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Silver rhyton with gold inlay from the 15th-13th century B.C.E. (Hittite Empire-Old Hittite Period)
from central Anatolia.

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Chronika, Volume III

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Editor's Introduction

Each year, *Chronika* brings together a collection of articles from graduate students at the University at Buffalo, and outside institutions across the United States and the globe. Volume Three includes an exceptional selection of peer-reviewed articles, which employ innovative theoretical and methodological approaches to advance our knowledge of European and Mediterranean archaeology. In addition, Volume Three includes expanded book review and conference report sections, and concludes with a lively interview about the future of interdisciplinary research with Dr. Will Meyer, the 2012-2013 IEMA postdoctoral fellow.

Key themes in Volume Three include identity, gender, migration, and heritage. Jacob Brady explores the relationship between ground stone and identity at Çatalhöyük, Turkey; Matthew Dysart demonstrates how faunal analysis adds to our understanding of ritual feasting in Minoan Crete; and Heidi Senn offers a reconceptualization of Greek warrior identity, based on her analysis of funerary remains from a period of political and economic turmoil in Late Mycenaean Achia. David Witt and Morgan Lemmer-Webber explore questions regarding Roman Identity. Mr. Witt examines examines how the concept of “creolization” can be used to model the relationship between the Roman Empire and *Divodorum* in Gaul, and Ms. Lemmer-Webber investigates questions of identity and heritage management in her analysis of two Roman stucco reliefs on display at the Art Institute of Chicago.

A number of articles in Volume Three employ archaeometric methods to answer cultural questions. Guinevere Granite and Andrea Bauerochse use Portable XRF in their analysis of Peiting Woman, a bog body from Bavaria, Germany. Eugen Ruzi's LA-ICP-MS analysis reveals a distinction between pottery composition and culture at two neighboring sites in Neolithic Albania, and Thomas Harper explores the population dynamics of the fascinating, yet short-lived, Cucuteni-Tripolye culture in Neolithic Ukraine, using a combination of calibrated ¹⁴C dates, climactic proxies, and settlement analysis. Together, these articles constitute significant, interdisciplinary contributions to the study of European and Mediterranean archaeology.

A central goal of *Chronika* is to expand our readership and audience, and this year we made progress toward achieving that goal by partnering with the Directory of Open Access Journals (www.doaj.org). The DOAJ promotes the advancement of scholarship by making all journal content freely accessible and searchable online. *Chronika* is committed to staying abreast of advances in library science and information technology, in order to reinforce our position at the forefront of graduate student research in the archaeology of Europe and the Mediterranean world.

Laura Harrison

Editor in Chief

Investigating Compositional Variability among Early Neolithic Ceramics from Korça Region, Albania

Eugen Ruzi

In this study, Laser-Ablation ICP-MS and other archaeometric methods shed light on the technological and compositional variability of the ceramics from Podgori and Vashtëmi, two Early Neolithic settlements located in the Korça Plateau in Southeast Albania. The results are able to demonstrate clear differences in pottery manufacturing and raw material procurement. In addition, this study provides evidence for the location and chemical composition of the clays used by the Early Neolithic settlers of Vashtëmi. Previous research relied mostly in stylistic similarities and rough typological frequencies to conclude that Vashtëmi and Podgori belong to the same chronological sequence. The study presented here does not support this assumption. Fundamental differences in pottery quality and technology argue for a lack of association between the two settlements, even though the distance between them is less than 10 km. Future research needs to investigate whether this lack of relatedness is chronological or otherwise.

Introduction

The Korça region represents one of Southeast Europe's most important areas for the transition to farming. Its homonymic fertile plateau has been intensively occupied throughout the post-Mesolithic prehistoric periods, and it is regarded as a highly productive agricultural area today as well. The earliest Neolithic sites in Albania are found in this region. It has been argued previously that the early farmers preferentially settled in wetland environments, in areas not occupied by local hunter-gatherers.¹ This is a requirement that this region fulfills very well, as the earliest Neolithic sites in Albania are found here, with the Mesolithic being completely absent.

Due to the lack of resources and a deprivation of international academic cooperation, the Albanian archaeology of the late 20th century never moved beyond mere descriptive accounts and traditional stylistic comparisons. This study attempts to bring another dimension to the archaeological interpretations: the archaeometric investigation of ceramics and their technologies.

In Albanian prehistory, the Early Neolithic has an early phase represented by material culture from two sites in the Korça region – Vashtëmi and Podgori (Fig. 1). An important characteristic of this phase is the overwhelming abundance of monochrome pottery (mainly red-monochrome but also black/grey-monochrome), followed later by painted pottery and impressed pottery.

In a general macroscopic overview, the pottery assemblages from Podgori and Vashtëmi appear similar. For example, the frequencies of the ceramic types and the decorative styles are almost the same. Some visible differences are noted especially in the quality of the white-on-red pottery, where the white paint is smoother and

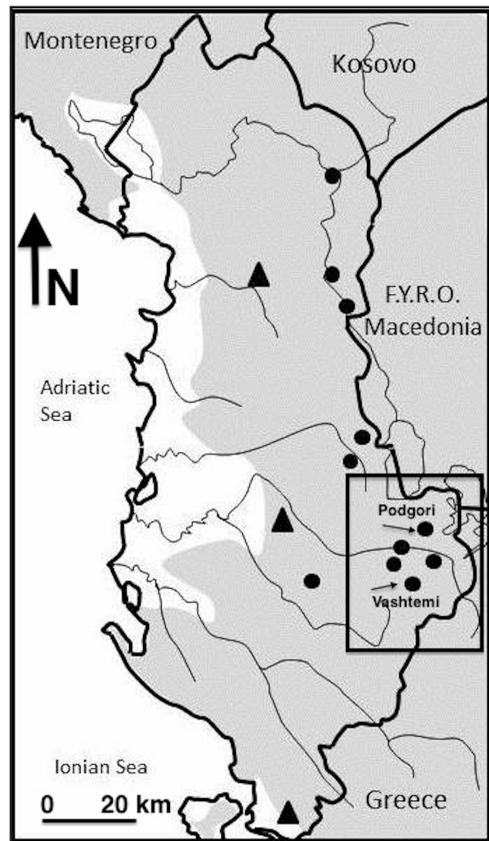


Figure 1: Map of Early Neolithic sites in Albania. Circles represent open-air sites; triangles represent cave sites. The rectangle in the SE, which is enlarged in Figure 2, is the focus of this study.

better-attached to the body of the pot in the Podgori ceramics than in Vashtëmi.² There is a need, therefore, to understand if such similarities and differences are indicative aspects of the relationship, or lack thereof, between the two settlements. I intend to explore this relationship by investigating the technological aspects of pottery production at both sites, through archaeometric techniques.

I propose to resolve a few issues that have not been determined by previous methods of stylistic comparison. An archaeometric analysis of the monochrome pottery of Vashtëmi and Podgori will determine

the following: (1) the internal variation of monochrome clay composition within each site; (2) the differences in clay compositional variability between the two sites; and (3) the geological distribution of clay sources. The goal is to provide empirical data to make more accurate inferences on the settlement history of the region. The attainment of such information will permit prospective researchers to test hypotheses on the general processes of the Mesolithic-Neolithic transition.

I will be investigating the composition of the pottery clays through an elemental characterization instrument, in this case Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS), and I will detect the presence or absence of calcareous materials through the use of an HCl acid test. The LA-ICP-MS data will be analyzed through multivariate statistical methods such as cluster analysis and principal component analysis, which will provide compositional groups and will test for clay sources. In addition, a visual inspection of pottery characteristics will reveal if there are qualitative differences in monochrome pottery technology between the two settlements.

Background

The Korça region consists of a large plateau located in the mountainous eastern part of the country, along the western shores of the lakes Ohrid, Prespa e Madhe and Prespa e Vogël, which are shared with the Republic of Macedonia and Greece. The geological composition of the surrounding mountains is diverse as well. The hills on the western part of the plateau are composed of molasse outcrops, while having serpentine boulders in the southwestern corner.³ The southeast is dominated by higher elevations consisting of limestone, which serves as the bedrock of the three large lakes mentioned above. The southeast has a mixture of Neogene molasse and sporadic ophiolite outcrops.⁴

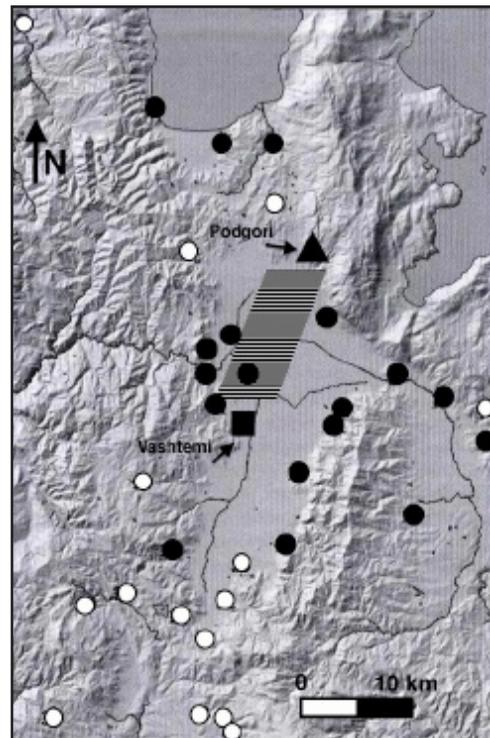


Figure 2: A distribution of pre and proto-historic sites in the Korça Region (after Aliu, 2006). Black circles are Neolithic and Chalcolithic sites, while white circles are Bronze and Iron Age sites. The striped parallelogram defines an approximated extent of the now drained, shallow Lake Maliq. Podgori and Vashtëmi are respectively located on the northeastern and southwestern corners of this lake.

Early Neolithic in the Korça Region

The Korça region represents the most intensely occupied area in Albania, especially during the Neolithic, Copper and Bronze Ages (Fig. 2).⁵ Its archaeological investigation began in the sixties and the seventies, by Albanian archaeologists such as Frano Prendi, Muzafer Korkuti, Aleksandra Mano, etc.⁶ The Neolithization of the territories within the contemporary borders of modern Albania is closely related to the first farming communities of Thessaly and Macedonia in Greece. This is not surprising, as geographical proximity played a major role in this process.

There are five Early Neolithic sites from this region: Vashtëmi, Podgori, Barç, Tren and Sovjan. The first two contain material that indicate a very early phase for this period, and will be the focus of this study. The chronological relationship between Vashtëmi and Podgori has never been clarified by their investigators. In fact, in some of their publications Vashtëmi is considered as a forerunner of Podgori.⁷ Yet, in others, Podgori becomes the earliest date for agriculture in Albania, making Vashtëmi its antecessor.⁸ The main features of each settlement and their respective pottery characteristics will be summarized in the following two sections.

Vashtëmi

Vashtëmi is located on the western edge of the Korça plateau and in the extreme south of Lake Maliq (Fig. 2). Adjacent to the west, there is a range of hills that contains sources of natural spring water which are still used today for irrigation by the local farmers. The Dunavec River runs in a south-to-north direction just a few hundred meters to the east, before draining into the much larger Devoll River only 2-3 km further north.

A short test excavation was conducted in 1973, following the discovery of the site by local farmers. Systematic excavation began in 1974, under the direction of Muzafer Korkuti, where an area of 225 m² was exposed Korkuti 1982.⁹ It bears no signs of a long-lived settlement, although the stratigraphy revealed three consecutive occupational phases. This is attested by its material culture as well, which belongs exclusively to the Early Neolithic period. The entire cultural stratum reaches a maximal thickness of 150 cm.

The most abundant ceramic type is red monochrome, which comprises almost 80% of all the collected ceramic sherds by Korkuti's team.¹⁰ The painted ceramics are

the second most frequent decorative style, exhibited in two different types: white color on a red background and red color in white background. Impressed pottery was the next category of decorations, but was found in smaller amounts than the previous ones. Other types of decorations, such as Barbotine, incisions, and plastic additions are rarer and appear in the later stages of the settlement's life.

The overwhelming ceramic type – the monochrome – comes in a variety of colors as well. Korkuti divided it arbitrarily into two main categories, a red monochrome and a grey/black monochrome.¹¹ For most ceramics included in the red monochrome category, the surface exhibits a light red color. Other surface colors included in this category are brown, reddish brown, and, in smaller amounts, light brown. The second category, the grey/black monochrome, is found more often in the upper strata of the stratigraphy.

Podgori

Podgori is an open-air settlement, located in the northeastern extremity of the Korça Plateau and the southwestern slope Maliq i Thatë. The settlement is situated not far from the modern village of the same name, at an elevation of 800 meters above sea level. It was inhabited from the Early Neolithic to the Bronze Age, but the use during the Early Neolithic is far more extensive than other periods.¹² It has a surface of approximately one hectare, and the Early Neolithic stratum reaches 3.2 meters in thickness. Systematic excavations were carried out in 1982, directed by Frano Prendi and Zhaneta Andrea. Since then, Podgori is considered as one of the biggest and most important Early Neolithic sites in Albania.¹³

As mentioned above, Podgori represents together with Vashtëmi the earliest Neolithic settlement in the plain of Korça

and the earliest in Albania so far. The thick Early Neolithic layer represents seven occupational horizons, divided into three levels of development: Podgori Ia, Ib, and Ic. Podgori Ia has an abundance of very good quality Red Monochrome and White-on-Red pottery. Moreover, there are some types that are quite exquisite in their aesthetic beauty, such as the Red-on-White and Polychrome.¹⁴ Impressed wares are found here as well, belonging to the two types also observed at Vashtëmi: the Adriatic Impressed and the local Devollite Impressed, with the former usually executed through fingernail impressions.¹⁵

There are some marked differences between Podgori and Vashtëmi, especially in the quantities of ritual objects and the abundance of raw material for lithic tools.¹⁶ Yet, the Albanian archaeologists argue that the two sites belong to the same cultural sub-group and chronological phase due to the fact that pottery decorations and the respective typological frequencies are the same.¹⁷ There are a few characteristics that are admitted as differences in pottery making between the two sites: (1) the monochrome pottery from Podgori is aesthetically of a better quality than in Vashtëmi; (2) the white paint is attached more firmly in the vessels in the Podgori samples, hinting to a better quality; and (3) in Podgori there is a polychrome variety of exquisite aesthetic quality, not found anywhere else in the Balkans during the same period.

Methods

In order to compare the ceramic technology between the two settlements, two different, but complementary, analytical techniques were employed. The analysis began with a simple HCl acid test, which is used to reveal the presence or absence of calcareous components in each ceramic sample. It is a simple method to understand if the clays or non-plastic inclusions come

from different geologic compositions. LA-ICP-MS is used to further separate the samples into different compositional groups and to compare them with the five clay sources collected during the 2010 SANAP (Southern Albanian Neolithic Archaeological Project) excavation season.

One hundred fifty eight ceramic sherds were drawn from excavated layers on both sites. 104 sherds came from the 2010-2011 SANAP excavations in Vashtëmi. The selection procedure was geared to satisfy one main criterion – the detection of the widest range of compositional variation.

The 54 remaining sherds came from the 1982 excavation in Podgori and were chosen by Dr. Ilir Gjipali, the co-director of SANAP. Since Podgori contains material culture that extends beyond the Early Neolithic period and has multiple phases of habitation, we collected samples from the earliest strata only. This sample choice would allow us to make a better comparison with ceramic sherds from Vashtëmi.

During the 2010 SANAP excavation season, a total of five clay samples (500, 501, 502, 503, and F12k) were collected from sources around Vashtëmi, with the purpose of comparing their composition with our ceramic sherds. The clay is not used anymore for pottery making in the villages around Vashtëmi, but in some areas is still used as a building material (this information was obtained by the local construction companies).

HCl Acid Test

The hydrochloric acid test is used to detect calcareous materials within the clay-temper matrix. Calcite-based minerals have been used frequently in ceramic technology to achieve desirable vessel properties. In Early Neolithic pottery, limestone temper has been used to improve the adhesive aspect of the vessel wall in paint application.¹⁸ Of

the two most frequently used temper types in Early Neolithic (calcite and sand), only the calcite reacts with the HCl acid. The formula of this reaction is:



As a result of this reaction, the carbon dioxide (CO₂) and water (H₂O) exit the vessel as bubbles, and are visible by microscope or with the naked eye. Sample preparation involves the cutting of a piece of the sherd (the same to be used for LA-ICP-MS analysis) and applying a 10% HCl acid dilution on the freshly-exposed section. If the entire surface of the section is bubbling, then the clay comes from a calcareous parent rock. If we see bubbling only in the inclusions outside the clay matrix, then we are dealing with the use of limestone temper. If there are no bubbles, or only a few of the visible inclusions are reacting, then there are no calcareous minerals in the sample.

Laser Ablation ICP-MS

LA-ICP-MS is a minimally-destructive technique that exhibits high levels of accuracy, precision and sensitivity. The strength of LA-ICP-MS rests on the capability of the technique to do spot analysis on spatially segregated components from solid materials.¹⁹ This capability allows for measuring only the elemental concentration of the clay matrix, by avoiding the temper particles and other non-clay inclusions. Consequently, by providing only the clay elemental concentrations, it allows for direct comparison with clay sources. As a result, this technique will tell us about (1) the location of the clay sources; and (2) the number of the types of clays used by the early farmers.

During the LA-ICP-MS analysis, a small laser beam removes about 5µm of material with every pass. Then, the ablated material is transported in the form of micro-

particles through an argon flow into the plasma torch of the ICP-MS, which serves to ionize the atoms. In traditional LA-ICP-MS instruments, a group of cones pull out the ions into the mass spectrometer, which then counts the quantities of atoms according to mass and charge.²⁰

Analysis and Results

A group of statistical analyses were used to make sense of the large multivariate data from the ICP-MS, as introduced by Neff²¹ and his colleagues.²² The entire data matrix contained 162 cases (samples) and 48 variables (element concentrations). To explore grouping tendencies within each assemblage, three statistical plotting techniques were used: (1) hierarchical cluster analysis dendrograms, (2) bivariate plots, and (3) principal components plots.

Macroscopic Overview of the Samples

The investigation of visible characteristics used for the cataloguing of the samples brought to light some significant differences between the two assemblages. First of all, it was very hard to pigeon-hole the surface colors into red and greyish black, the two main categories presented by Korkuti.²³ Ceramics from both sites came in a variety of colors, such as brown, light brown, orange, buff, etc. All these surface colors were encountered in both assemblages and no significant difference was detected in the frequencies of each color.

The most striking observation comes from the surface treatment. 55% of the Vashtëmi sherds had plain surfaces with no smoothness, no sheen, and no slip. From the Podgori assemblage, there were no sherds that fitted this description. A smooth surface with no sheen was catalogued as “burnished” (BU) in the inventory. 42% of the entire Vashtëmi sherds belonged to this category, whereas, again no sherds of this type were found in Podgori. The

Principal components analyses (PCA) were run on the data to test the validity of this initial difference between the two sites. This statistical technique can be performed in both modes: R-mode, focusing on variables; and Q-mode, focusing on the cases themselves.²⁵ In Figure 3 (Q-mode), a large group containing both Podgori and Vashtëmi samples covers almost half of the graphical space, while another distinct group consisting of only Vashtëmi samples is clustered in the top-right corner of the graph. To see which elements were responsible for this variation, an R-mode PCA was performed on the data. The results (Fig. 4) indicate for a stronger presence of rare-earth elements (REE) in the Vashtëmi samples. Other compositional components contributing to the separation of the groups are the elements iron, magnesium, silicon, and aluminum.

to explore further the data (Fig. 5 and 6). Again, the compositional variability within the Vashtëmi assemblage is much higher, as the samples are plotted all over the place in the graph. In contrast, samples from Podgori display more compositional cohesion. After these initial analyses, the conclusion is apparent: there is little variation in the chemical composition of the Podgori ceramics, while the opposite is true for Vashtëmi.

Compositional groups within the Vashtëmi assemblage

All the sherds from Vashtëmi were analyzed together to determine compositional groups within the site. Initially, the raw data were explored through hierarchical cluster analysis.

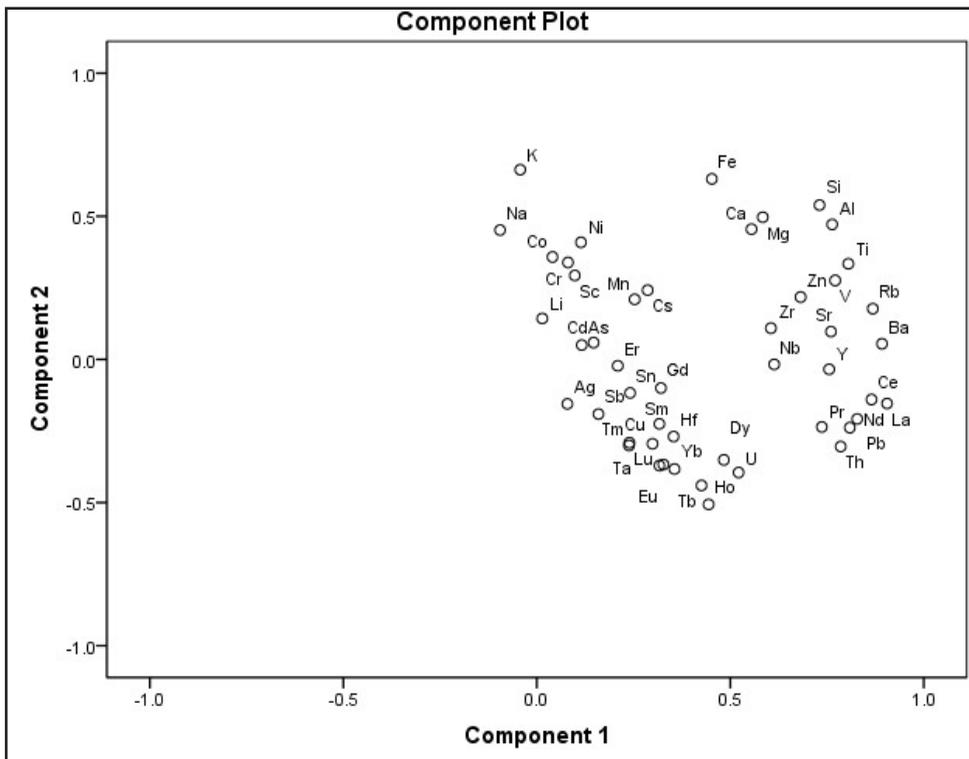


Figure 4: R-Mode Principal Components plot.

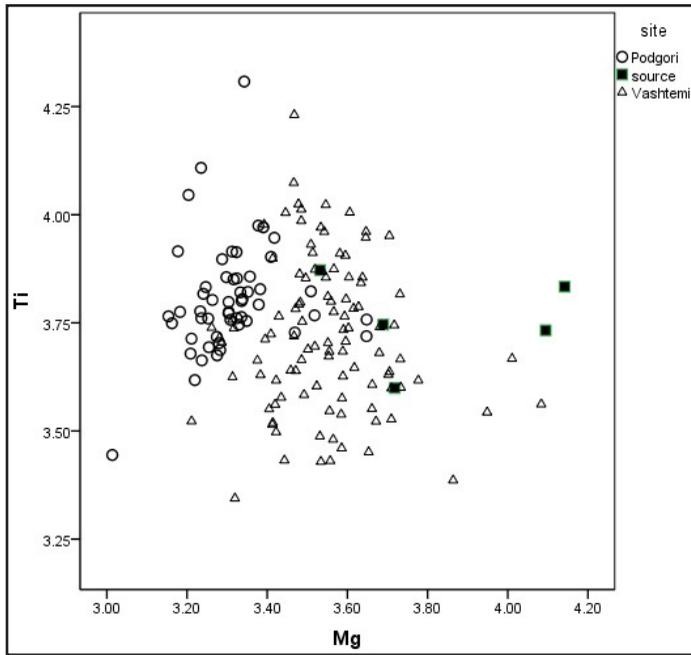


Figure 5: A bi-plot of the pooled variance of magnesium (Mg) and titanium (Ti)

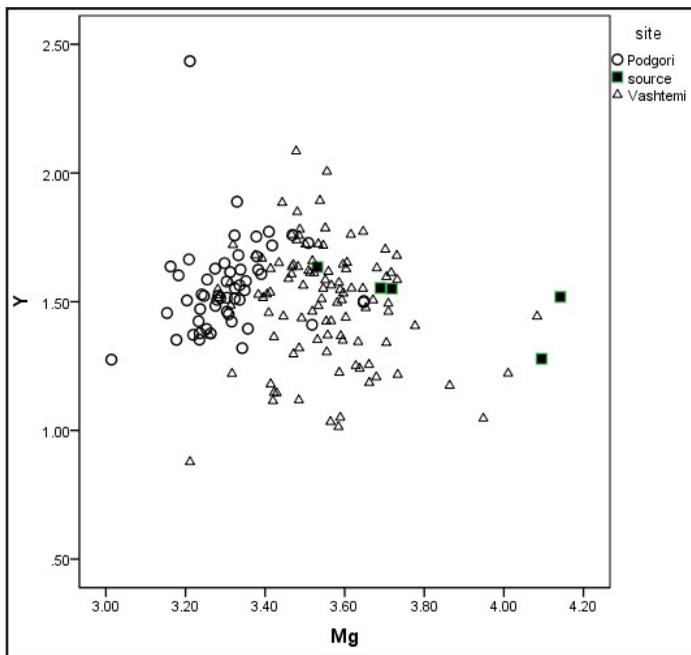


Figure 6: A bi-plot of the pooled variance of magnesium (Mg) and yttrium (Y)

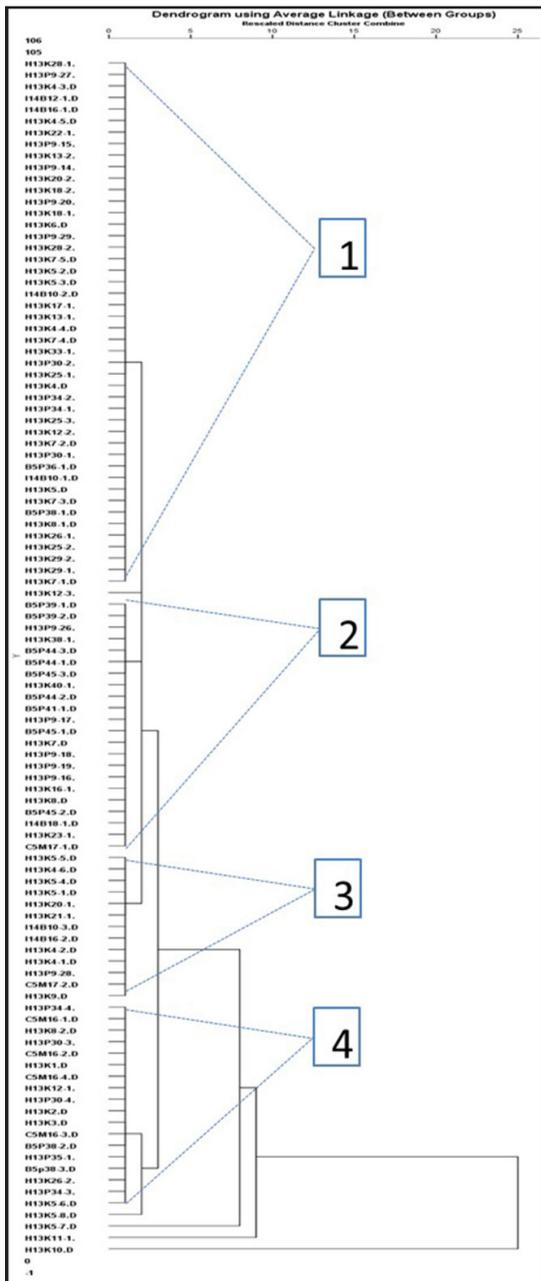


Figure 7: Cluster Analysis dendrogram of the Vashtëmi samples, indicating the existence of four major groups and a few outliers in the end (see bottom of the graph)

The samples were clustered into four subgroups (Fig. 7). The squared Euclidian distance between the subgroups 1, 2 and 3 is not very large, which could be interpreted as small variations within a single clay source. Subgroup 4, on the other hand, is separated further from these three subgroups. The presence of three outliers should be noted as well. They could be considered as “exotic” sherds, because their composition is different not only when considered within the compositional variation of Vashtëmi, but even when the Podgori samples are included.

The compositional differences between the subgroups were investigated through elemental bivariate plots. The only bivariate plot that revealed any significant difference between the subgroups was the Aluminum (Al) and Silicon (Si) (Fig. 8). The members of subgroup 4 exhibit smaller amounts of Aluminum and Silicon, especially when these two elements are combined.

Assigning clay sources to the sherds from Vashtëmi.

The data from the clay sources were merged with the data from Vashtëmi to detect if any of the clays would be compositionally similar to the sherds. This was performed only with the Vashtëmi group of data because the clay sources were collected in its surrounding areas. The analytical procedure was the same as in the analysis of the Vashtëmi data alone, except that five new cases (the 5 clay sources) were added to see in which groups would they fall.

Three clay sources, 501, 503 and F12k are positioned within the first cluster of the dendrogram (Fig. 9). The data was investigated further with bivariate plots.

Only clay sources F12k and 503 have been consistently within the main sample cluster in most of the bivariate plots, reaffirming the cluster analysis results. It could be implied that both of these clays come from the same geological foundation.

Figure 8: A bi-plot of the pooled variance of silicon (Si) and aluminum (Al), indicating that the major difference between group 4 and groups 1,2 and 3 is the smaller amounts of these two elements in group 4.

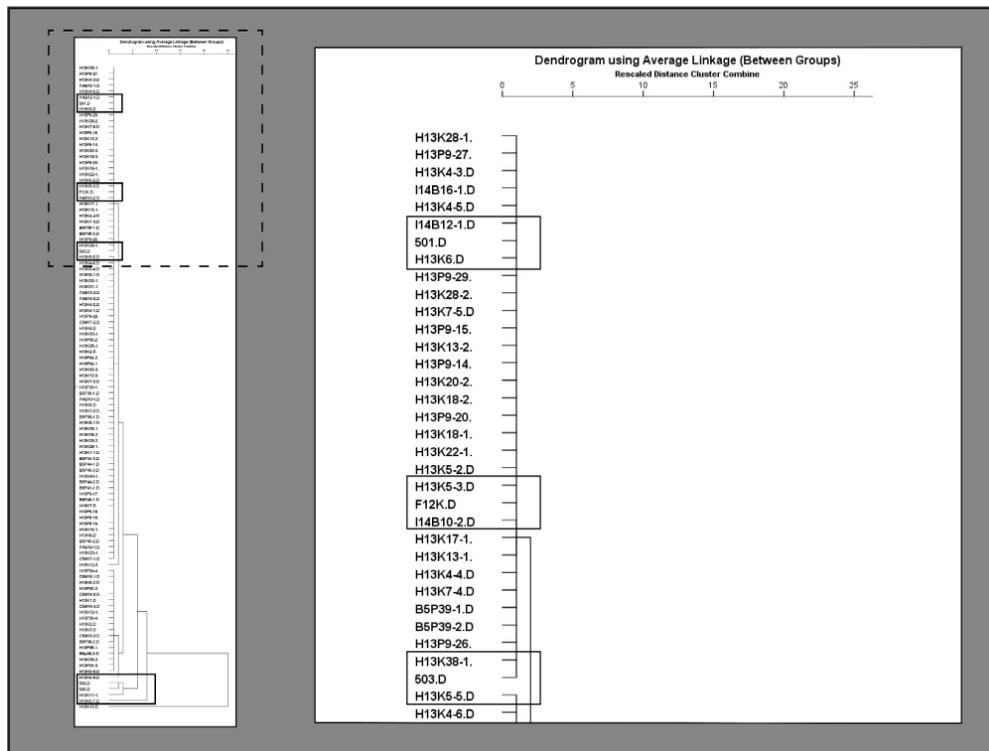
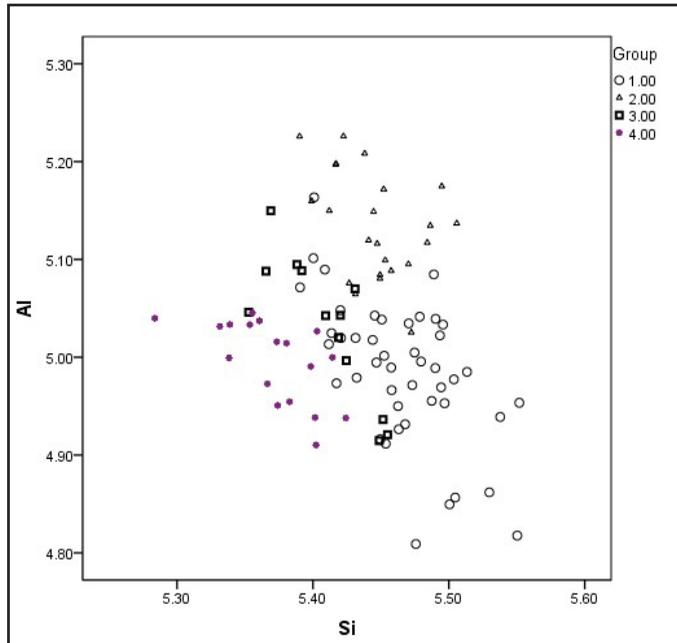


Figure 9: Cluster Analysis dendrogram of the Vashtëmi and the five sampled clay sources (500, 501, 502, 503 and F12k). Clay samples 501, 503 and F12k are located within the largest cluster of the Vashtëmi samples (the area is enlarged on the right), indicating their compositional similarity with most of the sherds from this site.

Discussion and Conclusion

The results of the LA-ICP-MS analysis demonstrate that at least two different clays were used for pottery-making at the Early Neolithic settlement of Vashtëmi. Clay of unknown chemical composition was used in the paste matrix of 'subgroup 4' ceramics. Subgroups 1, 2, and 3 are of similar enough composition to warrant their consideration as originating from the same clay source. A pooled variance of two elements, aluminum (Al) and silicon (Si) is responsible for the distinction between subgroups 1-3 and subgroup 4. There are two clay sources that display similarities with subgroups 1-3: sample 503 and sample F12k. The latter comes from a trench excavated during the 2010 SANAP season. Sample 503 was collected near the village of Maliq, about 6 km away from the site.

Ethnographic studies have revealed that in situations where transportation animals are not present, the artisans will not go further than 5-7 km to obtain clay for their craft.²⁶ Most of the clay sources are usually found at the lower end of this distance interval.²⁷ Therefore, it is reasonable to assume that sample 503 is less likely to be the clay source for the ceramics at Vashtëmi. We cannot rule out that clays 503 and F12k could be samples from the same geological population, which covers the entire southern area of the Korça Plateau and is drained exclusively by the Dunavec River.

The aesthetic characteristics of pottery are significantly different between the two sites. The quality of the monochrome pottery in Podgori is much higher. Most of the sherds in Podgori are either highly burnished or covered with a thick, shiny slip. In comparison, the majority of the monochrome sherds in Vashtëmi are plain or only slightly burnished.

In the HCl acid test, it was noticed that the Podgori sherds effervesced on their

surface, but not within the clay matrix. Therefore, the depositional environment surrounding the site is highly calcareous, but the clay used for the ceramics is not. This was not the case for Vashtëmi, where neither the environment nor the clays were calcareous. The assumption of a lack of calcareous clays in the plateau cannot be supported, because we have two such calcareous sources, clays 500 and 502. In addition, the northeastern corner of the plateau - where Podgori is located - is made entirely of limestone.

The following points summarize the concluding remarks of this study:

- there are significant differences in ceramic technology between the two sites, such as the quality of the surface treatment and the variability in clay sources;
- the Podgori artisans were choosing non-calcareous clays and were more conservative in their choices, minimizing compositional variability;
- at least two different clays were used in the production of the monochrome pottery in Vashtëmi. The source of one of the clays was found within the spatial extent of the settlement.

Previous research relied mostly on stylistic similarities and rough typological frequencies to conclude that Vashtëmi and Podgori belong to the same cultural group. The results presented here do not support this assumption. Fundamental differences in pottery quality and technology argue for a lack of association between the two settlements, even though the distance between them is less than 10 km. Future research needs to investigate whether this lack of relatedness is chronological in nature, or due to other factors.

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Endnotes:

- 1 Van Andel and Runnels 1995; Runnels et al. 2005
- 2 Korkuti 1982
- 3 Xhomo A. Kodra, Z. Xhafa, and M. Shallo 2002
- 4 Xhomo A. Kodra, Z. Xhafa, and M. Shallo 2002; Fouache et al. 2010 (March),
- 5 see Aliu 2006 for a review
- 6 Cabanes 1998; Korkuti 1998
- 7 Prendi 1976; Korkuti 1982; Prendi 1982; Prendi and Andrea 1981
- 8 Andrea 1983; Prendi 1990; Korkuti 1995
- 9 Korkuti 1982
- 10 Korkuti 1982, 99
- 11 Korkuti 1982, 99-100
- 12 Prendi 1990
- 13 Andrea 1983; Korkuti and Prendi 1992
- 14 Andrea 1983
- 15 Prendi and Andrea 1981; Andrea 1983; Prendi 1990; Ceka and Korkuti 1993
- 16 Korkuti 1982
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- 18 Vitelli 1993
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Ground Stone, Continuity, and Change at Çatalhöyük

Jacob Brady

The Early Chalcolithic in Central Anatolia (6100-3000 B.C.E.) is a period characterized by both significant changes in the way people lived and a continuation of traditional practices. The site of Çatalhöyük West offers a unique opportunity to study the complexities of the Early Chalcolithic. Lying only 300 meters from the Late Neolithic site of Çatalhöyük East, the West Mound shows both continuity and change with its neighbor. The analysis of ground stone artifacts is potentially less affected by chronological gaps resulting from erosion of the mounds since ground stone is considered a relatively conservative class of artifacts in terms of rate of change. My research focuses on the ground stone artifacts excavated from Çatalhöyük West and Çatalhöyük East by several teams over many years. This article will use the ground stone evidence to examine the processes of change and continuity between the East and West Mounds of Çatalhöyük, with special emphasis on raw material and typo-morphological traits.

Introduction

Çatalhöyük West lies 300m from the better known Late Neolithic East Mound, across both the ancient riverbed of the Çarşamba River and its current channel (Fig. 1). The Neolithic East Mound was located on the alluvial fan of the Çarşamba River, an area with a wetland environment at the time of occupation.¹ The West Mound covers approximately eight hectares and was first excavated in 1961 by James Mellaart, who dug two trenches at the top of the mound.² The West Mound has received less attention than the neighboring East Mound, but a number of recent excavations have been investigating the site.³ From 1998-2003, Gibson and Last⁴ excavated near Mellaart's 1961 trenches on the top of the mound. Current excavations are proceeding under Burçin Erdoğan at Trench 8⁵ and Peter Biehl and Eva Rosenstock at Trenches 5, 6 and 7, with Trench 6 excavations completed.⁶

New data suggest that the habitation sequence from the East Mound to the West Mound was uninterrupted and possibly concomitant. Mellaart had argued for a hiatus between the abandonment of the East Mound and the settlement of the West Mound.⁷ Potential erosion off of the East Mound and a poor understanding of the origins of the West Mound may account for this conclusion. New data from excavations on top of the East Mound⁸ and from a deep sounding of the West Mound⁹ have produced typologically similar pottery, suggesting a continuous habitation. Additionally, the L-shaped 'pot-stands' typical of the West Mound have also been found at the top of the East Mound.¹⁰ In light of the seamless transition in habitation from East to West, we can explore what changes and what does not during the transition. In order to do this, we must expand the research question to include all classes of material culture so that we can construct a holistic picture of the transition from East to West.

This article begins by exploring documented changes in the material culture between the East Mound and the West Mound of Çatalhöyük. This includes changes in pottery, obsidian, animal remains, human remains, and architecture. I then focus on the ground stone assemblage from the West Mound in order to incorporate this previously unstudied material into the larger picture of change and continuity at Çatalhöyük. Finally, I summarize the conclusions from the recent analysis of the Çatalhöyük West Mound ground stone.

Material Culture

The West Mound witnesses a number of changes from the East Mound, in material culture, economy, architecture and space, and social practices. Many of these changes are quite drastic, with some traits completely disappearing (e.g. intramural burials, plastered installations) and others arising without precedents on Çatalhöyük East (e.g. painted pottery, buttressed buildings). Pottery is one of these drastic changes. While a small amount of pottery has been found on the East Mound (about 25 kg), significantly more has been found on the West Mound (680kg), despite the lesser volume of excavated soil.¹¹ The West Mound pottery is largely painted in tones of red and brown, not unlike other Early Chalcolithic ceramics from Central Anatolia.¹²

Chipped stone also shows a number of changes from East to West, most notably the near total extinction of a variety of projectile points.¹³ The West Mound is mostly lacking in projectile points, revealing what was likely a major decrease in the importance and practice of hunting wild animals. This conclusion is also supported in the faunal remains. Sheep/goat emerge as the dominant species on the West Mound, and it appears that they are largely domesticated.¹⁴ Sheep and goats are often classed together due to the

morphological similarity of their skeletons. Bovines (auroch and/or cattle) decrease dramatically, reflecting the likely drop in hunting as well as a possible change in the local environment to a cooler, drier climate.¹⁵ In addition to the loss of points, the West Mound also sees an expansion in the source of the obsidian to include Cappadocian obsidian from both Göllüdağ and Nenezidağ.¹⁶

Architectural changes abound between the two mounds. The West Mound houses are missing the elaborate decorations from the East Mound, such as bucrania and wall murals. The introduction of interior buttresses on the West Mound allowed for larger houses and, considering the thickness of the walls, may have served as basement level supports for multi-story dwellings.¹⁷ The West Mound also displays

an increase in the variation of construction materials. The mudbrick used for house construction often contain debris in the form of pottery, seeds, and other rubbish, with the material from different houses coming from different sources, as opposed to the East Mound, where the mudbrick appears to be made from virgin soil dug from the plain.¹⁸

The transition from the East to the West Mound is also related to a number of social changes. The absence of intramural burial beneath house floors on the West Mound stands in stark contrast to the East Mound, where the practice was well acknowledged. How the inhabitants of the West Mound treated their dead remains a mystery. Other than a pair of infants, no burials have been found in Chalcolithic contexts on the West Mound.¹⁹

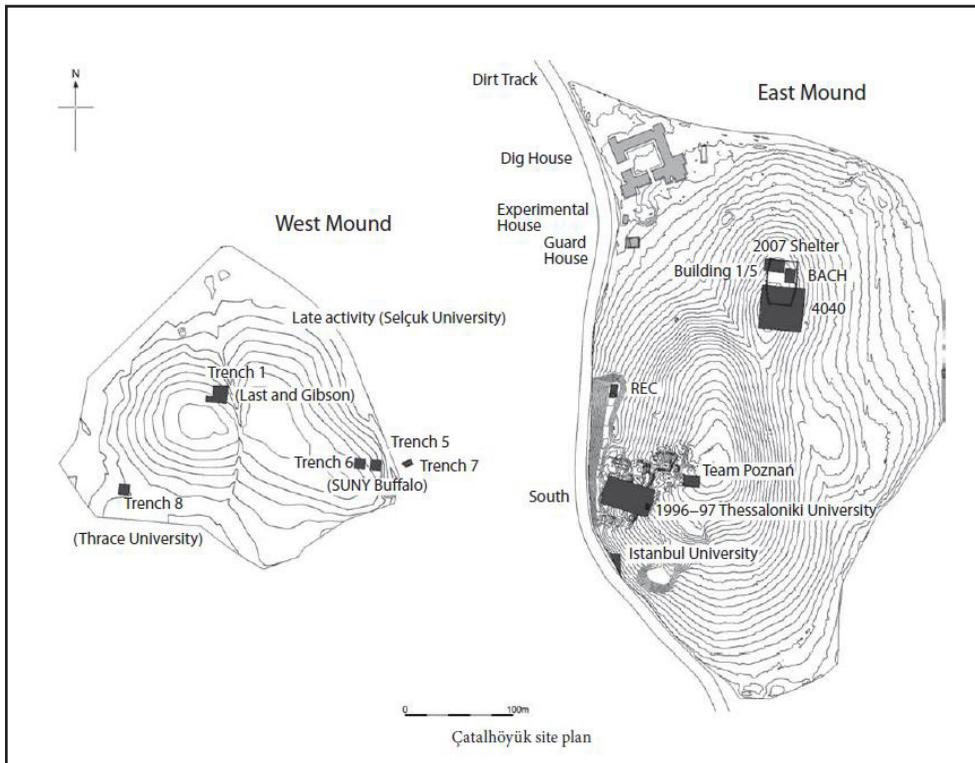


Figure 1: Çatalhöyük Site Plan (Hodder 2006, 13)

Ground Stone Raw Material Use

We will now consider the ground stone assemblage from the West Mound of Çatalhöyük, focusing on the use of raw material and the distribution of tool types. The results of this analysis will then be considered in comparison to the assemblage from the East Mound of Çatalhöyük in order to expose differences and similarities between the assemblages.

Initial analysis of the raw material of ground stone from the West Mound revealed some definite patterns (Table 1). The Çatalhöyük West Mound ground stone sample is composed of 351 pieces of worked stone. The West Mound ground stone material includes igneous, metamorphic,

and sedimentary rocks as well as a small number of minerals.

Igneous Rocks

Igneous rocks make up the vast majority of the sample, at 78.35% (n=275) of the total sample analyzed. Of the igneous rocks, andesite is by far the most common, representing 66.95% (n=235) of the total igneous rocks. Andesite is a commonly used material for food processing tools like querns and handstones. Karen Wright's analysis of a large sample of ground stone material, mostly from the East Mound, shows a similar usage of raw material.²⁰ Basalt is the next most common type of rock, making up 7.98% (n=28) of the total sample. Pumice (1.42%, n=5), gabbro

Material	Total	% Total	% Rock Type	
Andesite	235	66.95%	78.35%	Igneous
Basalt	28	7.98%		
Pumice	5	1.42%		
Gabbro	3	0.85%		
Diabase	4	1.14%		
Sandstone	8	2.28%	8.26%	Sedimentary
Limestone	19	5.41%		
Chert	1	0.28%		
Conglomerate	1	0.28%		
Undifferentiated Metamorphic	6	1.71%	9.97%	
Marble	21	5.98%		
Serpentinite	6	1.71%		
Metaquartzite	1	0.28%		
Steatite	1	0.28%		
Undifferentiated Mineral	1	0.28%	2.28%	Minerals
Calcite	1	0.28%		
Quartz	5	1.42%		
Pigment	1	0.28%		
Undifferentiated	4	1.14%	1.14%	N/A
	351	100.00%	100.00%	

Table 1: Raw Material Usage of West Mound



Figure 2: Andesite Grinding Handstone

(0.85%, n=3), and diabase (1.14%, n=4) make up the rest of the igneous rocks.

Wright found that 73% (n=4841) of the worked stone from the East Mound was made from igneous rocks, and 59.4% (n=3983) of the total number of worked stone was andesite, compared to 78.35% igneous and 66.95% andesite in the West Mound sample. There appears to be a slight increase in the use of igneous rocks and andesite in particular. This may be indicative of an increased cultivation of grains and the need for greater food processing capabilities. However, the increase in igneous rocks may be the result of either the sample size and/or the fragmentation of the sample.

Andesite

Andesite is the most common type of rock in the study sample, representing 67% (n=235) of the sample. It seems logical to ask why andesite is so common in the ground stone material from the West Mound. The answer must be a function of several factors including, but not limited to, the physical properties desired for

a given tool's design, the availability of the raw material, and traditions of tool conceptualization and manufacture.

Andesite is a durable, hard, and mostly coarse type of igneous rock. Andesites are less dense than basalts, meaning that they weigh less by volume. This characteristic would come in useful at Çatalhöyük, owing to its location and the need to bring in andesite from the volcano of Karadağ, 35 km away, as this is the closest source of igneous rocks in the area.²¹ At such great distances, the lower density of andesite would make bringing the material to the site much easier than heavier basalts. Grinding and abrading tools tend to be larger in size, so the effort required to bring these large stones to the site must have been considerable. The durability of andesite is especially desirable for food processing tools, in which the detachment of rock grains is undesirable. Andesite is therefore the rock most functionally suitable to food processing that is readily available to the people of Çatalhöyük West.



Figure 3: Serpentinite Grooved Axe Bit

Metamorphic Rocks

Metamorphic rocks make up 9.97% (n=35) of the total sample, with marble as the predominant type at 5.98% (n=21). Other metamorphic rocks represented in the sample include serpentinite (1.71%, n=6), metaquartzite (0.28%, n=1), and steatite (0.28%, n=1). Another six rocks (1.71%) were identified as metamorphic but were unable to be further defined.

Sedimentary Rocks

Sedimentary rocks are 8.26% (n= 29) of the total sample, including sandstone, limestone, chert, and conglomerate. . Limestone makes up 5.41% (n=19) of the total sample while sandstone is 2.28% (n=8). While lake marls, chalks, and soft limestone are the only rocks in the local area of Çatalhöyük, these do not appear to have been used to make ground stone tools on the West Mound.²² The limestone and sandstone in our sample is most likely brought in from some distance and is harder and more useful for tool manufacturing than the local soft rocks. It is likely that lake marl and chalk are the main components of the wall plaster at Çatalhöyük West, but this falls outside the scope of the present research.

Minerals

Minerals comprise 2.28% (n=8) of the total sample. This small group of minerals includes quartz, calcite, and ochre. It must be noted that this group only includes individual pieces and does not account for pigment residues on other pieces of ground stone material. While the sample contains only one piece of ochre, as a pigment it is present on several other pieces.

Quartz is the most commonly represented mineral in the sample, representing 1.42 % (n=5) of the total sample and 62.50% of the mineral group. Quartz appears in a few different forms, including carnelian, rose quartz, and common quartz. All but one of the pieces of quartz are classed as polishing tools, with the other piece assigned to the miscellaneous class of ‘stone balls.’

Worked Stone Analysis

In this section, we will discuss the composition of the sample by tool class and type (Table 2). It is impossible to say how many individual tools are represented by the pieces in the sample. Most of the pieces in the sample are fragments of tools, with only a few complete tools represented. The nature of the fragmentation of the sample is still poorly understood. It is unknown whether the fragmentation occurred in post-depositional contexts, the tools were intentionally fragmented, or the fragmentation was accidental and resulted in the deposition of the pieces.

Grinding and Abrading Tools

Grinding and abrading tools present a couple of unique problems in analysis. Grinding and abrading tools were lumped together in analysis due to the difficulty in distinguishing between the two. In hand samples, grinding wear and abrading wear can appear quite similar in andesite and basalt. In addition, the high rate of

Use Wear Feature/Tool Type	Total	% Total	Class %	
Undiff. Grind/Abrade	148	39.47%	46.93%	Grind/Abrade only
Grind/Abrade Slabs	20	5.33%		
Grind/Abrade Handstones	8	2.13%		
Undiff. Grinding	3	0.80%	3.20%	Grinding only
Grinding Slabs	4	1.07%		
Grinding Handstones	5	1.33%		
Undiff. Abrader	8	2.13%	10.13%	Abrading only
Abrader Slabs	6	1.60%		
Abrader Handstones	24	6.40%		
Undiff. Polishing	4	1.07%	13.07%	Polishers
Polishing Slabs	6	1.60%		
Polishing Handstones	39	10.40%		
Undiff. Pounding	1	0.27%	8.00%	Pounding
Anvils	3	0.80%		
Hammerstones	14	3.73%		
Mortars	3	0.80%		
Pestles	9	2.40%		
Grooved Abrader	4	1.07%	1.33%	Grooved
Incised Pebbles	1	0.27%		
Axes	7	1.87%	1.87%	Cutting
Maceheads	1	0.27%	0.27%	Perforated
Vessels	10	2.67%	2.67%	Vessels
Beads	5	1.33%	1.33%	Beads
Stone Balls	12	3.20%	3.47%	Miscellaneous
Pigments	1	0.27%		
Undiff. Misc.	29	7.73%	7.73%	Undiff. Misc.
	375	100.00%	100.00%	

Table 2: Tool Types and Use Features

breakage of grinding and abrading tools makes it difficult to determine the type of the tool. Grinding slabs and grinding handstones show similar use-wear patterns, and fragments are difficult to ascribe to a particular type without information on the size or shape of the parent tool.

As a class, grinding tools and abrading tools account for 60.27% (n=226) of the total sample. This is the largest class of tools in

the sample, but there are a few caveats and considerations. Grinding tools and abrading tools are separate classes in the Çatalhöyük East technotology, but were combined due to the difficulties of differentiating between the two types of wear. Combining them into one class will naturally have the effect of increasing the frequency of the class. Additionally, grinding and abrading tools tend to have a high rate of fracture. The large number of fragments skews the

representation of grinding and abrading tools. However, recognizing this, it is still safe to say that grinding and abrading tools are a significant proportion of the overall ground stone material.

Polishing Tools

Polishing tools account for 13.07% (n=49) of the total sample, the second most of any class behind grinding and abrading tools. Polishing slabs represent 1.6% (n=6) of the total sample. There were also four pieces that showed polish use wear that could not be assigned to a specific type. The most common type within the class is the polishing handstones, or just polishers. There are 39 (10.4%) polishers in the total sample. As a type, polishers frequently show sign of secondary use, at 20.51% (n=8). Secondary use features identified on polishers include pounding (n=6), cutting (n=1), and grinding/abrading (n=1). The frequency of secondary use could be the result of misinterpretation of polishing wear from manufacturing. This is a problem that needs to be addressed by microscopic wear analysis in future research.

Pounding Tools

As a class, pounding tools make up 8.0% (n=30) of the total sample. Three pieces (0.8%) are identified as worktables or anvils. One of the anvils shows signs of being used as a grinding or abrading slab, including rounded surface grains over percussion scars. Another three pieces (0.8%) are identified as mortars. Two of the mortars also show use-wear indicative of grinding or abrading. There is one undifferentiated pounding tool which could not be assigned to a specific type.

Hammerstones comprise 3.73% (n=14) of the total sample. One of the most interesting features of the hammerstone type is the high frequency of secondary use-wear associated with them. Secondary use-wear is wear that occurs after initial use life and

can be the result of tool recycling, in which the purpose and actions associated with the tool may differ from the original. Of the 14 pieces identified as hammerstones, 9 (64%) show signs of secondary use. This is the highest percentage of secondary use among any type of tool. Without microscopic use-wear and chaîne opératoire analysis, it is not yet possible to say whether the use-wear related to hammering is more often a primary or secondary activity or whether use is concomitant. Microscopic analysis is required to observe the sequence of use-wear and could reveal in which order wear had been accumulated. Secondary use-wear on hammerstones is identified with grinding/abrading, polishing, cutting, and other pounding activities (pestle). There are 9 pieces (2.4%) with use-wear indicative of pestles. Of these, 44% (n=4) have secondary use-wear, including grinding/abrading, polishing, and hammering wear.

Cutting Tools

The sample contains seven (1.87%) cutting tools, all of them axes. Two (28.57%) of the axes show signs of secondary use, one as a polisher and one as a hammerstone. The axes do not show macroscopic signs of hafting, and it seems unlikely that the axes were not hafted. Hafting methods are an issue of interest for future research.

Vessels

Vessels make up 2.67% (n=10) of the total sample. No distinction was made between vessel types (i.e. plates, trays, bowls) in the present analysis. Vessels show no signs of secondary use-wear and are all broken. Three vessel fragments were able to be refitted, the only such pieces from the entire sample. These three fragments were originally from two different units. Once refitted, they positively constituted a single artifact and were thereafter treated singularly, being counted as only one vessel.



Figure 4: Macehead from Trench 5, Çatalhöyük West

Other Worked Stone

One of the most aesthetically pleasing pieces of ground stone from Çatalhöyük West is the macehead (CH11 WT5 16967 x19). The macehead was found near the end of the 2011 field season. The macehead appears to be made from meta-andesite. It weighs 310.5 grams and measuring 47.5 mm high and 57.6 mm across. The piece is complete and shows no obvious signs of damage. Stone balls make up a total of 3.2% (n=12) of the total sample. It is still unclear whether some or all of these stone balls were manufactured or collected from streambeds. It is also unknown what the purpose(s) of the stone balls were.

Discussion

A number of conclusions may be drawn about the West Mound ground stone material from this analysis. While these conclusions are drawn from preliminary analysis, they do offer insights into the data and pose questions for future research. Perhaps the largest question to ask of the data is how does it relate to the East Mound ground stone data? We can begin by noticing the overarching similarities in raw material and tool type distribution.

Andesite remains a very important rock for any tools that require considerable durability or coarse textures, such as pounding tools and grinding tools. Andesite is well suited for the manufacture and use of the types of tools it was made into. Andesite is quite durable, though not as much as basalt, but can be much less dense and therefore easier to transport from the quarry or during routine use. It is also easier to work with and less resistance to fracture. Particles are not easily detached from the surface of the rock, making it well suited for grinding applications.

The prevalence of andesite is largely due to access. It can be found at the volcanos of Karadağ and Karacadağ, the closest sources of the rock. Andesite from the volcanos may have been transported using draught animals, as domesticated cattle were kept by the people of Çatalhöyük West. However, there is as yet no direct evidence of draught power in use at such an early date. An even closer reservoir of stone would have been the East Mound itself. It is difficult to identify a tool as originating from the East Mound unless it shows indicative typological markers. There are definitely great quantities of material originally from the East Mound found on the West Mound. Pottery and chipped stone from the Late Neolithic have been found in the walls and buttresses of Trench 5.²³ While such positively Late Neolithic materials have not been found in room fill or on house floors, it is at least apparent that the people of Çatalhöyük West were incorporating East Mound material into their buildings. Another similarity between the materials from the two mounds is the emphasis on grinding/abrading tools. These tools make up the majority of both assemblages, with slightly more on the West Mound. It is still unclear whether the greater percentage of grinding/abrading tools on the West Mound is the result of actual patterns, the overrepresentation of fractured pieces, or research methodology. It may be that

increasing exploitation of domesticated cereals required more grinding tools, however the use life of the tools appears to be short and this could result in an overrepresentation of the actual number of tools in use. The grinding/abrading tools from the West Mound have comparatively little use wear and appear to have been fractured before the end of the tool's life. This is contrary to the pattern of curation observed by Baysal and Wright in the East Mound material, which showed long lifespans and a strong tendency for reuse and recycling.²⁴

The little use-wear and high fracture rate of the West Mound material deserves further mention. This phenomenon may be called 'wasteful' because of the greater amount of new raw material that must be manufactured into tools, only to have those tools smashed early in their lives while they still had potential for use. This 'wastefulness' may have correlates in the treatment of pottery and butchered animals. The West Mound pottery contains formed, unfired pottery that is sometimes painted.²⁵ This pottery was discarded before the completion of the production process, even though it could have easily been reused. Animals bones show a similar pattern, with the carcasses being only lightly processed.²⁶ This recurring 'wastefulness' could be related to increasing exploitation of the environment and increasing trade connections, although it is still a topic of ongoing study.

The transition from the East Mound to the West Mound includes changes in a number of artifact types and practices. Combined, these changes create a community that appears unrecognizable compared to the 'classic' Late Neolithic levels of Çatalhöyük East (e.g. level 6). However, the West Mound ground stone artifacts see both changes and continuity from the East Mound. The approximately similar distribution of tool types between the two Mounds suggests that the inhabitants of the West

Mound engaged in an economy not entirely dissimilar from that of the East Mound. The people of the West Mound continued to practice a small scale, subsistence food economy, using similar food processing technologies as their predecessors. There remained a focus on craft industries, but with an increased focus on ceramic production. If ground stone tools represent a broad cross-section of the economic technology, then the evidence suggests that while many things changed from East to West, life continued on the West Mound much as it had for their ancestors.

Endnotes:

- 1 Rosen & Roberts 2005
- 2 Mellaart 1965
- 3 Gibson & Last 2003a, 2003b, Biehl & Rosenstock 2009, 2010, Erdoğu 2010
- 4 Gibson and Last 2003a, 2003b
- 5 Erdoğu 2010
- 6 Biehl & Rosenstock 2009, 2010
- 7 Mellaart 1965
- 8 Team Poznan area, Czerniak and Marciniak 2008
- 9 Trench 7, Biehl and Rosenstock 2007, 128-129
- 10 Czerniak and Marciniak 2003
- 11 Biehl et al. 2012:55
- 12 Düring 2010
- 13 Biehl et al. 2012:58
- 14 Orton 2010
- 15 Biehl et al. 2012
- 16 Ostapchouk 2012
- 17 Biehl & Rosenstock 2009
- 18 Biehl et al. 2012
- 19 Biehl et al. 2012
- 20 Wright 2011
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- 22 Wright 2011: 9
- 23 Biehl et al 2012, 81-82
- 24 Baysal and Wright 2005
- 25 Franz 2010
- 26 Biehl & Rosenstock 2010

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The effect of climatic variability on population dynamics of the Cucuteni-Tripolye cultural complex and the rise of the Western Tripolye giant-settlements

Thomas K. Harper

*This paper presents the results of a multi-scalar analysis of 1800 years of Cucuteni-Tripolye population dynamics, with particular emphasis on the rapid Western Tripolye migrations beginning c. 4150 B.C.E. that led to the development of the giant-settlement phenomenon in Central Ukraine. In addition to macro-scale population modeling, statistical analysis is performed to demonstrate a significant correlation between giant-settlement formation in the Southern Bug-Dnieper interfluvium and proxies for a concurrent period of sudden, global climate change. Through the use of high-resolution climate data, this research compliments and expands upon existing theories of climate effects on Cucuteni-Tripolye population dynamics and settlement agglomeration.**

Introduction

The Eneolithic Cucuteni-Tripolye cultural complex of Romania, Moldova, and Ukraine poses many questions for the study of ancient population dynamics. Recent international attention has primarily been concerned with the Western Tripolye giant-settlement phenomenon,¹ where at least eleven settlements of 100-335 ha in size were constructed in the land between the Southern Bug and Dnieper rivers (the Southern Bug-Dniester interfluvium; SBDI) and each briefly inhabited between *c.* 4150 and 3500 B.C.E.² (see figure 1 for geographic reference). Since these are the largest known settlements of prehistoric Europe, the processes of their formation figure prominently into the inevitable archaeological debates surrounding their purpose and degree

of sociopolitical complexity. On the basis of ceramic typology, it is generally accepted that several rapid waves of migration brought a large portion of the Cucuteni-Tripolye population into the forest-steppe ecoregion of Ukraine at this time, predominately from the Cucuteni-Tripolye “homeland” in the Siret, Prut, and Dniester river valleys.³ While initial development of the Cucuteni-Tripolye culture (phases Precucuteni/Tripolye A through Cucuteni A/Tripolye BI; *c.* 4800-4300/4200 B.C.E.) was marked by increasing growth in the West, the forest-steppe region of Ukraine was comparatively unpopulated. I.V. Manzura describes the colonization of the East as being akin to a “steppe valve” suddenly being opened.⁴ Probable causal factors behind this opening have been highly speculative.

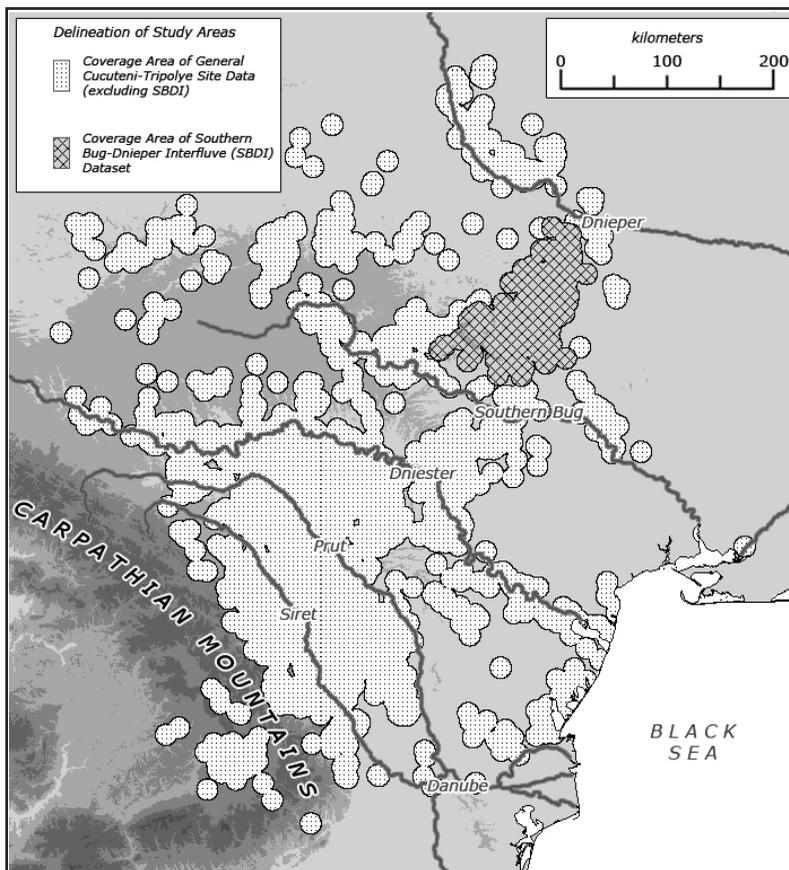


Figure 1: Geographic reference and delineation of study areas, including major river systems.

Previous Scholarship

Most accounts of the territorial and cultural development of the Cucuteni-Tripolye culture are descriptive in nature, featuring qualitative summaries of the proliferation of material culture set against varying periodizations.⁵ More analytical, demographic approaches can be found in the writings of S.N. Bibikov, V.M. Masson, N.M. Shmaglyi, and A.G. Kolesnikov, and M. Yu. Videiko.⁶ Even so, in many cases the demographic work of these authors was abbreviated, limited to certain regions, and usually undertaken as a component of some other analysis (e.g. paleoeconomic calculations). The most dedicated examination of macro-scale Cucuteni-Tripolye demography is the 1993 study of V.A. Kruts.⁷ The demographic portion of this present research may be seen as a logical development from the methods and intent of Kruts, which, while they are still relevant, may benefit greatly from recent developments in the understanding of the Cucuteni-Tripolye complex.

In particular, the work of A.V. Diachenko has brought insight into migratory events related to the advent of the giant-settlements belonging to the Vladimirovskaya, Nebelevskaya, and Tomashovskaya local groups in the Southern Bug-Dnieper interfluvium. Following extensive work in chronology – both relative⁸ and absolute⁹ – archaeological understanding of this region during phases Tripolye BII to CI-II (c. 4200-3400 B.C.E.) is better than any other area of the Cucuteni-Tripolye complex. On the basis of this improved local chronology, Diachenko has produced a systematization of settlement data¹⁰ from which several models of development and interaction have been derived.¹¹

From the perspective of this study, Diachenko's most notable work has been in proposing a correlation between Cucuteni-Tripolye settlement events and eustatic fluctuations of the Black Sea,¹² a paleoclimatic proxy that is related to regional temperature and aridity.¹³ According to these data, where sea level

regressions signify cool and dry periods, and transgressions warm and wet periods, the middle-to-late Tripolye migrations occurred during periods of cool, dry climate. Essentially, a reduction in regional carrying capacity due to climatically-induced constraints provided an impetus for emigration from the western regions to the forest-steppe.

Application of these sea level trends entails some controversy. Several paleoclimate schemes based on these data (of which there are dozens) were recently criticized by E. Fouache and his colleagues as being highly variable and confounded by active geology throughout the Black Sea basin. In particular, the authors targeted the hydrodynamically-improbable suggestion that the level of the Black Sea was, for extended periods, lower than observed global trends.¹⁵

However, reservations toward these data aside, Diachenko's suggestion of a climatic determinant for migrations is an improvement over older theories of Cucuteni-Tripolye population dynamics. These typically assume a situation of "explosive" population growth triggering resource shortfalls,¹⁶ which is a problematic assumption. According to F.A. Hassan,¹⁷ the concept of population "pressure" in archaeology is "vague and rather ill-defined" and usually of little substance in reference to empirical observations. Demographic growth rates vary widely and rarely follow the curve of maximum biotic potential, instead being subject to environmental and technological constraints which impose a local carrying capacity.¹⁸ Carrying capacities may be seen as a "hard" limit to population growth, but there are further "soft," human-defined, limits that pertain to resource optimization and other social considerations. In preindustrial societies, the optimal carrying capacity of a given territory is often only a portion of its theoretical maximum,¹⁹ generally providing some buffer for normalization in the event of resource shortfalls. In any case, it is possible to adopt the underlying hypothesis of the current literature – that migration was undertaken

due to some form of economic crisis – while rejecting the proposed demographic causation. I will instead turn to issues of climate.

Migration and Climate

Based on the suggestion by B. Weninger and his colleagues that the Holocene Rapid Climate Change (RCC) phenomenon²⁰ may explain diachronic variation in several archaeological contexts,²¹ we recently made the qualitative observation that the Tripolye BII period settlement of the SBDI was temporally aligned with the beginning of an RCC interval with a period of *c.* 6000-5000 cal B.P.²² There is also similar agreement with Bond Event 4, *c.* 5900 cal B.P.²³ There are many proxies (some

of them discussed here) which indicate a period of both terrestrial and oceanic climate fluctuation at this time, one among many in a roughly millennial global cycle of variable temperature and aridity. While RCC conditions have global ramifications,²⁴ in this regional context I am primarily concerned with the mechanics of the Pontic “steppe corridor” and the influence of the Siberian High pressure system, one of the chief indicators of RCC conditions up to the super-regional scale (Fig. 2). The chief objective of this research is to assess whether any correlation can be found between the RCC/Bond Event proxies and Cucuteni-Tripolye population dynamics. To this end, settlement data from the Southern Bug-Dnieper interfluvium were tested against a

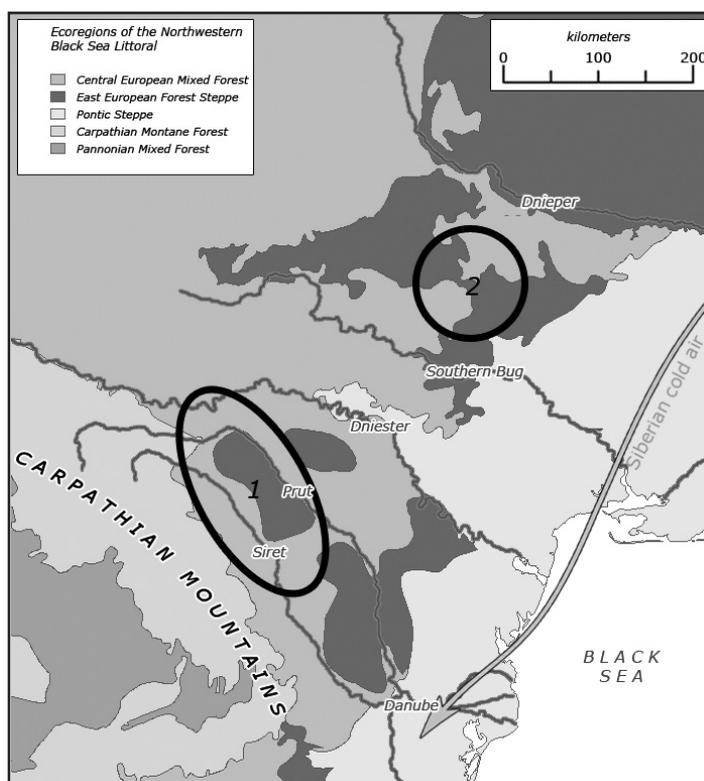


Figure 2: Ecoregions along the Black Sea littoral (data from Olson et al. 2001). Winter cold air emanating from the Siberian High pressure traverses the “corridor” of the Pontic steppe. 1 – nucleus of early settlement (Precucuteni to Cucuteni A/Tripolye BI); 2 – main area of middle to late (Tripolye BII, CI, and CI-II) settlement in the SBDI, including giant-settlements.

Phase	Date range (B.C.E.)	Corresponding cultural periods	
		Romania	Ukraine/Moldova
1	c. 4800 - 4550	Precucuteni	Tripolye A
2	c. 4550 - 4200	Cucuteni A	Tripolye BI
3	c. 4200 - 3900	Cucuteni A/B	Tripolye BI-II, Tripolye BII
4	c. 3900 - 3600	Cucuteni B	Tripolye CI
5	c. 3600 - 3000	Horodistea-Foltesti	Tripolye CI-II, Tripolye CII

Table 1: Simplified Cucuteni-Tripolye periodization for macro-scale model application (after Weninger and Harper, forthcoming). Note that this deviates in some cases from regional schemes of relative chronology due to limitations of settlement and ¹⁴C data.

collected body of climate data (defined below) and compared with a macro-scale model of population development.

Model Construction and Analysis Methodology

Chronology – Macro-scale Model

In constructing the macro-scale model, I utilize previous work on the calibration and analysis of available ¹⁴C data,²⁵ which generalizes the Cucuteni-Tripolye periodization into discrete temporal units. The construction of this periodization involved an initial radiocarbon data set of n=244, reduced to a core data set of n=104 due to considerations of data validity. In the results, chronological phases consisted of near-parabolic distributions of ¹⁴C envelopes, with the notable exception of phase 3, for which ¹⁴C dating is problematic. If cultural periods are conceived as being described by overlapping normal distributions, it is possible to describe their duration according to degrees of statistical confidence, and estimate the location of break-points to form a rough, abstracted periodization for model application. This periodization is described in Table 1.

These results compare favorably to several other recent periodizations,²⁶ but it must be stressed that the phases outlined here neglect much regional variability. Problems exist with the distribution and accuracy of ¹⁴C data, especially during short or transitional periods (Cucuteni A/B, Tripolye BI-BII, Tripolye BII). The conflation of Tripolye BI-II and BII

settlement data seen in Manzura’s research²⁷ (and also utilized in this study) is currently a necessary measure. It is a good example of problems that exist in understanding relative chronology between regions, and the compromises that must be made in attempting a meaningful categorization of data. According to numerous studies, Tripolye CI materials are a continuous development of BII. Tripolye BII and CI are, in fact, both synchronous with Cucuteni B, which should have a longer duration than shown here. In the SBDI in particular, settlements of periods BII and CI are partially contemporaneous for approximately a century;²⁸ estimated here as c. 3950-3850 B.C.E. On the other hand, the difference in material culture and the existence of temporal discontinuities between settlement events belonging to phases BI-II and BII makes their combination inappropriate.²⁹

Chronology – SBDI Settlements

While the absolute chronology may be used to statistically define cultural periods in a broad sense, it is more difficult on a local level. Very few ¹⁴C dates exist for the Southern Bug-Dnieper interfluvium and the quality of most of them is suspect. As an example, examination of the four Kiev dates (Ki-6922, Ki-6923, Ki-6924, Ki-6925) from the Ol’khovets settlement belonging to the Kosenovskaya local group (Tripolye CI-II) give a combined 68% range of 2870-2630 cal B.C.E., which is well into the Early Bronze Age. The comparison between older dates (mostly from the 1970s-1990s)

for the Tomashovskaya giant-settlements of Tal'yanki and Maidanetskoe with the new Oxford AMS dates from Tal'yanki³⁰ further reveals the scope of the problem (refer to Fig. 3). It was decided that these newer dates alone should be used to position the relative chronology, with the Tomashovskaya local group settlement phase 3 stage 2 set to *c.* 3850-3800 B.C.E.³¹

Settlement Data

Settlement data were collected into three separate sets. The first is a macro-scale data set (n=2595) of site coordinates georeferenced from the research of Manzura.³² While it is accurate enough to describe the general locations and clustering of known Cucuteni-Tripolye sites, it lacks any metadata beyond temporal categorization. The second data set consists of SBDI settlement data (n=68; Tripolye BII to CI-II) adapted from the work of Diachenko.³³ This set describes the absolute positions, sizes, and in most cases the

microchronological relative dating of sites. The final data set is the author's general collection of Cucuteni-Tripolye settlement and ¹⁴C data (n=210), derived from a variety of sources.³⁴

The second and third sets, owing to their detailed metadata, were used to determine trends in the spatial and temporal variation of settlement sizes, which were then applied to the macro-scale model. The disparity between my collected settlement data from the SBDI (n=68) and all other regions (n=29) is but one example of the comparative systematization of Cucuteni-Tripolye archaeology in this region. Calculations for settlement size in different spatio-temporal contexts are described in Table 2. The lower median values are representative of the vast majority of settlements, but the contribution of large settlements reflected by the mean values must also be considered. In order to overcome dubious values caused by the small sample size, a weighted mean was calculated based on four model scenarios:

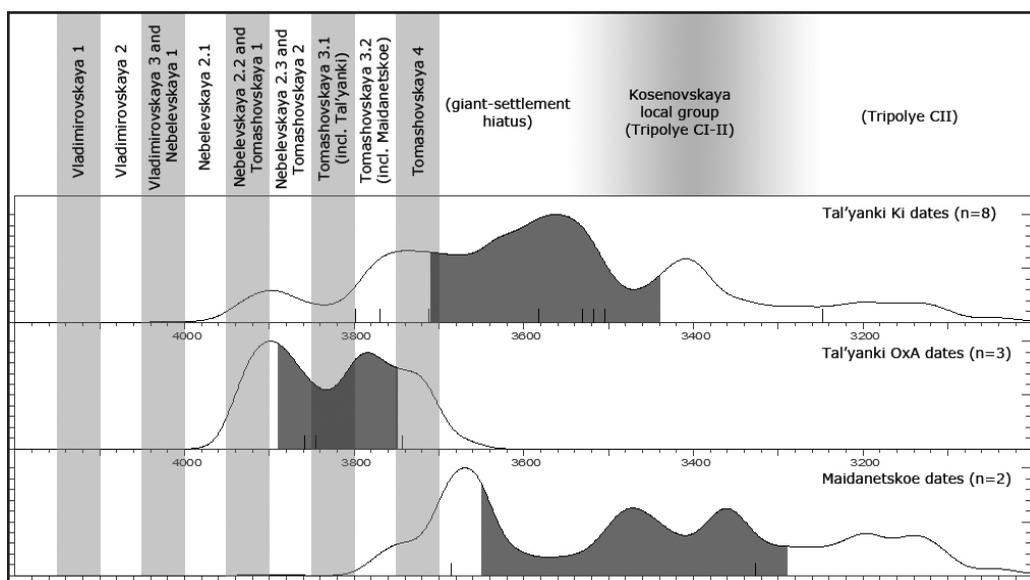


Figure 3: Problems in the relationship of ¹⁴C dates to relative chronology in the SBDI. The darkened regions of the radiocarbon envelopes indicate the interquartile range (50% confidence interval). This study relies on recent AMS dates from Tal'yanki to situate the relative sequence of settlements.

Phase	Southern Bug-Dnieper interfluve				All other regions			
	mean	median	weighted mean	n	mean	median	weighted mean	n
1	n.d.	n.d.	n.d.	0	2.1 ha	1 ha	2.5 ha	5
2	n.d.	n.d.	n.d.	0	5.8 ha	3.8 ha	4.1 ha	8
3	46.4 ha	39.3 ha	37.4 ha	15	5.4 ha	4.5 ha	4.2 ha	11
4	50.8 ha	14.1 ha	32.2 ha	41	4.8 ha	2.6 ha	3.6 ha	3
5	27.8 ha	11.8 ha	25.9 ha	12	2.0 ha	1.8 ha	2.7 ha	4

Table 2: Calculated spatial and temporal variation in settlement sizes.

- scenario 1 utilizes mean values, geographically but not temporally segregated;
- scenario 2 utilizes mean values, geographically and temporally segregated;
- scenario 3 utilizes median values, geographically but not temporally segregated;
- scenario 4 utilizes median values, geographically and temporally segregated.

Beyond the calculation of weighted settlement sizes, these data must be processed further to account for temporal factors before estimating population values. Firstly, our macro-scale chronological phases are not of equal duration; utilizing the commonly-accepted assumption that settlements were inhabited for roughly 50 years,³⁵ the number of settlements must be divided by the number of settlement generations. Secondly, the number of dwellings per hectare of settlement and the coefficient of synchronously-functioning houses must be determined. For this, the average value of 9.66 buildings per hectare from the SBDI data set is used, as well as Diachenko's observation³⁶ that, according to studies of settlement microchronology, only 78.4% of structures at the Tripolye CI giant-settlement of Maidanetskoe are synchronous.³⁷ Finally, the received value for the number of synchronous structures should be multiplied by estimates for household composition – four to seven individuals; middle value: 5.5.³⁸ All of these considerations may be expressed in the formula:

$$p = \left(\frac{\sum_{i=1}^n a_i}{t} \right) bsd$$

where p is total population at a given time reference, a is the area of settlement i in a series of n settlements, t is the number of settlement generations, b is the number of houses per hectare (constant; 9.66), s is the coefficient of housing synchronicity (constant; 0.786), and d is the household composition (constant; 5.5).

Demographic Interpolation and Comparison with Climate Data

A key limitation of this macro-scale model is its poor temporal resolution. All settlement and climate data were temporally justified in a time series spanning 4800 to 3000 B.C.E. (ten-year increments). This necessitated linear interpolation of demographic data over intervals of centuries. Owing to this, it was decided that statistical testing of the model environment would likely yield spurious correlations. Therefore the empirical SBDI data constitutes the testing environment, while the macro-scale model is descriptive, used to compare our results against the demographic context of the Cucuteni-Tripolye complex as a whole.

Climatic proxies were derived from the climate database provided with the University of Cologne Radiocarbon Calibration Program software package (CalPal).³⁹ The following data sets were used: Holocene Non-Sea-Salt K⁺ ion series from GISP2 with 200-year moving Gaussian filter,⁴⁰ Holocene Sea-Salt Na⁺ ion series from GISP2 with 200-year moving Gaussian filter,⁴¹ North Atlantic Holocene Drift Ice Proxy (Stack),⁴² Global Sea Levels,⁴³ SL21 *S. elongatus* prevalence,⁴⁴ LC21 Aegean warm-water foraminifera species prevalence,⁴⁵

and MD04-2788/2760 XRF Ca intensity.⁴⁶ In most cases these were high-resolution data sets that conformed easily to our measurement interval, but in some cases linear interpolation or slight temporal adjustments (+/- 5 years) were required. An explanation of each of these climatic proxies is presented in Table 3.

Results and Discussion

Demographic Calculations

The manner in which the area of settled territory should be calculated within the model environment quickly became a concern,

as density calculations are contingent on a fixed search radius.⁴⁷ In the end I utilized an adaptation of Hassan's⁴⁸ methodology, wherein an arbitrarily-defined zone of resource extraction (defined here as 10 km) is applied to each settlement and its population distributed over this area. This distance contour reflects the author's previous modeling in the area of Cucuteni-Tripolye paleoeconomy,⁴⁹ which suggested that resource extraction at the largest settlements would have likely extended beyond the normative five-kilometer exploitation assumption for sedentary societies.⁵⁰ Still, functionally speaking, the resource extraction area will be far less for most settlements in

Dataset name	Abbreviation	Measured phenomenon	Proxy for:
Holocene Non-Sea-Salt K ⁺ ion series from GISP2 with 200-year moving Gaussian filter	GISP2 NSS K ⁺	Non-sea-salt K ⁺ ion deposition in GISP2 ice core, Greenland	Strength of Siberian High pressure system
Holocene Sea-Salt Na ⁺ ion series from GISP2 with 200-year moving Gaussian filter	GISP2 SS Na ⁺	Sea-salt Na ⁺ ion deposition in GISP2 ice core, Greenland	Strength of Icelandic Low pressure system
North Atlantic Holocene Drift Ice Proxy (Stack of MC52-V29191+MC21-GGC22)	Bond events	Percentage of ice-rafted debris in North Atlantic sediment cores	North Atlantic sea ice formation; Northern Hemisphere temperature
Global Sea Levels	GSL	Generalized observations of paleo-shorelines	Global sea level trends
SL21 <i>S. elongatus</i> (%)	SL21	Change in the prevalence of a cold-water species of dinoflagellate in the SL21 core, Aegean Sea	Aegean Sea surface temperature
LC21 Aegean warm-water foraminifera species (%)	LC21	Ratio of warm-water to cold-water forams in the LC21 core, Aegean Sea	Aegean Sea surface temperature
MD04-2788/2760 Black Sea XRF Ca intensity (total counts/1000)	BS XRF Ca	Variable rate of calcium deposition in a Black Sea sediment core	Sakarya River outflow strength; precipitation in NW Anatolia

Table 3: Explanation of climate proxy data relevant to RCC.

Data		Model phase				
Region(s) / Variables		1	2	3	4	5
SBDI	p	105	172	15,354	11,429	630
	a_t (modeled)	1,011	1,575	9,435	6,487	1,795
	y (modeled)	0.104	0.109	10627	1.762	0.351
	a_t (corrected)	227	354	2,118	1,456	403
	y (corrected)	0.463	0.486	7.249	7.847	1.563
All others	p	4,159	19,480	10,254	15,192	4,730
	a_t (modeled)	29,736	53,762	51,653	60,310	67,427
	y (modeled)	0.140	0.362	0.199	0.252	0.070
	a_t (corrected)	6,676	12,069	11,596	13,540	15,137
	y (corrected)	0.623	1.614	0.884	1.122	0.312
Combined	p	4,264	19,652	25,608	26,646	5,360
	a_t (modeled)	30,747	55,337	61,088	66,797	69,223
	y (modeled)	0.139	0.355	0.419	0.399	0.077
	a_t (corrected)	6,903	12,423	13,714	14,996	15,540
	y (corrected)	0.620	1.582	1.867	1.777	0.345

Table 4: Comparison of model output for population (p), settled territory (a_t), and population density (y). “Corrected” data is normalized according to the coefficient of disparity between modeled and empirical SBDI settlement observations.

Temporal reference (local settlement phases)		Major settlements	a_t	p	y
Phase	Range (B.C.E.)				
1	c. 4150-4100	Fedorovka	314	5,873	18.69
2	c. 4100-4050	Vladimirovka	628	3,380	5.38
3	c. 4050-4000	Nebelovka, Val'yava	2,422	17,662	7.29
4	c. 4000-3950	Gluboček, Khristinovka 1	2,745	15,362	5.60
5	c. 3950-3900	Shushkovka	2,333	11,354	4.87
6	c. 3900-3850	Chichirkozovka, Dobrovody	1,341	16,873	12.58
7	c. 3850-3800	Tal'yanki, Vasil'kov	942	14,776	15.68
8	c. 3800-3750	Maidanetskoe	789	9,521	12.07
9	c. 3750-3700	Tomashovka	1,591	6,710	4.22
<i>"Mean" scenario</i>			1,456	11,279	7.75

Table 5: Territory, population, and density estimates for each settlement phase of the SBDI during the Vladimirovskaya-Nebelovskaya-Tomashovskaya giant-settlement period, c. 4150-3700 B.C.E.

the model, which are situated in high-density clusters.

Comparison of modeled territory and density estimates with the empirical SBDI data showcases another obstacle of inferring a picture of population at a given time reference using temporally-indistinct data – territorial estimates far outweigh the population estimates, thus giving very low population densities in comparison to ethnographic observations of sedentary agriculturalists.⁵¹ The close agreement between modeled and empirical population values for the SBDI lent some confidence to the model findings, and led to the calculation of a normalizing coefficient (0.2245) to correct for modeled densities. Tables 4 and 5 summarize findings related to the modeled and empirical data sets, respectively. These data are displayed graphically in Figure 4.

Plausible Peak Population Values

According to the final, compensated values, during its time of peak population (Cucuteni B / Tripolye CI period, *c.* 3750 B.C.E.) the Cucuteni-Tripolye complex as a whole was composed of 27,000 people inhabiting roughly 15,000 km², for an average density of 1.8 persons per km². The SBDI, while accounting for only 10% of total inhabited territory, was home to 43% of the population and boasted an average density of 7.8 persons per km² (see Fig. 5 for a visualization of these data).

Compared to the estimates of Kruts,⁵² these values are incredibly low. For the same period, Kruts estimates a total population of 330,000 over an area of 110,000 km², for a density of 3 persons per km². This is reduced from a peak of 410,000 during the middle Tripolye (BII) period, which is not present in the present model (it instead shows a plateau

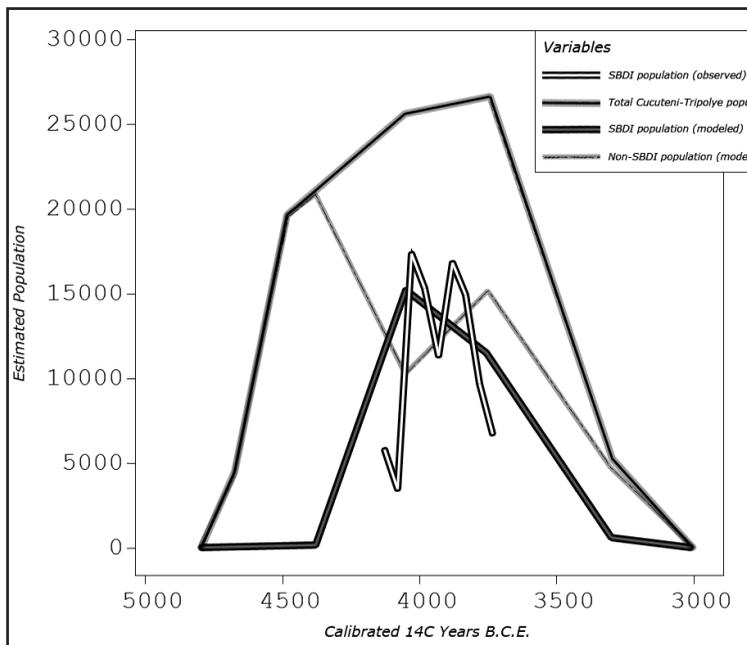


Figure 4: Comparison of spatially-distinct modeled population values against empirical SBDI settlement data. While modeled values for Tripolye CI correspond with an “average” scenario, it conceals considerable variability due to migrations, two peaks of which may be perceived here.

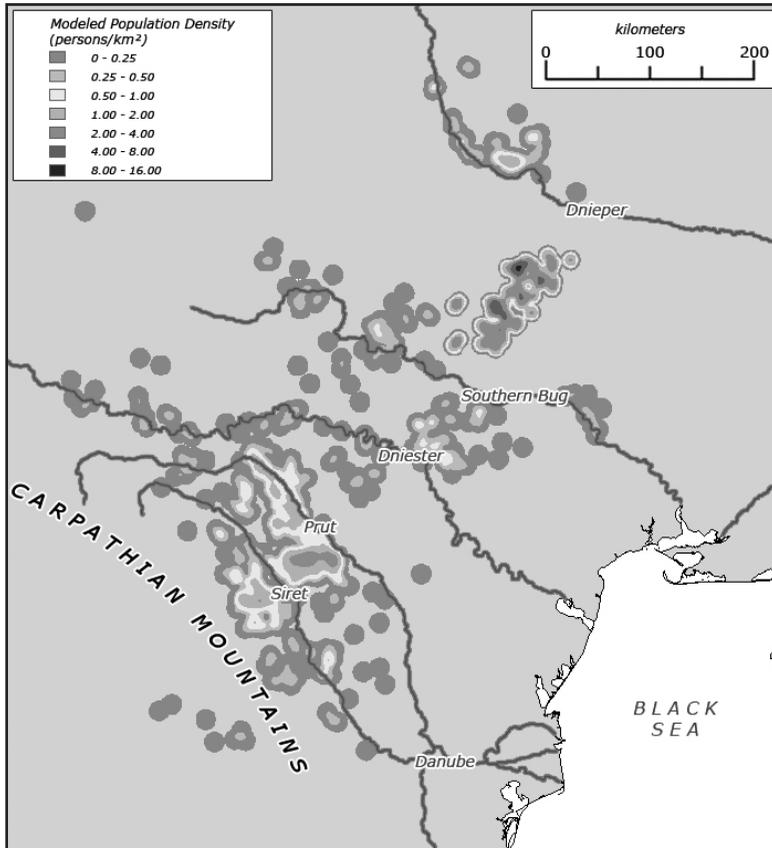


Figure 5: Modeled Cucuteni-Tripolye population densities during the middle of Cucuteni B/Tripolye CI (c. 3750 B.C.E.).

between both periods). Interestingly, despite large numerical differences, Kruts comes to a similar distribution of population, with ~39% (130,000) residing within the SBDI. While the model results here are affected by the sample size (in the case of the SBDI data, roughly 60% of known regional sites), compensating for this still does not approach the values proposed by Kruts. With liberal allowances for data limitation, a peak population of 50,000 individuals seems an upper limit.

To argue my case from the perspective of global population trends, let us examine the estimates of C. McEvedy and R. Jones,⁵³ as well as the growth rates calculated by M. Kremer based on these same data.⁵⁴ The values are: 7,000,000 for world population in 4000 B.C.E., 14,000,000 for 3000 B.C.E., and an annual growth rate of 0.000693. The overall

trend of this model of global population growth is roughly hyperbolic until 1970 C.E., but the growth rates between each model state are abstracted to assume exponential growth. This allows for the interpolation of a value for 3750 B.C.E., given the formula for exponential growth:

$$x_t = x_0(1 + r)^t$$

where x_t is population at time t , x_0 is the starting value and r is the rate of growth, this generates an estimate of 8,325,000 in 3750 B.C.E. Since the Earth's land surface is approximately 1.4894×10^8 km², some simple arithmetic tells us that Kruts's scenario would place 4% of the world's population over an area of roughly seven ten-thousandths of its land surface. By contrast, our values account for 0.3% of the world's

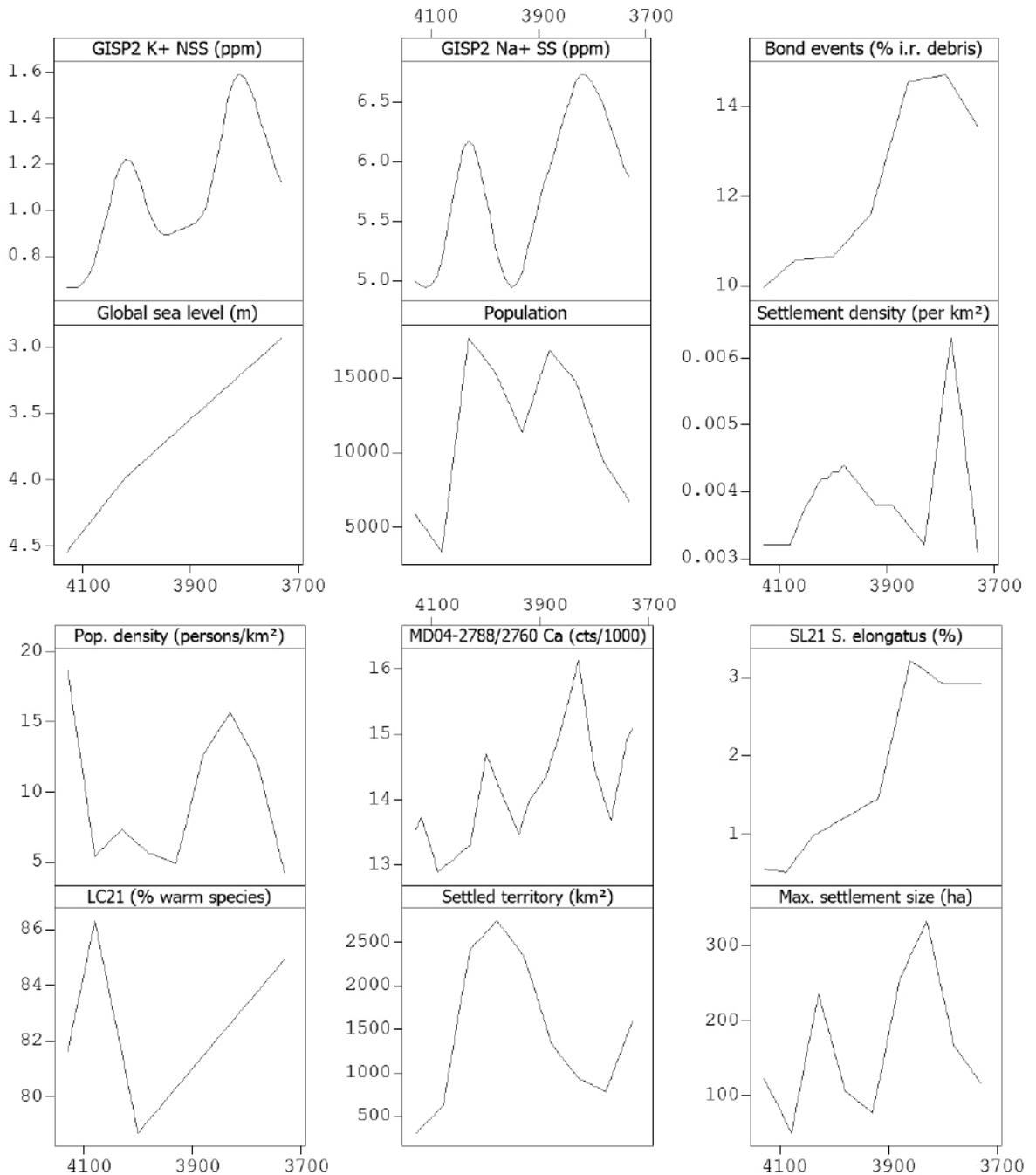


Figure 6: Trends in metrics of SBDI settlement development displayed alongside a variety of paleoclimate proxies. The chief indicator of RCC in the context of this study is the GISP2 K+ data, which measures the strength of the Siberian High pressure system.

population over the same area, of which only one-seventh is actively exploited at this time.

The divergence in values here is due to Kruts's methodology for extrapolating population based on land area. While the settlement data show extensive "no man's land" between local settlement groups, Kruts determines local densities and uniformly extrapolates for entire regions. This leads to inflated values which do not accurately reflect observed settlement patterns. It should also be noted that Kruts's model has a different temporal resolution, and utilizes an older scheme of relative dating without reference to calibrated absolute chronology. Contextualized against the total world population, it is asserted that a peak population value of ~30,000-50,000 for the entire Cucuteni-Tripolye complex c. 3750 B.C.E. is a more plausible scenario.

Assessing Statistical Correlations

The core of the climate analysis lies in the calculation of statistical correlations between climate proxies and data from the model of SBDI settlement development (Fig. 6). The following correlation matrix (Table 6) therefore makes the distinction between correlations between like classes and correlations between unlike classes of data. We are chiefly concerned with the latter.

Aside from calculation of the correlation coefficient to determine the strength of a relationship and interpretation of the p-value to determine the significance of a relationship, results may be weighed on the basis of how many mutually-correlated variables exist within a class. For example, we can see that the measure of maximum settlement size (a_m) is well-correlated with nearly all of climatic measurements – RCC weather systems, North Atlantic ice rafting, Anatolian precipitation, and Aegean sea surface temperature. Taking this variable as a proxy for migratory strength, these correlations provide the strongest support for the idea that giant-settlement development was contingent on climatic variability.

Strong correlations also exist between settlement density (y) and the climate proxies. A negative correlation during periods of peak migration (as indicated by a_m) is to be expected, as population concentrates in solitary giant-settlements. The highly positive correlation seen here is likely due to the periodic emergence of agglomerated settlement systems among the settlements of the Tomashovskaya local group during periods of particularly poor climate. While small-scale migrations are occurring constantly, these organizations may be considered a largely non-migratory climate response. As an example, the second exaggerated peak in the trend line of settlement density corresponds with the development of a dendritic $K=2$ settlement system based around the giant-settlement of Maidanetskoe.⁵⁵

Care must be taken to not ascribe too much confidence to some of the results of the correlation analysis. The variable of global sea level (GSL) was included largely as a control, since these data describe (at this time) simply a near-linear positive increase. The correlation coefficients for a_m and y , versus GSL (0.468 and 0.484, respectively) should be taken as a baseline for interpreting the strength of correlations between these and other variables. Therefore it is more difficult to assess the meaning of received relationships between, for example, y , and Bond Events.

Sea surface temperature data from Aegean cores LC21 and SL21 are also not considered important from the perspective of correlations. They instead are a verification tool for assumptions regarding GISP2 data. On a centennial time scale, high $K+$ and $Na+$ values are correlated with the "cold poles" variety of RCC, but it cannot be assumed that they are accurate predictors of this on a finer time scale. Taken together, they show that the GISP2 peaks relevant to this analysis are indeed periods of relative cold.

The XRF Ca intensity measurements from core MD04-2788/2760 are particularly interesting,

	GISP2 K+ NSS	GISP2 Na+ SS	Bond events	G.s.l.	p	y_s	y_p	BS XRF Ca	SL21 SST	LC21	a_t
GISP2 Na+ SS	0.920 0.000										
Bond events	0.743 0.000	0.775 0.000									
G.s.l.	0.747 0.000	0.678 0.000	0.914 0.000								
p	0.374 0.016	0.381 0.014	0.216 0.174	0.251 0.113							
y_s	0.608 0.000	0.407 0.008	0.359 0.021	0.484 0.001	0.157 0.326						
y_p	0.253 0.111	0.412 0.008	0.453 0.003	0.112 0.487	-0.012 0.942	-0.068 0.671					
BS XRF Ca	0.598 0.000	0.615 0.000	0.741 0.000	0.684 0.000	0.460 0.002	-0.025 0.875	0.433 0.005				
SL21	0.747 0.000	0.777 0.000	0.988 0.000	0.939 0.000	0.269 0.089	0.345 0.027	0.399 0.010	0.786 0.000			
LC21	0.080 0.617	0.225 0.158	0.216 0.174	0.087 0.587	-0.735 0.000	-0.089 0.578	0.169 0.289	-0.172 0.283	0.161 0.315		
a_t	-0.034 0.834	-0.209 0.189	-0.310 0.048	-0.009 0.957	0.641 0.000	0.149 0.351	-0.705 0.000	-0.036 0.824	-0.226 0.155	-0.774 0.000	
a_m	0.669 0.000	0.833 0.000	0.671 0.000	0.468 0.002	0.620 0.000	0.043 0.791	0.617 0.000	0.736 0.000	0.676 0.000	-0.068 0.671	-0.154 0.335

Table 6: Correlation matrix of SBDI settlement data and climate modeling proxies. Dark grey - significant relationships between disparate classes of data; white – significant correlations between like classes of data; grey – uncorrelated data; black – correlation rejected due to poor data quality.

as they illustrate regional variation in weather responses to the RCC mechanism. In this case, since Ca intensity is correlated with the GISP K+ data, we may infer that it behaves similarly to modern weather patterns – in the winter, cold winds from the Siberian High blow southwest along the steppe corridor, at times forming a cyclonic system over the Black Sea that may spawn severe weather. The confluence of cold air and comparatively warm water prompts condensation and precipitation, which is primarily contained within the Black Sea basin. It should be stressed that, despite the proximity of these regions, comparatively

wet conditions in northwestern Anatolia do not preclude (and may actually indicate) dry conditions in the forest-steppe of Ukraine.

Conclusion

The presented results add substance to the hypothesis that climate played a key role in influencing the Western Tripolye migrations. While the data show only two of five major migrations identified in the archaeological materials,⁵⁶ they do not contraindicate the assessment that constant micro-waves of migration continually brought new population into the SBDI. The correlations between

SBDI population observations and climatic proxy data gives us confidence enough to suggest a general relationship – that Manzura’s demographic “steppe valve,” at least during the interval of *c.* 4150-3700 B.C.E. in the Southern Bug-Dnieper region, was determined by trends in the super-regional climate. We focus on these climatic trends due to their influential position at the beginning of a postulated causal chain, which necessarily leads to social and political stresses that prompt migratory episodes. Unfortunately, however, these stresses are inferential and not measurable at this time. Perhaps the results presented here may guide speculation in this area.

Aside from proposed corrections to the population research of Kruts, the findings of this study compliment the extensive body of analytical research into the developmental processes of Cucuteni-Tripolye settlements, as exemplified by the recent modeling of Diachenko.⁵⁷ As archaeologists work to assess and improve upon existing hypotheses of Cucuteni-Tripolye cultural development, we should seek to extend the high-quality analysis of the Southern Bug-Dnieper interfluvium to other regions, while developing a coherent vision of populations at a variety of scales beyond individual regions and local groups. It is hoped that, despite its limitations, the analysis presented here constitutes a step in this direction.

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Endnotes:

- 1 Recent volumes include Korvin-Piotrovskiy et al. 2003; Ciuk 2008; Korvin-Piotrovskiy and Menotti 2008; Anthony and Chi 2010.
- 2 All dates rendered in “B.C.E.” notation are based on determinations of calibrated radiocarbon years.
- 3 Manzura 2005, Ryzhov 2007, Kruts 2008, Diachenko 2010b.
- 4 Manzura 2005, 325.
- 5 e.g. Mantu 2000, Manzura 2005.
6. Bibikov 1965; Masson 1980; Shmagliy 1980; Kolesnikov 1993; Videiko 2002.
7. Kruts 1993.
8. Ryzhov 2007; et al.
9. Rassamakin and Menotti 2011.
10. Diachenko 2010a.
11. Most recently, Diachenko and Menotti 2012.
12. Diachenko 2010b.
13. Previously discussed by many climate authors; see Dolukhanov and Shilik 2007 for a recent example focusing on human responses.
14. Fouache et al. 2011.
15. Fouache et al. 2011, 9.
16. Zbenovich 1996, 205; Manzura 2005, 318.
17. Hassan 1981, 161.
18. Depending on whether one applies Neo-Malthusian (e.g. Zubrow 1975; Hassan 1981) or Boserupian theory of population dynamics in relation to economic “intensification” (e.g. Boserup 1981), or a compromise between the two (e.g. Wood 1998), carrying capacity values are open to debate, as are mechanisms of population regulation. However, few – if any – demographic specialists would accept a general assumption of unchecked growth in preindustrial societies.
19. Hassan 1981, 167.
20. Mayewski et al. 2004.
21. Weninger et al. 2009.
22. Weninger and Harper, forthcoming.
23. Bond et al. 1997, 1260.
24. For more general information on the properties of the RCC mechanism, see Mayewski et al. 2004 and Weninger et al. 2009.
25. Discussed in Weninger and Harper, in press.
26. cf. Diachenko 2010b, 41 (table 3); Rassamakin and Menotti 2011, 646(table 1).
27. Manzura 2005.
28. Diachenko and Menotti 2012, 2814.
29. Rassamakin 2012, 24-29.
30. Rassamakin and Menotti 2011, 650-651 (table 2).
31. This nomenclature for settlement phases is derived from Diachenko and Menotti 2012.
32. Manzura 2005, 317-333 (figs. 2, 3, 6, 7, 12).
33. Diachenko 2010a, 20 (table 1); Diachenko 2012, 2812 (table 1).
34. Zbenovich 1996, 202; Mantu 1998, 246-295; Telegin et al. 2003, 461-462; Rassamakin 2004, 8-9; Palaguta 2007, 97-164; Kruts 2008, 234-236; Lazarovici et al. 2009, 85-166; Diachenko 2010a:20-21.

35. Kruts 2008.
36. Diachenko 2008, 14; Diachenko 2010c, 120-121.
37. A similar value was independently arrived at for another context – the settlement Bernashovka II in the Dniester region (Kolesnikov and Tkachuk 1993).
38. Kruts 1989, 117-126; Videiko 1992, 9-11; Kolesnikov 1993, 36-41; Diachenko 2010c, 114-120.
39. Weninger and Jöris 2008.
40. O'Brien et al. 1995; Mayewski et al. 1997; Meeker and Mayewski 2002; Mayewski et al. 2004.
41. O'Brien et al. 1995; Mayewski et al. 1997; Meeker and Mayewski 2002; Mayewski et al. 2004.
42. Bond et al. 2001; Bond et al. 2008.
43. Brückner et al. 2010, fig. 7.
44. Marino et al. 2009, 3256 (fig. 6).
45. Marino et al. 2009, 3254 (fig. 5).
46. Kwiecien et al. 2008, 113 (fig. 7).
47. Specifically, this study uses the quadratic kernel density function included with ArcGIS 10.0, which is in turn modeled after that of B.W. Silverman (1986, 76 [equation 4.5]). ArcGIS formed the primary environment for manipulation of spatial data, with terrain constructed from the data of Wessel and Smith 1996 and Danielson and Gesch 2011.
48. Hassan 1981.
49. Harper 2012.
50. Formulated by E.S. Higgs and C. Vita-Finzi and mentioned in many sources (e.g. Higgs and Vita-Finzi 1972, 31).
51. cf. Hassan 1981, 41 (table 4.2).
52. Kruts 1993, 235.
53. McEvedy and Jones 1978.
54. Kremer 1993, 683 (table 1).
55. Links between climatic variation and these specific phenomena are discussed at length in Diachenko 2010b; Diachenko 2010c; see also Diachenko 2012, 132.
56. According to Ryzhov 2007, 445-453.
57. Diachenko 2012.

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Ovis/Capra, It's what's for Dinner; Preliminary Analysis of Faunal Material from a Minoan Settlement

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The processing, cataloguing, and preliminary analyses of faunal material from the Minoan settlement of Gournia began during the 2012 excavation season. This included backlogged material from the two previous seasons. Excavations during the past three seasons, under Prof. L.V. Watrous and Ph.D. student D.M. Buell from the University at Buffalo SUNY, have revealed a thriving Middle/Late Minoan Period settlement complete with industry, trade, and faunal material. A specific deposit consisting of faunal material, hundreds of stacked conical cups with other assorted shallow bowls and ceramics found within the palace suggest the practice of a specific ritual event that is not unique to Gournia, but compares favorably to similar deposits from across the island. The goal of this project is to examine this ritual practice through the analyzation of the faunal material in context with the other ceramics in order to extrapolate Minoan cultural practices from ritual activity.

Biological organisms must consume energy in order to survive. As a part of that consumption, numerous waste materials are invariably left over, such as charred seeds, organic residue, and animal bones. Thus, an investigation of these materials reveals the diets and consumption practices of past populations.¹ Archaeologists and analysts must begin their investigations at the very beginning in order to build the best cases on which to base our interpretations. Archaeologists should attempt to interpret these materials beyond simple diet and consumption in order to progress theories beyond those of a deterministic Cultural Ecology or cultural evolution via energy extraction of Steward² and White,³ respectively. As helpful and insightful as these early theories were, we now realize that the shaping of culture was not solely determined by the environment,⁴ especially in later societies consisting of sedentary towns and villages. Choices were often not optimal; rather, choices stemmed from cultural practices and traditions and were acted out unintentionally.⁵ Therefore, a careful analysis of consumed waste material, especially faunal material, can tell us more than the fact that this past population consumed meat. Spatial analyses and contextual studies of primary faunal deposits can give us clues to the cultural and social practices that created such deposits, highlighting certain aspects of cultural activities such as feasts, gatherings, and preparation.⁶ After populations became more sedentary and agricultural, they created other uses for animals based on their cultural practices that went beyond simple consumption.⁷ Eating and other animal uses are as much cultural practices as are ritual and traditions, and the analysis of faunal material alongside the analyses of other cultural materials adds to the interpretations of social practices and cultural changes over time.

Archaeology of Feasts

Faunal analysis has evolved methodologically and theoretically since its origins from simple species lists and fragment counts of a given assemblage from hunter/gatherers to

investigating animal domestication and site formation processes.⁸ In the process of this evolution archaeologists have created methods of analysis which interpret faunal assemblages starting from their original cultural practices, through the taphonomic processes which operate on the material after deposition, up through the subsequent excavation of the material.⁹ Through this process, archaeologists have begun to emphasize their studies on specific events, such as feasts, which have recently become a hot topic.¹⁰

There is a wealth of ethnographic information concerning feasting, and archaeological evidence continues to grow as more and more scholars recognize evidence for this activity in archaeological contexts. There is a wide spectrum of definitions of a feast, from Nerissa Russell's "occasions consciously distinguished from everyday meals,"¹¹ to Michael Dietler's "ritualized social events in which food and drink constitute the medium of expression in the performance of what Cohen has called 'political-symbolic drama,' as contrast to daily activity."¹² Scale is also a question of what constitutes a feast; do they always have to be made up of large gatherings? Most archaeologists today realize that feasts are not always made up large gatherings, but, rather, can be viewed along a spectrum.¹³ The common theme through all definitions of feasts is an event that is markedly different from everyday meals and activity. Feasts are also distinct events that can be more archaeologically detectable than everyday meals, which is another reason for the rise in popularity for archaeological investigations. There are many aspects of a deposit that can suggest a distinct event besides the sheer size and number of specimens. One way is the context of the deposit; faunal remains mixed with other materials such as preparation, serving, and/or drinking vessels often indicates a single or short term event.¹⁴ Nerissa Russell also highlights the presence of special food prepared for feasts.¹⁵ This can be either a richer assortment of species or a more concentrated emphasis on a single species; whichever way, it

is the different balance of taxa than normal that can mark a deposit as a feast. The location of a deposit is also important. Many archaeologists investigating feasting events note that feasting deposits are typically separate from everyday waste, and are usually near the location of the event, such as an open courtyard, open space in the middle of a settlement, a temple or other sacred building.¹⁶

Through feasts, archaeologists examine political and economic relationships,¹⁷ as well as social relationships¹⁸ and the rise of complexity.¹⁹ Brian Hayden, for example, sees the act of competitive feasting during the upper Paleolithic and Mesolithic periods as precursors to the development of agriculture and the domestication of animals.²⁰ According to Hayden, as social leaders were competing for prominence early feasts became more and more elaborate as individuals tried to outdo one another. This continual practice of one-up-manship inevitably led to the domestication of animals and agriculture in order to create larger feasts. Paul Halstead has also suggested that food, and in particular feasts, eventually led to social inequalities in Neolithic Greece.²¹ According to Halstead, during times of hardship and crop failure, households which were suffering would borrow from those who had more, or work in the fields of those who were better off. Over time, this led to debts owed to the larger households which created dependency on the larger houses by those households which were suffering.²²

Evidence for feasting is more apparent, and elaborate, during the Bronze Age and later periods. Of course, textual evidence assists archaeologists working in the Late Bronze Age and later in Greece. Valasia Isaakidou et al. discovered a large sample of burned cattle bones in Room 7 at the Mycenaean 'Palace of Nestor' at Pylos.²³ This sample compared quite favorable to Homer's account of animal sacrifice from the *Odyssey*, as well as later Archaic and Classical sources. The cattle bones had been stripped of their meat and heaped together in the middle of Room 7 in

the palace and then subsequently were burned, presumably as a display and sacrifice to the gods. Isaakidou et al. interpret this display as an Archaic Greek ritual practice that possibly began in the Late Bronze Age.²⁴

Methods of identifying types of feasts have come from archaeological investigations into Bronze Age feasting deposits. Archaeologists contend that, based on the nature of the contextual ceramic sample, one can infer whether a specific feasting event was more inclusive or exclusive.²⁵ According to Halstead and Barrett in their introduction to feasting, highly individualized cups underline the participation of individual actors, while standardized serving vessels emphasize the existence of both groups of 'companions' or close kin served from the same dish, and of a larger collective that shared a common material culture and etiquette of consumption.²⁶ In essence, standardized cups with simple designs represented more communal gatherings, whereas highly specialized, individual cups represented a more enclosed, elite gathering. Therefore, archaeologists concentrated on the ceramic samples from feast deposits, attempting to find 'sets' of drink wares and serving wares in order to determine the nature of the feast.²⁷

Not all feasts occur for specific political or competitive means. Dietler and Hayden, for example, have categorized feasts according to their function.²⁸ Hayden has created an elaborate typology of feasts, sorted into three main categories: alliance and cooperation feasts, economic feasts for gain, and diacritical feasts which are sumptuary for status and display.²⁹ Dietler groups feasts into empowering feasts, which typically serve to enhance the host's prestige; patron-role feasts, which are redistributive and typically maintain and legitimate an existing hierarchy; and also diacritical feasts, which are all about marking off an elite group.³⁰ As Dietler states, "It is possible to move beyond the traditional focus on generalized diet (or 'what they ate') in the archaeological analysis of food by seeing

food as a pervasive and critical element in the articulation and manipulation of social relations.³¹ Newer methods for faunal analysis and archaeological theories, such as theories of practice and structuration,³² allow for this shift in focus to occur.

Faunal analysis as a whole, as well as feasting as a practice, is in the process of being reconceptualized. The practice of feasting is beginning to be examined with as much vigor as the function, or meaning, of the feast. Yannis Hamilakis defines a feast as;

“It is the memory of the distinctive event, of the performances, of the processions, of the violence and sensory effects produced by the sacrificing and killing of animals, of distinctive participants with their elaborate garments, their perfumed bodies and their rare and exotic drinking vessels, of the substances consumed with their psychoactive effects, and so on.”³³

Meg Kassabaum is examining the act of feasting along a continuum, based on the number of participants and its particular social meaning.³⁴ Gender divisions and roles, both during a feast and during the preparations, are now being examined.³⁵ Questions such as, what roles did women play in the preparation of the feast, along with, how gender inclusive were past feasts, are now being investigated along with the typical questions of how big was the feast, and what did they eat.

While feasts and rituals are two separate acts, oftentimes the two occur together. A useful definition of ritual is, “a performance, planned or improvised, that effects a transition from everyday life to an alternative context within which the everyday is transformed,”³⁶ or an event which has an impact on the world.³⁷ Feasts can be either ritualized or secular; it depends on the context and intention behind the practice. The ethnographic record is full of ritual acts involving animals and feasts, and

then the disposal of the remains, typically of wild or hunted game. According to Russell, the context and association of a deposit can reflect ritual action.³⁸ Comparison of sacrificial or ritual deposits to more secular everyday deposits can be a method to illuminate areas of ritual practice in order to delineate different uses of space.

Let us now examine how these definitions of feasting and ritual may relate to the faunal and associated ceramics discovered in the Minoan settlement of Gournia.

Method and Materials

The faunal material for this analysis was collected during excavations at Gournia during the summers of 2010 through 2012. We used an open-air trench method of excavation, segregating individual cultural deposits within trenches into separate loci both horizontally and vertically. Trenches from within the palace at Gournia dry sieved 100 percent of the excavated soil and took a 25 percent soil-sample for flotation analysis. Sieving was done using a 1/8 inch mesh screen. Faunal specimens were then collected and sorted into bags according to the trench and locus from which they were found. Cleaning the specimens was done using a dry-brushing method with soft-bristled toothbrushes and wooden probes to dislodge soil from within bone cavities and crevices. Each identifiable specimen, 3 cm or larger in diameter with diagnostic characteristics, was then identified to an element or a specific taxon or cataloged if the specimen was culturally modified.³⁹ Taxonomic identification was done using a comparative collection from INSTAP (Institute of Aegean Prehistory)/East Crete Center in Pachia Ammos assembled by Prof. Lynn Snyder and consisting of single examples of *Bos taurus*, *Equus ferus caballus*, *Sus scrofa*, *Ovis aries*, *Capra hircus*, *Canis lupus familiaris*, a *Mustelid* and a *Sylvianus*, along with several *Ovi/Caprid* mandibles ranging in relative age from juvenile to adult. France’s “Human and Nonhuman Bone Identification” was also used.⁴⁰ Unidentifiable specimens were not

cataloged but were kept and stored for future analysis.

Trench 10 is a room in the southwest corner of the palace at the Minoan settlement of Gournia, also known as Room 13.⁴¹ This location places it right next to the Baetyl Stone and kernos outside the southwestern corner along the road.⁴² During the Middle Minoan III period (roughly 1900 BCE to 1550/1500 BCE, also known as MMIII) there was no wall separating the deposit from the *kernos* and the Baetyl stone; the cups were placed in and around the two. What is significant is the public access of this practice, occurring along the street.⁴³ It was not until after the Theran eruption that the southwest wing of the palace was constructed, thus incorporating this cult practice physically within the palace during the Late Minoan IB period (roughly 1550/1500 BCE to 1400 BCE, also known as LMIB).

Roughly half of the faunal material recovered from Trench 10 has been cataloged, 303 total identified specimens as of this writing. This deposit is, by far, the largest faunal deposit recovered from Gournia and comprises roughly 75 percent of the total faunal remains identified from the entire site at this time. The deposit ranges in date from MMIII to LMIB, with the majority of the deposit dating to between MMIII and MMIIIA (roughly 1900 BCE to 1700 BCE). Relative dating of each locus and deposit was done based on the associated pottery. Whether this representation is a reflection of the total deposit or simply due to the incomplete catalog is yet to be seen. Trench 10 is the richest deposit in species represented. Besides the typical *ovi/caprids* (sheep and goats) and *sus* (pig) species (each of which are represented from the other deposits) *bos* (cow), *avid* (bird) and fish were also represented. Trench 10 is the only deposit with *avids* and fish represented, with the exception of a questionable talon from Trench 4. The only other *avid* representation is a single carpometacarpus (part of the wing). *Bos*, along with artiodactyls and other large mammals, are almost exclusively represented in Trench

10, except for two *bos* molars from Trench 5, which was determined to be a pottery dump. The deposit was relatively dated based on the conical cups and shallow bowls found in context with the faunal remains. Over 700 conical cups were recovered from this deposit, many of them stacked on top of one another.

The botanical remains are of great interest. An interesting subset of grape pips that were recovered was those surrounded by grape skins in two samples from Trench 10. According to Margaritis, the limited number of pressed grapes could indicate that they are the residues of wine, with the skins having escaped the sieving and ended up in the vessels of the stored wine.⁴⁴ The most striking find within the deposit are the pomegranate remains, found in large numbers in context with the LMIB deposit in Trench 10. As of this writing, they are the first example of this tree found in the archaeological record in Crete and one of the few finds in Bronze Age Greece.⁴⁵ Previously for the Aegean, the earliest iconographic evidence for pomegranates comes from the Middle Bronze Age, and the first botanical finds were from an elite residence at Tiryns from around 1200 B.C.E.⁴⁶ The pomegranate seeds from the LMIB deposit in Trench 10 may have come from trees in nearby gardens or orchards. These trees and their fruit have had strong religious associations with fertility and rites of passage.⁴⁷

The number and richness of the faunal sample in conjunction with the stacked conical cups from two distinct periods found from within the palace all suggest a distinct event or activity. Moreover, Elisabetta Borgna mentions similar Minoan deposits of faunal and associated conical cups which have been found at other sites on the island,⁴⁸ which would indicate that the deposit at Gournia is not unique. Huge assemblages of conical cups have been found in palatial clusters such as at Petras and Galatas and extra-palatial centers such as Nirou Chani. Borgna does not mention faunal remains in association with either of these cup deposits, however, large faunal deposits have been

found at Galatas.⁴⁹ Borgna also mentions an elaborate discard of feasting remains and 200 ordered, upside-down conical cups recovered in the pillar room of House B at Gypsades.⁵⁰

Many archaeologists and scholars have examined feasting events through an analysis of the pottery remains, inferring that the standardized form and surface treatment of conical cups and other wares underplay individual identity in favor of group affiliation in order to promote social solidarity.⁵¹ But who is a part of these groups, who is included and excluded? Besides eating and drinking, what is the nature of these events? A number of faunal analyses of feasting events concentrate on the richness and size of the sample, leaning towards rather functionalist interpretations of social and economic politics. But what happens to the remains after the event, are they segregated from other waste material both physically and conceptually, perhaps still imbued with the residual power inherent in ceremonial remains?⁵² Is the residual power still present in the space the event took place in? And, can comparing the taphonomic processes of secular and non-secular faunal remains prove helpful for future interpretations of other faunal deposits?

While it is extremely difficult to infer the intentionality behind such events, I believe archaeologists need to keep ‘intention’ in mind while making their inferences as a slight lean away from interpretations that may be too functionalist or reductionist. In so doing, I seek to examine this specific Minoan event through the left-over faunal remains, in context with the associated ceramic remains, in order to gain a more in-depth understanding of the event itself and the social practices embedded within it.

Endnotes:

- 1 O’Connor 2000, 3
- 2 Steward 1955, 30-42
- 3 White 1943, 335
- 4 Brumfiel 1992, 551
- 5 Giddens 1984, 9 in discussing Agency and Structuration, Giddens stresses that much of cultural choice comes from unintentional action derived from cultural structuration and not optimality.
- 6 Halstead and Barrett 2004, 6
- 7 Sherratt 1983, 90 this Secondary Products Revolution extended the life and use of animals from food and hide, including yoking for ploughs and wagons, dairy products, and renewable fibers such as wool.
- 8 Crabtree 1990, 155
- 9 O’Conner 2000, 43-53; see also Reitz and Wing 2008, 123-145; Crabtree 1990
- 10 Russell 2012, 379
- 11 Russell 2012, 378; see also Twiss 2008, 419
- 12 Dietler 1996, 89; see also Cohen 1974
- 13 Kassabaum Forthcoming; Dietler 1996, 2001
- 14 Borgna 2004; Dabney et al. 2004; Dietler 1996; Isaakidou et al. 2002; Russell 2012
- 15 Russell 2012, 386; see also Dabney et al. 2004; Isaakidou et al. 2002
- 16 Borgna 2004, 263; Dabney et al. 2004; Isaakidou et al. 2002
- 17 Hayden 1996, sees competitive feasts as precursor to domestication and agriculture
- 18 Dietler 1996:2001
- 19 Halstead 2004, 153; Hayden 1996, 127
- 20 Hayden 1996, see note 18
- 21 Halstead 2004
- 22 Halstead 2004
- 23 Isaakidou et al. 2002, 88
- 24 Isaakidou et al. 2002, 90
- 25 Borgna 2004, 259; Halstead and Barrett 2004
- 26 Halstead and Barrett 2004, 2
- 27 Rutter 2004 looks at ceramic sets in Minoan palatial settings at Kommos from the Middle and Late Bronze Age; see also Day and Wilson 2004, who examine the changing ceramic styles at Knossos during the Early Bronze Age as changing social practices.
- 28 Dietler 2001; Hayden 2001; see also Russell 2012, 381
- 29 Hayden 2001, 38 for a diagram of feast categories
- 30 Dietler 2001, 80-88; see also Russell 2012, 382
- 31 Dietler, 1996, 88
- 32 Giddens 1984
- 33 Hamilakis 2008, 16
- 34 Kassabaum forthcoming
- 35 Dietler 2001, 90; Russell 2012, 380
- 36 Alexander 1997, 139
- 37 Russell 2012, 52
- 38 Russell 2012, 77

39 Cultural modifications include cut marks from butchering, removing the meat and the skin, fractured for marrow extraction, or modified into a tool/decoration. See O'Conner 2000 Ch. 5, and Reitz and Wing 2008 Ch. 8

40 France 2009, very helpful with color photographs from multiple angle

41 Soles 1991, see map of Palace

42 Moore 1903, a Baetyl is a rough, oblong stone placed upright in a location and believed to possess a spirit, which would instigate the ritual activity associated with the stone.

43 Watrous 2012, personal communication via email

44 Margaritis and Jones 2006,

45 Margaritis 2012, forthcoming

46 Ward 2003, 530 discusses different references to pomegranates, such as vases, pendants and beads.

47 Ward 2003, 532

48 Borgna 2004, 262-263

49 Buell 2013, personal com.

50 Borgna 2004, 263 based from the excavation reports from Hogarth from 1899-1900

51 Borgna 2004, 262; Day and Wilson 2004, 45; Halstead and Barrett 2004, 2; Rutter 2004, 78

52 Russell 2012, 390

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Analysis of the Peiting Woman Using Portable X-Ray Fluorescence Spectroscopy

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Portable X-ray Fluorescence Spectroscopy was applied to the skeletal remains of 13 bog bodies and their bog burial environments. The objective was to create a better understanding of Northern European bog environmental chemistry and its diagenetic effects on interred bog bodies, determine bog body geographic disparity and/or origin, and identify if post-discovery preservation procedures were applied to the bog body remains. This paper summarizes the findings for one of those 13 bog bodies: the Peiting Woman from Bavaria, Germany. The elements analyzed include Antimony, Cobalt, Copper, Iron, Manganese, Molybdenum, Lead, Strontium, Titanium, Zinc, and Zirconium.

Introduction

X-Ray Fluorescence Spectroscopy (XRFS) is a categorizing term for several forms of spectroscopic techniques that help to determine and quantify the elemental composition of samples by using X-ray excitation. With the advantage of portability through use of a handheld unit, portable XRFS (pXRFS) provides a non-destructive testing method that offers objective, laboratory grade, presumptive analyses on on-site testing samples, such as metal alloys, mineral deposits, soil samples, and bone.¹

pXRFS can be applied to the analysis of bog body remains in several ways. It can provide information about the diagenetic effects of the bog burial environment on the interred bog body. pXRFS can also help to determine the geographic origin and/or disparity in environmental habitation of bog bodies early and late in life. In addition, pXRFS can allow one to identify whether housing curators and staff applied post-discovery preservation procedures to bog bodies. This research focused on the application of pXRFS to both the skeletal remains and the surrounding burial environment of 13 bog bodies; one of which was the Peiting Woman from Bavaria, Germany. This article summarizes the pXRFS findings for this raised bog body.



Figure 1: Map of Germany highlighting the finding site of the Peiting Woman (see dot).

Background

Peiting Woman

Peiting Woman was discovered in the “Weiten Filz”, a raised bog near the small town of Peiting, Bavaria, Germany (47°48'935” N, 10°58'225” E, Fig. 1) on July 23rd, 1957. Her body was found buried in a wooden coffin, dressed in clothing, and with a pair of apparently unused leather boots (Fig. 2). The entire skeleton was present and complete with much of her torso and upper legs still covered by fatty tissue.² Shortly after recovery, experts performed an autopsy that involved the removal of numerous internal organs, opening of the skull, and removal of the intact brain. The location of these removed organs is currently unknown. Her age was estimated to be between 20 and 30 years old.³ This was based on the following cranial suture fusion characteristics: the spheno-occipital synchondrosis showed signs of beginning ossification, demonstrating an age of 15 or older, and the styloid process and the temporal bone, which physiologically occurs after the age of 25, lacked visible ossification. Cause of death is indeterminate for this female bog body.⁴

Analysis of the wood of the coffin by ¹⁴C radiocarbon dating was undertaken to estimate the age of the bog body indirectly without having to use tissue samples. ¹⁴C dating of the coffin wood revealed an approximate age of 800 years, meaning Peiting Woman presumably died around 1,200 C.E. However, this dating method can only indicate an approximate age; several factors may influence the results obtained, which all involve the tree type used to build the coffin. These factors include tree age, strength, and durability; long-living trees (i.e. oaks or conifers) may overestimate the age of the body.⁵ As a result, ¹⁴C radiocarbon dating of the skeletal remains resulted in a new approximate time of death within the Middle Ages, between 1,290 and 1,370 C.E. and between 1,380 and 1,440 C.E. with a probability of 95%.⁶ Peripheral Quantitative Computer Tomography (pQCT) analysis of



Figure 2: Peiting Woman, a Middle Ages bog body, pictured within her wooden burial coffin.

the skeletal remains revealed a significant loss of cortical Bone Mineral Density (cBMD) of 83.4%. pQCT analysis also applied specifically to the pair of radii present revealed a higher cBMD for the left radius, suggesting left handedness.⁷

Spectroscopic analysis of the tissue's elemental content revealed that the coffin wood was well-preserved. Microbiological testing demonstrated only slight wood decay, considering such an extended period of submersion. The acidic and anaerobic conditions of the bog provided special preservative conditions for the wooden coffin. Additional analysis also revealed that the boards (i.e. sides, bottom and lid) were made of spruce (*Picea abies*), and the dowels used for fastening the boards were made of ash (*Fraxinus excelsior*). There were too few growth rings present to determine a dendrochronological age of the coffin reliably.⁸

Our examination of the skeletal remains additionally determined this individual to be a probable Caucasian female. Based on her erupted third molars and the limited visibility of her long bone epiphyseal-diaphyseal union sites, we could only narrow her age to greater than 20. Her stature range is 4 ft 7 in to 5 ft 9 in (1.43 m – 1.80 m) based on maximum lengths of visible long bones. We believe

that entombment within the wooden coffin prevented the effect of bog compression and warping of the skeletal remains.

Preservative treatment applied to the remains involved metal coiling used to keep the forearms and hands in anatomical position (Fig. 3). The sites of application include the proximal and distal ends of both radii and ulnae, as well as throughout the carpal bones and phalanges of both hands. Peiting Woman is currently stored at the Archaeological Staatssammlung in Munich, Germany.

Procedures

During the summers of 2009 to 2011, elemental readings were collected using an Innov-X Alpha Series analyzer. The Peiting Woman was investigated in 2010. The body was scanned three times at various pre-determined anatomical areas to enable the most accurate average concentrations for elements of interest as measured in parts per million (ppm). These averages were used to create a concentration range for each element of interest. Each scan lasted 30 seconds.

Since we were unable to visit the discovery site of the Peiting Woman during our investigations, we used geochemical soil data standards collected by the German



Figure 3: Metal coiling used to keep the forearms and hands in anatomical position (see arrows).

Federal Institute for Geosciences and Natural Resources instead.⁹ These soil standards were taken at 5 km increments (5 km, 10 km, 15 km) relative to the estimated discovery site to assure the correct soil elemental concentrations of the actual finding site were being compared to the bog body found at that location. After assembling all recorded measurements for the bog body and her discovery site, we compared the elemental composition of the teeth and bones to the elemental concentrations of the excavation environment, using pXRFs and the process of fluorescence.¹⁰

For this research, we compared bone, soil, and tooth Strontium (Sr) concentrations to determine if this individual migrated between infancy and death, and her possible birthplace. During childhood when permanent teeth become set in an individual's maxilla and mandible, Sr levels accumulated during that period of tooth development become fixed within the dental enamel and remain unchanged throughout life.¹¹ Alternatively, the Sr content of the individual's bone constantly changes throughout life because bone regenerates its chemical constituents continuously.¹² By comparing the Sr concentrations in bones and teeth to those in specific geographic regions, one can determine whether an individual migrated between infancy and death, and sometimes can even identify the location of his/her birthplace.¹³

To assess potential bog diagenetic effects, we also measured Copper (Cu), Iron (Fe), Manganese (Mn), Molybdenum (Mo), Lead (Pb), Zinc (Zn), and Zirconium (Zr). These concentrations were also used to assess the application of post-discovery preservation procedures. In addition, to further support or reject evidence of the application of preservatives, we evaluated the elemental concentrations of Cobalt (Co), Antimony (Sb), and Titanium (Ti).¹⁴

Hypotheses

We hypothesized that the Sr concentrations of the bone and teeth measurements for the Peiting Woman and the corresponding discovery site soil samples would be similar. This hypothesis would support the conclusion that this bog body was native to her discovery site. In addition, we hypothesized that the chemical composition of the raised bogs would alter the elemental concentrations of the bog body. Further, the elements analyzed would show incorporation into her bone and teeth with elevated elemental concentrations much higher than those of normal bone and teeth. Unlike the other elements analyzed, however, we hypothesized that Sr should withstand the diagenetic effects of the raised bog and maintain its bodily elemental concentrations accumulated during life. Lastly, we believed that pXRFs would verify that the remains

of the Peiting Woman underwent additional elemental incorporation due to post-discovery preservative procedures conducted by curators and staff at her housing museum.

Results

Geographic Origin and Migration Studies Using Strontium

The Sr level measurements for the bone, tooth, and geochemical soil data standards could not be used reliably to determine the geographic origin and migration history of the Peiting Woman. Within the submerged, acidic environment of a raised bog, both bone and tooth material is subjected to both Sr leaching and incorporation. Sr has the same charge and a similar atomic radius to Calcium (Ca) in the form of Sr²⁺ and Ca²⁺; thus, sphagnum and humic acid will specifically select for Sr, as they do for Ca.¹⁵ In addition, the increased solubility of hydroxyapatite under environmental conditions with a pH lower than 6.0 greatly facilitates Sr leaching.¹⁶ Finally, Sr incorporation can occur by free Sr ions penetrating the porous composition of the bog body bone and teeth through precipitation and ionic exchange from the surrounding soil. Consequently, the Sr concentration readings taken from raised bog body bone and teeth do not provide accurate reference values for determining the geographic origin and migration of bog bodies.¹⁷

Bone measurements and soil standards were compared to support or refute that bog diagenesis affected the remains of the Peiting Woman (Table 1). Inspection of the data

displayed in the corresponding graph and boxplot reveals that the bone and tooth Sr levels do not fall within the soil Sr range (Graph 1, Fig. 4). As a result, one can analyze the data statistically, using the one-way ANOVA and pair-wise comparisons, to demonstrate the extent of significant difference between the body and soil Sr levels. The resulting F-value ($F = 74.05$) is significant for the one-way ANOVA analysis (Fig. 4). To determine which groups demonstrated significant difference, pair-wise comparisons revealed significant differences in both bone and tooth Sr levels from those of the soil ($p < 0.0001$), while bone and tooth levels did not differ significantly from each other ($p = 0.9778$).

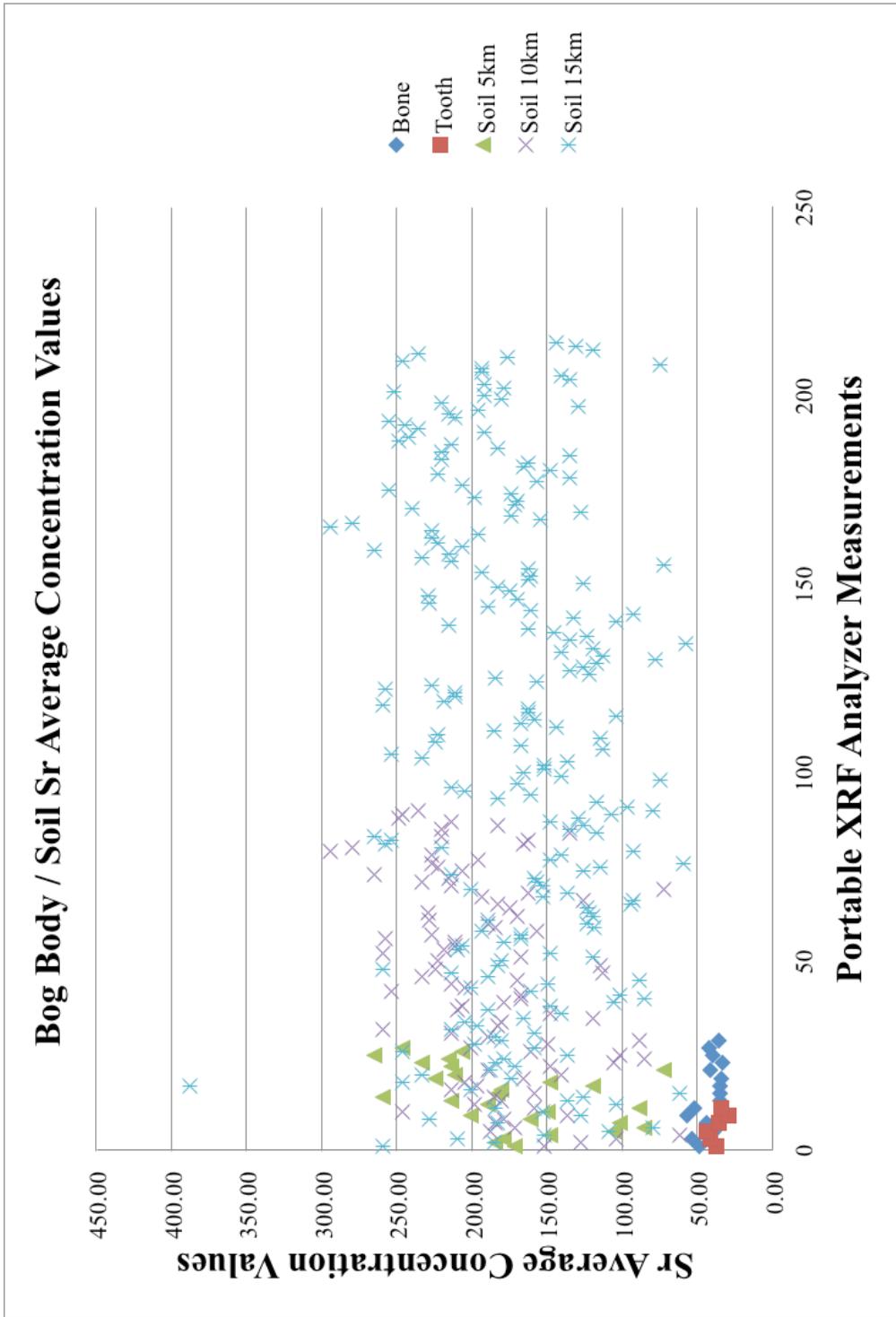
These findings, however, may not refute bog diagenesis occurring within the raised bog environment. One could hypothesize that the ranges do not correlate when comparing teeth and bone to soil for Peiting Woman because of her unique burial circumstances. Her wooden burial coffin may have impeded equilibrium of Sr concentration between her skeletal remains and the surrounding raised bog environment. This does not, however, imply that the bone and teeth were unaffected by the surrounding environment. This ancient wooden coffin was not impermeable. Skin and tissue deteriorated considerably from her upper body, mainly the arms and head. These bones had turned a brownish/blackish color, similar to other bog bodies put in direct contact with the water of the raised bog. Acidic bog water may have still seeped into the coffin to some degree, causing leaching of Sr from the bones and teeth and/or free Sr ion exchange. Since the bone and teeth

Bog Body and Range/Site Type	Sr ECR* (ppm)
Bone Range	22.00 – 57.00
Tooth Range	29.33 – 44.00
Soil 5km Range	73.00 – 265.00
Soil 10km Range	62.00 – 295.00
Soil 15km Range	62.00 – 295.00

*ECR = Elemental Concentration Range

Table 1: Body / Soil Sr Concentration Ranges

Graph 1: Body / Soil Sr Average Concentration Values



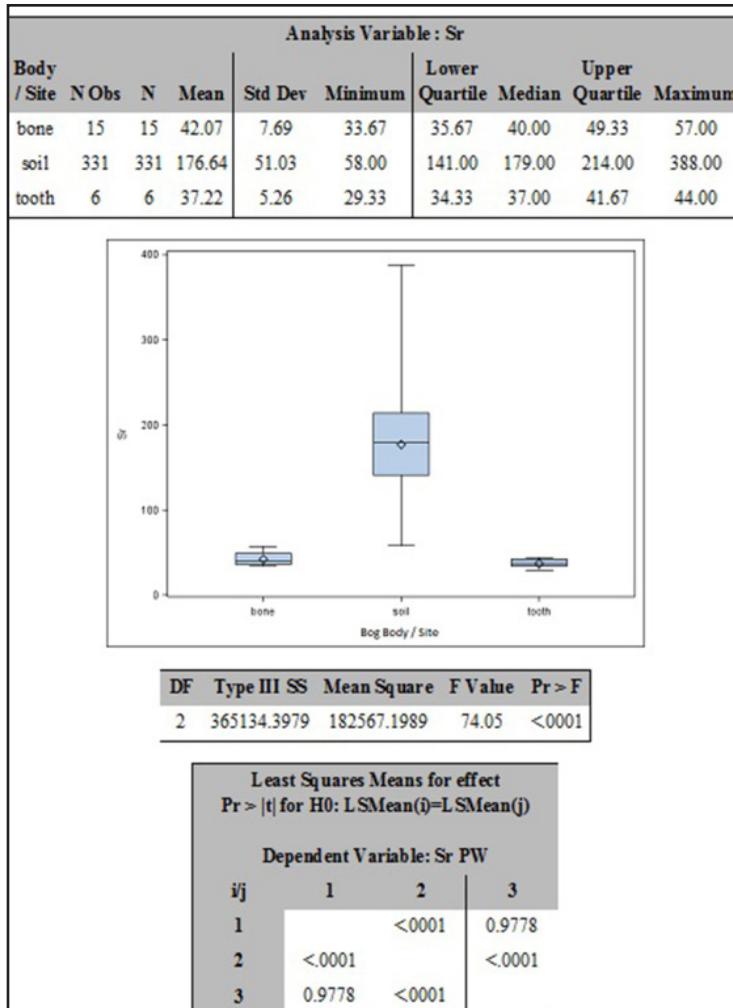


Figure 4: Boxplots, one-way ANOVA, and pair-wise comparisons for bone, soil, and tooth Sr data.

levels did not mimic that of the surrounding bog soil, the wooden coffin may have impeded ionic exchange so all that could affect the bone was Sr leaching. The similar ranges of Sr for both the teeth and bone of Peiting Woman may affirm leaching and/or incorporation, but it may also support that Peiting Woman was not native to her burial site. She may have grown up and even died elsewhere, accumulating similar Sr concentrations in her bone and teeth from that environment, and then been buried in the peat bogs of Peiting. Measuring the bones covered entirely by adhering skin, fat, and muscle found either in the abdomen or lower

legs may help to support whether the bones exposed in the coffin were contaminated or not. Unfortunately for these investigations, such examination was not permitted.¹⁸

Raised Bog Body Elemental Composition

Repeated measures ANOVA with bone locations was added as a random effect to compute 95% confidence intervals (CIs) for the overall mean element values to determine statistically if bog diagenesis affected the other elements of interest. These intervals were then compared to normal human bone elemental

ranges for each element of interest to test whether significant difference occurred among them (Table 2).

Similar to the diagenetic effects on the bone and teeth Sr levels, diagenesis in this bog environment also affected the other elements of interest for the Peiting Woman. Each of the elements of interest demonstrates elemental concentration levels, as well as CIs, that are noticeably, if not exceedingly, greater than levels found in normal human bone, except for Sr (Tables 2 and 3). Such noticeable increases in elemental concentrations suggest that elemental incorporation occurred within the bone and dental remains.

As discussed previously, the Sr concentration levels were affected by bog diagenesis and

appears unusable as biogenic indicators of geographic origin and migration for the bog body. From the levels reported, it seems leaching has occurred and the levels are greatly reduced compared to what they were in life for these individuals. This may be supported by Peiting Woman’s Sr concentration range demonstrating that its maximum (40.00 ppm) is the minimum range of 40.00 ppm in normal human bone (Table 3). Incorporation due to free Sr ionic exchange is also possible. As the majority of the Sr was leached from the bones, free Sr ions may have also been incorporated. One can suggest that the wooden coffin enclosing the body of Peiting Woman impeded the process of leaching and ionic exchange of free Sr ions, creating a disparity between the surrounding bog Sr levels and the body itself.

Element of Interest	CIs
Cu	17.06 – 71.30
Fe	97.36 - 304.77
Mn	288.03 - 362.61
Mo	5.83 - 14.54
Pb	1.33 - 76.17
Sr	33.90 - 48.90
Zn	389.75 - 1336.36
Zr	30.75 - 52.23

Table 2: 95% Confidence Intervals (CIs) for the mean of Elemental Readings

Element of Interest	Normal HBR* (ppm)	ECR
Cu	0 – 19.63	0 – 100.33
Fe	100.00 – 300.00	58.00 – 463.67
Mn	2.00 – 10.00	231.00 – 457.67
Mo	< 1.00	3.67 – 16.67
Pb	0 – 4.00	6.67 – 147.00
Sr	40.00 – 400.00	29.33 – 40.00
Zn	164.00 – 256.00	251.33 – 1575.33
Zr	0 – 5.00	24.67 – 60.00

*HBR = Human Bone Range
Data sources¹⁹

Table 3: Elemental Composition of the Peiting Woman

Post-Discovery Preservative Implementation

The remains of the Peiting Woman demonstrate post-discovery preservative implementation. The bone and teeth measured exhibit elevated levels for certain elements of interest at specific sites, which suggests elemental incorporation occurred (Table 4). This bog body may also demonstrate exceedingly high levels of metallic or metalloid elements that are usually found in lower concentrations in human bone and are not found in high concentrations in the raised bog environment. These elements include Co, Sb, and Ti. These specific elements are absent or do not reach levels minimally detectable by the pXRFS analyzer in the raised bog body bones and teeth not treated post-discovery with preservatives (Table 5).

The particular sites on the remains of Peiting Woman that exhibit excessively high elemental concentrations are both capitates, right hamate, right second metacarpal, left first metacarpal, fourth and fifth medial phalanx of the right hand, second proximal phalanx

of the left hand, both trochleae of the humeri, both radii, and both ulnae. Concentrations of both Fe and Mn are elevated (Table 4). Comparing CIs between treated and untreated bone statistically supported Fe as an element of differing intervals, but revealed a general overlap when comparing the CIs for Mn (Tables 2 and 6). Co was also found at excessively high concentrations at these specific sites (Table 5). These sites of enhanced elemental levels correspond with the areas of the body wrapped in metal coiling.

Conclusion

Applying pXRFS to the analysis of the Peiting Woman has provided much valuable information about the interactions between the bog environment and the remains of this bog body, and verified that post-discovery preservative treatment occurred during the conservation process. Because diagenesis may have occurred in this raised bog body, we conclude that one cannot apply data involving Sr concentrations to geographic origin and migration studies.

Element of Interest	PDPI Sites ECR	Unaffected Sites ECR
Cu	13.00 – 29.00	13.00 – 100.33
Fe	76.00 – 112978.67	58.00 – 463.67
Mn	101.50 – 786.67	231.00 – 457.67
Mo	5.33 – 26.33	3.67 – 16.67
Pb	9.00 – 89.00	6.67 – 147.00
Sr	22.00 – 49.67	29.33 – 57.00
Zn	68.67 – 1758.67	251.33-1575.33
Zr	26.00 – 51.67	24.33 – 60.00

Table 4: Elemental Concentration Ranges of Post-Discovery Preservative Implementation (PDPI) Sites vs. Unaffected Sites

Element of Interest	Normal HCR	ECR
Co	0.01 – 0.04	38.00 – 127.00
Sb	0.01 – 0.6	<LOD 218.00
Ti	0 – 40.00	<LOD 2435.00

Data sources²⁰

Table 5: Additional Elements of Interest in PDPI Analysis

Element of Interest	CI _s
Cu	13.74 – 26.16
Fe	333.35 – 1534.26
Mn	236.23 – 368.81
Mo	9.00 – 17.33
Pb	15.51 – 42.91
Sr	32.14 – 39.64
Zn	232.81 – 736.04
Zr	36.54 – 45.46

Table 6: CI_s for PDPI Elemental Values

Sr measurement ranges of bone and teeth for the Peiting Woman are not similar to those of the local geochemical soil standards. The similar ranges of Sr for both the teeth and bone of Peiting Woman may affirm leaching occurred to the body, but that the difference between those levels and the surrounding environment may also suggest that incorporation by ionic exchange was impeded, thwarting equilibrium of Sr concentrations between the body and the bog. Thus, it is likely she was not native to her burial site.

Each of the elements of interest demonstrates much higher elemental concentration levels than those found in normal human bone. These findings suggest that elemental incorporation occurred to this raised bog body during interment within the bog. Thus, pXRFS can assist with developing further understanding of the diagenetic effects of the bog to the bog bodies and augment the concept of chemical processes occurring within the bog.

Excessively high elemental values on specific sites on the remains of Peiting Woman suggest post-discovery preservative implementation occurred. PXRFS improves comprehension of archival collection history of bog bodies by identifying sites of post-discovery preservation implementation. This information could aid future preservation efforts by allowing curators to know the elemental composition of undocumented treatment conducted on the bodies. It can also allow one to assess the

possibility of reversing or lessening the effects of detrimental preservative treatments to the bog bodies.

Endnotes:

- 1 Arai 2006, 1-2; Granite and Bauerochse 2010a, 69; Bonizzoni et al. 2011, 252; Kenna et al. 2011, 395; Polikreti et al. 2011, 2889-2890.
- 2 Haas-Gebhard et al. 2009, 239.
- 3 Haas-Gebhard et al. 2009, 240.
- 4 Pestka et al. 2010, 396.
- 5 Pestka et al. 2010, 396-398.
- 6 Haas-Gebhard et al. 2009, 240.
- 7 Pestka et al. 2010, 396.
- 8 Rehbein et al. 2009, 320.
- 9 Fauth et al. 1985; Granite and Bauerochse 2010b, 98.
- 10 Granite, G. 2012, 60; Granite and Bauerochse 2010a, 71.
- 11 Budd et al. 1998, 121; Nafplioti 2008, 2310.
- 12 Slovak et al. 2009, 159.
- 13 Fowler 2007, 22.
- 14 Granite, G. 2012, 28, 228.
- 15 Katzenberg 1984, 4; Price 1989, 126-130; C. Vogt, personal communication, May 11th, 2011
- 16 Price 1989, 150.
- 17 Granite, G. 2012, 45.
- 18 Granite, G. 2012, 181.
- 19 Budd et al. 1998, 132; Emsley 2003, 30, 451; Fauth et al. 1985; Gilbert, Jr. 1977, 92-93; Katzenberg 1984, 14-15; Kenna et al. 2011, 395; Lambert et al. 1979, 119; Miculescu et al. 2011, 1118, 1122; Nafplioti 2008, 2311; Polikreti et al. 2011, 2894; Price 1989, 135; Scancar et al. 2000, 195; Wildman and Medeiros 2000, 278-280.
- 20 Barbalace 2006, June 9a; Barbalace 2006, June 9b; Barbalace 2006, June 9c; Budd et al. 1998, 132.

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Warrior Burials and the Elevation of a Military Elite in LHIIIC Achaia

Heidi Senn

*The collapse of Mycenaean civilization around 1200 B.C.E. left in its wake not only displaced and vulnerable settlements, but also a kind of ‘structural vacuum’ which forced populations to re-establish settlement patterns without the strict guidance of what had been a highly stratified and hierarchical authority under the Mycenaean palace centers. In a remote north-western region of ancient Hellas, the evidence of the so-called ‘warrior graves’ suggests that Achaian communities sought a decidedly military solution to the problems of re-organization and definition which confronted the reeling post-palatial population. In this article I will argue that the Achaian warriors, entombed so respectfully with the tools of their trade, were representative of a newly elevated military elite. **

Introduction

At the turn of the 13th century B.C.E. Mycenaean palatial society collapsed abruptly, after centuries of relative prosperity and progress.¹ This collapse involved a series of violent destructions at many of the palaces and occurred after half a century of growing instability for Mycenaean society.

The collapse also cleared the way for the Hellenic world to be re-formed under a new set of demands. The succeeding era is known as the 'post-palatial' or Late Helladic III C period (LHIIIC). This period was essentially a century and a half (c.1200 to 1050 B.C.E) of almost constant instability, and a time which witnessed the large-scale movement of peoples, the foundation and abandonment of sites, and continued military unrest.²

Funerary customs are a particularly profitable body of evidence for the LHIIIC period. In this case, LHIIIC burial rites seem to have been carried out in much the same way as the preceding period. At a time of general unrest, as William Cavanagh and Christopher Mee suggest, "in a broad sense people clung to their traditional practices."³ For instance, inhumation continued to be the norm, though cremation does begin to appear to a limited degree across parts of post-palatial Greece.⁴ Chamber tombs continue to be used, albeit constructed with a lesser degree of architectural sophistication than previously.⁵ Grave offerings, however, do become comparatively meager in the post-palatial period, in terms of both quality and quantity.⁶ Rich LHIIIC burials nevertheless do exist, and in some cases we are able to discern signs of rank or status based on these items. In this respect, the phenomenon of the warrior grave allow a particular insight into the ideology and behavior of elites in certain LHIIIC societies, and it is to this end that the following discussion is addressed.

Palatial and Post-Palatial Achaia

Following the initial collapse of the palaces around 1200 B.C.E., signs of conflict remain within the archaeological record for a lengthy period of time. At approximately the end of Early LHIIIC, several sites across the mainland and Aegean islands suffered further destructions, and can in some cases be directly linked with the activities of war. For example, the Lower Town of Tiryns suffered destruction in Early LHIIIC and subsequent abandonment.⁷ By Middle LHIIIC, the sites of Phylakopi on Melos and Koukounaries on Paros had also suffered destructions and after a relatively short settlement history they too were abandoned.⁸ In fact, by the end of Middle LHIIIC Mycenae, Lefkandi, Tiryns, Aigeira, and Kynos/Livanates, all suffered yet further destructions.⁹ The discovery of a number of hoards - material wealth deposited hastily in times of insecurity - further leads us to conclude that the LHIIIC period was by no means a peaceful time.¹⁰ The rise in popularity of warrior burials in the post-palatial period should then be placed into this context of widespread unrest, and understood within a time frame in which communities were forced to maintain high levels of military preparedness.

The archaeological record is our only source of information regarding the character of Achaia in this period, and the particularly high incidence of LHIIIC warrior burials is one of its most notable features (Fig. 1). During the palace period, the region of Achaia had never been a major palatial center, but had remained on the periphery of the Mycenaean world, supporting less concentrated, less centralized settlement patterns. When the palaces collapsed and major centers of Mycenaean activity were abandoned, Achaia experienced a reversal of fortune, and the archaeology demonstrates an increase in both material prosperity¹¹ and population.¹² Thanasis Papadopoulos has examined this pattern and suggests

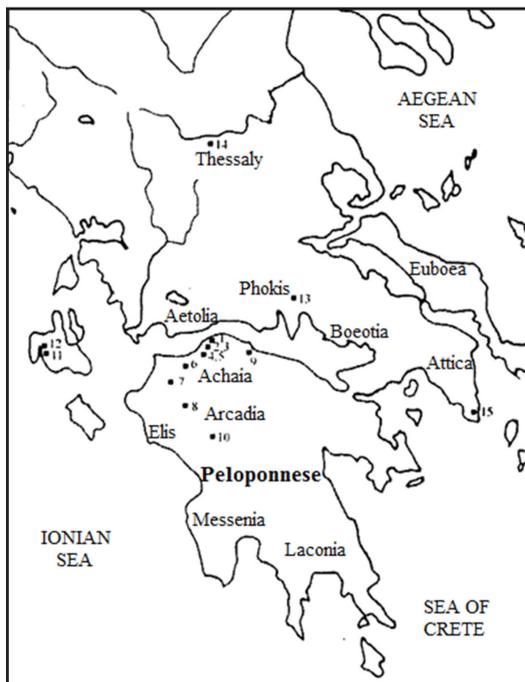


Figure 1: Map of the Greek mainland detailing the occurrence of LH III C warrior burials. A concentration of burials is evident in the region of Achaia. 1 Patra-Klauss; 2 Krini; 3 Monodhendri-Hagios Konstantinos; 4 Kallithea-Spenzes; 5 Kallithea-Langanidia; 6 Lousika-Spaliareika; 7 Kangadi; 8 Portes; 9 Nikoleika; 10 Palaiokastro; 11 Kephallonia/Lakkithra; 12 Kephallonia/Dhiakata; 13 Delphi; 14 Hexalophos; 15 Perati (after Deger-Jalkotzy 2006, 154; courtesy S. Deger-Jalkotzy).

that a convergence in Achaia of refugees from the failed palace centers may have brought with them the new equipment of warfare that found its way into these conspicuous LHIIC burials.¹³ I would further suggest that new elements, such as the boar's tusk helmet and bronze greaves may be representative of, and may have contributed to the process of 'militarization' that Achaia appears to have undergone in the post-palatial period. The instabilities of the time contributed to the development of an altered settlement pattern, and as Papadopoulos states, "the inhabitants of Achaia [became] fairly

warlike and the communities prepared to defend themselves."¹⁴ Papadopoulos has further suggested an interesting model for this new organization, which sees the possible maintenance of Mycenaean-like organization under the control of a military elite who were in charge of various communities. These populations were in turn dependent on a central stronghold, like the one at Teikhos Dymaion.¹⁵

I would suggest an alternative model, whereby the communities of Achaia may have maintained relative independence of each other, and would for this reason have required the guardianship of powerful military figures even more so than the network proposed by Papadopoulos. The archaeological record has provided evidence of destructions at Achaian settlements such as Teikhos Dymaion in Early and Late LHIIC, and at Aigeira in Middle LHIIC.¹⁶ These communities seem to have experienced some form of conflict or competition at various points in the LHIIC period, and would have therefore required a strong defensive element. Hence the notable occurrence of warrior burials, spread amongst different cemeteries and associated with isolated settlements across the region. There is no reason to believe that a peripheral region such as Achaia would have spontaneously developed a Mycenaean-like centrally organized structure where there had never been such a network before and an influx of settlers will have made the idea of central organization even more unsustainable.¹⁷ Either way, the relative prosperity of Achaia during the LHIIC period, coupled with a high incidence of warrior burials, is best explained by the growth in relevance and status of a military elite whose responsibility it was to maintain organization and defense in uncertain times.

Characteristics of Warrior Burial

The burial of warriors in Mycenaean culture (approximately 1600 to 1200 B.C.E) appears to have involved just as much ceremony and respect for the dead as any elite burial, military or otherwise. While warriors were well-represented among the Mycenaean elite, it was in the LHIIIC period that signs began to indicate that the status and importance of their role had been greatly enhanced.

The features that define a burial as a military one are the weapons and defensive equipment employed by and eventually interred with the deceased. Swords, spears, and javelins were the most common, along with knives or daggers of various types.¹⁸ Less common were greaves, shield bosses, arrow heads, bows, axes, and boar's tusk helmets.¹⁹ Combs, golden and bronze rings, razors, mirrors, and tweezers were also frequent companions to the warrior grave.²⁰

The Naue II sword has proved to be one of the most important elements in the panoply of an elite Greek warrior in the post-palatial period. The Naue II sword is believed to be a Hellenic interpretation of prototypes imported from Europe in the second half of the 13th century, and by the LHIIIC period, it had replaced traditional Aegean types as the most successful cutting and thrusting weapon.²¹ The swords predominated over Imma Kilian-Dirlmeier's contemporary thinner and shorter Type G and F Aegean blades, and measured between 60 and 80 cm in length and approximately 4 cm in width across the blade. The warrior burial at Krini sported such a sword, and included rare fragments of the scabbard (Fig. 2).²² The Krini blade was cast in a two-piece mold, and featured a swelling handgrip and flanged hand-guard. Sloping shoulders joined smoothly to the blade, whose straight edges tapered to a point, and included a midrib and elliptical

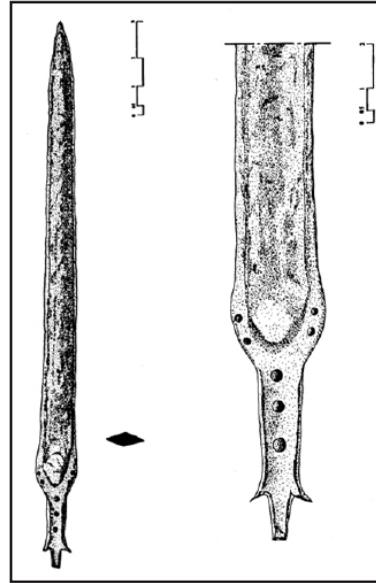


Figure 2: Rendering of the bronze Naue II type sword associated with warrior burial D, tomb 3 from Krini, Achaia (Papazoglou-Manioudaki 1994, 178; courtesy L. Papazoglou-Manioudaki).

section, as well as ‘blood channels’ down its edges.²³ The weapon is clearly well-crafted and indicative of its owner’s social standing. This type of expensive sword would have belonged exclusively to the elite, while the spear seems to have remained the most popular weapon among warriors of lower rank and means (Fig. 3).²⁴ The presence of a Naue II sword therefore allows us to identify a burial as not only a martial one, but also to distinguish its occupant as a member of the military elite.

Scholars frequently note a decided increase in the number of warrior burials belonging to the post-palatial period,²⁵ the majority of which date from the Middle to Late LHIIIC phases.²⁶ Despite the marked rise in warrior burials following the collapse of the Palaces, excavators note that even in the larger cemeteries, no more than one or two examples have been found together, with warrior interments instead surrounded by non-military burials.²⁷ In this way, the warrior burials were made

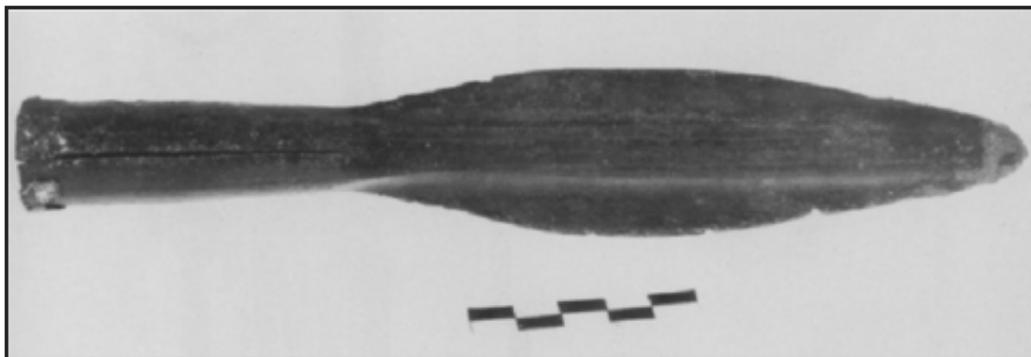


Figure 3: Photograph of a bronze spearhead, discovered in chamber tomb 3 at Krini, associated with burial D. This particular example of the Cretomycenaean type measures 22cm in length, and 3.2cm at its widest point (Papazoglou-Manioudaki 1994, pl. 27c; courtesy L. Papazoglou-Manioudaki).

conspicuous among other members of a given community, and I would argue that this may have been a direct reflection of the high valuation of military status at a social level.

The region of Achaia in northern Greece offers some of the best examples of the warrior burial phenomenon in post-palatial times. Under Sigrid Deger-Jalkotzy's figures, several dozen warrior burials have been attributed to the area within and around Achaia in the LHIIIC period.²⁸ Few earlier martial burials have been discovered within this area, and in the region of Patras, no precedent exists.²⁹ The numbers of actual weapon types discovered within Achaia are also significant. Lena Papazoglou-Manioudaki notes that only four or five Mycenaean swords of pre-LHIIIC date have been discovered in Achaia,³⁰ while in the post-palatial period, 13 Naue II swords were interred with burials, particularly in the northwest.³¹ Thus far at least six LHIIIC Naue II swords from the Peloponnese have been discovered, along with other examples of less certain date and context,³² as well as swords of Mycenaean type G or F. The increase in finds and types of other offensive and defensive equipment lends further weight to the argument that military skill underwent a definite re-valuation in the LHIIIC period.³³

An additional change in the burial customs of this region is the shift of emphasis from daggers to swords as the defining feature of warrior burials from palatial to post-palatial times.³⁴ It is possible to surmise, given this shift in focus, that the sword - being of greater value in its more elaborate design and its stricter function as a weapon of war - had acquired greater symbolic and practical value during the LHIIIC period. In these turbulent times, military leadership was highly advantageous, and upward mobility based on personal ability was a definite option. The weapons that were unique to the warrior craft were thus accorded greater popularity and respect in practical use, as in burial.

What this evidence suggests is an alteration in the social structure of post-collapse Achaia, one which involved the re-valuation of both the warrior and the tools of his trade. The changes were effected by the Mycenaean collapse and offered the possibility of local power, based on personal capability. In Achaia it seems to have been the warriors who stepped into the leadership role. It was they who were called upon to guard communities against the continuing threat of conflict which plagued the Mediterranean world in the LHIIIC period.

The LHIIC Warrior Burials

Discovered in the chamber tombs of western Achaia, warrior burials of the LHIIC period provide us with a unique insight into the workings of post-palatial society. In the Patras and Dyme region of western Achaia alone, 23 such burials have been identified in the cemeteries of Voundeni, Klauss, Krini, Kallithea, Lousika, Kangadi, and Portes (see Fig. 1).³⁵

Chamber Tomb 3 at Krini near Patras is an excellent example of a typical Achaian warrior burial. The roughly circular chamber of approximately 3 m in diameter contained two separate layers of burials and has been dated to the Early to Middle LHIIC period.³⁶ The upper layer contained the inhumation burials of four individuals arranged parallel to one another, each with their heads closest to the back of the chamber.³⁷ Resting by the skull of Burial A, a pile of pottery was uncovered, which probably constituted the combined burial goods of all four individuals.³⁸ Burial D contains a warrior who was laid neatly on his side in a contracted position. Lying beside the warrior was the body of a woman, whom the excavators suspect may have been his wife or companion and who was probably buried at the same time (fig. 4).³⁹ By the warrior's right hand, a sword of Naue II type was placed, still in its scabbard. An oval spearhead was also discovered pointed towards the back wall with a part of its wooden shaft preserved within its socket. The warrior wore a silver ring on his right forefinger, and a bronze spiral ornament and ivory comb have also been associated with his grave. The architectural formation of the tomb, the orientation of the bodies towards the door and for the most part the assemblage of grave goods associated with Burial D represent a typical case of warrior burial in LHIIC Achaia. Following Deger-Jalkotzy, I would suggest that this burial also represents an individual whose person, personal equipment and therefore

his warrior status has been treated with 'exceptional respect'.⁴⁰

The excavators of the Spaliareika cemetery near Lousika have recorded an 'extraordinary' series of military burials within a single tomb.⁴¹ The latest burial, dated to Advanced/Late LHIIC, was found in association with an incense burning ritual evidenced by a layer of burnt ashes and earth heaped over a pit burial covered by stone plaques. The assemblage of weapons is both rich and varied. Excavators uncovered a spearhead, butt-spike, knife, a Naue II sword, and a shield boss, which was surrounded by the remains of its leather covering. Two earlier warrior burials, belonging to the Early LHIIC and

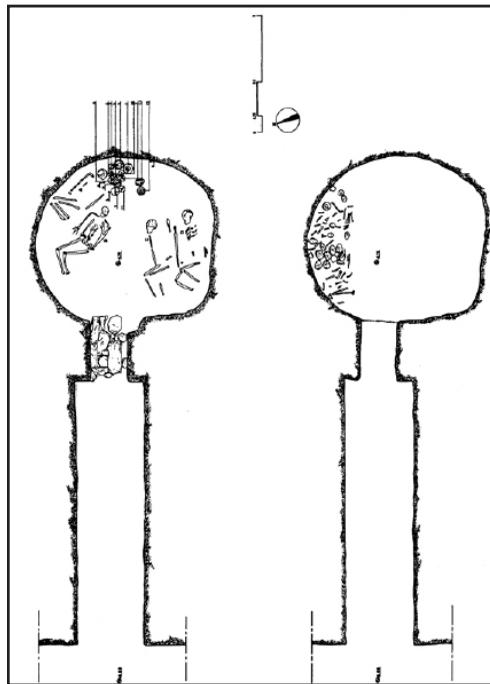


Figure 4: Rendering of the burial layers of chamber tomb 3 at Krini. Scale 1:40. Burial D, the right-most burial in the left picture is the LH III C warrior discussed (Papazoglou-Manioudaki 1994, 174; courtesy L. Papazoglou-Manioudaki).

Middle to Late LHIIIC periods respectively were uncovered within the same tomb, and may in fact represent three generations of hereditary warrior profession within a single family group.⁴²

The cemetery at Klaus has thus far provided us with no less than four clear examples of warrior burial in Chamber Tombs A, E, Θ, and M1. Burial B of Tomb A displayed a dagger, tweezers, some buttons, and two LHIIIC pots, while Burial A of Tomb Θ⁴³ was furnished with a Naue II sword, another set of tweezers, a knife, spearhead, and LHIIIC amphorae fragments.⁴⁵ The excavators have suggested that lower ranked warriors were also represented in the burials of the Klaus cemetery, with Tomb E displaying a much simpler spear-warrior burial. Pushed into the corner of the tomb was a pile of human bones accompanied by pots of the LHIIIA to LHIIIC periods, as well as some buttons and a spearhead. Burial A of Tomb M1 may likewise represent a lower-ranked warrior, with a spearhead and knife interred amongst several LHIIIB to C pot fragments.⁴⁴ The evidence of these simpler burials seems to support the argument that the spear was the primary weapon of lower-ranked warriors.⁴⁵

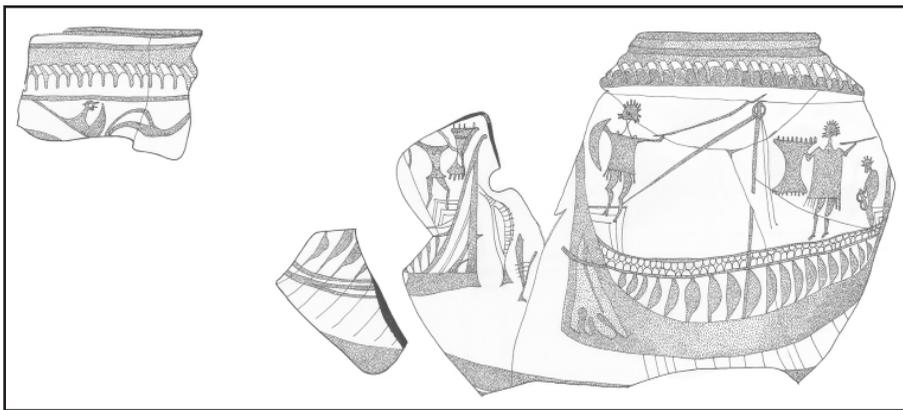
Although the vast majority of known warrior burials have been identified in the region of western Achaia, they do occur in other parts of the Greek mainland as well as on Crete and the islands. An example of a LHIIIC warrior burial can be found at Grotta on Naxos, a type which may have included a burial pyre.⁴⁶ In the vicinity of Chamber Tomb Delta, a small platform covered in a thick layer of black earth contained burnt bones from animal sacrifices, on top of which was found an inhumed male. The burial goods associated with this 'open air warrior burial' are particularly rich and included silver and bronze rings, a seal-stone, jewelry, numerous vases, and weapons, in this case two spearheads and a butt-spike.

Military Iconography

In addition to the sudden increase in frequency of the warrior burial, the LHIIIC period also witnessed a distinct increase in iconographical representations of the warrior and of war themes in general. Pots featuring scenes of chariotry, warfare, horsemanship, hunting, fighting on foot, on boats, and on chariots, became much more frequent in post-palatial contexts, particularly during the Middle LHIIIC period (Fig. 5a and 5b).⁴⁷ Marina Thomatos has provided some useful figures for this increase: during the LHIIIB period, three sherds depicting horses and four sherds with chariots have been documented. On the opposite end of the scale, 22 sherds displaying soldiers and 41 sherds depicting a combination of chariots and soldiers have been dated to the LHIIIC period.⁴⁸ These images of warfare also confirm the weapon assemblages that have arisen from the burials themselves. Within these scenes, spears, daggers, and swords make a frequent appearance, while other elements of defensive armor such as greaves, corselets, and shields are also depicted. While some choose to understand the images as merely 'heroic action' scenes growing in popularity (and possibly connected to the earliest form of heroic epic poetry in Greece),⁴⁹ the connection with an increase in warrior status and ceremonious burials in the LHIIIC period is too palpable to ignore. Both the burials and the pottery seem to indicate not only an escalation in the number of warrior elite, but also an increase in their social status. Their popularity as an artistic subject was dramatically increased, and the ceramic assemblage of the LHIIIC period would come to reflect the interests and activities of this warrior elite, and in turn, emphasize the importance of their role as the protectors of the inherently vulnerable settlements of post-palatial Greece. It is not a far leap to suppose that these warriors arose to take the place - to a more localized degree - of the fallen palace-bound elite as the political leaders



Figure 5: Iconographical representations of warfare and offensive and defensive equipment on LH III C vases: To the right (a) The ‘Warrior Vase’ from Mycenae, LH III C (Illustration by Bethany Kapira, 2013). Below (b) Krater discovered in the Kynos/Livanates region, LH III C Middle. (Illustration by Bethany Kapira, 2013).



of LHIIC communities, by virtue of their military prowess and status.

Conclusion

The Achaian warrior burials of the Late Helladic IIC period provide an exemplary source of evidence for both change and continuity with the palatial past of mainland Greece. The burials display a similar weapons assemblage as those belonging to the preceding palatial period, but at the same time demonstrate a changing emphasis on particular weapons in usage and in value as symbols of status. The burials suggest the rise of a different kind warrior, one whose function had changed according to changing circumstances.

What we do not see in the Achaian warrior burials is the phenomenon that has come to be expected of the post-palatial period in general: that of decline. In the majority of cases, the warrior burials of the LHIIC period continue to be associated with status items. These seem to have been laid with even greater reverence than in previous periods, and increase in frequency in many parts of post-palatial Hellas. Instead of demonstrating a decline, the warrior burials furnish us with a greater understanding of the status of military figures in post-collapse society than was previously possible. Coupled with a proliferation of military iconography in LHIIC ceramic assemblages, the graves paint the picture of a society increasingly

reliant on a military elite for protection, of a class of society which sought to accrue and control increasing amounts of wealth and prestige via military might. Above all, the warrior graves of the LHIIIC period are demonstrative of a decided escalation in the function and significance of military prowess, along with an associated shift in its relation to positions of power. In this we discern a fundamental discontinuity with the palatial past. A reorganization of social structure had occurred within the vacuum caused by the collapse of Mycenaean civilization, and it was the warrior, who through personal military prowess, was able to seize the opportunity for enhanced security, status, and ultimately, political power.

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Endnote

- 1 Schofield 2007, 170.
- 2 Cavanagh and Mee 1978, 42; see also Middleton 2010, 12-17.
- 3 Cavanagh and Mee 1998, 97.
- 4 Thomatos 2006, 170.
- 5 Cavanagh and Mee 1998, 97.
- 6 Deger-Jalkotzy 2008, 399.
- 7 Deger-Jalkotzy 2008, 394.
- 8 Deger-Jalkotzy 2008, 394.
- 9 Deger-Jalkotzy 2008, 394-395.
- 10 Deger-Jalkotzy 1998, 117.
- 11 Middleton 2010, 101.
- 12 Papadopoulos 1999, 273.
- 13 Papadopoulos 1999, 273.
- 14 Papadopoulos 1999, 267.
- 15 Papadopoulos 1999, 272.
- 16 Middleton 2010, 106.
- 17 Middleton 2010, 107.
- 18 Papazoglou-Manioudaki 1994, 186.
- 19 Papazoglou-Manioudaki 1994, 186.
- 20 Papazoglou-Manioudaki 1994, 186.
- 21 Eder 1999, 446.
- 22 Papazoglou-Manioudaki 1994, 177.
- 23 Papazoglou-Manioudaki 1994, 177.
- 24 Papadopoulos 1999, 270.
- 25 Deger-Jalkotzy 2008, 399; 2006, 168.
- 26 Deger-Jalkotzy 2006, 173.
- 27 Deger-Jalkotzy 2006, 175.
- 28 Deger-Jalkotzy 2006, 154.
- 29 Papazoglou-Manioudaki 1994, 200.
- 30 Papazoglou-Manioudaki 1994, 179.
- 31 Papadopoulos 1999, 273.
- 32 Deger-Jalkotzy 2006, 154.
- 33 Deger-Jalkotzy 2006, 170-171.
- 34 Papazoglou-Manioudaki 1994, 200.
- 35 Papadopoulos 1999, 267.
- 36 Papazoglou-Manioudaki 1994, 173-176.
- 37 Papazoglou-Manioudaki 1994, 173.
- 38 Papazoglou-Manioudaki 1994, 176.
- 39 Papazoglou-Manioudaki 1994, 176.
- 40 Deger-Jalkotzy 2006, 157.
- 41 Deger-Jalkotzy 2006, 157-158.
- 42 Deger-Jalkotzy 2006, 158.
- 43 Papadopoulos 1999, 270.
- 44 Papadopoulos 1999, 270.
- 45 Papadopoulos 1999, 269.
- 46 Deger-Jalkotzy 2006, 162.
- 47 Deger-Jalkotzy 1999, 130.
- 48 Figures calculated prior to 2006 (Thomatos 2006, 248).
- 49 Deger-Jalkotzy 1998, 162.

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Piecing Together a Lost History: Two Roman Stucco Reliefs from the Art Institute of Chicago

Morgan Lemmer-Webber

This study considers the history and iconographic significance of two Roman stucco reliefs at the Art Institute of Chicago. The design and composition of these little-known works is intriguing; however, the museum possesses little information regarding their subject matter, medium, function, or provenance and they remain unpublished to date. The goal of this study is both to fill in these gaps and to open a dialogue about the current state of research on these and related images focusing on the ambiguity of representations of women in domestic design and the particular issues of provenance concerning stucco reliefs.

These two Roman stucco relief panels from the Art Institute of Chicago are visually compelling (Figs. 1-2). The stark white figures hover in the abstracted space of the blue background, a format typical to the sacro-idyllic genre. Their subject matter, unfortunately, is far from typical. Since their original findspot is unknown, the museum lacks much of the information which might help one reach a deeper understanding of them as “art works.” The goal of this article is to fill in these gaps by opening a dialogue about the current state of research on these images and situate them within the larger context of maenad imagery in imperial Roman visual culture. Through an exploration of the processes by which objects such as these are torn from their original contexts of display, it further considers both what is lost by and what is gained from displaying objects like these reliefs in a museum setting.

The brief description of these works at the Art Institute reads as follows: “The right panel

depicts a seated woman extending her right arm toward a slender griffin (a mythological creature combining a feline body and an avian head) with raised wings. The left panel shows a winged female figure flanked by two deer and standing on a delicate tendril motif.”¹ The viewer is thus left to interpret the images largely on his or her own. Both images consist of white figural relief designs on a blue background framed by a stucco molding. The similarities in color, style, and molding as well as their joint accession indicate that the two reliefs came from the same building – and likely the same room – where they fit within a larger design scheme of decorative embellishments, perhaps as pendants.

Formal Description

The Deer Relief (Figs. 1, 3) depicts a central female figure presenting an offering to one of the two deer that flank her and face her in a heraldic pair. The body of the woman is



Figure 1: Deer Relief, First century C.E., Roman, stucco relief, 40.2 x 55.0 cm., Art Institute of Chicago, gift of Mrs. Edith Healy Hill, unknown provenance



Figure 2: Griffin Relief, First century C.E., Roman, stucco relief, 37.7 x 55.5 cm., Art Institute of Chicago, gift of Mrs. Edith Healy Hill, unknown provenance

a smooth silhouette, standard in the medium of stucco, with folds of loose drapery flowing behind her. Her hair is gathered back in a bun, and her head is bound with a fillet. The Griffin Relief (Figs. 2, 5) depicts a seated woman facing a griffin. With her right hand she offers a ribbon to the beast. Her body is similarly depicted in a smooth silhouette with folds of drapery visible beneath her chair. She is nude from the waist up and wears her hair in a layered bun at the top of her head with a small tuft of hair flowing in the back. The griffin is winged and the details of his feathers are incised into the stucco. The level of detail has been pared down to a simplified and stylized pattern of incisions. The right paw of the griffin touches the left foot of the woman, which creates a continuous line through the composition that can be traced from the tip of the griffin's wing to the woman's head. While the main figures in both reliefs were molded out of stucco, some details are painted onto the background with a thin coat of stucco rather than modeled. In cases such as the hind legs of the griffin, this

technique is used to lend the illusion of space; however, in the case of the flowing drapery, it is an economic means of adding detail in less time.

Both of the reliefs have been heavily restored. The blue background of the restored areas shows a distinct discrepancy in consistency from the original portions, featuring a slightly lighter overall color with inclusions of darker pigment sporadically mixed in with a slight sheen to the surface. The blue fields in the original fragments display a consistency of color throughout, with the exception of wear marks, and a matte surface. In the Deer Relief, the deer at the left of the composition is intact. However, the woman's legs below her knees as well as the legs, stomach, and haunches of the deer on the right appear to be reconstructed, as illustrated here in a line drawing of the relief (Fig. 4). It is unclear which areas of the frame are restored. In the Griffin Relief, the majority of the figures remain intact, with the exceptions of the top of the griffin's head and

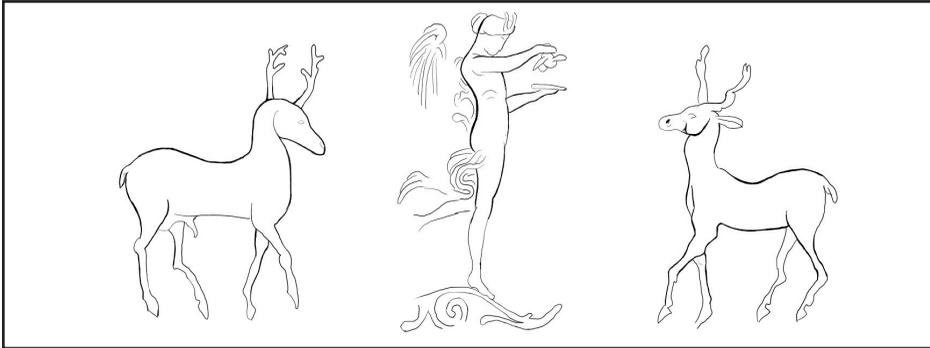


Figure 3: Drawing of Deer Relief as it appears today

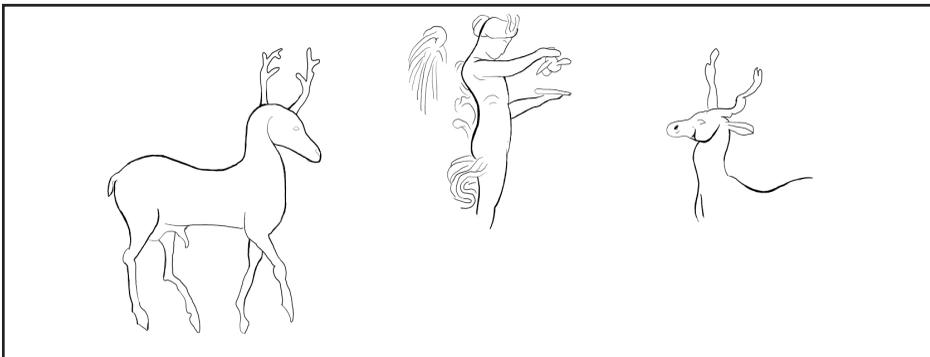


Figure 4: Drawing of Deer Relief indicating what remains of the original composition

wings, and the woman's head and her left arm as well as a portion of her torso (Fig.5). Large cracks extending through the frame section off original fragments including nearly a third of the background to the left of the figural composition and a smaller section of the top right corner (Fig. 6).

Medium

When compared to other extant Roman stucco reliefs, the level of craftsmanship in the Art Institute reliefs appears in many ways simplistic. The modeling of the figures is flat and shallow with little attention to musculature,² the drapery is painted flat on the background to expedite the modeling process,³ the griffin's wings are stylized, and the rectangular shape of the panels is less complex than the patterns which frequently appear in public baths and tombs.⁴

Despite these technical shortcomings, the pigmented background indicates the use of more complex and costly materials. Historically, the use of blue pigment was a status symbol in the ancient world displaying the wealth of the patron due to the precious stones such as lapis lazuli or azurite which were required for its production as noted by Pliny (HN XXXIII.12) and Vitruvius (De arch. VII.5.8).⁵ While a process of creating artificial blue pigment from copper had been developed by the first century CE, the color was likely chosen to convey wealth because of these traditional associations.⁶ Additionally, there appear to be small traces of gold leaf in numerous areas of the reliefs, most notably on the wrist of the Griffin Relief and the hair of the Deer Relief.⁷ If these traces truly are gold leaf, it would have profound implications on the cost of materials and thus on the wealth of the patron, the function, and the location of the works.

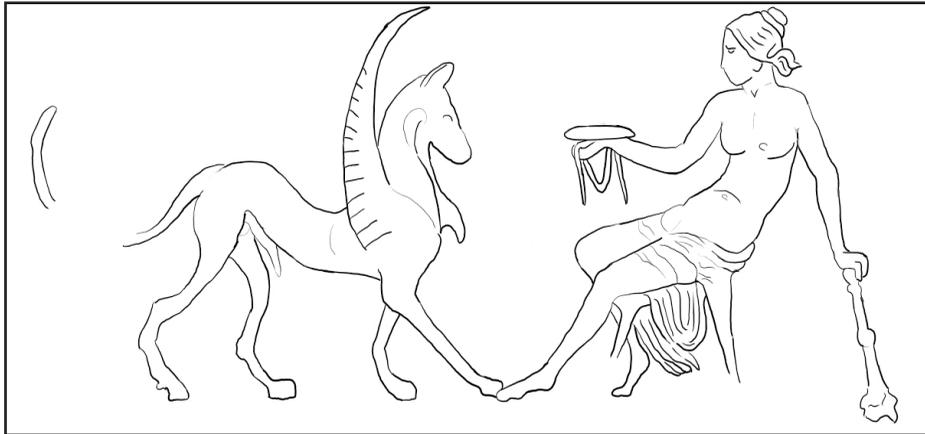


Figure 5: Drawing of Griffin Relief as it appears today

Since the visual impact of many stucco reliefs comes from the pattern of geometric shapes formed by the mouldings, colored backgrounds create a much more dynamic overall effect. The addition of color also complicated the production process. In order to prevent the materials from mixing, the white stucco had to be added after the painted surface dried. Since the artist could not blend the white stucco into the colored background, the figures themselves were typically less complex and often, paint or plaster slip was used to add details which would otherwise have been achieved through modeling or incised lines. Similarly, the application of gold leaf over the reliefs would have rendered intricate detail unnecessary. These production variations may account for some of the perceived technical shortcomings.

Iconography

The imagery of the Art Institute reliefs defies easy categorization. The interaction between the female figures with the griffin and deer, respectively, suggests a larger narrative context. The general function of the images may be votive as both figures appear to be making offerings to the animals. However, they do not conform to any immediately identifiable ritual or narrative tradition.

While the women do extend their arms in the general direction of the animals, their

countenances appear self-contained. Aside from the touching toes of the second relief, the figures do not directly interact with each other, indicating possibly that while they form a unified composition, the figures are intended to be interpreted independently. If the female figures are viewed alone, the pictorial tradition with which they share the most elements is that of maenads, the female followers of Dionysus. The posture of the woman in the Deer Relief bears a striking resemblance to the convention of the floating maenad.⁸ Although the angle and position of her body is more erect, the shape of her silhouette and her flowing dress are familiar attributes. The positioning of her arms resembles images of maenads playing cymbals.⁹ However, the objects in her hands remain unclear. The object in her lower hand could be a platter, but the object that she holds above it – possibly a small bird or a ceramic vessel – has no known parallel within maenadic imagery.¹⁰

The wings identified in the Art Institute's description of the Deer Relief, which are painted on the background of the panel rather than modeled, are less defined than those seen elsewhere in the stucco tradition (Fig. 1).¹¹ Even in the Griffin Relief from the Art Institute, the wing itself is in relief, and the feathers are indicated by a regularly spaced set of incised marks (Fig. 2). In contrast, in both of the Art Institute reliefs, the flowing drapery

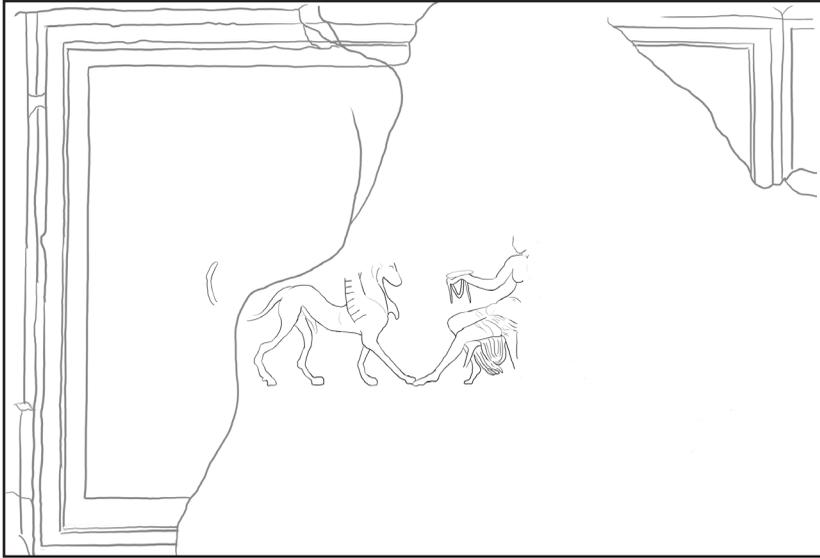


Figure 6: Drawing of Griffin Relief indicating frame damage and what remains of original composition

is painted flat onto the background rather than modeled. Given this context, it seems feasible that these markings in the Deer Relief from the Art Institute represent the billowing fabric that is characteristic of maenadic imagery rather than wings.¹²

The Griffin Relief from the Art Institute contains some iconographic elements that can be tied to the maenadic tradition. Among these elements is the downward turned torch on which the figure reclines. As noted by Livy in the *Annals*, the torch was integrated into Roman Bacchic revelry, and the theme of a maenad depicted with a torch was likewise incorporated into the visual imagery.¹³ Unfortunately, given the color discrepancies, this portion of the relief was likely restored, and therefore was not likely included in the original composition. While the objects in her outstretched right hand remain somewhat obscure, they possibly represent a platter and a sacred garland or ribbon, a combination of objects that are depicted elsewhere in maenadic imagery.¹⁴

Despite these similarities, the figures from the Art Institute display none of the overt attributes of the maenads, such as a thyrsus or tympanum. Additionally, in Roman interior

design schemes, maenads are typically shown either isolated within their frame without any narrative context or interacting with other members of the thiasos of Dionysus. By contrast, the figures in the Art Institute reliefs appear to interact with the animals. Further complicating this matter is the apparent reverence shown by the female figures toward the animals. Although less common in Roman depictions than their Greek precursors, animals do occasionally appear in the tradition of Roman maenadic imagery. In these instances maenads are depicted dominating or dismembering animals as an indication of their savageness.¹⁵ There seems to be no precedent in Roman art for maenads revering or worshipping animals in the manner depicted in the Art Institute reliefs.

One of the difficulties in identifying these figures as maenads lies in the ambiguity of maenads, who are depicted with little consistency in Roman interior design. Their identifiable attributes were stripped away, leaving ambiguous yet stunning figures to decorate the walls and ceilings of homes, public buildings, and graves. This could be due in part to the fact that maenads – along with cupids, nymphs, and Nike – were based upon standard templates that were commonly used as

decorative elements to fit within a larger design scheme.¹⁶ This ambiguity makes it difficult to accurately identify these and similar figures as maenads. The prevalence of maenads depicted in Roman art without concrete attributes makes this identification more likely than other figures. The goddess Diana, for example is often depicted with deer, but is rarely depicted without her bow and arrow. The use of shared templates to represent different types of mythical females raises the issue of the female form as a decorative or ornamental object in a way that was less common with male figures, who are more frequently depicted within narrative scenes or identifiable as specific mythological or historical figures.

In the case of the Art Institute reliefs, this ambiguity is further exacerbated by seemingly contradictory imagery. The motif of the maenad with a griffin could signify the context of the images. In Greco-Roman mythology, the griffin is a guardian animal and is therefore often depicted in funerary art to guard the grave. The convention of animals arranged in a heraldic pair is an apotropaic tradition that is often used to protect whatever they surround – in this case the female figure.¹⁷ Bacchic imagery is often found in funerary art as well, particularly as a popular motif for sarcophagus decoration. It is therefore possible that the figures are not in fact interacting within a narrative but rather reflect a theme associated with funerary imagery. By the same measure, this combination of imagery could signify a decorative motif with no intention of narrative function, as both the griffin and the maenad are often used as decorative ornaments within a design scheme.

Provenance

Since these images were donated from a private collection, the history of the reliefs before their arrival at the museum is unclear. The reliefs were donated by Mrs. Edith Healy Hill in 1922. The only prior article which refers to these reliefs directly was published a year later in the *Bulletin of the Art Institute of Chicago*

and informs us that Mrs. Hill inherited them from her father, the Chicago portrait painter G.P.A. Healy.¹⁸ He is said to have returned with them from Rome, where he resided from 1868-1872.¹⁹ Mr. Healy claimed that they came from the *Domus Aurea*, Nero's golden palace.

As is common with donations from private collections, there was no documentation or authentication of the findspot and no details as to how the reliefs were acquired. Legislation regarding the excavation and export of antiquities in Italy was not yet firmly enforced in this period.²⁰ The Grand Tour, which had been undertaken energetically by Americans and Europeans alike in the post-Civil War era, gave rise to and sustained a thriving tourist market for antiquities dealers. Artists residing in Italy frequently took on many roles in this tourist market, not only producing copies of classical artwork and creating original neoclassical compositions, but also leading amateur excavations and serving as intermediaries with Italian antiquities dealers.²¹ As a member of the artistic community living in Rome, it is possible that Healy himself had social connections with this aspect of the antiquities market. Given the ambiguous provenance of the works, there is always the possibility that the works are forgeries. However due to the presence and extent of restoration, it seems more likely that these images were fragmentary or damaged originals from a Roman source that were highly restored in the Victorian era and therefore bear distinct neo-classical elements.²²

The *Domus Aurea*, the location of origin proposed by Healy, was the first known site from which decorative stucco reliefs were recovered in the Renaissance and became a key inspiration for Renaissance designers. Although the stucco reliefs of Nero's palace were already in disrepair by the 19th century, Renaissance illustrations and engravings of the palace continued to be published and circulated and therefore the site remained the most famous source of stucco decoration. Due to its notoriety and state of disrepair, the likelihood of

two relief panels in reasonably intact condition from the Domus Aurea being legally exported out of Rome and into a private collection is improbable, although not impossible given the permissive attitudes towards antiquities at the time.²³ Generally speaking, the composition of the Art Institute reliefs does resemble that of reliefs from the Domus Aurea, seen in the stark contrast of white figures on a colored background. However, the rectangular format of the panels, their simplicity of composition, and quality of the stucco work, suggest a lower grade of craftsmanship.²⁴ This could indicate that they were commissioned by a private patron who was imitating imperial style within a limited budget or that they were from a less distinguished room or hallway within an imperial or public building.

While the lack of provenance diminishes the contextual information available and often calls into question the authenticity of any ancient artifact, specific complications arise in regard to interior design media such as stucco reliefs, because they were created in situ and intended to be permanent fixtures within a specific design scheme. The removal of a stucco relief from its original context is a destructive process. The rough edges visible in the top right corner of the molding of the Deer Relief indicate that the stucco finish directly surrounding the path of the saw was severely damaged (Fig. 1). Further examination of the moldings indicates that the reliefs were surrounded by other panels. In the top right corner of the second relief panel, we see the intersection of at least three panels, damage to the corner obscures where the fourth panel would have intersected (Fig. 2). This indicates that in order to remove these two panels with their moldings intact, many other panels were potentially destroyed.²⁵ Even if the figural reliefs remained intact, they would have been separated from the molding, leaving even fewer identifying features. Fresco and stucco fragments that are excavated by professional archaeologists are removed in thin layers in order to preserve the wall behind them. In the case of these reliefs, the unfinished edges

reveal that a portion of the wall was removed with the reliefs. Even if these panels were somehow removed with minimal damage to the surrounding panels, they would have left holes in the wall or ceiling from which they were removed. Therefore, if the building was not entirely demolished, at the minimum, the structural integrity was compromised.²⁶

From an iconographic standpoint, the removal of an image from its intended context often renders an image illegible because of the lack of association with other iconographic clues within the room. Even when an image can be understood on its own, the environment for which it was created informs and often dictates its function. Knowledge of this context can indicate the intended audience, whether it was public or private, decorative or functional, secular or religious. In the case of the Art Institute reliefs, this context could have provided crucial clues.

Conclusions

The key problem with the scope of this study is the intersecting layers of ambiguity surrounding the iconography of these specific reliefs, the iconography of maenads, and the context of the Art Institute reliefs. While there are several stylistic and iconographic trends that emerge in the depiction of maenads, the standard attributes developed in the tradition of Greek vase painting were not strictly adhered to in Roman traditions. Stripped of the specific attributes that tied them to the cult of Dionysus, maenads fell into the domain of ornamentation, interchangeable with figures such as Horae or Nikae. To compound this, the fragmentary remains of most surviving stucco reliefs render their interpretation difficult. Many reliefs were removed with little or no record of their location or function within the room. Those sites that do remain intact are in such fragmentary condition that many of the designs are illegible. These are often subterranean and not accessible to the public, which is further exacerbated by the limited publications in the field of stucco reliefs,

making even access to high-quality images difficult.

At the intersection of this uncertain imagery and under-studied medium fall two stucco reliefs from the Art Institute of Chicago (Figs. 1-2). With a perplexing combination of imagery and a lack of contextual clues to work from, the task of identifying and understanding these pieces is a highly problematic one. As an element of architectural design, these images were never intended to be viewed outside of the context in which they were set, and in many cases the key to understanding any narrative function or religious significance associated with such works lies in understanding the design scheme as a whole. Nonetheless, through a thorough comparison to other known artworks and artistic trends, certain facts emerge which contribute to our understanding of these images.

Although we will never fully recover the lost history of the Art Institute reliefs and other similar artifacts, they can still serve as valid examples of Roman stucco decoration. Given the fragmentary nature of much of the surviving body of Roman stucco reliefs, discounting pieces of unknown provenance further decreases the pool of images available for stylistic analysis and comparative studies of theme, style, and subject matter. Additionally, many of the artifacts which came into private collections from undocumented excavations came from private sites.²⁷ While we have access to extraordinary sites, such as the Domus Aurea or the Stabian Baths, stucco reliefs of unknown provenance afford a view of privately commissioned reliefs, affording us an understanding of the full diverse range of the medium.²⁸ While museum patrons do not experience the full effect of stucco reliefs within a design scheme as they were intended when individual panels or pairs are displayed, relief panels such as those at the Art Institute still give patrons a first-hand view of an ancient medium which is often under-represented in the field of art history and not widely available

in print or online. While it would be foolish to deny that there is a loss of knowledge with a loss of provenance, they do not consequently lose all of their scholarly value. As long as scholars are willing to open a dialogue about these gains and losses, we can still use this material to piece together the ambiguous remains of a distant past.

Endnotes:

- 1 Information plaque accompanying the images on display at the Art Institute of Chicago as of January 2013.
- 2 Given the scope of this article, I cannot give a catalog of Roman stucco reliefs, instead where comparisons are needed I will refer to figures in the standard texts of Mielsch (1975) and Wadsworth (1924). For more developed musculature, see Wadsworth (1924, Plate VII), and Mielsch (1975, Figs. K33f, K50 K64d, K88.1).
- 3 For modeled or incised drapery, see Mielsch (1975, Figs. K37.4, K37.8, K50).
- 4 For Complex stucco designs, see Mielsch (1975, Figs. K20, K46c, K51, K54, K68, K115).
- 5 Plin. HN XXXIII.12; Vitruvius. De arch. VII.5.8. Despite the descriptions of these rich pigments by ancient authors and chemical analysis of hundreds of wall paintings and ceramic decorations, evidence for pigments of precious stones is rarely corroborated; see Siddall (2006,28).
- 6 For more on blue pigments, see Siddall (2006, 24-25). For an examination of the significance of color in Roman art, see Bradley (2009). To date there has been no published analysis of the materials of these reliefs, leaving the identity of their chemical and mineral composition unknown.
- 7 The presence of gold leaf is not evident in photographs and remains uncorroborated without an elemental analysis.
- 8 For the convention of the floating maenad, see Mielsch (1975, Figs. K27.6, K37.2, K37.4).
- 9 For the convention of a maenad with cymbals, see Mielsch (1975, Fig. K27.6).
- 10 For the convention of a maenad with a platter, see Mielsch (1975, Figs. K37.4, K50.1).
- 11 For stucco wings see Wadsworth (1924, Plates IV, IX, XLIV).
- 12 For maenads with billowing drapery, see Mielsch (1975, Figs. K27.6, K37.4, K50.1, K50.2).
- 13 In Hespaltia's description of the Bacchic revelry of historic maenads, she recounts, "Matrons in the dress of Bacchantes, with disheveled hair and carrying blazing torches, would run down to the Tiber, and plunging their torches in the water would bring them out still burning." Livy (Annals, XXXIX.8-18).
- 14 For a maenad with a garland and platter, see Mielsch (1975, Fig. K37.4).
- 15 For a maenad with a dismembered animal, see Touchette (1995, Fig. 8a).
- 16 Ling 1991, 220.
- 17 Gardner 2003, 111.
- 18 M.B.W. 1923, 15.
- 19 See DeMare (1954, 242-65), for more on Healey's time in Rome.
- 20 Monari 2012, 1.
- 21 Dyson 2006, 9.

22 While there are numerous documented occurrences of forgers damaging their forgeries to look like antiquities, the discrepancy between the discrete traces of gold leaf and the clear distinction in materials between the fragments and the restored areas suggest to me that the fragments are original. See Dyson (2006, 9). Since the interests of Victorian collectors was primarily aesthetic value and the display of the treasures of antiquity, they were more eager to restore fragments to a completed image even if that meant altering the design.

23 Monari 2008, 2.

24 For extensive images of the remaining stucco reliefs of the Domus Aurea as well as Renaissance illustrations, see Iacopi (2001).

25 Since the provenance is unknown, the extent of damage to other images is likewise unknown. It is also possible that these panels were the damaged fragments left from the removal of other reliefs.

26 The depth of the reliefs is not listed by the museum, so the extent of the wall which was removed with the reliefs is unknown without closer inspection.

27 Strong (1959, 98) notes that excavators of the Necropolis at Pozzuoli in 1925 discovered holes in private tombs where relief panels had already been removed.

28 See also the set of Roman stucco reliefs at the Metropolitan Museum of Art of unknown provenance, whose quality of craftsmanship indicates a non-imperial patron, in Mielsch (1975, K37.1-K37.8).

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“Creolization” and Agency in Divodurum Mediomatricorum

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This paper investigates the nature of enculturation and agency within an expanding hegemony, specifically the Roman Empire. However, rather than using the traditional concept of Romanization, the concept of creolization will be discussed and applied to the site of Divodurum Mediomatricorum (modern Metz, France), whose public architecture and landscape indicate different strategies utilized by the people of the indigenous Gallic society as they adapted various Roman practices in the creation of the Gallo-Roman culture. This paper will illustrate that the theoretical advancement of creolization can provide archaeologists with a better understanding of the processes of enculturation.

Introduction

As the Roman Empire expanded throughout the Mediterranean and Europe, it encountered numerous peoples who resisted this expansion. Some attempts failed, while some succeeded. Despite the immediate outcome of the struggles, these contests inevitably led to changes in the lives of the individuals involved and of the physical expressions of the settlements in which they lived. This paper investigates the nature of enculturation within the period of the first century B.C.E. to the second century C.E. However, rather than using the traditional concept of Romanization to explore these processes, the concept of creolization is discussed and applied to the site of Divodurum Mediomatricorum¹ in northeast Gaul, illustrating different strategies used by the people of the indigenous Gallic society as they interacted with various Roman practices in the creation of a Gallo-Roman culture.

Divodurum Mediomatricorum, which is now Metz, France, is located on a promontory at the confluence of the rivers Moselle and Seille. Cliffs along the rivers form two of Divodurum’s boundaries; a wall formed the third. Ten to thirty-five hectares were encompassed by these boundaries, but the larger figure seems more accurate.² Thus, Divodurum was one of the larger *oppida* known in northern Europe, and by far the largest settlement among the Mediomatrici.³ Even if Divodurum was much smaller, the size of the city compared to other settlements in the region suggests that it was of primary political importance in the area and served as a “capital” for the Mediomatrici.⁴

Divodurum shows no evidence of warfare and there is no evidence that Roman forces, whether military or civilian in nature, directly influenced the development of the site’s Gallo-Roman culture, unlike many

other Gallic sites.⁵ Rather, it illustrates a successful attempt by the citizens of the site to join the Roman Empire—an active, multigenerational process of participation and negotiation in the creation of a new identity which was derived from both Roman and Gallic sources, but in which neither culture dominated. Because of this, the citizens of the site built and utilized the various structures and symbols throughout the settlement’s landscape over the course of two centuries; this landscape is evidence of the intentionality of the inhabitants. This indigenous approach to interpreting the landscape is in contrast to traditional concepts of Romanization, in which the Roman culture was forcibly exported to Gallic elites and the role of non-elites was minimized or disregarded completely. By studying Divodurum, we are able to see the extent to which individuals were willing to alter their civic-ceremonial landscape without overt force from Rome in an attempt to participate in the Roman hegemony on their own terms.

Theoretical Background

This study employs the concept of creolization, rather than utilizing traditional concepts of acculturation and Romanization. Originally a linguistic term designating the blending of two dialects to create a third,⁶ creolization “has come to be used more generally for the processes of multicultural adjustment through which [blended] societies were created.”⁷ This theoretical framework was first applied to the development of African-American culture within the United States,⁸ but was successfully adapted for a study of the Roman religion by Jane Webster.⁹ It has since proven to be a valuable tool with which to approach the topic of cultural contact and ensuing change.

Creolization allows for a wide-ranging analysis of interaction, both political and social. It interprets the use of artifacts and

symbols by non-elites not as an attempt to become Roman, but rather the use of such artifacts through an indigenous, non-Roman set of rules. As Webster claims:

“Provincial artifacts in the Roman world may likewise appear Romanized, but can in certain contexts likewise operate according to a different, indigenous, set of underlying rules. As creole artifacts, they can negotiate with, resist, or adapt Roman styles to serve indigenous ends, and ultimately, they are part of the emergence of creole societies.”¹⁰

Creole culture is a combination of different traits, and the processes of creolization take place in a nonegalitarian social context of asymmetrical power relations.¹¹ These processes are given material expression through artifacts and landscape features which illustrate dual cultural traditions which are then utilized to different degrees within a colonial experience.¹² Within this colonial experience, links to the past are often maintained in opposition to the goals of the dominant culture’s elites, and oftentimes carry risk because of the asymmetrical nature of this relationship.¹³ From this we see that creolization is “a process of resistant adaptation” and what results is not “a single, normative colonial culture, but mixed cultures” evidenced by the multiple, various uses of material culture.¹⁴ Creolization therefore provides a much more nuanced interpretation of material culture; one that is not limited solely to the power-based explanations offered by Romanization.

The Civic-Ceremonial Landscape of Divodurum

It is through this framework of creolization that I approach the civic-ceremonial landscape of Divodurum Mediomatricorum to reinterpret how its members engaged the Roman world. The civic-ceremonial

landscape contains numerous features that were traditionally viewed as forced imports from Rome. These features, which include the city’s forum and associated religious structures, various temples, a grid road network, and aqueducts, were seen as evidence of civilization that accompanied the movement of Roman soldiers and traders throughout the region.¹⁵ This may have been the case in other cities, such as Arelate, Augustodunum, Treverorum, and Virunum,¹⁶ but the historical and archaeological record indicates that Roman forces had limited influence within Divodurum.¹⁷ Therefore, the construction of these features was likely the result of processes of enculturation initiated and undertaken by the agents of Divodurum itself. This discussion will focus on features of the sacred landscape, but also incorporates features of the mundane landscape of the city.

The Hauts-de-Sainte-Croix

The political, religious, and economic center of Divodurum was located on the summit of the Hauts-de-Sainte-Croix.¹⁸ There is no evidence for buildings on the summit previous to Roman control,¹⁹ and this lack of construction corresponds to current ideas that oppida originally preserved locations of spiritual and communal importance within the landscape, locations which may have been reserved for assemblies, feasts, and ceremonies.²⁰ During the period of incorporation into the Roman Empire, the summit maintained its status as the civic-ceremonial precinct of the city.²¹ However, it was converted to present an image of Roman power rather than Celtic sacredness, as illustrated by the construction of a forum and other Roman features circa 80 C.E.²² Conversion of landscapes such as this remains a common practice throughout time, and is an effective method of altering and appropriating the power associated with the civic-ceremonial landscape of a site.²³

The forum was the primary place of leadership within any Roman city, and served as the legislative, economic, and frequently the religious center within the city.²⁴ Divodurum’s forum was just south of the intersection of the two main streets of the city, the *Cardo Maximus* and the *Decumanus Maximus*, at the summit of the *Hauts-de-Sainte-Croix*.²⁵ The forum consisted of a basilica that functioned as the city’s *curia*, which was the administrative building housing the offices of local officials such as the *quaestor*, *tabellari*, and *statores*.²⁶ Within the forum was the *Maison Quarrée*, the *capitolium* of Divodurum. As the *capitolium*, the *Maison Quarrée* may have functioned as the temple to the Capitoline Triad, but more likely was dedicated solely to *Jupiter Optimus Maximus*.²⁷ Also present at Divodurum was an altar dedicated to *Roma* and *Augusta*, probably located within or near the forum. The precise location is unknown but inscriptions attest to its presence.²⁸ Finally, the forum also contained markets, shops, and baths.

The forum’s layout and function conformed to the Roman plan.²⁹ Traditional interpretation through Romanization would claim that its presence would indicate the combination of state and sacred functions according to Roman design and illustrate the wholeness of Roman control. However, the construction of these public buildings was privately sponsored; inscriptions related to the construction and maintenance of the forum mention local individuals.³⁰ A reinterpretation through creolization would claim that local elites adopted the use of these Roman symbols for personal or corporate goals.³¹ This practice of financial contributions made by wealthy and prominent members of the *Mediomatrici* was known as *euergetism*, which was “a competition for, or expression of, civic status by means of lavish contribution”³² in an attempt to “persuade the imperial authorities that the

city and its inhabitants had been sufficiently Romanized to warrant promotion to a higher [*colonia*] status.”³³

If it is true that the population was expending their energy and money in order to gain a higher status for their city, it was not merely for the title only but also for the additional benefits associated with being a *colonia*. These benefits not only included the survival and growth of their settlement, but also the establishment of particular imperial offices which were later present at Divodurum, and the granting of Roman citizenship to the elite of the *civitas*, the state, of the *Mediomatrici*.³⁴ Thus, the elite of Divodurum were investing their resources in an attempt to navigate the expanding Roman hegemony on their own terms.

Roads

Divodurum’s roads were repaved using cut stone by the mid-first century C.E. The city used a grid plan by then, with streets every 122 m (400’), but it is unknown whether the grid predated the buildings or if the buildings had influenced the layout of the streets.³⁵ This grid pattern expanded with the city, eventually including the island of *Pontiffroy* and the construction of stone bridges across the *Moselle* and *Seille*.³⁶ The streets contained drainage ditches along their margins, and a few of them also paralleled the layout of aqueducts and water pipes throughout Divodurum.³⁷

The position of the forum at the center of the grid followed Roman custom, which may indicate that the roads were reoriented and rebuilt to correspond with the forum. However, if the layout of the roads was a pre-existing feature of Divodurum, the land for the forum was appropriated for public use according to Roman practices. Either situation illustrates the degree to which the inhabitants of Divodurum were willing to alter their city’s landscape. As *Woolf* states:

“The laying out of a grid across an entire city implies a single moment of foundation or re-foundation, with an impact on existing property rights and structures, and a cost in resources and manpower that can only be guessed at.”²⁸ This process is usually attributed as an example of power over a conquered settlement, but at Divodurum this realignment was undertaken by the citizens themselves, as a result of a collective decision to create a new capital city for themselves on the imperial model.³⁹

Aqueducts & Baths

Like many other Roman cities, aqueducts supplied water to a *castellum*, a reservoir, which divided and transmitted water via lead pipes to the various neighborhoods, where the water was distributed further to three ultimate destinations: basins and fountains, baths, and private homes.⁴⁰ The people of Divodurum constructed such an aqueduct supplying water to the summit of the Hauts-de-Sainte-Croix circa 80 C.E.⁴¹ Local officials known as the *seviri augustales* financed the aqueduct and associated structures, as indicated by a related inscription.⁴² The termination of this aqueduct was near a bath complex; the two may be related. The water was supplied *in nomine Caesaris*, in the name of Caesar, and for private and public uses. The former was directed towards projects and events ordered by Caesar, whereas the later provided water for public works (including baths, theaters, markets, et cetera), fountains which served as emergency reservoirs, and public basins or troughs.⁴³

Romans considered the *balneae*, or baths, a civilizing influence; Tacitus listed it among three “demoralizing temptations” of civilization of which native peoples readily assumed (*Agricola* 21). The baths, and the aqueducts which supplied them, are considered a distinctively Roman feature throughout Europe. Long distance aqueducts were not constructed

in continental Europe before the arrival of Roman administrations, and the technology to sufficiently waterproof the floors of the baths was unknown in Gaul. These innovations appeared to have accompanied the movement of Roman traders and administrators. As such, the presence of four baths within the limits of Divodurum is expected.⁴⁴ However, rather than being merely signs of civilization, the baths would have likely served the same function as the forum during this transitional period—a forum through which the Mediomatrici would participate with Roman culture on their own terms, and convince the Roman government of the suitability of the granting of *colonia* status for the city.

The Temple of Icovellauna

A temple dedicated to the Celtic goddess Icovellauna was located to the south of Divodurum. This temple is located near the course of the Gorze aqueduct, possibly because of the goddess’ association with water (her name may mean “beautiful water”).⁴⁵ The exterior of the temple was octagonal and fabricated of cut stone while the interior was circular; the building was surrounded by a portico. Within the building, a stream flowed through a ditch 6.4 m deep by 6 m wide and fed into a hexagonal basin that contained over a thousand coins; these coins dated to the second and third centuries C.E.⁴⁶ The physical form of the structure is similar to other Celtic temples discovered. Their central chambers and surrounding ambulatory were circular, as opposed to the rectangular designs of Roman and Greek temples. A sacred precinct, which may have been square or rectangular, enclosed the temple. Similar designs have been found at Augustodunum and Vesunna Petrocoriorum.⁴⁷

While the temple was constructed using Roman techniques, the plan of the structure

resonates as Celtic in style. Likewise, the practice of depositing coins within a water filled basin is Celtic in origin, as “offerings made into an underground basin reflect typical pre-Roman Celtic ritual practices according to which offerings were made into ditches, underground shafts, or water sources.”⁴⁸ Like the forum, the temple of Icovellauna was an attempt to combine preexisting social expectations with institutional form. However, rather than combining Roman institutions (such as the forum) with Celtic convention (such as the location of civic-ceremonial buildings), the temple combined a Celtic institution with the Roman expectation of how a temple ought to be constructed. The construction of the temple according to Roman techniques while maintaining Celtic conventions concerning the shape and function of the temple allowed for a compromise without resorting to either extreme, which might have proven objectionable according to either Roman or Celtic cultural rules.

The Taurobolium of Cybele

Also present at Divodurum was an altar for the *taurobolium* of Cybele, a Phrygian fertility goddess whose Roman cognate was Magna Mater, the Great Mother. The precise location of the altar is unknown, but it is mentioned in an inscription. This inscription is dated to 199 C.E., which is determined by the consuls named therein, and would date the utilization of this structure in the same time period as the Temple of Icovellauna.⁴⁹ The practice of the *taurobolium* involved “the ritual slaying of a bull or ram over a ditch in which the priest or devotee stood,” resulting in the priest or devotee being bathed in the blood of the sacrificial victim, similar to initiation rites within mystery cults.⁵⁰ Some evidence suggests that this rite was repeated every twenty years on the birthday of the worshipper, as the altars were dedicated *ob natalicium*, or, on account of a birthday party.⁵¹

The Roman custom entitled *interpretatio Romana* allowed the continuation of local practices, such as the worship of Icovellauna, as long as the people also participated in the Caesarian cults.⁵² While Romans viewed this as benevolent, the Mediomatrici surely saw this as an opportunity to continue pre-Roman, Celtic religious practices without interference from Rome. This accommodation extended both directions: unlike the worship of Icovellauna, the *taurobolium* was a Roman religious practice, possibly imported by legionaries. Romanization would explain the presence of the *taurobolium* as a unidirectional impact of the presence of imperial forces within the region, but creolization incorporates a degree of bidirectionality. The presence of both practices within the landscape of Divodurum illustrates a degree of syncretism present within the community, an *interpretatio Romana* that extended not only from Rome to the Mediomatrici, but from Divodurum to Romans.

Conclusion

Romanization was an attempt to explain the spread of Roman material culture throughout Gaul. According to Romanization, culture was consciously exported by Roman administrators in an attempt to civilize their new subjects.⁵³ However, this theorization ignores the fact that the new subjects exhibited agency and had the opportunity to determine how they interacted with Rome. Creolization incorporates this agency as a key component in how material culture is interpreted. It acknowledges that individuals and groups made decisions concerning the incorporation and utilization of outside institutions, rather than simply subscribing to these institutions because of outside forces or desirability.

The previous examples illustrate how the citizens of Divodurum altered the landscape of their city and its various institutions to reflect a superficial image

of Rome in an attempt to maintain aspects of pre-Roman belief and practices. Rather than interpreting this through the theory of Romanization, which dictates that these changes were unidirectional, the lens of creolization allows us to more fully understand the multidirectional and multidimensional processes of change undertaken by *Mediomatrici* agents and their reflection in the civic-ceremonial landscape of the city. These institutions of this landscape, which were duplicated at other sites and in other scales throughout Roman Gaul, illustrate larger patterns of creolization evident throughout the provinces. These patterns are evidence for the development of a hybrid Gallo-Roman culture in which neither Celtic nor Roman symbols dominated, despite the establishment of Roman hegemony. This paper has shown that the theory of creolization can be applied to situations such as that experienced by the people of *Divodurum* who negotiated competing identities within Roman Gaul during the period of time in which a distinctive Gallo-Roman hybrid culture evolved.

Endnotes:

- 1 Much of the data for the archaeology of *Divodurum* is derived from Gregory's 2002 dissertation on landscape change within the city during the period of transition from Gallic oppidum to Roman colonia. However, this data is reinterpreted using Webster's concept of creolization.
- 2 Gregory 2002, 34.
- 3 Gregory 2002, 34.
- 4 Gregory 2002, 34.
- 5 Gregory 2002.
- 6 Abrahams 1983.
- 7 Webster 2001, 217.
- 8 Braithwaite 1971; Ferguson 1992.
- 9 Webster 2001.
- 10 Webster 2001, 219.
- 11 Webster 2001, 218.
- 12 Webster 2001, 218.
- 13 Scott 1985, 1989, 1990, 2009.
- 14 Webster 2001, 218.
- 15 Walthew 1981; Gregory 2002, 13.
- 16 Wightman 1970; Nicholson 1996; Cunliffe 1997, 218.
- 17 Gregory (2002) discusses the supporting, albeit circumstantial, evidence of the archaeological record at length. This evidence relates primarily to the late 1st century C.E. date of construction for the Roman institutions: if the Romans had accomplished this construction, it would have occurred during the 1st century B.C.E., at the end of the Gallic Wars, similarly to other sites such as *Augustodunum*. Secondly, Gregory analyzes historical records concerning *Divodurum*, which is limited to two accounts: Caesar's Gallic Wars, which mentions movements against several *Mediomatrici* neighbors, but not the *Mediomatrici* themselves in 56 B.C.E., and a possible sack of the city in 69 C.E. as a result of the secession crisis precipitating from the death of Nero. The lack of documentation concerning the city suggests it played such a minor role in the events of the Gallic War that it was literally unremarkable.
- 18 Gregory 2002, 60.
- 19 Gregory 2002, 36.
- 20 Bowden et al. 2005.
- 21 Gregory 2002.
- 22 Drinkwater 1983, 144.
- 23 Duncan 1989.
- 24 Woolf 1998, 70.
- 25 Gregory 2002, 60.
- 26 Gregory 2002, 61.
- 27 Gregory 2002, 66.
- 28 Gregory 2002, 70.
- 29 Woolf 1997, 343.
- 30 Gregory 2002, 113.
- 31 Woolf 1998, 125; Gregory 2002, 113.
- 32 Gregory 2002, 108.
- 33 Gregory 2002, 29.
- 34 Gregory 2002, 25.
- 35 Gregory 2002, 97.
- 36 Gregory 2002, 97.
- 37 Gregory 2002, 97.
- 38 Woolf 1998, 119.
- 39 Woolf 1998, 120.
- 40 Evans 1982, 402.
- 41 Gregory 2002, 129.
- 42 Gregory 2002, 129.
- 43 Evans 1982, 403.
- 44 Gregory 2002, 128.
- 45 Gregory 2002, 67.
- 46 Gregory 2002, 67.
- 47 Drinkwater 1983, 147-148.
- 48 Gregory 2002: 118.
- 49 Gregory 2002: 68.
- 50 Gregory 2002: 69.
- 51 Gregory 2002: 69.
- 52 Webster 1997: 331.
- 53 Haverfield 1923; Redfield et al. 1935.

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The Statues that Walked: Unraveling the Mystery of Easter Island By Terry Hunt and Carl Lipo. Pp. 256, figs. 40, tables 3. Free Press, New York 2011. Price not available. ISBN 978-1-4391-5031-3 (hardcover).

There are rare cases, when tedious archaeological data are presented in such a delightful manner that makes reading an enjoyable activity. *The Statues that Walked: Unraveling the Mystery of Easter Island* by Terry Hunt and Carl Lipo is a book that satisfies such criterion. The strength of the book is found on the simplicity of its language. It is written in such a vibrant style that even the least knowledgeable reader of archaeology and Easter Island would be able to make sense of it. The arguments are presented logically one after the other, leading the reader to reach and accept the conclusions that the authors have put forth. In addition, the archaeological evidence is sprinkled quite often with historical accounts, making the process of understanding more fun. I congratulate the authors on such a delightful work.

The main premise of the book contradicts previous assumptions about the inhabitants of Easter Island. The story of the island became legendary by Jared Diamond's book *Collapse: How Societies Choose to Fail or Succeed*,¹ where the inhabitants of Rapa Nui (the name of Easter Island in the native language) exemplified the type of society that destroyed itself by overusing and abusing its own environment. Diamond's account was presented as a cautionary tale of environmental degradation caused by careless humans, who in this case, sacrificed their island's resources to satisfy their own competitive ways. This was epitomized in the image of Islanders cutting all the trees to transport their enormous statues from the quarries to the islands' edges. However, Hunt and Lipo's explanation differs radically from Diamond's conclusions.

Their story is one of environmental stewardship and human ingenuity, in which a group of people manage to survive despite the resource shortcomings of their habitat.

The first chapter deals with the very nature of the Rapa Nui. The readers are introduced to "a most mysterious Island," as popularized in a variety of books and documentaries, where a small group of people were able to erect giant statues in a remote island in the middle of the Pacific Ocean. Initially, the authors went in Rapa Nui with the goal of contributing to the already known prehistory of the place. However, the understanding of what happened in Easter Island started to change when the authors began excavating there in 2004 and 2005. The earliest dates for the island's colonization were much younger than previously thought, by almost 400 years (from 800 C.E. to 1200 C.E.). These new dates triggered a renewed thinking for the collapse of the Rapa Nui society, because the disappearance of the giant *Jubaea* palms and other trees would have been a much faster process. This contradicts the interpretation that humans were cutting down the trees to transport statues, because this process would have been much less abrupt.

A number of paleoecological studies provided evidence for the timing of the deforestation process. It started around 1280 C.E. and most of the trees were gone by 1650 C.E. According to the new data, one of the main culprits for this deforestation were Polynesian rats, introduced during the initial occupation of the island, which explains the higher rates of deforestation immediately after colonization. Obviously their high birthrate coupled with a lack of predators lead to the exponential increase of the number of rats in the island. Extraordinary amounts of rat bones and palm seeds bearing teeth marks were found in almost every stratigraphic layer.

Additional evidence for this phenomenon comes from many other Polynesian islands as well, where rats (and other species) have destroyed the local ecosystems.

The Island's lack of resources is discussed in detail in Chapter 3. The Island had very little to offer in terms of wild flora and fauna, in contrast to other Pacific islands, which are usually portrayed as bountiful paradises. Archaeobotanical data reveal a very poor environment, having only 20 species of plants. In addition, there was no coral reef nearby to support any variability in fish types. The land was extremely non-nutritious and the fresh water was very scarce. In other words, the natives should have had to deal with a very poor diet. However, the skeletal remains show no signs of malnutrition. This is surprising, because many early European explorers that visited the Rapa Nui were stunned by the small efforts that the natives allocated to their subsistence. This contradicted the enormous amount of labor they had put in erecting giant statues. Its remoteness and floral scantiness, together with its relatively small size, make it even more surprising to find over 950 large statues, for which the island is famous. It seemed quite a challenge to make a living there.

How did the people of Rapa Nui manage to deal with their impoverished soil to produce the few crops that could grow? Two ingenious agricultural techniques were used: (1) the construction of circular rock enclosures called *manavai*; and (2) the practice of extensive lithic-mulching. The first one permits for protection from wind therefore minimizing soil dehydration. In the second, tennis ball size rocks are spread through large unproductive tracks of land, which would have increased the mineral content of the soil's surface and it would have increased its humidity levels as well.

Chapter 4 and Chapter 5 tackle the evidence for the transportation of the giant statues,

or *moai*, as called in the native language. The authors find no evidence for the horizontal dragging of the statues through the use of palm trees, as suggested in Jared Diamond's *Collapse*. For a better understanding on the transportation method, the Hunt and Lipo team began scrutinizing the statues themselves. Almost all the statues that had fallen during the transportation were not completely carved like the finished ones standing on top of the stone platforms. The center of gravity in the former is located in the middle of the statue in the vertical and horizontal dimension. However, in the depth dimension (back to front) the center of gravity is located remarkably forward relative to the base of the statue. This suggested that the *moai* were probably moved in the upright position. In addition, the fallen statues along the road were broken in a manner to suggest vertical transportation. The same was deduced from statues heading either upslope or downslope, where in the former they were found resting on their backs and in the second resting on their faces. Experiments have revealed that you could move large objects by rocking them back-and-forth with ropes tied above the center of gravity, requiring even less people and less efforts than horizontal dragging. In fact the Rapanui (as the islanders are known) have songs and legends for "walking" *moai*, using a specific word for the unique motion called *neke – neke*, meaning "inching forward by moving the body with no legs."

Another previous assumption is examined in Chapter 6 – the propensity of many Pacific populations to exhibit violent behavior. Raids and fighting were common among Fijian, Tahitian and Hawaiians. Consequently, tradition and common sense (lack of resources = violence) would suggest that even the Rapanui were violent. However, this was not the case. The signs for lethal trauma in the skeletal remains are almost absent. Even non-lethal marks were rare, comprising

only 2.5% of the five hundred individuals. There is even less evidence for weaponry in the archaeological record. The only sharp objects to be considered as a weapon were semi-circular shaped obsidian flakes with a stem for hafting. Microscopic ware patterns, however, indicate that these were used to cut plant materials only.

The lack of a nucleated villages and towns is another peculiar cultural attribute of Rapa Nui. In chapter 7, the authors challenge the Western assumption that cultural elaboration requires complex societies as its main condition. The reason for this, according to the old theories, is that complex societies make use of labor surplus to invest in magnificent cultural achievements. However, evidence from houses reveals no indication of nucleated settlement patterns. In fact the houses seem to be scattered throughout the island. The situation echoes other places with monumental constructions. Hunt and Lipo present three such cases: Stonehenge, Hopewell and Adena communities. Cooperation is all that is needed. In all three of these cases we have large monuments, but no centralized economic and social organization.

Then, why build the statues? Why invest so much time and energy, when they could be spent to increase agricultural production? These questions are answered in chapter 8. A theoretical framework for an explanation is found within two evolutionary biology concepts: (1) *costly signaling*, and (2) *bet-hedging*. Costly signaling is principally a non-verbal communication. It sends accurate information about the qualities of the signaler to an interested audience. It is considered 'costly' because it simply cannot be faked, therefore, guaranteeing accuracy. The construction, transportation and display of multi-ton statues convey important qualities of the people behind these activities. The benefit for the signal sender is attracting mates and an access

to help from future allies. The benefit for the signal receiver is accurate information about the sender's qualities.

Bet-hedging is a strategy that biologists have noted in environments with scarce resources. The key to evolutionary fitness success for a particular organism is the number of heirs in the long run. One way is having many children, which might make a lot of sense in some occasions. However, in environments with limited and unpredictable resources the opposite reproductive behavior is more effective; that is smaller number of offspring and more parental care. In the case of Rapa Nui (and others), any investment in cultural elaboration requires expenditure in time and energy. These activities do not have any direct and obvious benefits to the survival of the organism involved, because this might seem as wasted time and energy. However, it is because of these wasted resources that an indirect benefit comes about. A more optimal use of time and energy would have been allocated on food production and reproduction, which would have increased the population number in the island. This would have brought a catastrophic strain on its resources and a probable demise of the Rapanui.

The collapse of the islanders' way of life came immediately after their first contacts with the European travelers (chapter 9). A cultural collapse was the outcome of European goods. An example is given with the obsession of the natives for hats, which was the first thing that the Dutch and Spanish explorers noted. Hats were important in Polynesian cultures, as observed also in the large *pukao* hats that were placed on the heads of the statues. Due to the intrusion of European goods into their own culture, the native discontinued the building of more statues and abandoned the maintenance of the existing ones. In the late 19th century and the beginning of the 20th, the island saw

the rise of the cargo cults. This was another indication of the disruption of the native culture due to foreign influences.

The second form of collapse was more deadly. The Rapanui were not immune to the multitude of diseases brought unintentionally by the Europeans. The population was decimated by a number of epidemic outbreaks, including sexually transmitted diseases. After the Dutch and the Spanish, the British under captain Cook reported that there were only 600-700 people in the island and even these were suffering from numerous diseases. The abuses toward the people of Easter Island continued with several attacks by many “visitors” and culminated with the Peruvian large-scale slave raiding. By 1877, the population of the island reached its lowest point of just 110 people. In addition, the Peruvian government had loaned the island to a British trading firm, which used it for sheep ranching. This was the highest ecological impact to the island. The Rapanui were confined to a small area of the island and the rest of the land was for the sheep to roam on. Finally, it was only in the middle of the 20th century that the Rapanui got their autonomy and elected their first native governor.

Chapter 10, as the conclusion of the book, reaffirms that the story of Rapa Nui is not a cautionary tale of ecocide, as portrayed in Jared Diamond’s *Collapse*. It is a story of success, where the ingenuity of a small group of people led to their survival in a remote and small island in the middle of the Pacific. It is a story of a choice of long-term stability over short-term benefits, as the authors put it. It provides a lesson that the current people of the world can learn from.

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Endnotes:

1 Diamond, Jared M. 2005. *Collapse: How Societies Choose to Fail or Succeed*. New York: Viking

Hunters, Heroes, Kings: The Frieze of Tomb II at Vergina, by Hallie M. Franks. Pp. x + 158, figs. 70, 1 col. fold-out. The American School of Classical Studies at Athens, Princeton 2012. \$75.00. ISBN 978-0-87661-966-7.

With its stunning panoply of undisturbed grave goods and one of the most well preserved examples of Greek wall painting, Tomb II at Vergina easily ranks among the most sensational archaeological finds of the 20th century. Yet since its discovery in 1977, there has been little consensus regarding the identity of its occupants. Chronological refinement of the tomb's contents has fueled scholarship for over 30 years, in an attempt to settle the question of identity. During this time, interpretations of the frieze have figured prominently within the conversation, often becoming part of the debate over the identification of the deceased. Rather than entering this foray, which has become somewhat solidified into camps claiming Philip II or Philip III Arrhidaïos as the identity of the deceased male, Franks pursues a different goal in *Hunters, Heroes, Kings*, instead focusing on how the frieze helps us understand Macedonian society in the late 4th century B.C.E.

This shifting of focus away from questions of historicity provides a refreshingly new perspective on what can be gained from the frieze. Franks contends that the hunting scene on the frieze is designed to define and perpetuate Macedonian royal self-image, while simultaneously negotiating heroic and local dynastic pasts and regional ideals of kingship. Although many have sought to draw connections between Near Eastern lion hunt iconography and the Vergina frieze, Franks argues that the iconographic content of Tomb II frieze has been part of the Macedonian visual tradition since the 5th century B.C.E. The Tomb II frieze thus maintains and

exemplifies a tradition connecting the tomb's occupants to the local dynastic past, while simultaneously looking back to the heroic world to establish links between Macedonian royalty and the world of Greek epic heroes.

In the first chapter, Franks begins by discussing Neo-Assyrian lion hunt reliefs and their potential connection to Hellenistic sarcophagi and mosaics with hunting themes, such as the so-called Alexander Sarcophagus from Sidon. After discussing the temporal connection between Alexander's conquest of Persia and the increase of lion hunt iconography that follows in Hellenistic art, Franks looks for earlier evidence for these subjects in the Macedonian world. She finds this connection in numismatic evidence showing both lion hunts and mounted horsemen on Macedonian and Thracian coinage from the 5th and 4th centuries B.C.E., indicating that the iconographic themes on the Tomb II frieze were already present in classical Macedonian and Northern Aegean contexts well before the creation of the frieze.

After arguing that lion hunt and mounted horseman iconography had been part of the royal Macedonian visual tradition for the better part of two centuries prior to the creation of the Tomb II frieze, Franks next turns to the role of the hunt in Greek literature, and particularly in the epic past. She explores group hunting episodes, such as those of Odysseus and Meleager, that illustrate the convention of heroes being accepted into adulthood through participation in group hunts. Franks draws interesting parallels between the Tomb II frieze and mythological group hunting scenes, where the emphasis lies on cohesion of the group and on the social world to which success in the hunt ultimately allows access. Given the substantial evidence linking Macedonian royalty and Hellenic heroes, such as Alexander the Great's

unsubtle aspirations to become another Achilles, and early claims that the Argead royal lineage descended from Herakles, Franks' contention that the frieze alludes to mythological hunting scenes is compelling and well argued.

The third topic of Franks' interpretation of the frieze is the landscape in which the hunt takes place. She pays particularly close attention to the sacral elements in the scene, such as the votive sash and tablet hanging on a tree, and a pillar topped with statues. She presents these sacral elements as evidence arguing against the possibility that the landscape represents a Persian *paradeisos* (big game park), because there is no precedent for their existence in literature or iconography concerned with *paradeisoi*. On the contrary, Franks argues that the sacral elements are specifically designed to situate the scene in the mythic past, again strengthening the case for association with the heroic world of Greece. She admits that the relationship between hunts and sacred land is ambiguous, but chooses to let cases such as Herakles' hunt for the Nemean Lion in Zeus' sacred grove stand as precedent for the Tomb II frieze.

Franks concludes with a chapter on Macedonian royal self-image, and how the Tomb II frieze functions as a paradigm for the perpetuation of this image. An appendix to the book provides an account of recent scholarship on various aspects of the debate regarding the date of Tomb II and the identification of its occupants, with up-to-date bibliography. One of the most striking features of the book is a beautiful fold-out artist's rendering of the painted frieze, juxtaposed below an image of the frieze as it appears today. The artist's rendering is an invaluable resource for readers as they work through Franks' analysis and interpretation of many details of the frieze. Attractive color photographs, frequently interspersed throughout the text, further enrich the work and enhance

Franks' interpretations and arguments. The quality and size of the photographs will also help the book appeal to non-specialist audiences.

Although the work is generally clear and well written, the layout of the first two chapters is somewhat difficult to follow. The chapter titles, "The Hunters" and "The Hunt", seem to indicate a dichotomy between agent and act, but the chapter subtitles do not follow this dichotomy. Instead, agents and acts commingle throughout the chapter subtitles, rather than falling into the categories suggested by the titles. The content covered in each chapter is nevertheless well organized, but the chapter subtitles could provide a better indication of the chapter's content. Franks' discussion of the role of nudity within the frieze is also somewhat unclear. She does not propose a convincing explanation of why the two main characters in the frieze are clothed, while many, but not all, of the supporting characters are nude.

Hunters, Heroes, Kings is the third monograph in the ASCSA's Ancient Art and Architecture in Context series. The goal of the series is to combine archaeological and art historical approaches within a contextual framework, in order to realize a richer understanding of antiquity. Franks' work accomplishes this goal admirably. She presents a thoughtful interpretation of the Tomb II frieze, and demonstrates that there is more to be gained from the frieze than another contribution to the quest for identification of the tomb's occupants.

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Late Classical Pottery from Ancient Corinth: Drain 1971-1 in the Forum Southwest. Vol. VII.6, Corinth, by Ian McPhee and Elizabeth G. Pemberton, with contributions by Orestes Zervos and Elizabeth Whitton. Pp. xxiv + 400, figs. 74, b&w pls.52. The American School of Classical Studies at Athens, Princeton 2012. \$150. ISBN 978-0-87661-076-3.

McPhee and Pemberton have produced a comprehensive synthesis of the ceramic materials from Drain 1971-1, located between Buildings I and II in the area of the Forum at Corinth. The Drain represents the largest deposit of its kind from the second half of the 4th century B.C.E. and – although both authors previously worked with subsets of materials from the Drain – this study represents the first comprehensive statistical study of the assemblage. It offers a detailed description of the excavated materials as well as several discussions of form and form development that transcend traditional brevity; it also sheds light on the use and historical development of the associated buildings. Technical specifications pepper the prose, and their frequency creates a solid foundation for the volume's analytical components. A somewhat conversational tone facilitates access to this complex subject, and the authors succeed in organizing their analysis in a manner that is both user-friendly and intellectually sound.

Drain 1971-1 is a round-bottomed water channel cut into the bedrock in the southwestern part of the Roman Forum. The authors posit that it connected with a major built drain that extended along the northwest facades of four buildings in this area of the Forum before joining with the main city drain, though the second part of this hypothesis remains untested. Two short branches extend along the back of Building

II and behind Building I. The excavated portion of the Drain, initially uncovered in 1971, stretches for at least 22 m and has variable widths. The most numerous artifacts were ceramic fragments, decayed mud brick, and tile, though some metal and stone items were also present. Examination of the ceramics revealed that articulating fragments were scattered throughout the deposit, horizontally and vertically, and that the ceramics were broken prior to their deposition. The prevalence of vessels for food-related activities is clear, though some evidence of ritual and official activities is also present.

The authors' intimate knowledge of the site and its materials becomes apparent in their reconstruction of the events immediately preceding the original deposition. Their synthesis and contextualization of the data leads to the conclusion that the deposit is largely homogeneous and the result of a one-time fill dump, with much of the material originating in Building II. The singularity of this event is attributed to an earthquake that damaged the contents of the buildings and caused them to be shoveled into the Drain. The second chapter introduces six categories of attested ceramic materials, each of which is described in turn. Particular attention is given to black-glazed plain ware, pseudo-Cypriot blister ware, and cooking ware; the authors' analysis of the last and largest of these categories revealed overlap among the four main fabrics, a range of colors, and the characteristic presence or absence of stroke burnishing and dribbled slip.

The majority of the volume consists of a summary of the excavated materials that is divided into eleven catalogues based on functionality, many of which revolve around the preparation, transportation, and consumption of food and drink. Materials with shared culinary purposes such as food preparation and measurement (Catalogue II), cooking (Catalogue III), or

serving and pouring liquids (Catalogue V) are unsurprisingly grouped together. Other kinds of classifications – including the catchall category of vessels not intended for use with food or drink (Catalogue VIII), the more specific groupings of service vessels (Catalogue IX) and vessels for oil and perfumed oils (Catalogue VII), and the inevitable set deemed “miscellaneous” (Catalogue X) – are also included. Materials that pre- or postdate the main deposit are briefly addressed in Catalogue XI, along with a summary of eight of the best-preserved items from this category.

The forms represented in each catalogue are described in varying levels of detail and discussed in terms of variation and frequency, although no profile illustrations are provided in the catalogues themselves. An impressive set of illustrations and photographs of the referenced items is given in the set of figures at the end of the volume, but the separation of image and text feels a bit disjointed and could cause difficulty for students or others who are less familiar with the site’s ceramics. Technical specifications are described when necessary and a comprehensive, itemized list of all examples from the Drain is given at the end of each section. The end result is a synthesis that is able to present complex data in an accessible way, and this volume would be an excellent reference or comparative work for those focusing on Corinthian archaeology and all kinds of ceramic analysis.

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World Archaeological Congress 7

The World Archaeological Congress (WAC) is an international organization for practicing archaeologists consisting of elected representatives. It is the only such organization in existence. WAC, founded in 1986, encourages open dialogue among all people concerned about the past, including scholars from under-represented parts of the world, First Nations people, and descendent communities whose pasts are told by archaeologists.

One of WAC's most important functions is its quadrennial international congress in which new archaeological research, policy, and practice are introduced and discussed. Cultural Heritage and questions relating to indigenous peoples and the ownership of the past generally dominate the discussion. Previous WAC Congresses have been held in the United States, South Africa, India, Venezuela, and Ireland.

The WAC 7 conference was held in the Dead Sea, Jordan, January 13-18, 2013. This massive conference brought together over 1000 people from 70 different countries. Held in the King Hussein convention center, WAC seven was sponsored by His Majesty King Abdullah II Ibn al Hussein, and featured an opening address by His Royal Highness Prince Al Hassan Bin Talal. The conference also featured keynote addresses by Lynn Meskell, Gustavo Politis, Kristian Kristiansen, H. Martin Wobst, Eduardo Góes Neves, and Hisham Khatib. Filled with interesting and relevant sessions and talks, the congress was in session Monday-Tuesday and Thursday-Friday with both Wednesday and the following weekend reserved for excursions and tours. Touring locations included, Petra, Jerash, Ajlun Castle, and Wadi Rum among others. These tours were exceptional in that they not only included the visit to the sites, but a tour by the site's excavator as well. This provided an opportunity for an in-depth experience not otherwise available.

WAC 7 also introduced a Student Ethics Debate (inspired by the SAA's). Dozens of graduate students from across the world volunteered to participate in the debate. The students gathered in Madaba, Jordan over the weekend before the congress, where they were divided into teams of around 5-7 people each. Each team was itself an international affair and it was rare for a team to have more than two people from the same country. The teams were all given a number of case studies to study from which the debate questions were drawn. This debate, while suffering mildly from standard first-time hitches, was an amazing experience overall. The international quality of the teams ensured a variety of opinions as students from different cultures and backgrounds tried to reach a consensus on important archaeological ethical conundrums. The close interaction with both teammates and opponents allowed for the development of many friendships as well as professional contacts, and was the highlight of the conference from a graduate student's perspective.

WAC 7 also has two sources of funding to aid attendance. Grants are available through both the WAC travel funding committee, and through the Peter Ucko Archaeological Trust. These grants are available to professionals from low and middle-income countries as well as indigenous groups and students from all countries. This support ranges from conference registration fees, to accommodations, and in some cases, airfare support is included. WAC travel grants are only available to WAC members.

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Interview with Dr. Will Meyer, 2012-2013 IEMA Postdoctoral Fellow

Darren Poltorak

Dr. Will Meyer 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 Science with honors in Anthropology from Mercyhurst University in Erie, Pennsylvania. Will attended the University of North Carolina at Chapel Hill for his graduate work, earning his Doctorate of Philosophy in Anthropology. Utilizing multiple disciplines, Dr. Meyer explores the interactions of gender and landscape in Southern Burgundy during the Bronze and Iron Ages.

Dr. Meyer, what are your current research interests and goals, and what projects are you currently working on?

Before we begin, please call me Will. I didn't come up through programs where such titles were required and, I have to confess, haven't quite grown comfortable with my own title. Besides, I think of students as my junior colleagues. It is tough to remember this collegial relationship when you are expected to call me "Dr. Meyer" and I get to call you by your first names. So, please, it's simply Will. Now, onto your question...

My overall interest is in how people, both in the past and in the present, interacted and continue to interact with structures inherited from the past. Such interactions involve the physical structures of the landscape — in an iterative process that I call "landscape syncretism" — as well as conceptual structures, like gender.

As I discussed in my IEMA talk earlier this year, my dissertation was an exploration of landscape syncretism in southern Burgundy, focusing on the long-term "life histories" of burial mounds first constructed in the late Bronze and early Iron Ages. This project brought together a traditional approach to archaeology — including a large amount of field survey — with a consideration of folklore, archaeological historiography, and ethnography dedicated to trying to understand contemporary interactions with the protohistoric tumuli at the heart of my study. What emerged was a complex story of transformations, multiple existences, remembering and forgetting, and landscape conflict. Perhaps most interesting in terms of mapping my professional way forward, I came face to face with an ethical dilemma that faces many archaeologists as we seek to incorporate postmodernity and postcolonialism into our practice: how to navigate the very tricky path between the archaeologists' commitment to historical preservation and the needs of rural people to make a living from the land.

The project I am currently designing is an extension of my dissertation work, both materially and conceptually. A recurrent theme in my earlier research, one that shaped my dissertation, was the poor quality of data about the tumuli themselves, and the general paucity of early Iron Age data for my study area (despite the importance of the region to studies of the late Iron Age). In my new project — what I am currently calling the "Farms as Repositories of the Material Past (FARM-Past) Initiative" — I will focus on improving the quality of data about three specific tumulus complexes. In so doing, I hope to provide effective "anchors" or "attractors" for intensive survey, using protohistoric cemeteries in much the same way that Tina Thurston has used medieval churches in her own landscape research. The principal goal of this intensive survey will be to identify an important feature of Iron Age landscapes that remains virtually unknown in our project area: farmsteads. The FARM-Past initiative will use GIS-assisted predictive modeling, together with a series of remote sensing and geochemical techniques, to execute targeted surveys in the areas around the tumulus "anchors" I mention above. The identification of ancient farmsteads will not only provide a more complete picture of the Iron Age landscape(s) of this region. It will also allow me to examine a hypothesis that has never been systematically tested: that the farmsteads of the region's pre-Roman past are those still in use today. If this proves to be the case, the value of the "traditional farm" will be shown to far exceed its modern productive potential. Farmsteads are likely to contain a great deal of "tangible heritage" in the form of buried structures and artifacts that are directly threatened by changes to rural land use. This threat to patrimony is an ecological concern that I have already presented upon extensively and written about.

In addition to this work in Burgundy, I continue to be active in directing the excavations of the Iron Age port city of

Lattes (ancient Lattara), near Montpellier, on the southern coast of France. This year, with Dr. Michael Dietler (of the University of Chicago), I will conclude the excavation of a large, Greek-style courtyard house dated to the late 4th to early 3rd centuries BCE. This is the largest and earliest such structure known in the Western Mediterranean, and it is one of a number of contemporaneous courtyard houses in the port-side quarter of Lattes. Once we have completed this year's excavation, we will produce a volume on this architectural development — on its form, its social import, and its role in early urbanism in the region — as part of the Lattara series. My own contribution to this volume will likely focus on the importance of drainage structures to the development of these houses, an ecological topic that has captured my interest in recent years. As we finish up our current work at Lattes (ending an intellectual era), the rest of the junior staff and I are working to map out a future for the site and its associated museum, trying to ascertain how best to use the unique resources offered by Lattes to answer a new generation of archaeological questions.

While these two projects occupy most of my time and take up much of my research energy, I think that everyone has a “some day” project that they think about in their down time. My own “some day” project involves the “Pilgrims’ Road” from Vézelay, in northern Burgundy, to Santiago de Compostella, in northwestern Spain — one extensive UNESCO World Heritage area. One leg of this medieval route passes below my field headquarters in Burgundy and a complementary leg passes through Montpellier. Given this proximity to the places I already work, my imagination has been piqued by contact with contemporary pilgrims and with the medieval shrines along the Road. One day I plan to undertake a project that combines ethnography — actually walking the Road and conducting research with its current “inhabitants,” stationary and otherwise — with ethnohistory and archaeology.

My goal will be to explore the very real possibility that similar itineraries existed in the remote past, perhaps even before the sites that make up the Road today (or those that made it up in the 13th century) were Christianized. Further, to help understand how syncretic — both religious and landscape — transformations might have occurred in the past, I would like to find out how the people who currently walk the road and/or live along it understand its complex and fluid landscapes, how they develop relationships to these landscapes and to one another, and how both people and landscapes are altered by the interaction.

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

Wow! Now this is a difficult question to answer...

First and foremost, I would be remiss if I didn't tell you that Carole Crumley and another of my graduate mentors, Silvia Tomášková (who will be here for the IEMA conference this year), have inspired me the most. Carole's holistic “historical ecology” has provided a strong framework for my own research, both in Burgundy (where I work directly with her) and elsewhere. Silvia guided me further in exploring landscape approaches, as well as in examining feminist and gendered approaches to anthropology and archaeology. Especially important was Silvia's insistence that the value of gendered approaches to the past need not lie only in discussions of male and female bodies. These two professors had the strongest influence in shaping the scholar that I have become and — as colleagues and valued friends — Carole and Silvia continue to influence my work.

If you mean to ask about scholars whose writing has most influenced my work, I would say that there are quite a few. Chief among them is probably the ecologist Tim Ingold, whose “dwelling perspective” — a practical phenomenological approach to

understanding how humans live with and in their landscape — I greatly admire. If you were to tease out all of the quotes in my dissertation, you would probably find that I quoted Ingold the most.

Another strong influence on my scholarship are recent theories of materiality and what I affectionately refer to as the “new materialism.” Such theories make strange and sometimes uncomfortable bedfellows for Ingold (who deplores them), but I cannot seem to get away from them. Indeed, despite Ingold’s claims to the contrary, I see these approaches as part-and-parcel to a dwelling perspective. I have returned again and again to the Actor-Network Theory (ANT) of Bruno Latour, Michel Callon, and John Law. While I think that ANT is often over-deployed and misunderstood in anthropology, it does hold considerable promise for archaeology, which is — after all — deeply concerned with the relationships between people and things. Archaeologists like Peter Whitridge, now of Memorial University of Newfoundland and one of my early graduate committee members, have demonstrated how ANT might be applied successfully to studies of human-artifact relations. ANT grew out of science studies and I find the materiality work of other philosophers, historians, and ethnographers of science — like Andrew Pickering, Donna Haraway, and Karen Barad — equally inspiring.

Among the other authors who have greatly influenced me is Marc Bloch, one of the founders of the Annales school of history, whose *The Historian’s Craft* — with its focus on holism, interdisciplinarity, and the *longue durée* — should be required reading for any student of the past. Another such author is Keith Basso, whose ethnographic work among the Western Apache eloquently demonstrates how myth and landscape co-create one another. This emphasis on the importance of storytelling is something that Basso shares with Ingold, who suggests that archaeology is

yet another form of storytelling. This is a point of view that I have sought to explore, drawing on the writing of Walter Benjamin to think of the archaeologist not only as a storyteller, but also as a translator.

Two final authors whose work I will mention can be found a bit “closer to home.” Though she has retired from academic studies of archaeology, I continue to find the work of Barbara Bender incredibly inspiring. She challenged us to “think outside the box,” both in terms of archaeological interpretation and of archaeological method. I hope that I will challenge my own students to be similarly innovative. A similar “crosser of streams,” I also find the writing of the archaeologist Cornelius Holtorf (of Linnaeus University) immensely inspiring. In fact, it seems like every time I feel I’ve had an original idea about archaeological theory and interpretation, I find that Cornelius has already had the idea and written about it. Correspondence that I had with Cornelius when he was reviews editor for the *European Journal of Archaeology* suggests that he is not only brilliant, but also kind. I think this makes him a worthy role model.

Some would say the gender and landscape are specialties unto themselves. What made you want combine these theoretical schools? How has taking interdisciplinary approaches aided this?

I am going to take the liberty of putting together two questions that you asked separately, as the response to the two is related. You are, of course, quite right that landscape and gender are specialties unto themselves, with separate literatures and paradigms. Indeed, I can think of at least 10 different ways to “do” landscape and an equal number of ways to “do” gender!

But it’s important to keep in mind that many of these approaches — or, at least, many of the concerns that drive them — are shared by both landscape and gender specialists. Perhaps the most obvious among them

is a concern with the body. Landscape experts have considered everything from the physical needs and ecological effects of the human body to the sensory / phenomenological experience of dwelling in particular landscapes. Gender scholars have considered how bodies are viewed, interpreted, altered, and experienced. So it does not require a big stretch to begin thinking about how the deeply inflected and diverse bodies that gender scholars discuss move through the deeply inflected and diverse landscapes of landscape archaeologists and historical ecologists.

The question of “nature” is another point of intersection between the two specialties. Since the release of Simone de Beauvoir’s *The Second Sex* in the 1940s, feminist scholars have worked to question what constitutes the “natural woman.” With all due respect to Aretha Franklin, it seems that there is very little about gender that is, in fact, purely “natural” if by that one intends to say “biological” and “inherent.” This is a fact that queer scholars have brought into even starker light. While gender scholars have been teasing apart “nature” in one arena, landscape archaeologists and historical ecologists have been questioning it in another: revealing that very little of the earth’s surface — if any at all — remains unaltered by human activity and picking at the notion that “nature” and “culture” are in fact separate entities. Once again, it doesn’t require us to make a great intellectual leap to see how the two specialties might inform and build upon one another.

Since I was an undergraduate, I have been fascinated by how different approaches to knowledge might be put together. I think we get more out of combining different intellectual approaches — whether different theories or different methods — than we could get out of any single approach. I tend to see the potential for synergy when different approaches are added together, opening up new intellectual ground and

new questions that might not be predicted in advance. I encourage my students to seek out the conceptual and methodological synergies that will allow them to break open their own projects and take them to different intellectual places.

In light of this general approach to knowledge, it is probably not surprising that I have sought to put landscape and gender together, nor that I try to design projects that walk the line between archaeology and ethnography.

What have been the most rewarding aspects of the IEMA Postdoctoral Fellow position? What have been the most challenging?

One of the most rewarding aspects of the IEMA position has been that I have had the time, resources, and interlocutors to consider many of the ways that landscape and gender might intersect and inform one another. This was something that I needed: as a junior scholar, the more time one has to elaborate her/his intellectual position the better. I owe IEMA and its members a huge debt of gratitude for allowing me this time and for helping me think through the process.

Another rewarding aspect of my fellowship has been working with IEMA’s graduate students. Yours is a very rich and stimulating intellectual community. You are all working on or developing very interesting research projects and many of you are already very serious scholars — perhaps more serious than I will ever be! Our discussions in my graduate seminar have not only caused me to laugh (in my opinion, an underrated correlate to learning), they have also opened up new paths to thinking about “Landscape & Gender” even for me, who started a bit before you did. This has been incredibly exciting.

The easy answer to what has been most challenging about the period of my IEMA fellowship is: navigating the UB

on crutches. Having broken my leg last fall introduced a lot of difficulties and delays into the plan that I had for my time at IEMA, some of which I find myself confronting still.

Aside from that, one challenging — though also rewarding — aspect of being an IEMA Fellow has been the need to negotiate and translate among several different constituencies. Because the faculty and students of IEMA are not just anthropological archaeologists, I have been challenged to step out of my own “backyard,” to enter into new conversations, and to meet new people. For example, it was difficult to find speakers who would talk about the synergy of landscape and gender from the standpoint of Classics. Yet, having finally found the right people, I discover that they provide a valuable perspective quite different from my own. Thus, as I say, the challenge has come with its own reward.

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

Again, I am immensely fond of Barbara Bender’s work. In addition to its experimentation with “other ways of telling” archaeological stories, I think that her Stonehenge volume reports upon one of the most successful interdisciplinary research projects in archaeology. Bender concerned herself not only with the history of the site itself, but also on later encounters with the site. She opened herself up to understanding the concerns and perspectives of the area’s contemporary inhabitants. And, importantly, she gave them a role in narrating the history and importance of Stonehenge. I think that as archaeology moves forward into the 21st century, we need to be extra careful to involve the public in our work in useful and meaningful ways. This is kind of daunting, as it means opening up our discipline and

its authority to critique. Bender’s work at Stonehenge (and her current, unofficial work outside the academy) faced this challenge and demonstrated the value of overcoming our intellectual reservations about working with the public.

I am also quite fond of the work that Peter Schmidt (of the University of Florida) has done in East Africa over the past 30 years. Schmidt was one of the participants in the School for Advanced Research symposium that led to the publication of Crumley’s *Historical Ecology: Cultural Knowledge and Changing Landscapes* (1994). In his contribution to the volume, Schmidt demonstrated how understandings of the landscape that developed in the Iron Age have impacted such things as deforestation and the spread of HIV today. In subsequent work, he has expanded upon these themes, indicating — among other things — how the loss of cultural memory that has resulted from AIDS mortality impacts the heritage landscape of the region. With an understanding of the past and the present as fundamentally linked, Schmidt effectively shows his readers that archaeology and ethnography can (and should) work hand in hand.

A final project that I will mention is the study of Maya salt production and salt-producing landscapes undertaken by Heather McKillop (of Louisiana State University). I am interested in McKillop’s study, in part, because I am fascinated by the history and prehistory of salt production (indeed, I nearly focused on this in my own dissertation work). I am also fond of McKillop’s work because some portion of it involves submerged sites and, having worked in the waterlogged lowest levels at Lattes for so long, I am curious about how others meet the challenge of working with wet and waterlogged sites. McKillop’s study is effective as an interdisciplinary project, however, because she has been able to integrate a large amount of information about climate change and sea-level rise

with ethnographic information about the craft of salt production and archaeological information about the locations of this production in the past. It is very exciting and promising work.

Having recently completed your dissertation, do you have any advice for graduate students?

Indeed, I do... Some days it feels like I have too much advice for current graduate students! But I will limit myself to a few observations and suggestions, nearly all of which fall under the heading of “be practical and think ahead.” Much of this advice also falls under the heading of “do as I say, not as I did... learn from my mistakes.”

First — and I direct this advice specifically towards first- and second-year students — invest in a reference manager and start to use it as early as possible. Programs like EndNote and RefWorks are relatively easy databases to manage that will vastly improve the quality of your academic life. To have all of your notes organized in one place is, itself, quite valuable. The real value of these programs, however, is that they help you to cite sources and generate bibliographies simultaneously, as you write. As the amount of written work required from you begins to grow, you’ll come to appreciate the amount of time and effort you can spare on trying to recover your own citations and produce your own bibliographies (perhaps in several different styles during the same semester). I direct this advice towards the junior grad students specifically because reference managers are most effective when you begin them early. They can still be effective if set up later, but it will take more effort on your part to enter your “backlog” of references and notes.

Second, have a goal. Don’t just be in grad school because it is the logical next step in your academic development. Learning for learning’s sake is beautiful and important,

but in today’s political and hiring climate, it is not terribly practical. Start to formulate an idea now of where you’d like to be in five years, then in ten years. What kinds of projects would you like to work on? Where? And with whom? Cruise the AAA, AIA, and SAA job postings from time to time to see what employers are looking for... How might you fit into these positions? The details of your plan will no doubt change over the course of your graduate career, but — to be most effective as a graduate student and to get out in a timely manner — you need to know what you’re working towards, and to select a project and committee members who will help you to reach that goal. Believe it or not, the dissertation will not be final step in most of your academic lives... it is never too early to think about and plan what will lie beyond.

Third, take advantage of the resources available to you now. This is a moment where — while still keeping your long-term goal in mind — you can explore several different topics and approaches... perhaps the final moment for a while. So you should take this opportunity to talk to the non-archaeologist professors in your department. Given that each of us has to work with living communities who are interested (to varying degrees) in what we dig, I personally feel that every archaeologist should sit in at least one ethnography class. Maybe it’s a good idea to sit with the physical anthropologists for a while and think about human bodies, their limitations and potentials. Anthropological archaeologists should take courses in Classics and vice versa, and maybe it’s a good idea to go outside of archaeology, anthropology, and Classics to take courses in geography or the fine arts. While I know that time is at a premium for you, each of these different resources will greatly improve the kind of scholar that you are, offering you valuable new perspectives and expanding your “intellectual flexibility.”

Another place where many of us can use new perspectives is in facilitating and evaluating our writing. As you know, I tried to get a Writing Workshop going last semester that never really got off the ground. While it doesn't have to be as formal as the workshop I had in mind, you will find that writing groups — and particularly small groups that have people from the different subdisciplines — are a fantastic way to help you write in a timely manner and to improve the quality of what you're writing. It is okay to have only one kind of archaeologist on your writing group, but you won't necessarily challenge yourself to write for a broader public. You run the risk of using turns of phrase that are taken for granted in our discipline, but entirely opaque to an outsider, even to other scholars. In the end, no matter how your writing group is composed, you will benefit from have a few extra sets of "critical eyes" pass over your paper, from learning to give and receive constructive feedback, and from working through multiple drafts of nearly everything you write.

A further piece of advice: each of you should actively think about teaching. Many of you are on an academic track, meaning that most of you will probably be called upon to teach one day. So why not start building your pedagogical toolbox now? Take note of the teaching styles and texts that best work for you as a student. If you are assisting with a class, pay attention to the students' responses to lectures, media, readings, and assignments. What tricks does the professor use, if any, to keep students engaged? Could you use the same tricks? What might you do better (I don't suggest sharing this last part with most professors for whom you're working)? If you are lucky enough to teach your own course during your time at the UB, think about how you can integrate new technologies into your teaching and how you can design projects to take your students outside of the classroom. Even if you never get the chance to teach your own course, you

should think about what courses you would like to teach one day. Come up with a few course ideas and generate syllabi for them. When you are on the job market, you will be asked to share your thoughts about courses you might teach. By thinking about them well in advance, you will be able to present potential employers and students with course proposals that are much more "fleshed out" and enticing.

Finally — and this is a piece of advice that James Osborne provided to you last year — publish your work. Over the next few years you will be expected to write a number of pieces of varying lengths, often on different topics and from different perspectives. Many seminar and conference papers are quite good and well on their way to being published. Unfortunately, whether because they are busy or because they feel their approach is too remedial, many graduate students never go on to publish these papers. (I will confess that I am among the list of repeat-offenders here!) In today's hiring climate, you have to do everything possible to give yourself an edge and to make yourself attractive to potential employers. Publications seem to be the most effective means of doing both of these things. By carrying a few pieces through to publication during your graduate career (especially in peer-reviewed journals) you do a few different things: (1) you demonstrate that you are capable of sustained inquiry, (2) you show that you are serious enough to go through the process of submission, critique, and rewriting, and (3) you establish your own "intellectual coordinates," sketching out your scholarly perspective and outlining (through the works you cite) a network of scholars with whom you see yourself in conversation. Of all the suggestions that I have made here, I think that the advice to publish is the most important, and the one that I wish I had taken more seriously when I was a graduate student.

IEMA
Institute for European and Mediterranean Archaeology

College of Arts and Sciences
University at Buffalo, State University of New York

ENGENDERING & LANDSCAPE & LANDSCAPING & GENDER

Conference Organizer
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Ruth Tingleh, UC Berkeley, Department of Anthropology and Center for Digital Archaeology
Nancy Wicker, University of Mississippi, Department of Art

Over the past 20 years, an important development in social theory has been the recognition that all human life is embodied. Part-and-parcel to this embodiment is an inescapable sensual connection to the non-human things of the world, with which the human body is in a state of constant interaction. The stage upon which such interactions occur is the landscape. How we act – and interact – on this stage is influenced by the different categories of identity to which we belong, including sex, gender, age, class, faction, and ethnicity. In other words, people have different experiences of and in the landscape depending upon their gender and other identities. Further, just as societies endow different kinds of body with different expectations, rights, and limitations, places on the landscape might also be gendered in similar ways. Such intersections of landscape and gender have been explored in archaeology's sister disciplines but remain relatively unexplored within archaeology itself. Where they have been looked at, however, these points of overlap have provided a much richer sense of life in the past, revealing complex heterogeneities in the landscapes and societies that we study. This symposium brings together archaeologists, art and architectural historians, and ancient historians whose expertise spans the length and breadth of Europe in order to build synergy between engendered and landscape perspectives. Drawing on case studies from the Palaeolithic to the Modern periods, we examine how people of different genders experienced the landscapes of the past and how specific places or elements within those landscapes became gendered.

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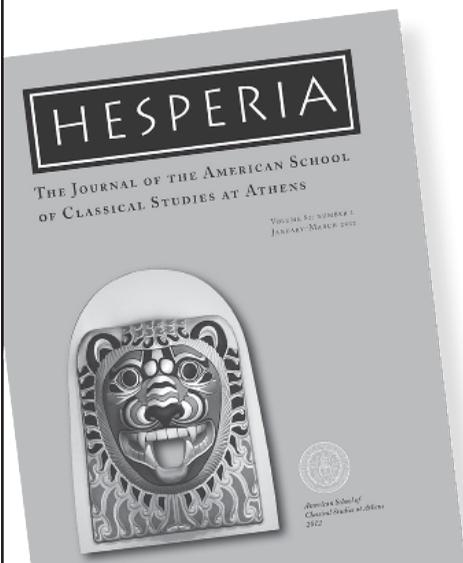
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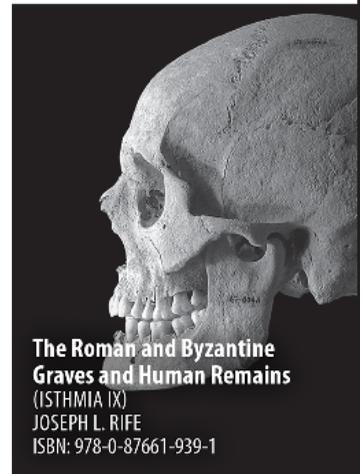
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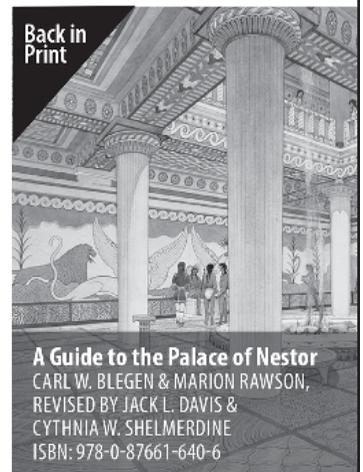
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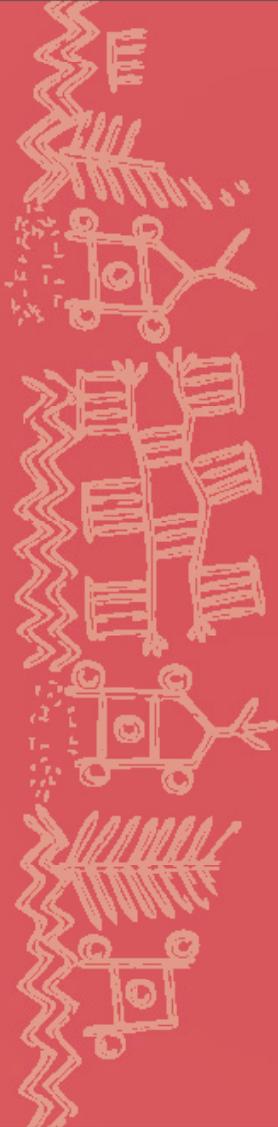
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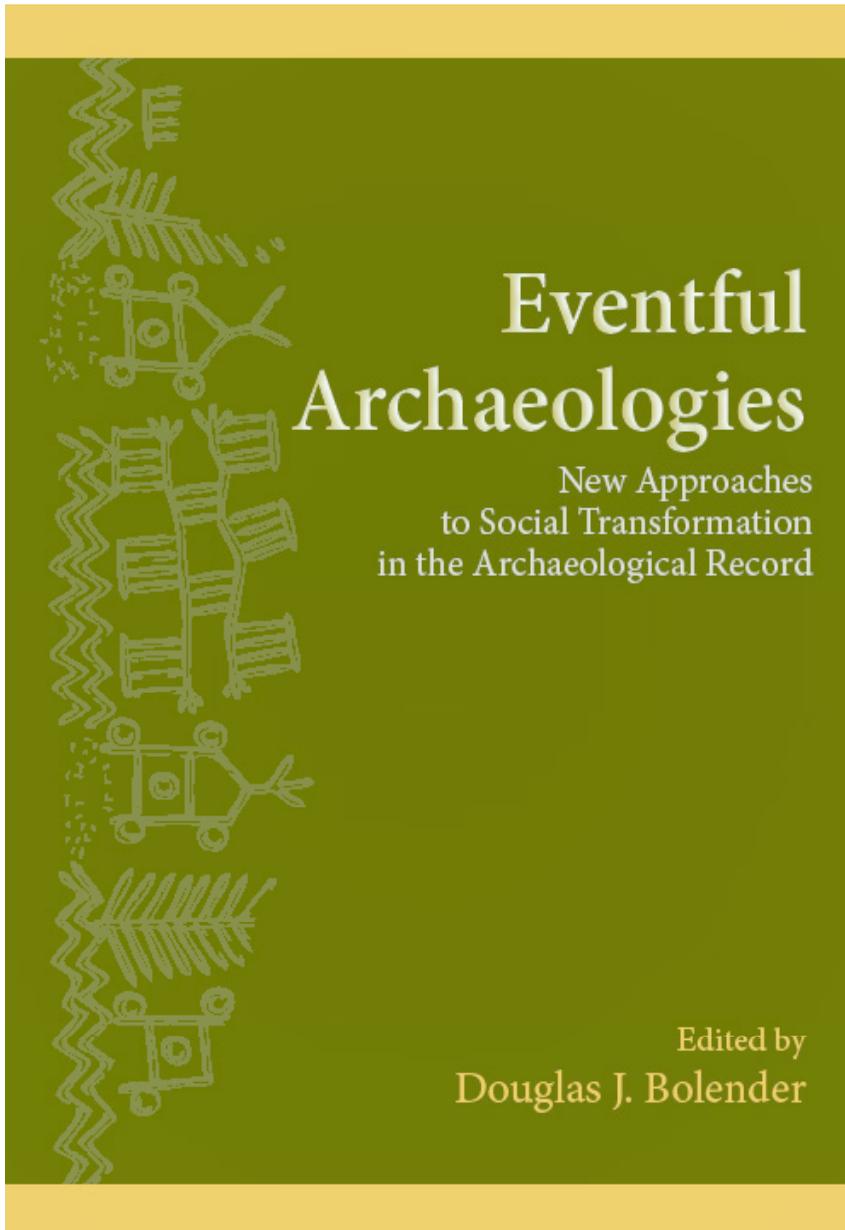
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