TEXTILE PRODUCTION AND ITS IMPLICATIONS FOR COMPLEX SOCIAL ORGANIZATION

by

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This Bachelors of Philosophy Thesis builds upon the present body of literature and research concerned with the relationship between craft production and the emergence of complex societies. This is done by examining the evidence for textile production at the Early Bronze Age site Karataş, in the Elmalı plain of SW Turkey. This research uses the tools of textile production to draw conclusions about the settlement's complex social organization. Karataş consists of a central mound, approximately 100 m in diameter with a 1.9 ha settlement surrounding it. Excavation at this site began in 1963 and continued to 1975, conducted by Bryn Mawr College under the directorship of Dr. Matcheld Mellink (Warner 1994: Preface, 5). This research demonstrates that Karataş went through varying degrees of economic centralization leading ultimately to the site's abandonment. By conducting a GIS analysis of the distribution of artifacts associated with textile production, this research reveals a concentration of textile production in the fourth period of the site's habitation (EBA II). This concentration is presented as possibly the result of an increase in political authority, emanating from the central mound, which was not previously present within this ancient community. It is followed by a gradual decentralization of textile production in the fifth and sixth periods (EBA II-III) and then abandonment. The final decentralization reflects a loss of political control across the settlement, and may be tied directly to the abandonment.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

PREFACE

This project was funded through the University of Pittsburgh Honors College. In addition, the Anthropology Section of the Carnegie Museum of Natural History provided many resources, as well as funding for this research to be presented at the 111th Annual Meeting of the Archaeological Institute of America in Anaheim, California, under the title 'Socio-Economic Transitions at the Early Bronze Age Site Karataş.' My thesis adviser, Dr. Bryan Hanks, has provided immeasurable guidance and support, not only towards this work, but consistently throughout my undergraduate career. From my very first college class, Dr. Hanks' 'Introduction to Archaeology', to the discussions that followed the defense of this thesis, Dr. Hanks has given enormous amounts of time and insight, well above what I had any right to expect. Likewise, Dr. Kathleen Allen has always been exceptionally generous and eager to support my endeavors. Dr. Allen is responsible for a majority of my knowledge of how archaeology is conducted in the field, and I could not have sought better training. Dr. William Harbert has been an excellent teacher and guide through the world of GIS and has shown tremendous enthusiasm for my work which gave me considerable encouragement. The external adviser of my thesis committee, Dr. Rita P. Wright of New York University's Anthropology Department, selflessly came from New York City to provide her unsurpassed expertise and counsel. Both my thesis and my academic future have been enriched by her influence.

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This work would not have been possible without the University of Pittsburgh Honors College, which has provided me with many opportunities. The attention that the Honors College places in its students is unparalleled and results in excellent research.

I would like to thank my colleagues at the Anthropology Section of the Carnegie Museum of Pittsburgh. Dr. David Watters, Dr. Sandra Olsen, and Deb Harding have all contributed to my work through their insights, kindness, and support. My time at the Carnegie Museum has done much to develop my professional understanding of Academia.

I would also like to thank my family, whose interest in my work has been generous and whose love has given me the confidence to pursue archaeology.

Finally, I would like to thank my wife, Anne Marie Sweeney, for being the most supportive of all. It was Anne Marie who had to deal with all of my highs and lows and who must wave goodbye to me each summer as I leave for the field. Her support has been unflagging and is a source of strength for me, upon which I know I will always be able to draw.

1.0 INTRODUCTION

The focus of this thesis is the organization of textile production during the final three periods of the Early Bronze Age (EBA) of the Anatolian site of Karataş. This thesis examines the excavated remains of Karataş with regards to what they can indicate about changes in complex social organization. Karataş is well suited for close examination, especially when narrowed down to its final three periods. This settlement, with a maximum estimated population of less than 1000 individuals, was never much larger than six hectares and was not inhabited in later periods, allowing unencumbered access to EBA levels (Warner 1994: 3, 177, Plate 10). The small size of the settlement limits the amount of data that must be incorporated and analyzed, a situation that can be beneficial for smaller scale research projects. Still, Karataş and other smaller sites are diverse enough to provide valuable insights into how communities functioned at a local level (Wattenmaker 1998: 65) and are ultimately valuable in filling in details at the regional level.

The Early Bronze Age is a rich period for research, as this was a time of great transition among Anatolian communities (Yener 2000: 67). Societies underwent considerable socio-political transitions including becoming more urbanized in the southeast and more centralized in the central and western regions (Sagona and Zimansky 2009: 176), where Karataş is located. More specifically, during the EBA II there was a significant increase in both metallurgy (Yener 2000: 67) and inter-regional trade (Şahoğlu 2005: 340-341) in Anatolia. This thesis concentrates on the Karataş periods that are dated to EBA II (2700-2400 BCE) and III (2400-2000 BCE),

which appear to have been a part of this trend in centralization and increased trade. Identifiable changes that occur in these time periods, such as the organization of craft production and an increase in the presence of stamp seals, indicate that Karataş was connected with the socio-economic transitions that have been identified in other sites and in the broader region in general.

Textiles were an ever-present element to nearly all aspects of society (Wright 1996: 85). Analyzing their production can be used to indicate larger patterns in craft production (Richmond 2006: 221), which in turn are tied to complex society. Since Vere Gordon Childe (1936) addressed the link between craft production and complex society in Man Makes Himself, this relationship has received a great deal of archaeological research and attention (Brumfiel and Earle 1987; Clark and Parry 1990; Costin 1991; Stein and Blackman 1993; Peregrine 1991; Wattenmaker 1998; Schortman and Urban 2004; Wright 1996). A major topic has been whether or not specialized craft production is representative of an increase in social complexity (Earle 1987:75). The nature of the relationship between these two concepts does not have a consensus, as some scholars argue whether complex society is the cause or the effect of craft production (Clark and Parry 1990).

1.1 CRAFT PRODUCTION AND COMPLEX SOCIETY

The way many societies function and are structured today is different from how Paleolithic peoples functioned tens of thousands of years ago (Trigger 2003: 41). That societies have progressively become more different in the way they are structured and organized is evident. Evaluating this difference is much more complicated than recognizing it. One method of evaluation is to state that many of these changes represent a movement towards complexity, and

that this complexity is manifested through various characteristics, some of which are visible in the archaeological record. A major tenet of the definition of complexity with regards to society is having a social organization that is defined by stratification and not kinship (Trigger 2003: 44), although this stratification, or inequality, cannot be viewed as a single line of hierarchy, but rather a multidimensional one. The multidimensional approach, which views such variants as power, age, sex, and ethnicity as forms of inequality, allows for a more comprehensive understanding of social dynamics, which in turn creates a continuum of stratification as opposed to a dichotomy (McGuire 1983: 99-100). This thesis views complex society as the presence of stratification within a society, in one or many of the forms put forth by the multidimensional approach. Using this definition, complex social organization can be identified through examining features of socio-economic institutions, such as specialization in craft production and supra-local interaction and integration.

Many studies have tackled the difficult concept of specialization (Costin 1991; Flad and Hruby 2007; Cobb 1996; Cross 1993; Clark 1995). This thesis views specialization as an extant form of social organization whereby certain individuals produce a surplus of a particular good beyond what they need and are consequently dependent upon the goods produced by the surplus of others (Costin 2000: 385; Cross 1993:65). Costin (1991:4) further describes specialization as a "differentiated, regularized, permanent, and perhaps institutionalized production system." Costin's definition emphasizes the spatial nature of specialization, which is important, as it is one of the characteristics that makes it recognizable through excavation. Costin (1991:5-9) goes on to define her approach to specialization by labeling it as multidimensional and presenting four parameters that describe the different facets: context, concentration, scale, and intensity.

Context examines the political and socio-economic conditions under which craft producers work (Costin 1991:11). This involves the important distinction between attached and independent specialists, a division first conceptualized by Earle (1981). The definitions of these terms have been modified by many (Clark 1995), however their general characteristics are detailed in brief here. Attached specialists are defined as having elite patrons and/or centralized institutions that are responsible for providing the workspace, raw materials, and tools for craft production. In return, the crafts produced are generally determined by and benefit those who provide the resources. Independent specialists do not have the benefit or direction of a patron, but rather produce crafts on their own in proportion with the economic demands of the society (Earle 1981: 230; Brumfiel and Earle 1987:5).

	Context		Concentration		Scale		Intensity	
	Attached	Independent	Nucleated	Dispersed	Labor	Kin-Based	Part-Time	Full-Time
Individual								
Dispersed Workshop								
Community								
Nucleated Workshop								
Dispersed Corvee								
Individual Retainer								
Nucleated Corvee								
Retainer Workshop								

Table 1 - Costin's Parameters (columns) and terms for the organization of production (rows). Grey boxes indicate parameters associated with the forms of organization. Light grey boxes indicate possible paramteres. Adapted from Costin 1991:10.

Concentration focuses on the physical placement of specialists with regard to each other and their consumers. It differentiates between nucleated clusters of production and more widely dispersed arrangements. These distributions are often the result of economic convenience (Costin 1991:13-14). This is a particularly important analytical perspective when spatial data is involved because it provides methods of interpretation that are more robust than political or economic models. Furthermore, it lends important information to the task of evaluating *scale*, which examines the number of people involved with production and how they were recruited and integrated. This can range from family level units of production, where family members are recruited, to massive organizations involving paid wages and contractual labor (Costin 1991:15). Finally, *intensity* assesses the amount of time spent by individuals on craft production. This is broken down into full-time and part-time labor (Costin 1991:16).

Costin also defines terms for the organization of specialist production (table 1 rows). These are as follows (Costin 1991: 8-9):

> *Individual specialization*: autonomous individuals or households producing for unrestricted local consumption
> *Dispersed workshop*: larger workshops producing for unrestricted local consumption
> *Community specialization*: autonomous individual or household-based production units, aggregated within a single community, producing for unrestricted regional consumption
> *Nucleated workshops*: larger workshops aggregated within a single community, producing for unrestricted regional consumption
> *Dispersed corvée*: part-time labor producing for elite or government institutions within a household or local community setting
> *Individual retainers*: individual artisans, usually working full-time, producing for elite patrons or government institutions within an elite (e.g., a palace) or administered setting
> *Nucleated corvée*: part-time labor recruited by a government institution, working in a special purpose, elite, or administered setting or facility
> *Retainer workshop*: large-scale operation with full-time artisans working for an elite patron or government institution within a segregated, highly specialized setting or facility

1.2 RESEARCH QUESTIONS

Costin's breakdown of the organization of specialization is of particular value to this research in two ways. The first involves the already mentioned compatibility with spatial analysis. This thesis makes use of a Geographic Information Systems (GIS) analysis of artifact distribution. The emphasis of Costin's concentration parameter, as well as the scale parameter, allows GIS data to be utilized more effectively. By interpreting the GIS results in a way directly relatable to the understanding of craft production, this manner of research achieves a more efficient harmony between method and theory.

The second benefit is related to the published information on Karataş. Many articles appeared in the American Journal of Archaeology and three of six planned site reports have been published. The issue lies in the various aspects of the site that have not received detailed publications, namely the site's largest and central structure, the Central Mound. In addition, details of the site's small finds, which would include a greater description of tools related to textile production, have not been published in their entirety. Fortunately, Costin's categorization allows for certain elements to be missing, while still providing valuable information on the details that are present. Being multidimensional enables Costin's approach to provide meaningful observations on what evidence is available, without being crippled by evidence that is lacking.

Using Costin's parameters, three research questions were generated to guide the investigation of the data found primarily in the second site report published on Karataş by Warner (1994), Elmalı-Karataş II. These are as follows:

1. How did the concentration of textile production change over time?
2. How did the scale of textile production change over time?
3. To what degree were elites involved with craft production?

1.3 METHODOLOGY

Evidence for textile production is abundant throughout the final three periods of Karataş' occupation. The most prominent form of evidence is the spindle whorl, of which 106 artifacts from the final three periods of habitation are examined in this research. Spindle whorls are one of the most plentiful artifact types found at Karataş (see Appendices A and B for table of artifact quantity and trench distribution). This selection of whorls is not a complete account of whorls from Karataş, but it does include all whorls which have been published. An unpublished quantity of whorls was uncovered in the multiple cemeteries of the site, primarily found in female burials (Angel 1975:386). Spindle whorls, in this thesis, are not only valuable in their availability, but also as providers of specific information with regards to textile production, such as location, quantity, and type of thread produced. Whorls, while not essential, are exceptionally useful in the process of producing thread from raw material (Barber 1991:42). Their presence in an area, especially in great quantity, signifies the act of thread spinning, which is one of the initial stages of textile production after the acquisition of the raw materials.

Through identifying areas of higher whorl concentration, possible centers of textile production within the settlement may become recognizable. The most efficient method of generating this analysis involves the input of data into a GIS database. From this point, clusters of high whorl concentrations are visible and can be quantifiably analyzed. Furthermore, data from different periods can be overlaid to better illustrate changes of whorl locations and frequencies through time in a 4D, or temporal variation combined with attribute and spatial variation framework.

1.3.1 Artifact Analysis

Data from the spindle whorls uncovered at Karataş are provided by the field report Elmalı-Karataş II, written by Jayne Warner (1994). This report provides the diameter and height measurements of the whorls, their shape (biconical, spherical, lentoid, globular, biconvex), the presence or absence of incisions, and the excavation trenches in which they were found. There is no information, unfortunately, that details the weights of each whorl, although this can be inferred to a small degree based on their physical dimensions.

Only the final three periods of Kartaş' habitations were chosen for examination. These are periods IV (EBA II), V (EBA II), and VI (EBA II-III). The first three periods of the site did not provide large amounts of spindle whorls and provided no evidence of other tools associated with textile production. The reason for this is unclear. Many artifacts come from contexts that fall within the transition from Period V to Period VI. Consequently, for this research, a new designation of Period V-VI has been created to accommodate these artifacts and their less precise provenience.

1.3.2 GIS Analysis

This research uses ESRI's ArcGIS software, version 9.3. A point feature class data element was created for each spindle whorl and placed in the location of the trench in which the whorl was found. Each point was assigned the following attribute data (with appropriate metadata): shape, dimensions, trench, and period. Points were placed on maps which were adapted from the plates present in the Elmalı-Karataş II site report and drawn through ArcGIS.

An issue with this method of analysis is that it does not provide information about the structures used in production. As physical provenience does not allow individual buildings to be designated as the source of spindle whorls, only trench-sized areas are identified as textile production locations. Unfortunately, in some instances, this provides for a large surface area. The focus of this research, however, does not operate at a structural level, but at a more 'neighborhood' level. This still allows conclusions to be drawn about artifact clusters. Many structural plans and materials are available and will be discussed throughout this thesis. They are able to provide some details, such as their possible function and general trends in size, that can be applied to the understanding of the textile production procedures.

2.0 TEXTILE PRODUCTION IN EBA ANATOLIA

Excavation has revealed that the textile industry in Anatolia extends as far back as the Pre-Pottery Neolithic (9600-7000 BCE) and may even date to periods before the advent of agriculture and stock breeding (Richmond 2006: 204). By the Early Bronze Age (3100-2000 BCE), the textile industry was, like many other industries in Anatolia at the time, becoming more centralized (Sagona and Zimansky 2009: 176). McCorriston's (1997: 517) discussion on the centralization of textile industries in Mesopotamia treats this phenomenon as a correlate to the rise of "a highly integrated complex of rural and urban settlements." While the rise of complex society in Anatolia did not follow the same course or timeline as Mesopotamia, there are analogous features that serve to highlight the transitions in socio-economic and political organization. McCorriston's argument, discussed in more detail below, details these transitions and the societal stimuli behind them. In her research, changes in how the textile industry was organized and conducted are crucial indicators of how society at large was becoming more urbanized.

On a local scale, the archaeological assemblage of Karataş is robust enough to support research on how textile production was organized and how the changes in this organization may reflect changes in social complexity. To complement the data from Karataş, other sites from Western Anatolia are also taken into consideration, including Troy, Beycesultan, and

Aprhodisias (fig. 7). The observations made by this research are driven by the tools related to textile production and by changes found in other features at Karataş, such as architecture, settlement planning, and evidence for other kinds of craft production.

While this research examines many of the artifacts excavated from Karataş, the focus rests primarily on those tools connected to textile production and their distributions, especially the spindle whorl. At Karataş, this particular tool is the most plentiful of those involved with the making of textiles. In addition, with respect to understanding how textiles were produced, the spindle whorl represents one of the earliest and the most time consuming parts of the production process: spinning.

2.1 MATERIALS, TOOLS, AND PROCESSES

Textiles unfortunately rarely last in the archaeological record. There are, however, several archaeologically recoverable tools associated with textile production in Early Bronze Age Anatolia. Prominent among these are spindle whorls, loom-weights, awls, needles (Richmond 2006: 207). These tools and their respective processes are detailed below.

2.1.1 Material

Textile production begins with the cultivation of fibers, which are derived from either plants or animals. Domesticated flax (Linum usitatissimum), which is used to make linen, is known in Anatolia from before the 8th millennium BCE (Burke 1998:4) and was the primary source of

fiber in the Near East for several millennia. Wool replaced linen as the most popular raw material for textiles in the late 4th millennium BCE (McCorriston 1998: 521). McCorriston (1998) has detailed a strong argument connecting the switch from linen to wool in Mesopotamia with an increase in complex society. Her analysis points out that the exploitation of wool was less labor intensive and more suitable to freeing up time and resources to pursue other activities. By providing these benefits, people would have been able to focus on more specialized crops, as their fields were no longer dedicated to growing flax. Likewise, their time could have been spent on other productive activities, possibly even a movement towards specialization (McCorriston 1998: 518, 524-525).

2.1.2 Spinning

Spinning is the act of drawing out many strands of raw material and twisting them together to make cordage or thread. Barber (1992: 9, 39) argues that the making of thread was one of the first "textile arts", citing evidence of cordage from the Upper Paleolithic Gravettian and Magdalenian cultures. Spinning can be done using only the hands, but this method is difficult and slow. A spindle, which is a device that serves as an axis for the raw fibers to twist around, can be used to spin thread much more quickly than bare hands. A very common

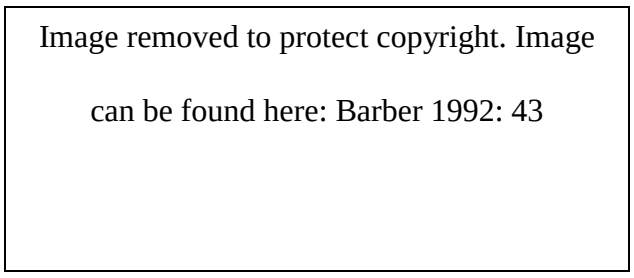

Figure 1 - Woman spinning

type of spindle is one made of wood and in the shape of a thin rod. The efficiency of this form of spindle can be increased by adding a whorl (fig. 1), which is a weight that increases the centrifugal force of the spinning. This additional pull enhances the spindle's ability to draw raw fibers quickly (Barber 1992: 51-53). In EBA Anatolia, spindle whorls are very common and can be directly linked to textile production (Richmond 2006: 208, 211). The whorls are generally made of clay or stone, but can also be made from bone, horn, metal, or more perishable materials (Keith 1998: 501).

The diameter of a whorl influences the speed at which a spindle rotates. With two whorls that weigh the same, the one with a smaller diameter will produce a greater centrifugal force, and thus a faster rotation. Consequently, whorls of a smaller diameter are better at producing "tightly spun thread with many twists per unit of length" (Barber 1992: 53). Weight is also a factor as higher weights also increase the force of a spindle's rotation. Heavier whorls are better for longer fibers, such as wool. Lighter whorls are more suitable to shorter fibers, such as flax (Barber 1992: 52). Unfortunately, neither of these characteristics provides concrete proof of the type of threads being produced. A spinner's skill can overcome the disadvantages of using less efficient whorls with various types of fiber (Chase et al. 2008:129; McCorriston 1997:522).

Depictions of spinning appear across Bronze Egypt and the Near East and generally show women engaged in this activity (Barber 1992: 48, 57, 58-59). Ethnographic and archaeological evidence from Turkey (Kimbrough 2006; Richmond 2006: 205), Mesopotamia (Wright 1996: 92), Mexico (McCafferty and McCafferty 1991; Sayer 1988; Chase et al. 2008) and Latin America (Feltham 1989) also indicate that spinners were predominantly women. The task of spinning, which was very mobile, was probably engaged in almost constantly as it is the lengthiest process in textile production (Kimbrough 2006: 238, 244).

2.1.3 Weaving

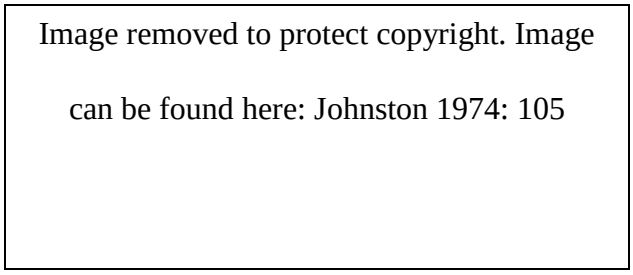

Figure 2 - Warp-weighted loom (Johnson 1974: 105).

Weaving is the act of interlacing threads to form cloth (Kimbrough 2006: 45). This act is greatly facilitated by adding tension to the strands of thread (called the warp) so that their rigidity makes it easier to interlace separate thread (called the weft). This can be done manually or through tying one or both ends of the thread to a fixed point. The structure to which thread is attached is called a loom (Barber 1992: 9, 80). The presence of loom-weights, stone or clay weights to which the threads can be tied to create tension, indicates that a warp-weighted loom (fig. 2) was the tool of choice for weaving in EBA Anatolia (Richmond 2006: 207). This type of loom was popular in much of Europe from the Neolithic to the Iron Age (Barber 1991: 91-95), although it was not as prevalent in Mesopotamia, where the horizontal ground loom was more common (Kimbrough 2006: 205), or in Egypt and Rome, where a vertical loom was used (Crowfoot 1937: 36-37).

The warp-weighted loom functions by attaching thread (the warp) to the front and back of the support beam that rests on top. These threads are then made taut by tying loom-weights to their unattached ends. This tension facilitates the weaving of the weft through the warp (Mårtenson et al 2009: 372, 377). Barber (1991: 94) cites evidence for warp-weighted looms

using 20-30 loom-weights in Neolithic Europe, and Faroese excavations in Northern Europe have uncovered evidence for as many as 38 weights per loom (Ryder 1993:312). Generally, variations in the amount of weights reflect thread diameter. Thicker threads are composed of more strands of raw material and thus need greater tension to maintain tightness. A weaver can either attach multiple threads to fewer, heavier loom-weights, or fewer threads to many lighter loom-weights. In this way, loom-weights are valuable in determining the thickness of the threads being woven (Mårtenson et al 2009: 378).

Archaeological and ethnographic evidence indicates that weaving, like spinning, was probably the domain of women (Kimbrough 2006; Brumfiel 1991), although there are examples of men doing this work (Thomson 1982; Imperato 1974). The ratio of spinners to weavers is difficult to determine as there is a wide range of estimates available. Delson (2004) notes that in 18th and 19th Century Brazil, home-based textile production (conducted by indigenous women using a vertical loom and spinning cotton) had a spinner to weaver ratio of 24-30 to one. Kriger (1993: 365, 377) records that in the 19th Century, women of the pre-colonial Sokoto Caliphate (West Africa), also using vertical looms and cotton, functioned at a ratio between two and eight to one. These ranges, ultimately between 30 and two to one, do very little to support an interpretation of the archaeological record. That spinners almost always out-number weavers, or perhaps more accurately, that spinning is a much longer process than weaving, is perhaps the only conclusion that can be safely taken from these ethnographic examples.

2.1.4 Needles and Awls

Like spinning, the usage of needles in textile production extends back to the Upper Paleolithic (Barber 1991: 39). Needles are used for sewing and embroidery and sometimes to lead the weft through the warp. Awls, likewise, can be used for weaving, but are also used to pin textiles together and for brocading. Bone and metal are the most common materials for making needles and awls (Chase et al. 2008: 128).

2.2 TEXTILE PRODUCTION AT KARATAŞ

Karataş is smaller than many of its contemporaneous neighboring settlements and has fewer textile production related artifacts. Troy I (with a settlement about twice the diameter of Karataş {Mellink 1973: 296}), has produced textile related artifacts numbering into the thousands (Richmond 2006). Enough artifacts are present at Karataş, however, to conclusively demonstrate that some manner of textile production was taking place and, furthermore, that some characteristics of this production can be better understood.

2.2.1 Materials

The organic materials and products of textile production rarely last in the archaeological record (Kimbrough 2005: 50) making it very difficult to know what types of fibers were used. There are, however, indirect forms of evidence that may indicate one fiber over the other. Angel's (1976: 385) human skeletal analysis of remains from a Period VI tomb at Karataş

revealed upper incisors with cylindrical wear. He notes that this type of wear matches that caused by stretch-biting wool thread among modern day Turks. These markings appear to be similar to those identified by Harper (2006: 19) at the Medieval/Venetian Period cemetery of Athienou-Malloura, Cyprus. Harper interpreted the wear as the result of processing fiber by pulling it through the anterior dentition. Unfortunately, while the dental wear may hint at wool usage, it is possible that other types of fiber are treated in the same way and leave the same type of markings (such as cotton in the Venetian wear). Consequently, it is valuable to analyze other sources of data.

A faunal analysis conducted by Hesse and Perkins (1974: 157) of sheep and goat bones indicates that 60% of individuals from Karataş Periods I-III (EBA I) were kept alive past three years. In Periods IV-V:2 (EBA II) this number rose slightly to 63%. The slaughter schedule developed by this study argues for sheep and goat herds being used primarily for meat, although the percentage of individuals living past three years could be the result of some secondary product utilization. The practice of keeping sheep into their maturity can be indicative of wool usage (McCorriston 1997: 521). Beycesultan's slaughter schedule matches Karataş' very closely (Hesse and Perkins 1974: 159), whereas other sites that have been studied do not. Richmond (2006: 214) has compared Troy, Alişar Hüyük, and Sos Höyük, and found that each of these EBA Anatolian sites focused primarily on sheep and goat for their main stock animals. Karataş' faunal remains, conversely, indicate that cattle were more prominent than sheep and goat. Furthermore, cattle were kept to much older ages than sheep and goat, indicating that they were not significant sources of meat (Hesse and Perkins 1974: 157). Richmond's (2006: 214) studies also illustrate that at the above three sites, sheep and goat were heavily relied upon for secondary products.

2.2.2 Spinning

Spinning is the best represented step in the textile production process at Karataş. Whorls are made of baked clay and appear predominantly with incisions, with one bearing pointillé decoration. Unfortunately, detailed information on incisions is not available, aside from their presence or absence.

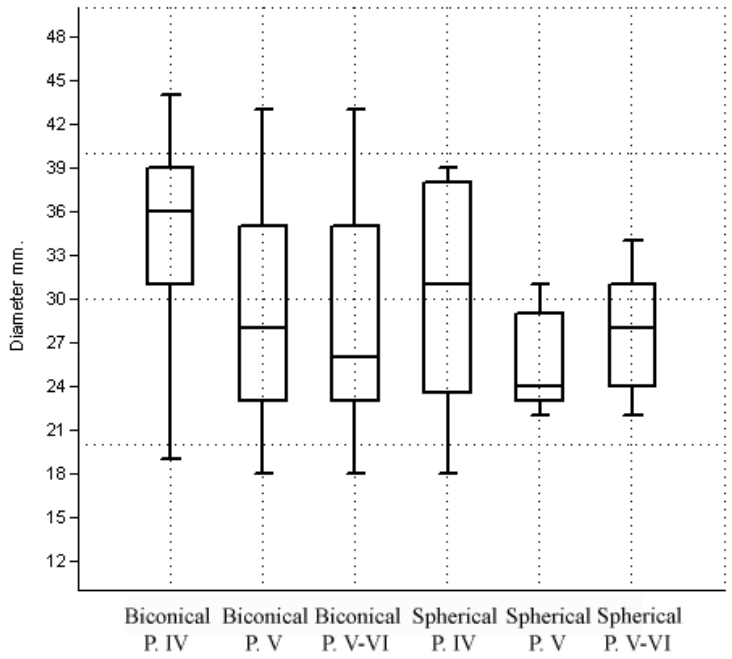

Figure 3 - Box plot illustrating average measurements (center line) with one standard deviation increment (the box). Measurements in millimeters. (Data from Warner 1992: 200-204).

As discussed above, some whorl types are more suitable for certain tasks than others. Unfortunately, determining different functions for each type of whorl is difficult at Karataş due to lack of data. Whorl weights were not recorded, although dimensions are available. Presented here is a box plot (fig. 3) of biconical and spherical diameters for Periods IV and V1.

Figure 3 illustrates that diameter decreased illustrates that diameter decreased from Period IV to V in both biconical and spherical whorls. The lack of information on weight weakens any possible conclusions with regard to how thread was produced, but the drop in diameter size may indicate a slightly different type of production being conducted in Period V

(potentially using finer thread), and certainly indicates a difference in whorl style. As discussed before, the difficulty in determining the type of fiber being used at this time (flax or wool) also adds uncertainty to whorl usage.

Within the excavated trench contexts, there does not appear to be a correlation between whorl type and location. The most common types of whorl is biconical, with this type appearing more than two times as often as the second most common whorl type, spherical. Contemporaneous whorls from Beycesultan (Lloyd and Mellart 1962: 277) and Aphrodisias were also predominantly biconical (Joukowsky 1986: 374).

Spindles, which tend to be more perishable than spindle whorls, are rarely found. Karataş has a rare example of a metal spindle fused with a metal whorl that came out of a Period V:2/3 female burial context (fig. 4). The whorl is made of copper or bronze, and the spindle is made of silver. The whorl, which was probably produced by casting, is biconical (Bordaz 1978: 256-257; Mellink 1969: 323).

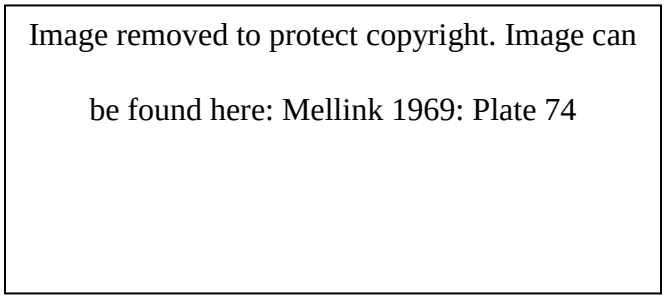

Figure 4 - Metal spindle and spindle whorl, fused together. Also pictured is a perforated metal disc. Metal disc is unrelated to textile production.

2.2.3 Weaving

Three types of loom-weight are known at Karataş: pyramidal, rounded-type, and triangular (fig. 5), and all types are made of terracotta (Warner 1994: 205). Only one loom-weight is associated

with Period IV (triangular type), whereas many were uncovered from periods V and VI. Weights are not available for loom-weights, but dimensions are.

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Figure 5 - Loom-weights. Right – pyramidal, middle – rounded-type, left – triangular.

2.2.4 Needles and Awls

Needles and awls made of both bronze and bone were used at Karataş in Periods IV, V, and VI. Two types of needle were present, one type having its eye formed by bending the shaft over and the second forming the eye by simply perforating the metal. Four types of bent eye needles were uncovered through excavation and two types with perforated eyes. A single needle shaft was also found. Two of the bent eye needles were found in female burials, whereas the other two, along with the two perforated needles and the shaft, came from trenches (not burials) that also had spindle whorls and loom-weights (Bordaz 1978: 239: 211-214). Finally, a bone needle was found displaying a high degree of polish, also in a non-burial setting (Warner 1994: 213).

Three bronze awls were recovered from Karataş, all in burial contexts. Two of the awls had no immediate association, but were nearest to female burials, and the third was found near the chest of a male skeleton (Bordaz 1978: 239: 202-204). Because the data on the tombs of Karataş have not been published, it is not yet possible to know which period these bronze awls

are associated with. All of them came from the Main Cemetery (fig. 10), which was used during Periods I-III and V.

In addition to the bronze awls, three bone awls were excavated, although none were found in burial settings. These awls are associated with Periods IV and V and will be discussed in greater detail in chapter 4.

2.3 CONCLUSION

Textile production at Karataş was accompanied by a suite of tools very common to Bronze Age Anatolia (Richmond 2006: 207). While much of the evidence available points to wool being the fiber of textile production at Karataş, too much remains uncertain to accept this with complete confidence. Textile production at Karataş is imperfectly understood due to this gap, in addition to the limited information on weaving techniques and locations. The spinning of thread is the best represented step in the archaeological record at this site, although even this step is not fully understood due to the variability present in spinner ability. One issue that is approachable is the gender of the textile producers. The evidence, both archaeologically (from burial contexts) and ethnographically, strongly points towards the primary textile workers being female.

3.0 KARATAŞ' PHYSICAL SETTINGS AND EXCAVATIONS

The region surrounding Karataş was originally the focus of interest on pre-Classical Lycian periods. The director of the Bryn Mawr excavations, Matcheld J. Mellink, was particularly eager to examine this region as a possible origin for early migrations to Crete, and possibly as the original homeland of the Minoans. The area was also argued to be the homeland of the Lukka, a Late Bronze Age people related to the Hittites and ancestors to the Lycians, yet had not received a great deal of archaeological attention (Mellink 1964: 269). Karataş itself was known as an Early Bronze Age site from pervious survey work and from tombs that had been discovered by local farmers just prior to the first excavations (Mellink 1964: 271). Another benefit to Karataş in particular was that it had no obstructing layers from later periods (Warner 1994: 3).

3.1 PHYSICAL SETTING

The settlement of Karataş lies in the Elmalı plain (shaded area in fig. 7 below) near the modern day city of Emalı of the Teke Peninsula in SW Turkey. The Elmalı plain is an upland plateau with an elevation of 1100-1200 m. It is surrounded by a southwestern extension of the Taurus Mountains, which makes passage into and out of the area difficult, especially south to the Mediterranean Sea (Warner 1994: 1).

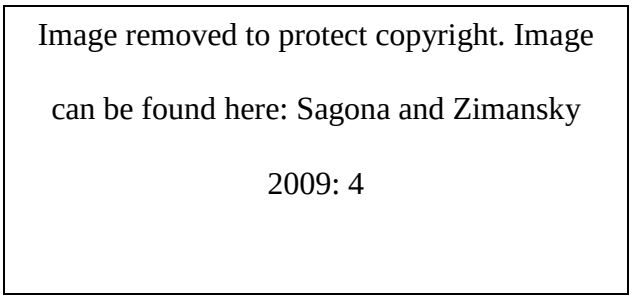

Figure 6 - Physical map of Anatolia and surrounding region.

The plain is a high alluvial drainage basin for the Elmali gölü (lake) and the Avlangölü (Joukowsky 1986: 434). The higher elevation of the plain allows it to avoid the heavy silt conditions more common closer to the coast (Brodaz 1978: 2). Instead, the plain is filled with a thin combination of a red-brown soil and a light surface soil, products of mountainside erosion. The bedrock layer is soft white limestone and greenish sandstone (Mellink 1964: 271). The surrounding mountains provide a well forested area (Mellink 1964:269) and the summers are typically hot and dry with higher precipitation in fall and winter.

Karataş is located in the Full Meso-Mediterranean climate zone, which consists of sub-montane and montane forests and supports modern day crops such as wheat, barely, oats, and chickpeas. Vineyards and fruit and nut trees are also common (Warner 1994: 1). Wheat and barely were most likely grown at the time of the Karataş settlement. Flotation has uncovered what has preliminarily been identified as wheat. Storage pits, much like those typically used for barley in neighboring settlements, were also found, although no direct evidence of barley was uncovered (Warner 1994: 179).

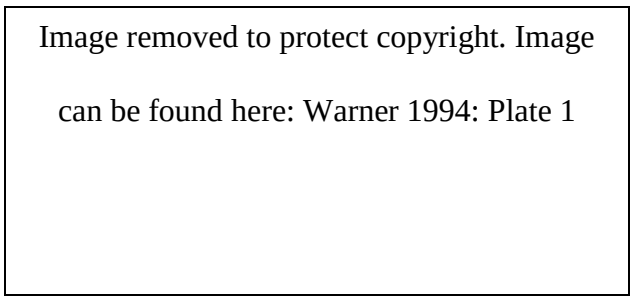

Figure 7 - Topographic map of Elmali Plain (shaded region) with Western Turkey inset.

Image removed to protect copyright. Image can be found here: Joukowsky 1986: 31

Figure 8 - Map of Mediterranean climate

Image removed to protect copyright. Image can be found here: Sagona and Zimansky 2009: 6

Figure 9 - Map of Anatolian natural vegetation zones

3.2 ANATOLIA BEFORE KARATAŞ

Anatolia has a long history of human presence, being inhabited as early as the Paleolithic as evidenced by stone tools, burials, and rock art. Shortly after the first appearance of ceramics in Anatolia (Sagona and Zimansky 2009: 10, 24, 27, 82), people were making pots in the Elmalı Plain. Evidence for this appears from the early Pottery Neolithic (7000 BCE) in the form of sherds, and the first settlements began to appear in the late Pottery Neolithic (6000 BCE). These settlements are marked by a ceramic style of coil built, grit tempered pots, which is the dominant style of pottery throughout SW Anatolia at the time. The transition to the Chalcolithic period (6000-4000 BCE) brought a wave of more distinct local features in ceramics, especially with regard to painting. In the Middle Chalcolithic, the Elmalı Plain witnessed a sudden abandonment of most settlements, a phenomenon attributed variously to invasion and/or agricultural

difficulties such as drought and crop disease. It is not until the Late Chalcolithic (LC) that settlements reappear, with many having a cultural sequence that continued uninterrupted into the Early Bronze Age. Western Anatolia in the LC was fairly unified in ceramic traditions, with handmade, coiled vessels tempered with grits and fiber (Eslick 1992: 81-83; Sagona and Zimansky 2009: 82, 124).

A stamp seal, found at the LC site of Bağbaşi, indicates that a system of trade existed that was complex enough to necessitate a means of identifying the origins of goods. Bağbaşi is located 700 meters east of the site of Karataş and demonstrates clear connections with this later site through the material, manufacture, and decoration characteristics of its ceramic tradition, although the two sites were never contemporaneous. Bağbaşi was abandoned abruptly in the LC, with little left behind (Eslick 1992: 87-88). Curiously, it is not until the EBA II at Karataş (Period IV) that stamp seals reappear in this region (Warner 1994: 180). What this indicates for trade in this area of the Elmalı is unclear. Bağbaşi had a single stamp seal, whereas a dozen have been uncovered at Karataş dating to EBA II and III. It is possible that in the interim between the sudden abandonment of Bağbaşi in the LC and the appearance of the first structures at Karataş in the EBA I (Periods I-III), the volume and complexity of trade routes diminished.

3.3 BRYN MAWR EXCAVATIONS

The excavation of Karataş began in 1963 and continued annually until 1974 uncovering 14,625 square meters. Large areas near the Central Mound and the cemetery were opened, as well as 125 trial trenches (fig. 10) surrounding the Central Mound (Warner 1994: 5). Mellink published

annual reports in the American Journal of Archaeology and three of a planned six field reports have been published. The above map lays out the location and labels of the various trenches.

Karataş had six periods, the earliest dating to late EBA I (3100-2700 BCE) and the latest to early EBA III (2400-2000 BCE), when the site was abandoned with no evidence of violence or hurried evacuation. Over the approximately 400-500 years of the site's existence, the settlement size and patterning went through many changes (fig. 11).

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Figure 10 - Map of trenches excavated by Bryn Mawr team, with each trench numbered or labeled

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Figure 11 - Maps of Periods III (top left), IV (top right), V (bottom left), and VI (bottom right). Cross hatched areas indicate habitation, shaded areas indicate cemeteries. Trenches associated with each period are also shown.

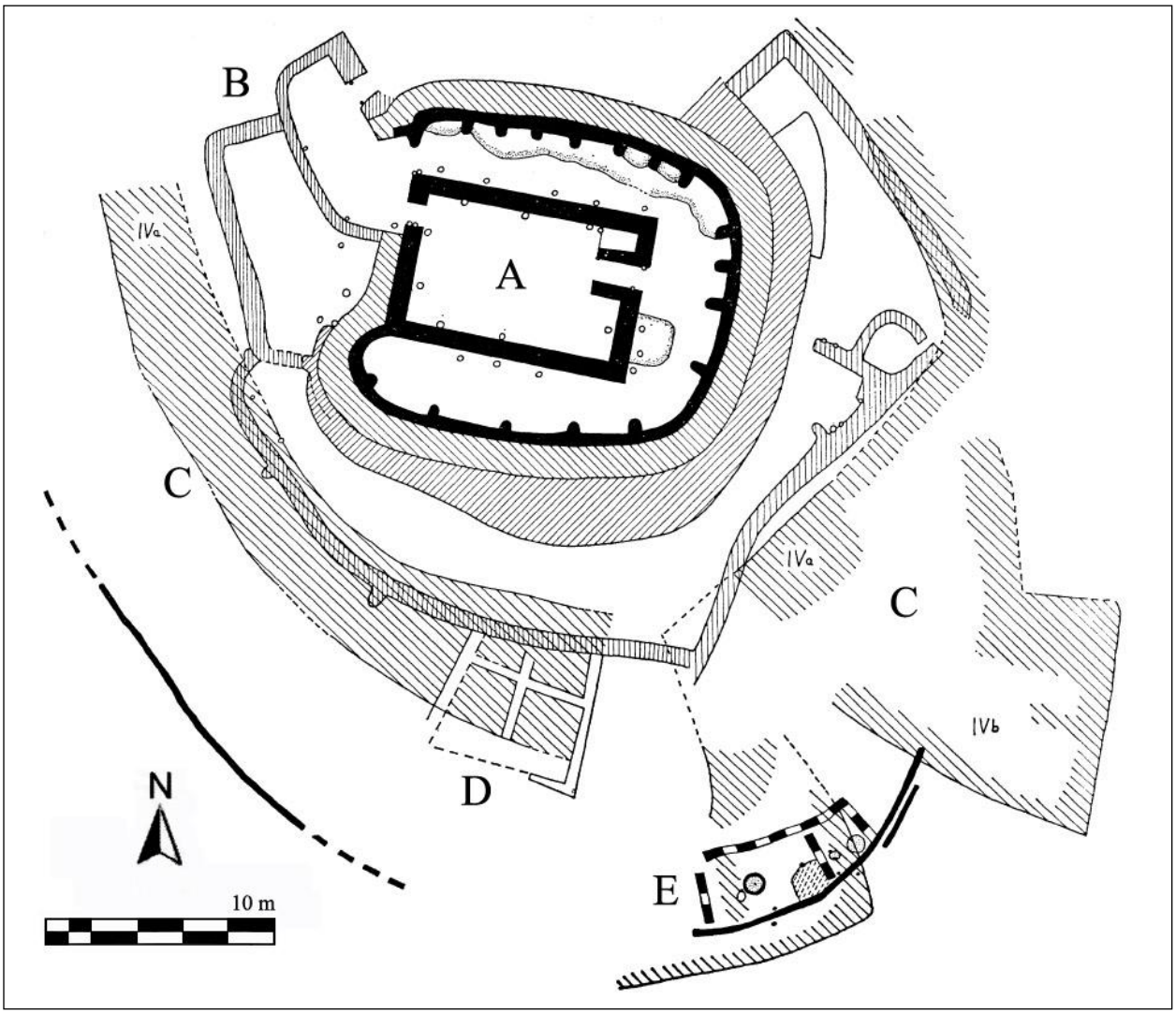

Figure 12 - Architecture of the Central Mound of Karataş showing features from Period III and IV. A – Central Mound structure. B – Walls present at the beginning of Period IV. C – Walls built during Period IV. D – Trapezoidal building from Period III. E – Fence houses. (Adapted from Mellink 1973: 294)

3.3.1 Central Mound and Trench MEE

The excavations placed the heaviest focus on the Central Mound and the cemetery in the south-west portion of the site. The data for these areas are not fully accessible, as the two field reports

dedicated to them have not yet been published. Preliminary analyses are available, however in the annual reports published in the AJA. The Central Mound, discovered in the first season, consisted of a one room structure at the top of a low hill and in close proximity to a well. This room, which may have been two storied, was surrounded by buttressed walls and a large number of storage pits (Mellink 1965: 245-248). The structure was built during the first level of habitation at Karataş and lasted at least into the third. The fourth and fifth layers are too eroded to be certain that the structure was still intact, although the treatment of the defensive architecture indicates that it was. During the first four periods, the defensive architecture was maintained and in Period IV it was strengthened, while at some point in Period V it was abandoned. Periods I, II, III, and V all have spindle whorls associated with this structure (Mellink 1996: 247-252; Mellink and Angel 1973: 296; Aslan 2000: 220), although the published material makes no mention of discovering spindle whorls in the Period IV level of the Central Mound. The incomplete nature of the data makes firm conclusions concerning this problematic.

The Central Mound consisted of an enclosure with a large, 3-4 m thick wall made of pisé. The wall's outer face was strengthened by stones with a coat of plastered mud which Mellink states would have required considerable organizational effort to create (Mellink 1966:251). Extensive storage space was used, with a focus on agricultural produce, oil or wine, and dried goods (Mellink 1965:251). Mellink (1965) interpreted these walls as the action of a rich/elite individual interested in fortifying his residence. Aslan (2000:224) warns against making many interpretations due to varied possibilities and poor preservation. This section of the site remains unpublished, other than season reports in the AJA, which further complicates clear understanding.

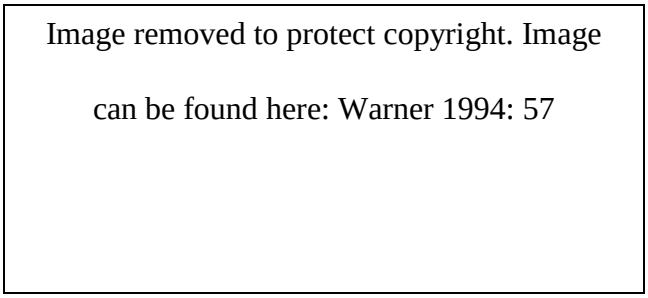

Figure 13 - Trench MEE, adjacent to SW corner of Central Mound. Shows features from both Period III and VI. Crosshatch indicates pizé. Stone foundations are drawn.

The transition between Periods III and IV marked a change in the architecture surrounding the Central Mound (fig. 12). A thicker wall was erected and smaller structures (labeled as E, fence houses, fig. 12) to the south, built in Period III and interpreted by Mellink as the homes of retainers or guards, were removed (Mellink 1973: 296). Outside of the Central Mound area, immediately to the SE, three structures were built in the area of trench MEE (Mound East Extension), where previously in Period III, only one had stood (Warner 1994: 122-123). The three structures (MEE-a-1, MEE-a, MEE-b, all discussed in more detail below), which Warner (1994: 178) interprets as houses, are very close in size and shape to the general type of structures at Karataş from Periods III and V. They are notable, however, in that they represent the movement of the community to the foot of the Central Mound. In Period III, the largest part of the community was located to the SW of the Central Mound, with only one average sized structure (MEE-a-3), and the small 'fence houses' (fig. 12) in close proximity to the mound. Period IV pottery was found in trenches 34 and 49, indicating there may have been some residential areas in these locations as well (Warner 1994: 171).

Of the structures present in trench MEE, MEE-a-1 was built in the megaron style with its eastern side overlapping MEE-a-2 (which was in use during Period III, but removed to make space in Period IV) and its entrance pointing out towards the Central Mound (Mellink 1970:248).

MEE-a-1 was constructed out of mud slab bricks, while the other two new structures (MEE-b and MEE-c), not intact enough to determine architectural style, were constructed of pisé. The area had a disproportionately high amount of animal bones and spits leading the original excavators to suggest that it was a center for food preparation and perhaps "public festivities or gatherings" (Warner 1994:122).

The area of Trench 35/37 was used as a cemetery in Period IV, containing 59 tombs (Warner 1994: 171). Human remains were placed in pithoi and set with the openings facing the east (Wheeler 1974: 416). Prior to Period IV, the area of Trench 35/37 contained structures that are interpreted as domestic (fig. 15).

Mellink (1973:295) identified the structure atop the Central Mound, particularly in the earlier periods, as the residence of an elite. Warner (1994: 178) concurs, suggesting that the increase in houses in the area of trench MEE during Period IV may indicate a weakening of authority from the Central Mound, or at least a reduction in the sanctity of that space. Aslan (2000: 224) is more tentative, citing the lack of published information. She proposes that it could have been an area of community storage and ritual, a possibility born out by the presence of the large open space and considerable room dedicated to storage.

Period V was the longest of the three periods discussed in this research. It was broken down into 3 sub-periods, which are distinguished by the construction and usage of various structures (Warner 1994: 172). This period witnessed the paving over of the houses in Trench MEE and the eventual

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Figure 14 - Trench MEE, adjacent to SW corner of Central Mound. Shows features from Period V. Paved ramp is darker area at top.

abandonment of the Central Mound. It also saw a considerable expansion of the site to the NW and SE (Warner 1994: 121-122, 172). Structures continued to be megara and were approximately the same size as Period IV (fig. 16).

Trench 100, a space uninhabited during Period IV, became a very significant area towards the end of Period IV. The trench contained 4 structures, only one of which is confidently identified as being constructed of pisé. The SE area of the site shows signs of conflagration and great amounts of ash, causing excavators to postulate that the other three structures were made of wood. Evidence for their existence comes from fragments of clay partition walls, ash accumulation, furniture remains, domestic pottery, and a large amount of storage jars (Warner 1994:99-103).

No structures appear in trench MEE at this period (fig. 14), but a paved area was constructed with a 6 m. wide ramp leading up to the rise of the Central Mound. On top of the paved section, excavators uncovered over 100 grinding stones, many storage jars, pithoi, and several ovens. These discoveries led the original excavators to interpret the area as a bread making center, possibly serving the Central Mound before it was abandoned (Warner 1994:118,121).

Figure 15 - Trench 35/37, showing structures from Period VI

The transition to Period VI was marked by a change in ceramic style, with wheel made vessels, buff and red bowls, red platters, and double-handed tankards becoming prevalent

(Warner 1994: 173). Period VI had a smaller area of habitation than Period V, as well as a less well dispersed distribution of artifacts (see Appendix B). A considerable majority of artifacts were uncovered in trench 35/37, which had five structures, at least three of which can be confidently identified as megaron style (Warner 1994: 35-41).

3.3.2 Artifacts

The archaeological artifacts excavated include pottery, spindle whorls, loom-weights, beads, stamp seals, spit supports, fire-screens, pot supports, metal artifacts (including pins, needles, chisels, awls, and jewelry), ground and polished stone implements, chipped stone, worked bone and shell (Warner 1994: 194-214). A distribution table for these artifacts is laid out in Appendix B.

3.4 CONCLUSION

The excavations of Karataş were extensive and well organized. The focus of much of the published data deals with architecture (Warner 1979, 1992; Aslan 2003), for which the site has presented a great deal of evidence. Work has also been done cataloguing the metal artifacts at

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Figure 16 - Chart of house sizes from Periods III to IV

Karataş (Bordaz 1978).

The transitions between periods were generally noticeable through ceramic styles (Warner 1994: 171-173). Architecture did not change significantly, although the largest structures were built in Period V (fig. 16).

4.0 ANALYSIS

Evidence for textile production at Karataş comes from the tools related to this process that have been uncovered through excavation. These tools include spindle whorls, loom-weights, awls, and needles. By developing a clearer picture of how textiles were made, aspects of Karataş' community organization and structure can be inferred. This picture then becomes valuable when used to determine larger regional patterns and a clearer conception of how complex social organization occurred on a broad scale can be reached.

At Karataş, the most abundant information comes from spindle whorls. Using the data taken from the distribution of these whorls, the other tools of the textile production process (which are not nearly as abundant as whorls) can be used to clarify how this production system was organized and carried out.

The distribution of whorls in Period IV, clustered primarily in excavation trench MEE, argues for a high concentration of production activity and perhaps a communal centralization. In period V, a similar but reduced concentration exists in the same location. There is also, however, what appears to be the beginning of a decentralization, as additional whorls are found in a wider dispersal in the south-west area of the site. In Period VI, the area within trench MEE is completely abandoned, possibly in favor of a new area of centralization in the NW part of the site.

Within the trenches, there does not appear to be a correlation between whorl type and location. The two most common types, biconical and spherical, appear in a seemingly unordered distribution throughout the site.

The distribution map above (fig. 17) makes clear both the expansion of the site between Periods IV and V, and the outward spread of spindle whorls up through Period VI. In Period IV, the settlement does not extend far beyond the Central Mound although the area of trench 35/37 was used as a cemetery at this time with 59 tombs (Warner 1994:46). Initial observation makes it clear that textile production moved to the south-east in Period V and then began to move to the north-west, becoming almost exclusive to that section in Period VI.

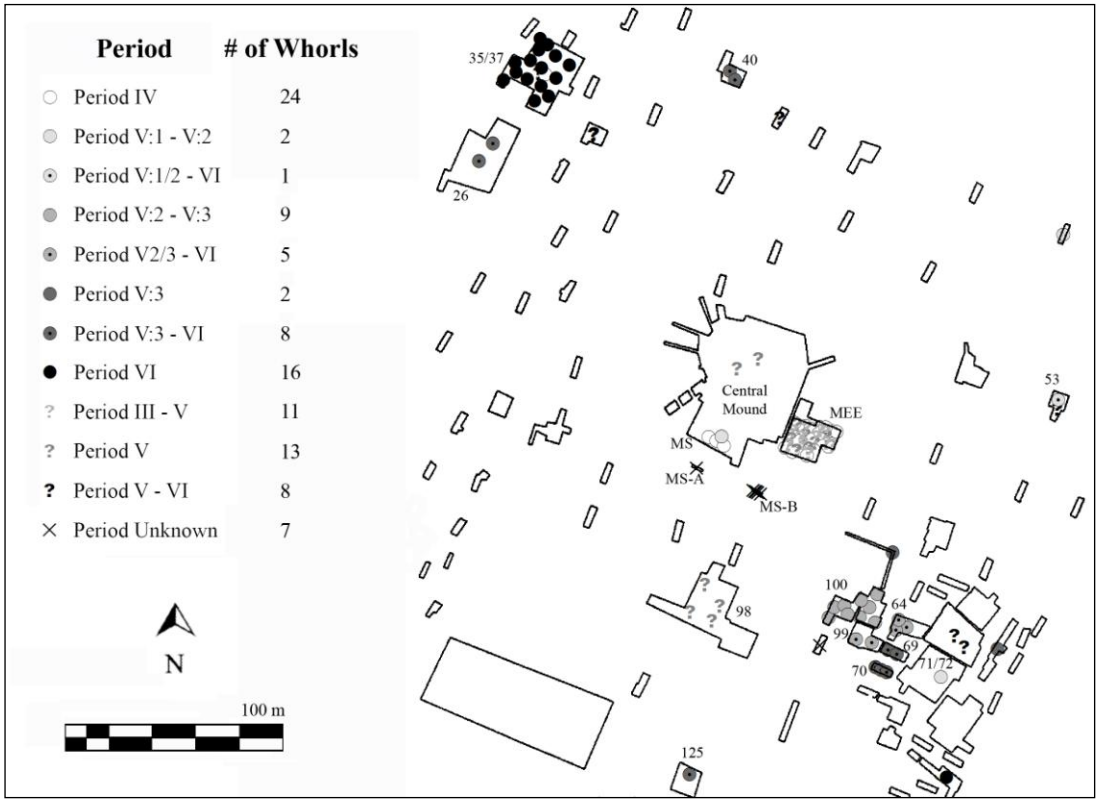

Figure 17 - Map of Karatas trenches illustrating trench location of all Karataş spindle whorls with physical provenience. Each symbol represents on whorl.

4.1 PERIOD IV SPINDLE WHORLS

The fourth phase of habitation at Karataş, Period IV, demonstrates a considerable concentration of whorls in the area of trench MEE (fig. 18), which is adjacent to the SE corner of the Central Mound. It also reveals what appears to be a reduction in the size of the settlement compared to Period III (fig. 11).

24 spindle whorls were found that were associated with Period IV. 20 of these whorls were found in one trench, Trench MEE. This is a ratio of one whorl for every 19.45 square m, the densest collection of whorls that was found at Karataş.

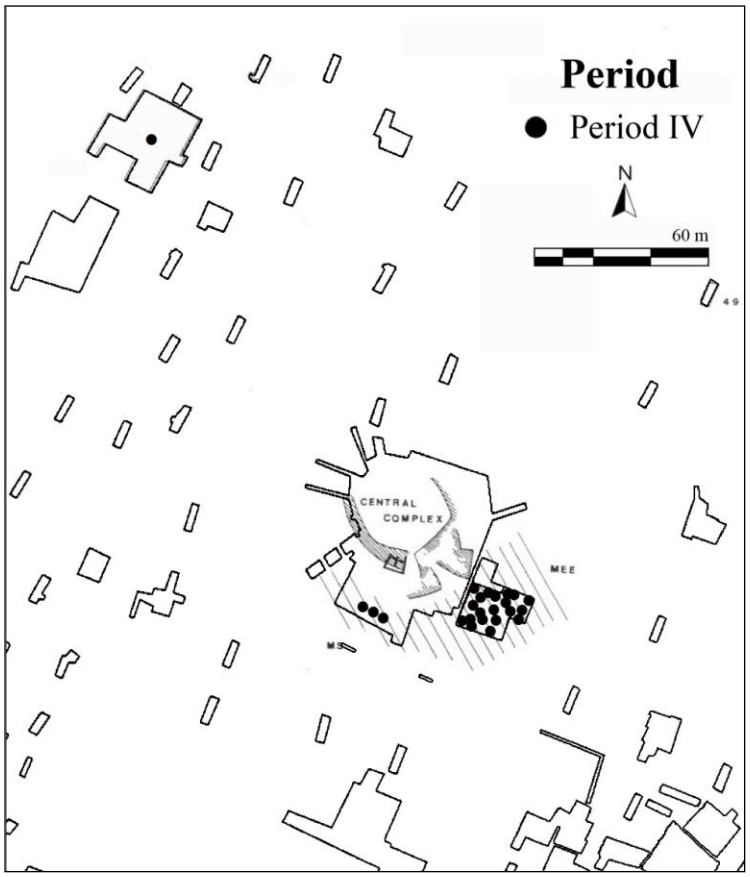

Figure 18 - Map of Karataş trenches illustrating trench location of Period IV spindle whorls. Crosshatch = area of habitation. Each circle represents one whorl. Whorl counts available in Appendix A.

While Period IV appears to have had a dense concentration of spinning activity, it must also be noted that the settlement covered a very small amount of space at this time. The population is very difficult to estimate due to the poor conditions of some of the structures, but considering population estimates for later periods, which are much larger, Period IV might easily have held less than 100 individuals.

4.2 PERIOD V SPINDLE WHORLS

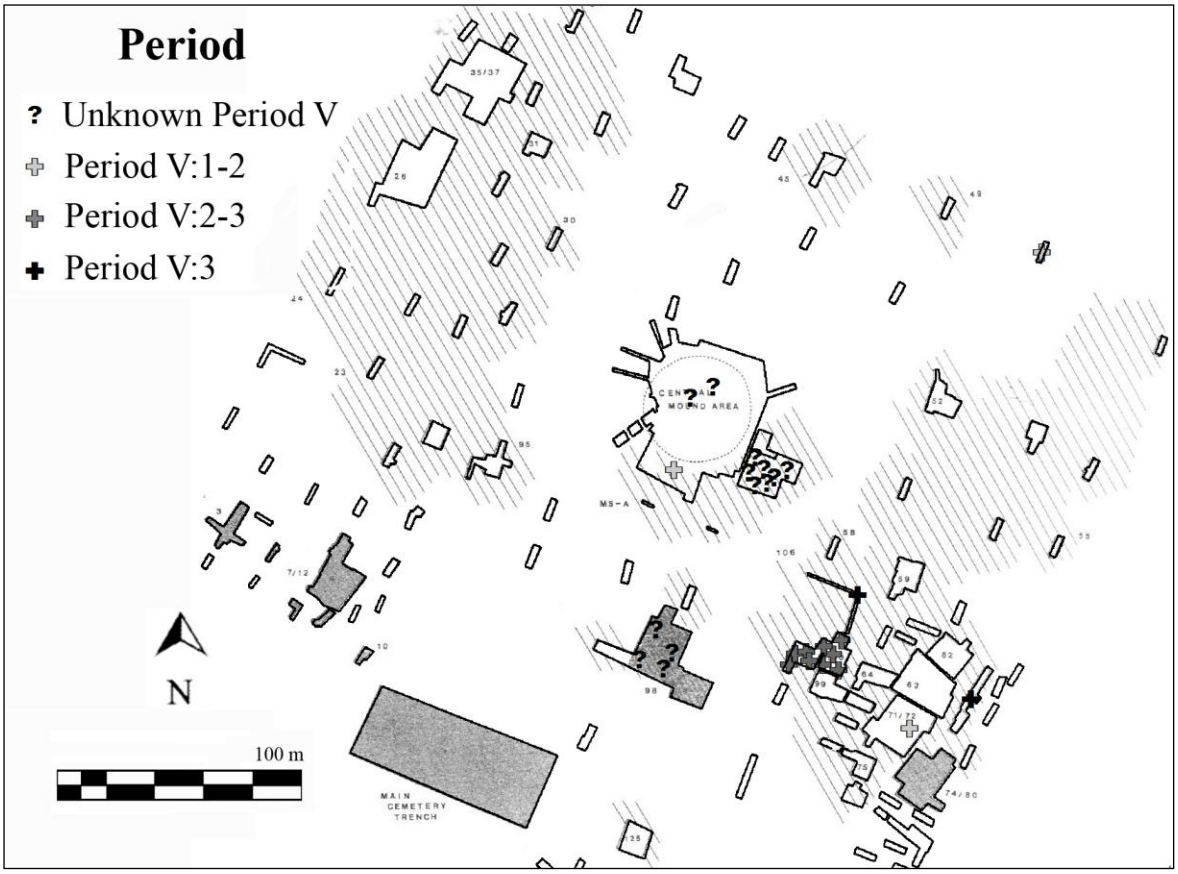

Figure 19 - Map of Karataş trenches illustrating trench location of Period V spindle whorls

Period V also presents a concentration of spindle whorls within trench MEE (fig. 19), although the collection is not as dense as in Period IV. Seven of the 24 whorls found for Period V came from trench MEE. MEE's surface area is 386 sq. m. giving it a ratio of one whorl every 55

square m. Trench 100 exceeded this number with nine whorls within its 315 sq. m. area, giving it a ratio of one whorl for every 35 sq. m., the highest of any trench in Period V.

Four whorls appear in trench 98 and a few whorls appear among the buildings to the south-east of the Central Mound, to the north and east of trench 100. Excavation found few architectural remains in trench 98, mainly wall fragments, preventing closer analysis of this trench (Warner 1994:97). The trenches excavated to the east of 98 indicate that textile production began to move away from trench MEE, and consequently the Central Mound, and possibly into individual residences (fig. 19).

4.3 PERIOD V-VI SPINDLE WHORLS

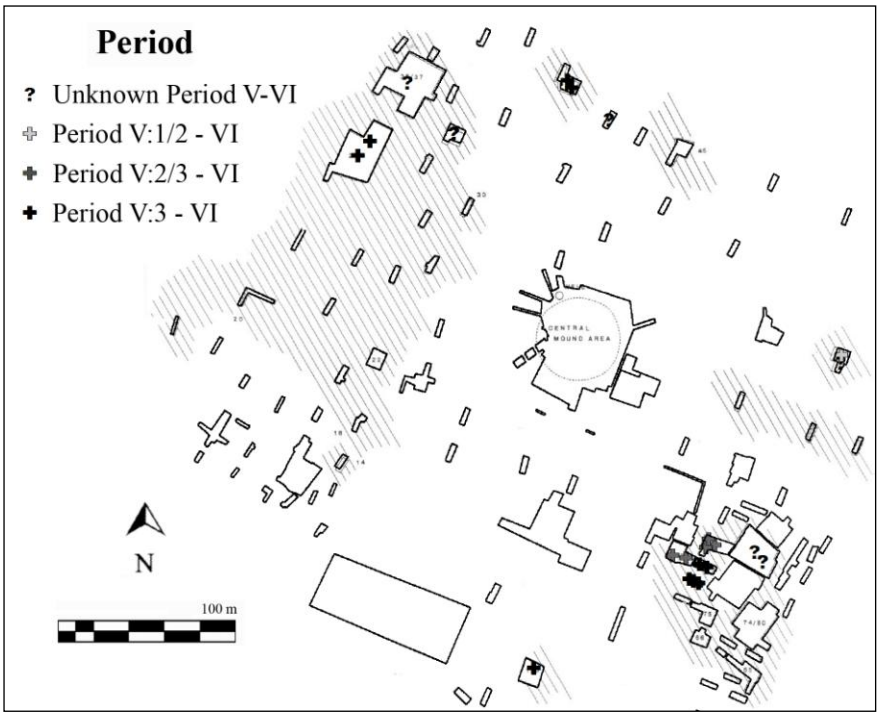

Figure 20 - Map of Karataş trenches illustrating trench location of spindle whorls that span Periods V and VI on top of habitation map of Period VI. Crosshatch indicates area of habitation. Each symbol represents one whorl.

Several areas of the site remained inhabited through Period V and into Period VI (fig. 11). These areas show a blend of the features found in each period as they continue the outward dispersal of horls initiated in Period IV as well as the new movement to the NW section of the site. The area to the south-east of the Central Mound continues to produce spindle whorls, whereas the areas to the north-west also begin to produce whorls, an occurrence much more prominent in Period VI.

Trenches 69 and 70 contained several whorls, though neither trench revealed identifiable architecture (Warner 1994:78-80). Trenches 26, 31, and 35/37 indicate an increase in textile production in the north-west section of the settlement. Domestic pottery and megaron style architecture were present in each trench and structures were made with stone foundations (Warner 1994:24-28, 30-33, 35-38).

4.4 PERIOD VI SPINDLE WHORLS

With the exception of trench 65, which comprised a single megaron style structure (Warner 1994:75), all whorls from Period VI appear in trench 35/37. The paved area in trench MEE is completely abandoned and spindle whorls have ceased to be associated with any other trenches from previous periods. Five megara appear in trench 35/37 (fig. 15), each built with stone foundations. In addition, two circular platforms were present, each over 2 m. in diameter, with no immediately recognizable function (Warner 1994:44-45). The concentration of whorls is high, with one whorl for every 46 square meters (fig. 21). More important is the type of whorl. Nine of the 17 whorls foundfor this period are lentoid whorls. Prior to Period VI, only two lentoid whorls have appeared at Karataş, one in late Period V and the second in the Period V-VI crossover.

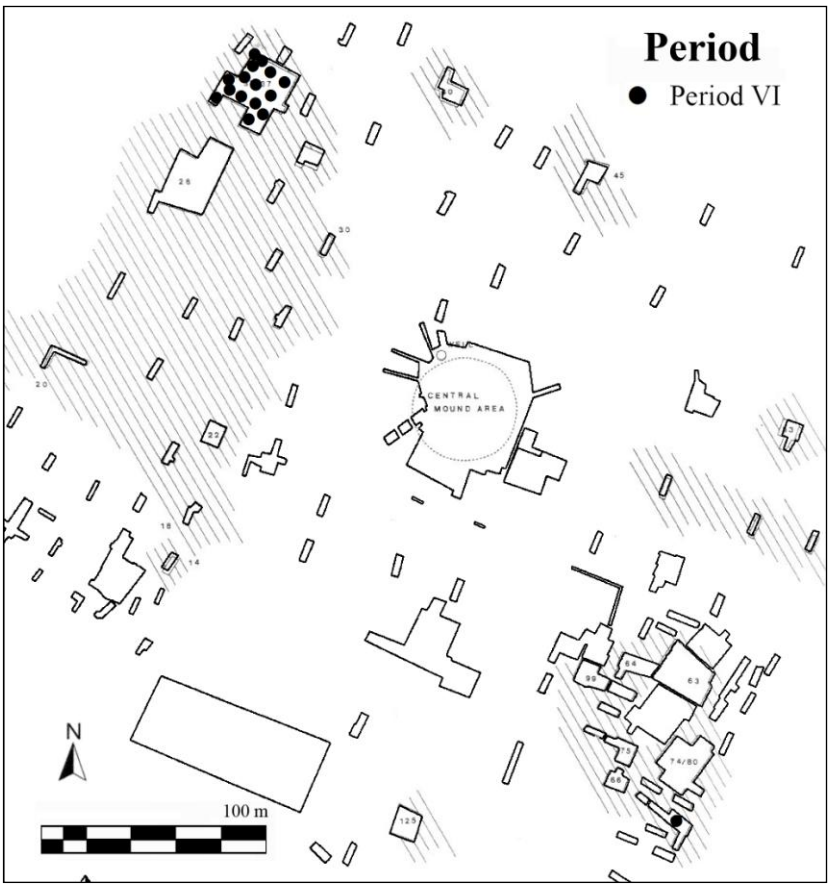

Figure 21 - Map of Karataş trenches illustrating trench location of spindle whorls associated with Periods VI. Crosshatch indicates area of habitation. Each circle represents one whorl.

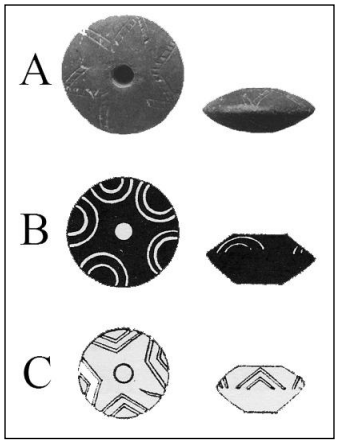

Figure 22 - A – Lentoid whorl from Karataş Period VI (early EBA III). B – Whorl from Beycesultan Level X (early EBA III). C – Whorl from Beycesultan Level IV (EBA III). (Adapted from Lloyd and Mellart 1962: 278 and Warner 1992: Plate 183)

The sudden appearance of lentoid type whorls presents an interesting parallel to Beycesultan, as this site also experienced the sudden prominence of a similar type of whorl at the contemporaneous levels X and IX (fig. 22), which the excavators interpreted as the presence of a new ethnic group. The switch to the thinner, wider whorl was more complete at Beycesultan, however, indicating a complete break from tradition (Lloyd and Mellart 1962: 277-278). Biconical whorls at Karataş are still very much present among the whorls from Period VI.

The population of Period VI is estimated to be less than that of Period V based on the number and average size of structures. Period V is estimated to have had 640 individuals that lived in the settlement (this figure does not include the central mound), whereas Period VI is estimated at 400 (Warner 1994:177). No estimations are available for Period IV.

4.5 OTHER ARTIFACTS

Loom-weights appear in clusters (fig. 23) at Trench 100 (five weights found by excavators at the bottom of a large jar dating to Period V), Trench 35/37 (seven weights of rounded-type dating to V:3), and Trench 69 (21 pyramidal loom-weights dating to period VI). Warner makes no mention of finding post holes in the immediate areas, which would have indicated the wooden structure of the looms.

A bent eye needle was found in Trench 100, and the fourth in Trench MEE. Of the perforated needles, one was found in Trench 63 and one in the Central Mound (Bordaz 1978: 239: 211-214). No information has been published describing the dating of these needles, but the needle from Trench 100 was most likely late Period V, as that is the period associated with other finds from this trench. Trench 63 does not have as narrow a chronological range, but can still be

comfortably placed within V-VI. Many spindle whorls and several loom-weights were also found in Trench 100, though just a single whorl and a single loom-weight were found in Trench 63. The needle from Trench MEE most likely came from Period V or earlier as this area of the site was abandoned after Period V. Numerous whorls have come from Trench MEE as well as two loom-weights. The needle from the Central Mound would also most likely have come from Period V or earlier for the same reasons.

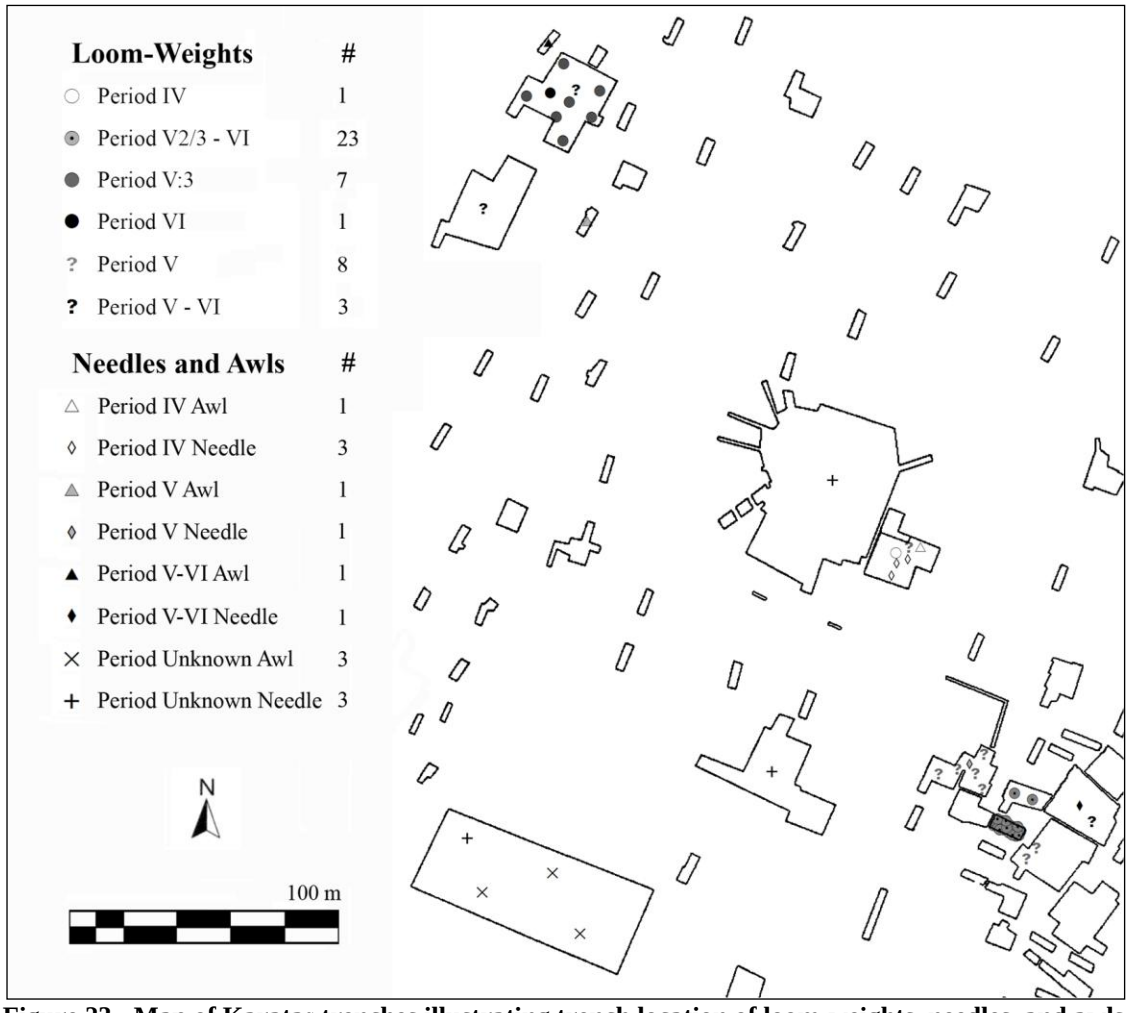

Figure 23 - Map of Karataş trenches illustrating trench location of loom-weights, needles, and awls from all Periods. Each symbol represents one artifact.

The final artifact that this research will use to examine textile production is not actually a tool used in the process. The distribution of stamp seals throughout the site (fig. 24) of Karataş matches that of spindle whorls fairly closely, suggesting that this industry was indeed one of export. Curiously, no stamp seals are found in 35/37 for Period VI.

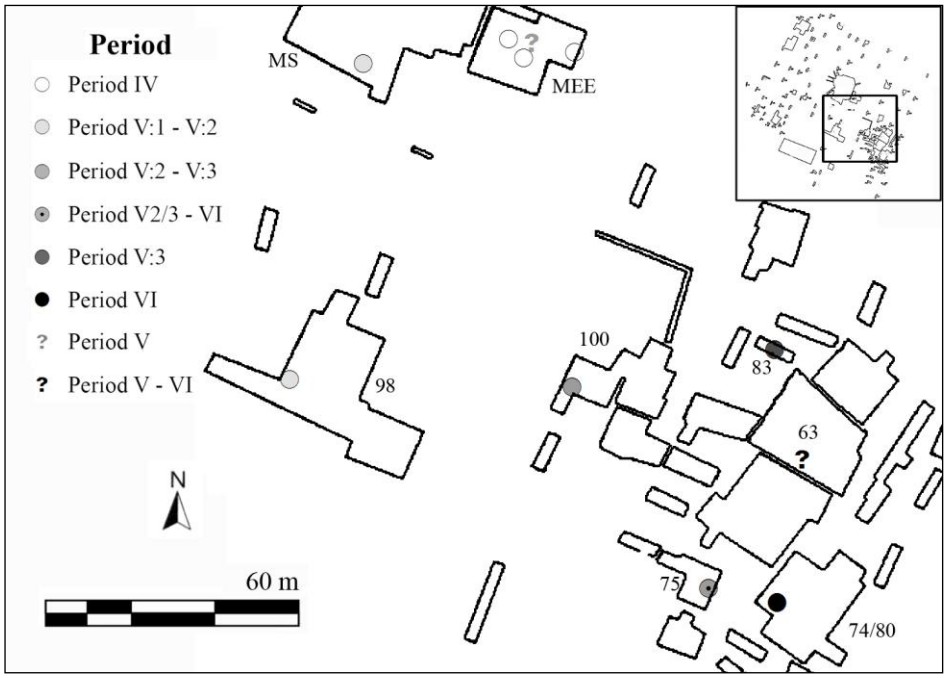

Figure 24 - Map of Karataş trenches illustrating trench location of stamp seals from all Periods. Each circle represents one stamp seal.

4.6 CONCLUSION

The spindle whorls of Karataş are useful in determining where and to what degree spinning activities occurred within the settlement. These factors in turn allow Costin's parameters of context, concentration, and scale to be better understood. A particular caveat, which is necessary to discuss briefly, is that the appearance of these whorls in these locations is not definitive evidence for textile production. The distributions that these maps illustrate are highly suggestive,

and when combined with the fact that textiles were certainly made somewhere at this site, excellent indicators of the most likely locations. The lack of abundant evidence related to the other tools necessary for textile production, however, weakens this argument. Karataş was a relatively small site and the methods of excavation were not geared specifically towards identifying centers of production. The distribution of whorls is far from a complete representation of what was occurring when Karataş was an active community, but it does provide a framework from which to develop more encompassing theories about the site's organization and the function of its various structures. This framework can then be tested against other forms of evidence from the site, and ultimately against neighboring sites for a more regional perspective. It is through these methods that this data can truly be used to its maximal capacity. This analysis, therefore, is in essence an initiating influence which may open queries about other dynamics present at the archaeological site of Karataş.

5.0 DISCUSSION AND CONCLUSIONS

Costin's (1991:27-28) discussion of specialized craft production functions primarily on a regional scale. She has identified, however, the value of applying it to a more local scale as well. The data available at Karataş is suited for interpretation through Costin's approach at a local scale, and is of great value in understanding craft production at this site.

The context parameter, which is used to distinguish between attached and independent specialization, (or more broadly, the socio-economic conditions of craft producers) is perhaps most identifiable in Period IV. This period places its center of production within trench MEE, a place associated with the possible home of an elite in the Central Mound. With the exception of grinding stones, the largest collection of which was also found in trench MEE (see Appendix B), there are no artifacts with a greater density than spindle whorls.

Costin's concentration parameter is perhaps the most immediately accessible aspect of her system of analysis. As this parameter examines the physical location of producers with relation to one another, the high density of Period IV's spindle whorl distribution within trench MEE contrasts significantly with the greater dispersal found throughout Period V. Both of these patterns differ again from what is found in Period VI, where fewer whorls are present and a possible new center for production appears in trench 35/37.

Finally, scale, which examines the number of individuals involved with production with respect to the over-all community size, is likely the last parameter of Costin's organization of

production that can be analyzed from the data at Karataş. Here again, significant changes occur throughout the site's history, with population rising and falling from Period IV to VI.

The last parameter, intensity, is not as easily determined at Karataş. Intensity focuses on the amount of time spent on crafted items and the degree of specialization that this time represents. Without the actual items, in this case the textiles, it is very difficult to estimate such information. In place of the textiles, the tools themselves can be analyzed for such features as standardization. While this approach is taken in this research, it is far from conclusive.

5.1 PERIOD IV

It is difficult to place the production of this particular period into Costin's multidimensional parameters. The data indicates that spinning occurred at least within the confines of trench MEE in period IV. Whether or not structure MEE-a-1 housed this work is indeterminable, but it is highly possible that textile production happened in this area and that the activity is indicative of the Central Mound's role in the community. The structural organization of this period places the greatest emphasis on the Central Mound structure (with the openings of several buildings in trench MEE facing it), as does the physical location of the spindle whorls. The (assumed) presence and upkeep of the Central Mound and the way structures are oriented towards it may be a reflection of a dependent relationship between textile producers and the mound's occupants. Attached specialization is associated with producers being dependent on elite support which is provided in such forms as work-shops, raw materials, and subsistence (Stein and Blackman 1993: 30). While the source of raw materials is impossible to determine, the proximity of the structures within trench MEE to the Central Mound may represent a possible 'work-shop' area

provided by an elite. Also, the evidence for bread making, identified by Warner in this area, may also be indicative of a center for food production. At the Neolithic Anatolian site Ulucak, near Izmir, 22 spindle whorls were uncovered in a room that also contained silos and an oven, indicating the possibility that cooking and textile production occurred there together (Çilingiroğlu 2009: 16-17). Likewise at Troy, spindle whorls have been found in main living areas (Richmond 2006: 217). These two cases may indicate household production only, however, as they do not demonstrate high scale production. At Karataş, it appears that something different is occurring with a possible center that was responsible for the mass production of both bread and textiles. The relationship between these two goods is not immediately clear, but further research may be able to establish a connection.

The examination of concentration provides further clarification on the details of textile production organization. The inclination is to argue that production is fairly nucleated, as many whorls appear within a relatively small surface area. Costin (1991: 13) states, however, that "the amount of nucleation is always relative to the areal extent of the society or region under study." Period IV presents the greatest concentration of spindle whorls, but, as was discussed in 4.1, the smallest inhabited area and presumably the smallest population. The ratio of whorls to living area is higher than any other time period which reflects both the large amount of whorls and the small size of inhabited space. This argues for a very high scale of production. Without enough data to derive estimates of population, village size is the only way to approximate the number of individuals living at any given time in Period IV. Estimation using village size must be relative and not quantitative. Relatively speaking, Period IV appears to be much smaller than Periods V and VI, yet has similar or higher frequencies of whorls. This attests to a much higher proportion of the population involved with textile production.

5.2 PERIOD V AND V-VI

Period V and the V-VI transition present a more dispersed arrangement of textile production and a lack of structures in the MEE trench. While the amount of whorls in trench MEE is still high in Period V (7 whorls), it is not as significant when compared to other, farther away trenches, such as 100 (9 whorls). Furthermore, the change in architectural material, from pisé to possibly wood and wattle and daub (Warner 1994:147), may reflect larger transitions in the community's organization. The transitions between each period at Karataş are not clearly discussed in the published literature, indicating that the exact nature of these transitions may be unclear. The transition from Period IV to Period V presents the most dramatic changes, from architectural material and size of the settlement to the distribution of spindle whorls. Presumably, the increase in settlement size was the result of a growth in population. Whether this was due to migration is unclear, but immigration does explain the rapidity of the site's expansion as well as the different artifact and architectural forms. As discussed in 4.4 (fig. 22), Beycesultan witnessed an influx of people with different artifact styles (and similar to those found at Karataş) at approximately the same time period.

The scale of production is much smaller in Period V as well as the transition between V and VI than it is in Period IV. Approximately the same amount of spindle whorls are dispersed over an inhabited area much larger than that of Period IV. This indicates a higher population utilizing a tool set approximately the same size as the previous, smaller population, and thus producing less thread per capita.

Periods V and V-VI are easier to identify with regards to context. With little to no evidence of elite involvement, these periods fit more easily into the definition of independent specialists. Textile production took place within homes and possibly within small community

centers (trenches MEE and 100), without any apparent affiliation with elites. Furthermore, the decrease in whorl diameters illustrates a potential shift in the desired type of thread which continued through into Period VI. While this shift is recognizable, it is at this point difficult to determine its motivation.

5.3 PERIOD VI

Period VI provides yet another transition in the site's spatial organization. Once again, textile production appears to be nucleated, or at least more so than Period V, within trench 35/37. The population is smaller than that of Period V, yet the proportion of whorls to individuals is roughly the same. If the whorls from Period V-VI are ignored, Period V had approximately 27 people per whorl, and Period VI had approximately 24 per whorl. Yet, Period VI's concentration indicates a higher scale of production as a greater number of producers would have worked in a smaller space.

This again suggests independent specialization, although of a more nucleated type than Period V. Whatever the role the Central Mound had in Period IV, it was completely diminished by Period VI, as the mound was no longer in use. As there is no evidence for the presence of an elite individual, it is possible that in Period VI production was centralized to fit the needs of the community, rather than the desires of an elite.

5.4 THE SPINDLE WHORLS

Costin (1991: 32) discusses indirect methods of identifying specialization, which may have some value to this present study. These are standardization, skill, and regional variation. Within the means of this research, standardization is the only method that can be applied to the archaeological assemblage at Karataş. Stein and Blackman (1993: 31) define standardization "as the relative degree of homogeneity or reduction of variability in the characteristics of an artifact or the process of achieving that relative homogeneity."

A small amount can be said about the shape of the whorls themselves, with regard to specialization and standardization. As mentioned earlier, at Karataş there are no remaining textiles from which to determine standardization. What does remain, however, are the tools. These can be examined as though they were goods themselves, although the weight that this analysis will have on standardization in general is considerably less than if the product itself were analyzed.

The collection of whorls from Karataş does not have published information on their chemical composition or surface decoration, but their height and maximum depth measurements are available. From these data, broad conclusions can be made about their levels of standardization. Of the six whorl types, biconical is the most common, appearing approximately 47% more often than the second most common, spherical, throughout the levels IV-VI of the site. Lentoid, as mentioned before, is mainly a product of Period VI. Examining each of these types of whorls with regard to their measurements and time period reveals that they are not particularly standardized. The chart below illustrates all major sets of whorls. From these measurements, the coefficients of variation can be drawn, which aid in determining the degree of standardization (Blackman et al. 1993:68).

Whorl Type	n	Mean	Standard Deviation	C.V.
P. IV Biconical Height	14	27.46	6.42	23.36
P. IV Biconical Max Depth	14	34.11	7.27	21.32
P. IV Spherical Height	8	25.00	6.46	25.83
P. IV Spherical Max Depth	8	29.69	8.01	26.99
P. V Biconical Height	13	22.00	6.40	29.11
P. V Biconical Max Depth	13	29.77	7.64	25.66
P. V Spherical Height	6	23.67	3.98	16.83
P. V Spherical Max Depth	6	25.50	3.62	14.19
P. V-VI Biconical Height	29	22.09	7.01	31.74
P. V-VI Biconcal M. Depth	29	28.86	7.14	24.72
P. V-VI Spherical Height	11	23.09	4.21	18.22
P. V-VI Spherical M. Depth	11	27.73	4.20	15.14
P. VI Lentoid Height	9	14.94	9.22	61.70
P. VI Lentoid Max Depth	9	29.56	6.41	21.67

Table 2 - Table illustrating number, mean, standard deviation, and coefficient of variation for spindle whorls. Measurements in millimeters. (Data from Warner 1994: 200-204)

The coefficients of variation are fairly high, suggesting that the spindle whorls were not made in a standardized way. Coefficients of variation lower than 10 are regarded as indicative of standardization, numbers higher than 10 are not (Stein and Blackman1993:38). Clearly, the numbers from the above chart are higher than 10, with spherical whorls coming the closest. This is expected, as the circular shape of the spherical whorls more readily lends itself to appearing standardized, as it is a very common shape.

While there does not appear to be any standardization among spindle whorls, the possibility of textile standardization is not eliminated. Whorls were tools, created one time to serve over many years, whereas the textiles they were used to produce were created at a much higher rate. The high density of spindle whorls in one area, most specifically trench MEE of Period IV, clearly indicates a centralization of labor. This centralization is never realized to the same degree after Period IV, although less intense versions of it appear in both Periods V (MEE)

and VI (35/37). Period V in particular provides evidence for household production, as whorls are found in the widest dispersal at this period, in the SE area of the settlement.

5.5 CONCLUSIONS

The data gleaned from Karataş indicates that the settlement underwent a unique series of socio-economic transitions. Starting with high scale, nucleated production and possibly attached specialization, the site witnessed a shift to a much lower scale, dispersed organization of production, and finally ended with a return to nucleation at a more medium scale prior to abandonment. The question remains, however: what was the degree of specialization at Karataş? In a broad perspective, Period IV may exhibit the lowest degree of specialization. While this period exhibits high concentration and a large scale of production, there was a higher ratio of producers to the overall population. This indicates that a larger proportion of the population was responsible for producing its own textiles, which placed less value on individual producers.

Scholars put forth two reasons for why specialization occurs. The first is that it simply is a more efficient method of creating goods. The second is that it produces higher quality goods (Wattenmaker 1998: 5). There is no evidence pointing to a higher quality of goods in Period IV. The textiles produced in this period may actually have been of a lower quality compared to later periods, due to the larger sizes of the whorls. Figure 7 illustrates that whorls became somewhat smaller in diameter into Periods V and VI. Smaller whorls make finer thread, which in turn makes finer textiles (Barber 1992: 52).

The desire to make textiles more efficiently is a more sustainable argument given the evidence. Regardless, Period IV may have been the closest Karataş came to having specialized

craft production, and in this case it was still in a fledgling state, as by Period V, there appears to have been a dissolution of concentration, scale, and intensity of production.

The high degree of community organization in Period IV appears to have created textiles in what Costin (1991:8) refers to as a nucleated workshop. Perhaps this organization was initiated by an elite from the Central Mound, and if this were the case, it may be more accurate to use Costin's (1991:9) term nucleated corveé labor. In either scenario, it appears that a greater surplus of textiles was produced in Period IV than the other periods.

Period V's greater dispersal and reduced association with the Central Mound also argue for a lower degree or even a lack of specialization. While the ratio of producers to consumers is lower, the intensity of social organization is missing. Costin's typology may label these production areas as either individual specialization, or dispersed workshops. The transition from Period V to Period VI sits neatly within the characteristics of each period. Unfortunately, there is no way to determine which period the whorls of this transition should fall under, although it is likely that many of them should be associated with Period VI, as they exist in contexts that last into this period.

Period VI then, presents an interesting case. Initially, it appears that a smaller scale nucleated workshop is present, but it may coexist with individual specialization as indicated by the whorls from Period V-VI. What may be additionally possible is that this new nucleation was an attempt to benefit from the value of centralized production. Richmond (2006:14) points out that in EBA Anatolia, the designation of specific areas for production within a settlement accompanied social growth. It is possible then that the organization that Period IV witnessed, which led to a surplus of textiles, thrust the settlement into Period V with a minor population boom, which could not be maintained due to a decrease in centralized organization. The reason

this loss of social hierarchy is difficult to surmise. The abandonment of the Central Mound provides information for when the loss occurred (early Period V), but is not forthcoming as to why. As population appears to be inversely related to centralization at Karataş, it is tempting to label it as the cause for the decline of complexity. Period VI then was the slow decline of the settlement prior to abandonment, with what may have been a community led attempt at centralizing production once more, perhaps in a community specialization organization.

	Context		Concentration		Scale		Intensity	
	Attached	Independent	Nucleated	Dispersed	Labor	Kin-Based	Part-Time	Full-Time
Individual		**P. V**		**P. V**		**P. V**	**P. V**	
Dispersed Workshop								
Community		**P. VI**	**P. VI**			**P. VI?**	**P. VI?**	
Nucleated Workshop		**P. IV?**	**P. IV**		**P. IV?**			**P. IV?**
Dispersed Corvee								
Individual Retainer								
Nucleated Corvee	**P. IV**							
Retainer Workshop								

Table 3 - Costin's parameters and terms for the organization of specialist production with periods from

Thus, a direct relationship between textile production and the beginnings of emergent complex society is supported. The erratic socio-economic conditions at Karataş (driven perhaps by fluctuations in population) prevented the settlement from continuing on an upward trajectory towards complex social organization, but the seeds for these developments are visible in the potential ties between community organization, craft production and population growth.

Richmond's study of textile production in Early Bronze Age Anatolia, which examined Troy, Alişar Höyük, and Sos Höyük, did not present results fitting the apparent pattern that took place at Karataş. By 'failing' to achieve the level of complex social organization that other Anatolian EBA sites were able to, Karataş presents itself as a valuable study. It illustrates an example of how the predicted progression towards complex society does not apply to all sites. Further research is necessary to truly derive the benefits of this analysis, which has exceptional relevance to the study of complex society in EBA Anatolia.

5.6 FUTURE DIRECTIONS

The research presented in this thesis represents an important step in the analysis and understanding of the site of Karataş. Further research, which will be conducted in the coming years, will attempt to build on the work completed here and fill in some crucial details related to the archaeological remains and how they can be interpreted.

One such continuation will involve other artifacts related to craft production and social organization. From the published reports on Karataş, analyses can be accomplished with regards to ceramic production and metallurgy, and possibly even feasting. This data will then be compared to the organization of textile production to develop a fuller understanding of how craft production on a broader basis was organized. By viewing Karataş as a multi-component society, the conclusions drawn through this thesis can be strengthened, modified, or abandoned.

Another essential future research direction involves a closer analysis of regional, contemporaneous archaeological sites. From this comparative approach, gaps in the data from Karataş can become less detrimental, as stronger inferences become available based on how

Karataş' neighbors engaged in their socio-economic systems. This comparative approach must start at a more micro-regional level, including southwestern Anatolia, but will also benefit from larger scale perspectives incorporating Mesopotamia and Egypt.

Pastoralism was almost definitely an important aspect of Karataş' economic sustainability and was largely untouched throughout this research. In many ways, pastoralism is difficult to access through the archaeological record present at Karataş, but this places added emphasis on a comparative approach which will aid in determining how nearby sedentary sites interacted with pastoralist groups. 'Nomads' have often been viewed as an invisible culture, although arguments against this belief have indicated that this is not necessarily true (Cribb 1991). A regional survey of the area around Karataş would likely reveal a lot in terms of settlement pattering and localities or habitation sites connected with mobile pastoralists. The lack of luxury items at Karataş may indicate that live-stock was the predominant form of wealth, if any form of wealth was present. Identifying a source of wealth will be of great value in determining the motivating factors that lead to the changes in Karataş' organization of production and domestic areas.

Identifying features of the geographic and physical organization is of high value, but so too is understanding elements of hierarchical organization. More data can be drawn from the Central Mound, though much of it is dependent on future publications, and how it relates to social organization. What is more immediately available, however, is information pertaining to gender. This was touched upon briefly in this research, but would benefit from a closer examination. Once again, this endeavor will be reliant on comparative studies to flesh out the data available at Karataş. Like the Central Mound, the cemeteries have not been published in full, but enough details are available to begin a preliminary study of how gender may have played a role in social stratification and complexity.

Finally, this research relies heavily on Costin's (1991) model for the organization of craft production. While this model is excellent, a re-examination of it with regards to what is found at Karataş would benefit the study over-all. Karataş, like all archaeological sites, has features that may not fit easily into the explanations laid out by Costin. Testing Costin's model to see how it could modified to better model the socio-economic processes and structure at this site will not only benefit research at Karataş, but also nearby sites that share Karataş' unique features; features that may be unique to Western Anatolia.

APPENDIX A

Data taken from Warner 1994: 200-204 .

Table lists trenches in which each whorl was found, the shape of each whorl (B – biconical, S – spherical, L – lentoid, G – globular, I – irregular, BX – biconvex), whorl measurements in millimeters, circumference based on height measurement, and volume based on circumference and maximum depth. Catalogue number has been assigned and created by author and period designation has been determined by author according to data presented by Warner 1994.

Catlg.			Shape			Max		
#	Period	Trench	BSLGI	Decorated	Height	Depth	Circumference	~Vol.
1	?	MS	B	Incised	27	38	119.38	3223.274
2	V-VI	31	L	Incised	12	28	87.96	1055.575
3	VI	35/37	G	Pointillé	25	42	131.95	3298.672
4	VI	35/37	B	Incised	24	30	94.25	2261.947
5	V3-VI	40	B	Incised	30	36	113.10	3392.92
6	VI	35/37	BX	Incised	11	24	75.40	829.3805
8	VI	65	B	Incised	27	39	122.52	3308.097
9	?	67	B	Incised	29	38	119.38	3462.035
10	V2-VI	99	B	Incised	16	22	69.12	1105.841
11	V3	85	B	Incised	38	40	125.66	4775.221
12	VI	35/37	BX	Incised	9	21	65.97	593.761
13	VI	35/37	L	Undecorated	8	29	91.11	728.8495
14	V	98	BX	Incised	21	38	119.38	2506.991
15	VI	35/37	L	Incised	11	32	100.53	1105.841
16	VI	35/37	L	Incised	27	27	84.82	2290.221
17	V3-VI	69	B	Incised	18	32	100.53	1809.557
18	V3-VI	70	B	Incised	33	26	81.68	2695.486
19	V2/3-VI	64	B	Incised	19	42	131.95	2506.991
20	VI	35/37	L	Incised	8	37	116.24	929.9114
21	VI	35/37	L	Incised	8.5	27	84.82	720.9955
22	VI	35/37	L	Incised	30	25	78.54	2356.194

23	V2/3	100	B	Incised	23	23	72.26	1661.903
24	V1/2	MS	L	Incised	11	21	65.97	725.7079
25	V2/3	100	B	Incised	21	35	109.96	2309.071
26	V	MEE	B	Incised	27	34	106.81	2883.982
27	V	MEE	S	Incised	21	26	81.68	1715.31
28	3-5	MEE	B	Incised	19	25	78.54	1492.257
29	IV	MEE	B	Incised	22	31	97.39	2142.566
30	IV	MEE	S	Incised	25	32	100.53	2513.274
31	IV	MEE	B	Incised	21	22	69.12	1451.416
32	IV	MEE	S	Incised	27.5	36	113.10	3110.177
33	IV	MEE	B	Undecorated	14	18	56.55	791.6813
34	V2/3	100	S	Incised	16	24	75.40	1206.372
35	V2/3	100	B	Incised	16	22	69.12	1105.841
36	3-5	MEE	S	Incised	21	26	81.68	1715.31
37	IV	MEE	B	Incised	31	42	131.95	4090.354
38	V	MEE	B	Incised	35	43	135.09	4728.097
39	3-5	MEE	B	Incised	32	41	128.81	4121.77
40	?	MS	S	Incised	14	18	56.55	791.6813
41	V2/3	100	I	Incised	24	38	119.38	2865.133
42	IV	MS	B	Incised	16	19	59.69	955.0442
43	V2/3-VI	64	B	Incised	16	22	69.12	1105.841
44	IV	MEE	B	Incised	23	31	97.39	2239.956
45	V3-VI	26	B	Incised	18	26	81.68	1470.265

46	V2/3	100	B	Incised	28	35	109.96	3078.761
47	3-5	MEE	B	Incised	29	37	116.24	3370.929
48	3-5	MEE	B	Incised	37	29	91.11	3370.929
49	IV	MEE	B	Incised	33	36	113.10	3732.212
50	3-5	MEE	S	Incised	28	32	100.53	2814.867
51	V3-VI	40	B	Incised	18.5	23	72.26	1336.748
52	?	MS	B	Incised	27	41	128.81	3477.743
53	IV	MEE	B	Incised	30	38	119.38	3581.416
54	IV	MEE	S	Incised	20	23.5	73.83	1476.549
55	?	MS	S	Incised	32	38	119.38	3820.177
56	IV	MEE	B	Incised	36	44	138.23	4976.283
57	IV	MEE	S	Incised	29	39	122.52	3553.141
58	IV	MEE	I	Incised	28	38	119.38	3342.655
59	V2/3	100	I	Incised	9	33	103.67	933.053
60	VI	35/37	L	Incised	8	25	78.54	628.3185
61	IV	MEE	S	Incised	27	31	97.39	2629.513
62	V	MEE	S	Incised	28	31	97.39	2726.902
63	IV	MEE	S	Incised	28	29	91.11	2550.973
64	3-5	MEE	S	Incised	32	38	119.38	3820.177
65	V2/3	100	S	Undecorated	22	24	75.40	1658.761
66	IV	MEE	S	Undecorated	35	39	122.52	4288.274
67	V3-VI	69	B	Undecorated	19	24	75.40	1432.566
68	IV	MS	B	Undecorated	18	23	72.26	1300.619

69	VI	35/37	B	Undecorated	17	26	81.68	1388.584
70	V	MEE	B	Undecorated	22	25	78.54	1727.876
71	V1/2	52	B	Undecorated	23	30	94.25	2167.699
72	?	MS	B	Undecorated	30	36.5	114.67	3440.044
73	V2-VI	99	B	Undecorated	31	37	116.24	3603.407
74	IV	MS	B	Undecorated	36	39	122.52	4410.796
75	VI	35/37	L	Undecorated	10	22	69.12	691.1504
76	V	MEE	B	Undecorated	25	35	109.96	2748.894
77	VI	35/37	L	Undecorated	24	42	131.95	3166.725
78	IV	MEE	B	Undecorated	25	28	87.96	2199.115
79	IV	MEE	S	Undecorated	26	36	113.10	2940.531
80	VI	35/37	S	Incised	31	31	97.39	3019.071
82	V	98	S	Incised	19	24	75.40	1432.566
83	V2/3-VI	64	B	Incised	23	24	75.40	1734.159
84	3-5	MEE	S	Incised	21	25	78.54	1649.336
85	V-VI	63	S	Incised	22	34	106.81	2349.911
86	V	MEE	B	Incised	26	36	113.10	2940.531
87	V-VI	42	B	Incised	25	33	103.67	2591.814
88	V-VI	63	S	Incised	30	33	103.67	3110.177
89	V1/2-VI	53	S	Incised	17	28	87.96	1495.398
90	IV	MEE	B	Incised	35	42	131.95	4618.141
91	V3	106	B	Incised	17	21	65.97	1121.549
92	V-VI	31	B	Incised	10	21	65.97	659.7345

93	V	98	S	Incised	29	29	91.11	2642.079
94	IV	MEE	B	Incised	27	36.5	114.67	3096.04
95	V-VI	70	S	Undecorated	23	31	97.39	2239.956
96	V3-VI	125	S	Undecorated	20	26	81.68	1633.628
97	3-5	MEE	B	Undecorated	20	26	81.68	1633.628
98	V3-VI	26	B	Undecorated	27	34	106.81	2883.982
99	V1/2	71/72	B	Undecorated	13	21	65.97	857.6548
100	V2/3	100	B	Undecorated	13	18	56.55	735.1327
101	V-VI	70	B	Undecorated	17	25	78.54	1335.177
103	V	98	S	Undecorated	21	22	69.12	1451.416
104	3-5	MEE	B	Undecorated	29	42	131.95	3826.46
105	3-5	MEE	I	Incised	?	?		
107	V	CM	?	Incised	?	?		
108	V	CM	?	Incised	?	?		
109	IV	35/37	?	Incised	?	?		
110	V-VI	35/37	?	Incised	?	?		

APPENDIX B

Data taken from Warner 1994: 194-214. Tables include most artifacts presented in Elmalı-Karataş II, though not representative of all artifacts discovered at the site of Karataş.

Periods IV, V, and VI are represented, as well as artifacts from contexts of uncertain provenience within Periods V and VI (marked Period V-VI). Categories are broken down into textile related artifacts discussed in text (spindle whorls, loom-weights, needles, awls), metal artifacts (pins, chisels, bracelets), stone artifacts (whetstones, hammer-axes, maceheads, scrapers, chipped stone tools, other), grinding implements (rubbing/polishing stones, pounders, grinding stones, slabs, mortars), stamp seals, worked shell and bone, ceramic items (jugs, pitchers, jars, bowls, pithoi, vessels), and fire pit objects (spit supports, firescreens, pot-supports).

APPENDIX B

Artifacts from Period IV

	Textile Production Related				Metal			Stone					
Trench	Spindle Whorl	Loom-weight	Needle	Awl	Pin	Chisel	Bracelet	Whetstone	Hammer-axe	Macehead	Scraper	Chipped	Other
MEE	20	1	2	0	2	0	1	1	1	4	0	0	1
MS	3	0	0	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0	0
35/37	1	0	0	0	0	0	0	0	0	0	0	0	0

Artifacts by percentage

	Textile Production Related				Metal			Stone					
Trench	Spindle Whorl	Loom-weight	Needle	Awl	Pin	Chisel	Bracelet	Whetstone	Hammer-axe	Macehead	Scraper	Chipped	Other
MEE	83.3	100	100		100		100	100	100	100			100
MS	12.5												
34													
48													
35/37	4.2												

Artifacts from Period IV

	Grinding Implements					Stamp Seal	Worked Shell/Bone	
Trench	Rubbing/Polishing Stone	Pounder	Grindng Stone	Slab	Mortar		Bone	Shell
MEE	0	0	0	0	0	3	2	5
MS	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0
35/37	0	0	0	0	0	0	0	0

Artifacts by percentage

	Grinding Implements					Stamp Seal	Worked Shell/Bone	
Trench	Rubbing/Polishing Stone	Pounder	Grindng Stone	Slab	Mortar		Bone	Shell
MEE						100	100	100
MS								
34								
48								
35/37								

Artifacts from Period IV

	Ceramic						Fire Pit Objects		
Trench	Jug	Pitcher	Jar	Bowl	Pithos	Vessel	Spit Support	Firescreen	Pot Support
MEE	2	4	0	2	1	2	2	0	0
MS	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0
35/37	0	0	0	0	0	0	0	0	0

Artifacts by percentage

	Ceramic						Fire Pit Objects		
Trench	Jug	Pitcher	Jar	Bowl	Pithos	Vessel	Spit Support	Firescreen	Pot Support
MEE	100	100		100	100	100	100		
MS									
34									
48									
35/37									

PERIOD V ARTIFACT TABLES

Artifacts from Period V

	Textile Production Related				Metal			Stone					
Trench	Spindle Whorl	Loom-weight	Needle	Awl	Pin	Chisel	Bracelet	Whetstone	Hammer-axe	Macehead	Scraper	Blades/Cores	Other
MEE	7	1	0	0	1	0		1	5	0	0	0	0
MS	0	0	0	0	0	0	1	0	0	2	0	0	0
CM	2	0	0	0	0	0	0	0	0	0	0	0	0
7/12	2	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0
35/37	0	7	0	0	0	0	0	0	0	0	0	0	0
38	0	0	0	1	0	0	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0	0	0	0	0	0	0
52	1	0	0	0	0	0	0	0	1	0	0	0	0
53	0	0	0	0	0	0	0	0	0	0	0	0	0
54	0	0	0	0	0	0	0	0	0	0	0	0	0
58	0	0	0	0	0	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0	0	0	0	0	0
71/72	1	2	0	0	0	0	0	0	1	1	0	0	0
74/80	0	0	0	0	0	0	0	0	0	0	0	0	0
82	0	0	0	0	0	0	0	0	0	0	0	0	0

83	0	0	0	0	0	0	0	0	0	0	0	0	0
85	1	0	0	0	0	0	0	0	0	0	0	0	0
93	0	0	0	0	0	0	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0	0	0	0	0	0	0
97	0	0	0	0	0	0	0	0	1	0	0	0	0
98	4	0	0	0	0	0	0	0	0	1	0	0	0
100	9	5	0	0	1	0	0	5	0	1	0	6/14	0
106	1	0	0	0	0	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0	0	0	0	0	0
M. Cemetery	0	0	0	0	0	0	0	0	0	0	0	0	0

Artifacts from Period V

	Grinding Implements					Stamp Seal	Worked Shell/Bone	
Trench	Rubbing/Polishing Stone	Pounder	Grindng Stone	Slab	Mortar		Bone	Shell
MEE	0	>4	>111	>5	>4	1	0	0
MS	0	0	0	0	0	1	0	0
CM	0	0	0	0	0	0	0	0
7/12	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0
35/37	0	0	0	0	0	0	0	1
38	0	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0	0
52	0	0	0	0	0	0	0	0
53	0	0	0	0	0	0	0	0
54	0	0	0	0	0	0	0	0
58	0	0	0	0	0	0	0	0
59	0	1	0	0	0	0	0	1
62	0	0	2	0	0	0	0	0
71/72	0	0	0	0	2	0	0	1
74/80	0	0	0	0	0	0	0	0
82	0	0	0	0	0	0	0	0
83	0	0	0	0	0	1	0	0

85	0	0	0	0	0	0	0	0
93	0	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0	0
97	0	0	0	0	0	0	0	0
98	0	0	0	1	0	1	0	0
100	0	0	0	4	2	1	0	0
106	0	0	0	1	0	0	0	0
125	0	0	0	0	0	0	0	0
M. Cemetery	4	0	2	2	0	0	0	2

Artifacts from Period V

	Ceramic						Fire Pit Objects		
Trench	Jug	Pitcher	Jar	Bowl	Pithos	Vessel/Cup	Spit Support	Firescreen	Pot Support
MEE	0	1	0	0	0	2	1	0	0
MS	0	3	1	0	0	0	0	0	0
CM	0	0	0	0	0	0	0	0	0
7/12	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0
35/37	2	1	0	3	0	1	0	0	0
38	1	0	0	2	0	0	0	0	0
51	0	0	0	0	0	0	0	0	0
52	0	0	0	0	0	0	0	0	0
53	0	0	0	0	0	0	0	0	0
54	0	0	0	0	0	0	0	0	0
58	0	0	0	0	0	0	0	0	0
59	1	3	1	1	0	0	0	0	0
62	0	0	0	0	0	0	0	0	0
71/72	5	6	3	3	0	0	2	0	0
74/80	0	0	0	0	0	0	0	0	0
82	0	0	0	0	0	0	0	0	0
83	0	0	0	0	0	0	0	0	0
85	0	0	0	0	0	0	0	0	0

93	0	0	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0	0	0
97	0	1	2	0	0	0	0	0	0
98	0	0	0	0	0	0	0	0	0
100	4	3	2	2	0	0	0	0	4
106	0	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0	0
M. Cemetery	9	9	6	3	0	0	1	0	0

Artifacts by percentage

	Textile Production Related				Metal			Stone					
Trench	Spindle Whorl	Loom-weight	Needle	Awl	Pin	Chisel	Bracelet	Whetstone	Hammer-axe	Macehead	Scraper	Blades/Cores	Other
MEE	25	6.7			50			16.7	62.5				
MS							100			40			
CM	7.1												
7/12	7.1												
25													
32													
35/37		46.7											
38				100									
51													
52	3.6								12.5				
53													
54													
58													
59													
62													
71/72	3.6	13.3							12.5	20			
74/80													
82													
83													
85	3.6												

93													
95													
97												12.5	
98	14.3											20	
100	32.1	33.3	100			50	100				83.3	20	100/100
106	3.6												
125													
M. Cemetery													

Artifacts by percentage

	Grinding Implements					Stamp Seal	Worked Shell/Bone	
Trench	Rubbing/Polishing Stone	Pounder	Grindng Stone	Slab	Mortar		Bone	Shell
MEE		>80.0	>96.5	>38.5	50	20	0	
MS						20		
CM								
7/12								
25								
32								
35/37								20
38								
51								
52								
53								
54								
58								
59		<20.0						20
62			<1.7					
71/72					25			20
74/80								
82								
83						20		
85								

93						
95						
97						
98				<7.7	20	
100				<30.8	20	
106				<7.7		
125						
M. Cemetery	100		<1.7	<15.4		40

Artifacts by percentage

	Ceramic						Fire Pit Objects		
Trench	Jug	Pitcher	Jar	Bowl	Pithos	Vessel/Cup	Spit Support	Firescreen	Pot Support
MEE		3.7				66	25		
MS		11.1	6.6						
CM									
7/12									
25									
32									
35/37	9.1	3.7		21.4		33			
38	4.5			14.3					
51									
52									
53									
54									
58									
59	4.5	11.1	6.6	7.1					
62									
71/72	22.7	22.2	20	21.4			25		
74/80									
82									
83									
85									

93								
95								
97		3.7	13.3					
98								
100	18.2	11.1	13.3	14.3				100
106								
125								
M. Cemetery	41.0	33.3	40.0	21.4	0	0	25	

PERIOD V-VI ARTIFACT TABLES

Artifacts from Periods V-VI

	Textile Production Related				Metal			Stone					
Trench	Spindle Whorl	Loom-weight	Needle	Awl*	Pin	Chisel	Bracelet	Whetstone	Hammer-axe	Macehead	Scraper	Blades/Cores	Other
21	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	?	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0
26	2	1	0	0	1	0	0	0	0	0	1	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	1	0
29	0	0	0	0	0	0	0	0	0	0	0	1	0
30	0	0	0	0	0	0	0	0	0	0	0	?	0
31	2	0	0	0	0	0	0	0	1	0	0	1	0
35/37	1	1	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	1	0	0	0	1	0	0	0	0	0
39	0	0	0	0	0	0	0	0	1	0	0	1	3
40	2	0	0	0	0	0	0	0	0	0	0	0	0
42	1	0	0	0	0	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0	0	0	0
53	1	0	0	0	0	0	0	1	0	0	1	5/6	1

55	0	0	0	0	0	0	0	0	0	0	0	?/1	0
56	0	0	0	0	0	0	0	1	0	0	0	0	0
57	0	0	0	0	0	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0	0	0	0	0	0
63	2	1	1	0	2	0	0	0	0	0	0	0	2
64	3	1	0	0	0	0	0	0	2	0	0	0	0
69	2	21	0	0	0	0	0	0	1	0	0	0	0
70	3	0	0	0	0	0	0	0	1	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0	0	0	0
99	2	0	0	0	0	0	0	0	0	0	0	0	0
125	1	0	0	0	0	0	0	0	0	0	0	0	0

Artifacts from Periods V-VI

	Grinding Implements					Stamp Seal	Worked Shell/Bone	
Trench	Rubbing/Polishing Stone	Pounder	Grindng Stone	Slab	Mortar		Bone	Shell
21	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0
28	0	1	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0
31	0	?	0	0	0	0	0	2
35/37	0	0	0	0	0	0	0	0
36	0	0	0	0	36	0	0	0
39	0	1	0	0	0	0	0	0
40	0	0	2	0	0	0	0	0
42	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0
53	0	0	0	1	0	0	0	0
55	0	0	0	0	0	0	0	0

56	0	0	1	0	0	0	0	0
57	0	0	1	0	0	0	0	0
59	0	0	0	0	0	0	0	0
63	0	0	2	0	1	1	0	1
64	0	0	0	0	0	0	0	0
69	0	0	1	0	1	0	0	0
70	0	0	0	0	0	0	0	0
75	0	0	0	1	0	1	0	0
99	0	0	0	0	0	0	1	0
125	0	0	0	0	0	0	0	0

Artifacts from Periods

V-VI

	Ceramic						Fire Pit Objects		
Trench	Jug	Pitcher	Jar	Bowl	Pithos*	Vessel/Cup	Spit Support	Firescreen	Pot Support
21	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0
26	2	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0
29	0	1	0	0	0	0	0	0	0
30	0	0	1	0	0	0	0	0	0
31	2	3	3	0	0	0	0	0	0
35/37	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0
39	0	0	0	1	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
42	0	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0
53	0	0	0	0	0	0	0	0	0

55	0	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0	0
57	0	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0	0
63	2	2	3	3	0	3	1	0	0
64	1	0	1	2	0	0	0	0	0
69	1	0	1	3	0	0	3	0	0
70	0	0	0	0	0	1	0	0	0
75	0	0	0	0	0	1	0	0	0
99	0	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0	0

Artifacts by Percentage

	Textile Production Related				Metal			Stone					
Trench	Spindle Whorl	Loom-weight	Needle	Awl*	Pin	Chisel	Bracelet	Whetstone	Hammer-axe	Macehead	Scraper	Blades/Cores	Other
21													
22													
23												5.6	
24													
26	9.1	4			33.3						50		
27													
28												5.6	
29												5.6	
30												5.6	
31	9.1								16.7			5.6	
35/37	4.5	4											
36				100				33.3					
39									16.7			5.6	50
40	9.1												
42	4.5												
43													
45													
53	9.1							33.3			50	61.1	16.7
55												5.6	
56								33.3					

57						
59						
63	4.5	4	100	66.7		33.3
64	13.6	4			33.3	
69	9.1	84			16.7	
70	13.6				16.7	
75						
99	9.1					
125	4.5					

Artifacts by Percentage

	Grinding Implements					Stamp Seal	Worked Shell/Bone	
Trench	Rubbing/Polishing Stone	Pounder	Grindng Stone	Slab	Mortar		Bone	Shell
21								
22								
23								
24								
26								
27								
28		33.3						
29								
30								
31		33.3						66.7
35/37								
36					94.7			
39		33.3						
40			14.3					
42								
43								
45								
53				50				
55								
56			14.3					

57	14.3				
59					
63	28.6	2.7	50		33.3
64					
69	14.3	2.7			
70					
75		50	50		
99				100	
125					

Artifacts by Percentage

	Ceramic						Fire Pit Objects		
Trench	Jug	Pitcher	Jar	Bowl	Pithos*	Vessel/Cup	Spit Support	Firescreen	Pot Support
21									
22									
23									
24									
26	25								
27									
28									
29		16.7							
30			11.1						
31	25	50	33.3						
35/37									
36									
39				11.1					
40									
42									
43									
45									
53									
55									
56									

57						
59						
63	25	33.3	33.3	33.3	60	25
64	12.5		11.1	22.2		
69	12.5		11.1	33.3		75
70					20	
75					20	
99						
125						

PERIOD VI ARTIFACT TABLES

Artifacts from Periods VI

	Textile Production Related				Metal			
Trench	Spindle Whorl	Loom-weight	Needle	Awl	Pin	Chisel	Blade	Bracelet
14	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	1	0
20	0	0	0	0	0	0	0	0
35/37	16	0	0	0	1	0	1	0
65	1	0	0	0	0	0	0	0
66	0	0	0	0	0	0	0	0
69	0	0	0	0	0	0	0	0
74/80	0	0	0	0	0	0	0	0
78	0	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0	0

Artifacts by Percentage

	Textile Production Related				Metal			
Trench	Spindle Whorl	Loom-weight	Needle	Awl	Pin	Chisel	Blade	Bracelet
14								
17								
18							50	
20								
35/37	94.1				100		50	
65	5.9							
66								
69								
74/80								
78								
98								

Artifacts from Periods

VI

	Stone					
Trench	Whetstone	Hammer-axe	Macehead	Scraper	Blades/Cores	Other
14	0	0	0	0	0	0
17	0	0	0	0	0	0
18	0	0	0	0	0	0
20	0	0	0	0	0	0
35/37	7	4	0	0	0	2
65	0	0	0	0	0	0
66	0	0	0	0	0	0
69	0	0	0	0	0	0
74/80	0	0	0	0	0	0
78	0	1	0	0	0	0
98	0	0	0	0	0	0

Artifacts by Percentage

	Stone					
Trench	Whetstone	Hammer-axe	Macehead	Scraper	Blades/Cores	Other
14						
17						
18						
20						
35/37	100	80				100
65						
66						
69						
74/80						
78		20				
98						

Artifacts

Periods VI

	Grinding Implements					Stamp Seal
Trench	Rubbing/Polishing Stone	Pounder	Grindng Stone	Slab	Mortar	
14	0	0	0	0	0	0
17	0	0	0	0	0	0
18	0	0	0	0	0	0
20	0	0	0	0	0	0
35/37	1	0	<15	<5	0	0
65	0	0	0	1	1	0
66	0	0	3	0	0	0
69	0	0	0	0	0	0
74/80	0	0	0	0	0	1
78	0	0	0	0	0	0
98	0	0	0	0	0	0

Artifacts by Percentage

	Grinding Implements					Stamp Seal
Trench	Rubbing/Polishing Stone	Pounder	Grindng Stone	Slab	Mortar	
14						
17						
18						
20						
35/37			<83.3	<8.33		
65				>1.7	100	
66			>16.7			
69						
74/80						100
78						
98						

Artifacts from Periods VI

	Worked Bone & Shell		Ceramic					
Trench	Bone	Shell	Jug	Pitcher	Jar	Bowl	Pithos*	Vessel/Cup
14	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	1	0	0	0	0	0
20	0	0	0	0	0	0	0	0
35/37	0	0	0	3	1	2	0	2
65	0	0	0	0	0	0	0	0
66	0	0	0	1	0	0	0	2
69	0	0	0	0	0	0	0	0
74/80	0	0	0	0	1	1	0	0
78	0	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0	0

Artifacts by Percentage

	Worked Bone & Shell		Ceramic					
Trench	Bone	Shell	Jug	Pitcher	Jar	Bowl	Pithos*	Vessel/Cup
14								
17								
18			100					
20								
35/37				75	50	66.7		50
65								
66				25				50
69								
74/80					50	33.3		
78								
98								

Artifacts from Periods VI

	Fire Pit Objects		
Trench	Spit Support	Firescreen	Pot Support
14	0	0	0
17	0	0	0
18	0	0	0
20	0	0	0
35/37	0	1	1
65	0	0	0
66	0	0	0
69	0	0	0
74/80	0	0	0
78	0	0	0
98	0	0	0

Artifacts by Percentage

	Fire Pit Objects		
Trench	Spit Support	Firescreen	Pot Support
14			
17			
18			
20			
35/37		100	100
65			
66			
69			
74/80			
78			
98			

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