walls, graduated heating of communal pools, a latrine, and vaulted ceilings. The Southwest bath existed in this from the middle of the first century until the middle of the third century A.D., known as Phases C and D. After destruction in the Herulian Sack of 267 A.D., the Southwest bath seems to have functioned as a philosophical school in Phase E, from roughly the fourth – sixth centuries A.D. The building still contained baths in Phase E, however, and appears to have had a double function as a bathing establishment and an educational space.

Although the fourth century B.C. poros aqueduct line is located in the vicinity of the Southwest bath, there is no evidence that it or any other aqueduct ever supplied the bath with water. There are, however, five wells and a Hellenistic bottle-shaped cistern that are located on the site. Remains of the drainage network were found throughout the excavation area, indicating many changes over its five architectural phases.

Phase A: second century – first century B.C.

Little evidence remains from the earliest phase of the Southwest bath, mainly due to later architectural phases that have obscured its remains. Besides the retaining walls noted above, the primary evidence for Phase A consists of a circular building 7.20 m in diameter.[4] The circular foundation was composed of conglomerate blocks laid at angles, with their joints packed with rubble. Cuttings in bedrock to the south of the circular structure may indicate a second room or an adjacent structure, but its form and function are unclear. A wedge-shaped marble bathtub was found in the vicinity, which Shear Jr. associated with this phase of the baths.[5] Water for the Phase A baths was most likely supplied by an elaborate cistern complex consisting of a bottle-shaped cistern, a seven meter tunnel, and a man-hole providing access to the tunnel. A well south of the circular bath building was also in use at the time.[6]

The architectural evidence for Phase A of the Southwest bath corresponds with the general consensus for Greek bathing practices and building techniques in the Classical and Hellenistic periods.[7] Greek baths normally contained a round room with bathtubs placed around the perimeter, primarily made from cut stone. Ashlar masonry is the standard building technique. Wells and cisterns frequently supplied the water for Greek baths, rather than aqueducts. Attendants poured water over the bathers, although there are iconographic depictions of bathers
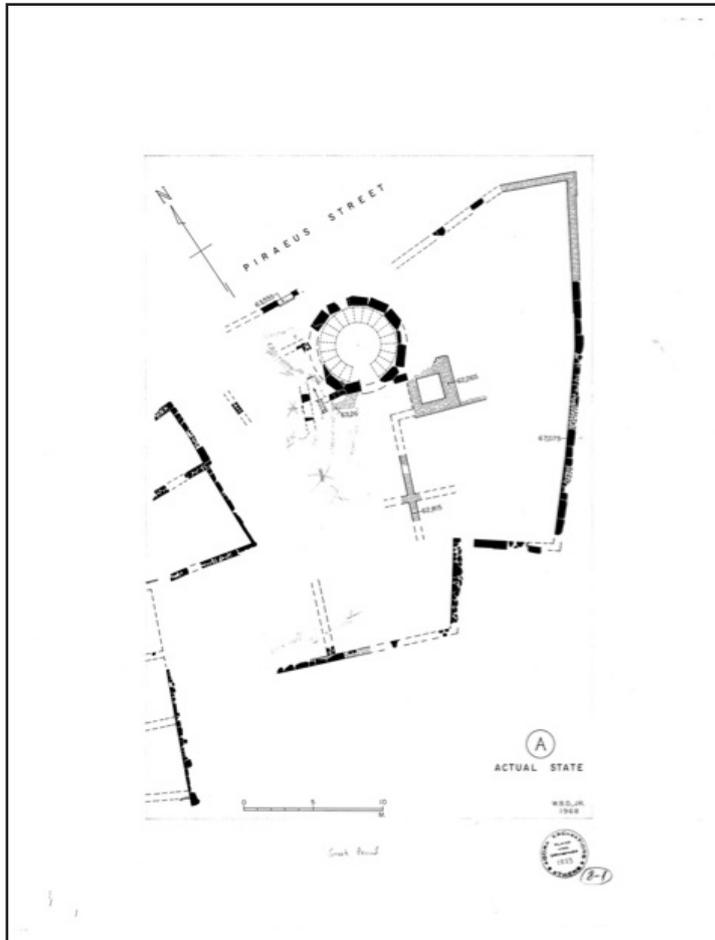
Figure 1: Phase A of the Southwest Baths, actual state. Agora PD 1833.

standing under waterspouts. Water was heated in boilers, and braziers were used to heat the rooms, in addition to the steam from hot water. While some Greek baths were located in buildings dedicated to public bathing, bathing facilities were also commonly found in gymnasia. Individual bathtubs have also been recovered from domestic contexts, and some sanctuaries included areas for bathing. The circular building built of ashlar blocks and the wedge-shaped marble bathtub found nearby support the identification of Phase A as a public bath, located just outside the Agora.

Phase B: first century B.C. – first century A.D.

Phase A of the Southwest bath ends in the first century B.C. Shear Jr. attributes its end to the Sullan sack of Athens in 86 B.C., although there is little evidence for violent destruction. Pottery associated with Phase B architecture dates to the late first century B.C., and Shear Jr. believes that the baths remained out of use between the Sullan sack in 86 B.C. and its Phase B rebuilding. Phase B still employs the

circular room associated with the hip baths of Phase A, although the room has now been fitted with a hypocaust floor heating system.[8] The hypocaust floor consisted of square terracotta tiles set in a bed of mortar laid over the original conglomerate block foundation. Square pilae were laid over the tiles, in order to create the heated air cavity. Square terracotta tiles were also used for the suspensura, or suspended floor on which the bathers walked. A mosaic of marble chips laid in mortar covered the suspensura.[9] Traces of a brick-lined flue were found to the southeast of the round room, showing the direction from which heat was transferred from a furnace to the hypocaust. The continuation of the marble chip floor through an opening in the circular foundation led to the restoration of an entry point in the southeast. Concrete debris, some with spherical curving, was found during the excavation of the hypocaust floor, indicating the presence of rubble concrete walls and a vaulted ceiling. The conglomerate blocks of the Phase A foundation were widened to 1 m thick with an interior brick lining, providing further support for the construction of a vaulted
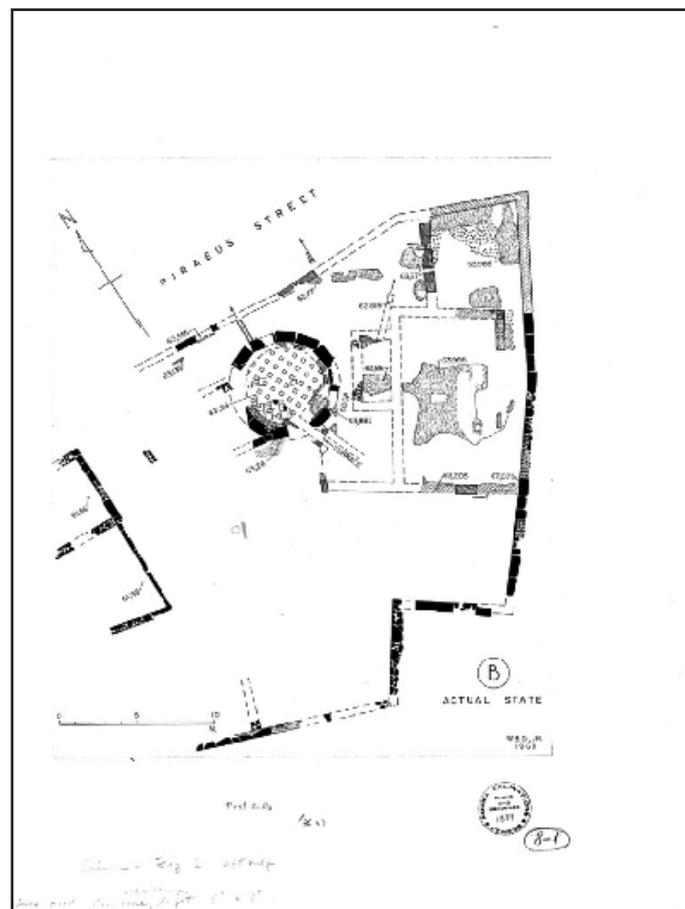

Figure 2: Phase B of the Southwest Baths, actual state. Agora PD 1834.

ceiling.[10]

In addition to the circular room, evidence exists for other structures in its vicinity. Remains of the marble chip flooring found in the circular room were discovered at similar levels outside the structure, primarily to the east and southeast. Although disturbed by subsequent building phases, remains of Late Hellenistic/Early Roman walls were also found in these areas, leading to the tentative restoration of rooms. The remains indicate the possible presence of two rectangular rooms, the larger one with a small rectangular niche in its western wall. A small segment of a drain was found in the north wall of the niche.[11]

Shear Jr. believed the Phase B architectural evidence indicated the presence of a Roman-style bathhouse, with a "more up-to-date look and all the latest western amenities."[12] He speculated that the marble chipped floor and the drain segment indicated the presence of a pool in the western niche, and that the rectangular rooms were signs of a large, communal, Roman-style bathing establishment. McCallum, however, is more tentative in his interpretation of the Phase B remains. He notes that the placement of the doorway in the circular room is problematic in its relation to the niche in the rectangular room, because the doorway opens directly onto the niche's western wall. Furthermore, the marble chipped floor is described as being both the bottom of the proposed pool in the niche, and also as the floor level in the rectangular room, although there is only a 0.15 m difference in the elevation of these two surfaces.[13] One would expect a greater change in elevation between a pool and its surrounding floor level. These inconsistencies make it difficult to accept the proposed restoration of a pool in the niche in the rectangular room, although the presence of the drain leading northward does argue in its favor. There is clear evidence for a Roman hypocaust floor heating system, but beyond

this innovation it is speculative to restore a pool in the poorly preserved remains to the east of the circular building. Without the presence of a communal pool, it is difficult to classify Phase B as a Roman-style bath. The function of the circular room is likewise difficult to classify. Was its function basically the same as it was in Phase A, with the addition of a hypocaust floor and a vaulted ceiling? Did the hip baths remain present around its perimeter? If there were pools located elsewhere on the premises, such as to the east in the niche of the rectangular room, it is possible that the circular room functioned as a sweat room during this phase, with bathing taking place elsewhere. On the other hand, it may have maintained its function as the primary bathing area in Phase B, with the marble hip baths still providing a "Greek-style" bathing experience.

Building Techniques

The building techniques used in Phase B show significant changes from the traditional Greek techniques of Phase A. The structure retains its traditional circular form, but new masonry techniques present different options for how to proceed within this traditional framework. The decision to incorporate Roman heating technology is perhaps the most significant impetus in the adoption of new building techniques in Phase B. Hypocaust floor heating cannot be built without the structural use of brick and mortar. Romans were familiar with construction techniques using these materials, but Greeks preferred to build with dry masonry techniques and worked stone.[14] The choice to build a hypocaust thus indicated a significant change in building technique and material at Athens. The pilae were laid on terracotta tiles leveled in a bed of mortar, providing a stable base for the suspensura. Above the pilae, the terracotta tiles that form the base of the suspensura were covered with a leveling course of mortar, into which

the marble-chipped mosaic floor was set. Mortar and brick construction was also utilized to create the flue from the furnace to the hypocaust floor. The conglomerate block walls were widened with a brick lining to support a vaulted ceiling.

Although adherence to the circular room plan illustrates a degree of architectural conservatism, the various applications of brick and mortar in Phase B are strong indications of Roman influence on its design. But does this necessarily mean that a Roman architect built Phase B, or could Athenian builders have carried out a Roman design? If a Roman architect were present, would he have been able to instruct and educate Greek workmen in construction techniques that were unfamiliar to them? While the hypocaust required the ability to mix mortar and build with brick in a competent manner, the construction of a vaulted ceiling is more technically complex. It is unlikely that architects and workmen with little to no experience in concrete and vault construction could execute a project such as the Phase B baths without the guidance and assistance of experienced personnel.[15] Although the archaeological evidence does not reveal the identity of the builders, the techniques and technologies present in the Phase B baths imply the presence of both a Roman architect to design the building, and workers experienced in Roman techniques to build it. If the building techniques and technologies used in Phase B imply the involvement of a Roman architect and construction workers, it is important to consider the evidence for how and why Romans would have been living and working in Augustan Athens.

The Roman Army in Augustan Athens

When considering the spread of Roman building techniques, it is important to consider the potential influence of the Roman army. For example, Lancaster has recently argued that the technique of pitched-brick vaulting came to Greece after Roman army engineers saw its use while on Trajan's Parthian campaign in 113-117 A.D.[16] While the Phase B architectural innovations in the Southwest bath occurred about a century earlier than Trajan's Parthian campaign, it is possible that the Roman military could have been involved in the dissemination of building techniques at this time as well. Unfortunately, there is little evidence regarding the presence of the Roman army in Augustan Athens. There is epigraphic evidence attesting to the presence of the Roman army in Greece during Rome's eastward expansion in the third – first centuries B.C., but the army was usually transient, rather than settled for extended periods and exerting a prolonged effect on the local population.[17] If this is the case, it mitigates the potential influence of the Roman army on local populations, including technological exchange and influence on traditional building techniques. The potential influence of the military cannot be ruled out, but the archaeological and historical records do not provide evidence for its prolonged presence in Augustan Athens.

Roman Citizens in Augustan Athens

In addition to the technical aspects of the Phase B innovations, it is important to consider what is known about the Roman population of Athens at this time, since Roman citizens living or working in Athens may have influenced the Phase B innovations at the Southwest bath.[18] Aside from military activities, Romans began living and traveling in the Greek world as early as the third century B.C. The activities of businessmen regularly brought Romans through Athens, especially after the appropriation of Delos in 166 B.C. As the Roman republic expanded eastwards, Roman officials began passing through Athens as well, as they headed east for administrative purposes. Roman citizens

also came to Athens for education at philosophical schools. Lastly, some Roman officials are known to have come to Athens after being exiled from Rome. By the first century B.C., epigraphic evidence attests to Roman names in the ephebe lists, followed shortly after by the first instances of Romans holding administrative offices in Athens. Habicht believes, however, that Romans were not a strong presence in Hellenistic Athens overall. Likewise, Geagan argues that during the imperial period, Rome preferred to support Athenians in the governance of their city, rather than to become directly involved in local Athenian affairs. The offices of Hoplite General and Epimeletes gained power during the Roman period, and many of the Athenians that held these positions enjoyed strong support from Rome. In sum, while the number of Romans living in Athens may not have been high, a Roman presence was felt in Athens. Whether passing through on business, studying at a philosophical school, or living in exile, there were Romans in Athens. The Phase B innovations at the Southwest bath may reflect their will and desire as much as the changing tastes of the local Athenians.

Architecture in Augustan Athens

While the Roman army and citizenry offer interesting, if somewhat speculative, evidence into the extent of Roman influence in Augustan Athens, the architectural evidence is more forthcoming. The Augustan period was a busy time for construction in Athens.[19] The Roman Agora, started by Julius Caesar, was completed during the reign of Augustus. Monumental projects such as the Odeion of Agrippa and the reconstruction of the temple of Ares were underway in the Athenian Agora, clearly visible from the Southwest bath. On the Acropolis, the monopteros in front of the Parthenon was constructed under Augustus, and the Erechtheion was remodeled to repair

damage sustained during the Sullan sack. In a recent examination of Augustan buildings in Athens, Burden argued that Augustus redesigned the heart of the city with the intention of portraying the imperial family as the rightful heirs of the Panathenaic festival.[20] While it is beyond the scope of this article to discuss the motives for every building project in Augustan Athens, it is difficult to dissociate the Phase B remodeling of the Southwest bath from the other architectural projects going on at the same time.

Burden's work on the building program of Augustan Athens includes substantial detail on building techniques, and even the identity of the builders. Regarding the Odeion, his analysis shows that the building was designed and laid out on a module measured in Roman feet.[21] The monumentality of the project and the complexity of the auditorium's roof suggest to him that Roman architects were responsible for its design and present to supervise its construction. Regarding the labor force employed in the spanning of the roof, Burden believes that specially trained carpentry crews would be necessary for the work. He furthermore notes that such specialized crews of Roman builders did move freely between cities, depending on where jobs were available.[22] His supporting evidence is a frieze from the Column of Trajan, which depicts a specialized crew of bridge builders. Although the Trajanic frieze postdates the architectural projects in Augustan Athens, it is reasonable to believe that such crews existed and were present in Augustan Athens. The presence of Roman architects and workmen at the Odeion, which is in close vicinity to the Southwest bath, may be more than a coincidence in regard to the new technologies built into the Phase B bath. The design and technical knowledge necessary for its hypocaust floor and vaulted ceiling may have come directly or indirectly from the Roman architects working in the vicinity, perhaps even as

close as the nearby Odeion.

Conclusion

Phase B of the Southwest bath ends around 50 A.D., when the baths are deconstructed and rebuilt on an entirely different architectural plan.[23] The new building was significantly larger, with 13 rooms spread over an expanded area. At least four rooms included pools, and there is strong evidence for graduated heating of communal pools, which is a sure sign of a "Roman-style" bathhouse. The hypocaust heating system was expanded to include three large rectangular rooms, at least one with heated walls in addition to a heated floor, and all with vaulted ceilings. The new hypocaust was built directly over the foundations of the circular room from Phases A and B, preserving its remains beneath the new building. With this reconstruction, the Southwest bath continued a transition that started from traditional Greek antecedents in Phase A, and developed into the architecturally ambiguous layout of Phase B. The construction of the hypocaust floor system is the earliest example of this technology in Athens, and evidence for concrete vaulted ceilings is also not present before this period. These architectural innovations are a sign of the increasing Roman presence in the city, and it seems likely that their construction indicates the presence of Roman workmen. These new building techniques become common in the architecture of the first and second centuries A.D., although local adaptations remain noticeable.

Athenians adopted Roman bathing habits slowly. From a technical standpoint, the Southwest bath provides an interesting case study of how the process unfolded. The first hypocaust system in Athens does not show the whole-hearted adoption of Roman-style bathing with graduated heating and large communal pools. Instead, the traditional circular room of a Greek-style bath is rebuilt with Roman floor heating and a concrete vaulted ceiling. The ambiguous nature of Roman technology built into the form of a traditional Greek bath perhaps reflects uncertainty, or even resistance, among the population of Athens regarding Roman bathing practices. Some may have welcomed the heated floor and a new, perhaps more airy ceiling. Others may have continued to prefer the familiarity and tradition of the Greek-style bath, perhaps influencing the continued use of the circular architectural form. Judging from the later building phases of the Southwest bath, Roman-style bathing did eventually become common in Athens. Before its adoption, however, the remains of Phase B provide interesting evidence for a short period when Greek architectural tradition blended with foreign influence in form and technology.

Endnotes:

1 The Southwest bath were excavated in 1948, 1949, and 1968. The results were originally published by T. Leslie Shear Jr. in Hesperia 38, pp. 394-415.

2 The retaining walls are built in a 'checkerboard technique' of alternating conglomerate ashlar blocks and smaller polygonal limestone, which became popular in this part of the Agora in the early fourth century B.C. Young 1951, p. 193.

3 Shear Jr. labeled these architectural phases A – E. Phase A starts in the second century B.C., and ends in the first century B.C.; Phase B starts in the late first century B.C. and ends in the mid first century A.D.; Phase C starts in the mid first century A.D and ends in the mid second century A.D.; Phase D starts in the mid second century A.D. and ends in the mid third century A.D. Phase E starts in the fourth century A.D and ends in the sixth century A.D.

4 See Figure 1.

5 Agora Find ST 334. Shear Jr. calculated that 20 of these wedge-shaped bathtubs would have fit perfectly within the circular room of the Phase A baths, although McCallum notes that this would leave no room for space between the tubs. Shear Jr. 1969, 397; McCallum 2009, 37.

6 Well E 18:7 is described in Agora Field Notebook OO XXIV, 4606-4623. Cistern complex F 17:4 is described in Agora Field Notebook □□ XV, 2843.

7 General accounts of Greek baths and bathing include Ginouvres 1962; Yegül 1992, pp. 24-29; Gill 2004.

8 See Figure 2.

9 Shear Jr. 1969, 398. The square terracotta floor tiles have 0.49 m sides. The square pilae have 0.25 m sides.

10 Shear Jr. 1969, 398-399; Agora Notebook OO XXII, 4265.

11 See Figure 2.

12 Shear Jr. 1969, 398.

13 McCallum 2009, 40-41.

14 Greek builders did use hydraulic cement to waterproof cisterns, but rarely for structural purposes. For general accounts of Greek masonry techniques, see Camp and Dinsmoor 1984; For Roman masonry, Adam 1994 and Taylor 2003 provide excellent accounts of the architectural process.

15 Boyd 1978, 83. Architectural evidence for vaulting in Greek construction begins in the late 4th century B.C. with barrel-vaulted tombs in Macedonia, and continues in the Hellenistic period. All classical and Hellenistic evidence for vaulting is dry masonry, however, and none comes from Athens. Boyd believes the Macedonian army learned vaulting construction techniques from Mesopotamian sources while on campaign with Alexander the Great.

16 Lancaster 2010.

17 Payne, M. 1984, 25-30. Payne examined roughly 250 dedicatory inscriptions on statues to Romans erected in Greece from the third-first century B.C.

A substantial portion of the inscriptions (75%) was dedicated to military personnel, primarily for the purpose of demonstrating allegiance to high-ranking officers, in the interest of community preservation. She notes that often the recipient of the dedication would no longer be in Greece by the time the sculpture was ready for dedication.

18 For recent research on Roman citizens in Athens, see Habicht 1997; Geagan 1997; Walker 1997; Daly 1950.

19 The most recent analysis of architectural developments during the reign of Augustus is Burden 1999. Other contributions include Shear Jr. 1981, Thompson 1950, and Hoff 1988.

20 Burden 1999, 210-225. It is interesting that although Burden discusses Augustan building projects in the Agora in great detail, he does not include nor mention the Southwest bath at any point in his work.

21 Burden 1999, 82.

22 Burden 1999, 103.

23 Limitations of space prohibit the analysis of building techniques and technological developments in the later phases of the Southwest baths, which will be considered by the author in future work.

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Minoan Metal Vessel Manufacturing: Techniques and Technology

Christina Clarke

The equipment and processes used to manufacture hammered metal vessels during the palatial periods of Bronze Age Crete have not previously been investigated in detail. The study described in this paper takes an interdisciplinary approach to the investigation of how these vessels were made, combining archaeological research with metalsmithing practice to reconstruct Minoan metal vessel production techniques. The results indicate that simple tools found at many Minoan metallurgical sites are effective for creating these vessel forms. That these tools are also found in contexts which are not considered metallurgical sites may indicate that metalsmithing occurred in more locations than are currently recognized.*

Introduction

The aim of this study is primarily to establish how hammered Minoan metal vessels were made and what tools were used in their manufacture. It will be shown that a number of commonly found Minoan tools previously not identified as tools of a metalsmith may have been used for metallurgical tasks. This project, therefore, makes a dual contribution to Minoan archaeology. Previous studies of Minoan metal vessels have not examined their manufacturing techniques in great detail.[1] Furthermore, it is difficult to draw conclusions about the practice of a craft without understanding what equipment is required and the specific manner in which this equipment is used. By applying practical knowledge of a craft to analysis of the artifacts, a richer understanding of the craft and its practitioners can be gained.[2] The methodology of this study combines information from archaeological material with practical application of Minoan metalsmithing equipment. This interdisciplinary approach has not previously been applied to the study of Minoan vessels.

The initial stages of the study involved studying excavation reports and archaeological publications on Minoan metallurgy and Bronze Age metallurgical sites in Crete. The second stage was the detailed examination of seventeen Minoan vessels in the Chania Archaeological Museum and the Ayios Nikolaos Archaeological Museum in Crete and the Ashmolean Museum in Oxford. The final stage of the study was to replicate some of the tools and equipment found at Minoan metallurgical sites and to use them to make Minoan vessel forms. This paper covers some preliminary findings of the study, focusing on both the hammering processes used to shape the body of a vessel and methods for polishing the surface.

The first section introduces the vessels themselves; the second describes the processes used to make vessels and the relevant metallurgical technology available to the Minoan world. In the third section the practical reconstructions carried out for the study are described. The findings arising from the reconstructions are then discussed.

Minoan Metal Vessels

Hammered vessels in bronze and precious metals were produced in Crete during the Bronze Age largely during the palatial periods. Some characteristics of ceramic vessels indicate that metal vessels may also have been made during the Early Bronze Age, but for the most part they appear in Minoan material from the Protopalatial period and production appears to have flourished during the Neopalatial period. After the Neopalatial period, vessels continued to be produced, but the forms were slightly different.[3] It is possible that many extant from later periods were heirlooms from the Neopalatial period.[4] Common vessel types include hydrias, tripod cauldrons, pitchers, lamps and basins of various forms and, to a lesser extent, large cauldrons, cups and bowls (Fig. 1).

Many metal vessels from the Shaft Graves at Mycenae, especially those in precious metals, are regarded as being Minoan products or as having been made by local metalsmiths trained in the Minoan tradition.[5] However, of the 250 or so extant vessels from Crete, only a handful are of precious metal and the rest are copper alloys, predominantly tin bronze. Because of the dearth of vessels in precious metals from Crete, this study focuses primarily on the production of bronze vessels. According to Evely and Stos, the tin bronzes used range from 7-11% tin.[6] Many vessels are formed from a single piece of metal but some larger forms are made from multiple pieces riveted together (Fig. 1g and j). Additions to the hammered form such as handles and legs are either cast or forged separately and are riveted to the body of the vessel.

Vessel-Making Processes and Minoan Evidence for Metallurgical Technology

A metallurgical site is usually identified by the remains of casting processes, such as metal spill,
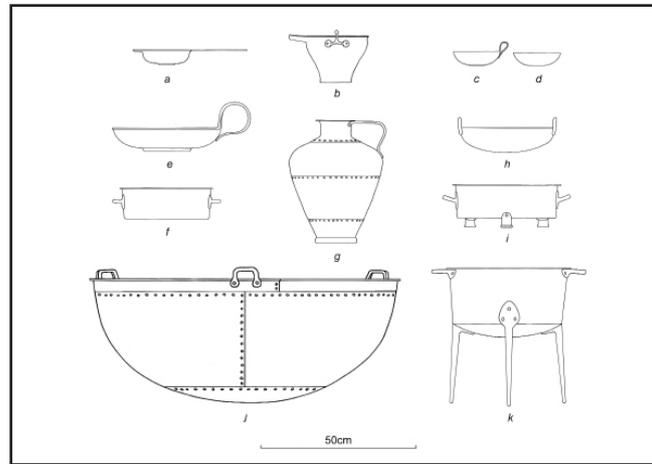
Figure 1: Some Minoan bronze vessel types: a) lamp, b) lekane, c) one-handled cup, d) bowl, e) one-handled basin, f) pan, g) hydria, h) basin, i) tripod pan, j) cauldron, k) tripod cauldron.

slag, crucibles, tuyères and molds. However, because vessel production is largely a matter of hammering a pre-cast billet, casting may not necessarily have been carried out at a vessel-making installation. Therefore, manufacturing sites for Minoan vessels are difficult to identify. The most distinctive remains from the construction process for vessels – hammers, anvils, stakes, whetstones and an annealing hearth – may not always be apparent. To complicate matters, most of the equipment is similar to domestic equipment: stone tools for grinding and pounding for food production, whetstones for sharpening domestic tools and hearths for food preparation and heating.[7] Some equipment may have been used for both domestic and craft activities.

In order to create a hammered vessel, a disk-shaped billet is required. Archaeological material suggests that these were cast in bivalve stone molds. One such example comes from Malia.[8] This study has revealed that in some cases, Minoan vessels were fashioned from billets that were cast using the lost-wax method. Billets were probably between 0.3 and 0.6 cm thick, depending on the diameter of the disk. Generally, the larger the diameter, the more difficult it is to cast a thin billet.

Throughout the manufacturing process, the metal must be annealed repeatedly. As it is hammered, metal becomes hardened and further shaping is very difficult. If it is worked too far, cracks develop in the material. Heating relieves the stresses by causing recrystallization, softening the metal for further working. The equipment needed for annealing includes a hearth and some means of introducing a draft.

No hearths in Crete that I am aware of have been definitively linked with metallurgical activity by the presence of metal droplets or slag, but hearths have been found in the vicinity of other metallurgical evidence. The Unexplored Mansion at Knossos had extensive evidence of metallurgical activities, including crucibles, molds, metal scrap and various stone and bronze tools. Pillar Hall H of the building contained a pi-shaped hearth, but it is not regarded as being for metallurgical purposes since there was no evidence of slag, droplets or high temperatures.[9]

The temperature of the burning charcoal in a hearth is raised by the introduction of a draft. Typically, annealing takes place between 500-800°C, which is quite low compared to the temperatures required for melting: 1083°C for copper and slightly lower for bronzes,

depending on the percentage of tin. Casting requires a strong draft, probably supplied by bellows. Pot bellows were used throughout the Bronze Age in Crete; remains of pot bellows come from Prepalatial Chrysokamino and Postpalatial Kommos.[10] However, for annealing temperatures, bellows are unnecessary, and a draft was probably supplied by blow-pipes made from reeds.[11] No evidence of blow-pipes such as ceramic nozzles to protect the end from burning has survived.

Heating metal causes oxides to form on the surface of the metal, and these must be removed before hammering begins because, if they are hammered into the surface, they will cause weaknesses which later cause cracks. There is no way of knowing how Minoan smiths would have removed the oxides, but the two possible methods are the use of abrasives, or chemical processes. Several weak acids which were available to the Minoans are effective for removing oxides, including vinegar, especially when combined with salt, and uric acid from urine or bird dung. The oxide-coated metal may be quenched in the acid and left in the solution for as long as is required for the oxides to disappear, which may take seconds or hours depending on the strength and composition of the acid. The metal is subsequently rinsed in water.
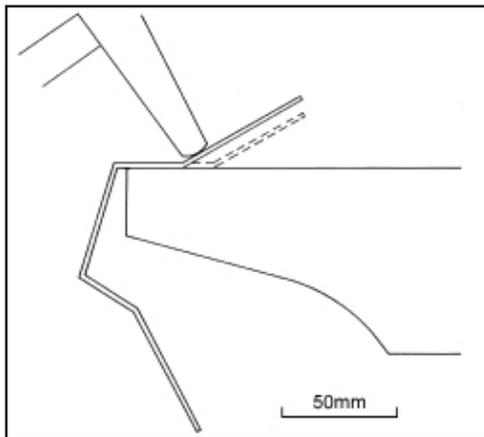
The tools required to transform a billet into a vessel are hammers, anvils and stakes. There are two main hammering methods used to make vessels: raising and sinking. Raising is hammering the metal over a stake, working it from the outside of the vessel (Fig. 2), whereas sinking is hammering the metal over a hollow, working from the inside (Fig. 3). For Minoan vessels, the majority of the shaping was accomplished by sinking, with some final shaping done by raising.

Bronze tools for metalsmithing from Minoan Crete are extremely rare. Examples of bronze hammers which might be suitable for vessel-making include one from Quartier Mu at Malia[12] and another in the Mitsotakis Collection at Chania Archaeological Museum from an unknown site.[13] Stakes or anvils which could have been used to make vessels come from Zakro Palace,[14] Ayia Triada,[15] and Samba Pediados.[16] None of these bronze tools comes from a confirmed metallurgical context. Far more common are simple stone hammers; these are often found at metallurgical sites. These are elongated pestle shapes, spherical cobbles and a variety of pebbles. These hammer stones are not appropriate shapes for hafting, and so were probably hand-held. This practice is seen in other cultures. For example, Egyptian depictions of metalsmithing such as those

Figure 2: A transverse-section of raising: the wall of the vessel is held over the stake and hammered from the outside.
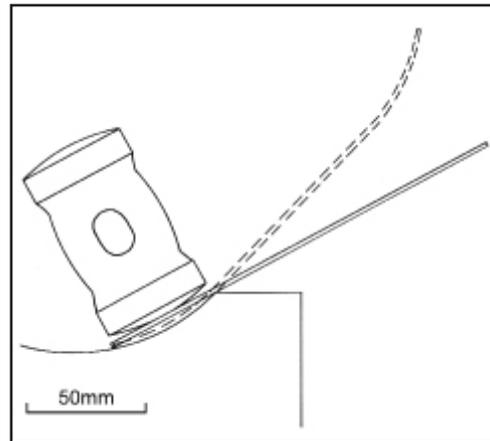

Figure 3: Cross-section of sinking. The original flat billet is hammered into a carved, wooden hollow, causing the walls to become thin and concave (indicated by broken lines)

from the New Kingdom Tomb of Rekhmire show the use of stone hammers without handles, and Inca smiths used lumps of copper held in the hand as hammers for goldsmithing, including elongated and spherical forms much like the Minoan hammers.[17] Stone types used for these hammers in Crete include igneous stones, marble and limestone.

As for stakes and anvils, only a handful made of bronze survives. There is little evidence otherwise for the equipment on which the metal was hammered. Stone slabs which may have been used as anvils have been recovered from Building A in the Artisans' Quarters at Mochlos and houses at Kommos, but flat anvils like these have limited usefulness for vessel-shaping.[18] That the evidence for such equipment is so meager suggests that materials which have not survived were used. Today, metalsmiths often use wooden stakes for raising and a hollow carved into the top of a tree stump for sinking.[19] Minoan smiths probably used similar equipment.

The last stage of creating a vessel before handles or other additions are attached is finishing the surface to produce a polish. Abrasives are rubbed over the surface to cut down the rough texture left from hammering. Coarse abrasives are applied first to remove the deepest scratches and successively finer abrasives are subsequently applied to remove scratches left by coarse abrasives until the scratches are small enough to make the surface reflective. A method for producing a high polish is burnishing, a process in which a hard, polished tool is rubbed over the surface. This can be performed after larger scratches on the surface have been removed with abrasives.

Many Minoan stone tools showing flattened and facetted surfaces provide ample evidence that they were used for finishing metal. The tools are of various sedimentaries such as marble, limestone and siltstone or other stones such as quartzite, emery and pumice. There are some materials suitable for finishing which were available to the Minoans but which have

not yet been noted for such uses in Minoan contexts. Charcoal is an excellent fine abrasive but might be overlooked as a tool during excavation.[20] Some of the stone types used to make Minoan sealstones are suitable for burnishing but would not necessarily show evidence such as flattening or faceting owing to their hardness.[21] As a result, their potential for such uses might not be considered during excavation. Examples include hematite and quartzes such as agate and amethyst, some of which are used for burnishing by some metalsmiths today.[22]

Reconstruction of the Equipment and Processes

Equipment

The equipment replicated from Minoan artifacts for this study included a hearth, stone hammers and finishing or polishing tools. Other tools used, for which there are no surviving Minoan artifacts because of the ephemeral nature of the materials, were a blowpipe, a wooden raising stake and wooden stumps with hollows of differing sizes carved into the upper surface. This equipment has so far been used to make two small bowls as test-pieces (Fig. 4) and a large hydria made from four sections (Fig. 5).[23]

The hearth built for the reconstructions was based on the design and dimensions of pi-shaped hearths found at Kommos and at the Unexplored Mansion at Knossos to test whether this hearth design is suitable for the vessel-making process (Fig. 6). It was built into the side of a small embankment by digging out a slightly scooped hearth bed and building up three short walls around the bed from fire bricks. The internal dimensions of the hearth were 35 cm wide, 46 cm deep and 20 cm high. Charcoal was used for fuel. Since the choice of material for Minoan blowpipes would have no effect on the results, an aluminum tube 62 cm long with an internal diameter of 0.7 cm was used. The length of the tube was necessary in order to reduce facial exposure to the heat

Figure 4: Copper bowl made as a test piece.

Figure 6: Charcoal hearth constructed for this study (photo by L. Nguyen-hoan).

Figure 7: Stone hammers used for the reconstructions.

Figure 5: Copper hydria produced with Minoan equipment.

of the fire. The internal diameter was chosen in accordance with data from Rehder, which indicates that a nozzle for a blowpipe must have an internal diameter of 0.5-1 cm.[24]

The hammers used were elongated pestle forms and a spherical cobblestone such as those found

at some metallurgical sites. The pestles were of marble, granite and a fine-grained igneous stone, and the cobble of basalt (Fig. 7). For sinking, hollows of various depths and dimensions were carved into wooden stumps. The stakes used for raising were carved hardwood forms.

Materials used for finishing were stones of similar types to Minoan whetstones and finishing stones including pumice, limestone, marble and a fine-grained igneous stone. Charcoal was used as a fine abrasive and

hematite and agate for burnishing.

Reconstruction of the Process

The billet was placed in the hearth and buried in the burning charcoal. Using the blowpipe, a draft was introduced to raise the temperature of the charcoal immediately around the billet (Fig. 8). Depending on the size of the billet, annealing took between five and ten minutes. The billet was subsequently removed from the hearth, quenched in a solution of salt and vinegar to remove oxides and rinsed in water.

The hammering techniques varied according to what metal movement was required. Sinking was the main technique used for the reconstructions, the material being hammered over one of the wooden hollows with the cobble or a pestle, doing this hammering in a spiraling manner from rim to center or center to rim (Fig. 9).

Generally, it was only possible to perform one or two hammering-rounds before the metal needed to be annealed. The result of many rounds of sinking was ultimately a thin-walled, deep bowl. This was then adapted with localized sinking or raising to create the desired vessel form. Raising was carried out on vessel sections where tall, vertical walls were required.

Figure 8: Annealing a billet in the hearth with a blow pipe (photo by L. Nguyen-hoan).

The hollow form was held against the wooden stake and hammered with a pestle in concentric circles parallel to the rim. The movement which the material takes can be visualized as the same as that of a clay vessel being turned on a wheel. By gradually encouraging the material inwards and upwards, the diameter is reduced. Raising is carried out for several rounds, annealing between each, to achieve a smaller rim diameter.

The last stage was polishing the vessels. The sedimentary stones and pumice, which are coarse abrasives, were used to cut back the surface. Charcoal was used to cut back the scratches left by the stones and thus produce a reflective satin polish. A high polish was created by burnishing the surface with hematite and agate.

Summary of the Findings

The simple pi-hearth and blowpipe were very effective for annealing the material quite quickly, indicating that many Minoan hearths had the potential to be used for metallurgical activities other than casting. Hammering with stones revealed that the simple, unhafted stone hammers found at many Minoan metallurgical sites used in combination with a wooden hollow and stake are very effective for creating Minoan vessel forms. It was discovered that it was actually not possible to carry out most of the sinking with a hafted hammer, since the handle obstructed access to the deeper parts
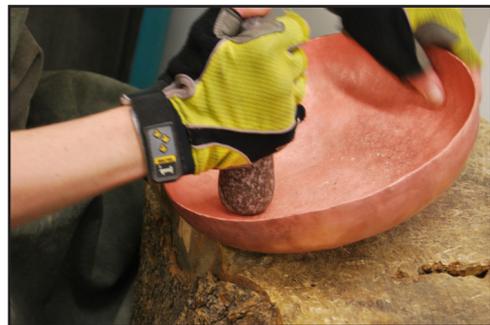

Figure 9: Sinking a vessel with a pestle into a hollow carved into a wooden stump (photo by L. Nguyen-hoan).

of the interior. A hand-held stone, however, could be manipulated much more easily in tight spaces. The pestle was the most versatile shape of the hammers, and the type of stone used for the hammer did not seem to affect its functionality, although a very soft stone such as pumice would be unsuitable. Igneous stones last indefinitely, but even hammers as soft as marble are effective, although tending eventually to deteriorate. This suggests that, rather than choosing stones for hammering according to stone type, metalsmiths chose them with their shape in mind.

The types of stones used as finishing tools that are found in Minoan contexts are very effective. Some individual tools were comparable in efficiency to modern steel files. As was the case for hammers, it did not seem to matter what type of stone was used, as long as it was fine-grained, since coarse stones leave deep scratches in the material.

Conclusions

The experiment of replicating as far as possible the materials and techniques used by the Minoan craftsman produced results in some ways surprising, especially regarding the effectiveness of handheld stones as hammers. It became clear that the stone tools found at many Minoan metallurgical sites and the pi-shaped hearths would have been very effective for creating Minoan vessel types. It is significant that much of the required equipment is also common in contexts that are not currently regarded as having metallurgical significance, since pestles and other hammering stones also have domestic uses, as do pi-shaped hearths. Since these tools and this equipment do not show obvious signs of having been used for vessel-making or other metallurgical activities, as archaeological finds they would not usually be considered for these uses. This study, however, leads us to reconsider these conclusions. This evidence also suggests that metallurgical activities probably took place at more locations than are currently acknowledged. By demonstrating

that metallurgical activity is not tied to casting remains alone, this study should encourage excavators to consider the possibility that metalworking took place at a broader range of sites than are recognized today.

Technical Glossary:

anneal. Softening metal which has become hardened with working by heating it.

billet. A piece of metal cast in raw form ready to be made into an item. Billets may be rods, bars, disks, plates or amorphous forms.

lost-wax casting. A method of casting metal. The method referred to in this study is known as direct casting. A model of the object to be cast is first made in wax and subsequently coated with an investment material such as clay or plaster. This is then heated to melt out the wax, which empties through a channel incorporated into the design. The result is a hollow mold into which molten metal can be poured to fill the void left by the wax model. The metal object is removed by breaking the mold.

pot bellows.[25] A type of bellows used to introduce a draft into a metallurgical hearth or furnace. It consists of an open clay pot with a nozzle in its wall connected to a pipe which feeds into the burning fuel. A piece of leather with a slit in it covers the top of the pot. When this is pumped up and down, air drawn through the slit is forced into the fuel.

stake. A wooden or metal form over which sheet metal is hammered to create a hollow form such as a vessel.

Endnotes:
1 Matthäus 1980, 323-33; Evely 2000, 380-7.
2 The author is a gold- and silversmith with over a decade of experience in the craft. In her practice, she has focused specifically on using traditional silversmithing methods to create vessels.
3 Rehak 1997, 57.
4 Driessen and Macdonald 1997, 62, 67.
5 Davis 1977, 353-5; Matthäus 1980, 341.
6 Evely and Stos 2004, 267.
7 Stone tools see Evely 1993, 108-118; hearths see Shaw 1990.
8 Chapouthier and Demargne 1942, 65, no. 1, pls 16 & 52.2a.
9 Popham 1984, pl.29(e); Catling 1984, 206; Evely 2000, 338, fig. 137.1. M. Shaw uses the term 'pi-shaped hearth' to refer to this and other hearths at Kommos (1990).
10 Chrysokamino see Betancourt (2008); Kommos see Blitzer (1995, 508, no. M 42, pls 8.80A and 8.105).
11 Evely 2000, 363.
12 Poursat 1996, 118, no. M 78/B 1, pl. 43k.
13 Davaras 1992, 266, no. 331.
14 Platon 1971, 129, fig. on p. 4, bottom right.
15 Deshayes 1960, 122, pl. 63.4.
16 Deshayes 1960, 298, no. 2321, pls 40.3, 63.1.
17 For Egypt see the depictions of metalworkers from the Tomb of Rekhmire in Prisse d'Avennes (2000, 120); Incas see Vega (1961, 130-1).
18   Mochlos see Carter (2004, 75, no. IC.410, pl. 23, IC.); Kommos see Blitzer (1995, 485-6, pls. 8.59A-D).
19 Brepohl 2001, 243, 246.
20 Brepohl, 2001, 339.
21 For sealstone materials see Evely (1993, 156).
22 Brepohl 2001, 343.
23 As of the writing of this paper, the hydria sections have been shaped and riveted together and are still to be polished.
24 Rehder 1994, 349.
25 Betancourt and Muhly 2006.

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The Emergence of Sociopolitical Complexity at Gournia: Local and Regional Perspectives

Laura Harrison

Between 2200 and 1900 B.C.E., the coastal site of Gournia on Crete grew substantially in size and population, eventually emerging as a regional center for production and export. At the same time, other sites in the Mirabello region were destroyed, and new sites were established in defensible locations. People from the Cycladic islands fled to Crete and established new settlements on the north coast, possibly in response to a climatic upheaval. How did Gournia manage to emerge as a prosperous center, amidst the turmoil and chaos sweeping through the Mirabello region at this time? This article proposes that by successfully integrating immigrant populations into a new lower class, elites at Gournia reorganized craft production, which fueled economic prosperity. Recent excavations at Gournia support this hypothesis. There is new evidence for intensive ceramic production at the northern periphery of the site in the Late Prepalatial period. In the Protopalatial period, an expansive new architectural complex with craft workshops was constructed near an elaborate residence, suggesting that elites played an important role in the centralization of production and redistribution at Gournia.

Introduction: Gournia and its Regional Context

Gournia is located on the northeastern coast of the island of Crete, and sits on a small hill overlooking the expansive Gulf of Mirabello (Fig. 1). The Gulf of Mirabello is the northern boundary of the Isthmus of Ierapetra, the narrowest part of Crete, where just twelve kilometers of flat, easily navigable land separate the Aegean Sea and the Libyan Sea. The ease of moving through the landscape in this region facilitates trade and exchange, and the area was densely populated throughout much of the Bronze Age.[1] The Vrokastro, Kavousi, and Gournia surveys have produced a range of data on the settlements in this region,[2] revealing sequences of urban growth in some areas, and desertion in others. These shifts in regional settlement pattern are key to understanding the development of sociopolitical complexity in the Mirabello region from the Prepalatial period to the Protopalatial period (Fig. 2).

Settlement Pattern: The Mirabello Region

In the Early Minoan II period (EMII), there were three main centers of production and trade in the Mirabello region of eastern Crete: Mochlos, Vasiliki and Priniatikos Pyrgos. Each of these centers specialized in a certain kind of craft manufacture. Mochlos was known for its production and export of fine stone vases, Vasiliki for its distinctive fine, mottled pottery, and Priniatikos Pyrgos for its large pottery vases.[3] Mochlos stands out as a center of wealth during this period, as the rich graves with fine jewelry and imported objects from the Near East and Egypt attest.[4] Mochlos, Vasiliki, and Priniatikos Pyrgos were surrounded by smaller, agricultural sites, which were dispersed throughout the landscape. These smaller settlements operated relatively independently and did not rely on the villages for their survival.[5] Gournia was established by a small group of settlers who were probably drawn to the settlement because of its proximity to the sea, abundant natural resources and the fertile land in the area. Archaeological remains from this early period at Gournia
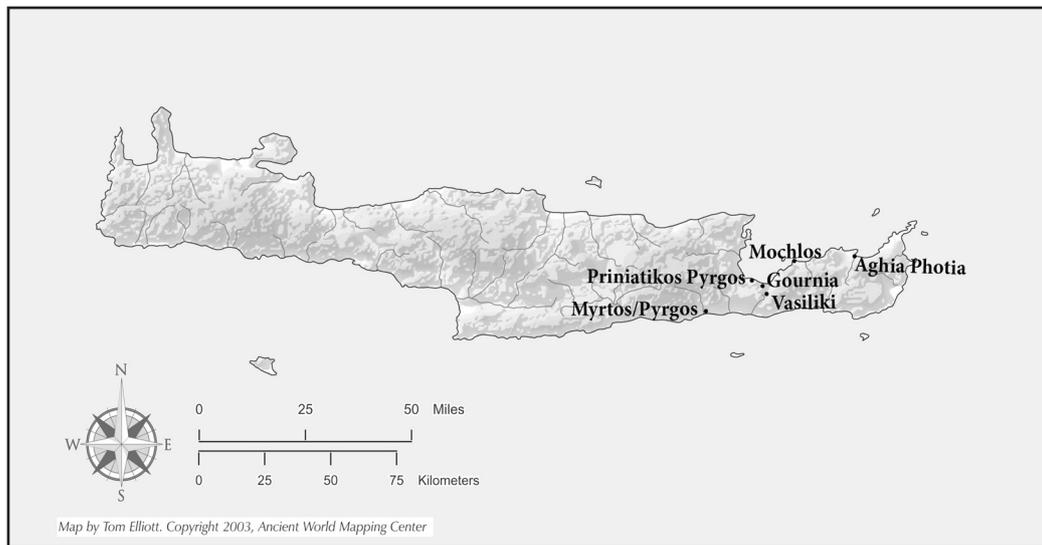

Figure 1: Map of Crete

DATE B.C.E.	CHRONOLOGICAL PERIOD	MAJOR CULTURAL DEVELOPMENTS
3100		
3000	EMII	
2900		
2800		
Prepalatial 2700	EMIIA	Emergence of ranked society
2600		
2500		Widespread foreign contact
2400	EMIIB	Destruction of major sites by fire
2300		Decline, isolation, retraction
2200	EMIII	
Late Prepalatial 2100		Nucleation and affluence at Gournia
2000	MMIA	
1900	MMIB/IIA	Tremendous population growth
Protopalatial 1800	MMIIB/MMIIIA	Construction of first palaces
1700		
1600	LMIA	Construction of second palaces
Neopalatial 1500	LMIB	
1400		

Figure 2: Chronology of Bronze Age Crete

are scarce; although no architecture has been discovered, pottery has been found below later houses on the acropolis and the settlement may have had a similar appearance to Vasiliki or Myrtos/Pyrgos.[6]

At the end of the EMIIB period, a series of destructions swept through the Mirabello region. Mochlos, the most prosperous village in eastern Crete, was destroyed by fire, and similar destructions occurred at Vasiliki, Myrtos Fournou Korifi, and Myrtos/Pyrgos.[7] The dispersed agricultural settlements that dotted the region mostly disappeared, many coastal sites were abandoned, and new sites were established in defensible locations or in marginal, previously unoccupied areas, such as the high mountains of the Kavousi region.[8] Gournia was different: the settlement managed to maintain a continuous occupation and a thriving burial tradition, as the many inhumations in the cliffs at the nearby Sphoungaras cemetery attest.[9]

The settlement pattern in the Mirabello region was fundamentally reorganized in EMIII and Middle Minoan IA (MMIA), following the EMIIB destructions. Small clusters of houses cropped up around patches of arable land near permanent water sources, and although they operated autonomously, neighboring clusters may have engaged in some communal activities, such as metal production at Chrysokamino on the coast.[10] In EMIII and MMIA, Gournia expanded in size and population, and emerged as an affluent center of craft production and manufacturing.[11] A new kind of granodiorite-tempered pottery with lively white on dark designs was produced here, and distributed throughout the Mirabello region.[12]

The patterns of land use established in EMIII and MMIA in the Mirabello region set the tone for the MMIB settlement pattern, which progressed along the same lines.[13] Site clusters remained intact, but a twofold increase in the number of sites and a dramatic population explosion in MMIB led to the dispersal of small farmsteads into the countryside.[14] The metallurgy workshop at Chrysokamino was abandoned in the Late Prepalatial period and metal production probably shifted to Gournia, where it operated under the control of elites at the helm of a rapidly centralizing regional state.[15] At Gournia, the growth that began in EMIII led to a

major expansion and reorganization of the settlement in MMIB and supported its position as the most important urban center in the Mirabello region.[16] This growth mirrors a pattern of urban growth visible at other sites on Crete, including Knossos, Mallia, and Phaistos, which witnessed the construction of the first palatial buildings during this period.[17]

Climatic Upheaval and Cycladic Immigration

An influx of immigrant populations on the north coast of Crete began in the Prepalatial period and reached its height in EMIII and MMIA, adding to the social and economic changes already underway in the Mirabello region. These settlers, from the Cycladic islands and West Asia, may have fled to Crete in response to a large-scale global climate event, which would have dramatically affected the efficacy of their subsistence strategies. This climatic disaster began around 2200 B.C.E. and lasted about 300 years, causing a severe, prolonged drought that affected all major societies in the eastern Mediterranean.[18] The drought is extensively documented on a global scale in ice cores, pollen records, and historical accounts, and its abrupt onset and lengthy duration have been tied to a number of significant sociopolitical collapses.[19] In the period from 2200 to 2000 B.C.E. the cities of Byblos, Kultepe, Tarsus, Ebla and Ugarit were destroyed by fire, and Old Kingdom Egypt collapsed.[20] The onset of drought caused the urban Harappan civilization in the Indus Valley to decentralize, and the population moved out to the countryside.[21] In Palestine, cities disappeared and only a few villages remained,[22] and in Mesopotamia, the severe drought led to a disastrous sequence of crop failures, political collapse, chaos, and foreign invasion, documented in cuneiform as the epic Curse of Akkad.[23] At the conclusion of this prolonged drought, entire regions were resettled in Syria, Palestine and Mesopotamia. Settlements were fundamentally reorganized, served different functions than they had before, and had different ethnic compositions.[24]

Crete's response to the severe drought parallels that documented in the Near East. The onset of the disaster coincides with the abandonment of major settlements, widespread population movements, the establishment of new settlements in rural areas, and the appearance of new ethnic groups. The arrival of Cycladic settlers on the north coast of Crete in EMIIB and EMIII occurs at the same time as a widespread depopulation of the Cyclades, visible at sites such as Akrotiri on Thera.[25] The site of Aghia Photia in northeast Crete has overwhelmingly Cycladic-style artifacts and tomb architecture, and is widely regarded as evidence for a Cycladic zone of cultural influence on the north coast of Crete.[26] The arrival of Cycladic populations on Crete may have destabilized the social structure further, during this time of increased environmental stress. This is reflected archaeologically through the abandonment of many sites on the north coast, and through population nucleation at larger centers, that contain evidence for a new, lower class; probably an immigrant population.[27]

By MMIB, processes of recovery on Crete were underway. A new building with an elite focus was constructed on the hilltop at Myrtos/Pyrgos.[28] Gournia grew to its largest size, and witnessed the construction of House Aa on the east slope, which had its own paved court and storage magazine with pithoi.[29] Settlements restabilized themselves, assumed new functions, and operated at a greater level of sociopolitical complexity. There is evidence for social ranking in this period at Gournia, in the disparity between high-status and low-status tomb architecture and contents. The richest burials were located at the north spur of the settlement, in rectangular house tombs, whereas lower-class burials were

placed in the hills of nearby Sphoungaras, in simple pithoi inhumations.[30] The lowest class burials contain Cycladic grave goods, indicating that they may contain inhumations of immigrant populations.[31]

The North Trench Deposit: Evidence for Continuity at Gournia

The sequence of events outlined above addresses regional changes in the settlement pattern on Crete over several hundred years at a broad scale. But, how are these changes manifest in the archaeological record of a single site? The site of Gournia is a valuable source of information for this inquiry, because it was occupied continuously from the Prepalatial to the Protopalatial periods. Other sites in the Mirabello region were destroyed in the Late Prepalatial period and contain truncated chronological sequences, or were established later during the MMIB population explosion. Evidence from Gournia reveals nuances of sociopolitical development obscured during this hazy period of prehistory at other sites.

The North Trench deposit is a large ceramic dump located at the northern periphery of Gournia, north of a rubble wall approximately 1 m in width. It was discovered and partially excavated by Harriet Boyd Hawes and Edith Hall during their 1901-1904 campaigns at the site.[32] The deposit contained enormous quantities of distinctive white on dark pottery, and Boyd-Hawes and Hall assigned the deposit an EMIII date on the basis of stylistic observations.[33] The North Trench deposit is large and homogeneous, and is regarded as the type-site for EMIII pottery.[34] White on dark pottery has since become the most important chronological marker for EMIII in eastern Crete.[35] The abundant quantity of EMIII material at Gournia is unique; the phase is scarcely present at other sites in the Mirabello region. It is of critical importance to explanations of the emergence of sociopolitical complexity, because it hints

at a unique cultural sequence at Gournia, unparalleled at other sites in this part of eastern Crete: intensive occupation and economic prosperity lasting from EMIII through MMIB.

The exact function of the North Trench deposit was unclear to Boyd-Hawes and Hall when they excavated it. Beyond its relationship to the large rubble wall, it was not associated with any architectural features.[36] Consequently, the deposit was classified simply as a ceramic dump, because joining sherds were extremely scarce, and other types of refuse associated with midden deposits, such as animal bones, were not present. One objective of recent research at Gournia has been to clarify the function of the North Trench deposit, and to reevaluate the position of white on dark pottery in the relative chronology of eastern Crete. The results of this work are introduced below, and the broader implications of these finds are examined in the conclusion.

Recent Fieldwork at Gournia

New excavations at Gournia were reopened in 2010, after a hiatus of fieldwork at the site that lasted over a century. A central objective of the Gournia Excavation Project was to locate and recover new material from the North Trench deposit, in order to clarify the cultural sequence at Gournia as well as the relative chronology of eastern Crete. In addition, new excavations on the unexplored eastern slope of the site were pursued, in order to determine the horizontal extent of the site in this direction, and to date any cultural levels found there.

The project was successful in locating the extant portion of the North Trench deposit, and recovered over two tons of pottery during the 2010 field season. In 2011, further excavations were carried out, which defined the boundaries of the

deposit, and its relationship to the rubble wall to the south. An initial examination of the pottery confirmed observations made by Boyd-Hawes and Hall; especially that the deposit contained no artifacts other than potsherds, and that joins were exceedingly rare. Further, a preliminary analysis of the shape, fabric and decoration of material recovered in 2010 and 2011 agrees with earlier observations made by Boyd-Hawes and Hall, although the material requires further study before any concrete stylistic or chronological observations can be put forth.

The discovery of a ceramic kiln destruction adjacent to the western boundary of the North Trench offers compelling insight into the function of the deposit, suggesting that the sherds may be refuse from pottery production. The kiln destruction is roughly 1 m x 2 m in size, and contains multiple layers of burned soil replete with ceramic wasters that date to the Late Prepalatial period (MMIA), as well as over 21 kg of plaster kiln lining. The industrial activity at Gournia was concentrated at the periphery of the site, close to the sea and facing the prevailing winds from the north. This setup has parallels at Priniatikos Pyrgos, where several ceramic kilns were uncovered on a promontory by the sea, and also at Chrysokamino, where metal production was concentrated a windy outcrop just a few kilometers east of Gournia, on the Mirabello coast.[37]

On the eastern slope of Gournia, a series of adjacent trenches totaling 10 m x 12 m in size were excavated in 2011, which revealed a number of rectilinear rooms on either side of a paved, cobblestone street approximately 1 m wide. It is likely that this street connected to the circuit road that encircled the Gournia acropolis, but this remains to be confirmed in future field seasons. The contents of rooms in the architectural complex vary; some contained rich midden deposits (trench 21,

44), others were largely devoid of cultural material (trench 29), and still others yielded evidence for industrial activity, such as thick concentrations of loomweights, ground stone tools, standardized weights, and murex shells (trench 45). Outside of one room of the complex, there was a triangular cut bedrock pit .80 m deep, which tapered down to a point and contained an abundance of grayish-green, greasy soil with no artifacts in it whatsoever. This pit was interpreted as a waste pit, possibly for some kind of manufacturing activity. All of the soil from this feature was collected for further testing and analysis, in order to determine the exact composition of the refuse.

The architectural complex on the eastern slope of Gournia dates to the Protopalatial period, and extends beyond the boundaries of Neopalatial settlement. Although the Protopalatial acropolis remains a mystery because of later construction, several large houses (House Aa, House Ea) indicate social stratification during this period. Of particular interest is House Aa, which contains four storage magazines stocked with amphorae and pithoi and a paved court. If the Protopalatial architectural complex revealed by recent excavations is in fact an industrial quarter, then it is possible that these production activities may have operated under the purview of managerial elites who resided just a few meters away, in House Aa. This view is consistent with the idea that the growth of social complexity at Gournia was brought about by increasing centralization of economic production under elite control.

Conclusion

Recent work at Gournia has shown that pottery production during the EMIII and MMIA periods was concentrated at the northern periphery of the settlement. These activities came to a halt in MMIA, when a pottery kiln was destroyed, and the

ceramic dump went out of use. In MMIB, a new and more elaborate industrial quarter was constructed on the eastern slope, which housed the production of multiple different crafts in architectural units. Craft production at Gournia may have operated under the management of elites living in nearby elaborate residences, such as House Aa. How does this new information from Gournia relate to what we know about the emergence of sociopolitical complexity in the Mirabello region, and what role did Cycladic immigrants play in the reorganization of production at Gournia from EMII to MMIB?

The following reconstruction is offered. EMII was a temporary period of prosperity on Crete, when a number of small centers (Mochlos, Vasiliki, and Priniatikos Pyrgos) were involved with production of specialized crafts. Craft production probably operated at the household level, involved voluntary cooperation, and was not centralized under the leadership of authority figures. These sites maintained trading contacts with their neighbors in the Isthmus of Ierapetra, as well as with Cycladic islanders to the north, and more distant polities in the Near East and Egypt. Competition between elites at EMII centers was amplified by the onset of a severe drought around 2,200 B.C.E. that triggered violence and warfare, and led to the demise of many sites at the close of EMIIB. Trade within and outside of Crete decreased dramatically at this time. Cycladic immigrants, responding to the climatic upheaval, fled to Crete and either established their own small settlements on the coast, or integrated themselves into the lower classes at Gournia, a rapidly expanding and affluent center. The enormous quantity of EMIII pottery from the North Trench deposit, and its association with a pottery kiln, suggests intensive production activities were occurring during this time, despite the turmoil sweeping through the rest of the Mirabello region.

By MMIB, the severe drought subsided. Gournia underwent a reorganization and expansion, which was fueled by population growth. The poorly furnished burials in the Sphoungaras cemetery at Gournia, which contain Cycladic grave goods, indicate that the Cycladic settlers were members of a new, lower class. It is possible that Gournia managed to withstand the EMIIB disaster in the Mirabello region by offering a safe haven for Cycladic immigrants fleeing a climatic disaster. This caused the population to increase to a threshold point, and facilitated the development of a new forms of hierarchical ranking. This trend toward greater social complexity continued unabated throughout the Protopalatial period, as Gournia continued to prosper as the most affluent center of manufacturing and export in the Mirabello region.

Endnotes:

1 Betancourt 2006a, 4-7; Soles 1979, 150
2 Vrokastro Survey, Hayden 2004; Kavousi Survey, Haggis 1996; Gournia Survey, Watrous 1993
3 Betancourt 1979; Hayden 2004, Kalpaxis et al 2004, 157; Warren 2010
4 Soles and Davaras 1989, 413
5 Watrous (forthcoming, 2-3)
6 Soles 1979, 150-51
7 Betancourt 2006b, 264, Manning 1994, 234; Watrous (forthcoming, 3)
8 Haggis 2005, 65-9; Haggis 2006, 228; Hayden 2004, Manning 1994, 234-36; Watrous (forthcoming: 4)
9 Soles 1979, 151
10 Haggis 2006, 226
11 Betancourt 2006b, 266; Soles 1979, 151; Watrous (forthcoming, 4)
12 Haggis 2006, 228; Betancourt 2006b, 266
13 Betancourt 2006b, 264; Haggis 2006, 228-9
14 Betancourt 2006b, 264-5; Watrous (forthcoming, 7)
15 Betancourt 2006b, 266
16 Betancourt 2006b, 264
17 Manning 2010, 14; Soles 1979, 151
18 Staubwasser and Weiss 2006
19 Staubwasser and Weiss 2006, 380-81
20 Roberts et al 2011, 152; Gibbons 1993, 985; Manning 1997, 149; Watrous 1994, 734
21 Staubwasser and Weiss 2006, 381
22 Palumbo 2001
23 Jacobsen 1957
24 Staubwasser and Weiss 2006, 382
25 Watrous (forthcoming, 10)
26 Betancourt 2003; Day, Wilson and Kiriatzi 1998, 141
27 Watrous (forthcoming, 5)
28 Cadogan 1977-78, 71
29 Soles 1979, 153
30 Soles 1979, 165
31 Watrous (forthcoming, 8)
32 Boyd Hawes 1908
33 Watrous 1994, 719
34 Betancourt 1984, 11
35 Betancourt 1984, 11; Watrous 1994, 719
36 Boyd Hawes 1908, 20
37 Betancourt 2006c, 47, Kalpaxis et al 2004, 143-55

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Pottery in the Landscape: Ceramic Analysis at the City-Kingdom of Idalion, Cyprus

Rebecca Bartusewich

The ancient site of Idalion, Cyprus has a landscape dominated by two acropoleis containing sacred sites. The plain below is the location of domestic occupation. I have petrologically analyzed 45 ceramics from the domestic area and one sacred area and found that while the sacred spaces dominate the landscape, ceramics were not produced/chosen differently for the sacred area over the domestic area. The visual proximity of the sacred and the everyday seems to indicate cohesion in the social and natural landscape. The preliminary petrological analysis of pottery from Idalion has shown, thus far, that the sacred and profane are intertwined.*

Pottery, as a part of the material repertoire of society, is subject to variability in societal tradition based on the landscape and the environment. As a theoretical basis, the landscape provides an interesting framework for studying material culture, especially in the ancient city of Idalion, Cyprus, where space and geography were important for urban and cultural development. Using a sample of 45 Iron Age (1050 B.C.E. – 300 B.C.E.) pot sherds from Idalion, Cyprus, I have microscopically analyzed the fabric of these sherds and two local clay samples to determine production/ selection practice for two areas within the landscape of Idalion. Through petrographic analysis, I hoped to better understand the production and trade of pottery at Iron Age Idalion. I chose pottery used in the domestic area in the Lower City and the sacred area on the East Terrace to determine if there is a difference in the production of pottery

used for sacred purposes, however the results indicated there is no marked difference and so I have initially concluded that at ancient Idalion the sacred and profane were intertwined in daily life.

Idalion, Its Landscape, and Its Cypriot Context

The island of Cyprus has a history beginning in the Neolithic and continuing, mostly uninterrupted, until modern times. Copper was mined on the island in the Bronze Age and representatives of many cultures came to the island as traders, settlers, and rulers, often drawn by the economic and political implications of the copper trade.[1] Ancient Idalion, Cyprus is located on the Mesaoria Plain in the foothills of the Troodos Mountains bordering modern Dhali (Figure 1). The ancient city-kingdom is dominated by two acropoleis (East- Mouti tou Arvili and West- Ambelleri) on which
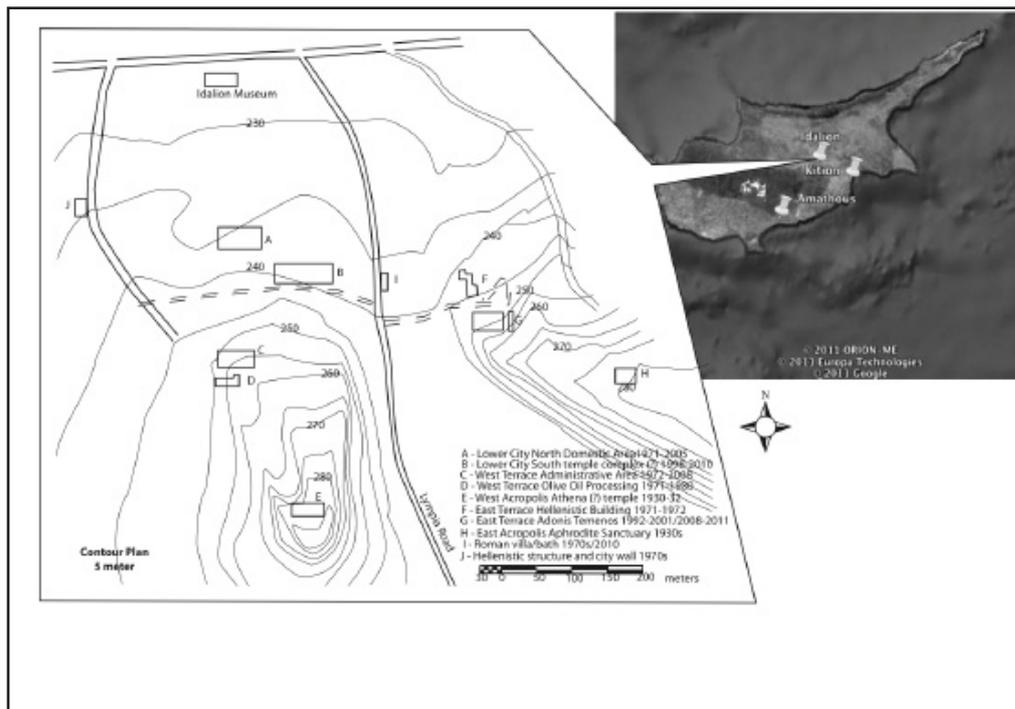

Figure 1: Google Earth Cyprus map with a contour map of Idalion, showing areas of work. Adapted from Figure 1 in Stager, Walker and Wright, eds. 1974. (Permission granted by ASOR and Dr. Lawrence Stager, May 2009)

sanctuaries, temples, and administrative centers have been built and represent several cultural groups.[2] The sanctuary of Adonis on the East Terrace[3] lies in the midst of a bowl-shaped depression in the acropolis and the plain below also looks up to the Phoenician-Hellenistic period administrative center[4] and the (Archaic-Hellenistic Period) temples.[5] The sacred areas of Idalion are geographically higher and visually take priority in the landscape.

The pottery studied in this project does not show a difference between the sacred space on the acropolis and the domestic space on the plain below. At Idalion, the physical separation of the sacred and the profane areas may have been mentally less separate than the current evidence suggests. There is a large amount of the site that is presently unexcavated and it is not clear how the ancient population would have interpreted the physical landscape and the perceivable separation between the sacred and profane spaces. However, what has been published and uncovered archaeologically shows that there is the possibility for more domestic areas, for example south of the Adonis Temenos on the same terrace is evidence of Hellenistic structures that have not been re-investigated since the 1970s.[6] The possibility for domestic spaces very near the sacred and the evidence of pottery production being similar in both areas may allow for free movement between the sacred and the everyday. Accordingly, landscape in archaeological terms is a synthetic, or intangible entity affected by daily routines and interactions between people and the land.[7] Ultimately, landscape is a useful term, because it can be used to interpret the effect of physical geography on material culture and people. There is an interaction between people and their land in the way they carry out their daily lives which can be seen in the products they create and where their life activities occur. Water was not a far resource for the ancient people of Idalion (less than 100 m) and while they may not have realized it and so their transport jars did not need to be as hearty as those required for travel across longer distances.

History of Pottery Analysis and Geology of Idalion

Pottery Analysis

An American team of archaeologists has excavated the site of Idalion almost continuously since 1972 and a significant amount of pottery has been uncovered. General studies of the pottery from Idalion include typological investigations[8], type specific context analysis[9], ceramic ecology[10] and ethnographic study.[11] Neutron activation analysis (NAA) was also performed on Idalion, and other areas' potsherds, once in a small sample of 59 and again on a sample of 500 potsherds. Those results indicated that Cypriot pottery shares a high concentration of certain minerals no matter where on the island the clays were obtained, and also showed that few sherds were identified as demonstrating local clay sources from Idalion.[12] Mercuri conducted a study of the clay from the Yialias River in Dhali as another way of analyzing the production practice of Idalionites. Clay was extracted from near the Neolithic Dhali-Agridhi (Figure 2) site to the northeast of modern Dhali, on the south bank of the Yialias, and analyzed for plasticity and production feasibility through experimentation. Mercuri concludes that the clay in the Yialias River needs the addition of plastic temper for it to be useful for firing and production.[13] Keeping these studies in mind, local unfired clay from both the Yialias River (red) and the Idalion hills (green) was used for comparison for this present study.

Geology

The geology of Cyprus has been studied and published extensively in multiple locations.[14] The Troodos Mountains are the major basic and ultrabasic igneous rock source for the island and the region of ancient Idalion lies in the foothills. Ophiolite is dominant in the Troodos, while the foothills are made of basalts and serpentine.[15] Surrounding the igneous geology of the Troodos and running through ancient Idalion is a sedimentary
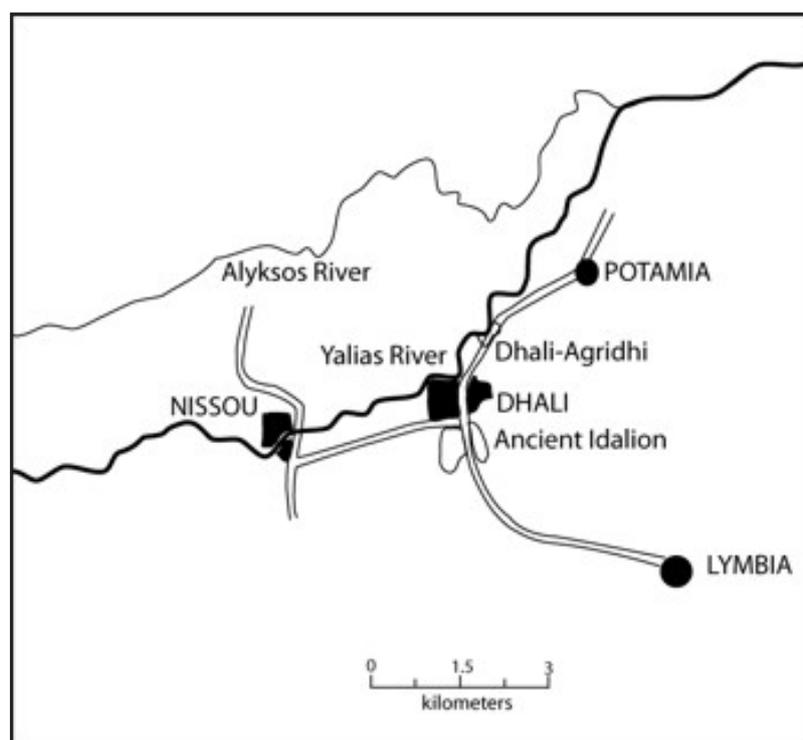
Figure 2: Map of area around ancient Idalion. Modern towns are indicated by all capital letters. Adapted from Figure 1 in Stager and Walker, eds. 1989. (Permission granted by ASOR and Dr. Lawrence Stager, May 2009)

geology dominated by the Pakhna Formation that consists of marl clay below layers of gypsum, shales, chalks and limestone. Shells are also evident in the sedimentary geology. In the Kyrenia Range to the north of the island, limestone, sandstone, dolomite, and cherts with bryozoas make up the geology.[16]

Methodology and Analysis

Petrology is a field that studies the mineral makeup of lithics and ceramics through the analysis of thin section slides under a polarizing microscope. Williams describes petrology as a "means of establishing: origin; comparability of similar material with known origin; and the technology involved."[17] Petrology can provide a wealth of information about raw material sources and patterns of movement

and exchange. The present study subjected 45 plain ware (including coarse ware and cooking ware) pot sherds and 2 unfired clay samples to analysis, in accordance with accepted standards of macroscopic and microscopic analysis as used by Whitbread.[18]

Local unfired clay samples were used as a comparison to determine whether or not the samples selected for study were locally produced, since no kilns or production facilities uncovered in the archaeology of Idalion indicate production at the site. The local clay in Dhali is dominated by foraminifera and limestone and can be found in the Yialias River bed[19] and in the Pakhna geological formation running under the ancient city. I analyzed two samples of these clays petrologically in an unfired state consolidated with aradite hardener HY997 and acetone. I had no access to a kiln and could

Sample Number	Area	Description	Relative Date	Fabric Group	Sample Number	Area	Description	Relative Date	Fabric Group
1	LCN	CP bs	Hellenistic		24	ET	PW bs	CA	III
2	LCN	PW bs	Hellenistic	X	25	ET	PW bs	Hellenistic	VI
3	LCN	CP bs	Hellenistic	I	26	ET	PW bs	Late CC	VI
4	LCN	Hell W/G or Col W bs	Hellenistic		27	ET	WP bs	CA II/CC I	IV
5	LCN	PW bs	CA II	I	28	ET	PW bs	Hellenistic	V
6	LCN	PW bs	late CA/CC	III	29	ET	WP bs	CA II/CC I	IV
7	LCN	CW/CP bs	CA		30	ET	PW base	Hellenistic	X
8	LCN	CP bs	CC II	I	31	ET	PW bs	CC/Hell	I
9	LCN	PW bs	late CC	IV	32	ET	WP bs	CA II	VIIa
10	LCN	CW bs	CC		33	ET	PW bs	Late CC	V
11	LCN	PW bs	Late CC	VIII	34	ET	PW bs	CC	X
12	LCN	CP bs	CC/Hell	II	35	ET	PW bs	CA II/CC I	VI
13	LCN	PW bs	CC	VIIb	36	ET	PW bs	Late CC	VIII
14	LCN	B on R bs	CA II	V	37	ET	WP bs	CA I	V
15	LCN	CP bs	CC	I	38	ET	P hndl stu	CC/Hell	I
16	LCN	PW bs	Hellenistic	V	39	ET	CW bs	CC	IV
17	LCN	CW bs	CC	IX	40	ET	PW bs	Hellenistic	VIIa
18	LCN	PW bs	CC/Hell	VIIb	41	ET	CP bs	CA II	I
19	LCN	WP bs	CC/Hell	IV	42	ET	PW bs	Late CA/CC	III
20	LCN	PW bs	CC	VIIb	43	ET	CP bs	CC	II
21	LCN	WP bs	CA II	IV	44	ET	CP bs	Hellenistic	I
22	ET	PW bs	CC/Hell	VI	45	ET	CW bs	Hellenistic	VIIa
23	ET	Hell W/G bs	Hellenistic						

B on R- Black on Red, Hell W/G- Hellenistic Wash/Glaze, Col W- Color Ware, CP- cook pot, CW- coarseware, PW- plain white, WP- White Painted, bs- body sherd, hndl-handle, ET- East Terrace, LCN- Lower City North

Figure 3: Table of pottery sherds analyzed. {Abbreviations: B on R- Black on Red, Hell W/G- Hellenistic Wash/Glaze, Col W- Color Ware, CP- cook pot, CW- coarseware, PW- plain white, WP- White Painted, bs- body sherd, hndl-handle, ET- East Terrace, LCN- Lower City North

not fire the clays to see the affect of heat on the clay fabric. This means that I could not see the effect of heat on the local clay, however, under a petrologic microscope, the minerals are still identifiable without the effects of heat. The clay samples came from an archaeological context and were not formed or worked by my own hand. They were discovered in rain wash layers of the re-opening of the East Terrace excavations in 2008.

My analysis of the archaeological material indicates two main fabric groups among the samples from Idalion: Group A, a highly igneous matrix with little to no sedimentary geology present suggesting an origin in the Troodos mountains, and Group B, a lime-rich matrix with limestones, foraminifera, and some

igneous inclusions that can be attributed to the local area, if not at Idalion, then somewhere nearby in the Troodos foothills. Ten groups of clay types were identified among the 45 potsherds (Figure 3).

Group I: This fabric is very rich in volcanic material (Group A) with very scarce to no limestone inclusions. There is sparse subangular quartz in the coarse igneous matrix. The igneous inclusions consist of hornblend (common to sparse), pyroxenes (sparse to none), serpentine (common to sparse), and common feldspars. This group encompasses a range of variations with the same general inclusions, however sorting and percentage of minerals varies. The nature of the volcanic inclusions also suggests various locations

within the Troodos geological complex (Akamas Peninsula and the summit20). Some rounded igneous rock fragments can be 2 mm across, but also as small as 0.8 mm across. This fabric group is intentionally non-specific to fabric color and appearance; the abundant igneous inclusions are the binding factor in this group designation.

Group II: This group is characterized by the same inclusions as Group I; however, limestone and foraminifera inclusions are now common in the matrix. The clay is moderately sorted and contains about 30% inclusions.

Group III: A lime-rich clay (Group B) with abundant rounded/oval-shaped limestone fragments, but no shell or foraminifera. Igneous inclusions are evident and are d 1 mm in size when there are rock fragments. Feldspars, clay pellets, and pyroxenes are all common in the matrix that is made up of about 25% inclusions, moderately sorted. Subrounded quartz and micas are sparse in the matrix.

Group IV: A Group B clay rich in foraminifera and shell with sparse to no limestone fragments. Sparse lava fragments of various sizes, some up to 4 mm, with other igneous inclusions including feldspars, pyroxenes, and serpentines also sparse. This group is also broad and includes fabrics of various sorting and mineral composition.

Group V: This clay is not unlike Group IV, however the inclusions are now finer and much smaller, most d 0.5 mm across. Sparse igneous rock fragments, rounded limestones, and subangular quartz make the majority of the well sorted matrix. There are 20% minerals, however when looking only at the shell/foraminifera and not the natural clay matrix, the percentage falls to 5%.

Group VI: A fine volcanic matrix (Group A). All the inclusions are igneous including common feldspars, sparse pyroxenes, common/sparse serpentine, and lava fragments (other igneous inclusions such as mica are much less frequent,

but not excluded from the possibilities). Common subangular/subrounded quartz and clay pellets with feldspars are also in the very well sorted matrix of 20% inclusions.

Group VII: Another fine volcanic matrix (Group A) now including shell/foraminifera and limestone fragments. The well sorted clay contains 50% minerals all of which are d I mm across. Pyroxenes and feldspars are common, as well as clay pellets (some with feldspars) and subrounded quartz grains. Shell/limestone and lava fragments are sparse. There are two types of clay matrix for this group, while they exhibit the same inclusions, one is thicker and more compact (VIIa) and the other is finer and more processed (VIIb).

Group VIII: This group is very different in appearance from the rest of the samples. It contains very well sorted abundant quartz and limestone in almost identical rounded tabular shapes. There is common shell, sparse clay pellets, and sparse small (d 0.3 mm) volcanic inclusions. The inclusions make up 40% of the clay. The clay is thick walled (c. 8 mm) and is fired to a light gray color (2.5Y 6/1) with a light red core (2.5YR 6/8).

Group IX: A fabric group that resembles the other igneous fabrics (Group A), however, serpentine is abundant in the matrix. Small, rounded limestone (d 0.5 mm) is sparse with a few larger examples (2 mm across). Weathered igneous rocks are common and are d 2 mm in size although some examples are much smaller (d 0.4 mm). The inclusions make up about 45% of the clay that is moderately/poorly sorted. The serpentine is generally small (d 0.3 mm) and well mixed with in the clay.

Group X: A group with compact igneous matrix (Group A) composed of mostly small (c. 0.5 mm) mineral inclusions. Serpentine and clay pellets (some with feldspars) are sparse, while weathered igneous rocks and ophiolite are common. Larger (c. 1 mm) limestone fragments are sparse, while feldspars are common. Subangular quartz is also common

in the matrix with less than 15% mineral inclusions. This clay group is likely to be from the upper regions of the Troodos Mountains.

The results of analysis demonstrate overall that there is no marked difference in paste recipe for pottery used in the Adonis sanctuary and the pottery used in the domestic occupation. Some of the samples are from the Idalion area; others come from regions in the Troodos. The igneous rocks of the Troodos Mountains appear in almost all of the samples analyzed from Idalion, however many are subrounded to subangular and are naturally occurring or part of another larger group of inclusions that could be explained through a mixing of clays. The larger, more angular inclusions appear to have been purposely added to the clays as temper to improve workability (samples 7, 17, 29, 41).

The Mesaoria Plain has a sedimentary geology consistent with 14 of the grouped samples studied and the remaining volcanic (igneous) matrix clay groups make up 26 samples. The igneous petrology of Groups I, II, VI, VII, IX, and X appear consistent with a source in the Troodos. Five samples were not grouped and may have been imported to the island, but further analysis is necessary before this can be stated as fact. Bieber found that only two of the groups identified through NAA were locally made at Idalion;[21] he processed 164 potsherds (the majority of which were painted fine wares) from Idalion and 63 had unidentifiable sources. Among the Idalion sherds in this study, there is a greater concentration of Troodos and Mesaoria clays present indicating either regional exchange/purchase or clay acquisition.

Implications

After analyzing the fabrics under the petrological microscope it was clear that there was no distinct difference in the inclusions between the domestic/industrial precinct in the Lower City South and the sacred temenos (East Terrace) at Idalion. While the domestic precinct of the Lower City of Idalion may

have had its own workshops, pottery may not have been one of the crafts carried out at the sanctuary;[22] there was no evidence of a kiln on the East Terrace, or in the Lower City in the archaeological record thus far. The following discussion contextualizes the findings from Idalion within research on landscape, societal structure, and production practices.

Christopher Tilley discusses the ways in which individuals impact and create their society through daily activities and that their lived experience can be inferred by archaeologists by investigating their material remains.[23] The inhabitants of Idalion exploited their land and resources in order to create a marketable product, copper, which was then commemorated through the production of ceramics which reinforce an ideology derived from the importance of particular places within the landscape. The people of Cyprus, and consequently Idalion, depended on copper and other resources from the Troodos and so their culture depended on appreciating this physical landscape. At Idalion, island wide traditions, other than copper mining, are followed when approaching the landscape and working within it. For example, as shown by Al-Radi,[24] sanctuaries in Cyprus during the Iron Age all share the characteristics of peribolos wall, an altar, platform or cella, and remains of offerings. At Idalion these characteristics are fulfilled by the East Terrace sanctuary, the Lady Sanctuary on the East Acropolis, and the West Acropolis sanctuaries. As stated above, Bieber also found that there are island wide traditions exemplified by the pottery he investigated with NAA that demonstrated similarities in plastic inclusions.[25]

Society changes and evolves based upon the individual's objectification of his/her personal space and therefore, material culture is a projection of the people.[26] Pottery is created by and for social groups and as a result both similarities and differences occur between groups. Shanks and Tilley also indicate that reality is produced by material culture, not reflected by it and therefore the pottery is, in

a sense, speaking for itself.[27] At a Neolithic site in France, Burri shows that household production of pottery can be individualized by choosing a different temper in each home, but the shape and use of the pots are universal.[28] In this way we recognize the agency of the potter in his/her choice of inclusions and clay fabric and can explain production in the context if social reality. Burri's research can be projected beyond the household into a discussion of the production characteristics of Idalion pottery.

At Idalion, igneous temper may have been a way to identify with the landscape that provided resources like copper. The sanctuaries of Idalion were in the foothills of the Troodos and were clearly part of the everyday life of the inhabitants. While the Troodos Mountains are not a mere walk away their physical distance seems not to matter as much as their visual proximity. This can be seen in the igneous temper used in ceramics found at Idalion. Similarly, if visual proximity can explain the relationship between the Troodos and Idalion, it also explains the sanctuaries and the domestic spaces of Idalion. Archaeologists are aware that the sacred is very important to ancient cultures, yet it is not clear how integrated it is into daily activity. I argue that it is not unlikely that the same type of ceramics can be used in both contexts because pottery is a social object that is not restricted to either sacred or domestic usage.

Summary

The production characteristics for the sanctuary on the East Terrace and the domestic area in the Lower City were not distinct to either site. Temper used in the production of pottery can show how people connect with their landscape and at Idalion, pottery tempered with the igneous rock of the Troodos Mountains shows how Cypriots connected with the hills that granted them a livelihood through mining copper. While this connection can be seen in pottery all over the island, it is significant that the temper did not change between wares of domestic and sacred uses at Idalion. In this way, the sanctuary was not a place to be feared and only approached at special times of year, but a place of daily reverence and appreciation, if not necessarily a place of daily physical contact. The proximity of the sacred and the everyday seems to indicate cohesion in the social and natural landscape. While more work is necessary, the preliminary petrological analysis of pottery from Idalion has shown, thus far, that the sacred and profane are in fact intertwined.

Endnotes:

1 Iacovou 2008; Voskos and Knapp 2008.
2 Hadjicosti 1995 and 1997; Gaber 1992, Forthcoming; Gaber and Dever 1996; Gjerstadt 1946, 2-7.
3 Gaber and Dever 1996.
4 Hadjicosti 1995, 1997.
5 Gjerstadt 1946, 2-7.
6 Doerrman 1974.
7 Anschuetz, Wilshusen, and Scheik 2001, 160.
8 Gaber 2000, Morris 1992, Alin 1989.
9 Broedel Forthcoming.
10 Mercuri Forthcoming.
11 Johnston 1974.
12 Bieber 1974;1989.
13 Mercuri Forthcoming
14 Bellamy 1905; Bellamy and Jukes-Brown 1905; Gass 1960; Gass and Masson-Smith 1963; Koucky and Bullard 1974; Robertson and Woodcock 1986.
15 Gass and Masson-Smith 1963, 418; Gass 1960.
16 Bellamy 1905; Bellamy and Jukes-Brown 1905, 26; Gass 1960; Robertson and Woodcock 1986, 142 and 152.
17 Williams 1983, 301.
18 Whitbread 1989;1995.
19 Both in ancient and modern times
20 Gass and Masson-Smith 1963, 439.
21 Bieber 1977, 131-2 and Table 3.
22 Gaber and Dever 1996.
23 Tilley 1982.
24 Al-Radi 1983, 97.
25 Bieber 1974;1989.
26 Tilley 1982, 27.
27 Shanks and Tilley 1987.
28 Burri 2007.

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Planning for Heritage Preservation in Western Turkey: a GIS Approach to Archaeotourism and Agricultural Policy

Caitlin Curtis

In the Marmara Lake basin, western Turkey, the burial mounds of Bin Tepe are constantly threatened by looting, development, and agricultural expansion. This study outlines a Geographic Information Systems (GIS) methodology used to plan for a solution to preservation through archaeotourism development and agricultural policy compromise in the region. The components of this study include determining how to best take advantage of the scenic view of the mounds for tourism, projecting the potential future visual impact of growing olive trees, and developing a plan to mitigate this impact with unplanted zones. Fieldwork in 2011 both confirmed and furthered GIS analyses.*

Introduction

The Marmara Lake basin in western Turkey is an archaeological landscape that is populated by 116 monumental earthen mounds that constitute the famous Bin Tepe burial ground. The future of these mounds is currently unclear. A rapidly developing olive oil industry is quickly covering the Bin Tepe landscape with olive orchards, and beginning to obscure the mounds from view in the process. This study aims to aid in the development of a heritage management plan for preservation and sustainable development in the Marmara Lake basin through the use of GIS (Geographic Information Systems). In particular, it will detail research prior to and during the 2011 field season, which entails the use of GIS to plan for archaeotourism development and agricultural policy compromise in the region.

Central Lydia Archaeological Survey (CLAS)

The major goals of the Central Lydia Archaeological Survey (CLAS) are to discover the many past landscapes of Central Lydia, as well as to research preservation initiatives and policies aimed at land management.[1] The study area is approximately 350 km² surrounding the central Marmara Lake, and is located about 100 km inland from the Aegean coast within the Manisa Province. This region includes modern features such as towns, roads, canals, dams, and most importantly for this discussion, countless agricultural fields and orchards (Fig. 1).[2]

Prominent on the archaeological landscape are the 116 burial mounds, or tumuli, that make up the Bin Tepe burial ground. These date to the Iron Age, from the 7th-4th c. B.C.E., when the Lydian kingdom, and
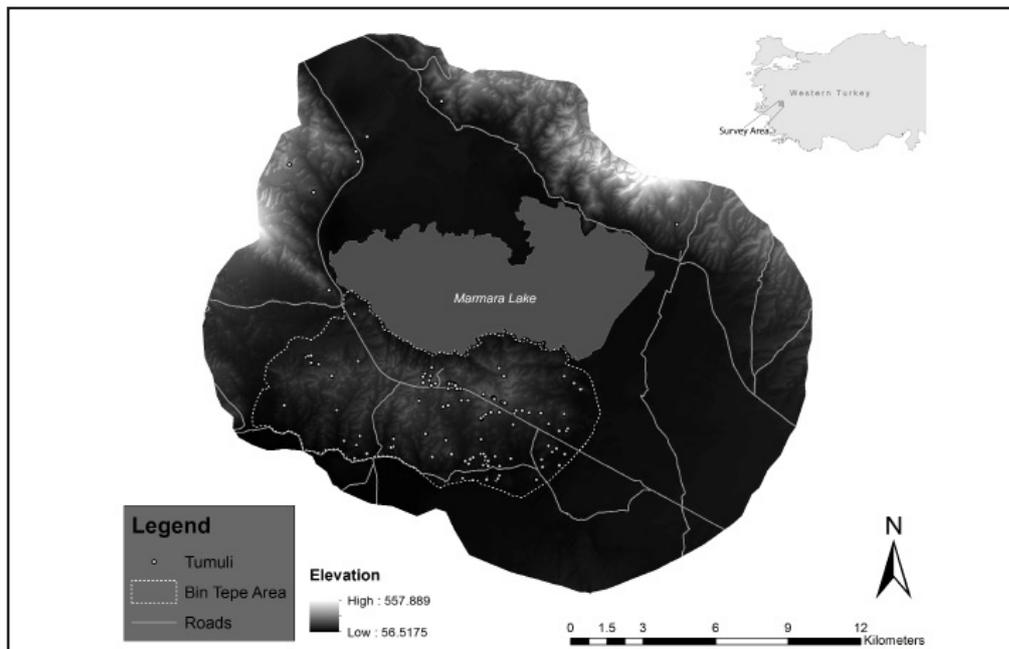

Figure 1: CLAS study area, including tumuli, the extent of Bin Tepe, and major roads; location in western Turkey shown in the inset (map created by C. L. Curtis, data courtesy of the Central Lydia Archaeological Survey).

subsequently the Persian satrapy, reigned over the area.[3] These ancient Lydians and Persians, centered at the famous Sardis site 10 km to the south, buried kings and other high status individuals in tomb chambers with rich grave goods and marked these burials with earthen mounds. The size of the mounds can range up to 70 m in height, with three very large mounds thought to represent the burials of the most important Lydian kings. But, most mounds are more modestly sized, ranging between 10 and 40 m in height.[4] The tumuli are still a dominant presence in the landscape today.

Preservation Challenges

This important archaeological heritage is constantly under threat from looting, modern development, and agricultural expansion. Over 95% of tumuli in the survey area have already been looted, and new looting often yields frustration and further destruction rather than new treasures to sell.[5] Construction projects continually challenge the preservation of the mounds and the ecological landscape. Agricultural expansion, the focus of this study, is encroaching upon sites, damaging them both physically and aesthetically. In particular, a rapidly developing olive oil industry in the region is becoming a major means of income for many, and is quickly populating the landscape with olive orchards.[6] A lack of communication and collaboration between the various stakeholders in the region has thus often led to archaeological destruction.

Heritage Management Goals

A primary goal of the CLAS project is to manage these threats to preservation, especially through the development of a heritage management plan.[7] The major perspective of this plan is to seek collaborative solutions to heritage preservation by working together with local farmers, nearby village and urban

communities, as well as regional and national governmental bodies.[8] One aspect of this plan is to encourage sustainable tourism based on the idyllic Bin Tepe landscape and its impressive mounds. Sustainable archaeotourism aims to have little to no negative impact on archaeological sites,[9] and a model such as this one could provide an influx of income into the region, as well as potential funding to support preservation initiatives. Therefore, it is hoped that all stakeholders will benefit by preserving the Bin Tepe mounds through sustainable tourism.[10]

Approaching Tourism and Agriculture with GIS

The expansion of olive orchards--as opposed to a previously diverse mosaic of much shorter field crops--will begin to block the view of the Bin Tepe mounds, and thus compromise a major touristic resource.[11] GIS can be extremely useful in mapping threats and creating a plan to manage sites in their spatial context. Thus, a GIS model was developed to determine how to best take advantage of the scenic view of the mounds for tourism, to project the potential future visual impact of growing olive trees, and to develop a plan to mitigate this impact with tree-free buffer zones. The quantitative and visual results of this model will be helpful in improving the dialogue between archaeologists, local communities, and regional authorities, and will hopefully foster progressive, forward-thinking policies that support preservation.

The spatial analysis presented in this paper had three major goals. The first was to find a potential location in Lydia to become a stopover for tourists along the highway that provided the best view of the mounds. The second was to project and quantify how the view of the mounds from this point would be obstructed as trees continued to grow. The last goal was to delineate buffer zones around mounds that allow for the
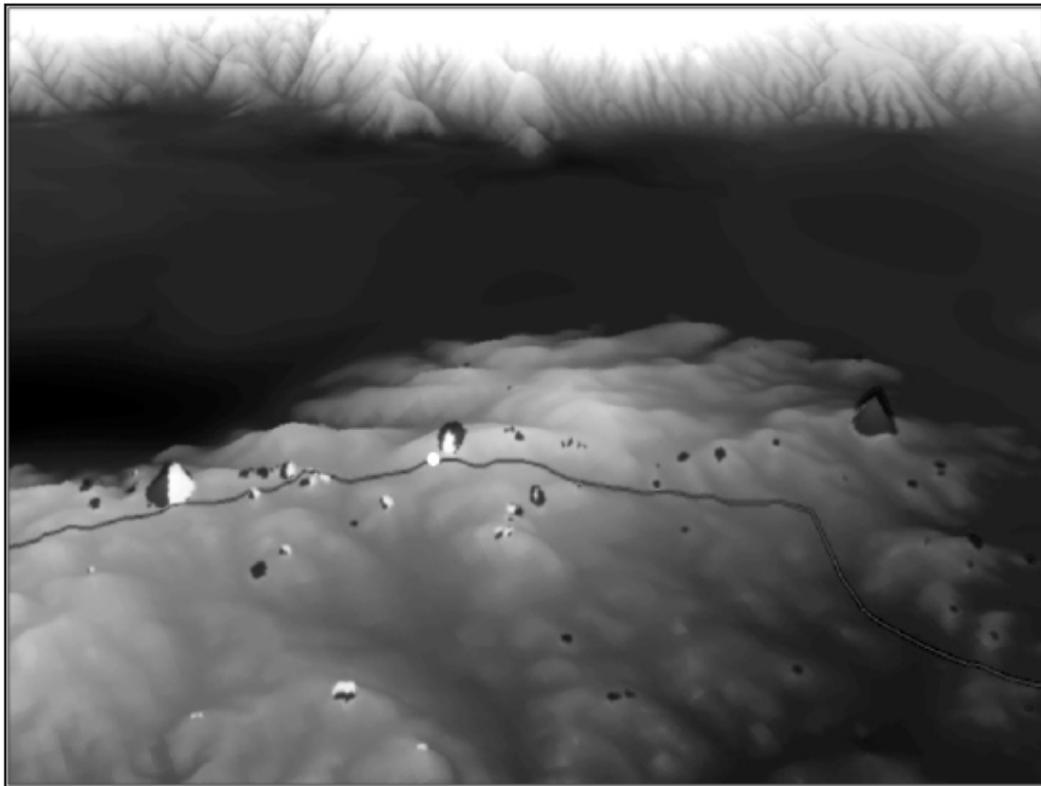
Figure 2: A 3-D visibility model of burial mounds along the highway (grey line) in the Bin Tepe region south of the lake. The white point is the chosen location for a viewing platform based on visibility analysis. The white areas of mounds represents the portions that can be seen from that point, while the black areas cannot be seen (model created by C. L. Curtis, data courtesy of the Central Lydia Archaeological Survey).

view of the mounds to be maintained by establishing a limit to orchard expansion. In order to accomplish these goals, spatial analysis was used to project the visibility of mounds in a landscape with no olive trees, trees at their current height, trees at their future height, and trees planted only at a certain distance from mounds.

Locating the View

The Salihli-Golmarmara highway is a major thoroughfare through the Bin Tepe region and is frequented by visitors coming from Istanbul and Pergamon on their way to destinations farther east.[12] It is also one of the main routes of people travelling to the famous Sardis site to the south, by way of the nearby city of Salihli to the east. It is hoped that Bin Tepe can tap into the existing Sardis tourist market.[13] A quick stop on the highway would be an ideal way to begin developing tourist appreciation for the Bin Tepe landscape.

In order to plan for this tourist stop, the ideal location for a viewing platform along the highway was determined using visibility analysis in GIS.[14] Viewshed or visibility analysis is a function of GIS that projects what can and cannot be seen from a location or set of locations while

Tree Height (m)	3	5	10	15
Visibility Reduction	24%	36%	56%	70%

Table 1: The visibility of mounds with various heights of olive tree populating the landscape. Percent indicates reduction in visibility of mounds as compared to visibility of mounds in a landscape with no trees (derived by C. L. Curtis from Central Lydia Archaeological Survey data).
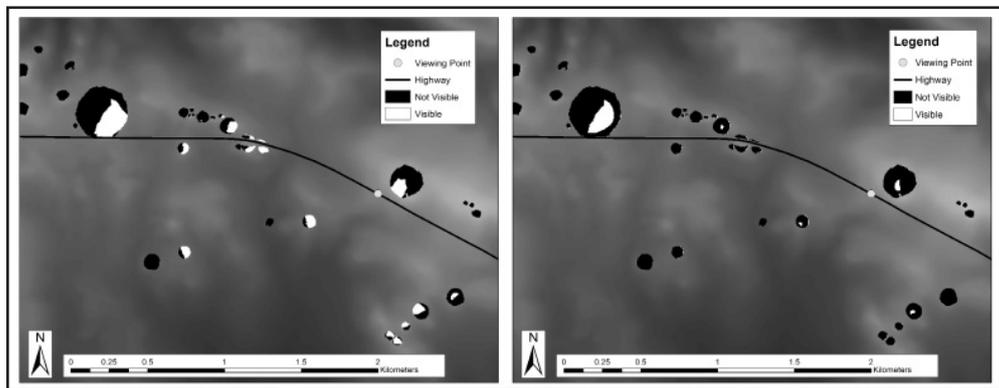

Figure 3: Area of mounds visible from chosen viewing point in a landscape with no trees (left) versus 15-meter trees populating the whole landscape (right) (maps created by C. L. Curtis, data courtesy of the Central Lydia Archaeological Survey)

considering obstructions of the local terrain to an observer's line of sight.[15] The rolling topography of the Bin Tepe ridge prevents a very wide and clear view of all mounds from any spot on the highway. For example, the three largest and most prominent mounds--often associated with the major Lydian kings Alyattes, Gyges, and Ardys--cannot be seen at the same time from any one location on the highway. Though it would have been preferred to incorporate views of these three major monuments from the prospective viewing point, the rolling landscape made this impossible, though the fieldwork described below details how the chosen viewpoint mediates this difficulty. Subsequently, the best viewing point was chosen on the basis of the widest visible area that contained the most mounds in view, as determined by the overlap between the visible areas in the viewshed layer and tumulus points. This point was also chosen with consideration

of the nearby bus stop and village, for ease of access and amenities for tourists, respectively. Viewshed analysis was completed again using this observer point, and a 3-D model illustrating the areas of the mounds visible from the chosen viewing spot can be seen in Figure 2.[16]

Projecting Olive Tree Growth

Next, a model was created in order to estimate how olive trees will block the view of the mounds as they grow. Though GIS scholars are working on the problem, there is currently no simple way to incorporate vegetation into viewshed models.17 One contribution of this project is in creating a simple methodology that other archaeologists and heritage managers with basic GIS experience could use in order to determine how the view of archaeological sites might be affected by growing vegetation.

Tree Height (m)	Buffer Extent (m)			
	5	10	20	50
3	18%	12%	2%	2%
5	31%	25%	16%	5%
10	55%	51%	41%	21%
15	69%	67%	62%	42%

Table 2: The visibility of mounds with various tree heights and extents of buffer zones around mounds. Percent indicates reduction in visibility of mounds as compared to visibility of mounds in a landscape with no olive trees (derived by C. L. Curtis, data courtesy of the Central Lydia Archaeological Survey).

In this analysis, trees are modeled as if they were a solid extension of the topography in all areas except on the mounds themselves.[18] Though olive trees are certainly not the only crop in the area,[19] this model predicts a worst-case scenario in which olives populate the whole landscape to demonstrate the effect that unabated olive expansion could have.

The trees in Bin Tepe are mostly very young, having been planted only recently with the upswing in olive oil production, and most orchards are thus currently at a height of approximately 1-3 m. The maximum height of olive trees was estimated at 15 m,[20] and the progression from current to future height was modeled with scenarios of 3, 5, 10, and 15 m trees rising above the ground surface. The results demonstrated that if trees populated the whole region with no buffer zones around mounds, the visibility of the mounds would decrease substantially as trees grow.[21] For example, a landscape of 15 m trees would reduce visibility of the mounds from the chosen viewing point by 70% as compared to a landscape with no trees (Fig. 3, Table 1).

Delineating Treeless Buffer Zones

For the purpose of directing future agricultural compromise, it was projected how not planting trees in certain areas around mounds—or creating treeless buffer zones—would limit the blocking of the mound view. Treeless buffers were delineated arbitrarily at 5, 10, 20, and 50 m extents. These values were chosen to test which buffer distance allows for the most visibility of the mound with the various scenarios of tree heights populating the landscape. Results show that there is a clear relationship between wider buffer zones and greater visibility, with wider zones being necessary to afford mound visibility with higher trees (Table 2). Without knowing the exact maximum tree height in Bin Tepe, it was necessary to complete more work to determine which buffer might be ideal.

Approaching Tourism and Agriculture in the Field

It is clear that GIS was extremely useful in addressing the goals of determining an ideal viewing point, assessing the impact of tree growth on that view, and evaluating possible mitigation of the blockage by tree expansion with buffer zones. However, to check the accuracy of the GIS analysis and further address these three points, it was necessary to complete fieldwork on the ground. The goals of this work were firstly to ground truth the viewing point determined by GIS and observe the actual view to determine its value as a tourist attraction. A second goal was to assess the changes in olive trees on the ground since

Figure 4: A view from the ideal viewing platform location (photo by C. L. Curtis, courtesy of the Central Lydia Archaeological Survey).

the CLAS 2005 survey of Bin Tepe. A final hope was to try to determine the ideal and feasible buffer zone to allow for a full view of the mounds.

Ground Truthing the View

The point determined by GIS was found to be a promising location for a tourist-viewing platform of the burial mound landscape (Fig. 4). It is located at the base of one of the three "royal" mounds. In addition to the magnificent view, there is already an earthen platform remaining from the Sardis Exploration excavations of the mound in the 1960s, as well as a dirt road leading up to it. These assets represent potential opportunities for touristic development. The existing earthen platform would require only modest adjustments for touristic viewing use, and information panels and maps could direct visitors to nearby villages and other attractions in the Bin Tepe area, such as Marmara Lake.

For the more adventurous tourist, the top of the mound provides panoramic views including the patchwork agricultural landscape, Marmara Lake, many tumuli, and the famous Alyattes tumulus to the east, obscured from view below due to a rise in elevation of the Bin Tepe ridge. Though one of the large "royal" mounds is visible to the west, the largest, famous Alyattes tumulus to the east is obscured from view at ground level due to a rise in elevation of the Bin Tepe ridge. However, it becomes visible about halfway up the side of the mound, and is a prominent feature of the viewscape from the top of the mound. This viewpoint location thus allows for the direct physical experience of one of the three major 'royal' mounds, as well as potential visual experiences of the other two, thus reconciling the problem of the view-obscuring terrain discussed above.

A stairway could be constructed up the side of the steep mound to allow for easier access, as well as to prevent erosion

Figure 5: Comparison of olive tree growth near--and on--a tumulus in 2005 (left; courtesy of the Central Lydia Archaeological Survey) and 2011 (right; C. L, Curtis, courtesy of the Central Lydia Archaeological Survey).

Figure 6: Comparison of olive tree growth and expansion near a tumulus in 2005 (left; courtesy of the Central Lydia Archaeological Survey) and 2011 (right; C. L. Curtis, courtesy of the Central Lydia Archaeological Survey).

due to tourist foot traffic. The northwest side of the mound, facing Alyattes, has already been deeply trenched, and the new construction could utilize this area of existing damage to avoid compromising the integrity of the mound profile. Another platform structure could be constructed part of the way up the mound, perhaps when Alyattes becomes visible, to allow for visitor traffic control, an information panel, and benches for a brief rest for those who need it. A specialist in sustainable construction and conservation would have to be enlisted to ensure that construction was exacted in a manner that did not damage the mound,[22] and also preserved its

visual impact as much as possible. Benches and another panel could also be placed at the top of the mound to provide further information to visitors.

Monitoring Tree Growth

Next, the second aspect of the project, monitoring the growth of olive trees over time, was appraised in the field. An archive of photos from the 2005 Bin Tepe survey was scoured for those that pictured olive trees near mounds. If olive trees were already apparent in 2005, their growth and expansion could be compared in 2011. Several pictures from 2005 clearly

documented olives, and a sample of these mounds were visited in 2011. Attempts to recreate the view of the initial photo allows for ease of comparison between 2005 and 2011, and it is clear that the olive orchards have grown drastically in only a few short years (Fig. 5 & 6).

Delineating Buffer Zones

Finally, the last aspect of the GIS analysis was buffer zone delineation. The 15 m maximum tree height determined prior to fieldwork was generic and not region specific, and so the buffer problem could begin to be truly assessed only by determining the expected maximum height for the olive trees in the region by finding the tallest tree currently standing there. The goal was to ascertain which projected buffer zone scenario determined by spatial analysis (Table 2) is appropriate

by finding the maximum tree height in the region. When villagers were asked about the oldest and tallest trees, they directed us to a small cluster of those from the Greek occupation, said to be 70-90 years old, which measured 6-7 m in height. However, they also said that most trees are pruned and kept to a height of 4-5 m for ease of access to the fruit. So, it seems that a 20 m buffer around mounds would be sufficient in maintaining their scenic value, as the GIS model projects only a 16% blockage with 5 m trees (Table 2).

Moreover, another study determined that depth of archaeological evidence in relation to tree roots further supports this buffer delineation, as most tree roots extend to 1.0-1.5 m below the surface, where archaeological remains are commonly buried.[23] Therefore, Crow and Moffat assert that "on most known sites of archaeological
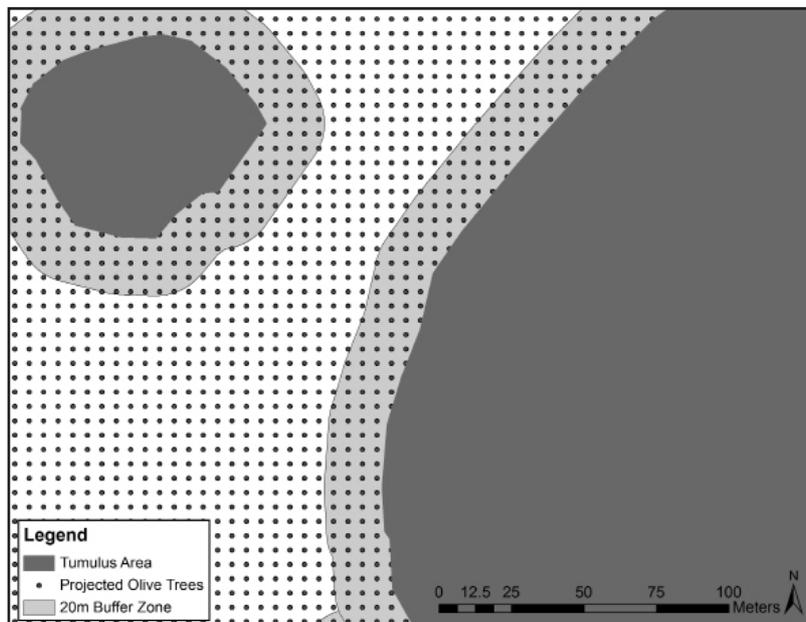

Figure 7: Zoomed in illustration of 5-meter-spaced olive trees across the whole landscape with the exception of tumulus areas. The number of olive tree points intersecting with the 20-meter buffer zones of all tumuli is 23,620 (map created by C. L. Curtis, data courtesy of the Central Lydia Archaeological Survey).

importance, new tree planting is not recommended and a buffer of at least 20 m should be allowed around the site before trees can be planted on adjacent land."[24] Thus, the buffer zone most appropriate for preserving mound visibility is also most appropriate for protecting potential buried remains.

Follow-up Spatial Analysis

These field findings motivated a follow-up spatial analysis based on the potential implementation of the newly determined 20 m buffer zone. What would the effect on local farmers be if this buffer zone policy were implemented around all tumuli in Bin Tepe? This new analysis modeled olive trees as points spaced at regular 5 m intervals across the entire landscape. This spacing interval was determined in the field and supported by an olive tree study of a neighboring region.[25] Moreover, this follow-up analysis is consistent with the initial spatial analyses, which modeled a landscape completely covered in olive trees. A new layer was created representing only the 20 m tree-free buffer zone "rings" around tumuli, and the intersection of these 20 m buffer zones and the 5 m spaced olive tree points was calculated (Fig. 7). The results of this analysis indicate that in a landscape totally covered by olive trees, some 23,620 trees might have to be removed if this policy were to be implemented.

The value per mature olive tree per year can be estimated at about $7,[26] which results in an estimated $163,340 reduction in local Marmara Lake basin profits per year.[27] This is likely an oversimplified estimation, as olive trees are not currently the only crops surrounding mounds, and thus not all buffer zones would require crop removal. It is clear, however, that considerations must be made for how to sustain the livelihood of local farmers while preserving heritage. One solution is to compromise by instituting the buffer zone only near mounds that do not yet have olive trees nearby, thus preventing further expansion of view blockage while maintaining existing olive income. Another potential avenue to explore is a compromise between farmers and the government, with land grants provided to those who do not cultivate or cultivate less obtrusive plants in the buffer zones around mounds.[28]

In addition, potential tourism income can be considered. Though local figures are not currently available at the fine scale of the Marmara Lake basin, figures for the larger Manisa province in which it resides are instructive. In Manisa province in 2007, olive profit was $30.8 million, while profit from tourism in the same year was approximately $179.7 million.[29] Therefore, if tourism is as successful and profitable in the Marmara Lake basin as it has been in Manisa province overall, it could potentially make up for the profit reduction associated with olive tree exclusion in buffer zones, as well as increase local income exponentially.

Conclusions

The analyses presented here demonstrate how important it is to engage in heritage management planning within an explicitly spatial context. GIS was utilized to aid in planning both for tourism development and for agricultural policy aimed at heritage preservation in the Marmara Lake basin. The visual and analytical power of these results will be instrumental in striving for a collaborative solution with locals.

Endnotes:

1 Roosevelt 2007; Roosevelt and Luke 2008a, 2009, 2010, forthcoming; Curtis and Sneeringer 2009; Luke 2010a, 2010b, 2011a, 2011b.
2 Kersel et al. 2008.
3 Roosevelt 2009.
4 Roosevelt and Luke 2006, 186.
5 Roosevelt and Luke 2006, 192; Roosevelt and Luke 2008, 181.
6 Luke 2010b, 395.
7 Central Lydia Archaeological Survey 2011; Luke 2011a, 2011b.
8 Luke 2010b, 401; Central Lydia Archaeological Survey 2011.
9 Boers and Cottrell 2007.
10 Luke 2010b, 401.
11 Though there are certainly buried archaeological sites between the tumuli that are being damaged by agriculture (Luke, personal communication, 2012), the visual presence of the tumuli provide a much more accessible resource for tourists, and are thus the focus of this analysis.
12 Luke, personal communication, 2012.
13 Currently, most tourists are interested in the early Christian and Jewish heritage at Sardis, and a new tourist facility focused on the Lydian-period burial mound landscape would bring new attention to this crucial chapter in the Marmara Lake basin's past (Luke, personal communication, 2012).
14 ArcGIS 9.3.1 was utilized for all analyses. Please contact the author with any questions or further details regarding exact GIS analysis procedures.
15 Shellito et al. 2004, 170.
16 Viewshed analysis was first exacted using all points of the highway shapefile as observer points, and subsequently executed again using the chosen viewing point as the observer point. The shapefile of the area of the mounds was used to clip the viewshed results to create the ArcScene 3-D image, in which only the areas of the tumuli are highlighted so that the proportion of the mound area that is visible and not visible is readily discernible. (Figure 2).
17 Dean 1997, Llobera 2007.
18 For each potential tree height, a raster was created with all cells given the value of that particular tree height. This raster was added to the base digital elevation model (DEM) raster to model the increase in elevation of the growing trees by creating an entirely new DEM. All mound areas were erased prior to conversion to raster format, and therefore, the model shows that trees are growing everywhere except the areas of the mounds themselves.
19 Common low-height crops are wheat, tomatoes, tobacco, and grapes. Aside from olives, other orchard crops include peaches, cherries, figs, and almonds, though these crops are not experiencing expansion

to the same extent as olives (Luke, personal communication, 2012).

20 California Rare Fruit Growers, Inc. 1997.

21 Visibility analysis was exacted on each of the vegetation-inclusive DEMs from the chosen viewing point. The resulting vegetation raster was clipped with a buffer polygon shapefile for each buffer scenario. The number of raster cells visible was then compared to the number of cells visible in the initial visibility analysis from the ideal viewing point (Fig. 2) to estimate the percent decrease in visibility from a landscape with no trees to a landscape populated by trees of various heights.

22 For comparison, see Brú 2002: 46.

23 Crow and Moffat 2005, 108.

24 Crow and Moffat 2005, 108.

25 Engindeniz et al 2010, 616.

26 Engindeniz et al 2010, 616.

27 $7 is the value is for a mature tree, after the establishment period of approximately ten years. An olive tree must grow for six years before becoming productive, and only reaches its full yield potential at ten years of age. It can be expected to provide this yield for about 86 subsequent years before declining (Engindeniz 2010: 618). Therefore, any trees less than six years old represent an investment by farmers that has not provided any of its potential yield as of yet, and this will require additional consideration in terms of compensation for profit loss (Luke, personal communication, 2012).

28 For example, see a similar model that has been successful in the Stone Henge landscape (Young et al. 2008, 58).

29 Engindeniz 2010, 616; Central Lydia Archaeological Survey 2011; Today's Zaman 2011. Detailed tourism figures are not yet available for Manisa province past 2007, but it is clear that agricultural income is rising rapidly. Updated figures may sway the balance between the value of olives versus tourism (Luke, personal communication, 2012).

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Memory and Monuments at the Hill of Tara

Erin McDonald

This article focuses on the prehistoric monuments located at the 'royal' site of Tara in Meath, Ireland, and their significance throughout Irish prehistory. Many of the monuments built during later prehistory respect and avoid earlier constructions, suggesting a cultural memory of the site that lasted from the Neolithic into the Early Medieval period. Understanding the chronology of the various monuments is necessary for deciphering the palimpsest that makes up the landscape of Tara. Based on the reuse, placement and types of monuments at the Hill of Tara, it may be possible to speculate on the motivations and intentions of the prehistoric peoples who lived in the area.

This article focuses on the prehistoric and early historic monuments located at the 'royal' site of the Hill of Tara in County Meath, Ireland, and the significance of the monuments throughout and after the main period of prehistoric activity at Tara. The Hill of Tara is one of the four 'royal' sites from the Late Bronze Age and Iron Age in Ireland, and appears to have played an important role in ritual and ceremonial activity, more so than the other 'royal' sites; medieval literature suggests that Tara had a crucial role in the inauguration of Irish kings.[1] Many of the monuments built on the Hill of Tara during the later prehistoric period respect or incorporate earlier monuments, suggesting a cultural memory of the importance of the Hill of Tara that lasted from the Neolithic to the Early Medieval Period. Cultural memory of Tara continues today, with its recent nomination as a UNESCO World Heritage Site.[2]

Space and Chronology

An understanding of the spatial and chronological relationship of the various monuments is key in order to decipher the palimpsest of the Tara landscape. As shown in Figure 1, the Hill of Tara is located on ridge approximately 150 m above sea level, and is composed of nearly 40 monuments spread over 900 m.[3] The monuments date from the Neolithic to the Iron Age and retained importance into the Early Medieval Period of Ireland. The monument types vary from passage tombs and linear earthworks to henges and multivallete enclosures, most of which appear to be more related to ritual, rather than domestic activity.[4]

Extensive survey work carried out by Conor Newman and the Discovery Programme in the late 1990s led to the discovery of several previously unknown features on the hill, and thus a better understanding of how the monuments relate to each other chronologically and spatially.[5] Before

the work of the Discovery Programme, relatively little was known about the archaeology of Tara. Seán Ó Ríordáin carried out excavations of Duma na nGiall and Ráith na Senad, but died before he could publish his findings.[6] In recent years, Ó Ríordáin's notes have been compiled into site reports and excavated material was utilized for radiocarbon dating.[7]
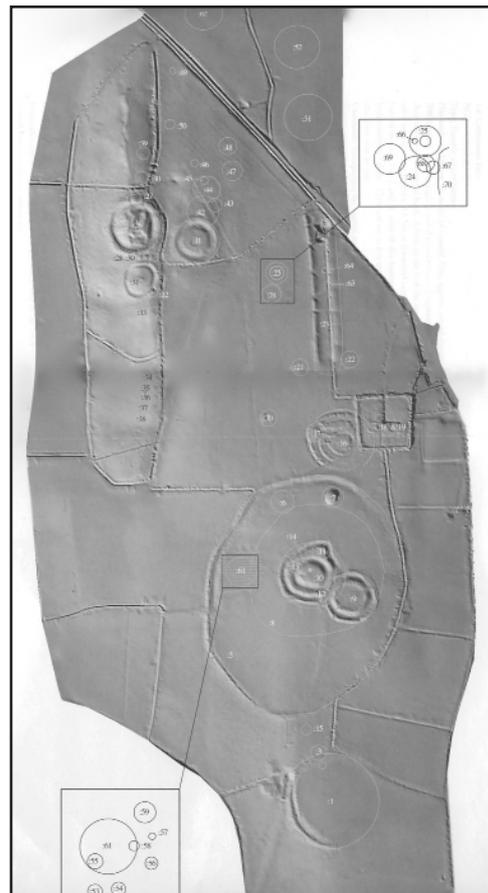

Figure 1: Monuments and features on the Hill of Tara. Features discussed: Ráith na Ríg (:5), Duma na nGiall (:7), Tech Cormaic (:9), The Forrad (:10), Ráith na Senad (:16), Tech Midchúarta (:23). Newman 1997, Fig. 109.

	Monuments on the Hill of Tara	Irish Chronology
4000BCE		
3000BCE	Palisaded enclosure Duma na nGiall Tech Midchúarta*	Neolithic
2000BCE	Ring ditches	
	Ráith Maeve, Forrad Reuse of Duma na nGiall	Bronze Age
1000BCE	Bowl-barrows	
0	Ráith na Ríg and Ring barrows	Iron Age
1000CE	Ráith na Senad Ráith Lóegaire Ring Forts and Tech Cormaic	Early Medieval

Table 1 Approximate chronology of monument construction on the Hill of Tara. Almost all of the dates of the monuments are based on typologies or contemporary, radiocarbon dated monuments. The chronology for the monuments on the Hill of Tara is based on Newman 1997 and the Irish chronology was compiled from Flanagan 1998 and Bradley 2005.

*In a later publication, Newman suggests that Tech Midchuarta could date to the later prehistoric period or Early Medieval Period (2005: 378).

When studying the monuments and the development of the Tara landscape it is crucial to consider the overall chronology of the site as well as the chronological relationship between each of the monuments. Most of the chronology assigned to the features at Tara is based on site typologies and radiocarbon dates from similar monuments in Ireland,[8] but unfortunately, this does not provide absolute dates for most of the features at Tara. However, for the purposes of this paper, it provides a relative chronology and general understanding of the development of the Tara complex over thousands of years. Duma na nGiall and Ráith na Senad were both excavated by Seán Ó Ríordáin in the 1950s and some radiocarbon dates have been extracted from the excavated material.[9] Table 1 illustrates the rough chronology of the main monuments at Tara and their placement within the chronology of prehistoric and Early Medieval Ireland.[10]

Table 1 clearly demonstrates that there is almost continuous activity on the Hill of Tara throughout prehistory, either as construction of new earthworks or reuse of older monuments. There is also a change in the types and number of earthworks erected over time, the significance of which will be addressed below.

It is crucial to recognize that each generation of people living in the Tara landscape was not starting with a landscape clear of previous peoples. Just like today, there were older constructions that required consideration before new monuments were built.[11] People living in the Bronze Age ascribed meaning to the monuments built during the Neolithic, as can be seen in their

reuse of Neolithic features such as Duma na nGiall, and continues today with the controversy surrounding the construction of M3 motorway 2km from Tara.[12]

Social Changes

The megalithic and large earthen monuments of prehistoric Europe have been variously interpreted over the decades. Some archaeologists suggest that monuments were simply the burials of the followers of a particular religion.[13] Others suggest they were used as territorial markers or markers of ownership of resources in the immediate vicinity of the monument.[14] Still others interpret the monuments as statements by ruling classes or leaders.[15] Because of its long duration and the variety of monuments constructed there, the Hill of Tara is a good example of the possibility that multiple reasons motivated the construction of the monuments and how they were used by contemporary and later generations. The monuments on Tara not only reflect the importance of Tara as a ritual site, but also the changing ritual practices and social structure of the communities of prehistoric Ireland.[16]

The Neolithic of Ireland, Britain, France, and Spain is characterized by the erection of megalithic monuments.[17] The organization and mobilization necessary for the construction of megalithic monuments such as Newgrange and others suggests the beginning of a hierarchical society and the emergence of leaders.[18] However, recent theories about power and social organization suggest that large communal burial monuments may have been the work of a corporate, heterarchical community, with a focus on communal ritual and shared power rather than personal prestige and individualized power.[19] It is during the Bronze Age, when individual interments and burial mounds become more numerous, that there may have been a shift in power structure to a more hierarchical society. It

is also during this time that prestige goods, such as gold torcs, begin appearing in burials.[20]

The sociopolitical changes over time are significant when considering the types of monuments at Tara and their intended use and meaning. For example, the incorporation of earlier monuments into new constructions or the reuse of older burial mounds may suggest the desire to legitimate power based on ancestry or ownership of land.[21] Examining the ways in which older monuments were reused can provide archaeologists with information about the more complex issues such as power, the role of ancestors, and individual versus communal ritual practices.

The Monuments

There are approximately 40 known constructions on the Hill of Tara that were built over a period of four millenia.[22] Most of the larger monuments appear to have been built with respect to the older monuments by avoiding them or by incorporating them into newer constructions.[23] However, the Tech Midchúarta earthwork has proven difficult to place within the chronology of Tara, and because it is a fairly unique construction there are no dated monuments with which to compare it.[24] Because of its particularly ambiguous dating, it is difficult to address Tech Midchúarta in the context of this paper, and so it will only play a minor role in the analysis of the monuments.

The earliest activity at Tara occurred during the Late Neolithic with the construction of a palisaded enclosure that may be related to the subsequent construction of the passage tomb Duma na nGiall, which dates to the second half of the fourth millennium B.C.E. and contains several Neolithic burials and the typical Neolithic grave goods: Carrowkeel Ware, bone pins, and pendants.[25] There was an intense phase of burial in Duma na

nGiall around 3000 B.C.E., and then what appears to be a dormancy period for a few centuries, during which time little to no archaeologically visible activity occurred.[26] As discussed earlier, Tech Midchúarta was perhaps built at this time as well.[27]

The following Bronze Age witnessed a significant increase in the amount of construction activity taking place at Tara. This may be indicative of a change in burial practices, with individual burial rites becoming more prominent than the earlier communal monuments.[28] Bowl-barrows and ring-ditches are the most common monuments during this period. A total of 19 ring-ditches and four bowl-barrows are constructed from the Late Neolithic to the Late Bronze Age. The considerable amount of overlapping or adjacent layout of the barrows may suggest an intention by the builders to associate their barrows with the older barrows. It is unclear how much time passed between the construction of the overlapping barrows, but a pattern emerges in which the later monument is constructed adjacent to the southwest quadrant of an earlier monument, creating a linear arrangement of barrows.[29]

The Forrad enclosure was constructed in a number of successive phases, the first of which began during the Bronze Age. Similarly to the Ráith na Ríg enclosure discussed below, the inner bank of the Forrad bulges to accommodate three earlier burial mounds. The second phase consisted of the construction of the inner mound, making the monument a bowl-barrow. The third phase may coincide with the construction of Tech Cormaic and consists of the construction of an outer bank and ditch.[30]

Also during this time, the passage tomb Duma na nGiall was reused and became one of the most heavily used cemetery mounds in Early Bronze Age Ireland.[31] Nearly 40 burials were placed in the mound

as secondary urn burials and some of the original burials within the tomb itself were removed to make room for Bronze Age interments.[32]

The Iron Age also witnessed a considerable amount of construction activity at Tara. The largest monument on Tara, Ráith na Ríg, was constructed at this time and is significant not only as a monument, but also in its special relationship with other earlier monuments. It appears that Ráith na Ríg was constructed to avoid overlapping with earlier monuments and to incorporate them into its circumference (Fig. 2). Ráith na Ríg is a hengiform enclosure and is by far the largest of the monuments on the hill, enclosing approximately 54,721 m²,² with a bank between 2 and 2.5 m tall.[33]

At five locations around the circumference of the Ráith na Ríg enclosure, there are slight bulges that deviate from it's elliptical shape. At three of these bulges there are visible monuments, suggesting that the enclosure was built to accommodate and include the monuments within its circumference. There do not appear to be any monuments located at the two remaining bulges, but this may be due to destruction from later activity.[34] Ráith na Ríg encloses three major monuments: the Forrad and Tech Cormaic at the center, and Duma na nGiall at the perimeter. There is geophysical evidence of at least six more monuments, some of which, like Duma na nGiall and the Forrad, predate the construction of Ráith na Ríg and were deliberately incorporated into the enclosure. Five ring barrows and several ring ditches were also constructed during the Iron Age phase of activity on Tara. Tech Cormaic is also within Ráith na Ríg, but was probably a Late Iron Age or Early Medieval addition, and will be discussed below.[35]

Ráith na Senad (Fig. 3), a significant monument built during the Iron Age, appears to be an important monument

Figure 2: Hill-shaded model of Raith na Rig. The white arrows point to possible entrances. The black arrows indicate areas where the elliptical curve of the earthwork bulges, possibly to accommodate earlier monuments. Newman 1997, Fig. 22.

during the final phases of prehistoric activity at Tara. Unfortunately, the construction of a church in the twelfth century, and activity by British Israelites in search of the Ark of the Covenant at the beginning of the twentieth century, inflicted severe damage to the monument.[36]

As a quadrivallete enclosure, Ráith na Senad is one of the most complex monuments on the Hill of Tara. There is very good stratigraphy of the four phases of construction of the enclosure, but only the fourth phase yielded radiocarbon dates; dating to the second to fourth centuries C.E.[37] Based on the high quantity of imported goods, Grogan suggests that the residential enclosure may represent a "high-status homestead of a native Irish group with familial ties in the region of

Figure 3: Ráith na Senad. Newman 1997, 91.

Romano-Britain on the fringes of the empire…"[38] The fourth phase of Ráith na Senad appears to be the only residential enclosure at Tara, but further excavation of numerous other circular enclosures at Tara may change this assumption.

Tech Cormaic, a bivallete ring-fort, seems to be the last monument constructed at Tara and was attached to the earlier Forrad, perhaps to establish prestige by being associated with what appears to be a rather important burial complex. The outer bank and ditch of the Forrad may have been constructed at this time in an attempt to incorporate Tech Cormaic into the larger, older monument.[39]

Also during the last phases of activity at Tara around the first few centuries C.E., a palisade was constructed following the perimeter of Ráith na Ríg. Newman suggests that the palisade is defensive and may indicate a increase in social tensions and conflict.[40] This argument has been made for many prehistoric sites in the British Isles, namely the hillforts of Iron Age Ireland and Britain[41], but later interpretations favor ritual over defense.[42] Until excavation work is carried out on Ráith na Ríg, there is no reason to assume that it became a defensive enclosure during the Late Iron Age.

Ritual and Memory at Tara

Each new construction changed the layout of Tara and altered the landscape. The reuse of older monuments during the various phases of prehistory is not uncommon,[43] but Tara is especially unique because of the long duration of activity that took place there. Over a period of approximately four millennia, communities returned again and again to Tara either to use the older monuments or to construct new ones. Because of its relatively continuous use throughout Irish Prehistory, Tara provides the means to study the changing ritual activity and the evident cultural memory of prehistoric Irish peoples.[44]

Katina Lillios suggests that there were four types of mnemonic practices performed during prehistory: reuse and/ or transformation of burial monuments, curation of artifacts and human remains, inscriptive recording, and mimesis.[45] The reuse and/or transformation of burial monuments is seen all over the Neolithic of Western Europe and was carried out in a number of ways, such as Bronze Age burials placed in the mounds of Neolithic tombs or the incorporation of Neolithic burial mounds incorporated into later monuments, as seen at Tara.[46] The curation of artifacts and human remains refers to portable objects that were used over multiple generations. Curation is difficult to establish from the archaeological record, but may be demonstrated in objects that show signs of multiple repairs, such as Neolithic Grooved Ware pots that were frequently placed in henges.[47] Inscriptive recording refers to the chaîn opératoire of artifact manufacture, formal structure or style of artifact types and associations of particular artifacts with specific contexts.[48] Lastly, mimesis refers to the imitation and incorporation of the natural and cultural landscapes in architecture and material culture. Mimesis is particularly evident at Tara, where earlier monuments

are incorporated into later monuments. Lillios suggests that the "long histories" of monuments helped to define and dictate the identities and actions of the people who were building the monuments and those who used the monuments long after their initial purpose had been lost.[49]

The reuse or transformation of burial monuments is the mnemonic practice most evident at Tara. The incorporation of older monuments such as the Forrad and Duma na nGiall, into later constructions, such as Ráith na Ríg and Tech Cormaic, suggests a desire to incorporate old traditions into new traditions,[50] or perhaps an intention to legitimize the authority or prestige of the person or group constructing the monument.[51] If ancestry played an important role in Bronze Age or Iron Age Irish society, then utilizing earlier monuments may have been a way of claiming a particular ancestry.

A slightly different interpretation by Cornelius Holtorf stresses the importance of prospective memory and, perhaps, the message that the builders wanted to preserve for and convey to future generations.[52] It is not possible to know exactly what the builders of the monuments at Tara wanted to convey, but it is clear that succeeding generations, including our own, have extracted meaning from the monuments at Tara.

Although we may never know how the monuments were perceived by the ancient peoples building them, it is important to consider the changes that each new monument created in the landscape and how those changes affected the views to and from the hill.[53] Bradley points out that Stonehenge, another monumental site used and changed over a long period of time, "…remained a pivotal point of a landscape in which the distribution of human activity was constantly changing."[54] This statement is true of many prehistoric monuments,

especially Tara.

The activity at Tara was not confined to the erection of monuments,[55] but rather, it is very probable that ritual activity occurred regularly in between the construction of each monument and that not every generation added to the landscape we see today.

Conclusions

Tara is considered to be one of four 'royal' sites in Ireland, the others being Emain Macha in County Armagh, Dun Ailinne in County Kildare, and Cruachain in County Roscommon.[56] Although all four sites are important ritual sites with roles in Early Medieval literature, only Tara and Dun Ailinne are considered complexes: Emain Macha and Cruachain each consisting of only one enclosure. Tara, however, stands out as the only 'royal' site that had considerable activity before the Iron Age.[57] This early activity has considerable implications for the significance of Tara during prehistory and can help us understand whether or not it had a more prominent role than the other three royal sites.

It is certainly clear that more precise dating is required in order to make any significant conclusions about the monuments on the Hill of Tara, namely their relationship to one another, and their reflection of sociopolitical changes. However, the evidence discussed here provides a starting point for understanding past perceptions of Tara.

The palimpsest of monuments on the Hill of Tara provides archaeologists with an insight into the changing ritual and, perhaps, political changes that occurred during the prehistory of Ireland. The density of monuments at Tara is a testament to the importance of the site through time and the meaning ancient peoples ascribed to monuments within their landscape. Just as we ascribe meaning to monuments such as Tara, Stonehenge and Newgrange, so too did ancient societies of the monuments that were built by the people before them. This tradition has continued into modern times, and even though modern monuments are not constructed at Tara, the site still retains its significance in modern society. There are many ancient sites that have meaning to modern society, even if that meaning differs from the original meaning.

Popular memory has played an important role in the preservation of prehistoric monuments around the world. Despite not knowing the original intention of the prehistoric peoples who built these monuments, today's societies continue to extract from or ascribe meaning to the monuments and recognize them as important elements of history and culture of modern peoples.

Endnotes:

1 Newman 1998, 129.
2 UNESCO World Heritage Center. (2010, 4, August. http://whc.unesco.org/en/tentativelists/5528)
3 Newman 1997.
4 Newman 1997.
5 Newman 1997.
6 Newman 1997.
7 O'Sullivan 2005; see also Grogan 2008.
8 Newman 1997.
9 O'Sullivan 2005; see also Grogan 2008.
10 In the Discovery Programme Reports, Newman (1997) suggests that Tech Midchúarta was built fairly early in the development of the Tara complex, during the Late Neolithic. However, in a later publication (2005), Newman suggests that Tech Midchúarta dates to the Early Medieval period; the postulation is partially based on the regular appearance of Tech Midchúarta in Early Medieval Irish literature. For the earlier dating, it is suggested that Tech Midchúarta is a cursus, based on its similar form to other cursus monuments built during the Neolithic.
11 Newman 2007, 418.
12 M3 Motorway Archaeology Website (www. m3motorway.ie)
13 Daniel 1962.
14 Renfrew 1973; see also Chapman 1981.
15 Fleming 1973; see also Shanks & Tilley 1982.
16 Bradley 1998.
17 Bradley 2005.
18 Sheridan 1994, 51.
19 Lillios 2008, 231; see also Parkinson & Galaty 2007; Sheridan 1994, 51.
20 Newman 1997; see also Bradley 2005.
21 Lillios 2008, 231.
22 Newman 1995; see also Raftery 1994.
23 Newman 1997.
24 Newman 1997; 2005.
25 Newman 1997; see also O'Sullivan 2005.
26 O'Sullivan 2005.
27 Newman 1997.
28 Lillios 2008.
29 Newman 1997.
30 Newman 1997.
31 Newman 1997; see also O'Sullivan 2005.
32 Newman 1997; see also O'Kelly 2005, 106, 108; O'Sullivan 2005.
33 Newman 1997.
34 Newman 1997.
35 Newman 1997.
36 Newman 1997; see also Grogan 2008.
37 Grogan 2008.
38 Grogan 2008, 97.
39 Newman 1997.
40 Newman 1997; 2005, 378–9.
41 see Cunliffe 1984.
42 see Hill 1995.
43 Lillios 2008, 236.
44 Newman 1997; 2007, 417–8.
45 Lillios 2008, 235.
46 Lillios 2008, 236
47 Lillios 2008, 239.
48 Lillios 2008, 242.
49 Lillios 2008, 228.
50 Newman 1998, 138.
51 Lillios 2008.
52 Holtorf 1996, 121.
53 Newman 2007; see also Bradley 1998.
54 Bradley 1998, 92.
55 Bradley 1998.
56 Raftery 1994.
57 Raftery 1994.

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Time Geography: a reanalysis of a spatial shift on the Great Hungarian Plain

Katie Grow

In the 21st Century, Academic Archaeology has been characterized by two trends-an appreciation for scholarship outside the Anglo-American world, and continued utilization of interdisciplinary methods and theories. In the 1970s, Swedish Geographer Torsten Hägerstrand introduced a conceptual framework that emphasized an individual's existence as rooted in both time and space. Since then, Time Geography has allowed researchers to analyze and operationalize a number of currently favorable theoretical constructs, including agency, biography, and human relationships with space. Through a reanalysis of data collected on the Great Hungarian Plain, I intend to demonstrate the usefulness of Time Geography in examining a significant shift from the Late Neolithic to the Early Copper Age, highlighting a changing relationship between prehistoric human groups and their dynamic landscape.

It seems quite obvious to say that all humans exist in both space and time. Because of this truth, it is not difficult to consider that as individuals we are bound by, and in some respects defined by, our physical existence in the space and time in which we live. In the 1970s Swedish Geographer Torsten Hägerstrand introduced a new idea and methodology for conceptualizing this idea of human existence as rooted in both space and time. Hägerstrand's Time Geography has highlighted a number of important concepts that were eventually noticed by archaeologists in the 1990s, when our field started to focus on concepts like agency and people's relationships with the landscape. By re-examining a spatial shift on the Great Hungarian Plain, I intend to prove that archaeological data can be viewed in a new light through this geographic method, allowing for the identification of patterns and consideration of new ideas about human interaction with the land.

In the 1960s Torsten Hägerstrand, a professor of Geography at the University of Lund in Sweden, became dissatisfied by the state of the Geography discipline. Appearing as just an endless collection of encyclopedic data, early 20th century Geography lacked defined perspective.[1] In an attempt to add depth to the discipline, Hägerstrand developed the concept of Time Geography, introducing the individual as a relevant actor, examining human paths travelled through space on a daily, weekly, or yearly time scale. Utilizing a conceptual tool referred to as a time-space prism, Hägerstrand introduced the idea of tracing different individuals' paths in diagrammatic form. The concept of the path indicates that the actions and events that make up the existence of an individual have both spatial and temporal qualities.[2] By tracing the course of a person through space and time, 'choreography' of individual existence is highlighted[3] and the biography of a person is seen as a continuous path

through time-space.[4] While this was an innovative introduction of humanist ideals into the field of Geography, it has equal value for archaeological questions and research. In the last couple of decades, landscape studies have grown in popularity in the archaeological discipline,[5] as we are learning that space and place, and human interaction with them, are anything but static concepts. Previously, landscape and space were portrayed only as a backdrop or stage on which human life played out. New research has revisited these concepts however; now examining them as more dynamic and interactive, both structuring and being structured by human actors. Time Geography allows us to conceptualize the interaction people would have had with their landscape in the past.

Important to this central goal of examining people's movements within their landscape is the idea that certain constraints exist on human paths. Some of these constraints are physical, including the limits to how far any individual can travel within a given time span; while others are socially based, authority and power relationships determining access or constraint on certain activities or admission to certain places.[6] In addition, an element of landscape perception should be added to these kinds of possible constraints. The way a group in modern times or prehistory may view their wider landscape or region might influence the extent of how far and where their paths might lead. When a region is viewed as hostile or dangerous, paths throughout the landscape might be significantly impacted. These constraints highlight the way people live as well as the way they view the world around them. Unquestionably, attempting these kinds of examinations in past human groups could highlight a number of interesting ideas about dynamic human groups.

While many time-space prisms trace individuals, highlighting individual paths

and projects, they can also be used to trace common or theoretical paths of a community. By concentrating on a group level, it may appear that all individuals are being portrayed as equal, without gender, specific identity, or social class. Other work in Time Geography has drawn specifically on definite identities, charting their paths and projects through space and time to reveal something about gendered, social, and individual existences. The intent of utilizing a group-level time-space prism however, is to consider larger, more expansive changes, occurring at the societal level and most likely impacting all members of the group regardless of gender, age, and class. The paths that have been charted are theoretical, based on archaeological evidence and data indicating the locations of certain activities. While the discovery of exact paths in specific space and time is not a feasible goal, the reconstruction of typical paths is possible[7] and the objective of these kinds of analyses. Finally, the charting and examination of past human paths is in no way an attempt to claim predictability. The activities and experiences of a specific individual are inevitably impacted by a number of factors that would be impossible to uncover archaeologically. By examining theoretical paths based on archaeological evidence of activity and where it occurred in relationship to the landscape, we can still make interesting observations and insights, without claiming the ability to recreate entire biographies of past individuals and groups.

Utilizing data published by Andrew Sherratt in the 1980s and William Parkinson in the 1990s and 2000s,[8] a re-evaluation of a shift apparent from the Late Neolithic to the Early Copper Age on the Great Hungarian Plain is conducted. Operating concepts and tools from Time Geography, the course of typical yearly paths of groups in both of these time periods displays a drastic change in landscape interaction and possibly world-views. By comparing time-space prisms of two adjacent periods, a new kind of visual knowledge of this shift will add a way to conceptualize the changes in a broader, societal format. Once mapped, a number of observations can be made upon viewing the comparison of the two time-space prisms.

The Cultural Context

While many of the specifics are contested amongst archaeologists of the region, there are some accepted descriptions of the different cultures that inhabited the Great Hungarian Plain in different periods. This analysis is mainly concerned with the cultures of the Late Neolithic and the Early Copper Age. A brief description of these culture complexes and their predecessors will help set the stage for an understanding within the framework of these groups.

The Neolithic was a time period that saw increasing differentiation between groups on the Great Hungarian Plain. Regional variation, first identified in ceramic styles and later supported by settlement pattern distinction, increased from the early to the later stages of the Neolithic.[9] The cultures spanning the Plain in the Early Neolithic are referred to as Körös, Körös-Cris, or Körös-Starčevo-Cris depending on exclusion or inclusion of Eastern Romanian and Northern Yugoslavian area variants (respectively). The groups continue to diversify and become more isolated aggregates into the Middle Neolithic. Cultures of this time period are termed Alföld Linear Pottery Culture in English. The height of uniquely defined culture groups as territorially distinct and characteristically variant occurs in the Late Neolithic era on the Plain. Three very distinct cultures prevailed, labeled the Tisza-Herpály-Csöszhalom complex, combinative of the individual names of all three culture designations.[10] Although the distinctness of the three cultures has been debated, generally speaking this

complex is accepted as describing the state of settlement and people on the Great Hungarian Plain at the end of the Neolithic. A transitory period occurs between the Late Neolithic and Early Copper Age (often discussed as inhabited by a Proto-Tiszapolgár culture, with hesitation), after which a significant shift occurs. The Early Copper Age is distinctly different than the period preceding it. Most notably, the ECA was characterized by one, unified culture. Tiszapolgár is accepted as the culture existing throughout the entire Plain at the commencement of the Copper Age, the distinct and isolated cultures from the past no longer evident in the archaeological record.

Because of this distinct shift, the transition from the Late Neolithic to the Early Copper age is the subject of much interest. The archaeological evidence that indicates the existence of one unified culture as opposed to three distinct entities includes settlement patterns, settlement characteristics, social organization, mortuary activity, pottery styles, and economic indicators. These same elements that were used to distinguish between the social groups of the Late Neolithic and Early Copper Age help to formulate probable paths of individuals from both periods.

Archaeological Evidence Facilitating the Creation of Paths

Intensive surveys conducted on the Hungarian Plain since the 1980s[11] have been used to look at the transition from the Late Neolithic to the Early Copper Age on a regional level. These surveys show a drastic change in the way people settled on the landscape. The archaeological data indicates that the Late Neolithic was characterized by large nucleated sites isolated from other sites throughout the Plain. In contrast, the Early Copper Age displays a record of much smaller sites spread out evenly across the landscape, filling in the spaces that were previously uninhabited.[12] The large Late Neolithic sites were primarily located on tells, and were utilized for a long time. These communities were often fortified with trenches, ditches or fences encircling the tell.[13] Rigid boundaries kept people close to the tell, rarely moving out into the uninhabited land between supersites. Crops and even grazing was most likely done only in the near vicinity of each site, if not in empty areas directly inside of the tell.[14] The houses tended to be large, multi-roomed structures with internal sub-divisions. Hearths, ovens, and storage pits were found associated with individual housing units.[15] Ritual activity within domestic houses has been supported by evidence of clay alters and sacrificial pits in many Tisza and possibly Herpaly structures.[16] The three discrete cultures of this time period generally shared these Late Neolithic characteristics. In addition to settlement structure and character, mortuary practices that were distinctly Late Neolithic have been identified. Burials usually take place within the walls of the tell. Occasionally, graves have been uncovered outside of the settlement, but they are usually grouped nearby. The presence of grave goods is relatively scarce in burial contexts from all three cultures.[17] The overall picture of a Late Neolithic tell is one of isolation and protection. There is some evidence of trade but primarily with settlements of the same culture designation.[18] Despite some trade interaction, all other activities of the inhabitants, from economical to mortuary, seem to have occurred within the fortified structure or significantly close to its outer boundaries. Interaction would have been limited between the tells, even more so between different culture groups. Fortifications often display a need for protection from outside forces and the rest of the region, the evidence of fortification remnants at the tells helps define the way the Late Neolithic groups might have interacted with and perceived the greater region.

With the arrival of the Early Copper Age, the discrete cultures of the Tisza-Herpály-Csöszhalom complex transform into the homogeneous Tiszapolgár culture. The settlements contemporaneous with the ECA are located roughly within the same area that the Tisza, Herpály, and Csöszhalom communities were found in the Late Neolithic. Because of this, it is concluded that they are the descendants of the Late Neolithic groups, rather than a group of outsiders moving into the region.[19] These smaller settlements were not based around any kind of tell or supersite, and were much closer to each other, drastically increasing in numbers, and evenly dispersed on the landscape. Previously uninhabited parts of the region filled in with these smaller spread-out settlements. The large Late Neolithic tells had transformed into small hamlets. Within the hamlets, there is an absence of signs of fortification; the only trenches in the archaeological record are most likely too small for protection purposes.[20] Extensive trade is apparent from lithic raw materials and the existence of uniformed pottery styles and construction throughout the region.[21] Houses are small, one-roomed buildings with single family units seemingly the basic unit of the social structure. Unlike their Neolithic predecessors, ovens, hearths, and storage pits are not associated with specific housing structures,[22] indicating a shift in where cooking and subsistence activities were taking place. Evidence of economic activity within the small domestic structures may support a conclusion of differential craft production within the domestic sphere, and increased inter-dependency as a result of it.[23]

Strontium Isotope research, used to detect changes in diet and geographical location throughout an individual's lifetime, has been used to support the theories that the ECA was defined by mobility and fluidity. A marked difference in the range of strontium values from the Late Neolithic to the Early Copper Age might also be evident of grazing activities extending farther out into the region during the ECA, increasing the range of geographic strontium signatures in hamlet populations.[24] The same might be true of crop areas, strontium entering human bones from both plant and animal food sources.

Mortuary practices have significantly changed in the Early Copper Age. Rather than burying the dead directly within the settlement or the near vicinity of it, cemeteries in this time period become larger designated areas placed in isolated locations on the landscape.[25] They are not found close to specific individual sites, indicating that they could have been utilized by more than one group in the area. The amount of grave goods increases significantly, all graves contain some burial items in direct contrast to burials in the Late Neolithic.[26] The overall picture that has developed from decades of archaeological research is one of increased mobility and fluidity across the region. The settlements were occupied for a much shorter duration, which also indicates eventual relocation and residential mobility.[27] Much additional work, including environmental studies (paleohydrology, soil studies, climate change), ceramic investigations, and ongoing archaeological excavation and survey are continuing to add to the picture of this incredible transition.[28]

Constructing Time-Space Prisms for the Late Neolithic and Early Copper Age

In order to create a time-space prism, hypothetical paths of humans in prehistory must be inferred from the archaeological evidence of the Late Neolithic and Early Copper Age. Since human movement in time and in space is required for the activities that are evident in the record to occur, these paths are not hard to support as probable. The paths that have been selected are those most supported by archaeological
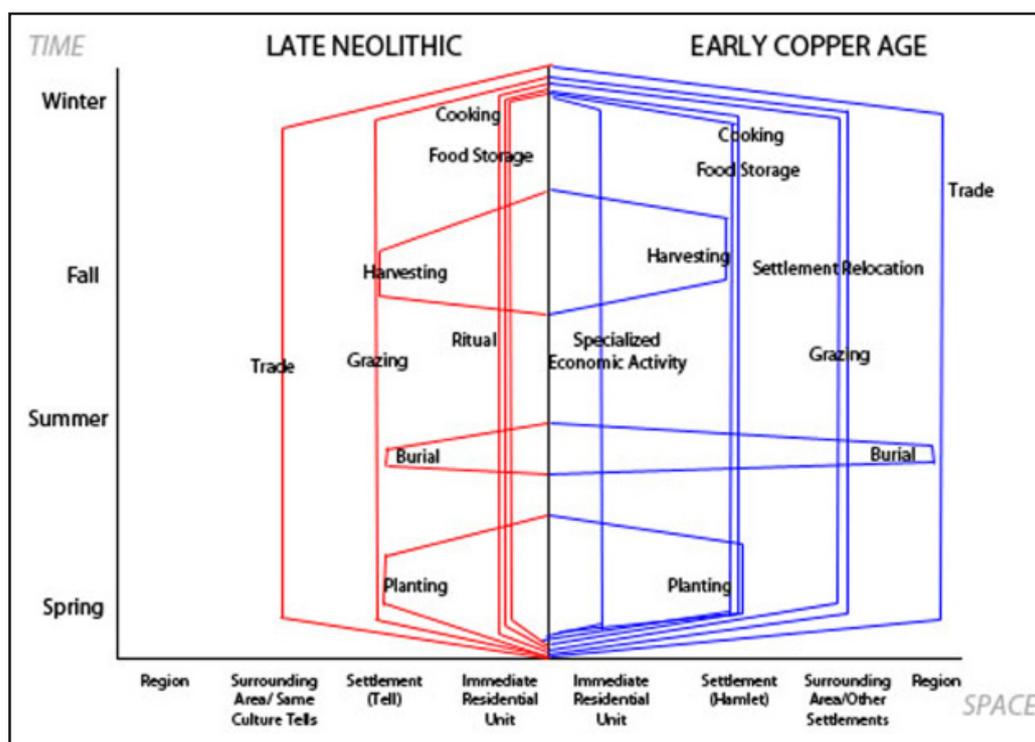
Figure 1: Time-space prisms of Great Hungarian Plain groups from the Late Neolithic and the Early Copper Age

evidence, reducing speculation and increasing the probability that these were in fact common movements in prehistory. The time scale being represented is yearly as opposed to daily or weekly aggregates of activity, charting movements and activities that required the formation of these paths based on seasons that they were most likely conducted during. The space scale extends from the immediate vicinity of individual residential units to the region as a whole. In the Late Neolithic, the immediate residential unit, the multi-roomed structures within the tell, are the extent to which individuals would travel for cooking, food storage, and ritual activity. Paths that extend further out into the settlement in general would be created for the purposes of planting, harvesting, grazing, and burial of community members. The only

hypothetical path that traverses a distance outside the settlement is for the purposes of trade, in which case a path might extend into contact with tells of the same culture group. Paths of the Late Neolithic groups would not for the most part extend into the greater region, where members of the other two cultures were living.

In contrast with those in the time-space prism of the Late Neolithic, Early Copper Age paths are distinctly different. Specialized economic activity is a path that is limited to the immediate residential unit, the small, one-roomed housing structures that made up the ECA hamlets. Paths that would have been taken for food storage and cooking activities, as well as general subsistence needs, would be extended into the settlement area rather than confined

to individual housing units. Grazing and crop related activities would extend paths of ECA inhabitants into the surrounding areas of the settlements, and most likely in contact with the paths of members of other nearby Tiszapolgár hamlets. In this prism, paths of individuals might extend even further into the wider region, where both trade and burial in isolated cemeteries utilized this wider range of the landscape. In addition, the short duration of occupation at the Tiszapolgár hamlets, in comparison to the long extended use of Late Neolithic tells, indicates that settlement relocation would have created paths into the area outside the settlements and possibly even further into the greater region.

Examining time-space prisms for both periods on the Great Hungarian Plain shows a significant change. The extent of paths that individuals would have traversed through space and time in the Late Neolithic drastically shifts in the Early Copper Age. People are moving around their landscape in entirely new ways, and the paths that are crossed most likely mark an entirely new level of interaction and connection. Using Hägerstrand's concept of Time Geography and time-space prisms to map hypothetical paths in prehistory, we can conceptualize this shift on the Great Hungarian Plain in a whole new light, taking into account peoples movements, experience and interaction with different levels of their landscape.

Concluding Observations

Looking at the time-space prism constructed, it is clear that there was a shift in the extension of paths and movements in space. Using this conceptual tool, we can consider a number of conclusions regarding landscape perception and interaction by Late Neolithic individuals and how these might have changed in the Early Copper Age. The Late Neolithic seems to have been characterized by a

bound landscape. There is little evidence that people moved beyond the boundaries of the settlement and across the more distant landscape. The Early Copper Age in comparison seems to have experienced a dissolving of these restrained boundaries, the landscape a free region in which to roam and move about. In the ECA, people were coming in contact with each other, interacting at the very least in trade and at cemeteries where they felt comfortable burying their deceased alongside members of other hamlet communities. Whole settlements had shorter occupation periods, occasionally moving to new locations increasing the contact they had with other groups. It seems that while in the Late Neolithic identity might have been associated more with the individual tell, in the Early Copper Age, all groups living on the Plain could have shared a similar identity. This would create an ease at which they would interact with each other willingly. Economic changes that lead to specialization and differentiation between the hamlets might have produced a system of stability, alliances, and exchange, which is often the result of, and maintained by, interdependent social units with different production activites.[29] Because of the potential of a shared identity, economic interdependence, and consistent contact with other settlement groups in the Early Copper Age, the landscape might have been viewed as open, unbounded, and limitless. People would have felt free to move around, unconstrained by the region as a whole. In stark comparison, in the Late Neolithic people might have viewed the greater landscape with apprehension and trepidation. Others on the Great Hungarian Plain would have been viewed as outsiders; no shared identity would have encouraged constant interaction and intermixing. While the lack of interaction might be claimed to come from the farther distance to travel between Late Neolithic tells than between ECA hamlets, this larger distance was traversed in the Early Copper Age for

cemetery use and trade. Consequently, it seems that isolation in the Late Neolithic was due to factors other than the logistics of long distance travel. Overall, people's relationship with the landscape and views of their place in the region would have changed drastically from the Late Neolithic to the Early Copper Age, evident in the change of paths that we can recreate from archaeological evidence.

By constructing time-space prisms and hypothetical paths for Late Neolithic and Early Copper Age occupants on the Great Hungarian Plain, the utility of Hägerstrand's Time Geography is exemplified for questions of archaeological interest. In the 21st century, the archaeological discipline is becoming increasing multi-disciplinary, often using methods first created in other fields. In the spirit of interdisciplinary cooperation, theoretical ideas that were established outside of archaeology can also contribute. The work of a Swedish Geographer in the 1970's has proven to be a useful tool in conceptualizing an archaeological phenomenon, and reminds us of the value of academic work that steps outside of our discipline and allows for a wider intellectual tradition.

Endnotes:

1 Flowerdew 2004.
2 Pred 1984, 279.
3 Pred 1977, 208.
4 Pred 1984, 279.
5 For examples see David and Thomas, 2008.
6 Pred 1977, 208.
7 Thurston 1999, 667.
8 Szeghalom Survey data used by Sherratt (1982; 1983) and Parkinson (1999) and the Körös Regional Archaeological Project.
9 Sherratt 1982; Parkinson 1999.
10 Sherratt 1982; Parkinson 1999.
11 Szeghalom Survey data used by Sherratt (1982; 1983) and Parkinson (1999) and the Körös Regional Archaeological Project.
12 Sherratt 1982; 1983; Parkinson 1999.
13 Parkinson 2006, 40.
14 Sherratt 1983, 35.
15 Parkinson et.al. 2002-2004, 103.
16 Parkinson 2006, 40; Kalicz & Raczky 1987, 22.
17 Parkinson 1999, 109.
18 Parkinson 2006, 42.
19 Parkinson 1999, 126; Parkinson 2006, 42.
20 Parkinson 1999, 132.
21 Parkinson 2006, 42.
22 Parkinson et.al. 2002-2004, 103.
23 Parkinson et.al. 2002-2004, 104.
24 Giblin 2009, 496.
25 Sherratt 1983, 36; Parkinson et.al. 2002-2004, 101; Bognár-Kutzián 1963.
26 Parkinson 1999, 129.
27 Parkinson 2006, 53.
28 See Salisbury 2010; Parkinson 2006; Parkinson et. al. 2010
29 Johansen et.al. 2003, 52.

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Statuae Deorum Hominumque: The Distinction in Epigraphic Statuary Terminology between Divine and Human Representation in Africa Proconsularis and Beyond

Kevin Roth

The sheer number of Latin words for 'statue' suggests that there might be some semantic difference among them. Some scholars have claimed that statua and imago refer only to statues of persons, while signum and simulacrum are reserved for statues of gods. Analysis of epigraphic evidence from Africa Proconsularis reveals that this assessment is only partially valid: statua is used indiscriminately for human and divine statues. Evidence from the rest of the Roman Empire confirms the flexibility of the term statua.

The Latin language possesses several words that could be translated as 'statue:' statua, signum, simulacrum, imago, and effigies. These terms, however, are not all synonyms. Through analysis of literary evidence some scholars have concluded that statua and imago refer to statues of persons, while signum and simulacrum are reserved for statues of gods. These conclusions are partially confirmed and partially challenged by investigation of epigraphic evidence.

Sylvia Estienne, in her study of literary sources concludes that the terms signum and simulacrum refer exclusively to statues of gods, while statua and imago are reserved for depictions of mortals. The term effigies is applicable to either category, but is rarely encountered. She displays her findings quite concisely in a table, but unfortunately does not provide any footnotes to explain where she gets her information.[1] She characterizes signum and simulacrum as fundamentally synonyms, but distinguishes the former as the older and more common term and the latter as more specifically an anthropomorphic depiction of a god.[2] Imago specifically is a bust.[3] Peter Stewart broadly agrees with Estienne's dichotomy of human and divine statues, but adds that the Latin terms statua and simulacrum are the equivalent of the Greek andrias and agalma.[4] Stewart departs from Estienne in equating the term simulacrum with 'cult statue.'[5]

These conclusions about Latin statuary terminology are based almost entirely on literary sources. The present work will investigate whether epigraphic evidence leads to the same conclusions. The words statua, signum, simulacrum, effigies, and imago appear too frequently within Latin inscriptions to allow for analysis within the empire as a whole.[6] To limit the scope of the investigation, the province of Africa Proconsularis will initially serve as a microcosm for the empire as a whole.

Inscriptions that refer to statues are quite common and overwhelmingly occur on the bases that once held those statues. Since statues are less durable than their bases, typically little remains of the statue itself. This presents a significant problem for the analysis of statuary terminology: the word itself is clear enough, but often there is no explicit mention of what the statue depicts. This is understandable, since it would have been obvious from the statue itself. Consequently, the corpus of suitably unambiguous inscriptions is more limited that would be desirable. In the case of inexplicit references, some are more likely to be one type of statue or another, but cannot be absolutely identified. Unambiguous evidence of the nature of a statue is provided by the use of a noun in the genitive case adjacent to a word for 'statue,' e.g. the following inscription (AE 1955, 00196): [De]i Herculis simu[lacrum] / M(arcus) Pacatus Amil]

The term imago appears exceedingly rarely on inscriptions in Africa Proconsularis, and often its use is ambiguous, but in five cases it seems to clearly refer to people.[7] This supports the conclusion of Estienne and Stewart, but is insufficient to be conclusive. Estienne makes the further point that the term imago is specifically a bust (inherently of a human) rather than a full statue. The epigraphic evidence from Africa Proconsularis is ambiguous on this point, but nowhere else is there evidence to support Estienne's conclusion. The term imago refers to far more than simply the famous wax busts of ancestors that prominent Romans kept in special cabinets in their atria and put on display in funeral processions. Such a scenario strikes the imagination so strongly that it is easy to forget that ancient accounts of this practice are limited and that the basic definition of the term is revealed by what the word image has come to mean in English.[8] Stewart argues that the term simply means 'statue' and is often used synonymously

with statua, and very often together with it in the phrase statuae et imagines.[9]

The inscriptional evidence for simulacrum is somewhat clearer because it never refers to statues of humans. Rather, in five inscriptions the word clearly refers to gods and in two additional ones seems to, but only after extensive reconstruction.[10] An additional inscription is puzzling.[11] It includes a reference to what seems to be a statue, but no term for 'statue' is used. Instead, the name of the goddess depicted is put in the accusative case, much as today someone might call a copy of the Venus de Milo simply a Venus de Milo. Following the name of the goddess (Fortuna Victrix) is the phrase cum simulacris victoriarum. Victoria was the personified goddess of military success, but she was conceived of as one deity. It is possible that the plural victoriarum of the inscriptions indicates that there were several individual statues of the goddess. It is also possible that the victoriae are representations of successful battles, not depictions of deities.

As for signum, there are no inscriptions that unambiguously refer to a statue of a human, but there are three that clearly refer to gods, and a fourth that seems to refer to a deity, but this conclusion is vitiated by reconstruction.[12] In addition, there are two inscriptions that mention statues of the she-wolf together with the twins (though in one case the word signum is reconstructed) and one that depicts a statue of Marsyas.[13] Both of these figures are, strictly speaking, mythological characters rather than gods, since they were not worshipped and were not believed to possess any of the powers associated with gods, but nonetheless they were important. The she-wolf supposedly suckled the infants Romulus and Remus and a statue of Marsyas stood in the Roman forum, possibly on the rostra itself, as a symbol of free speech.[14] These figures presumably ranked closer to gods than to men, and so the use of the term signum

in reference to statues of them does not negate the conclusion that the term excludes sculptures of humans.

In all of Africa Proconsularis there is only one inscription that includes the word effigies, and it is in such a poor state that it is difficult to understand exactly what the inscription is trying to convey, let alone ascertain the identity of the effigies.[15] The ambiguity here does not contradict the findings of other scholars, who declare that the rather rare term can be used for any kind of statue.[16]

Estienne and Stewart both argue that statua refers specifically to a statue of a person.[17] The inscriptional evidence from Africa Proconsularis confirms that the term can refer to a statue of a human, but it is surprisingly difficult to find an inscription that unambiguously mentions a statua of a person. There is only one example that specifies with the genitive, but there is an additional inscription in which the genitive phrase that is attached to statua is reconstructed.[18] There are, however, numerous examples of statuae that almost certainly depict a person. Though a name in the genitive adjacent to statua is almost non-existent, there are many inscriptions that begin with the name of a person in the dative case. If an individual or, as often happened, the local government erected a statue to or someone, then it is likely that that statue depicts that person, particularly if no other person or god is mentioned in the same inscription. There are many examples of this type of inscription.[19]

A specific category of statua consists of depictions of living emperors. As with the statuae of non-imperial men, there are no completely unambiguous usages of the term, but there are several whose context makes it extremely likely that the statue is of the contemporary, living emperor. One inscription begins with the name of the emperor Caracalla in the dative case

and later mentions a statuam togatam. [20] Since the toga was specifically the garb for Roman men, it seems likely that this statue depicts the emperor wearing a toga. The second inscription begins with Antoninus Pius and Lucius Verus in the dative and later specifically mentions statuas duas, so it is within the realm of possibility that the two statues depict the emperor and his adopted son. [21] The third inscription is very similar in basic form to the second: it begins with Caracalla and Julia Domna (the emperor's mother) in the dative case, to whom a local notable gave statuas duas. [22]

Africa Proconsularis offers nine inscriptions that include the word statua in obvious reference to a god, as indicated by the use of the genitive case. [23] Such usage is not specific to one or a limited number of gods, but includes Saturn, Mars, (Juno) Caelestis, Hercules, Mercury, Fortuna, the Genius Curiae, Cupid, Concordia, and Asclepius. One of these inscriptions (CIL 08, 01548) mentions a templum Cererum. A multitude of goddess of agriculture, rather than a single Ceres, is attested only in African inscriptions (with only two exceptions, both of which can be attributed to African influence). [24] In addition to the unambiguous examples, there are a further eight inscriptions that mention statues that are very likely to be divine, but whose wording is either slightly ambiguous or partially reconstructed. [25] Furthermore, one inscription bears the term statua applied to a deified emperor (Hadrian), who would be appropriately classified as a god rather than man. [26] Examination of similar inscriptions from the other provinces of Roman Africa shows that this usage of statua is not a peculiarity of Africa Proconsularis: five inscriptions from other African provinces show the same result. [27] Within this last group, two are of particular interest (AE 1941, 00046; CIL 08, 08313) since in both instances statues of both gods and men are listed and the term statua is used for each.

Thus, one must conclude that, epigraphically at least, statua can be a statue of a man or god. This discovery, however, is not completely original to the present work. In a footnote to an article, the German scholar Jörg Rüpke noted that in a paper delivered in 2010 Estienne commented that in Africa statua usually refers to statues of gods. [28] This little disseminated finding, as stated, is somewhat misleading, since Africa displays enough inscriptions describing a statua of a person that it is more accurate to say that the term can indiscriminately refer to each type of statue, rather than that it usually refers to statues of gods. Estienne is incorrect, furthermore, in limiting this proviso to Africa.

Further investigation reveals that statua clearly refers to a statue of a god in inscriptions from provinces throughout the Roman Empire. [29] The eight examples come from the disparate regions of Italy, Syria, Asia Minor, Greece, and Sicily. In all the provinces of Roman Africa the total number of inscriptions containing the word statua in reference to a statue of a god (or divine emperor) is thirteen. This is prima facie evidence that the practice of using statua to refer indiscriminately to statues of gods and people was more common in Africa than anywhere else in the Roman world, but further research is necessary to disprove or confirm this possibility, and even further research is needed to explain it. The most significant point, however, is that the ambiguous usage of statua is not at all confined to Africa.

These findings show that one would be ill advised to use the term statua to make a conclusion about the identity of the figure depicted, in the absence of other information. In her chapter within to Divine Images and Human Imaginations in Ancient Greece and Rome Estienne mentions an inscription from Lanuvium which includes the term statua. [30] The term immediately follows an abbreviation

that clearly refers to Juno Sospes. Since the goddess' name appears as a series of letters, it is impossible to determine its grammatical case. If the name is assumed to be in the genitive case, then clearly this would have to be a statua of a god. If the dative case is restored, then it could be a statue of the goddess, or of someone else (presumably the emperor Hadrian, who ordered the statue to be made out of the old and worn-out gifts dedicated to the temple). Estienne concludes that it must be the latter, basing her decision solely on the use of the term statua, which she argues is used exclusively for statues of persons.[31] Though her research with literary evidence supports this conclusion, the evidence presented here shows that it is untenable in light of the ambiguity of the term statua.

The ambiguous meaning of statua is confined to its usage in epigraphy. These findings do not contradict Estienne's conclusion concerning the usage of the word in ancient texts. This contrast between the usage of a word in literature and in inscriptions is mirrored in Greek. The word agalma, which Stewart equates with the Latin simulacrum, is used within literary sources in reference only to divine statues, but on inscriptions it can also refer to statues of people.[32] Thus, both Greek and Latin possess a statuary term that is used in a more restricted fashion in literature than on inscriptions.

Both literary and epigraphic evidence indicate that the terms signum and simulacrum are used exclusively for statues that depicted gods, mythological figures, or deified emperors. In contrast imago refers to a statue of a person, likely a full statue rather than simply a bust. The term statua is applied only to statues of humans in ancient writings, but the epigraphic usage is ambiguous, referring to statues of both men and deities.

Abbreviations:
AE: L'Année épigraphique
AfrRom: Africa Romana
BCTH: Bulletin Archélogique du Comité des Travaux Historique
CIL: Corpus Inscriptionum Latinarum
D: H. Dessau, Inscriptiones Latinae Selectae
ILAlg : Inscriptions Latines de l'Algerie
ILPBardo: Catalogue des Inscriptions Latines Paiennes du musée du Bardo
ILT : Inscriptions Latines de la Tunisie
IRT : Inscriptions of Roman Tripolitania

Endnotes:

1 Estienne 2010, 257.
2 Ibid., 259.
3 Ibid., 258; based on the evidence of Daut 1975. Stewart (2003) states that "Daut bases his detailed survey of statue-vocabulary on the works of Cicero, but his conclusions are generally matched in other, later texts" (21). Daut's conclusions are not based on epigraphic evidence.
4 2003, 21-22, 186.
5 Ibid, 186.
6 The Clauss-Slaby epigraphic database produces the following number of results: statua: 1088; simulacr-: 80; imag-: 288; sign- (a word with many more meanings than simply 'statue'): 198; effigie-: 23. A search on the Heidelberg database reveals fewer total results, but roughly the same proportionate frequency of appearance: statua: 442; simulacr-: 32; imag-: 125.
7 1) BCTH-1954-122 = AE 1957, 00077 = AE 1987, 01055; 2) CIL 08, 17143 = ILAlg-01, 01985 = D 06778 = AE 1898, 00040; 3) CIL 08, 17408 = ILAlg-01, 00010 = D 05474 = AE 1910, +00126 = AE 1938, +00045 = AE 1955, +00146; 4) CIL 08, 26279 = Uchi-01-Ugh 00011 = Uchi-02, 00089 = AE 1908, 00268; 5) ILPBardo-01, 00213
8 Polybius 6. 53; Pliny the Elder NH 35. 6
9 Stewart 2003, 23-4.
10 1) AE 1955, 00196 ; 2) BCTH-1946/49-494 = AE 1949, 00054; 3) CIL 08, 15881 (p 2707) = D 05505 = ILCV +04328 = ILPBardo-01, 00366; 4) CIL 08, 26474 = Dougga 00127 = AE 1906, 00122; 5) ILAlg-01, 02033
11 CIL 08, 05290 (p 962, 1658) = ILAlg-01, 00179 = D 0547
12 1) CIL 08, 04836 = CIL 08, 16911 = ILAlg-01, 00561 = D 06804 ; 2) CIL 08, 11999 (p 2397) = D 05441; 3) CIL 08, 26478 = ILTun 01394; 4) CIL 08, 12285
13 1) CIL 08, 00958 = CIL 08, 12438 = D 06819; 2) CIL 08, 12220 = D 06820
3) AE 1997, 01643 = AE 2003, +01890
14 DeWitt 1926, 223.
15 CIL 08, 00758 = CIL 08, 12222 = ILTun 00632
16 Estienne 2010, 259; Stewart 2003, 20, 24.
17 Stewart 2003, 22: "Statua almost always refers to free-standing sculptures of mortals" and Estienne 2010,
259: "With few exceptions, it is common to differentiate divine representations (signum or simulacrum) from human representations (statua or imago)."
18 1) IRT 00562 = AE 1948, 00006a = AE 1952, +00173 2) CIL 08, 00714 = CIL 08, 12133 = D 05499
19 e.g. IRT 00565; IRT 00598; CIL 08, 00714
20 AE 2004, 01875
21 BCTH-1954-122 = AE 1957, 00077 = AE 1987,

01055
22 ILTun 00066 = ILPBardo-01, 00020 = AfrRom-04-02-486 = AE 1934, 00035
23 1) AE 1933, 00233 ; 2) AE 1992, 01798 = AE 1993, 01737 ; 3) CIL 08, 00993 (p 2440) = CIL 08, 12454 = D 04433; 4) CIL 08, 05367 (p 962) = CIL 08, 17496 = ILAlg-01, 00288 = AE 2000, +00068 ; 5) CIL 08, 01842 = ILAlg-01, 03007 ; 6) CIL 08, 01548 = CIL 08, 15550 = D 06827 ; 7) IRT 00316 ; 8) CIL 08, 15447 (p 2595) = Uchi-01-Rug 00023 = Uchi-02, 00003 = AE 1892, +00094 = AE 1908, +00264 = AE 1941, +00073 = AE 1999, +01846 ; 9) IRT 00396 = AE 1991, 01619 = AE 2005, +01662
24 Rives 1995, 157.
25 1) CIL 08, 23749 = AE 1899, 00116; 2) CIL 08, 01887 = CIL 08, 16510 = ILAlg-01, 03066 = AE 1977, 00859; 3) CIL 08, 26279 = Uchi-01-Ugh 00011 = Uchi-02, 00089 = AE 1908, 00268 4) CIL 08, 00712 = CIL 08, 12143; 5) CIL 08, 14377; 6) CIL 08, 10569 = CIL 08, 14394 = AE 2002, +01679; 7) CIL 08, 05299 (p 962) = CIL 08, 17479 = ILAlg-01, 00177 = D 05475; 8) AE 1992, 01766 = AE 1993, +01733
26 1) AE 1910, 00154
27 1) AE 1941, 00046; 2) CIL 08, 07983 (p 1879) = CIL 08, 07984 = ILAlg-02-01, 00034; 3) CIL 08, 02372 (p 951, 1693) = AE 1941, 00047 = AE 1946, +00066 = AE 1987, 01071; 4) CIL 08, 08313 (p 1897) = CIL 08, 08335 = CIL 08, 10900 = CIL 08, 10898 = CIL 08, 20136 = CIL 08, 20141 = CIL 08, 20142 = AE 1925, 00023 = AE 1925, 00024 = AE 1949, 00040 = ILAlg-02-03, 07644; 5) CIL 08, 19122 = ILAlg-02-02, 06487
28 "As Sylvia Estienne demonstrated in a paper presented at the Max-Weber-Kolleg Erfurt, in inscriptions signum is synonymous with simulacrum in this respect. However, exceptionally in Africa statua usually refers to divine statues (2010)" (186). (present writer's emphasis)
29 1) CIL 13, 11245 = CAG-21-01, p 520 (Lugudunensis); 2) CIL 03, 14386d = IGLS-06, 02723 (Syria); 3) CIL 09, 00976 (Apulia et Calabria / Regio II); 4) CIL 10, 00006 = D 05471 (Bruttium et Lucania / Regio III); 5) CIL 03, 00534 (p 1312) = Corinth-08-02, 00120 (Achaia); 6) CIL 14, 02867 = EE-09, p 432 = D 03687a = SIRIS 00528 = RICIS-02, 00503/0602 (Latium et Campania / Regio I); 7) CIL 03, 06888 = D 04062 (Lycia et Pamphylia); 8) ILSicilia 00075 = AE 1989, 00345a (Sicilia)
30 Estienne 2010, 264.
31 "An imperial inscription demonstrates that the transformation of metallic offerings into a statue given to the gods was not unusual, even if, in this specific case, the statue was probably an image of an emperor, as is pointed out by the term statua." (present writer's emphasis)
32 Stewart 2003, 25

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The Sebasteion at Aphrodisias:
An Imperial Cult to Honor Augustus and the Julio-Claudian Emperors

Geraldine Thommen

Augustus and the Julio-Claudian emperors' successful reign over the vast Roman Empire were due primarily to provincial loyalty and acquiescence. My research examines the intermingling of Roman, Hellenistic, and Aphrodisian art forms in the imperial sculptural reliefs of the Sebasteion at Aphrodisias in order to demonstrate the use of visual art forms to express provincial loyalty to the princeps. I argue that the diverse artistic styles of the Sebasteion's imperial reliefs' represent definitive evidence of an imperial cult in the eastern provinces and signify imperial concordia, a primary aspect in the successful reign of Augustus and the Julio-Claudians emperors.

The successful reign of Augustus and the Julio-Claudian emperors over the vast Roman Empire was due in large part to provincial loyalty and acquiescence. In order to express their allegiance to Rome and distinguish themselves from the cities in the east, provincial leaders created imperial cults to honor the rulers of the empire. Cults dedicated to the worship of kings was a customary practice in the eastern provinces, but imperial cults established for Augustus and the Julio-Claudian emperors used distinct forms of art and architecture to publicly display their loyalty and worship to their new leader. Provincial populations also created imperial cults as visual acknowledgment of the emperor's imperial propaganda, including his auctoritas, potestas, and pietas.

My research paper argues that the Sebasteion at Aphrodisias, a temple and sanctuary dedicated to Augustus, Aphrodite Aphrodisias, and the Julio-Claudian emperors, represents definitive evidence of an imperial cult, based on the structures and sculptural program created in response to imperial conquest. Questions I will consider include, how was the creation of imperial cult viewed by the emperor, in what specific ways did imperial cult benefit Aphrodisias and the emperor, how did the intermingling of artistic styles promote imperial rule, and in what way did imperial cults in the East permit the provinces to elevate their status within the empire? My research examines the Sebasteion's distinct intermingling of Roman, Hellenistic, and Aphrodisian art and architectural forms, and focuses on three imperial reliefs within the sanctuary-temple's sculptural program. At the conclusion of my paper, I hope to have demonstrated that the Sebasteion in Aphrodisias represents a unique Eastern architectural design that provides strong evidence of a provincial imperial cult to honor Augustus and the Julio-Claudian emperors.

Excavations of Aphrodisias began in 1960 by New York University professor Kenan Erim, and inscriptions, uncovered on fortified city walls, dated Aphrodisias's founding between the late 2nd century and early 1st century B.C.E. based on decrees issued from Rome.[1] According to a large number of inscriptions discovered along the northern side of the city's theater, referred to as the "Archive Wall," many Roman Republic leaders, including Sulla and Julius Caesar, established political relationships with the city and many of its elite families. By the late 30s B.C.E., the city of Aphrodisias became a leading province in the East for the Roman Empire, in both strategic location and natural resources. In his Annals, the ancient historian Publius Cornelius Tacitus documents that Aphrodisias became an advantageous locale for Rome's military and political ventures throughout the East, and he states that the city received high praise from Augustus regarding the "fidelity to the Roman nation with which they had sustained the Parthian inroad."[2]

The concept of eastern imperial cult became an established religious and political practice long before the reign of the Roman emperors. Kings in the Hellenistic East legitimized their power and divine right as absolute rulers by their association with a state pantheon, and Roman republic leaders, including Lucius Cornelius Sulla and Julius Caesar, used eastern cults to validate their elevated status. Eastern imperial cults offered god-like honors, referred to as isotheoi timai, so that citizens could express eusebeia ('piety') and euno□ sein ('loyalty') to the isotheos ('one equal to the gods').[3] The imperial cult that developed in the East to honor Augustus and his Julio-Claudian, although based on the same principles used to venerate Hellenistic monarchs and Roman Republic leaders, established different terminology and distinct forms of art and architecture to express their loyalty to the

rulers of the Roman Empire.[4] The term sebastos ('holy/revered place') is the Greek equivalent for augustus and became the title bestowed upon the imperial emperor in the eastern provinces.[5] Although the Roman princeps never officially sanctioned the establishment of imperial cults in the east; the honors were positively received by the emperors, which were advantageous for their reign and provided visual acknowledgment of Augustan and Julio-Claudian propaganda in the East.

Ancient historical texts document that citizens in the provinces were encouraged to honor the emperors, and express gratitude and loyalty to Rome. Pliny states in his Natural History that the Roman Empire was the "nurse and mother of all the lands…and joined together scattered empires," implying that Rome and the emperors had established a communis patria for all citizens.[6] The quote insinuates that the numerous political and economic improvements, at least based on Roman standards, put in place after the conquest of the East by the Roman Empire brought prosperity and peace to these impoverished or barbaric regions. Due to the strong relationship between Augustus and the leaders of Aphrodisias prior to the Roman conquest, the prosperity that the city experienced after Augustus became emperor, and the citizenship bestowed upon many of the Aphrodisian aristocracy, certainly validates Pliny the Elder's notion that Rome was the nurturer of all lands.

The Sebasteion, discovered during a 1979 excavation of Aphrodisias, not only signifies evidence of an imperial cult in name, but also in its design, function, and sculptural decoration. According to inscriptions found on the temple's architrave, construction began during the reign of Tiberius, but due to numerous earthquakes during the mid-1st century C.E. reconstruction and completion of the temple-sanctuary did not occur until the reign of Nero. The east-west
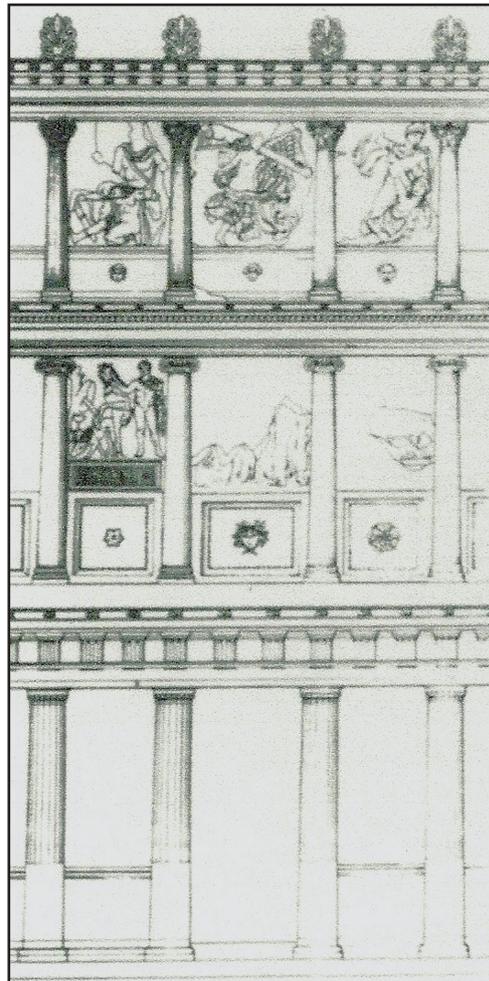

Figure 1: Partial reconstructed elevation of South Portico

oriented Sebasteion combined Hellenistic and Roman architectural conventions, but unusual architectural elements and decorative forms reveal the development of an innovative Aphrodisian style.[7]

The axial-symmetrical plan appears to be modeled on imperial fora, most notably those created in Rome for Caesar and Augustus; both contain temples axially placed at the end of symmetrically flanking porticoes.[8] Each portico contains superimposed columns, a different order

signifying each story, but the height of the porticoes, and their placement flanking a long processional or sanctuary way represents a distinct Aphrodisian architectural design (Fig. 1); this unique format of elements was not replicated in any other cities in the Greek East. The use of Roman building forms in the construction of the Sebasteion implies that the Aphrodisians wished to demonstrate their desire to simulate Roman structures and sculpture. However, either because of their limited accessibility to actual Roman models or a desire to maintain a certain level of artistic freedom, builders and sculptors implemented Hellenistic and Aphrodisian art and architectural forms in their construction of the Grand Sanctuary-Temple.

Full sculptural reliefs, as well as a multitude of fragments, have been recovered from the Sebasteion site, and the organization of these artworks within the temple has been recreated by scholars from New York University and Cambridge University, specifically Kenan Erim and Christopher Ratté from the former, and R. R. R. Smith from the latter, based on the excavated materials from the site. On the second and third stories of each portico, a complex series of 180 reliefs, 90 for each portico, originally decorated the processional walkways.[9] Along the north portico, six relief panels and fifteen inscribed bases have been reconstructed from excavated fragments, but archaeologists have reconstructed the north portico's visual program.[10] The second storey reliefs depicted ethnē, or personifications of the lands defeated by Augustus. A series of single standing draped women, differentiated by costume, attributes, and inscriptions located on the bases, were most likely modeled from a catalog of reproductions produced in Rome and distributed throughout the provinces.[11] The third storey of the north portico most likely contained a series of allegorical figures personifying time

and place, based on two recovered reliefs depicting personifications of Day and Ocean, Hermera and Oceanus.[12]

The second storey reliefs contained prototypical scenes from the standard canon of Greek religion and mythology, including Herakles, Dionysus, and Apollo, although a few restored panels contain images that refer specifically to Rome or Aphrodite, such as a relief recreating the scene of Romulus and Remus with the She-wolf.[13] The third story relief panels contain imperial narrative scenes of Augustus and the Julio-Claudian emperors with their family members, gods, or symbolic personifications, juxtaposed next to panels of mythological figures, such as Nike and Roma.[14]

Three imperial reliefs I have selected to analyze for my research reflect Aphrodisias's perception of imperial rule, as well as Augustan and Julio-Claudian propaganda, and the design of the reliefs reveal the unique style of Aphrodisian sculptors. Three important elements appear in each sculptural panel: the nudity of the emperor, specific imperial portrait types, and a defined narrative that honors different attributes of each emperor. I will briefly explain the importance of these three elements, and then proceed with my analysis of the individual imperial reliefs.

Nude images were a well-established artistic practice in antiquity to honor figures of prestige or power. In Rome, the emperor was only represented nude after his death, signifying his divine status. In provincial imperial cults, nudity became a common means of visual representation to honor the emperor as a divine leader, as well as imperial attributes of pax, concordia, stability, and prosperity that he brought to the provinces. Although the nude image of the emperor was representative of their divinity in the East, they were not meant to be represented as actual gods. Imperial

Figure 2: Augustus, Nike, and Trophy, South Portico

leaders were given "honors equivalent to the gods," or isotheoi timai, meaning that they were venerated and bestowed sacred honors, but acknowledged as mortal men; the key word is 'equivalent,' indicating a level of separation between emperor and god.[15]

The emperors' portraits used in the Sebasteion reliefs demonstrate that Aphrodisian sculptors had access to reproductions of imperial portrait types, but local sculptors replicated them with their own personal style and techniques.[16] For instance, Augustus's image resembles his Prima Porta type, but his three pincer locks are positioned in a direction that diverges from his imperial portrait. Identification of the princeps was essential to understand the meaning of each relief,

and the three imperial relief panels examined in this research paper, although not exact likenesses, would be identifiable by all visitors who came to the Sebasteion to honor the emperors.

The iconography, personifications, and motifs used in the narrative scenes of the reliefs were essential elements in conveying the intended meaning of each panel, and they provided the most conclusive evidence that the Sebasteion was an eastern-designed imperial cult to honor Augustus and the Julio-Claudian emperors, unique to the Greek East. Themes found within the three relief panels include military victory, conquest of barbaric nations, peace, and unity. Sculptors carefully intermingled Roman, Hellenistic, and Aphrodisian images to depict each emperors'

Figure 3: Claudius and Agrippina, South Portico

accomplishments, and the positive changes they brought to the East.

Imperial triumphs by the princeps achieved stability and peace throughout the provinces, and the sculptural relief, Augustus with Nike and trophy (fig. 2), exemplified the pax and concordia that Augustus brought to Aphrodisias due to his many victorious conquests. Augustus's victories and resulting dominion is conveyed through the symbolic images of the relief: an eagle situated along his right leg, and the personification of trophy positioned to his left, standing atop a bound

captive, presented to him by the Greek goddess Nike. Augustus's facial features and hair, although not exact likenesses of his imperial portrait types, appears loosely modeled on the Prima Porta and Forbes type. The size of the emperor's ear and modeled physiognomy appear accurate in size and shape to his imperial portraits, but the placement of his three pincer locks of hair, a standard element of his sculpted image, lacks the precise placement on his upper forehead. The emperor's classically nude body, signifying his divinity, is presented in a relaxed contrapposto stance, his head turned to the left toward trophy
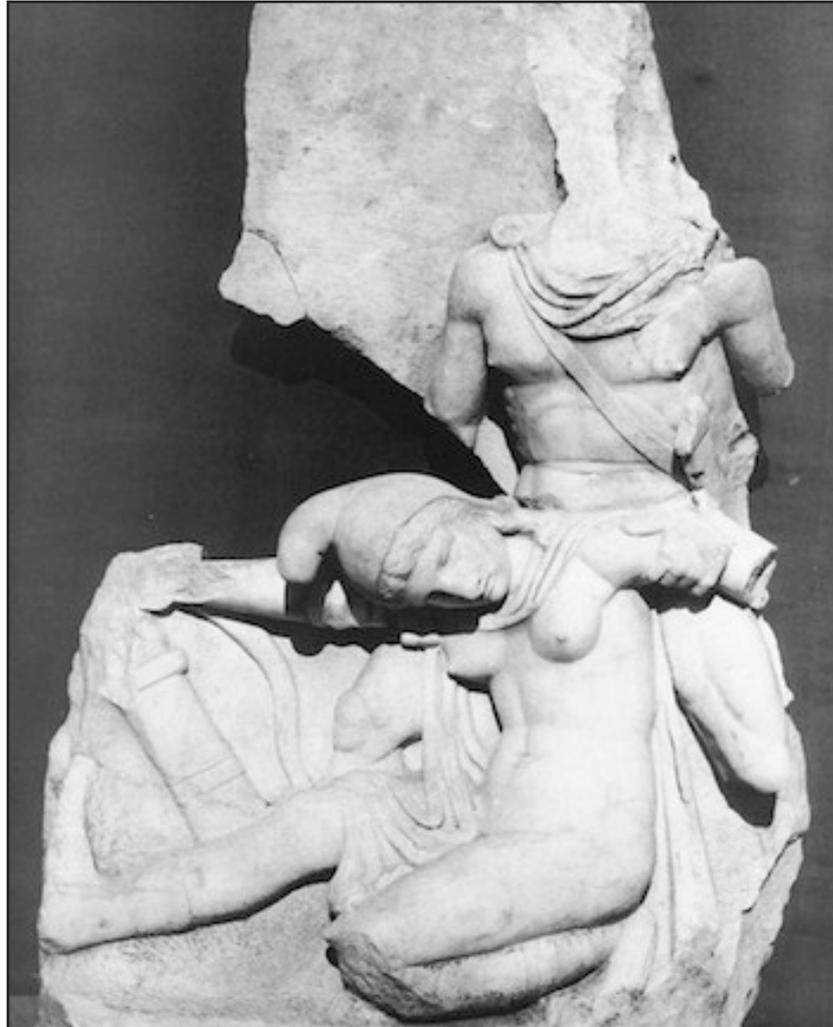
Figure 4: Nero and Armenia, South Portico

and Nike. Augustus holds a scepter in his right hand, which conveyed imperial rule, and his head is decorated with a wreath, most likely made from oak leaves, that signified the emperor's victorious triumphs that saved the lives of the Roman citizens, and referred specifically to the people of the eastern provinces.

Augustus depicted with images of Nike, a trophy, or a conquered prisoner, was not an uncommon subject matter in Augustan art, but the unique narrative of the Sebasteion panel. In Figure 2, Augustus with Nike and trophy, the intermingling of Roman and Hellenistic forms represents a distinctly Aphrodisian design, as these were not typical imperial representations in the Greek East, and may allude to Aphrodisias's close relations with the Roman Empire. The image of Augustus surrounded by accolades and attributes of

his imperial reign provides strong evidence of an imperial cult to honor the peace and stability Augustus brought to the Roman Empire through his military victories and conquests.

Personal attributes of the emperor, admired and honored by provincial populations, represented the theme conveyed in the imperial relief, Claudius and Agrippina (Fig. 3). The panel depicts the third princeps of the Roman Empire shaking the hand of his fourth wife, Agrippina the Younger, while a togate stands at the same height, an eastern interpretation of equality between these three figures. Shaking hands in Roman art commonly symbolized marital concordia or fides between political leaders, but in eastern iconography this action typically denoted death or parting.[17] The imperial relief, Claudius and Agrippina, certainly honored Roman concordia between the emperor and his wife.

Portraits of Claudius did not appear until 41 C.E. when he became emperor at the age of fifty-one, which typically depicted the middle aged princeps with wrinkles above his eyebrows and around his mouth, as well as fringed hair across his forehead. The image of Claudius's advanced age implied his pietas, or even his modestia, two important qualities emphasized in imperial propaganda. The emperor's wife Agrippina the Younger appears loosely modeled on her imperial portrait type with four deeply cut, elaborate rows of curled hair. Despite missing an idealized head, the sculptural image of the Roman State or People places the corona civica upon Claudius's head, signifying that the emperor had saved the lives of not just a single Roman citizen, but the entire Roman Empire. The imperial relief panel, Claudius and Agrippina, conveyed concordia and protection within the empire, two key qualities honored in an imperial cult, but the image of imperial husband and wife shaking hands, and the togate sculpture

signifying the Roman State, represented a sculptural format unique to Aphrodisian sculpture.

The final imperial relief, Nero and Armenia (Fig. 4), contains Roman and Eastern iconography, and includes not only images that honor dominance and peace, but acknowledges the emperor's compassion toward conquered nations. Nero's nude, muscular physique, adorned with only a short cloak draped around his neck, and fastened with a round brooch, as well as a baldric carrying an empty scabbard hanging along his side, towered above the personification of the Armenian nation. The portrait and torso appear modeled from young imperial portrait types of Nero, but this relief presented a non-typological representation of the center-part fringed hair along his forehead.

The personification of Armenia, whose slumped, defeated figure sits up on the ground, supported by Nero's legs and hands, contained numerous iconographical elements that identified her as a barbarian nation. A short cloak on her shoulders and short boots with ribbon-like ties, coupled with her soft 'phrygian' placed atop her long, unbound hair that fell down past her shoulders, represents a barbaric figure; a quiver and bow propped next to the conquered figure represented iconography typically associated with Armenia.18 In the Sebasteion relief panel, the emperor appears ready to lift up the conquered nation and welcome her into the empire, although the personified Armenia had suffered defeat. Nero's successful campaigns against Armenia received significant publicity and notoriety throughout the Roman Empire.19 The Sebasteion relief panel, Nero and Armenia, provided definitive evidence of an imperial cult to honor the emperor's potestas, pietas, and auctoritas, and the unique format of the figures in the imperial sculptural panel demonstrated an innovative Aphrodisian aesthetic that

reflected the artist's and city's perception of the emperor and his accomplishments in the East.

The successful reign of Augustus and the Julio-Claudian emperors depended on the loyalty and acquiescence of the eastern provinces. Although not demanded by Roman leaders, the creation of temples and sanctuaries to honor the princeps also expressed visual acknowledgment and acceptance of the propagandized values and virtues of the emperors. The extensive sculptural program of the Sebasteion at Aphrodisias, and more specifically, the imperial relief panels on the third storey of the south portico, represented a unique intermingling of Roman, Hellenistic, and Aphrodisian artistic styles that presented evidence of an imperial cult to honor Augustus and the Julio-Claudian emperors, and documented a unique local aesthetic of the city's sculptors, and their interpretation and support for imperial reign.

Endnotes:

1 Reynolds 1982, 2-4.
2 Tacitus 3.62.
3 Price 1984, 88.
4 Taylor 1975, 244-245.
5 Taylor 1975, 168.
6 Pliny 2.3.39.
7 Smith 1987, 92-94.
8 Smith 1987, 94.
9 Smith 1988, 51,53.
10 Smith 1988, 95-96.
11 Smith 1990, 92-94
12 Smith 1988, 51.
13 Smith 1987, 97.
14 Smith 1987, 96-98.
15 Price 1984, 88.
16 Price 1984, 100.
17 Price 1984, 107.
18 Smith 1987, 118.
19 Smith 1987.

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Ritual Significance in Mycenaean Hairstyles

Florence Sheng-chieh Hsu

Although the frescoes excavated from Bronze Age sites on the Greek mainland provide evidence for female figures in the Mycenaean society, the hairstyles of these figures have not been studied in detail. As in many other ancient cultures, hairstyles were not only an exhibition of beauty and fashion, but they also represented certain age groups or a person's social status. The Mycenaeans inherited many of their hairstyles from their Minoan predecessors, although differences existed as well. It is also possible there may have been a shift in meaning for seemingly similar looking hairstyles from the Minoan to the Mycenaean periods. Female figures, which compose most of the Mycenaean figures in frescoes known to date, are fine examples for discussing the artistic representation and potential significance of Mycenaean hairstyles. By comparing with Minoan hairstyles, discussions of Mycenaean examples lead to conclusions in the relationship between hairstyles and ritual activities in the Mycenaean society.

Minoan Hairstyles

Before looking into Mycenaean figures, it is necessary to discuss the basics of Minoan hairstyles. The largest and best-preserved repertoire of Minoan figures was excavated at Akrotiri on Thera.[1] In her article "Youth and Age in the Theran Frescoes," Ellen N. Davis suggested that hairstyle was closely related to a person's age in Minoan society. She divided the figures in various Theran frescoes into six age groups, including four stages of youth and two stages of adulthood.[2] In her opinion, shaved heads, often represented with the color blue, and hair locks are indications of youth.[3] For example, the saffron-gatherer in an ocher-colored garment from Room 3a in Xeste 3, a building at the southwest of the excavated Akrotiri, represents the first stage of youth (Fig. 1). Two locks grow from her head, one forehead lock and the other back lock. The rest of her head is painted blue with traces of short black lines that represent newly grown hair. She further posits that as people grew to certain ages, they shed their locks and stopped shaving their heads.[4] The double chins and the developed breasts that appear on figures in later stages of maturity support her argument. Although different opinions from Davis' categorization of the age groups have been expressed,[5] it is generally agreed that locks and shaved heads represent childhood in the Minoan society.[6]

Based on the stages of maturity suggested by Davis, an additional significant feature can be observed, which is the color of the eyes. The figures in all four stages of youth have blue marks painted in the whites of their eyes, while red marks are applied to the eyes of the figures in the last stage of adulthood.[7] Thus the eye-color of female figures can also be an indication of age.[8]

The seated goddess in Xeste 3 (Fig. 2) provides an instructive comparison with the Mycenaean figures discussed below.

Figure 1: Saffron-gatherer from Xeste 3, Akrotiri (After Doumas 1992, 156)

She is identified as a goddess because she appears to transcend all age groups, which is visible in her hairstyle and other features. Her hair is long and voluminous, with the upper part tied up into a bun, similar to that of the woman holding a necklace from the Lustral Basin in the same building (Fig. 3), representing Davis' fourth stage of youth.[9] Yet, separated from the other tress of hair at the very top of her head is a tied up portion that appears comparable to the locks from earlier stages of youth, such as the saffron-gatherers in the same painting (Fig. 1).[10] The two forehead locks, the two tresses of hair curled up in a spiral shape against the white background, and the blue area representing a shaved portion next to her ear are all reminiscent of the hairstyle of the youths. She also wears a blue band with borders of red beads on her forehead. Similar beads decorate other parts of her hair, especially along the long tress on top. The hairstyle of the goddess seems to be a combination of hairstyles from all four groups of youth in Theran frescoes. Since the goddess has fully developed breasts, she

Figure 2: Seated goddess from Xeste 3, Akrotiri (After Doumas 1992, 162)

Figure 3: Woman holding a necklace from Xeste 3, Akrotiri (After Doumas 1992, 138)

Figure 4: The Mykenaia from Mycenae (After Immerwahr 1990, XX)

cannot be in a stage of youth. Her hairstyle thus indicates her connection with youth, which is reinforced by the blue paint in her eye.

The Mykenaia

The Minoan female figures offer fine comparisons to those in the Mycenaean frescoes. The Mykenaia, excavated at the cult area of Mycenae in 1970,[11] is one of the most complete Mycenaean human figures uncovered so far (Fig. 4). Measuring 71 cm wide and 47 cm high, the fragment preserves the figure from the chest up to the lower part of the hair. Set against a blue background, the Mykenaia has a frontal torso with her head in profile facing to her right. A thin, black outline defines her. Her brow and eye are long and thin, and it appears that she has red marks inside her eye. Her ear is rendered with red lines. Her hair is detailed with thin, white lines. The original appearance of the very top of her coiffure is unknown due to the missing upper part of the fresco. Her bangs form spirals. She has a forehead lock and a side lock that comes down the left side of her face and mistakenly along her right shoulder instead of her left shoulder and left arm, as it should be in natural circumstances.[12] Although the lower half of the fresco is missing, it is still apparent that the tress coming down along her left shoulder separated into at least two tresses near her elbow. It is uncertain whether the tress represents the other side lock, which would again be a confusion of left and right, or the hair at her back. She wears an elongated hair bun bound up into a loop with a red-white-red band that matches the bands of her short-sleeved, saffron-yellow bodice. The cut of her outer bodice exposes her breasts, which are covered with a V-shaped diaphanous garment of the same saffron yellow. She holds in her right hand a beaded necklace, which is similar to the one she wears and resembles the bracelets on both her arms.

Figure 5: Lady with a pyxis from Tiryns (After Rodenwaldt 1912, pl. VIII)

The depiction of the Mykenaia's hair bun is reminiscent of the woman holding a necklace from Xeste 3 (Fig. 3). The figure from Xeste 3 possesses back hair, separated into two tresses at the end, which is long and voluminous. The back lock is preserved in the form of a bun, or a loop. She has a long hair band that wraps around her forehead and continues to her back hair, which is also present on the Mykenaia. One of the major differences between the figure from Xeste 3 and the Mykenaia is the absence of forehead locks from the woman holding a necklace. This absence probably results from the cutting of the locks as a representation of transformation from youth to adulthood. Instead, a small loop of a band is knotted at her forehead,

Figure 6: Female procession from Thebes (After Reusch, 1956, pl. 15)

likely replacing the forehead locks from the previous periods.[13]

A figure that has an even closer overall hairstyle to the Mykenaia is the seated goddess in Xeste 3 (Fig. 2). They both have forehead locks and spiral-shaped curls. If the hair bun of the woman holding a necklace is a variation of back locks from the previous stage of life, the hair bun of the Mykenaia can also be assumed to carry the same meaning. As discussed above, locks were specific features for youths in the Minoan society. The Mykenaia, however, more closely resembles an adult with her double chin and full breasts. The red paint in her eye is yet another indication of her age, which only appears on the figures of the oldest group in the Theran frescoes. This combination of features brings up two possibilities. First, because of her similarity to the seated goddess, the Mykenaia could be a goddess or a woman impersonating a goddess; and second, locks that indicate youth in the Minoan society might have gained a different meaning in the Mycenaean society, which will be discussed later in this article.

Mycenaean Processional Figures

The lady with a pyxis from Tiryns is one of the most widely known Mycenaean processional figures (Fig. 5), but interpreting this figure is complicated by

the fact that E. Gilliéron reconstructed it on paper from a number of different figures, including fragments of three female heads.[14] Still, it provides valuable information on the hairstyle of Mycenaean female figures, since the fragments that definitely come from the same figure show a significant portion of the lady's hair. Her hair is highly stylized with large curls as the front upper part of her hair and small curls as the bangs. A distinctive forehead lock is curled in a way that is more complicated than all those previously mentioned. Two side tresses fall on her shoulder and separate in two directions, the longer one towards the front and the shorter one towards the back. Some side tresses, which appear to be from the opposite side of her face, come down along her shoulder and breast and end up in several tresses. The depiction of the tresses on her shoulder and part of her back is intriguing; they seem to be bound by some kind of rings or loops. She has a bun and ponytail-like tresses on the back of her head. Her hair is decorated with a red band with white dots. Unlike the Mykenaia, whose hair is detailed with thin white lines, the lady with a pyxis has hair that is depicted by leaving some of the parts blank, which reveals the background color. The highly stylized hair with equally spaced tresses contrasts greatly to the hair of the Mykenaia that hangs down more naturally. The rest of the body of the lady with a pyxis is as stiff and exaggerated as

Figure 7: Female processional figures from Pylos (After Lang 1969, pl. O)

Figure 8: Bull-leaper from Pylos (After Lang 1969, pl. C)

her hair. Judging from her breasts, her chin, and the red paint in her eye, she is a mature woman. The lady with a pyxis thus has features similar to the Mykenaia despite their difference in artistic styles.

The reconstruction of the processional scene from Kadmeia at Thebes (Fig. 6) is similar to the lady with the pyxis from Tiryns, except that the Theban women are rendered with greater naturalism and more variation.[15] Both profile and frontal view are applied to their upper bodies. Their hands display different poses in accordance to the objects they are holding, and they wear jewelry of different kinds. Such variation is not present in their unified hairstyle, which seems the same as the Tirynthian hairstyle that has curls, locks, and tresses.
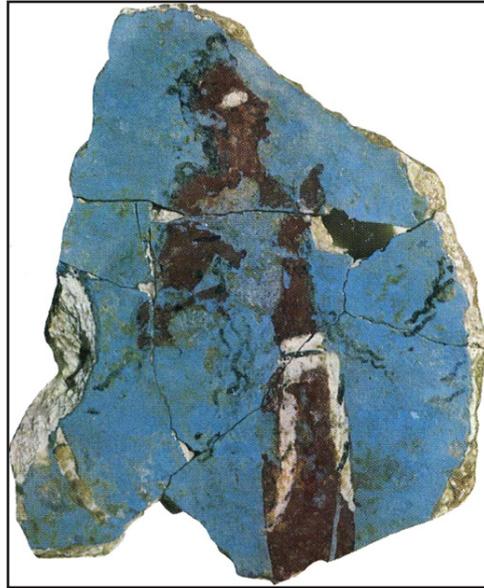
Even the artistic manner is highly stylized with the same number of tresses and curls. The uniformity seems to indicate that this hairstyle carries certain significance.

Processional figures have also been excavated at the site of Pylos. Two life-size female figures were reconstructed on paper from more than a hundred joining and non-joining fragments (Fig. 7).[16] These pieces present parts of their faces, breasts, arms, hands, clothing, and feet outlined in black against a white background. Similar to some of the figures in the Theban procession, the upper bodies of the Pylos women are rendered in an almost frontal view while the rest of their bodies are in profile. Unfortunately, only a small portion of their hair has survived. In observing the fragments, the presence of thick and curved side tresses that separate into two or more tresses is certain. None of the women's upper heads survived. Yet, fragments of another female figure found in the same plaster dump provide evidence

Figure 9: White goddess from Pylos (After Lang 1969, pl. D)

for curls on the forehead and a forehead lock.[17] The very top and the back of their hair, nevertheless, were reconstructed from the processions of Tiryns and Thebes due to the lack of finds.[18] Further evidence is needed to acquire a whole picture of the female hairstyle in Pylos.

Among the three sites considered in this article, the Theban procession is dated the earliest while the Tiryns procession is the latest.[19] Over the span of two centuries, the artistic style changed from a more naturalistic rendering to a highly stylized one. The background consisting of blue, yellow, and white horizontal zones in the Theban procession is replaced by monochromatic backgrounds in the latter processions. The variety and elaboration of the jewelry, the patterns on clothing, and the objects carried in the Theban procession have decreased in the Pylos procession. Until the Tiryns procession, the figures are shown with exaggerated profiles and stylized poses. Despite the different artistic renderings, the hairstyles of the figures

appear to remain the same. Forehead locks, curls, buns, and tresses seem to be essential parts of proper hairstyles for Mycenaean processions.

The forehead lock in particular deserves special attention. Like the Mykenaia, all of the other female figures discussed above have forehead locks, even though they appear to depict mature women. The association of locks with youth in the Minoan society, then, cannot be the case in Mycenaean society. Other than being female, the figures are all participating in some kind of ritual activity. By examining figures of the opposite sex and outside ritual contexts, the possible significance of the forehead lock can be observed. Pylos has the largest repertoire of male figures and the only male procession in Mycenaean wall paintings. Most male figures appear in hunting and fighting scenes, where none of the figures, wearing a helmet or not, have a forehead lock.[20] Fragments from the male procession scene are badly burned, which makes the details difficult to see.[21] Yet, fragments of a male bull-leaper show a forehead lock (Fig. 8). Since bull-leaping is a key ritual sport in the Aegean, the fragments strengthen the connection between forehead locks and ritual activities.

Headdress

The Mycenaeans, like the Minoans, decorated their hair with bands and jewelry as shown by the female figures from the Mycenaean sites. Other than those ornaments, what seems more popular among the Mycenaeans than the Minoans are crown-like hats, which are tight around the forehead and wide at top, often with tassels. The White Goddess from Pylos wears a hat of this kind (Fig. 9). Three parts make up the hat. The lowest part is a wide band with alternating red and yellow vertical double-S curves on white. Above it is another band with red and white horizontal lines, decorated with patterns

Figure 10: Priest-King from Knossos (After Evans 1921-1935, II, pl. XIV)

in blue. The upper and main part of the hat is of the color saffron-yellow with red vertical curved lines. In the reconstructed drawing, it has a flat top with a slight knob in the center.[22] Whether there is anything attaching to the top is uncertain. It covers most of the goddess' hair, but the forehead lock can still be recognized. A hat of similar shape is seen on the female figure holding sheaths of grain from the Cult Center at Mycenae.[23] The red and blue hat is plumed at the top. Examples are not limited to wall paintings. Signet rings from the sites of Mycenae and Tiryns depict sphinxes and goddesses wearing such hats, sometimes with tassels attaching to the top.[24] Painted on a clay larnax found from a chamber tomb of Tanagra are mourning women that wear similar hats with tassels.[25]

Depictions of such hats extend to outside the Greek mainland, specifically from sites of the Late Minoan period, when there was a Mycenaean presence on Crete. One example, although male, is the crown of the Priest-King from Knossos (Fig. 10), which has decoration around its fringe and a conventionalized lily rising from above, to which are attached long plumes.[26] Similar hats are also worn by female figures on the Hagia Triada sarcophagus.[27] The female carrying two buckets wears a hat of similar shape, except that it continues down to her neck. Three strings attached to the top of the hat fall down over her waist. Another female figure in the bull-sacrificing scene on the other side of the sarcophagus wears an almost identical hat. Since such a crown-like hat is not known from earlier Minoan sites, it is most certainly a Mycenaean feature.

Ritual Significance

It is widely attested in cultures around the world that specific costumes are worn during ritual activities and events. It is likely that hairstyles and headdresses would have served the same purpose. By observing the Mycenaean frescoes, some conclusions can be made. First, the use of jewelry and headdress, which is more prevalent in Mycenaean society than in Minoan society, would have expressed more than aesthetic value. The crown-like hat, in particular, is significant in Mycenaean religion. Based on the frescoes uncovered so far, this type of hat never appears in fighting or hunting scenes but only in ritual contexts. Whether they are humans, divine figures, or mythological animals, they are all engaged in some kind of activity that carries religious connotation. The crown-like hats are thus very likely to hold ritual significance.

Second, certain hairstyles would have been more appropriate than others for ritual activities. Despite the fact that the artistic

renderings vary widely among frescoes excavated from different Mycenaean sites, common features can be observed on the hairstyles of female processional figures. Locks, tresses, buns, and curls all appear simultaneously on the same figure, which is definitely more elaborate than the Minoan hairstyles, where they usually have a lock, a bun, or some curls. Such an elaborate hairstyle could have been the hairstyle for Mycenaean processions. The forehead lock, in particular, might have become more associated with religion in the Mycenaean society, rather than representing youth as it is in the Minoan society.

Due to the disappointing amount of surviving frescoes and some variable factors, such as the size of the frescoes or the preservation of the colors, it is not easy to reach definitive conclusions. While more evidence is needed, the relationship between hairstyle and ritual activities in the Mycenaean society cannot be overlooked. Besides exhibiting aesthetic value, certain hairstyles represent an individual's status or position within the society. Further examination of hairstyles holds great promise for shedding more light on Mycenaean culture and society in the future.

Endnotes:

1 Thera shows strong Cretan influence in many aspects, including wall paintings (Immerwahr 1990, 4), architecture (Rehak 2004, 86-87), and pottery (Rehak 2004, 94).
2 Davis 1986, 399.
3 Marinatos 1974, 6: 47; Davis 1986, 399. An entirely shaved head with the skin painted blue or very short-cut and blue-dyed hair have also been suggested as possible interpretations of the color blue (Laffineur 2000, 898).
4 Davis 1986, 399.
5 While Davis (1986, 399-401) placed the Fisher Boys from the West House in the first stage of youth and the Boxing Boys from House Beta the second, Koehl (1986, 101) argued the other way round based on the more developed biceps and shoulders of the Fisher Boys.
6 Evidence of Minoan children with shaved heads, and sometimes with locks, is represented in a number of sculptures, which include the bronze child from the Psychro Cave (Hood 1978, fig.98) and the terracotta heads from Mt. Juktas (Hiller 1977, pl. 18d, e). For more examples, see Davis 1986, 404, n. 31. The tradition might have derived from Egypt, where youths wore the Horus locks held special religious positions. (Lurker 1980, 56-7; Koehl 1986, 101).
7 Davis 1986, 401, 404.
8 Rehak (2004, 92), on the other hand, argued that the blue marks in the eyes indicate a saffron-rich diet, which includes high concentrations of vitamins A and B.
9 Davis 1986, 402.
10 For other examples, see Doumas 1992, 154 and 160.
11 Mylonas 1970, 123.
12 Another example of hair that comes down the wrong side of the figure is the white-skinned acrobat in the Toreador Fresco from Knossos (Evans 1930, 3: pl. XXI). Confusing left and right is not uncommon in Aegean art. For a discussion of hands and feet, see Immerwahr 2005.
13 Davis 1986, 401.
14 Immerwahr 1990, 114. See Rodenwaldt (1912, 81, 82, IX) for images of fragments.
15 The fragments were studied and reconstructed by Reusch (Reusch 1956, pl. 15; Immerwahr 1990, 115).
16 Lang 1969, 86.
17 See Lang 1969, plate 128: 52 H nws, for the fragments.
18 Lang 1969, 89.
19 Thebes, dated to the LH II period, has the earliest example of the mainland procession (Rodenwaldt 1912, 201; Immerwahr 1990, 115). Pylos is dated to the LH IIIB period (Blegen 1966, 421). Destroyed at the end of the palace era,

the Tiryns procession is dated among the latest examples (Immerwahr 1990, 114).

20 See Lang 1969, plates M, N, for examples.
21 In Lang's reconstruction, the two male figures, whose head was preserved, have no forehead locks (Lang 1969, plate N: 5H5).
22 Lang 1969, plate 128: 49.
23 Mylonas 1983, 144.
24 See Mylonas 1983, 193 and 211, for examples.
25 Mylonas 1983, 186.
26 Evans 1928, II, 775.
27 See Long 1974, pl. 15 and 31, for images.

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Interview with Dr. James Osborne, 2011-2012 IEMA Postdoctoral Fellow

Darren Poltorak

Dr. James F. Osborne is currently the Postdoctoral Fellow at the Institute for European and Mediterranean Archaeology at the University of Buffalo, SUNY. He received a Bachelor's of Arts with honors in Ancient Near Eastern Studies from the University of Toronto. James attended Harvard University for his graduate work, earning a Master's of Arts and Doctor of Philosophy in Archaeology of the Levant, with the latter being awarded with distinction. He has recently been awarded the Andrew W. Mellon Postdoctoral Fellowship in the Humanities at Johns Hopkins University. Drawing from multiple disciplines, such as Geographical Information System and built environment studies, Dr. Osborne explores issues of territoriality and politics in Iron Age Turkey.

What are your current research interests and goals, and what projects are you currently working on?

In the broadest sense, my research focuses on the archaeology and history of the Bronze and Iron Ages of the ancient Near East, but of course I have specialties within that. Culturally and chronologically, I work in the Iron Age (which, in the Near East, is roughly 1200-600 BCE) and do most of my writing and field work on the Syro-Hittite culture, a patchwork of a dozen or so city-states that surrounded the northeast corner of the Mediterranean Sea at that time. I entered the Near East thinking I would become an archaeologist of ancient Israel, and the archaeological record of Israel and the Hebrew Bible will always be interesting to me. Methodologically, I am most interested in studying the relationship of the built environment and political authority, which I try to do both through the quantitative methods of spatial analysis and through qualitative interpretation of the historical and visual records.

My primary field project is the Tayinat Archaeological Project, directed by Timothy Harrison of the University of Toronto. Tayinat is a large Bronze and Iron Age site in the Amuq Valley, right at the northeast corner of the Mediterranean, and was the capital city of the region. At the moment I am starting plans to excavate a small rural site to complement our understanding of life from the capital. This summer I'm also joining in a Harvard-based survey in northern Iraq in the heartland of the Assyrian Empire. I'm hoping these two projects might lead to a cross-regional study of cultural and political interaction between empire (northern Iraq) and province (southern Turkey) during the Iron Age, which is a very exciting prospect.

While at the Institute for European and Mediterranean Archaeology here at the University at Buffalo, my primary research

project is organizing, and subsequently publishing, an international symposium. The title of this year's conference is "Approaching Monumentality in the Archaeological Record," May 12-13, and has scholars participating in the fields of anthropology, classics, history, and art history. It promises to be an exciting event.

Looking at your research interests, I can see you are pulling from several different disciplines. What drew you to this approach?

The ancient Near East during the Bronze and Iron Ages is very much a historical time and place, with many hundreds of thousands of inscriptions of all types, from royal proclamations to receipts of individual economic transactions. At the same time, the art historical record is equally rich. It has always seemed to me that needing to incorporate history, art history, and archaeology is the commonsense approach. Not all archaeologists are fortunate enough to work in a time and place where these types of sources exist, and of course, many archaeologists undertake research in historical periods that does not necessarily require historical documentations—archaeometry, for instance. But when one's subject matter is so strongly "cultural" in nature, as my research into political authority clearly is, then it strikes me that incorporating texts and iconography is not only helpful, but intellectually obligatory.

Whose work did you find the most inspiring for your own?

There have been a number of people who have inspired my research. Foremost among these is art historian Irene Winter, who is also a specialist in the Syro-Hittite culture (among other things), and who always taught me that, in a sense, there are no disciplinary divisions between art history, archaeology, and history—just a research question that can be addressed

from any combination of approaches. My thesis advisor, Larry Stager, treats the past—in his case, ancient Israel—in much the same way, as does Timothy Harrison, who most encouraged me to pursue archaeology as a career. In anthropology, I always find myself coming back to the comparative urbanism research of Aztec specialist Michael Smith. As for social theory, I tend to cite most those scholars responsible for the so-called "spatial turn" in the humanities and social sciences—Foucault, de Certeau, Lefebvre, and, in geography and archaeology, Edward Soja and Adam T. Smith.

What drew you to the topic of "monumentality"? How are you applying interdisciplinary approaches to this topic?

The first time I thought about monumentality as a concept was when I read Michael Smith's article "Form and Meaning in the Earliest Cities: A New Approach to Urban Planning" (2007), where he talks about five criteria archaeologists can use to assess the presence of urban planning; one of these criteria is monumentality. It intrigued me, and so I looked up it in literature elsewhere, and found that the term is used different ways—often, extremely different ways—depending on the disciplinary tradition of the researcher. Archaeologists, art historians, and architects are the people who discuss monumentality explicitly the most frequently, and so I decided that a conference bringing together scholars from these fields would be a good start to assess the interdisciplinary potential that the concept of monumentality provides. As the students in my class on the topic are discovering (I hope!), there is a lot in common between these three fields, and the places where they diverge reveals a lot about the disciplines' intellectual priorities.

What have been the most rewarding aspects of the IEMA Postdoctoral

Fellow position? What have been the most challenging?

By far the best aspect of my position at IEMA is its interdisciplinary character. Although primarily based in anthropology, I spend time every week in the Classics department, where I talk to the professors and graduate students there and learn about their research and interests. From these conversations I've learned a lot about the classical world that is largely terra incognita to me. I also appreciated not having to teach in the fall semester; as much as I love being in the classroom, that time gave me the opportunity to start converting my dissertation chapters into publishable articles, which is critically important for junior scholars like me. The challenges I've experienced pertain mostly to the conference itself, and managing the schedules and special requests of twenty prominent scholars, as well as corralling and stream-lining their intellectual contributions to the symposium. It has definitely been a lesson into the world of event planning.

In your opinion, what are some of the most successful interdisciplinary research projects in archaeology, and what about them in particular yielded positive results?

These days it seems like every archaeological project calls itself "interdisciplinary," and since archaeology has always been a jack-of-all-trades type of profession, it does seem a fair descriptor for almost all field projects today. That said, I think the work done at Çatal Höyük, directed by Ian Hodder, and including a major UB excavation on the site's West Mound directed by the director of IEMA, Peter Biehl, deserves a lot of credit for incorporating the research of scholars with vastly different methodological and theoretical approaches. I think that particular project has been successful in its interdisciplinarity because of its constant
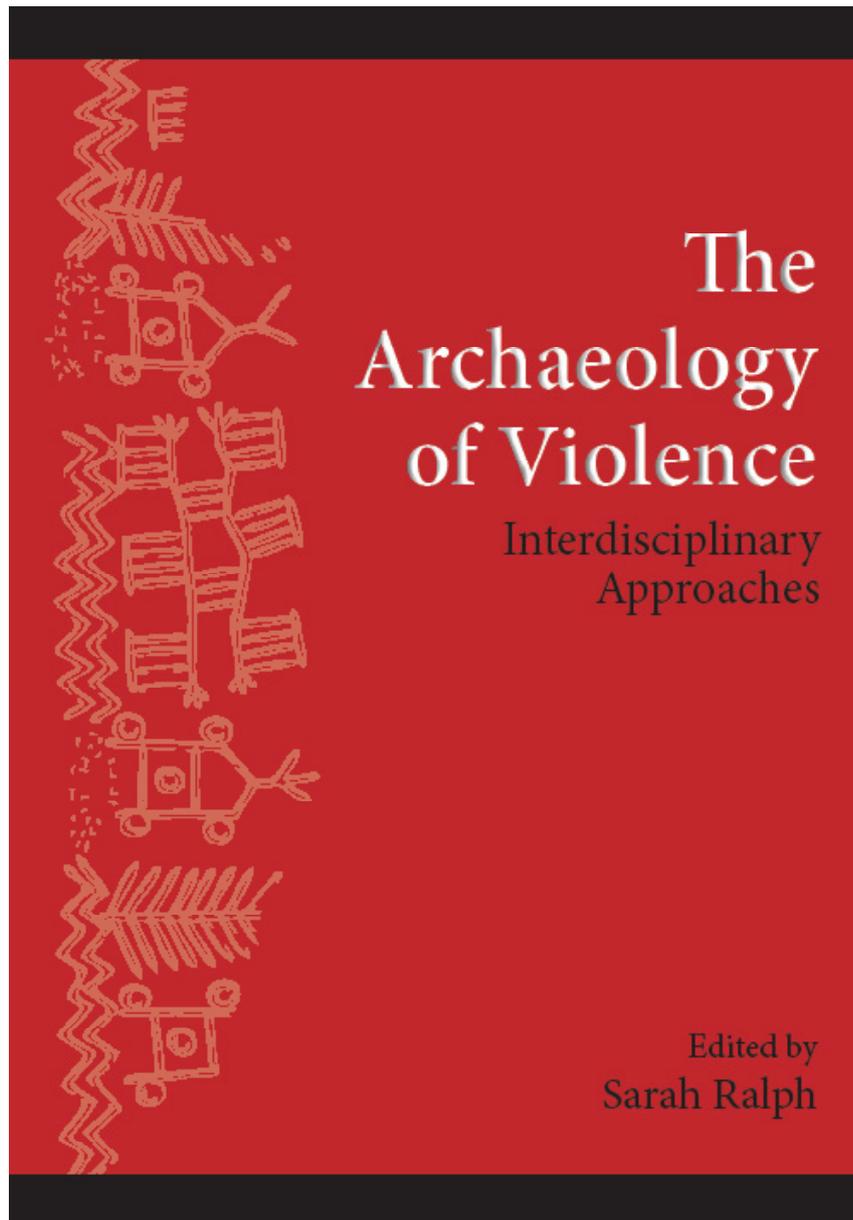
willingness to be open-minded and to entertain research proposals from scholars, both established and junior, no matter how experimental the project.

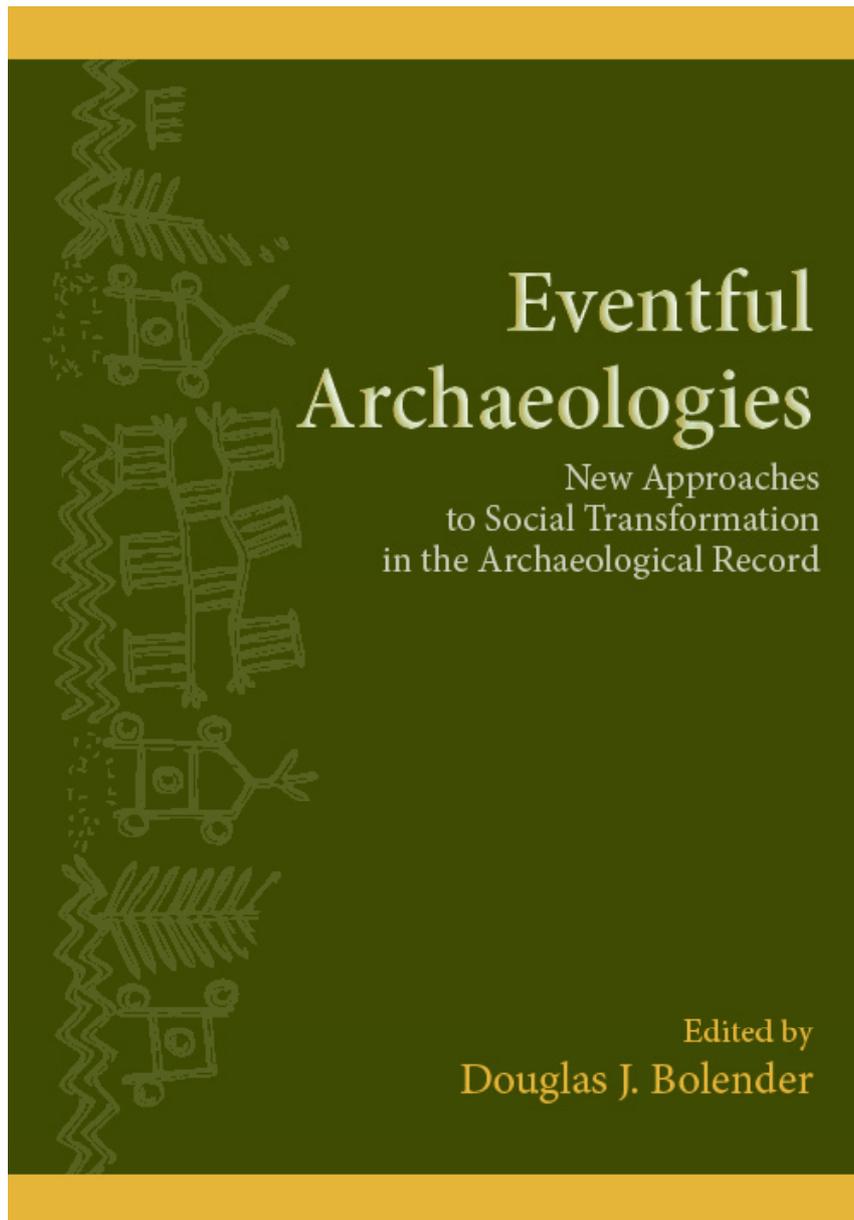**Do you have any advice for graduate students?**

They say "a good dissertation is a done dissertation," and although that is obviously true on one level, I prefer to encourage graduate students to think that "a good dissertation is a good dissertation." Grad students build up a reputation among professional scholars over the years as they conduct and write-up their results, present at conference, and so on, and this reputation will prove critical as they enter the job market. Furthermore, the better the dissertation is, the easier it will be to convert into publications after graduation.

A second piece of advice I would give is that it is important, if at all possible, to have a publication record begun by the time you graduate with your Ph.D. Although it is very difficult to publish and write one's dissertation at the same time, having a peer reviewed article on one's CV demonstrates to search committees that the anonymous intellectual community at large—and not just your dissertation committee—respects your work. If it can be on a topic separate from one's dissertation, all the better, since it highlights your diverse interests. I encourage graduate students to pick a seminar paper they found particularly interesting to research, and the one they were most proud of writing, and try as hard as possible to convert that seminar paper into a manuscript to be submitted to a peer reviewed journal. If it gets rejected, resubmit it somewhere else. That article will immediately place you in a different league from other junior scholars who have yet to publish.

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