Picrolite and the Cypriot Neolithic: An Experimental Study

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PICROLITE CARVING AND THE CYPRIOT NEOLITHIC:

AN EXPERIMENTAL STUDY

By

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Bachelor of Science – Anthropology
Montana State University
2012

A thesis submitted in partial fulfillment
of the requirements for the

Master of Arts – Anthropology

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The Graduate College

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Forrest Jarvi

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Abstract:

Picrolite, a fibrous green stone originating in the Troodos mountains on the island of Cyprus, appears in the archaeological record almost from the very earliest sites on the island. Thus far, few publications have addressed the material from anything but a descriptive perspective. Research at the Aceramic Neolithic site of Kritou Marottou Ais Giorkis has uncovered a wide variety of picrolite artifacts since excavations began in 1997. Preliminary experimental studies have begun to explore the ease of both obtaining and manipulating the material using only local materials and unassisted manpower. This thesis presents a three-part investigation into the place of picrolite in Neolithic Cyprus. A literature review reveals the dearth of holistic information regarding picrolite, particularly in the Neolithic period. Experimental picrolite working, performed using local raw materials, reveals the relative simplicity of picrolite carving. A brief use wear analysis allows for a reasoned critique of current lithic analysis models used for Cypriot Neolithic sites. Together, these sections allow for a more nuanced approach to the study of picrolite in the Cypriot Neolithic, considering issues including iconography, identity, and social interactions for this period of time.
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Chapter 1: Introduction

Fundamentally, this thesis is about two things. First, it is an attempt to fill a gap in existing literature and second, it is one of the first attempts to use experimental archaeology to explore the unique nature of Neolithic archaeology on the island of Cyprus. Picrolite, a fibrous green stone originating in the Troodos mountains, the largest mountain range on the island, appears in the archaeological record almost from the very earliest sites on the island. Research at the Aceramic Neolithic site of Kritou Marottou Ais Giorkis has uncovered a wide variety of picrolite artifacts since excavations began in 1997 (Simmons 2012a). Recent excavation seasons in 2013 and 2014 have been instrumental in broadening the scope of information available on the stone through firsthand collection and my own informal experimental carving and grinding using native materials including chert, limestone, sandstone, and diabase.

![Figure 1.1: Map of Cyprus (from http://www.decorationsmoy.tk/cyprus-map/)](http://www.decorationsmoy.tk/cyprus-map/)

Theoretical Background

Theoretically, this thesis straddles the line between the middle-range and behavioral theories espoused by many processual archaeologists (Reid et al 1975; Sabloff 1981), and the
more culturally-contoured interests of Michelle Hegmon’s “processual-plus” movement (Hegmon 2003). The methodology is drawn from the experimental use-wear and artifact-creation studies of the 1970s and 1980s (e.g., Odell and Odell-Vereecken 1980), but it is critical that this study shows how picrolite may have been culturally situated at *Ais Giorkis* and more broadly in Cypriot prehistory. This is where questions of the value of ornamental goods, the meaning of luxury items, and the social ranking of objects and raw materials may be drawn in from disciplines ranging from the archaeology of food (e.g., Gumerman 1997) to finance (e.g., Ait-Sahalia et al 2004), and cultural anthropology (e.g., Kipp and Schortman 1989) in order to generate a hypothesis as to why picrolite appears to have been a valued ornamental material for several millennia before nearly vanishing from the archaeological record during the Bronze Age. The relative difficulty of obtaining and carving picrolite, as explored by my experimental carving, plays into these ideas nicely, when considering whether picrolite could have been a highly ranked material in addition to a material reserved for ornamental use.

Figure 1.2: Ais Giorkis in western Cyprus (from map at http://6worldmapsof.xyz)
Structure of the Study

In order to satisfy its dual goals, this project is a three-part endeavor, involving a literature review, an experimental study, and a lithic use wear analysis. With regards to filling the knowledge and publication gap on picrolite, I wish to explore the question of how the distribution and production of picrolite ornaments can expand our understanding of Ais Giorkis, and the role of picrolite in the broader Aceramic Neolithic on Cyprus. This thesis, therefore, focuses on data pertinent to the Neolithic period on the island, but a thorough treatment of the material must address the entire time depth of human habitation on the island, from the Epipaleolithic, beginning around 12000 years before present (Simmons 2012a, b), through the Early Bronze Age, which began in the third millennium B.C. (Knapp 2013), where production of picrolite artifacts drops tremendously. The narrative picks up again in the twentieth and twenty-first centuries, where archaeologists have begun to articulate with the potential social roles of the stone through the history and prehistory of the island, as discussed in Chapter 2. In order to fully explore this depth of time and breadth of artifact and site types, Chapter 2 is a literature review, drawing from geological and archaeological publications to generate and present a holistic picture of the obtainment and use of picrolite through the last twelve thousand years. Also in this chapter, the ease of obtaining workable picrolite is discussed, particularly concerning direct procurement possibilities as well as potential for exchange networks involving the inhabitants of Ais Giorkis.

Chapter 3 of this thesis centers upon the ease of creating the assemblage of picrolite artifacts found at Ais Giorkis, including incising, drilling, and grinding picrolite using only locally
available materials. In order to explore these issues, I shaped picrolite into several of the forms found at Kritou Marottou Ais Giorkis. The more detailed description of the methodology, along with the description of the types of artifacts found on site, are outlined in Chapter 3. The materials to be used were collected in 2013 and 2014 during the field seasons and were sufficient to draw a sufficient sample of pebbles large enough to shape into the types of artifacts found at Ais Giorkis. The incising and drilling material, chert, was also obtained on location near Ais Giorkis and the grinding materials used in the study, limestone, diabase, and sandstone, were also obtained near the modern town of Kritou Marottou, less than 5km from the site.

Chapter 4 will cover the macroscopic analysis of the chert flakes and tools used to work the picrolite during this study. As a necessary disclaimer, I must note that one symptom of using traditional Near East lithic typologies to categorize the stone tool assemblage at Ais Giorkis is that utilized flakes do not exist as a distinct category. Instead, implements with edge damage, either through use or deliberate retouch, are categorized as retouched blades or flakes. As such, any concept of use wear is impossible to approach from a data-oriented direction, except by re-analyzing already categorized tools from Ais Yiorkis, which are currently stacked among layers of boxes of artifacts at the Palaepaphos Museum in Koukla, Cyprus. To make up for this dearth of published or otherwise accesible data, this thesis contains my assessment of used edges of carving implements to assess three main issues, the relative durability of different raw materials, the relative durability of retouched versus non-retouched artifacts, and, most importantly, the categorization of tools from the site of Kritou Marottou Ais Giorkis.
Chapter 5 turns to a broad discussion of the conclusions that can be drawn from the results of the literature review, the experimental working, and the lithic use wear. This is where the important questions are addressed, those concerning the social importance of picrolite, its place in island identity and iconography, and the movement of artifacts (as a proxy for the people moving them) across the physical and social landscape of early prehistoric Cyprus.
Chapter 2: Literature Review

The main function of this literature review is to reveal the essential gap in knowledge and synthesis in existing publications on picrolite, particularly with regards to the Neolithic period on the island. The Chalcolithic period is much better represented, but almost solely with regards to the gorgeous cruciform figurines that are perhaps the most aesthetically distinctive artifacts in Cypriot prehistory. What these publications (e.g., Merrillees 1980) and those describing contemporaneous terracotta figures (e.g., Orphanides 1988) do is often reify conceptions of binary gender classifications and ‘Mother Goddess’ ideology that have been subsequently rejected as overly simplistic or not specific enough to the particular trajectory of symbolic iconography on Cyprus (Knapp 2013: 237). With regards to the Neolithic, there is almost nothing approaching synthetic literature on picrolite, and those that do attempt this are discussed below. It is clear, regardless, that the existing literature is fundamentally incomplete and that this project fulfills a need for a more recent and more synthetic approach to the Neolithic procurement, use, and social role of picrolite.

When considering the literature on picrolite in Cyprus, it is useful to break the discussion down into three main themes. The first of these encompasses the purely descriptive elements of publications, including site reports and certain elements of larger thematic publications such as A. Bernard Knapp’s (2013) comprehensive volume on Cypriot prehistory. Geological discussions of the origin and composition of picrolite make up the second category, and the cultural history of picrolite in Cyprus is the third, and least common, theme. The first of these is by far the most common, with most site reports ranging from Epipaleolithic to Early
One of the best examples of picrolite in site reports can be found in the French report on the Aceramic Neolithic site of Parekklesia Shillourokambos (Guilane et al 2011). Detailed photographs and descriptions (in French) give a thorough impression of the range of artifact types found on site, but ultimately these types of reports, no matter how detailed, are helpful only in a limited scope of research questions, and a summary of artifacts, however interesting, is only the beginning of a more complete exploration of the role of picrolite in prehistoric Cyprus. Some of these publications come tantalizingly close to saying something more meaningful about labor specialization, exchange networks, or island identity, such as Knapp, in his all-too-brief discussion of picrolite cruciform figurines, which he suggests may have “wider ramifications for the study of ideology and identity during the Chalcolithic era” (Knapp 2013: 224). Fortunately, Knapp’s broad treatment of the subject also includes citations to those few who have more deeply considered the social role of picrolite; as I discuss below, these discussions almost exclusively target the stunning Chalcolithic cruciform figurines, with essentially no emphasis on the relevance of the material in earlier periods.

There are countless other site reports noting the existence of picrolite artifacts in prehistoric contexts. Research at the Aceramic Neolithic site of Kritou Marottou Ais Giorkis, for example, has uncovered a wide variety of picrolite artifacts since excavations began in 1997 (Simmons 2012b, Fig 1) but, in keeping with the trend, there is little text attempting to approach picrolite beyond a descriptive level. It seems nearly every pre-Bronze age site on the island has at least a few worked and/or unworked picrolite pieces in the excavated record (e.g.
Guilane et al 2011, Knapp 2013, Peltenburg 1991, Simmons 1999, Simmons 2012a, Swantek 2006), but few researchers have found the need to more thoroughly consider why and how artifacts made from the material came to be so prevalent. Those who have are discussed in this chapter.

Geological discussions are critical for understanding the potential sources for procurement of raw picrolite, and in many cases are tied into the discussions of the cultural history of picrolite. Costas Xenophontos’ (1991) article is an excellent example of a geologically-focused publication, with a few important tie-ins to the larger cultural context of the material. He discusses the crystalline structure of picrolite and the presence of different textures of the stone as a product of formation processes and the surrounding stone matrices (Xenophontos 1991: 128-129). Perhaps most importantly for considering other publications is Xenophontos’ contention, based upon x-ray diffraction tests, that neither antigorite nor steatite are present in artifacts or source rocks on Cyprus (Xenophontos 1991: 132), a variance that turns out to be only present in the literature, not in the material or geologic record of the island. While Xenophontos only wrote this single article on picrolite in Cyprus, and that more than two decades ago, it remains the definitive work on the interplay between geography and archaeology for the study of Cypriot picrolite.

Xenophontos’ article is highly relevant in another respect. It discusses the geological and hydrological processes that made high quality picrolite available for the use of prehistoric Cypriots. The processes involved in the formation of the Troodos mountains were the only processes of sufficient character to generate workable picrolite, while the “outcrops in Paphos and Limassol districts...are penetratively deformed and sheared in such a way that no usable
vein material was produced” (Xenophontos 1991: 132). In addition, the proximity of the exposed veins to the watersheds of the Kouris and Karyotis rivers meant that pieces from the larger, higher quality veins could be transported and polished by floodwaters in the river valleys. Raw pieces found at the archaeological sites of Kholetria Ortos and Dhiarizos Ayios Savvas are large enough to be initially sourced to the major outcrops in the Troodos, but well rounded such that water transport in either the Kouris or Karyotis rivers is indicated (Xenophontos 1991: 132). The most essential takeaway from Xenophontos’ article, which is useful for understanding the distribution patterns of picrolite in prehistoric Cyprus, is that high quality picrolite, suitable for the construction of the array of artifacts we find, is only found in the Kouris and Karyotis river valleys (Xenophontos 1991:137).

R. G. V. Hancock and W. A. Fox (1992) present a more chemically oriented approach to the geological variation of picrolite, which they mistakenly term antigorite, on the island. They use neutron activation analysis to attempt to source the material, which is important research, but the cultural connotations are lost in the shuffle of technical jargon. What the discussion does well is it reveals this conflation of antigorite, and in some cases steatite and serpentinite (as noted in Xenophontos 1991), which can make it difficult to sift through the literature for mention of picrolite artifacts. Fortunately, the geological discussions by Xenophontos (1991), as well as Hancock and Fox (1992) make the reasons behind this confusion a little more understandable, since all of the other material names refer to either geologically, aesthetically, or chemically related materials.

One important conclusion to be drawn from this work is the possible association of picrolite with asbestos veins, which makes the carving of the material a potentially dangerous
proposition (McCarthy pers comm.; Xenophontos 1991: 132). In retrospect, this association makes sense, since our Ais Giorkis excavation team’s forays to the Troodos picrolite source required driving by a defunct asbestos mine near the village of Amiantos. Out of respect for the potential dangers of asbestos inhalation, the experimental work was conducted with the use of a mask to filter out the fibers, in the event there was any blowing dust from the carving process.

The cultural history of picrolite carving is a critically important component of this thesis, and the general lack of in-depth treatments of this issue both limits the scope of the literature review and deepens the potential impact of this thesis. To date, the only major published work centering on the cultural role of picrolite is Edgar Peltenburg’s (1991) article on picrolite in Cypriot prehistory. Peltenburg explores the concept of exchange of picrolite within Chalcolithic Cyprus as it could have related to intersite hierarchies. To put this article in its context over two decades ago, Peltenburg (1991: 107)suggests that “Evidence for foreign and local contacts in Cyprus before the Bronze age is so sparse” that the prehistory of the island could be characterized by its “insular and regional isolation.” Through more recent excavations and interregional studies of Epipaleolithic, Neolithic, and Chalcolithic sites (see Simmons 2012; Vigne et al. 2011), as well as publications within the very same bulletin as Peltenburg’s article (Mellink 1991), it is quite clear that the isolation of sites or clusters of sites described in the article is not supported by the archaeological record. Inter- and intraregional trade on the island, and between Cyprus and Anatolia, was likely far more developed than Peltenburg’s argument suggests. As for the intraregional exchange in the Chalcolithic described in this article, the question of the overall importance of picrolite is the one most relevant to my study.
Peltenburg (1991:109) characterizes picrolite as a “nonessential, nonutilitarian, ‘valuable’ material.” This is an interesting characterization, and one that begs the question of why picrolite ought to be considered a valuable material. Based upon the assumption that picrolite is a valuable material, Peltenburg models site hierarchy based upon proximity to picrolite sources, with Erimi, at the edge of the Kouris riverbed, being the most prominent Chalcolithic site to figure into his argument.

Peltenburg also notes the dispersed production of picrolite artifacts, as evidenced by the relatively large numbers of unworked pebbles found at archaeological sites where no natural source of the material is present. This suggests that raw pebbles were the primary form of transported picrolite, rather than finished artifacts. The ability to work picrolite, therefore, could not have been a marker of site hierarchy, though it does not preclude the presence of ‘artisans’ at sites who could have produced the majority of artifacts. For Peltenburg, picrolite was a good that gave sites near raw sources privileged access to exchange goods from other, more distant sites, a good that was replaced by copper at the advent of the Bronze Age (1991:118). The disappearance of picrolite at that time, according to Peltenburg, was a marker of the “breakdown of the whole infrastructure of production, exchange, and consumption (1991: 118)” of the entire Chalcolithic Period. Perhaps, but this would not explain why picrolite is absent from Bronze Age contexts in sites near the raw sources, where exchange would not have been necessary to obtain the lovely green stone.

Peltenburg also more fully discusses the role of picrolite in the Chalcolithic period in a 1990 publication about art in the Cypriot Chalcolithic. Unfortunately, he marginalizes the place of picrolite in periods prior to the Chalcolithic, suggesting that “…picrolite, a soft stone akin to
steatite, the hallmark of Chalcolithic Cyprus, was used previously, but only for uninspired plain pendants” (Peltenburg 1990: 8). We know this is not true, with the wide range of artifacts found at Shillourokambos and Ais Giorkis, not to mention other Aceramic and Ceramic Neolithic sites. Peltenburg also suggests that the exploitation of picrolite may have been a factor in the discovery of copper ores, but this makes little sense since all indications are that raw picrolite for artifact creation was obtained in pebble form from the Kouris and Karyotis riverbeds, rather than from the raw source in the Troodos. The Troodos source is near the copper-bearing pillow lavas, but again, it appears to have not been the source for worked picrolite. What is far more interesting and potentially powerful is Peltenburg’s discussion of the Philia Phase in Cyprus, which begins the Bronze Age, a period where the use of picrolite dropped significantly. Peltenburg suggests that the beginning of the Philia Phase in the Late Chalcolithic/Early Bronze Age coincides with a seeming collapse of Chalcolithic societies in West Cyprus. The Erimi Culture [on the Kouris River] collapsed, and the Bronze Age began. The site of Erimi was a center for picrolite working and procurement, so it is possible that the collapse of that group was reflected in the sharp decline in the use of picrolite (Peltenburg 1990: 19). This is plausible, but Peltenburg consistently overemphasizes the role of Erimi in picrolite production, a view that is limited in the sense that it ignores the first six thousand years of picrolite working on Cyprus, a long time before Erimi became a prominent Chalcolithic site. Now, it is likely that the Philia Phase had some impact on the use of picrolite since, as discussed in the historical background section, the Philia Phase seems to be driven by Anatolian culture, rather than indigenous Cypriot culture, and picrolite has no cultural associations for Anatolian populations.
There are three major problems with Peltenburg’s analyses. The first is that Peltenburg’s entire premise is based upon the idea that Cyprus was essentially a regional isolate before the Bronze Age (Peltenburg 1991: 107), which we now know to be untrue (Simmons 1991: 230-231, Knapp 2013). Therefore, for any analysis of patterns of picrolite distribution in the Neolithic, this argument is fundamentally lacking. The second problem with Peltenburg’s hypotheses is that they presuppose that picrolite is valuable simply because it is a material used solely for ‘nonutilitarian’ artifacts, with the implication being that picrolite artifacts are more meaningful than decorative artifacts made from other materials. While it is certainly plausible that picrolite had a unique role and value in Cypriot prehistory, and I actually argue in favor of that point in Chapter 5, it is in this case an *a priori* assumption rather than a well-supported idea. The third issue, particularly pertaining to the Neolithic focus of this thesis, is that Peltenburg’s emphasis on exchange networks de-emphasizes human individual and group mobility with regards to the potential seasonality of certain sites like Ais Giorkis (Simmons 2012, DiBenedetto et al 2014). If groups were wintering near the coast in southwest Cyprus, this would put them in even closer proximity to the Kouris and Karyotis sources of picrolite pebbles, meaning direct obtainment of materials would be potentially simpler than trade, especially considering there is no evidence as yet of intergroup or intragroup conflict that would preclude collection of these resources.

Laura Swantek (2006), a former student of eminent Cypriot archaeologist Stuart Swiny, wrote a master’s thesis entitled “The Cultural Biography of Picrolite in Prehistoric Cyprus,” which addressed the possible networks of raw material and artifact exchange, as well as the potential social role of picrolite in Neolithic, Chalcolithic, and Early Bronze Age Cyprus. This work in particular gives a very post-modern framework to the role of picrolite, constructing
cultural biographies of artifacts, which in essence give the artifacts themselves characteristics often ascribed to human agents (Swantek 2006: 17). Swantek (2006: 25-26) also discusses the tactile and visual qualities of picrolite, and how those make the stone distinctive on the island. Her thesis contains a significant descriptive component, and notes that one of the more common artifact types is comprised of pendants with a single drilled hole and varying degrees of shaping. Interestingly, this does not appear to be a common artifact type at Kritou Marottou Ais Giorkis, though Swantek deliberately minimizes her exploration of the Aceramic Neolithic Period in her thesis, moving from a brief discussion of Akrotiri Aetokremnos to the Ceramic Neolithic, nearly three millennia later. Swantek (2006: 46) does thoroughly address the potential social role of picrolite in the Ceramic Neolithic period, suggesting that the types of artifacts found were markers of group identity. The assumption made in her thesis is that there were multiple independent or pseudo-independent outgroups with distinct identities that were marked specifically by stylistic differences in material culture. This concept is not further explored, although she does make an interesting suggestion, that “the stone was more symbolic than the shape it was carved into” (Swantek 2006: 50). Considering the stone is found at archaeological sites across the island, the distribution of picrolite seems to be more suggestive of an island-wide shared importance of the material than of in-group and out-group markers. Conversely, it might indicate regional or group-based differences in identity if there was a dramatic difference in the prevalence of the material based upon distance (either physical or social) from the source.

In conclusion, these works provide a useful, but limited set of information when exploring the concept of picrolite artifact production and its implications for the more
functional (e.g., chipped stone and groundstone) artifacts found in association with picrolite artifacts. There is essentially no treatment of lithic technologies, and minimal discussion of the actual production and forms of the artifacts, Swantek’s (2006) site summaries being an exception in their discussion of artifact form. This is both a blessing and a curse for this particular work; it is unfortunate that there is little background information for me to draw upon when addressing artifact forms and technological constraints, but it means in the end that my work provides a new and dramatically different angle on picrolite artifacts in the prehistory of Cyprus.
Chapter 3: Experimental Picrolite Working

Methodology:

This experimental study, as well as the lithic use wear analysis in Chapter 4, is derived methodologically from the middle-range actualistic studies of the 1960s and ’70s “New” Archaeology (e.g., Saraydar and Shimada 1973; Odell and Odell Vereecken 1980). Many of the studies from that era focused on lithic use-wear, which is discussed further in the next chapter. This study, in contrast, is focused upon the efficacy of lithic implements in relatively unskilled hands at incising, grinding, and drilling picrolite. The end goal of this section is to understand the relative difficulty of creating the types of artifacts found at Cypriot Neolithic sites, particularly Ais Yiorkis. The implications of the results bear on the potential for craft specialization, learning patterns, and the potential representation of island-wide identity patterns.

Typologies:

31 picrolite artifacts have been analyzed and catalogued from the archaeological assemblage at the site. The table detailing the finds, drawn directly from the small finds database at UNLV, can be found in the appendix, under Picrolite Finds at Ais Giorkis. In keeping with the focus of many processual studies, I define four major types of picrolite artifacts found at Ais Giorkis; tablets, thimbles, almonds, and rings. These are not the only types of artifacts found, as several fragments of picrolite ‘platters’ also have been recovered (Simmons 2012a), but in terms of frequency these are the most common. Like any typology, the categories do have some gray areas, but the variation between the groups of artifacts is sufficient to justify
the categories I create. Examples of the artifacts found at Ais Giorkis can be seen in Figure 3.1.

The four categories are as follows:

1. Tablets

   The most common picrolite artifact on site, these pieces range from less than two centimeters to about three centimeters in maximum dimension, are generally rectangular or asymmetric trapezoidal in shape, and are less than half a centimeter thick. They are incised on one or both sides with a simple grid of perpendicular lines, and have no other distinctive decorative attributes.

2. “Thimbles”

   These pieces are rounded, shaped generally like their western namesake, and have the same cross-hatching pattern incised upon the outside. Most of the ‘thimbles’ found have a hole drilled or carved on the bottom, but the walls of the cup are thick enough to keep the artifacts intact, despite the active fluvial geology of the site.

3. “Almonds”

   I use the term almonds as a catch-all for rounded artifacts that also have the cross-hatching but are more ovoid or lenticular in shape. The name comes from one particular artifact in this general classification that was shaped almost exactly like a shell-less almond, with what seemed to be polishing or wear across the midsection.

4. Rings
These uncommon artifacts appear to be finger-rings, of varying thickness and width. Very well polished, they are among the more delicate picrolite artifacts recovered, and are not recovered intact.

**Materials:**

For this experiment, I selected eleven unworked picrolite pebbles, all obtained from the Kouris riverbed near the modern town of Erimi, the location of which overlaps the Chalcolithic site of Erimi, which was rich in picrolite ornaments (Peltenburg 1991). The eleven have been subdivided by category, as noted in the introduction to this section, two each to be fashioned into ‘almonds’ and thimbles, three into rings and four into tablets. In terms of size, the blanks are sufficiently large to be representative of the artifacts of each type found on site as seen in Figure 3.1. The physical dimensions of each blank can be found in Table 3.1. Length is the maximum dimension of the piece, width is the largest dimension perpendicular to the
maximum dimension, and thickness is along the third perpendicular axis. Photographs of the blanks can be found in the appendix. Importantly, I selected river-worn pebbles for this experiment, rather than the raw picrolite found at the Troodos outcrop near Amiantos. This is because nearly all, if not all of the unworked pieces found at archaeological sites, at least those recorded in the refereed publications on the topic, are river-polished pebbles rather than raw chunks from the Troodos source (Xenophontos 1991: 127-128, Peltenburg 1991: 109).

<table>
<thead>
<tr>
<th>Blank</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Thickness (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tablet 1</td>
<td>17.2</td>
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<td>8.9</td>
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<td>35.6</td>
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<td>3.9</td>
</tr>
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<td>18.5</td>
<td>16.7</td>
<td>5.4</td>
</tr>
<tr>
<td>Tablet 4</td>
<td>21.0</td>
<td>15.4</td>
<td>5.5</td>
</tr>
<tr>
<td>Almond 1</td>
<td>31.1</td>
<td>14.5</td>
<td>10.3</td>
</tr>
<tr>
<td>Almond 2</td>
<td>36.0</td>
<td>14.5</td>
<td>12.0</td>
</tr>
<tr>
<td>Thimble 1</td>
<td>22.8</td>
<td>19.0</td>
<td>15.7</td>
</tr>
<tr>
<td>Thimble 2</td>
<td>18.5</td>
<td>16.2</td>
<td>14.9</td>
</tr>
<tr>
<td>Ring 1</td>
<td>25.1</td>
<td>23.4</td>
<td>4.6</td>
</tr>
<tr>
<td>Ring 2</td>
<td>22.5</td>
<td>16.9</td>
<td>3.8</td>
</tr>
<tr>
<td>Ring 3</td>
<td>25.4</td>
<td>21.0</td>
<td>2.0</td>
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</tbody>
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Table 3.1: Picrolite Blanks

For the carving, drilling, and grinding implements, I selected seven incising implements and three drilling implements, all made of Cypriot Lefkara Basal and Lefkara Translucent chert,
and three grinding implements made of other local materials. The metric and material details of the implements can be found in Table 3.2. I chipped the local stone into the incising and drilling implements, and despite my relatively modest flintknapping skills, I managed to make flakes resembling those found in the tens of thousands on site, retouching a few to make perforators and drills. As with the picrolite blanks, pictures of the unused chert pieces and grinding implements can be found in the appendix. Incising implements are labeled C1-C7, drilling implements D1-D3, and grinding implements G1-G3. The other abbreviations used in the table, LB and LT, reflect the two major types of chert found at Ais Giorkis, Lefkara Basal and Lefkara Translucent.

As with the picrolite blanks, photos can be found in the appendix, unless indicated otherwise. In order to record various stages of the process, I used a Nikon D7100 digital SLR camera, with a Nikkor 18-55 mm lens for high quality macro photographs of the process. Calipers were used to record dimensions, and a consistent, neutral blue background and white light were selected for the photographs to ensure color consistency between photographs. This is important for revealing the innate varieties of green tone in picrolite, even from the same geographic source (Xenophontos 1991).

Experimental Procedure:

As noted before, this study is rooted in the replicative, also known as actualistic (Tschauner 1996: 2), studies, of the processual archaeology of the 1960s and ’70s. As a result, I used a well-recorded, systematic method for replicating the picrolite incising, drilling and grinding potentially used to create the four types of artifacts listed above.
This is almost certainly not a perfect imitation of the creative processes used by the people of the Cypro-PPNB, instead serving more as a proof-of-concept endeavor to address the difficulty of replicating the end product of the picrolite working process.
The concept of *chaîne-opératoire* (Leroi-Gourhan 1993) may occur to the readers of this work, and one could certainly argue that by attempting to replicate the end product that I am missing potential earlier stages in the forms that the picrolite artifacts take. This is possible, but judging by the average size of the unworked pebbles found by myself and fellow UNLV archaeology graduate students Katelyn DiBenedetto, Trent Skinner, and Cristina Tica in the Kouris riverbed (no pebbles without major impurities over 6 cm in maximum dimension and most around 2-3 cm), there are few possibilities for there to be earlier stages of most of the picrolite artifacts. In addition these artifacts are, as discussed in Chapter 2, not likely to be utilitarian in purpose and so are exempt from the typical use of the term *chaîne-opératoire*.

I selected, as noted in the following results section, a single tool for use for a single purpose on each type of artifact, only using one incising implement for each tablet, almond, and thimble, and one drilling implement for each ring. The grinding implements were not used in an as isolated a fashion, since the wear on them is not examined as part of this particular experiment (though a future research experiment may address this). Using a single incising or drilling implement was chosen for two reasons. First, to ensure there is no potential confound in the use-wear analysis in Chapter 4, and second to be able to best analyze the efficacy of the two types of chert used in the experiment.

There was one main criterion I used for judging the relative difficulty of picrolite artifact creation: Time. Measuring this was relatively straightforward. I took photographs of my process every five minutes, beginning with the pebble in its raw form and continuing until photographic comparison between the artifact and the replica shows minimal differences or until the pebble
breaks. The artifacts, particularly the rings, have not always been recovered intact, though whether these broken artifacts were discarded remnants of failed creation processes or simply artifacts damaged by natural or cultural processes once they entered the archaeological record was difficult to ascertain. It seems most likely that many are damaged by postdepositional processes, but we must always be careful not to assume that all artifacts we find are in their current form through deliberate construction, without accidents being made. Unfortunately, archaeological context is not a great indicator at Ais Giorkis for whether the artifacts were deliberately deposited, randomly discarded, abandoned in normal storage positions, or transported by geological and/or fluvial processes to their found positions (Keach 2015), with occasional exceptions like the in-situ blade caches. I also acknowledge that judging whether a replicated artifact is ‘sufficiently close’ to the actual artifact is a somewhat subjective procedure, but once again I must emphasize that this replicative experiment is a proof of concept in order to address the relative difficulty of carving and is no less subjective in that regard than any replicative lithic study.

Results:

The picrolite working process generated all the data for Chapters 3 and 4 of this thesis, and this chapter presents the process in an almost exclusively descriptive manner, though I do interject my impressions of the process where relevant. Deeper interpretations and takeaways from the process are found in Chapter 5, where I synthesize the information gathered in Chapters 3 and 4 with the broader context of picrolite in prehistoric Cyprus. I present the worked pieces in the order I created them, in order to capture the learning process as I became
more accustomed to the creation of picrolite artifacts. This means that artifacts in this chapter are not presented in numerical order, or separated out by category. Synthetic interpretations of the processes involved in creating each type of artifact are presented, with the other interpretations, in Chapter 5.

Tablet 1:

I began the process with what I initially believed would be the simplest artifact type, the tablet with cross-hatching on only one face. Incising implement C1, a non-retouched flake of Lefkara Basal chert, was used for this artifact. In the first five minutes, immediate edge damage was noticed on C1, but the incising process went remarkably quick. Four parallel lines were incised to a depth of just over a millimeter in the first five minutes, with the cross-hatching completed in just over ten (See Figure 3.2). At this point, it seemed my premonition about the ease of incising the tablet faces was well-founded.

Figure 3.2: Tablet 1 at 10 minutes
Almond 1:

The second artifact in this process was chosen because it added one layer of complexity, with more dramatic shaping necessary to approach the rounded contours of the ‘almond’ artifacts. For the shaping, I chose a coarse grinder, G1, with incising flake C2 for the following cross-hatching. Grinding was a slower process than anticipated, with only superficial shaping of the edges of the picrolite by the ten minute mark (Figure 3.3). By the fifteen minute mark (Figure 3.4), the grinding had begun to meaningfully alter the overall shape of the picrolite, and by twenty minutes I was able to begin incising. Attempting to replicate the cross-hatching on a curved surface was much more difficult than on the flatter tablet face, but again the non-retouched edges proved effective enough to make significant progress by the 30 minute mark (Figure 3.5). Incising around the artifact perpendicular to the long axis was more difficult than along the long axis, possibly because incising on the long axis creates a somewhat flatter surface relative to the direction of the cut. Still, by 45 minutes, the crosshatching was completed (Figure 3.6) to a depth of around a millimeter across the entire surface of the artifact, though the lines were not as straight or regular as I would have liked.

Almond 2:

In an attempt to improve my performance from Almond 1, I chose to move directly into Almond 2, this time using the finer-grained grinder G3 and retouched Lefkara Basal incising implement C3. C3 is a flake tool, with unifacial retouch along approximately 30% of the total edge length. Almond 2 was proportionally close to the right shape, with a few corners that needed grinding. By ten minutes, some progress had been made (Figure 3.7), but it really took
until 20 minutes (Figure 3.8) to approximate the almond shape. Incising began then, and the retouched edge was actually significantly less effective at beginning the incisions on the surface of the picrolite.

Figure 3.3: Almond 1 at 10 minutes

Figure 3.4 and 3.5: Almond 1 at 15 and 30 minutes
Progress was still made, but it took until the 55 minute mark (Figure 3.9) to complete the cross-hatching, making for a total of 35 minutes to finish the incising, compared to 25 for the similarly-sized Almond 1. Once the grooves were started, the retouched tool worked fine, but getting each groove started was a much more difficult process, with several accidental scratches when the tool got off track. On the flip side, no edge damage was noted on this retouched tool, which begs the question of which was more important in selecting a tool, time spent creating both the tool and the picrolite artifact or durability of utilized tools. This question will be more directly addressed in both Chapter 4 and Chapter 5.

*Ring 1:*

With some knowledge and experience gained with incising and grinding, drilling is the next logical step, so I began the construction of Ring 1 with the drilling of the center hole. I used
retouched Lefkara Basal drill D1, and it became quickly apparent that that particular retouched tip was not going to be a very effective tool for the process.

Figures 3.7 and 3.8: Almond 2 at 10 and 20 minutes

Figure 3.9: Almond 2 and C3 at 55 minutes
Five minutes of attempting to start a hole resulted in only a very small divot in the center of the blank (Figure 3.10). Even with such a thin piece, it took over 20 minutes to see any hole all the way through the material. Once the hole reached the far side, it was slightly quicker work, but the retouched edge ended up being too blunt to effectively enlarge the hole. Before the hole got large enough to compromise the integrity of the piece, I ground down some of the asymmetries with grinder G3, which had been fairly effective at shaping Almond 2. The shaping was largely complete by 45 minutes (Figure 3.11), and it was clear at this point that any effective further progress would have to be made by switching drilling implements, so I decided to move on and explore the efficacy of the other drilling implements on subsequent rings and thimbles.

Figures 3.10 and 3.11: Ring 1 at 5 and 45 minutes
**Tablet 3:**

For this tablet, I used incising implement C4, an un-retouched Lefkara Basal flake with a steep angle on one edge that almost acted as natural backing. This made it very easy to apply the necessary pressure to the cutting edge, and the size of the artifact (Refer to Table 3.1) made it easy to grip. This, combined with my growing familiarity with the materials, meant that I could complete the cross hatching on one side of the tablet within ten minutes (Figure 3.12). This was another one-sided tablet, and the quickest to make to this point.

![Figure 3.12: Tablet 3 and C4 at 10 minutes](image)
Tablet 4:

This one-sided tablet was incised using un-retouched Lefkara Basal implement C5, the smallest of the incising implements by far. Thanks to its sharp edge, C5 was still quite effective at incising the picrolite, with cross hatching completed by 10 minutes (Figure 3.13). The small implement made my hand more tired while using it, but otherwise it was just as effective as the larger C4 for incising the tablet.

Figure 3.13: Tablet 4 at 10 minutes
Tablet 2:

As this was the final tablet in the experiment, and the largest, I decided to mark it with a double-sided cross-hatched pattern. I used implement C6, a truncated Lefkara Translucent blade very comparable in overall geometry with the blades found in caches at Ais Giorkis. The blade made for a very effective incising implement, with cross-hatching on the top complete within ten minutes (Figure 3.14), even though Tablet 2 has more than twice the surface area of the other tablets. The back side was complete before the twenty minute mark (Figure 3.15), making this the quickest tablet overall, especially when considering the area that was incised. I attribute this to two things. First, the sharpness and ease of holding C6 made incising very quick and easy on the hand. Second, this was the fourth tablet and sixth overall project, meaning I began to better understand the effective angles and forces necessary to make a clean groove in the surface of picrolite pebbles.

Figure 3.14 and 3.15: Tablet 2 front at 10 minutes and rear (with C6) at 20 minutes
Ring 3:

This blank was the thinnest of all the blanks, and nearly round apart from a couple asymmetrical spurs of material, so it made sense to attempt to make a ring from it. Using coarse-grained grinder G2, I shaped the blank into a nearly round shape (Figure 3.16), and began drilling it using a broken, un-retouched, Lefkara Translucent flake labeled D2. D2 had two sharp corners where it had broken in construction, and those corners worked far better for perforating the picrolite than the retouched D1 had for the first ring. It only took until the ten minute mark, five minutes from beginning to drill, to make a hole all the way through, and D2 was also far more effective at widening the hole, getting it to within 4 millimeters of the edge of the ring by the 25 minute mark, 20 minutes into the drilling process. At this point, a chunk split off the edge (as seen in Figure 3.17 near the top right of the ring), and I deemed the piece complete enough for the purposes of this experiment.

Figure 3.16 and 3.17: Ring 3 at 5 and 25 minutes
Ring 2:

The final ring I drilled was the thickest of all, so I mostly worried about making the hole all the way through the picrolite blank. I used retouched Lefkara Basal drill D3, and this drill was horrendously ineffective, taking 25 minutes to make even the smallest hole all the way through, and constantly slipping out of the initial position for the first 5 minutes. I widened the hole slightly by the 40 minute mark (Figure 3.18), but D3 was an abject failure as a drilling instrument. Along with the relative inferiority of D1 as a drill, particularly compared to the simple, sharp corner of D2, it was clear that retouched Lefkara Basal drills would not have been effective for the purposes of picrolite working. I discuss why I believe this is the case, as well as the relevance of this with regards to the archaeological record, in Chapter 5.

Figure 3.18: Ring 2 at 40 minutes
Thimble 1:

The thimbles were saved for last, since they combined the drilling, grinding, and incising of rounded surfaces into one artifact type. For T1, I used fine-grained grinder G3 once more, along with un-retouched incising implement C7. D2, an un-retouched Lefkara Translucent drill, was used to make the base concave like several of the thimbles found at Ais Giorkis. The first step was grinding the base flatter, then making it slightly concave, and this only took five minutes with G3 and D2, since the base was close to flat already. The incising process took until the 20 minute mark (Figure 3.19), which was quicker than the almonds had been, thanks to the fact that I had better learned how to incise a curved surface by that point.

Figure 3.19: Thimble 1 at 20 minutes
Thimble 2:

This thimble was left with a flat base, rather than concave, which made the process significantly quicker. G3 and C7 were used again, with a second edge of C7 used for the incising. The first 5 minutes were spent grinding Thimble 2 to a more rounded shape, and the incising was done by the 15 minute mark (Figure 3.20). Working Thimble 2 was a relatively simple process, again thanks to the practice and experience gained from working the previous blanks. As noted above, deeper and more synthetic analysis of the picrolite working process can be found in the subsequent sections of this thesis.

Figure 3.20: Thimble 2 at 15 minutes
Chapter 4: Use Wear Analysis

The concept of lithic use wear analysis was born from the New Archaeology of the 1960s and 70s. In the vein of other replicative – or actualistic (a la Johnson 2010) – studies, lithic use wear is an attempt to use present-to-past analogy and interpret the material remains of archaeological sites in a more empirically grounded manner. In this brief chapter, I approached the materials I used to carve the picrolite with a focus on macroscopic, visible wear resulting from the use of chert flakes and tools to incise and drill picrolite. There are three main reasons for this analysis; the first of these is to look at the relative durability of Lefkara Basal and Lefkara Translucent cherts, the two main materials found in the chipped stone assemblage at the site. The second reason for performing the use wear analysis is to assess the costs and benefits of using retouched pieces to perform the experimental incising and drilling; this will also require a retrospective look at the processes in Chapter 3. The third reason for this analysis is to assess the accuracy of the lithic sorting and recording performed during the excavations at Ais Giorkis. This is particularly relevant because the concept of utilized flakes and blades, though recognized during the lithic analysis process, is not one that can be coded into the database due to the limitations of the lithic analysis system in place for the site. Edge damage in general, whether deliberate retouch, use wear, or post-depositional damage, is coded into the same categories, those of retouched blades and flakes. In addition, tools were recorded as 5.9 percent of the lithic assemblage (by count) that had been analyzed as of 2012, as recorded in a UNLV database for the site (Simmons 2012a: 92). The proportion of tools in lithic assemblages is often used in the interpretation of archaeological sites, including in the Neolithic Near East (e.g., Borrell and Molist 2007), the region most often associated with Neolithic Cyprus in terms
of material culture. Because of this, the potential skew in the interpretation of the lithic assemblage could have implications for the overall interpretation of the site.

When looking at the concept of relative durability, it is productive to consider the potential strengths and weaknesses of the use-wear model. The analysis of the materials used in the experiment can only be as strong as the methodologies used to perform the initial experiment. For this reason, I can confidently say that Lefkara Translucent chert is more durable than Lefkara Basal when used to incise and drill picrolite, but I cannot say that Lefkara Translucent would have been a better material for the purposes of creating picrolite ornaments simply based on use wear analysis. John J. Shea (1987:48) described this set of limitations well, noting that we “must be explicit about the functional parameters we are attempting to acquire” with regards to properly utilizing use-wear analysis. This is why, for this portion of the analysis, I can only look at relative durability for the techniques I used, and cannot make a more sweeping generalization at this point. Figure 4.1 illustrates the difference well, with the significant edge damage on the upper edge of Lefkara Basal C7 contrasting with the minor wear on the utilized lower edge of Lefkara Translucent C6 and the lack of any visible wear on Lefkara Translucent drill D2. The durability difference could be seen in both drills and incising implements, with more edge damage on all Basal incising implements and a significant amount of blunting to the tips of Basal drills D1 and D3. Whether this makes Lefkara translucent a better material, as noted above, must depend upon multiple factors including durability, ease of knapping, and ease of obtainment, which will be discussed briefly in Chapter 5.
When considering the relative durability of retouched and un-retouched pieces, there are two ways to approach this. One, based upon visible changes to the material, and one based upon the effectiveness of the piece as I continued to use it. In terms of visible change, retouched pieces were minimally damaged by the drilling and incising processes, showing very little evidence of wear (see Figure 4.2), while un-retouched pieces were quite visibly damaged (Figures 4.1 and 4.3), at least for the Lefkara Basal subset of the tools.
In terms of effectiveness, un-retouched Basal implements did seem to become less effective when the edge was worn or damaged, while retouched implements did not see a drop-off in performance. However, damaged un-retouched pieces still were easier to use than their retouched counterparts were when new. This is one clear example of how use-wear analysis alone is limited in its scope. Retouched pieces were more durable across the board, resisting damage and remaining closer to initial condition, but they were significantly inferior in performance. I would suggest that this fact, combined with the fact that retouched pieces take
somewhat more labor to create, would make un-retouched pieces more logical for use in picrolite working, particularly considering the sheer amount of workable stone available to the occupants of Ais Giorakis. There is one large caveat to this entire discussion, and that is that I do not and cannot know the exact techniques that Neolithic Cypriots used. It is plausible that other techniques, perhaps including using hafted pieces, may have made retouched pieces more effective and therefore a better time investment than unretouched pieces that would have to be switched out with greater frequency.

Figure 4.3: Damaged edge of C1

The question of lithic analysis is the most directly relevant to current research with the materials from Ais Giorakis. As noted above, the lithic analysis system in place for the site does not include categories for ‘utilized flakes,’ meaning edge damage is frequently labeled as minor or ‘nibbling’ retouch in order to characterize utilized lithics as tools. I wish to challenge the concept that retouch is a necessary condition for deeming a lithic implement a ‘tool,’ because that necessitates categorizing use wear as retouch, limiting the utility of the analytical system. Levi Keach was able to photograph two examples of tools with ‘nibbling retouch,’ both of which
were recovered and analyzed during the 2015 field season at Aiso Giorkis, and they bear a striking resemblance in terms of the degree of edge modification to those used for incising picrolite (Figure 4.4). I am not arguing that these two examples were used for picrolite incising (though it is plausible), but it is clear that the regularity and scale of edge modification on un-retouched pieces used for picrolite incising would be sufficient to get the implement categorized as a retouched tool under the current system. Chapter 5 will discuss the final implications of this, as well as the broader takeaways from this entire project.

Figure 4.4: Two edges of blades classified as marginally retouched tools
Chapter 5: Conclusions

*Picrolite as a Highly Ranked Material:*

This study was performed in an attempt to fill a gap in the current literature on Picrolite in prehistoric Cyprus, particularly the Neolithic period, and there are some very interesting results. First, picrolite has been assumed to be an important material, particularly in the Chalcolithic period, in establishing group identity, trade networks, and site hierarchies (Peltenburg 1990, 1991, Swantek 2006). What was assumed without significant justification was that picrolite was somehow uniquely privileged as a material to carry this level of social impact. This begs the question of how a material takes a privileged position in a hierarchy of materials, particularly when the material in question is not utilitarian. To better understand this concept, I draw parallels to the concept of luxury goods, a concept explored in modern economic science, cultural anthropology, and archaeology.

A luxury good seems, on the surface, to be a relatively easy thing to define but as one goes deeper it becomes clear that a single criterion is not sufficient. This should not come as a surprise, since monocausal or one-size-fits-all definitions rarely hold up to extended scrutiny. This is particularly telling with regards to the archaeological record, where ascertaining the social and/or cultural value of a material argument ranges from a difficult task to a nearly impossible one for sites and artifacts dating before the advent of writing. With the written record, one can at least get at the relative value of things according to the writer or to the establishment for whom the record was written, whether this value is monetized or more subjectively defined. Nevertheless, addressing the relative social value of raw materials and
artifact types is a common theme among archaeological publications, particularly since the end of the culture-history era in archaeological theory, where the main goal of archaeological analysis was to describe and categorize, not to attribute meaning, usefulness, or value.

*Cultural Anthropology:*

One useful parallel for assessing the reasons behind the valuation of picrolite comes from the anthropology of food. For the anthropology of food, luxury seems to be defined based upon conceptions of *necessity and desire* (van der Veen 2010: 406, Bourdieu 1979). Additionally, questions of class affiliation are addressed by the relative availability of certain ‘non-necessary’ foods, though understanding what is truly *needed* by an individual or group is a fuzzy proposition to begin with. Bourdieu (1979) discusses the relative proportions of the budget of different economic classes that are allocated to certain types of food, and it becomes clear that the reason certain foods are ‘luxurious’ is because they are expensive. Most importantly for the definition of luxury in the anthropology of food is Christopher Berry’s contention that a luxury good must “be desired by many but attained by few (van der Veen 2010:407),” and by extension that these food types are *not a necessity*. Berry considers himself to be a researcher of the ‘philosophical anthropology of politics’ as per his Glasgow University webpage (Berry n.d.), and his linking of the realms of desire (a social and cognitive phenomenon) with the economic realities of stratified class structure make his and Bourdieu’s complementary ideas on luxury foods a useful basis to draw a definition of luxury good. Complementing this idea, Brian Hayden links the perceived value of the luxury goods to the prestige of the owner or consumer, indicating further that privilege and rank are critical
qualifications for the possessors of luxury goods (Hayden 2003). For this section, the definition drawn is as follows:

*A luxury good is one that is desired by many, obtainable by few, and needed by none.*

**Economics:**

Economics has a vested interest as a discipline in addressing luxury and value, and the social implications of those concepts. Conversely, anthropology has taken a critical look at cost/benefit analyses, value, and systems of wealth through the lens of economic anthropology, so this interdisciplinary crossover is not a novel concept. As a result, there is a significant overlap with cultural anthropology in the conception of luxury goods. Ait-Sahalia et al. (2004) describe the dichotomy of *basic* goods and *luxury* goods, while measuring the varying levels of consumption of such goods as a function of overall wealth. Basic goods are defined as those with a value for subsistence, and rich households are described as being “...almost satiated in their consumption of basic goods (Ait-Sahalia et al. 2004: 2959-2960).” Luxury goods are those that, in opposition to basic goods, are obtained on a *discretionary* basis, rather than a basis of necessity and subsistence. In complementary terms, economist Shinsuke Ikeda notes that “...when wealth exceeds long-run needs...consumers are likely to increase spending more on luxury goods (Ikeda 2006:497),” suggesting that a lack of *necessity* is one of the important markers of a luxury good in modern economic terms. Critically, these articles are not written with any anthropological background, so the underlying structures that generate wealth
inequalities and class differences are not a focus of this section. The definition of luxury in economic terms is therefore very simple:

A luxury good is an unnecessary good which can be obtained once basic subsistence needs are met.

Archaeology:

Archaeology is the most difficult discipline of the three to tease out a specific definition of luxury goods, since the theoretical frameworks that exist in the discipline are almost all drawn from other fields of study, including the two above. Marijke van der Veen's (2003) article, though published in the journal *Archaeology*, draws the definition of luxury *directly* from a cultural anthropologist, Berry, and is therefore not included in this section. Similarly, a collection of works on luxury foods in *World Archaeology*, including an article cited above (Hayden 2003) are mostly more applicable to the Cultural Anthropology section than the archaeological section. What I am looking for is a conception of value that is both applicable directly to the archaeological record and altered from its original form to fit an archaeological context. While I understand that textual evidence in the archaeological record can be very important in understanding value, this would not aid in the development of a definition of luxury food, so I am not looking for definitions based upon textual evidence found in the archaeological record. The directions of discussion I found went in two primary directions, both of which are useful for this study. The first of these is a definition of exotic goods, brought in the same symposium as Hayden’s (2003) article on luxury foods. While not explicitly luxury goods in nature, exotic goods are defined as those that are brought in from geographically
removed areas (MacLean and Insoll 2003:562), and therefore requiring cultural investment in direct obtainment and/or networks of exchange. Defining goods as exotic is not sufficient to label them a luxury, according to MacLean and Insoll (2003), so I must move on to another, more archaeologically-relevant case, to flesh out the definition. The conception of luxury goods is closely tied in archaeological theories to the formation of complex societies, particularly state formation theories. Interestingly, Tourtellot and Sabloff (1972) actually argue that goods of state and ritual value (which they call Functional goods) are not important in the formation of states. Kipp and Schortman (1989) disagree strongly, arguing that luxury goods are actually the goods that helped create and maintain the structures of social ranking within polities and secured alliances between polities during the process of state formation. Their article focuses on networks of trade and exchange that helped reinforce the power and unity of incipient states. Importantly, Kipp and Schortman do discuss that some if not all ‘exotic’ goods (using MacLean and Insoll’s definition of exotic) ought to be categorized as luxury goods on the basis of their rarity and perceived value to social groups. This is a rather vague definition, and luxury goods are also described in this article as ‘preciosities’ and ‘sumptuary goods,’ without explicitly defining these terms further (Kipp and Schortman 1989:371-372). Implied, however, is the idea that these goods would be explicitly recognized as valuable and exotic, since the focus on the goods is tied directly to the formation of the state. While state formation processes are never simple, a definition of luxury can be teased out from these archaeological readings.

A luxury good is one that is of high social value, is tied into networks of regional or interregional exchange, and is not needed for subsistence or food provisioning.
Does Picrolite Fit?

Below I discuss how well Picrolite fits into each of the definitions created above. It is important to understand that my research on picrolite is a work in progress, so my conclusions are not final. This is simply a step in trying to actively integrate picrolite into a holistic picture of prehistoric Cyprus, going beyond the purely descriptive site reports and geochemically and geologically focused articles.

A luxury good is one that desired by many, obtainable by few, and needed by none.

Picrolite is found at nearly every prehistoric site on the island of Cyprus. It is geographically circumscribed as far as the source goes, so it must be obtained from one of only a few locations on the island. The spread of the material makes it clear that it was a desirable material, especially considering it has no utilitarian value, as far as subsistence activities go. The only criterion in the Cultural Anthropology definition of luxury that picrolite does not meet is that of relative scarcity. Social stratification is poorly explored in Neolithic Cyprus in general, but the fact that it is found at so many sites over such a long time period, and the fact that one can collect (as I have) nearly a kilogram of the material from the river sources in less than an hour even in the present day, indicates that this is not a material with significantly restricted access. Should future excavations show both social stratification and a differential access to picrolite, this answer may change, but as for now picrolite does not fully meet the definition of a luxury good in this context. The economic definition follows:
A luxury good is an unnecessary good which can be obtained once basic subsistence needs are met.

This one is rather straightforward (even if subsistence patterns are complex). While necessity is a negotiable concept (what do we really need?), the definition in economics is based upon subsistence, and picrolite does not appear to have any value in subsistence activities. As such, picrolite does meet this economic definition of luxury goods. The archaeological definition is far more complex, however.

A luxury good is one that of high social value, is tied into networks of regional or interregional exchange, and is not needed for subsistence or food provisioning.

Understanding the social value of picrolite is one of the major goals of my thesis work, so I cannot fully answer whether picrolite fits this definition. I can, however, address the other two parts of the definition. As discussed above, picrolite is not a necessity for subsistence or provisioning, so it does fit that part of the definition. The most important and interesting section of this definition is the role of luxury goods in networks of exchange. It is quite clear, even considering the limited scope of publications on picrolite, that the material was integrated and potentially highly influential in regional exchange networks, particularly during the Neolithic and Chalcolithic. While Edgar Peltenburg suggests that picrolite was a “nonessential, nonutilitarian, ‘valuable’ material” (1991: 109), he describes Cypriot prehistory as defined by
more isolated clusters of sites, citing examples of 20th century Cypriots who had never left their upland villages in their lifetimes (Peltenburg 1991). Through more recent excavations and interregional studies of Epipaleolithic, Neolithic and Chalcolithic sites (see Simmons 2012; Vigne et al 2011, and many others), as well as publications within the very same bulletin as Peltenburg’s article (Mellink 1991), it is quite clear that the isolation of sites or clusters of sites described in the article is not supported by the archaeological record. Regional networks of exchange did exist, even if the valences of those networks cannot be fully known. Among the materials that can be sourced to narrow geographic locations, picrolite and obsidian are the ones found across the island, suggesting that the value of these items was great enough to go through the trouble of obtaining (from the Troodos or riverbeds for picrolite and Anatolia for obsidian) and exchanging or otherwise transporting the materials for tens to hundreds of kilometers. One interesting material parallel to picrolite actually can be found in the American Southwest in the form of turquoise, another ‘nonessential’ decorative material that was (and is) highly valued by native peoples in the region. While much greater in number, particularly in regions like Chaco Canyon (Powell 2005), turquoise otherwise fits the criteria that picrolite does, with a nonutilitarian nature, a natural geographical range limited to the Southwest and northern Mexico (Mathien 2001: 104), and evidence of the material at sites a significant difference from the origin of the material (Roper 1988). Obviously, the scale of North America is far greater than that of Cyprus, but the comparison stands and we know without a doubt that turquoise qualifies as a luxury good.

Cyprus is not a large island, particularly in comparison with North America, but with the mountainous terrain of the western portion, it would not have been a trivial task to transport
these goods on foot across the entire island. Clearly, with its integration into networks of regional exchange, picrolite fits at least two of the three criteria in this archaeological definition of luxury goods. The applicability of the third criterion is up in the air, but it seems at least plausible to me that picrolite was a highly ranked ornamental material in prehistoric Cyprus, leading to some of the most iconic artifacts in the history of the island.

*Difficulty and Expertise:*

The preceding sections certainly suggest that picrolite was a highly ranked material, and the experimental work in Chapters 3 and 4 provide an interesting supplement to these concepts. For the carving process, I assumed a certain level of expertise would be necessary to create the types of artifacts found in Neolithic contexts. While I may not have entirely succeeded in creating facsimiles of *Ais Giorkis* artifacts, it is clear that even a relative novice at both flintknapping and stone carving can successfully approximate the types of artifacts found on site. One of the most critical takeaways of this is that the value of the artifact and the material is not necessarily linked to the value of the creator of the artifact. There is no reason that there needed to be a specialist or artisan creating picrolite artifacts in the Neolithic period. Quite the opposite, in fact. Picrolite was easy to obtain, either through trade or direct procurement, and, just as importantly, it was easy to work and shape into the artifacts that, according to researchers like Swantek (2006) and Peltenburg (1990, 1991), were a critical marker of social identity across the island. What this suggests to me is not internal site hierarchies (particularly for the Neolithic), but rather a shared, island-wide valuation of picrolite *as a marker of island identity*. Particularly with the strong Anatolian influence in the Philia
Phase, it makes total sense that the material would drop in frequency right when a major social shift takes place. With no attachment to picrolite in the incoming cultures, the social importance of the material was lost.

I**mplications for Ais Giorkis and the Cypriot Neolithic:**

One implication, connected to the previous section, is that picrolite was likely not exclusively worked by specialists or artisans in the Neolithic period. While this is not a groundbreaking conclusion, with no suggestions for labor specialization in the Aceramic Neolithic, it is nevertheless important to understand that picrolite can be worked into the forms found in Neolithic contexts by someone without experience or specialized knowledge. It is also important to recognize that there is no need for more formalized tools than the basic flakes and blades found in the tens of thousands at sites like Ais Giorkis and Shillourokambos. Therefore, there is really no way to assess which implements were used for picrolite carving, particularly within the limitations of the current lithic classificatory systems. Some attempt at judging use-wear may allow for projections to be made about what types of artifacts show wear consistent with that generated by picrolite carving, but by and large these projections would be insufficient for any strong statements.

Another implication generated by both the literature review and my own experience in obtaining picrolite, is that picrolite would have been relatively simple to obtain in Prehistoric Cyprus. Without evidence of inter-group violence -indeed without evidence that Neolithic Cyprus was a socially divisive place - or strong territorial control (Knapp 2013), direct
procurement would have been possible with only a few days of travel, and exchange would have made it potentially even quicker. As noted in the discussion of luxury goods, getting picrolite to the farther-flung reaches of the island would likely have necessitated exchange or much longer travel times but it is unlikely, with the small size of the island, that picrolite would have had a dramatically different value based upon proximity to the Kouris and Karyotis riverbeds. It is also, as noted by Xenophontos (1991) and Peltenburg (1991), as well as personal experience, very easy to find picrolite in the riverbeds; its green tint sticks out like a sore thumb among the brown and grey river rocks.

What the investigation of the types of artifacts found at both Shillourokambos and Ais Giorkis does show is an interesting prevalence of one particular geometric pattern, the cross-hatched or ‘checkerboard’ pattern (Guilane and Briois 2001: 47, Guilane et al 2011: 236, Simmons 2012a: 95). This is even more interesting when one looks at the checkerboard patterns on limestone cobbles from Neolithic contexts at Kholetria Ortos (Figure 5.1). Noted by Dr. Simmons during his excavations at Ortos in the early 1990s (Simmons 1994: 9), these cobbles were not made of picrolite, rather of local limestone. By the early 1990s, artifacts of that type had only been found at Khirkitia, so the discovery of the incised pebbles at Ortos gave them a significant time depth as well as a regional spread. To this point, no such limestone cobbles have been found at Ais Giorkis, but their presence at Khirkitia, Ortos, and in Aceramic Neolithic contexts at Shillourokambos, combined with the same pattern on picrolite artifacts at Ais Giorkis, shows a very clear pattern. This checkerboard/cross-hatching pattern may be abstract, but it is certainly not random. In fact, it appears to be the most common and widespread shared iconography in Neolithic Cyprus, so the fact that it is present on picrolite
pebbles is significant. Importantly for my experimental study, this pattern is also very easy to incise, which may have played a role in its prevalence in Neolithic Cyprus, along with simple perforations like those found on the common pendants and rings.

Figure 5.1: Incised Cobble from *Kholetria Ortos* (from Simmons 1994: 9)

Combining Swantek’s concept of the stone’s relevance with the patterns in iconography, I suggest that picrolite’s aesthetic qualities (its distinctive green color and smooth, naturally polished texture) were part of the reason the stone was chosen as a significant artefactual material. It stands out in the landscape; even in its raw form, the green tint makes it visible amongst the other Cypriot river rocks. It is unique as a material within Cyprus, and the fact that
there are no publications even mentioning picrolite in archaeological contexts off the island adds to the uniquely Cypriot character of the stone.

What this study has shown, in combining literature review with hands on, practical experimentation, is that picrolite was both more and less than people assume it to be, and that it is worth further study. It may not be the main driver behind intersite and intergroup exchange and it may be too easy to work to be responsible for the creation of specialized artisans, but it is still the one constant that links the Akrotiri Phase with the Late Chalcolithic, changing in form to reflect the prevailing iconography of the time and serving as one of the central themes of Cypriot archaeology.
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Appendix:

Photographs:

Photograph 1: Tablet Blanks

Photograph 2: Ring Blanks
Photograph 3: Almond Blanks

Note that Almond 3 in this photograph was not used for the experiment. This was due to issues with the quality of the material.

Photograph 4: Thimble Blanks

Note that Thimble 3 in this photograph was not used. This was due to poor quality material.
Photograph 5: Incising implements C1-C4

Photograph 6: Incising implements C5-C7
Photograph 7: Drilling implements D1-D3

Photograph 8: Grinding implements G1-G3
<table>
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<th>UID</th>
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<th>Material</th>
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<th>Length</th>
<th>Width</th>
<th>Thickness</th>
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<td>178</td>
<td>70</td>
<td>1</td>
<td>&quot;thimble&quot;</td>
<td></td>
<td></td>
<td></td>
<td>incised &quot;thimble&quot; blank</td>
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<td>177</td>
<td>71</td>
<td>1</td>
<td>&quot;thimble&quot;</td>
<td></td>
<td></td>
<td></td>
<td>incised &quot;thimble&quot; blank fragment-checkerboard pattern</td>
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<td>176</td>
<td>78</td>
<td>1</td>
<td>pendant blank</td>
<td>22.7</td>
<td>10.6</td>
<td>5.9</td>
<td></td>
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<td>185</td>
<td>103</td>
<td>1</td>
<td>incised pebble</td>
<td></td>
<td></td>
<td></td>
<td>black picrolite ?</td>
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<tr>
<td>192</td>
<td>118</td>
<td>1</td>
<td>&quot;blank&quot;</td>
<td></td>
<td></td>
<td></td>
<td>pendant (?) blank - partially polished/ shaped</td>
</tr>
<tr>
<td>200</td>
<td>158</td>
<td>1</td>
<td>picrolite fragments</td>
<td></td>
<td></td>
<td></td>
<td>1 small polished frag; 1 broken partly polished pendant blank</td>
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<tr>
<td>207</td>
<td>176</td>
<td>1</td>
<td>picrolite fragment</td>
<td>10.6</td>
<td>6.3</td>
<td></td>
<td>3.9 small frag</td>
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<tr>
<td>212</td>
<td>289</td>
<td>1</td>
<td>incised pendant ?</td>
<td>13.7</td>
<td>19.1</td>
<td></td>
<td>5.3 ILL. Broken along the length</td>
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<td>85</td>
<td>1344</td>
<td>1</td>
<td>bead</td>
<td>37.1</td>
<td>22.3</td>
<td></td>
<td>19.4 incised cylindrical object; square cross hatch pattern; worn on 1 side (against body?)</td>
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<tr>
<td>82</td>
<td>1359</td>
<td>1</td>
<td>&quot;ring&quot; fragment</td>
<td>17.7</td>
<td>5.1</td>
<td></td>
<td>4.9 thickness is for int/ext; no incisions/working, may match last year’s ring frag. ?</td>
</tr>
<tr>
<td>83</td>
<td>1381</td>
<td>1</td>
<td>&quot;thimble&quot;/cupule</td>
<td>26</td>
<td>15.4</td>
<td></td>
<td>17.8 inside T= 9.9; incised in typical fashion cross hatch; burnt?, broken along width</td>
</tr>
<tr>
<td>84</td>
<td>1399</td>
<td>1</td>
<td>almond; amygdaloid</td>
<td>23.1</td>
<td>11.9</td>
<td></td>
<td>9.7 beautiful incision- diamonds; worn around the center possibly due to cordage</td>
</tr>
<tr>
<td>95</td>
<td>1453</td>
<td>1</td>
<td>Picrolite -raw stone</td>
<td>12</td>
<td>8.8</td>
<td></td>
<td>6.9 pale green with some red and yellow</td>
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<tr>
<td>107</td>
<td>1597</td>
<td>1</td>
<td>ring frag.</td>
<td>24.3</td>
<td>6.3</td>
<td></td>
<td>2.6 int. bevel; regular width; light green, looks faded</td>
</tr>
<tr>
<td>44</td>
<td>1732</td>
<td>1</td>
<td>incised oval</td>
<td>27.2</td>
<td>24.5</td>
<td></td>
<td>14.4 incised square; considerable wear; start of hole n flat base</td>
</tr>
<tr>
<td>42</td>
<td>1747</td>
<td>1</td>
<td>Fragment</td>
<td>14</td>
<td>11.1</td>
<td></td>
<td>9.8 Unworked fragment, polished</td>
</tr>
<tr>
<td>8</td>
<td>1749</td>
<td>1</td>
<td>fragment</td>
<td>6.9</td>
<td>4.8</td>
<td></td>
<td>4.7 tiny fragments</td>
</tr>
<tr>
<td>5</td>
<td>1777</td>
<td>1</td>
<td>&quot;thimble&quot;</td>
<td>23.8</td>
<td>19.1</td>
<td></td>
<td>13 oval, incised squares, &quot;medium&quot;, 4.9 rim, 9.8 depth</td>
</tr>
<tr>
<td>43</td>
<td>1803</td>
<td>1</td>
<td>&quot;acorn&quot;</td>
<td>23.8</td>
<td>18</td>
<td></td>
<td>14.8 very worn, no incision in middle; fine rect. Pattern of incisions</td>
</tr>
<tr>
<td>13</td>
<td>2001</td>
<td>1</td>
<td>incised picrolite</td>
<td>21.2</td>
<td>12.8</td>
<td></td>
<td>5.1 rough &quot;trapezoid&quot;, complete, incised all ends, squares plus</td>
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<tr>
<td>UID</td>
<td>FN</td>
<td>Material</td>
<td>Description</td>
<td>Length</td>
<td>Width</td>
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<td>-------</td>
<td>-----------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>36</td>
<td>2070</td>
<td>1 vessel fragment</td>
<td>parallel lines</td>
<td>61.1</td>
<td>40.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>156</td>
<td>2101</td>
<td>1 frag- incised-elongated</td>
<td>11.8 flat bottom; interior striation - rimmed plate?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>155</td>
<td>2118</td>
<td>1 &quot;cupule&quot; frag- incised</td>
<td>4.7 oval with round end; flat bottom; larger grid than norm; broken along the length</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>grid</td>
<td></td>
<td>17.4</td>
<td>10.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>157</td>
<td>2133</td>
<td>1 &quot;pebble&quot; - raw material</td>
<td>4.9 wall 4.9; base 4.3; bottom grid intersects side grid with &quot;wedge&quot; incision between</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>158</td>
<td>2181</td>
<td>1 frag- unworked</td>
<td>31.3</td>
<td>21.4</td>
<td>17.6</td>
<td>unworked, irregular pebble</td>
<td></td>
</tr>
<tr>
<td>154</td>
<td>2186</td>
<td>1 chip</td>
<td>31.3</td>
<td>21.4</td>
<td>17.6</td>
<td>unworked, irregular pebble</td>
<td></td>
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<tr>
<td>159</td>
<td>2194</td>
<td>1 ring frag; approx 1/2</td>
<td>22.5</td>
<td>22.3</td>
<td>6.5</td>
<td>unworked, irregular pebble</td>
<td></td>
</tr>
<tr>
<td>160</td>
<td>2253</td>
<td>1 unworked cobble</td>
<td>24.6</td>
<td>15.1</td>
<td>14.7</td>
<td>unworked, irregular pebble</td>
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<tr>
<td>161</td>
<td>2380</td>
<td>1 incised &quot;cupule&quot; rim-grid</td>
<td>14.6</td>
<td>14.4</td>
<td>3.4</td>
<td>unworked, irregular pebble</td>
<td></td>
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<tr>
<td>165</td>
<td>2522</td>
<td>1 ring/ pendant 1/2 circle</td>
<td>21.9</td>
<td>6.6</td>
<td>4.8</td>
<td>unworked, irregular pebble</td>
<td></td>
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</tbody>
</table>
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EDUCATION

University of Nevada, Las Vegas
Anthropology Graduate Program 2013-2015
Thesis: Picrolite Carving and the Cypriot Neolithic: An Experimental Study

Montana State University, Bozeman
Anthropology, Class of 2012 2008-2012
Graduated Summa cum Laude, 3.93 GPA
MSU Honors Baccalaureate Degree
Graduated in Honors with Highest Distinction

AWARDS
8 time President’s List or Dean’s List Honoree 2008 – 2012
MSU Presidential Scholar 2008 – 2012
MSU Award for Excellence recipient (top 40 seniors in the university) 2012

RESEARCH INTERESTS
Near East and Island archaeology, actualistic studies, lithic technology, architecture, artifact and raw material provenience.

RESEARCH EXPERIENCE
Experimental Picrolite Carving
MA Thesis Research Spring 2015 – Fall 2015
Incising, grinding, and drilling picrolite to approximate the artifact assemblage at Kritou Marottou Ais Giorkis, Cyprus. Lithic use wear analysis followed.

Lithic Analyst, Harris Site, New Mexico
Graduate Assistant, UNLV Fall 2014 – Spring 2015
Catalog management, metric data input, lithic analysis at UNLV Southwest Archaeology Lab, Dr. Barbara Roth, Supervisor

Archaeological Excavation, Kritou Marottou Ais Giorkis, Cyprus
Excavator, Lab Assistant, Crew Supervisor Summer 2013, Summer 2014
Excavation, lithic analysis, and artifact curation under Dr. Alan Simmons, project director. Crew supervision for U. of Edinburgh field school students under Dr. Paul Croft.
Analysis of faunal remains, Absaroka Indian Agency archaeological site

**Student Researcher:** Fall 2012
Faunal skeletal remains identification and analysis. Synthesis of data for entire site, and for government and Native American areas separately.

Analysis of Lithic Debitage from TBAS 102, Wadi Juheira region, Jordan

**Student Researcher:** Fall 2011 – May 2012
Measurement and analysis of incomplete Natufian blades and bladelets under Dr. Michael Neeley.

Archaeological Excavation, Ness of Brodgar, Orkney, Scotland

**Excavator** July 2011 – Aug. 2011
Survey, excavation, post-ex analysis, GPS and Total Station use, and proton magnetometry scanning, as part of a four week long field school through Willamette University. Director: Scott Pike.

TEACHING EXPERIENCE

**Graduate Assistant, ANTH 428, 429, 411, UNLV** Spring 2015-Fall 2015
Instructor: Dr. Jiemin Bao
Topics: Food and Identity, Anthropology of Identity, Buddhism

**Teaching Assistant, Anthropology 101, Montana State** Fall 2012
Instructor: Dr. Mike Neeley

**Student Fellow, Texts and Critics Freshman Honors Seminar** Fall 2012-Spring 2013
Faculty Fellow: Dr. Mark Schlenz (Fall), Alan Kesselheim (Spring)

**Student Supervisor:** Supervised student participants during an archaeological practicum at the O’Hare Ranch in Paradise Valley, Montana. Activities included a geoarchaeological lecture, flint knapping, pedestrian survey, and test excavation of a stone circle (tipi ring). Dr. Craig M. Lee, Project Director

GRANTS/SCHOLARSHIPS

UNLV GPSA Scholarship, 2014
$300 for travel to Cyprus for Archaeological Excavations at Ais Giorkis

UNLV Angela Peterson Memorial Scholarship, 2014
$1500 for travel to Cyprus for Archaeological Excavations at Ais Giorkis

MSU Undergraduate Scholars Program research grant 2011-12.
$750 for research on Epipaleolithic bladelets from TBAS-102, a Natufian site in West-Central Jordan. Co-PI with Aaron Whittenburg, MSU
Presidential Scholarship, Montana State University 2008-2012: Merit-based full tuition waiver and $1250 stipend for four years

CONFERENCES ATTENDED
Poster Presentation: 2015 ASOR Annual Meeting, San Diego, CA  
Ecological Variables at one of Cyprus’s Earliest Villages  
Co-Presenters: Katelyn DiBenedetto (primary), Levi Keach, Alan H. Simmons, Trent Skinner  
Nov. 18-21, 2014

The 32nd Annual CAARI (Cyprus American Archaeological Research Institute) Archaeological Workshop in Collaboration with the Department of Antiquities Cyprus  
As Presenter: Human Adaptations in Ice Age America: An Exploration of Paleoecological, Archaeological, Linguistic, and Skeletal Evidence.  
Paper Title: “The Origins of Kennewick Man”  
June 15, 2013

April 23 & 25, 2013

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American Schools of Oriental Research (ASOR)
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