

PATTERNS OF STRUCTURE: THE FIBER ARTIFACTS OF LA TIZA

by

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DEDICATION

I dedicate this work to my grandmother, Betty Jean Newman.

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CHAPTER I

INTRODUCTION

For decades, technology and fabric scholars have proposed that pre-Hispanic Andean fabrics, especially textiles, were a medium for communication that conveyed meaning not just through design and iconography. Structure was also essential to the message (Lechtman 1993; Conklin 1997; Frame 2001a). The degree of integration of structure and artistic/cultural expression in pre-Hispanic Andean craft is far removed from the post-industrial, Western models that dominate our modern material culture. Thus, it can be difficult for scholars to grasp the importance of fiber structures as a conscious expression of worldview and identity. The aim of the research presented here is to take this idea of fabric structure as a medium for communication and apply it to a highly fragmented assemblage that has been archaeologically recovered to determine if structural changes substantiate the results of other lines of analysis.

The site in question is La Tiza, a large (approximately 30 ha) site located near the confluence of the Aja and Tierras Blancas rivers and near the modern town of Nasca, Peru. The site consists of several domestic and mortuary components dating from the Middle Archaic to the Late Intermediate Period (LIP going forward) and possibly into the Late Horizon (Conlee 2011, 2010a, 2015) (3600 BC – AD 1532). Unfortunately, we only have a fraction of the fabrics and textiles produced during the occupation of La Tiza and very little of that is more than small fragments. Even that small amount is rare in the context of world archaeology and worth exploring for what information it may yield.

The next chapter (II), defines the basic fabric terms. Chapter III recounts the history of fabric craft traditions along the Andean coast. It begins broadly before switching to a more narrow regional focus: the fabric traditions in the Nasca region from the Paracas Culture through the LIP. Chapter III concludes with a summary of the theory behind the current investigation. The next Chapter (IV) is a condensed account of La Tiza. Chapter V outlines the research design and methods for collecting and analyzing the data from the fabrics. Chapter VI presents the results, chronologically organized, followed by the discussion of those results and some concluding remarks in Chapter VII. A more detailed presentation of the results (with photos of the specimens), organized by unit number, is contained within the Appendix.

CHAPTER II

BASIC TERMINOLOGY

At the start, it will be helpful to define some of the general terminology that is used to describe fiber artifacts as there are distinctions between the terms as they are used in a technical sense and the common usage. Emery's *The Primary Structures of Fabrics: An Illustrated Classification* (1966) is the most widely utilized reference guide for fabric and textile discussion (King 1983; Rowe 1984b; Splitstoser 2012) and the following definitions are closely aligned with hers with some deviations, as noted. The term *fabric* encompasses all fiber constructions and includes the varied and overlapping categories of textiles, felts, nets, cordage, and many other groups (Emery 1966:xvi; Seiler-Baldinger 1994). *Cloth* and *basketry* are both categories of fabric structures differentiated by their relative rigidity. Basketry is more rigid and cloth more pliable, and due to the variable qualities of the materials used to construct fabrics, the boundary between the two is somewhat subjectively determined (Emery 1966). Additionally, basketry is generally constructed without the aid of a loom or frame (Adovasio 1977).

The most basic division in fabric structures is between those “composed directly from fibers or fibrous material,” or single element structures (*e.g.*, single- and multiple-ply yarns and felts) (Emery 1966:xvi, 17), and interworked structures. *Interworked structures* are constructed of prepared elements and can be sub-categorized based on how many sets of elements are present and how the elements articulate. *Elements* are simply the individual components of an interworked fabric that can be more or less complicated (*i.e.* number of plies) based on their own structure. The most common types are unspun

fiber or fibrous material (single strand or combined strands that may be twisted together), spun yarns (single- or multiple-ply) that can compose an individual unit or be combined into units comprising multiple yarns, and cords (Emery 1966). Clark (1993:522) places the division between yarns and cords at around 1 mm. However, *yarns* are single element spun fiber structures; *cords* can be either single element or an interworked (braided) structure. *Ropes* are defined as having a diameter over 8 mm and have the same structural diversity as cords. All three are grouped together under the term *cordage*. Emery (1966:9) defines *spinning* as “the process of twisting together and drawing out massed short fibers into a continuous strand.” That strand is referred to as a single *ply*. Plies can be combined by twisting, or plying, usually in the opposite direction of the original spin. Yarns can be re-plied adding layers to the structure (Figure 2.1) (Emery 1966).

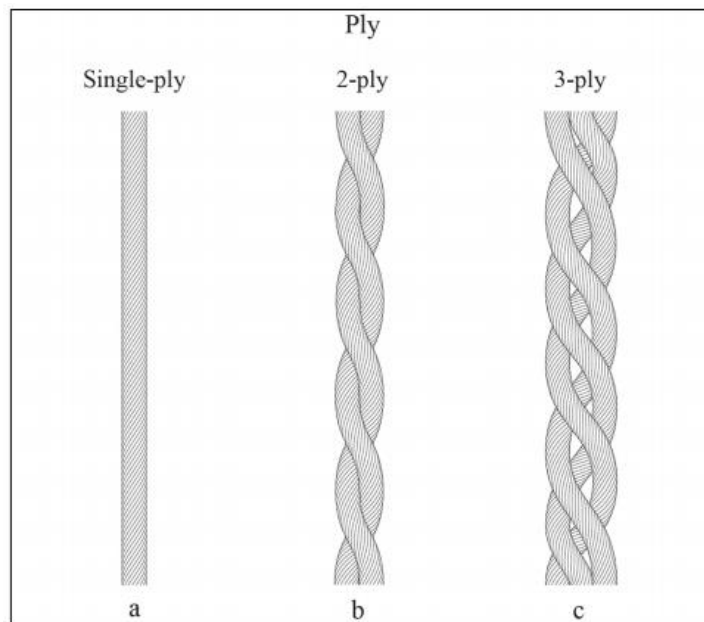


Figure 2.1 Diagram of Plies (Splitstoser 2012)

There are categories of fabrics composed of single elements interworked with themselves, a group that includes *knots* and *netting* (Emery 1966). *Sets of elements* are “a group of such components all used in a like manner, that is, functionally undifferentiated

and trending in the same direction” (Emery 1966:27). *Braided, plaited, or macramé (interknotted) structures* are composed of one set of elements. Braid and plait are commonly applied to disparate and overlapping structures within this category and are, therefore, less useful to describe specific structures. (Emery 1966; Rowe 1984b). However, here, the terms, especially braid, will be used in conjunction with the specific structural terms due to their strong cultural resonance. Plaiting is commonly applied to structures of all dimensions. Braiding is generally applied to narrow bands in which one set of elements is interworked and the term can be applied to many different types of interworking. *Oblique interlacing*, which often takes the form of a braid, describes a structure in which individual units from one set of elements are brought over and under each other, turning over at oblique angles to the selvages, or self-finished edges, creating a flat band or strap (Figure 2.2) (Emery 1966; Rowe 1980, 1984b).



Figure 2.2 Flat Oblique Interlacing (Emery 1966; Speiser 2011 [1983])

When there are two or more sets of individual elements that are interworked at 90 degree angles, the two are differentiated into *warp* and *weft* elements. Warps are elements aligned in one direction that are anchored to the loom and generally referred to as the vertical or longitudinal elements. Wefts, the horizontal or transverse elements, are woven

in at perpendicular angles to the wefts (Figure 2.3) (Emery 1966). Fabrics that are composed of one set of warp and one set of weft elements are called *simple structures*. Interworked fabrics that are composed of more than one set of either or both the warp or weft elements are called *compound structures*. This includes double- and triple-cloths (Figure 2.4) (Emery 1966; Harcourt 1962). *Textiles* are cloth fabrics constructed of at least one set each of warps and wefts that have been woven together. *Weaving*, or *warp-weft interlacing*, is the process by which the warp and weft elements are brought over and under keeping a simple, rectilinear structure (Emery 1966; Good 2001). In this discussion, textile will adhere to this specific technical definition unless otherwise noted.

Fabrics that have many characteristics in common with true woven textiles, especially those that function in similar ways, are casually called textiles and this usage has some utility as will be demonstrated later. *Twined fabrics* are differentiated from woven fabrics in that at least one set of elements, either the warp or the weft, spirals around the other set of elements (Figure 2.5) (Emery 1966).

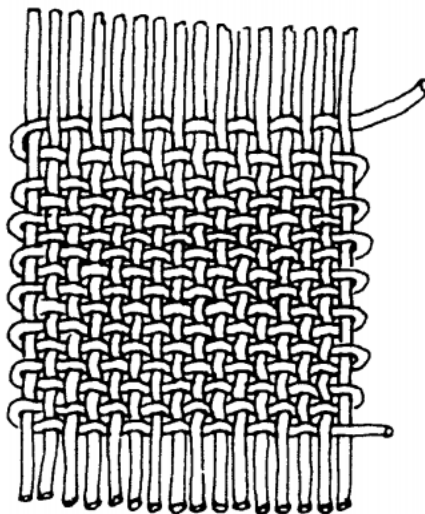


Figure 2.3 Illustration of Warp Being Woven Through Wefts (Rehl 2002:436)

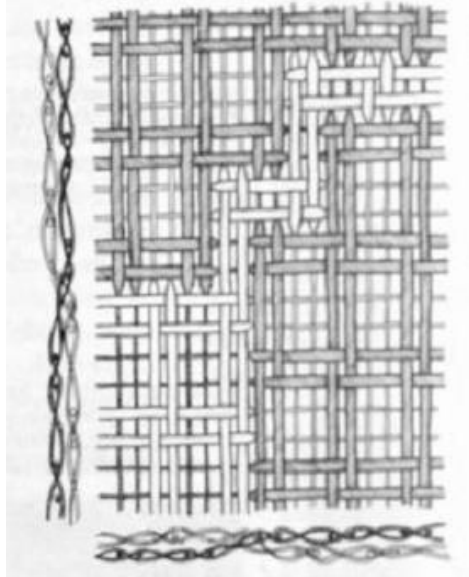


Figure 2.4 Diagram of a Plain Weave Double-Cloth (Cahlander and Baizerman 1985:16)

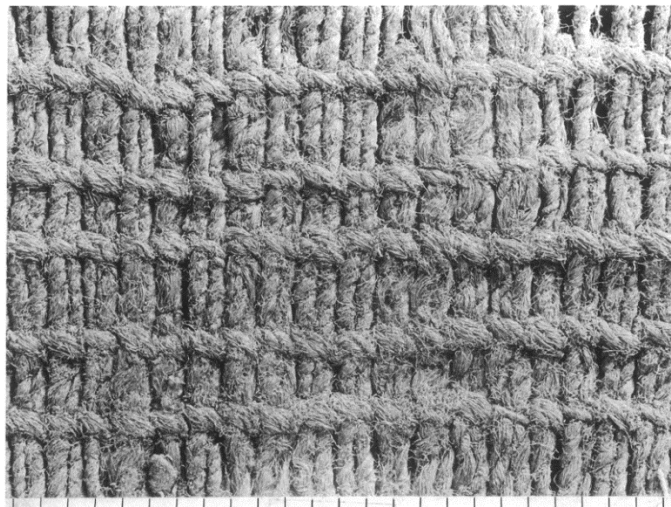


Figure 2.5: Twined Fabric from Huaca Prieta (Bird et al. 1985:116)

CHAPTER III

PRE-HISPANIC FABRIC TRADITIONS OF THE ANDEAN COAST

Thanks to dry conditions favorable to preservation, cordage, basketry, textiles, and other fabrics are relatively abundant in the archaeological record along the desert coasts of Ecuador, Peru and northern Chile. This chapter reviews the current theories regarding the development and introduction of fabric technologies in the region, beginning with the origins of domestication of raw materials. It will also cover the coastal development of new technologies and changes in preference throughout time and space that coincide with cultural patterns and events. There will then be a focus on the fabric traditions of the Nasca region from the Paracas culture through the LIP.

THE COAST

The Pacific coastline of the Andean region has been termed the *chala* and extends from sea level to approximately 500 m asl (Figure 3.1) (Pulgar Vidal 1987; Sandweiss and Richardson 2008). This geographic zone encompasses the coast that begins in Ecuador and extends through Peru and into northern Chile. The desert coastline begins in Southern Ecuador and becomes drier and more extreme the farther south one travels (Sandweiss and Richardson 2008). Rivers bringing water from the mountains cross the desert and create corridors of arable land which were eventually widened due to irrigation agriculture (Sandweiss and Richardson 2008; Silverman and Proulx 2002). These arable lands were not only a source of raw materials for fabrics but are one of the critical components of the infrastructure of the complex civilizations that emerged along the

coast, although the exact magnitude of importance is difficult to pin down (Moseley 1975, 1992; Quilter et al. 1991; Haas and Creamer 2006).

The next highest ecological zone, the *yunga*, which on the Pacific face on the Andes is located between 500 and 2300 m asl. This arid region is dissected by numerous dry ravines, *quebradas*, and steep river valleys where agriculture is possible (Pulgar Vidal 1987; Sandweiss and Richardson 2008). La Tiza, between 700 and 750 m asl, is located within this zone.

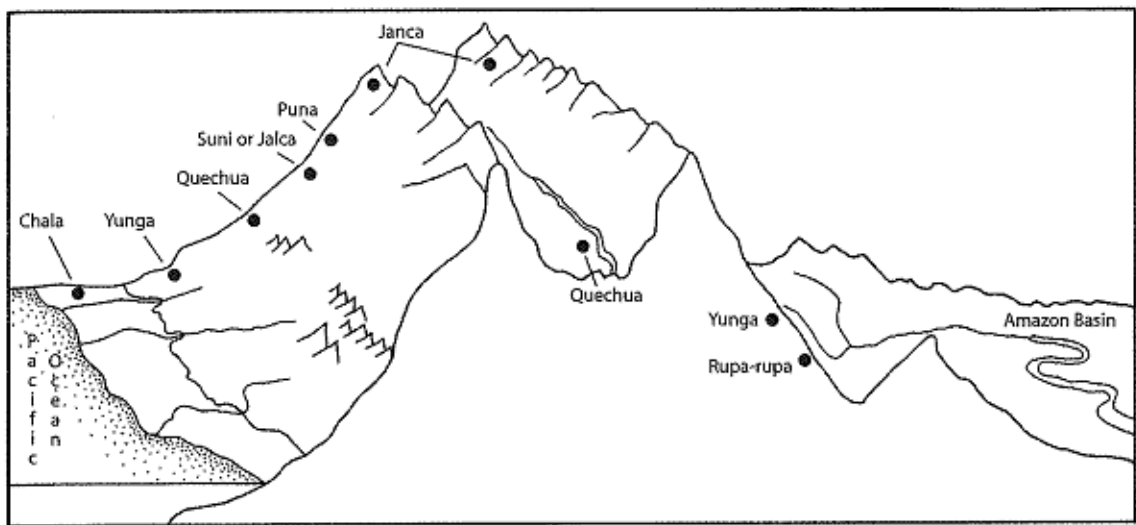


Figure 3.1 Pulgar Vidal's Environmental Zones (Sandweiss and Richardson 2008:95)

FIBER

It is likely that fiber processing technologies existed before humans reached the Americas. However, the supporting evidence is scant and most of the discussion, especially of spinning technique development, is based on inferences derived from ethnographic and experimental studies (Raymond 1984; Rodman 2000; Tiedemann and Jakes 2006). The method of spinning fibers by rolling them against the thigh has worldwide distribution and was probably the earliest method developed independently by many spinning traditions, as it can be achieved without the use of any additional tools

(Bird 1979; Rodman 2000; Tiedemann and Jakes 2006). Thigh spinning is most effective with longer fibers such as bast and bark fibers and some wools (Tiedemann and Jakes 2006).

According to Bird (1979), fourcroya (*Furcraea andina* and *Furcraea occidentalis*) was probably one of the first fibers available for use along the desert coast of Peru. It is classified as a *leaf* fiber (“from the leaves of monocotyledonous plants”; Emery 1966:5) as opposed to bast (stalk – *e.g.*, linen or flax), bark, or seed (*e.g.*, cotton) fibers. Fourcroya is similar to, or in the same family as, yucca and agave and was probably sourced from the *lomas*, communities of plants fed by fog on the otherwise sparse arid landscape (Reeves 1971). It has commonly been recovered as cordage or in net-worked fabrics. Although there are rare examples in which the fiber was used in warp and weft weaving (Bird 1979). Very few bast fibers are thought to have been available along the desert coast. *Asclepias* (milkweed) vine is the only one that has been identified with any confidence and it was generally spun with cotton fibers (Bird 1979). Human hair was also used, seemingly opportunistically (Bird 1979). The two most important sources of fiber in the pre-Columbian Andes were cotton and camelid wool (Bird 1979). *Oldest Fiber Specimens in the Andes.*

The current oldest fabrics that have been directly dated come from Guitarrero Cave and date between 12,100 and 11,100 cal BP. The specimens are all fragments of twined constructions made from *Agavaceae* (agave or yucca), *Bromeliaceae* (bromeliads), and *Cyperaceae* (rushes) fibers. They are probably from bags, clothing, and matting and were found in layers that also produced cordage and knots (Jolie et al. 2011). Impressions from cordage have been observed on material recovered from the Monte

Verde site in Chile and possibly date to around 14,500 cal BP (Jolie et al. 2011; Adovasio 1997). Other exceptional dates for fabrics include knots from Quebrada Jaguay along the southern coast of Peru which have been indirectly dated to around 10,600 cal BP and fabrics from Paloma, Peru which have been directly dated to around 8,800 cal BP (Sandweiss et al. 1998; Jolie et al. 2011).

Cotton Domestication

In South America, the naturally occurring colors of cotton include “white, tan, light brown, dark brown, and a grayish mauve” (Rowe 1984a:18). The current consensus is that the early domesticated cotton was likely *Gossypium barbadense*, which is thought to have been domesticated along the coasts of modern day Ecuador and northern Peru where wild varieties occur naturally. From there the technology spread down the coast and into the highlands (Stephens and Moseley 1973; Damp and Pearsall 1994; Dillehay et al. 2007). The exact date when domestication began is unclear. Currently, the earliest known archaeological macrobotanical cotton remains come from sites in the Ñanchoc Valley in northern Peru and date to 5948 cal B.P (Dillehay et al. 2007). This site is higher than 500 m above sea level (m asl), and Dillehay et al. suspect that this was not the place where domestication developed and the more likely location is along the coastal plains where the plant naturally occurs. They estimate that this would mean domestication probably occurred by at least 5500 years ago.

The earliest observed archaeological specimens recovered from the Ecuadorian coast, long suspected of being the region of first domestication, were found at the Valdivia site of Real Alto and have been dated to between 3500 and 2300 BC using uncalibrated radiocarbon dates (Damp and Pearsall 1994). Huaca Prieta has also

produced cotton artifacts from early contexts. The northern Peruvian coastal site was originally excavated by Bird in the 1940s and cotton fabrics and textiles were recovered from contexts dated between 5302-1933 cal BP (Dillehay et al. 2012, Bird et al. 1985). More recently, Dillehay and a large group of interdisciplinary researchers (Dillehay et al. 2012) have revisited the site. They have expanded upon Bird's work and published dozens more radiocarbon assays from Huaca Prieta and another nearby site. Pertinently, they have directly dated a cotton yarn to 6882-6657 cal BP (2σ). This pushes the likely date for cotton domestication in the region back more than a millennium.

From there, it appears cultivation techniques made their way southward along the coast. Transitional forms, dated to 2500 B.C, have been found in central Peru at Ancón-Chillon sites (Stephens and Moseley 1973; Damp and Pearsall 1994). These macrobotanical cotton remains have been found in contexts, which also produced "twined fabric and cordage" and other evidence of early fiber work (Stephens and Moseley 1973). This is the precursor to the Cotton Preceramic Phase (4500 – 3500 yr B.P.), which is characterized by the industrial use of cotton, particularly along the coast, for nets, bags, and clothing (Dillehay et al. 2007).

The Maritime Hypothesis and the Origins of Cotton Domestication

In 1975, Moseley proposed that cotton domestication and the earliest civilizations in the Andes came about as the result of maritime subsistence strategies, specifically the use of cotton for cordage, nets, and possibly clothing, since presumably there would be less leather on hand as fishing began to replace hunting as a source of protein (Stephens and Moseley 1974; Moseley 1975). There has been considerable debate regarding the degree to which maritime strategies are responsible for laying the foundations of Andean

civilization (Haas and Creamer 2006), but from the material record it does seem clear that there was a strong relationship between cotton domestication and maritime resources (Dillehay et al. 2007; Stephens and Moseley 1973; Engel 1963; Bird et al. 1985).

Camelid Domestication

There are currently four species of camelids found in the Andes, two domesticated, the llama (*Lama glama*) and the alpaca (*Vicugna pacos*), and two wild, the guanaco (*Lama guanicoe*) and the vicuña (*Vicugna vicugna*) (Stahl 2008). While the determination is not clear-cut (due in large part to hybridization), the DNA evidence suggests that the llama was domesticated from the guanaco and the alpaca was domesticated from the vicuña approximately 6000-7000 years ago (Kadwell et al. 2001). Llamas are the largest of the South American camelids and have relatively coarse wool. Their typical modern range is 2,300 to 4,000 m asl (Stahl 2008) although there is archaeological evidence that herds were kept and bred at coastal elevations (Figure 3.2) (Shimada and Shimada 1987). Guanacos are smaller than llamas and have been known to enter into the desert lowlands (Stahl 2008). Bird reported finding guanaco fiber in archaeological contexts that date to approximately 10,000 B.P. (Bird 1979; Whitford 1939). Alpacas are smaller than guanacos, but larger than vicuñas. Modern herds are typically range at 4,400 to 4,800 m asl and are more common in the northern Andes (Stahl 2008), but like the llama, herds have probably been kept at coastal elevations (Shimada and Shimada 1987). Vicuñas and alpacas both produce finer wools, those from the vicuña typically being considered the finest. The range of vicuñas is typically restricted to the high grasslands of the *puna* (4,000 to 4,800 m asl), the highest zone at which permanent settlements have existed in the Andes and the probable location of early

domestication efforts (Wheeler 1995; Pulgar Vidal 1987; Sandweiss and Richardson 2008; Stahl 2008). The earliest compelling evidence for herd tending comes from Telarmachay rockshelter in the Junín puna and dates to approximately 6,000 B.P. (Stahl 2008). The high puna of modern day Argentina has also been proposed as a site of early camelid domestication (Stahl 2008). With regards to the early evidence for camelid fiber being used in fabrics, the assumption has been that use of the fiber and a desire for greater control over the acquisition and traits was one of the motivations for camelid domestication (Bird 1979). The earliest surviving example for wool fiber being incorporated into an interworked fabric is from the site of Asia. The spun wool yarn has been dyed red and dates to 1288 BC (Engel 1963:25). Wool subsequently becomes more common during the Early Horizon (800 BC to 1 AD) (King 1965; Bird 1979). It seems that the percentage of white wool increased under domestication, a trait likely selectively bred into populations to facilitate the dyeing process. The reasons being that white fibers allow for more vibrant dye expression and that dyes take to wool fibers more easily than cotton (Bird 1979).

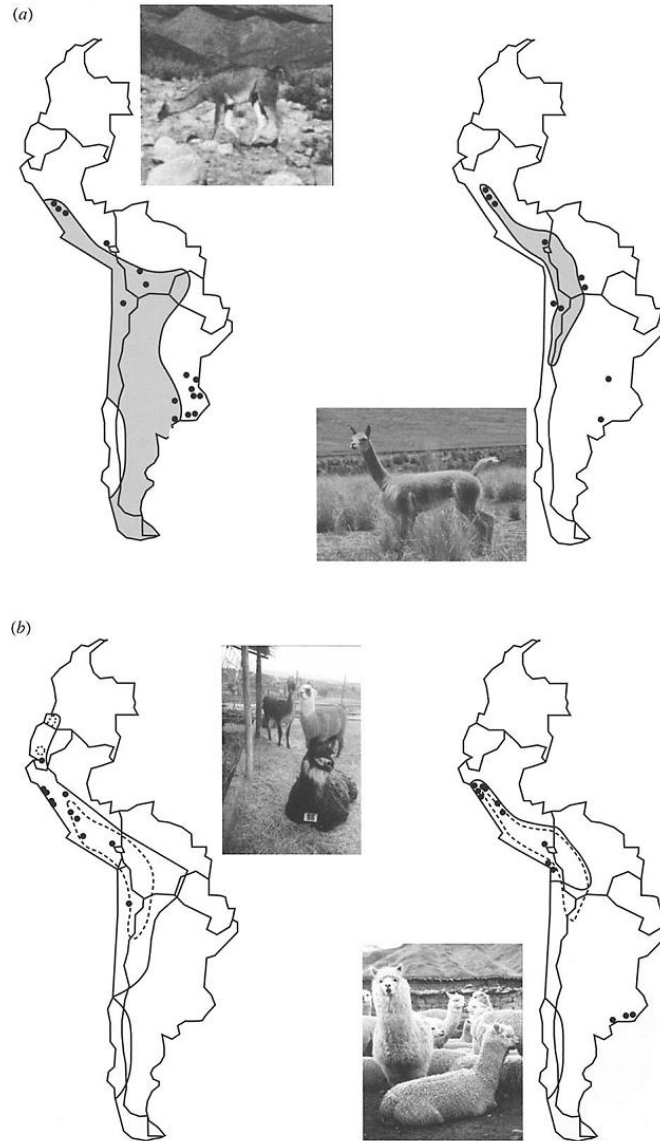


Figure 1. (a) Geographical distribution and photographs of the guanaco (*L. g. cacsilensis*) (left) and vicuña (*V. v. mensalis*) (right). Map taken from Wheeler *et al.* (1995). Photographs: guanaco, P. Daulesberg; vicuña, J.C.W. Shaded areas mark the extent of present ranges, solid circles represent Pleistocene and Early Holocene fossil localities. (b) Geographical distribution and photographs of the llama (left) and alpaca (right). Map taken from Wheeler *et al.* (1995). Photographs: J.C.W. Solid lines mark the distribution prior to 1532, dashed lines mark the present range, solid circles represent archaeological sites containing llama and alpaca remains.

Figure 3.2 Range Comparison of South American Camelids (Kadwell et al. 2001:2577)

Spinning Technology

There has been speculation that thigh spinning was probably the first method used to spin cotton, a seed fiber of shorter length. Although another probable early cotton-spinning technique, drawing fibers from the pointed end of a twirling stick that has been wrapped in the fibers, is much more effective (Rodman 2000). However cotton spinning

started, spindles and whorls, the system of a slender rod and weight that acts as a flywheel to extend the spin and stabilize the mechanism (Figure 3.3) (Tiedemann and Jakes 2006), became associated with cotton very quickly and have been used as justification for suggesting cotton yarn processing at some of the early Andean sites (Marcos et al. 1979). The close relationship between spindle whorls and cotton is much more pronounced in Mesoamerica, northern Mexico and the American Southwest, where animal fibers are less of a complication since sheep's wool was not introduced until the arrival of the Spanish. Rabbit fur was sometimes used, and there have been reports of an unidentified wool showing up in archaeological contexts in far northern Mexico, but plant fibers dominate Mesoamerican fabrics (King 1978; Anawalt 2000). The two components, cotton and whorls, seem to follow each other northward arriving simultaneously in the archeological record in each location as cotton cultivation spreads (Teague 1998).

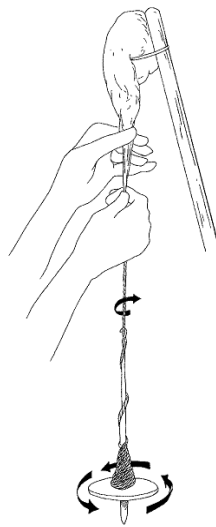


Figure 3.3 Illustration of Drop Spindle Spinning Technique (Tiedemann and Jakes 2006).

In the Andes, the correlation between the introduction of cotton cultivation and spindle whorls is far less clear. Few spinning implements have survived from Late Preceramic contexts. Spindles were often simple, made of thin pieces of smoothed wood or a cactus spine, and subject to preservation issues (King 1965). That there are no ceramic whorls should come as no surprise since ceramic technologies had not yet appeared in the region, but the dearth of spindle whorls made of other materials suggests other possibilities. One is that whorls may not have been used. Among modern Andean spinners, the preferred technique for processing cotton into yarns involves a supported spindle. Whorls are only sometimes employed with this method, less frequently with finer yarns (King 1965; Rowe 1984a). Another possibility is that whorls, at least early on, had stronger associations with the other fiber that dominates Andean textile traditions, camelid wool. The drop spindle technique, in which the additional weight of a whorl is necessary, is more appropriate for the longer fibers of wool yarns (King 1965; Bird 1979; Bird et al. 1985).

Huaca Prieta. At Huaca Prieta, no spindles or whorls were positively identified from the Late Preceramic Period occupation strata. However, this does not necessarily mean that expedient or improvised pieces did not serve those functions. Bird made this suggestion after observing a spinner local to the area using a shoot from a shrub as a spindle. According to his description, no separate piece functioned as a whorl, however the lower end of the shoot increased in diameter (Bird 1979; Bird et al. 1985). It is also possible that the thigh spinning technique was utilized at the site. The most common yarn structure at Huaca Prieta is S-spun and then Z-plied, Z(2s) (this spin and ply notation system will be explained in Chapter V), to form two-ply yarns. This is consistent with

what has been observed from other Late Preceramic sites along the north coast and possibly indicated that most of the yarns were spun against the thigh – spinning by twisting away from the body and then plying yarns by rolling them towards the body (Bird et al. 1985, Paul 1990; Tiedemann and Jakes 2006).

Asia. During his excavations at the Preceramic site of Asia on the Central Coast, Engel (1963) recovered many fabrics, yarns, and spinning implements. Engel only reports one radiocarbon date for Asia, 1288 BC \pm 100 (uncalibrated). This date seems late, and almost no information about the context is given. King (1965:60) considers that fabric assemblage from Asia “does seem to show progression from the earlier Huaca Prieta material,” so it may be safe to assume a later Preceramic context for Asia. In the assemblage, woven textiles were not common, being vastly outnumbered by twined fabrics. Looped and knotted fabrics were also observed. Additionally, Engel (1963) indicates that cotton was the most prevalent fiber, with other plant fiber, camelid wool, and human hair also present. He also speculates that cotton was likely cultivated nearby, as the environmental conditions would have been favorable and because some unprocessed cotton, seeds, cotton twigs, roots, and leaves were recovered from the site. Spindle whorls (n=16) crafted mostly from more perishable plant materials (wood, bark, cork, resin, seeds, and fruit) as well as one made from stone were found during the excavations. Unfortunately, Engel (1963) (Figure 3.4) does not have scales in the published spindle whorl photos, nor does he describe their sizes or weights. Therefore, it is difficult to compare them to other collections, but, based on the circumstantial evidence, it seems possible that they were used to spin cotton. However, Engel (1963)

assumes that the spindles were used in a drop-spindle technique, which would be a technique more likely to be used with wool.

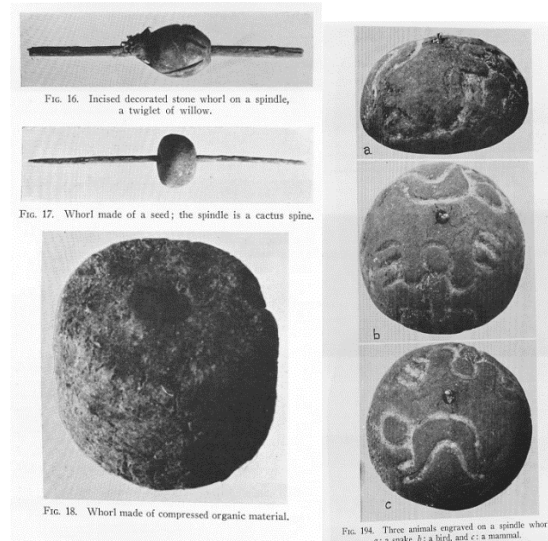


Figure 3.4 Spindles and Whorls Recovered by Engel at the Asia Site (Engel 1963:24, 81)

STRUCTURAL INNOVATION

Preceramic and Initial Periods

More complex loom weaving technologies seem to have been developed out of twining technologies which utilize a simple version of a frame loom. While the early plain weaves of the Preceramic Period were likely created on similar looms as twined cloths (Doyon-Bernard 1990). A *loom*, or the framework, which can come in many forms, upon which a textile is constructed. The warps are anchored to the loom bars. Shed rods (for separating the warps), shuttles (to keep the wefts contained), and heddles help manipulate the elements to facilitate weaving (Figure 3.5) (Rowe 1977; Brown 1978). The introduction of *heddles*, a device that allows groups of warps to be manipulated up or down in one motion, is necessary in order for twills and double-cloths to be possible. This innovation seems to have occurred during the Initial Period (1800-800 BC; Doyon-Bernard 1990). Around the end of the Initial Period and the beginning of

the Early Horizon (800 BC-AD 1), structural innovation fluoresces (Doyon-Bernard 1990).

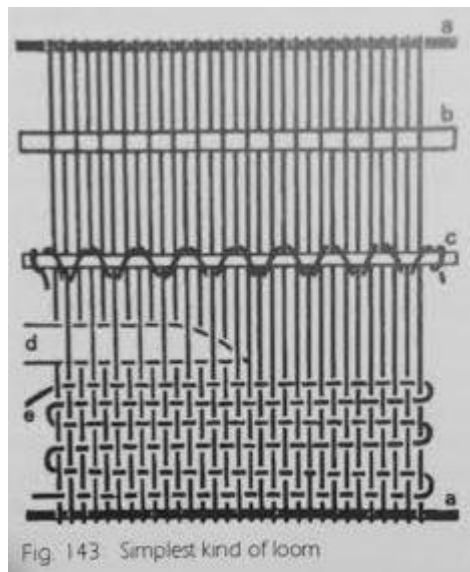


Figure 3.5 Simple Loom Diagram - a. loom bars, b. shed rod, c. heddle rod with attached heddles, d. sword, e. weft (Seiler-Baldinger 1994:78)

Huaca Prieta. This site has been a well-known Preceramic locality since Bird began investigations there in the 1940s (Dillehay et al. 2012). Due to excellent preservation conditions, thousands of fabric specimens have been recovered (Bird et al. 1985; Dillehay et al. 2012). Cotton yarn dating to 6882-6657 cal BP (2σ) has recently been recovered by Dillehay et al. (2012). Future publications from these investigations, including those regarding fabric technologies, will likely prove immensely informative regarding the cultural innovations leading up to the Preceramic Period (approximately 4500-3500 BP; Dillehay et al. 2007). For the present discussion, I will focus on the publications that have analyzed the fabrics recovered from Bird's investigations.

Specimens of basketry and matting were found throughout the Preceramic occupation strata (Layers C-Q; ^{14}C dates for Layers D-Q: 5590-2160 cal BP; 2σ). Two of the baskets from earlier strata (Layers M - Q: 5590-3267 cal BP; 2σ) had designs sewn in

dyed-blue cotton yarns onto the basket structure (Bird et al. 1985; Dillehay et al. 2012). Otherwise the baskets mostly appear to be made from junco rushes. The matting was either twined or woven. The twined mats were all constructed from junco or totoro reeds. The woven mats were constructed of junco or totoro with cotton or bast-fiber yarns forming the wefts. As late as 1947, Bird et al. (1985) observed that the mats used by the modern inhabitants of the area were constructed in the same manner as the Preceramic archaeological specimens.

Over 7000 other fabric and fiber specimens were recovered from Bird's investigations at Huaca Prieta. Cotton was the most common constituent fiber with an "unidentified bast" also being present in significant quantities. The use of human hair for fiber work was only observed in the strata that post-date the Preceramic occupation and no camelid fibers or fourcroya was observed even though the latter grows nearby in the modern era (Bird et al. 1985).

Twined structures make up over 70% of the non-basketry fabrics Bird recovered from Huaca Prieta and of over 99% of the twined fabrics were composed of doubled warps. Typical of Preceramic twined fabrics, most of the wefts begin at one edge and terminate at the other (*i.e.*, not worked back and forth). No direct evidence of the use of looms to construct fabrics was observed during Bird's excavations, but some of the fabric structures indicate that simple frame looms were utilized in the construction. Variations in the twining patterns have created the earliest documented decorative design elements in Andean fabrics (Bird et al. 1985). The integration of designs into twined structures signals the earliest documented evidence for fabrics having a function beyond basic utility (Cahlander and Baizerman 1985).

Bird has suggested that twining was more prevalent at Huaca Prieta because heddles had not yet been invented or at least had not yet been introduced into the area. Less than five percent of the recovered non-basketry fabrics were true textiles, mostly plain weaves and some twills. Designs were incorporated into some of the plain weaves by using different colors of fiber to create stripes. In at least one instance a warp-stripe was created using blue dye (likely indigo). At least seven specimens combine twining and weaving in the same fabric and one of these was painted with red pigment. Examples of netting, looping, knots, and cordage were also recovered (Bird et al. 1985).

Asia. This is a Preceramic site located in the Omas Valley on the central coast of Peru. A single unit at the site was excavated by Engel in 1958 before being destroyed by flooding. However, fabric specimens and spinning, sewing, and what appear to be weaving implements were recovered (Engel 1963).

As at Huaca Prieta, twined structures are much more abundant than woven textiles. However, from Engel's descriptions and drawings, it appears that it was more common at Asia for wefts to go back and forth in twined fabrics, as opposed to start and terminate in one pass as was common at Huaca Prieta. Both S-spun and Z-spun yarns were common. Also like Huaca Prieta, cotton was the predominant fiber, though only white cotton was observed and Engel (1963) also notes the presence of wool which was absent from Huaca Prieta (Bird et al. 1985). Engel also suggests that fur from other animals, such as foxes, may also have been used. Spindles of "slender acacia spines, or of twiglets of willow" as well as whorls of various materials were recovered confirming their use in spinning yarns. Threaded cactus spine needles, embroidered fabrics, and featherwork were also recovered.

FABRIC TRADITIONS IN THE NASCA DRAINAGE

The Nasca region is located along the southern coast of Peru in the extremely arid Atacama Desert. The area consists of the valleys of the Rio Grande De Nasca River and its tributaries (Silverman and Proulx 2002). There is evidence of sporadic occupations that stretch back to at least the Middle Archaic (ca. 3500 BC). However, sometime around 800 BC, during the Early Horizon, the Paracas culture with its elaborate craft traditions developed (Paul 1991). From that point until the arrival of the Spanish, the Nasca region oscillated between control from small regional polities and larger empires (Silverman and Proulx 2002).

Paracas Culture

The Paracas culture (800-100 BC), centered on the Paracas Peninsula of the South Coast of Peru north of the Nasca drainage, is well known for its technical and artistic mastery of textile techniques (Paul 1991). Beautiful Paracas textiles began to appear on the collectors' markets around 1911, looted from their original contexts. It was not until 1925 that Tello began scientific excavations at the site (Paul 1991). The Paracas culture has been defined as tradition of related textile, ceramic, and architectural styles with a geographical distribution that encompasses the Cañete, Topará, Chíncha, Pisco, Ica, and Río Grande De Nasca river valleys (Paul 1991). It is important to note that the proposed chronology for the Paracas Culture is complex and controversial (Paul 1991; Peters 2012).

Unlike in later periods when workbaskets filled with spinning and weaving implements were commonly interred with the dead, during the Paracas Period, bags served that purpose (King 1965). No looms have been recovered from a Paracas site.

However, due to the variety of sizes of extant pieces and the fineness of embroidery, it is thought that the Paracas weavers utilized a variety of loom types and sizes, including back-strap looms, upright looms, and small frames (Paul 1990). Spindles and whorls of gourd, wood, or ceramic are commonly recovered from Paracas sites indicating that yarns were often spun on a drop spindle (King 1965). The typical yarn structure was Z-spun and then S-plied, typical of the southern Peruvian coast (Paul 1990; King 1965). Cotton was the dominant fiber for textiles, although wool was also common and seems to have been preferred for embroidery. Fourcroya has also been identified along with various reeds and sedges utilized for basketry (King 1965). Dyes identified in Paracas designs include “indigo, relbunium, the insect cochineal, and shellfish” (Paul 1990).

The variety of fabric structures and designs recovered from Paracas sites is large: “plain weave, double-cloth, warp-float patterns, ‘brocade,’ embroidery, painted textiles, knotted netting, [...] braiding,” warp-wrapping, twills, and tie-dye just to name a few (King 1965). Plain weaves are the most common Paracas textile structure and appear to have been the preferred medium for the elaborate embroidered mythological motifs which are the hallmark of Paracas textile traditions (Paul 1990; Frame 2001). The Paracas Culture also excelled at producing many other complicated structures including interlocked plain weaves and warp-patterned weaves. Very complicated non-woven structures, such as oblique interlacing (braiding) were also common (Paul 1990). Tapestry weaves have been recovered, but it was generally restricted to border sections. The technique was far less common during the Paracas Phases than it was among the later cultures of the south coast of Peru (King 1965; Paul 1990).

Nasca Culture

There is not a clear delineation in the craft traditions marking the transition between the Paracas and Nasca Culture (Silverman and Proulx 2002). Most of the techniques observed in Paracas textiles continued to be produced through the Proto- and Early Nasca Phases (100 BC–AD 450; King 1965). Though two of the techniques, cross-knit loop stitching and interlocking warp and weft fabrics, “were brought to their fullest development” during the Early Nasca Phase (AD 1-450; Rowe 1972:67). Cross-knit loop stitch (also known as needleknitting) is a technique that was used to create distinctive embroidery or three-dimensional knit figures (it will be described in greater detail later in the discussion) (Figure 3.6). Interlocking warp and weft fabrics are a distinct form of discontinuous warp and weft (DWW) structures in which the discontinuous sections were interlocked at the borders (Rowe 1972; Harcourt 1962). It was also during the Early Nasca Phase that many new geoglyphs were created and construction of Cahuachi began (Silverman 1993; Silverman and Proulx 2002).

During the Middle Nasca Phase (AD 450-550), there was significant movement and development, including the construction of aqueducts, due to drought conditions (Schreiber and Lancho 2003). By the end of the phase, the practice of painting designs on textiles, common throughout the Early Nasca Phase was abandoned (Sawyer 1979). The Late Nasca Phase (AD 550-650) is characterized as the time of building Wari influence in the region (Conlee et al. 2009; Conlee 2010a).

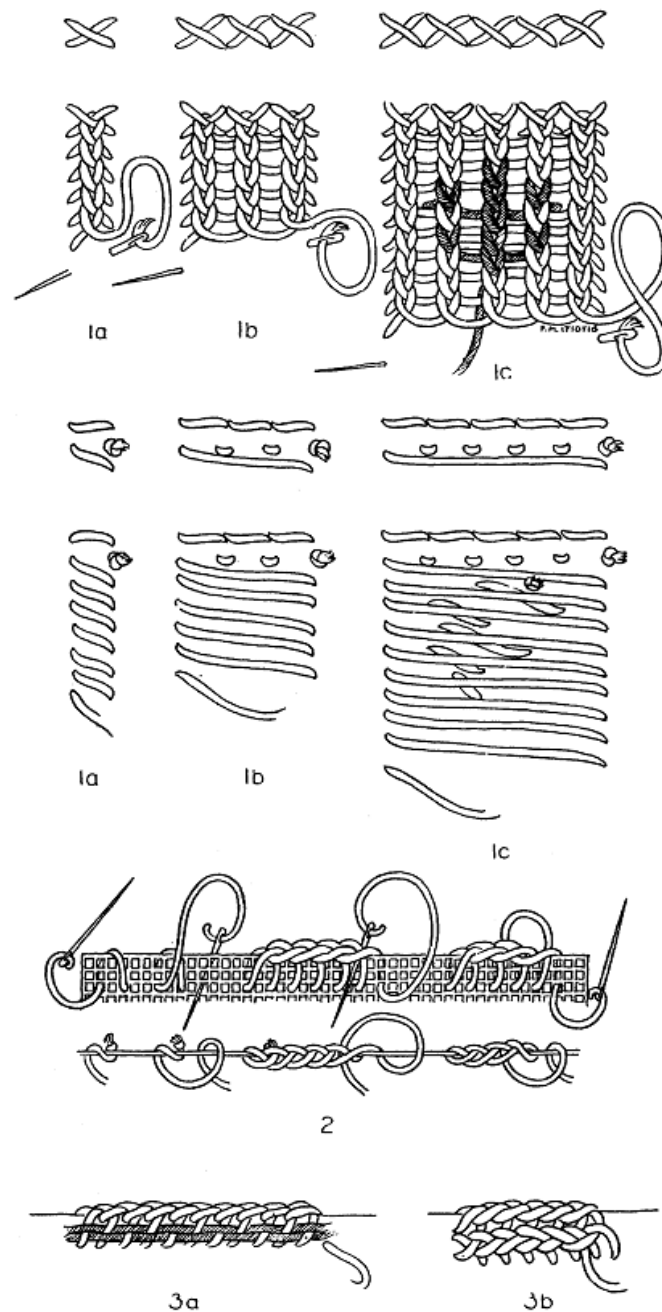


FIG. 1. Flat bands of needleknitting. a, one-loop; b, three-loop; c, five-loop, patterned with familiar plant (?) motive.

FIG. 2. Method of reconstructing one-loop needleknitted edge binding.

FIG. 3. a, One-loop needleknitted edge binding with additional yarns woven under and over the long bars of the stitches. b, Surface side of three-loop needleknitted edge binding.

Figure 3.6 Cross-Knit Looping and Embroidery (O'Neale 1934:409)

Middle Horizon and Wari Influence in the Nasca Valley.

In the Nasca Region, the Middle Horizon (AD 650-1000) was characterized by a strong influence from the Wari Empire (Silverman and Proulx 2002; Conlee et al. 2009). In regard to textile techniques, the importance of DWW structures continued into the Middle Horizon (Rehl 2006). Ritual significance seems to have been attached to DWW structures throughout their use. During the Early Intermediate Period they were constructed of wool yarns probably because the scarcity of the fiber made it more valuable commodity. There was a switch in the Middle Horizon and cotton began to replace wool as the fiber of choice for DWW textiles. It seems that this switch may be related to the influence of the highland-based Wari Empire that had become a presence in the Nasca Valley (Rehl 2006). Alternatively, the preferred fiber for double weaves (which regionally date back to the Paracas fabric traditions) switches from cotton to wool during the Middle Horizon (Cahlander and Baizerman 1985).

A. Rowe (1977:113) has also proposed that warp-patterned weaves developed in the South highlands during the Middle Horizon and were introduced to the coast from there. This was a preliminary suggestion based on her extensive studies using museum collections and Rowe conceded that more research using archaeologically recovered textiles was needed to substantiate her hypothesis. The use of museum textiles as the basis for the defining of textile traditions has well-documented benefits and shortcomings, notably the lack of well-documented provenience for many of the pieces (Cahlander and Baizerman 1985). It does not appear that Rowe's hypothesis has been disproven, although it is not clear how much investigation has been devoted to determining its validity (Clark 1993:131).

Late Intermediate Period

The collapse of the Wari Empire signaled the beginning of the Late Intermediate Period (LIP; AD 1000-1476) and obvious cultural and demographic changes including the emergence of regional leaders and polities such as the Tiza Culture in Nasca (Conlee et al. 2009; Conlee and Schreiber 2006). Localized political structures did not mean that groups were isolated and there is evidence for trade of fabrics up and down the coast as well as trade between the coasts and both the highlands and the Amazon (Young-Sánchez 1994). Very little raw camelid fiber has been identified at LIP coastal sites, suggesting that wool was generally imported from the highlands already spun into yarns (Rowe 1984a; for an exceptions see Conlee 2000). Relatively little research has been done on the South Coast LIP fabric traditions compared with the contemporaneous traditions of the North and Central Coast (Young-Sánchez 1994). This is due in part to South Coast LIP textiles being overlooked/undervalued by researchers but South Coast burial practices have also resulted in relatively fewer fabrics being preserved. At least in the Ica Valley, it became less common than it had been during earlier periods to deposit offerings of textiles with burials and elite burials were often dug deep into the more moist subsoil negatively affecting preservation. The graves of common individuals were more likely to be shallower and dug into the dry sand, and thus, more likely to have survived (Rowe 1979). Plain, commoner fabrics and textiles are less likely than more expensive and elaborate pieces to end up in the museum collections that have been one of the major resources for fabric scholars.

Several decorative structures have been identified as carrying over into the LIP and appear to be common: tapestry, weft striping, double-weaves, complementary warps

and wefts, supplementary wefts, and cross-knit looping embroidered finishes. Wool yarn seems to have been reserved for decorative bands and borders (Rowe 1977, 1979; Garaventa 1979; Young-Sánchez 1994). Interestingly, a “memory” of Nasca decoration survives the Middle Horizon and re-emerges during the LIP. Tapestry compositions are again dominated by rectilinear shapes with black outlines. Although the highland technique of interlocking the wefts between the different color fields is more common than the slit technique that characterized coastal traditions (Rowe 1979:186). Double-weaves return to the simple light-dark dichotomous patterns (Rowe 1977).

SUMMARY OF FABRIC TRADITIONS

The fabric traditions of the Pre-Hispanic Andes were rooted in ancient technologies that seem to have predated or at the very least been developed shortly after people migrated to South America (Jolie et al. 2011). While it is difficult to date the domestication of cotton and camelids, current data suggests that cotton cultivation began at least 5500 years ago (Dillehay et al. 2007) and camelid tending was likely happening by at least 6000 BP (Stahl 2008). It also appears that cotton cultivation had strong ties to maritime subsistence strategies (Moseley 1975; Dillehay et al. 2007). The evidence from the early Preceramic sites seems to be in support of thigh-spinning as the original technique for producing yarns and the introduction of spindle whorls being connected with wools (Bird 1979; Bird et al. 1985; Engel 1963). It also appears that twined fabrics predate woven textiles (Bird et al. 1985; Engel 1963) and that more complicated weaving structures were dependent upon the invention of more complex looms and heddles (Doyon-Bernard 1990).

In the Nasca Region, the Paracas Culture developed an extensive and sophisticated repertoire of textiles structures and design techniques. On one level, there is a significant continuity of the tradition extending from the Paracas Culture and through the Nasca Phases, the Middle Horizon, and the LIP. However, modifications to the basic structures and design schemes map fairly closely with major changes to the societal structures and ideologies.

THEORY BACKGROUND

The ancient Andean fabric and textile traditions are renowned for their creativity and execution (Rodman and Cassman 1995). Only within the last few decades has discussion of the technical aspects ceased to be overshadowed by discussion of color and formal composition (Rodman and Cassman 1995; Conklin 1997). But for Andean peoples, fabric structure was as important, if not more important than the decorative elements that modern observers are drawn to. Thankfully, there has been a growing body of research studying Andean fabric structures and attempting to decode what they meant to the people that created them.

A completed garment is the summation of a series of choices made by the craftsperson. It is a conversation between the individuals and society influenced by the eccentricities of skill and material (Splitstoser 2009). Particularly when dealing with decisions that do not affect the functionality of the item, society defines the standard choices which work within its ethical and political systems. The work of the individual functions within those boundaries or pushes beyond. Likewise, the choices of individuals, which themselves are heavily influenced by concepts of identity, can have an effect on how society defines acceptable choices (Splitstoser 2009). Thus, the socially sanctioned

choices are reflective of the sum of individual execution and this produces variety and style in garments and other fabrics.

The execution of craft and the choices made can be recreated through the analysis of the embedded gestures. In fabrics, this can mean determining the direction and method for spinning yarns, the way in which weaves come together, and the general rhythm of the craft (Splitstoser 2009). The deftness with which a structure is achieved and the amount of time expended in construction can also allow some degree of insight into the thoughts of the craftsman. The characteristics of implements of construction can also function as a more indirect indicator of gesture and choice.

Brumfiel (1996) analyzed spindle whorls from several Mesoamerican sites to see if resistance to the dominant culture could be observed through changes in the quality of tribute cloth extracted from Indian groups under Aztec and Spanish colonial rulers. As very little of the actual cloth has been preserved, spindle whorls serve as an efficient proxy because the size of a spindle whorl is a major determining factor in the fineness of yarns spun, particularly with cotton fiber. Brumfiel originally believed she would be able to identify resistance by Indian women weavers through increases in the frequency and proportion of heavy, broad spindle whorls found in contexts associated with periods of external domination. Larger whorls mean thicker yarns which equate to coarser cloth. Contrary to her proposed hypothesis, at nearly all the sites she looked at, the average size of the spindle whorls decreased under Aztec and Spanish rule indicating the production of even finer cloth as tribute (Brumfiel 1996:458). Further examination of the spindle whorls indicated that during those periods of outside domination, the larger spindle whorls, which would have been used to make domestic cloth, continued to be decorated

while the smaller whorls were plain. Brumfiel suggests that even though women produced finer cloth for the Aztec and Spanish, it was due to the ease with which the demands of the rulers were enforced. When the production of fine cloth was for domestic purposes, it was closely related to the identity of the woman weavers. When the domestic, social use of the finer cloth was taken away during outside rule, care and expression of identity was shifted to the utilitarian cloth. This is supported by the increase in care expended in the production of larger whorls (Brumfiel 1996:459).

There are several textile experts who focus on the importance of structure in Andean weaving. Conklin (1997) has stated that for researchers, particularly Western scholars, trying to understand the meaning behind structures in Andean textiles first requires becoming aware of the way our modes of communication has structured our understanding of the material world. Writing is the dominant form of communication in Western societies. Because of this, we often have a difficult time comprehending how the subtle changes of form can be imbued with so much information (Conklin 1997:109). Although for anyone familiar with Andean cultures, that fiber artifacts can store information should not come as a shock. As Conklin (1997:119) points out, the *quipu* record keeping system of the Inca (AD 1440-1532) (Rodman and Cassman 1995) is well known from the accounts of the Spanish colonizers and we know from excavations that similar systems were used by the Wari culture during the Middle Horizon (AD 500-900). Quipu are constructions of yarn and cordage in which information was recorded in the choice of spin, ply, color as well as knots and positioning (Conklin 1997; Urton 2003). Unfortunately the Spanish destroyed many of the quipu and managed to eradicate the detailed knowledge of how to read them (much like they did with the codices of

Mesoamerica). From analysis, we know that the quipu could at least store numerical information. However, conquest-era Spanish accounts suggest that they were also able to store “many forms of information, including accounting, the recording of history and the law” (Conklin 1997:119). Conklin explicitly makes the connection between information recorded in the structure of quipu and information being communicated through the structure of fabric.

In the Andean world, art and technology were not a dichotomy. Textiles were meant to be taken in – structure and decorative elements - as an integrated whole. Conklin (1997) has suggested that this is probably related to the concept of dualism, an omnipresent idea in the Andean world. Moreover, the structure of fabrics was integrated into the message and “read” by those with the appropriate technical knowledge. (Conklin 1997; Splitstoser 2009). Conklin (1997:110) suggests that weaving was the “central communicative medium of Andean thought.” It also seems as though the technical knowledge was pervasive. The historical accounts indicate that learning to weave was an “educational fundamental” for Incan men and women at every status level, and that as a society a substantial amount of time was spent in fabric production (Conklin 1997:114). More modern ethnographies have documented Andean girls as young as six demonstrating technical proficiency in spinning (Bird 1979:13).

It has also been established that textile structures are directly related to concepts of identity among the pre-Conquest Andean people (Rodman and Cassman 1995, Conklin 1997). According to Spanish documents, the Inca had three different categories of tapestry textiles that were woven by three distinct groups of people. *Cumbi*, “the most prestigious textile type” and also reserved for government use (Rodman and Cassman

1995, p. 34), was woven by male specialists, *qompi-kamayoc*. The other two groups were composed of female specialists, spouses of officials and the *mamakuna*, women who were sequestered away from the rest of society to fulfil various government functions (Rodman and Cassman 1995). It has also come to the attention of Andean scholars that specific textile structures can be associated with culture groups (Conklin 1997). This information has been used to help identify many of the pieces in private collections and museums that unfortunately lack provenience (Rodman and Cassman 1995). Stem stitch embroidery has strong identifications with the Paracas culture (450-175 BC). Additionally there is a strong correlation between paired single-ply yarn warp for plain weave fabrics and the Chimu culture (Conklin 1997).

Rodman and Cassman (1995) examined the tapestry traditions of the Andean highlands, the Altiplano, and compared them with each other and with coastal tapestry traditions. Their intent was to study textile structure and its use in identifying the cultural affiliation of some of the Andean textiles in museum collections around the world, but their examination also incorporates ideas of cultural identity and continuity, trade, status, wealth, and resource availability. The four highland groups they focused on had related traditions for constructing tapestry tunics: the Recuay (200 BC to AD 500), the Wari (AD 500-900), the Tiwanaku (AD 400-1000), and the Inca (AD 1440-1532). For all four of these groups, tapestry woven tunics would have been an indicator of wealth and prestige. Also, it seems that a lot of this prestige was related to “its extremely labor-intensive construction” (Rodman and Cassman 1995:33).

In contrast to the highland tapestries, those from the coastal areas tend to have warps, the vertical element, made from coastally produced cotton. The wefts, the

horizontal element, could be made from camelid wool, the most common fiber for both sets of elements in Altiplano production (Rodman and Cassman 1995:33). One of the structural differences between the two traditions is likely related to the increased cost of importing wool into coastal communities. In Altiplano tapestries, when the weft changes direction it is interlocked with the weft of the adjoining color field. In coastal traditions, there is no interlock and the weft is only wrapped around the last warp. This results in an almost imperceptible reduction, at least in this individual event, in the use of camelid fiber, but results in vertical slits or openings in the fabric separating color fields (Rodman and Cassman 1995:33). And from depictions of tunics being worn, we know that Inca tunics were longer, to the knees, than the tunics worn by coastal peoples. On the coast, tunics were short enough that they apparently necessitated the use of a loincloth (Rodman and Cassman 1995:34). The other major difference between the two traditions is the type of loom used. Coastal weavers used narrow looms, approximately “thirty six to forty inches wide” and the warps constituting the longest axis. The Recuay, Wari, Tiwanaku, and Inca used a simple frame loom in which the weft axis was the longest, reaching widths of around 7 feet (Rodman and Cassman 1995:33) (Figure 3.7). The result of this was that in Altiplano tunics, the orientation of the warp and the weft during construction was opposite of the way the fabric would be oriented, or worn, while in use.

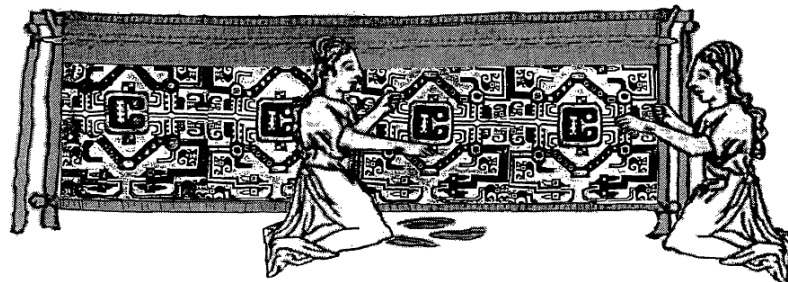


Figure 3.7 Illustration of Wide-loom Tapestry Weaving (Rodman and Cassman 1995:37)

As far as the archaeological record has shown, the Recuay were the earliest Andean group that adopted the wide-loom for tapestry production and this seems to be the origin of the Altiplano wide-loom tapestry tradition. Although unfortunately, there are very few surviving examples of Recuay tapestry (Rodman and Cassman 1995). The wide-loom tradition was continued by weavers from the Wari and Tiwanaku polities, who were contemporaries from the sixth through the tenth centuries AD. There is significant overlap between the two groups regarding the images and colors used in tapestry design, but scholars are able to distinguish between the two because they have distinctive structural traditions (Rodman and Cassman 1995). The most distinguishable difference is that the Wari continued the Recuay tradition of piecing together two tapestry webs to form a tunic. This means that the front and back of the tunic were created separately and then sewn together at the shoulders and along the sides. Tiwanaku tunics were constructed of one long piece of woven tapestry that would have required a rather unwieldy loom. The Tiwanaku tunics were constructed by folding the tapestry over at the shoulders, sewn, and then sewing them along on the sides. The opening for the neck was a slit in the tapestry weave (Rodman and Cassman 1995).

Camelid wool was always used for both the warps and the wefts in Tiwanaku tapestry, but for their warps, Wari weavers would use cotton, wool, or a combination of the two. In some Tiwanaku tapestry, the warps are paired. This may suggest two separate Tiwanaku traditions, one of which may be derived from the poorly known Pucara tapestry tradition. Only one Pucara tapestry has been recovered and it has paired warps. Wari tapestry is also often distinguished by the unusual ways in which the selvedge edges are finished. The selvedges of Tiwanaku and the later Inca tapestries were finished in the

loom. Most of the time the warp selvages from Wari tapestries appear to have been cut from the frame and then finished. This suggests that throughout the weaving process, Wari weavers were able to manipulate the warps enough to insert a shed, whereas Tiwanaku and Inca weavers had to use needles to finish weaving the wefts through the warps (Rodman and Cassman 1995).

Inca tapestry tunics were constructed from a single continuous woven piece with selvages that were finished in the loom much like the Tiwanaku tapestry. Like the Wari, Inca warps could be made from either cotton or camelid fiber. However, unlike the antecedent traditions, the Inca warps were single three-ply yarns (Rodman and Cassman 1995). Thus, the long Altiplano tapestry tradition is one in which weavers built upon earlier traditions as a reference to the perceived connections with their identity. You could say that two of the major components of the Inca tapestry tradition, the ones that imbued it with value, were the technological legacy which legitimized their claims as rulers and the incredible amount of resources that was expended in the creation of these beautiful garments.

It has also been suggested that certain structures were likely imbued with ritual significance of power (Conklin 1997). In the 1960's, Jane Goodell spent time researching in Bolivia, where there has been remarkable continuity of textile traditions from ancient to modern times. She observed that the local spinners, spun yarn in either direction at the discretion of the craftsperson. However, yarn spun the opposite from the spinner's typical choice was believed to have protective powers and was often tied around the wrist or ankle of persons or statues that were in need of protection from evil spirits, *lloque* (Goodell 1968; Conklin 1997:118). Changes in the direction of spin have been observed

in gauzes recovered from the Chancay Valley. Typically, with gauzes from this region, the entire piece will be constructed solely with S-spun yarns. However, in some examples, certain repeated parts of the pattern will be made from Z-spun yarns. Since there seems to be no functional reason, a ritual one has been proposed. These changes in spin could have a protective purpose like the yarn bracelets and anklets from Bolivia (Conklin 1997:118-119).

Andean peoples ascribed fabric structures with their concepts of identity, power, and ritual. They built upon traditions and asserted their unique identity when they modified those traditions. Fabric structures were ubiquitous in the Andean world and are the closest thing they had to the writing (Conklin 1997). It must have been an effective way of communicating ideas because it served the people for centuries.

CHAPTER IV

LA TIZA

La Tiza is a large (approximately 30 ha) site located near the confluence of the Aja and Tierras Blancas valleys and consists of several domestic and mortuary components (Figure 4.1) (Buzon et al. 2012; Conlee 2011, 2010a). Cerro Blanco (Figure 4.1), the sacred white sand mountain, rises above the valley on the opposite side of the valley (Conlee 2015; Acosta 1962). Focused investigation of the site led by Christina Conlee began in 2002 with initial mapping of the site. Excavations were carried out in 2004, 2005, 2006, and 2009. Intermittent occupation through the Middle (6000-3000 BC) and Late Archaic (3000-1800 BC) was identified in the eastern portion of the site (Sectors I and II; Figure 4.3). The Middle Archaic component has produced a single fabric specimen and radiocarbon dates of around 3600 BC (Conlee 2015). No fabrics so far recovered from La Tiza can confidently be dated to the Late Archaic.

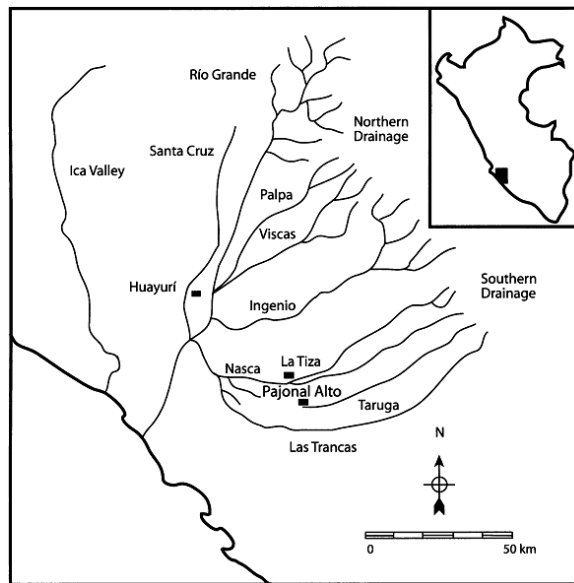


Figure 4.1 Map of Nasca Drainage showing La Tiza and Pajonal Alto (Conlee 2003)



Figure 8.5 Cerro Blanco (background, right side), looking up-valley (east) from the modern town of Nazca (*courtesy: David Johnson*).

Figure 4.2 Cerro Blanco (Silverman and Proulx 2002:206)



Figure 4.3 Plan Map of La Tiza (Conlee, n.d.)

No Initial Period (1800-800 BC) occupations have been identified at La Tiza or in the in the Southern Nasca drainage (Conlee 2015) and it is not until 400 BC (during the Early Horizon) that more intensive settlement of the region begins (Schreiber and Lancho Rojas 2003:13). Since the influence of the Chavín civilization (which is the Horizon referred to by in the term Early Horizon; Rowe 1960) seems to be limited in the Southern Nasca Drainage, the term Formative period had been adopted by researchers focused on that area. “Formative” because the foundations for the later Nasca Culture emerge: substantial investments in habitation structures and subsistence activities; the beginning of craft industry and regional political and religious affiliations; and the appearance of markers of status (Conlee 2015; Van Gijseghem and Vaughn 2008; Silverman and Proulx 2002). At La Tiza, there is evidence of a small Late Formative period settlement concentrated in Sector I and extending into Sector II that dates between 370 BC and AD 75 (Conlee 2015).

The Nasca Culture phases fall within the Early Intermediate Period (EIP). Distinct polychrome ceramics and an extensive and monumental network of geoglyphs are hallmarks of the Nasca. However, the level of mastery of textile technology in this region was never surpassed by any other contemporaneous Andean culture in the Pre-Hispanic era (Conklin and Moseley 1988). At La Tiza, there is an Early Nasca component which has been radiocarbon dated to AD 80-550 and seems to build upon the local Formative period activities. During the phase the site expanded to approximately eight hectares and encompassed parts of Sectors I, II, III, and V (Conlee 2015:9-10). This is the first point that the evidence for local raw cotton production is convincing (*i.e.*, unprocessed botanical remains recovered from Nasca units) and spinning and weaving implements

show up in the archaeological record (Conlee 2015: 10-11). La Tiza is also integrated into the regional social and economic structures that characterize the Nasca Region during the EIP, most notably the ceremonial activities that centered on Cahuachi and regional trade networks (Conlee 2015). The Middle Nasca component at the site is mostly mortuary and there seems to be a break in domestic occupation of the site that begins during this phase and lasts until the Middle Horizon. No Late Nasca component has been identified at La Tiza (Conlee 2015:16). Two units (21 and 54) that could confidently be dated exclusively to the Early Nasca Phase produced fabrics. Other units with mixed contexts (see Units 32, 46, and 53 below) produced fabrics that are difficult to assign to a specific chronological period but may contain Early or Middle Nasca fabrics.

The majority of the fabric and textiles excavated from La Tiza date to the Middle Horizon (AD 650-1000) and LIP (AD 1000-1476). Two major factors contribute to the discrepancy in the size of the fabric assemblages between the earlier (Archaic, Formative, and Nasca) and later (Middle Horizon, LIP) components. First, preservation biases favor later materials (this is especially the case with the LIP fabrics) and those that have been discarded in a manner that provides greater protection from the elements (*e.g.*, the Middle Horizon mortuary textiles interred within stone tombs). Secondly, the total amount of fabric that was used and discarded during the Middle Horizon and the LIP would have been greater than what was used in earlier periods. For later Andean societies, fabrics, particularly textiles, had a major role in the economy, at least at La Tiza, this commodification became entrenched by the Middle Horizon (Murra 1962). Additionally, the La Tiza LIP occupation was relatively extensive and heavily populated (Conlee 2015). More people equates to more fabrics being consumed.

In the Nasca Region, the Middle Horizon is characterized by Wari influence and its beginning coincides with the end of the Late Nasca Phase and the eclipse of the Nasca Culture around AD 650 (Conlee 2010a, 2011; Silverman and Proulx 2002, Vaughn et al. 2006, Conklin and Moseley 1988). The Middle Horizon occupation of La Tiza was underway by AD 650 and had strong ties to the Wari Empire (Conlee 2015:16). The Middle Horizon habitation is more spatially restricted than both the Nasca and the LIP habitation, around 3 ha encompassing most of Sector IV and a small portion of V. Elite tombs of a style that is distinctive of highland mortuary traditions and appear for the first time during the Middle Horizon are spread out over 4 ha in Sectors III and V (Conlee 2010a, 2015:17-18). Fabrics were recovered in both the Middle Horizon domestic area and the elite tombs. La Tiza is abandoned without ceremony around the same time as the Wari empire collapses (AD 1000) signaling the end of the Middle Horizon (Conlee 2015:21).

The collapse of the Wari Empire signaled the beginning of the LIP and a major restructuring of society with localized polities emerging and a focus on more conservative and local traditions (Conlee 2010b, 2015; Conlee and Schreiber 2006). The abandonment of La Tiza, was probably related to a period of increased aridity in the Nasca Region that began before the end of the Wari Empire and lasted through the first few centuries of the LIP (AD 1000-1476). People did not move back to La Tiza until sometime around AD 1200 (Conlee 2010a). The LIP occupation of La Tiza is the largest pre-Hispanic occupation at the site and the largest LIP settlement in the region, approximately 15+ ha and concentrated in sectors II and V. Evidence of a complex social organization and hierarchy has been identified, such as a degree of architectural

differentiation that was not seen in the earlier La Tiza occupations. However, craft production seems to have become focused on utility while elaboration, especially that involving iconography, become far less common – probably a response to and rejection of the Wari and Nasca culture (Conlee and Schreiber 2006; Conlee 2015).

La Tiza seems to have been largely abandoned during the Late Horizon, the time of the Inca Empire. The only evidence for a Late Horizon presence at the site consists of a radiocarbon dated charcoal sample from Unit 13 in Sector V. However, no diagnostic Inca ceramics were identified in that unit or from any part of the site (Conlee 2015). Fabrics were recovered from Unit 13 and for the purposed of this discussion are treated as if they date to the LIP; however, the presence of the Late Horizon radiocarbon date should be kept in mind.

CHAPTER V

RESEARCH DESIGN AND METHODS

HYPOTHESES

I was aware going into the analysis that the Middle Horizon and LIP fabrics comprised the bulk of the La Tiza fabric assemblage and that there were very few fabrics that dated to the Archaic, Formative, and Nasca periods. Therefore, for the early contexts the goal of the research was to get as much information about the fabrics as possible so that it could be available for subsequent research. That left comparing the Middle Horizon and LIP fabrics as the main focus of the current discussion. One of the things I was interested in investigating was the manifestation of the highland Wari influence during the Middle Horizon. Specifically, I predicted that the proportion of wool fiber used in fabrics would be greater and that highland-influenced decorative structures would be more common during the Middle Horizon than the LIP. A second area of investigation would be comparing the domestic and mortuary fabrics of the Middle Horizon component. I expected to find that more resource- and labor-intensive fabrics were recovered from the elite tombs than the domestic contexts.

FIBER STRUCTURE DATA COLLECTION METHODS

The fabrics recovered from the La Tiza excavations are curated in the storage facilities of the Museo Regional de Ica “Adolfo Bermúdez Jenkins” in Ica, Peru. Because of logistical constraints, data was collected from a sample of the fabric artifacts. All of the fabrics from the Archaic and Nasca periods were analyzed as the assemblages from both components are small. Fabrics from the Middle Horizon and LIP comprised the bulk

of the assemblage. There were two main concerns guiding my decisions regarding which fabrics to analyze from these components: 1) variety in structure, material, and design and 2) integrity of the fabric structure. In other words, the likelihood that I would analyze a piece increased if the structure had a novel feature (*e.g.*, dyed fiber, embroidery, or non-standard yarn structure) or if it appeared that enough structural integrity remained to get reliable measurements. The presence of *selvedges*, the edges of fabrics that have been self-finished to secure the structure and prevent unraveling, also increased the likelihood that a piece would be examined (Phipps 2013).

The glaring omission from this sample is a fragmented basketry specimen. It was excluded from this analysis because it was extremely fragile and I did not feel I had the skills to handle it without causing irrevocable damage. For the Middle Horizon elite tombs, fabrics from only five of the eleven fabric-containing tombs was analyzed. This decision will be explained within the Chapter VI.

The fabrics are wrapped in acid-free tissue paper and stored in re-sealable plastic storage bags within curatorial cardboard boxes. The fabrics recovered from each individual level from each individual unit are stored in one or more of the bags; no bags contain fabrics from more than one level or unit. The assemblage is highly fragmented and in order to simplify the analysis, the fragments from each level of each unit were sorted into groups based on structural similarity. The assumption is that these groups are fragments originally from the same piece. The number of groups should not be treated the same as a MNI (minimum number of individuals) because two different groups could represent structurally distinct portions of the same original piece. Each group was assigned a code that combines the curatorial information with a letter unique to each

group in a box. For example, 06-018-029-E indicates that the group of fragments (at least the majority) is stored in bag 029 from box 018 from the 2006 excavations and has been assigned letter E.

Nickel plated steel stamp tweezers (Showgard brand), a large weaving needle, and non-powdered latex gloves were used when manipulating and examining the textiles. A USB-powered microscope with LED lighting (Dino-lite brand) was used to examine the fibers and structures under magnification. Photographs were taken using both the microscope (hand-held and stabilized using a stand) and a digital camera (Canon PowerShot SD850 IS). For all analyzed specimens, the relevant provenience and curatorial information was recorded as well as completeness, flexibility, raw fiber, color, and relevant metrics were recorded. The software included with the USB microscope (DinoCapture 2.0) was used to take most of the measurements. For un-dyed fibers – the Munsell color code was recorded (Munsell Soil Color Charts were used). I have avoided using the term “natural” (after Clark 1993) to describe the color state of the un-dyed yarns (or yarns that may have lost all traces of dye). Instead they will be referred to as un-dyed or simply by the Munsell Color Code. All dyed fiber, or fiber suspected of having been dyed, will be identified. Cotton cultivation and camelid breeding practices, which might select for certain colors would be different than the naturally occurring color range and availability. As this study does not involve an in depth discussion of these practices, I prefer to not make any assumptions about what is natural. For dyed yarns, the common color name was used (*e.g.*, blue, red, and yellow). It is important to keep in mind that soil and body fluid staining may have affected the specimens and, especially for the dyed fibers, the color may have degraded over time.

For all individual elements the direction of spin and the number and layers of plies are recorded using the Parenthetical Notation Method developed by Splitstoser. As Splitstoser (2012: 8) defines it, the Parenthetical Notation Method “is modeled after mathematical expressions, in which nested parentheses dictate a consistent order of operations and are dealt with from the inside out.” The final twist is the only letter capitalized. This method is concise, and easy to both record and comprehend. For example, a cord with a S(2z(2s)) formula can be described narratively as a cord with a final S twist composed of two Z-twist yarns themselves composed of two S-twist yarns. To the extent possible, the diameter and angle of twist of the different elements and their constituent parts was measured.

The terminology I used to identify observed textile structures is consistent with the system created by Emery (1966). As the system has been used over the years, textile scholars have found that modifications and additions to her system have become necessary, especially in the area of structures consisting of one set of elements (Rowe 1984b). The sources for the terms used throughout will be cited when they are first described. In addition to the description of the component elements, for textile structures, the average space between the elements was measured and the elements per cm were counted. Knots were identified using Graumont and Hensel’s *Encyclopedia of Knots and Fancy Rope Work* (1952).

CHAPTER VI

RESULTS

When the entire La Tiza assemblage is taken into account, two observations are readily apparent. First, S(2z) yarns are by far the most common element configuration. They make up the vast majority of textile elements, mostly as singles and less frequently doubled, meaning two elements per warp or weft. In the detailed results below, standard yarns will refer to this S(2z) configuration. This standard configuration also serves as the basis for the more complex cords. Secondly, warp-faced plain weaves (WFPW going forward) are the most common plain weave structure and warp-faced structures serve as the base for most of the decorated pieces. A *warp-faced* textile, is one in which the warps are more closely spaced and dominate the visible surface of the fabric. A *weft-faced* textile is one in which the wefts dominate the surface (*e.g.*, tapestry weaves; Emery 1966). Also of note, the vast majority of the textiles discussed below were recovered from domestic contexts. The exception is the textiles recovered from the Middle Horizon elite tombs which are discussed under a different heading to differentiate them from the textiles recovered from domestic Middle Horizon contexts.

MIDDLE ARCHAIC (6000 – 3000 BC)

Unit 52 Level B Sector I

Regionally, the Archaic Period dates from 9000 to 1800 BC. At La Tiza, a Middle Archaic (ca. 3600 BC) occupation was identified (Conlee 2015). Only one fabric specimen (09-012-001-A) was recovered from an unmixed – Archaic context, a small fragment (1.5 x 1.25 cm) of a cross- knitting of Z(2s) cotton yarns. *Cross-knitting* is a

single element, interlooped structure composed of rows of loops that close by the element crossing over itself and then continuing on in a vertical trajectory (similar in shape to a cursive “e”). The rows are connected horizontally as the top of the loops wrap around the cross at the base of the loop immediately above it. This fragment was executed in the “stocking stitch” variation which results in the horizontal interworking being emphasized on one face of the fabric and the vertical trajectory of the element emphasized on the opposite face (Emery 1966; 41-42). Other terms used to describe this structure include *needleknitting* (O’Neale 1934), *loop stitch network* (Harcourt 1962: 104-105), and *cross-knit looping* (Adovasio and Lynch 1973). The technique has a long history in the Andes. The structure was observed among the fabrics found at Guitarerro Cave (Adovasio and Lynch 1973: 88) and, along with a closely related embroidery structure, was popular in the traditions of the Paracas and Nasca cultures (O’Neale 1934; Harcourt 1962). A version of the technique used to protect and decorate the edges of fabrics was observed in the later components at La Tiza.

PROTO-NASCA/LATE FORMATIVE (370 BC – AD 75)

Unit 7 Level D Sector II

Specimens recovered from this unit include a short length of wool yarn (04-022-001-A) in the standard spin/ply configuration and three small textile fragments that have become stiff, fragile, and discolored (possibly through charring). The nature of the textiles makes it difficult to identify raw material although it appears that the elements comprising all the fragments are the standard configuration. Two of the fragments (04-022-002-A) seem to be from the same textile with balanced plain weave and standard configuration yarns. The specimen (which broke into two pieces during examination)

from the second textile type (04-022-002-B) is either a warp-faced or a weft-faced structure.

EARLY NASCA (AD 80-550)

Unit 21 Level B Sector III (Early Nasca)

One textile group and two short lengths of yarn were analyzed from this unit. Specimen 04-038-001-A consists of two fragments of a WFPW constructed of standard configuration cotton yarns. The larger of the two textile fragments has had a reinforcing whip stitch, consisting of three standard yarns, sewn down the length of the side selvedge before the fragment was folded over and sewn to itself (using Z(2s(2z)) cord), parallel to the side selvedge, creating a corner. The lengths of yarns are both the standard spin/ply. One is cotton (04-038-001-C); the other is wool (04-038-001-D). The structure of the textile fragments was similar enough to suggest that they were from the same fabric, thus measurements were taken from only one of the specimens. The cotton yarn (04-038-001-C), may have come loose from one of the textile fragments.

Unit 54 Level B Sector II (Early Nasca)

The sole fabric from this unit is two short lengths of cord, Z(2s(2z)) configuration, made of dyed red wool.

MIDDLE HORIZON (AD 650-1000)

Unit 19 Level B Sector IV

A fabric artifact (04-051-001-A) consisting of a WFPW and a probable WFPW sewn together using a whip-stitch was recovered from this unit, along with loose cotton fiber and yarns, which were not analyzed. The warps and wefts of both textiles are cotton

and composed of standard yarns. The whip stitch is composed of two standard yarns and attaches the two pieces at a non-right angle.

Unit 20 Level B Sector V

The only fiber artifact from this unit is a loose, single ply, Z-spun wool yarn (04-051-002-A).

Unit 45 Levels A and B Sector V

Four groups of textiles were analyzed. Specimen 05-032-006-A consists of 4 fragments of a WFPW textile with embroidered trim, which covers the end selvedge. The warps and wefts of the textile are composed of standard configuration wool yarns. The trim consists of flat stitches creating three rows of chevrons. The embroidery was done with standard configuration wool yarns that seem to have been tripled before being sewn through the fabric. In order to keep the stitches flat and straight, the embroidery was probably done before the textile was removed from the loom (Harcourt 1962: 121).

Specimen 06-032-006-B consists of two fragments of a WFPW with standard configuration cotton warp and weft elements. The side selvedge is present on both of the fragments confirming the structural classification. Specimen 06-032-006-C consists of a single fragment of a balanced plain weave composed of loosely spaced Z spun cotton yarns. Specimen 06-032-008-A consists of two WFPW textile fragments. The warp and weft elements are standard configuration cotton yarns. On the of the fragments, the side selvedge is present and has been reinforced with two nested rows of whip-stitches which have created a slightly rolled finish; the interior stitches are tripled standard configuration yarns; the exterior stitches have a Z(3s(2z)) configuration.

Twelve groups of cordage from this unit were analyzed. Specimen 06-032-005-A is a length of standard cotton yarn with an overhand knot, one of the basic knots that can sometimes unintentionally manifest in loose cordage (Graumont and Hensel 1952: 11-12). Specimen 06-032-006-D consists of two strips of plain weave fabric, probably a balanced plain weave of standard configuration cotton elements, that were S twisted to create a cord. A knot, some variation on a hitch (Graumont and Hensel 1952: 12) joins the two twisted strips. Specimen 06-032-006-E is a complex cord composed of dyed red wool. One section of the cord has a spin/ply configuration of $Z(2s(2s(2z)+5s(2z)))$, then there is a reduction in the diameter of the cord as most of strands terminate and the loose ends tucked into the cord; the section that continues on has a $Z(2s(2z))$ structure. There is an overhand knot at the end of the smaller section preventing additional fraying. It appears that the $Z(2s(2s(2z)+5s(2z)))$ configuration was the original structure, and the transition to the smaller diameter $Z(2s(2z))$ structure and knot were methods to prevent fraying after the original cord was damaged. Specimen 06-032-006-F is a wool cord with a $Z(7s(2z))$ structure. Of the Stage II yarns ($S(2z)$), 2 are brown (7.5YR 3/2) and 5 are tan (10YR 5/6), all un-dyed. It does not appear that the crafter attempted to create a repeating pattern with the different color yarns. Specimen 06-032-006-G is an wool cord with $Z(5s(2z))$ structure. Specimen 06-032-006-H consists of a loop created by tying a square knot, an overhand knot tied on top of another overhand knot (Graumont and Hensel 1952: 12), along a $Z(2s(2z))$ wool cord. Specimen 06-032-006-I is a thick wool yarn of the standard configuration; 06-032-006-J a wool cord of $S(2z(3z))$ configuration; 06-032-006-K a wool cord with $Z(2s(2z))$ configuration; and 06-032-006-L a cotton cord with $Z(6s)$ configuration. Specimen 06-032-006-M consists of three segments of a cord with

Z(2s(2z)) configuration. The component Stage II yarns have a barber-pole pattern created with dark yellowish brown (10YR 3/4) and pale yellow (5Y 8/4) fiber. The yellow yarns are camelid fiber. The brown fibers could be camelid fiber, as well, but do appear very similar to human hair under magnification. Specimen 06-032-007-A consists of two lengths of cordage made from vegetal fiber tied together in a knot. Part of the knot and one of the lengths of cordage are degraded to the point of making structural identification difficult; however, the remaining portion of the knot suggests that it was a square knot, and the remaining cord has a Z(2s(3i)) configuration.

Unit 47 Levels A and B Sector V

A sample of two lengths of cordage was analyzed from this unit. Specimen 06-032-010-A would have been a bi-color wool cord, brown (10YR 2/4) and yellow (2.5Y 6/8), with an overhand knot. The remaining brown fibers only exist within and exiting the knot. The configuration of the yellow yarn exiting the knot is standard; however, the interaction of the brown and yellow fibers in the knot suggests that the original cord configuration incorporated both the brown and yellow fibers and would have been more complex. Specimen 06-032-011-A is a short length of standard configuration yarn consisting of dyed blue camelid wool fiber.

MIDDLE HORIZON ELITE STONE TOMBS

At La Tiza, a new, more labor and resource intensive, form of mortuary architecture was introduced during the Middle Horizon. The heavily looted partially above-ground tombs were built of stone and are, with one exception, single-room structures that contained multiple burials (adults and children). The tombs are related to

styles of mortuary structures seen in the highlands and the individuals interred within the structures were both local and foreign elites (Buzon et al. 2012; Conlee 2010a, 2011).

Twelve tombs have been excavated out of 70 identified at La Tiza (Conlee 2011). The tombs are concentrated in Sectors III and V (Conlee 2015). Fabrics were recovered from 11 of the 12 excavated tombs, of those, fabrics from only five tombs were analyzed. From Tombs 1, 25, 42, 52, and 57, only undecorated plain weave fabrics and loose yarns and fibers were observed. Tomb 4 contained a cotton plain weave fragments and a some loose cotton yarns; however, it also contained a ball of yarn. The yarn in the ball is cotton, undyed brown fiber, and standard ply configuration.

Tomb 2 Sector V

The sample of artifacts analyzed from Tomb 2 includes three specimens of cordage and 17 textiles. Cordage includes 05-053-029-A, an oblique interlaced braid segment composed of three relatively thick standard configuration yarns. The fragment is stiff and discolored probably from long term contact with human remains, this has made fiber identification difficult, but it is probably camelid wool or human hair. Specimen 05-053-029-B is a segment of a square braid made of wool yarns. Only enough structural integrity remains to say that the braid is composed of 16 individual elements, each of which appears to be composed of two standard composition yarns which may or may not have been twisted together (Z?). Also, while there has been significant discoloration to the piece, at least some of the yarns appear to have been dyed blue or green. Specimen 05-053-029-C consists of three segments of oblique interlaced braid. The patterning of this braid was achieved using an even number of elements and two different colors of wool yarn, a medium brown (7.5YR 5/8) and a very dark brown (10YR 2/2), that were

taken from the outside and brought to the center creating a repeating chevron pattern (Cahlander 1980: 33). Damage to the fragments has been significant, but each element appears to be composed of a Z(2s(2z)) configuration yarn and there are more dark elements than lighter elements, probably a one to two ratio.

Specimen 05-053-018-A consists of two balanced plain weave textile fragments with loosely spaced Z spun elements composed of cotton fiber. The fragments are roughly the same, irregular shape. That suggests that these two fragments may be a remnant from a double-layered textile. Groups 05-053-018-C (n=1), 05-053-018-A (n=2), 05-053-030-A (n=7), and 05-053-030-B (n=8) are plain weave cotton textiles with Z spun warps and wefts. There are five groups of undecorated fabrics that have a set of elements predominant, but a lack of selvages prevents a positive identification of either WFPW or a weft-faced structure. Three of these are composed of standard cotton yarns: 05-053-018-B (n=5); 05-053-030-C (n=1); and 05-053-030-D (n=7). Two are composed of camelid wool yarns: 05-053-019-A (n=2) and 05-053-019-B (n=1).

Textile specimen 05-053-018-D is novel in the assemblage as it is the only piece observed that has a plaid design and the only analyzed textile structure that contains singled, doubled, and tripled elements in one piece. To make it easier to describe the fragment, the sets of elements, all cotton fiber, were arbitrarily designated as warps and wefts. All of the “weft” elements are single unplied yarns and there is a repeating pattern of 12 un-dyed beige-yellow (5Y 8/4) yarns followed by four dyed-pink yarns. The beige-yellow yarns are S-spun and the pink yarns are Z-spun. The “warp” elements are composed of doubled, standard configuration beige-yellow yarns and a stripe consisting

of two units of tripled, dyed-blue yarns (one of the units only has two blue yarns remaining, but the spacing indicates that a yarn is missing).

Textile specimen 05-053-019-D consists of two fragments from a textile composed of standard configuration wool yarns. One set of elements is predominant and there is a striped pattern created using different color yarns. Since introducing stripes into a WFPW is an efficient and common way to introduce decoration into a textile, this suggests that this is probably a WFPW (Rowe 1977). The hidden elements are very dark brown (10YR 2/2) and the two different colors of yarns that comprise the predominant elements, or face, of the fabric are very dark brown (10YR 2/2) and dark reddish brown (5YR 3/4). A second group, 05-053-019-B (n=6), does not definitively have any stripes. However, the hidden elements are consistent with the hidden elements of the 05-053-019-D and the predominant elements consistent with the red-brown stripes. So while the textiles have been sorted into two different groups, originally, they may have been part of the same textile.

Specimen 05-053-020-A is a textile consisting of two fragmented pieces of WFPW that have been pieced together along their extant side selvages using a whipped seam stitch of doubled standard wool yarns. The warps and wefts of both pieced textiles are standard wool yarns. In addition to the side selvages, sections of the end selvedge are still present on both pieces and while heavily damaged, it is possible to determine that header cords are present, probably three. During weaving of finished end selvedge textiles, *header cords* are attached to the loom bars, generally by having another cord spiral around both. The warps are then attached to the header cords instead of the loom bar so that when the weaving is finished, the warps do not have to be cut in order to be

removed from the loom. In essence the header cord acts as the final weft(s) at the end of a textile. Header cords are often more substantial than the other wefts (Rowe 1977:13). It is not possible to determine the exact configuration of the header yarns, although it appears to be a Stage III yarn composed of four to six standard wool yarns with a final Z twist ($Z(?s(2z))$). A fringe remains along these end selvages that was created by leaving room between the final weft and the end of the warps and allowing the folded-over yarns to twist back on themselves, creating $Z(4s(2z))$ cords that extend approximately 3.5 cm beyond the last header cord (Seiler-Baldinger 1995:130).

Specimen 05-053-024-A consists of two side selvedge fragments of a WFPW composed of standard configuration yellowish-brown (10YR 5/8) cotton yarns. Remnants of an oblique interworked wool binding/border cover sections of the selvedge both protecting the edge and decorating the piece. The binding is heavily damaged making structural identification, beyond a generic oblique interworking, difficult. The yarns used in the decorative border are standard configuration and a very dark grey (7.5YR 3/1).

Specimen 05-053-025-A consists of two fragments of a WFPW textile. The structure is confirmed by the presence of a section of side selvedge. The only decorative element to the piece is the use of barber-pole warps, medium brown (7.5YR 5/8) and very dark brown (7.5YR 2.5/2), creating a mottled effect. The weft elements are solid brown (7.5YR 5/8). All elements are standard configuration and composed of wool fibers. A repair was observed in which solid very dark brown (7.5YR 2.5/2) warps are woven in. The two fragments are loosely held together by what appears to be a single remaining stitch composed of three of the barber-pole yarns.

Specimen 05-053-027-A is a single fragment, with a side selvage, from a *slit tapestry weave*, or tapestry in which there is no connection between different weft fields when there is a vertical boundary leaving a slit in the fabric (Emery 1966: 79). All of the component yarns are standard wool yarn. All warps and the main color field wefts are of undyed light olive brown (2.5Y 5/8) fiber. There are short, narrow strips composed of rows of dyed blue, and probably red, fiber yarns.

Specimen 05-053-029-D is a textile fragment that consists of two pieces of WFPW that have been sewn together along their side selvages using an alternating herringbone stitch. The seam stitches are tripled standard configuration yarns and the warps and wefts of the textile are also standard configuration yarns. All of the fiber is wool.

Tomb 3 Sector V

Thirteen groups of textile fragments, a braided belt fragment, and two short lengths of S spun blue wool yarns were analyzed from Tomb 3. Specimen 06-045-035-A consists of a fragment from the end of a belt in which the main body is flat oblique interlacing that transitions into a fringe of tubular oblique interlacing which is further dissected into a secondary cord fringe. There are approximately 32 bundles composed of doubled Z(2s(2z)) wool cords, 24 very dark brown (10YR 2/2) and 8 brownish yellow (10YR 6/6). The two fiber colors create a chevron pattern. The oblique interlacing is then subdivided into eight tubular oblique interlaced cords with the colors evenly distributed. The tubular cords are then subdivided into four Z(2s(2z)) cords, three very dark brown and one brownish yellow. Only one of these final fringe cords is preserved enough to

reach a finish, an overhand knot that seems be more consistent with repair. At the other end, the belt appears to have been cut, possibly when the tomb was disturbed.

There are seven groups of undecorated plain weaves from Tomb 3. Groups 06-045-033-C (n=4), 06-045-034-C (n=3), and 06-045-034-E (n=1) are balanced plain weave textiles with Z spun cotton elements. Groups 06-045-036-A (n≈40) and 06-045-036-B (n=1) is a balanced plain weave textile with standard configuration cotton elements. Group 06-045-034-D (n=1) is a plain weave (possibly WFPW) textile with standard cotton elements. Group 06-045-034-A (n=1) is a WFPW textile (confirmed by the side selvedge) with standard configuration wool elements.

Specimen 06-045-033-A consists of six fragments of a textile with one set of elements predominant. Two fragments, Specimen 06-045-034-B, from a lower layer (B as opposed to A) are so similar that they may be from the same textile. No selvedges were observed, but it is assumed that the structure is likely to be WFPW. The concealed wefts are dark yellow brown (10YR 4/6) standard wool yarns. The warps are standard configuration yarns of dyed red wool fiber and under magnification appear to be of a different quality fiber than the brown yarns. It is likely that the reason for two different yarns being used in this textile is that it was a more efficient use of resources: the warps, which use a presumably higher-quality fiber to begin with and were then were dyed making them more time and resource intensive, dominate the face of this fabric and the undyed, probably lower quality, yarns are hidden.

Specimen 06-045-033-B consists of six fragments of a textile with one set of elements predominant. As with 06-045-033-A, there are no selvedges and the determination of structure is presumed, in this case based on the presence of a stripe

design (more common to WFPWs). The wefts and the majority of the wefts are dyed-blue-black cotton yarns of standard configuration. The narrow warp stripe is composed of approximately four undyed brownish yellow (10YR 6/8) standard cotton yarns.

Specimen 06-045-036-C consists of about 30 fragments of a WFPW textile with standard configuration wool warps and wefts. At least some of the main elements, both warps and wefts, appear to be barber-pole (dark brown 7.5YR 3/2 and dark yellowish brown 10YR 4/4) although extensive discoloration makes it difficult to determine if this extends to all of the main body elements. A section of a covered/finished side selvedge is preserved along the largest fragment. This finish is a border, approximately one cm wide, composed of a closely spaced whip stitches. The cord used in the stitches is a S(4s(2z)) dark brown (7.5Yr 3/2) wool cord.

Specimen 06-045-036-D consists of a clump of fabric(s) that no longer retains enough structural integrity to make a clear identification. There is a mesh of dyed red, Z spun wool yarns that retains enough integrity to determine that it was a woven structure, maybe a loose, plain weave. However, the clump also has a mesh of brownish yellow (10YR 6/6) yarns, very similar to the red, that also maintain some hints of a woven structure. The current position of meshes and the difficulty separating the “pieces” out by color suggest that these specimen may be what is left of a layered fabric, possibly a warp-face double-weave (see Tomb 6).

Specimen 06-045-036-E consists of two fragments, both corners, from what appears to be a warp-face double-weave textile. Small sections of the overall design are observable despite the fragments being stiff and partially discolored, likely due to contact with human remains. Very dark brown (10YR 2/2) and medium brown (7.5YR 4/6)

standard configuration wool warps are used to create a rectilinear pattern. None of the wefts are exposed for analysis. There is knit or embroidered border finishing and protecting the end selvedge (confirmed) and side selvedge (presumed) on both fragments. It is difficult to identify the configuration of the border yarns, but S(2Z) yarns comprise the Stage II level of the final element.

Tomb 5 Sector III

Fourteen groups of undecorated plain weave textiles were analyzed from Tomb 5. Groups 06-018-028-E (n=10) and 06-018-028-M (n=3) are a balanced plain weave textiles with Z spun cotton elements. Groups 06-018-028-F (n=1), 06-018-029-B (n=1), and 06-018-030-A (n=1) are balanced plain weave textiles with standard configuration cotton elements. Groups 06-018-028-B (n=7), 06-018-029-C (n=2), 06-018-029-F (n=1), and 06-018-030-B (n=1) are WFPW textiles with standard configuration wool elements. Groups 06-018-028-C (n=25) and 06-018-029-A (n=3) are WFPW textiles with standard configuration cotton elements. These two are so similar that they may represent the same textile; however, they are from different bags and were treated as separate. Group 06-018-028-J consists of one relatively thick WFPW (confirmed by side selvedge). The diameter of the component wool elements that have a Z(2s(2z)) configuration are responsible for the increase in thickness of the fabric.

Specimen 06-018-028-A consists of 17 fragments of a WFPW textile. The structure is confirmed by preserved sections of end and side selvedges. Three of the fragments are large enough to suggest that these are from a large garment or blanket. Both sets of elements are of standard configuration and composed of wool fiber. At the end selvedge, there only appears to be a single header cord/element and there was no

clear view of it, but the configuration seems to be a doubled yarn. Additionally, the end selvedge has been finished using a cross-knit embroidery stitch, a variation on the cross-knit looping technique (O’Neale 1934; Harcourt 1962; Emery 1966). The color of the embroidery yarn (standard configuration, wool fiber), black (10YR 2/1), contrasts with the warps and wefts, yellowish brown (10YR 5/6), of the textile. Another possible decorative element, there are several small holes in the fabric that may be the voids left by lost embroidery yarns and cords. The voids are created, not through the breakage of elements, but by the elements being pushed to the side and there does seem to be some coherent organic shapes in the series of cord or large yarn sized holes.

Specimen 06-018-028-D consists of three fragments of a WFPW textile. Both sets of elements are standard configuration wool yarns. One of the fragments contains a corner of the textile that preserves sections of a side selvedge and a rolled hem probably containing the end selvedge. The stitches creating the rolled hem are tripled standard configuration wool yarns. The technique for creating a rolled hem on a completed textile is described by Brown (1978:201-202). On a warp-face textile, it is a simple procedure that involves using a needle to weave a supplementary weft in only one direction, towards the edge, through both the edge of the original textile and an overlaying “tape” created with supplementary warps. The roll is creating by pulling on the supplementary weft. According to Brown, this finishing technique was most commonly applied to coca bags and tunics.

Two groups are WFPW textiles with barber-pole warps, 06-018-029-G and 06-018-030-C. Specimen 06-018-029-G consists of two fragment of a WFPW with barber-pole warps as well as a finish, probably a fringe, coming off as part of the end selvedge.

The finish is created by the attachment cords that were left on the textile and is currently too tangled to analyze the original structure. All of the elements are standard configuration wool yarns: the barber pole warps are light yellowish brown (10YR 6/4) and very dark grayish brown (10YR 3/2); the wefts are light yellowish brown. Specimen 06-018-030-C consists of one fragment of a WFPW with bi-color warps; standard configuration wool elements; the wefts are dark brown (7.5YR 3/3) and the barber-pole warps are dark brown and very dark grey (7/5YR 3/1).

Specimen 06-018-029-D consists of one fragment of a textile with one set of elements predominant. All of the elements are standard configuration wool yarns and the textile exhibits two decorative design features: 1) a stripe (?) pattern executed by the dominant elements and 2) barber-pole concealed elements. It is assumed that it is a tapestry weave structure because the concealed elements are barber-pole, a feature common to highland influence tapestries (Conklin 1983; Rowe 1986). The colors of the stripes yellowish brown (10YR 5/6), very dark greyish brown (10YR 3/2), and a possibly dyed red (2.5YR 4/8). The barber-pole warps, very dark greyish brown 10YR 2/3 and yellowish brown 10YR 5/6, would have been almost completely obscured by the wefts, and may not be a decorative feature. They would be considered decorative if they became visible by a change in the structure in a different section of the fabric. If, however, they were completely obscured in the original textile, they may have been imbued with a supernatural quality, a question that will be addressed later.

Specimen 06-018-029-E consists of three fragments of a stripe-patterned WFPW textile. All three fragments preserve the side selvedge, confirming the structure classification. The stripes are created with the dominant warp yarns and three colors are

represented: dyed blue; dyed red; and very dark grey (7.5YR 3/1). The wefts are brownish yellow (10YR 6/8). All of the elements are standard configuration wool yarns.

Non textile specimens from this unit that were analyzed include 06-018-028-G, an overhand knot containing two different types of yarns: two Z spun, yellowish brown (10YR 5/6) cotton yarns; and yarns(s) made from contrasting dark brown (7.5YR 3/2) wool fiber. Not much of the wool yarns is preserved outside of the knot, and inside the knot, the configuration is distorted, precluding positive identification. Specimen 06-018-028-H is a segment of an oblique interlaced braid constructed in a method similar to Specimen 05-053-029-C, but with four elements, two each light olive brown 2.5Y 5/6 and very dark brown 10YR 2/2. Each element is made up of quintupled or sextupled standard configuration wool yarns. Specimen 06-018-028-I is a segment of an oblique interlaced braid constructed in the same manner as 05-053-029-A. Each of the three elements is composed of multiple standard wool yarns.

Specimen 06-018-029-H is a large fragment, approximately 60%, of a cinch-close completely wool bag composed of two individual WFPW textile panels, both with warp stripes and supplementary warp floats (Rowe 1977). This technique is common on bags recovered from Middle Horizon tombs in the Nasca Region although typically with a cotton ground cloth and wool supplementary warps (Rowe 1977: 35). The warps and stripes are positioned horizontally or parallel with the bag opening. This orientation is assumed although no selvages are visible. If any of the selvages remain, which presumably they do, they are concealed by the finishes along the side seams and opening (the bottom of the bag is missing). The side seams have been finished with cross-knit looping stitches, two wide, which seem to be utilizing the excess warps, either from one

of both panels. The edges around the opening are finished with what appears to be cross-knit looping stitches, one wide, of introduced yarn, Z(2s(2z)) configuration yellow (10YR 8/8) yarns. There is an oblique interworked tubular cord that probably served a decorative function attached at the middle of one of the side seams by a lark's head (cow hitch) knot (Graumont and Hensel 1952: 12; Cahlander 1980:35-36). The cord is composed of approximately eight strands, six yellow and two very dark grey, of bunched standard configuration wool yarns. The current termination is frayed and damaged and the original finish has been lost. The cinch-closure cord is heavily degraded and encrusted with dirt and organics making it difficult to identify the original ply configuration; although it appears to be composed of two individual Z(2s(2z)) cords. The two ends of the cord are tied together in an unidentified (due to damage) knot.

The two panels use different colors and warp float designs, but coordinate well and the designs do not clash. To facilitate discussion, the panels will be identified by their dominant color, yellow or green. The wefts of the both panels are yellow (10YR 7/8) standard configuration wool yarns. For the yellow panel, the warps of main structure are standard configuration wool warps and are arranged in stripes of yellow (10YR 7/8), very dark grey (10YR 3/1), and dyed green. Yellow and very dark grey supplementary float warps that are obviously bulkier, S(3z), create the impression of serpentine lines and dots running down the outward facing side of the textile. The green panel has standard configuration warps arranged in stripes of dyed green, yellow, and very dark grey. This side also has S(3z) configuration supplementary warps used to create serpentine lines and dots, but in three colors: yellow, very dark grey, and light red (2.5YR 6/8). On both panels the supplementary warps are unevenly floated on both the interior and exterior

faces. Parallels have been drawn between the design created by the supplementary warps and textile cross-sections (Frame 1986; Conklin 1997). Additionally this design is associated with the Altiplano (Conklin 1997), but the cross-knit stitch seam is associated with the textile traditions along the south coast (Rowe 1977: 36). Thus, the decorations from this bag incorporate both the highland and coastal traditions and the warp float design is an abstract representation of the ground cloth that supports it.

Tomb 6 Sector III

Twelve groups of simple plied yarns/cords, three groups of oblique interlacing, one twined fabric, and 19 groups of textiles were analyzed from this tomb. Nine of the cord types are simple, undecorated and made of cotton: 06-019-041-G (n=1) has a S(2z(8s(2z))) structure; 06-019-041-H (n=1) has a S(2z(6s(2z))) structure; 06-019-041-I (n=2) and 06-019-042-A (n=1) have a Z(2s(9s(2z))) structure; 06-019-041-J (n=2) has a S(2z(10s(2z))) structure; 06-019-041-K (n=1) has a S(2z(9s(2z))) structure; and 06-019-041-L (n=1) has a S(2z(12/13s(2z))) structure. Group 06-019-042-B consists of five lengths of cotton cord that have a S(2z(3s(2z))) configuration. The pieces have a gentle curvature to them that suggest that they may have been components to a larger cord with a final Z twist, Z(?s(2z(3s(2z)))). Group 06-019-043-E (n=4) is another Z(2S(9S(2Z))) configuration cotton cord. At least some of the Stage II yarns are barber-pole: yellow (10YR 7/6) and dark yellowish brown (10YR 3/4).

Specimen 06-019-041-M consists of a length of cord that has been secured by a figure-of-eight knot of a similar cord (Graumont and Hensel 1952: 12). A splice was observed at one of the frayed ends of the cord that has the knot secured around it. The splice occurs within the Stage III component of the cord as three S(2z) yarns are

interlocked around three introduced S(2z) yarns, doubling the number of component yarns in either direction to create the Stage IV, Z(10s(2z)), component. The cord is made entirely of cotton and the final ply configuration is S(2z(10s(2z))). Emerging from one end of the knot is the beginning of that cord, or the location where the Stage IV cord was folded over and re-plied creating a Stage V cord. The damage at the other end of the knot cord is so severe that it is impossible to determine the ply configuration of the knotted cord, but it is likely similar to the cord it secures and may be a different section of the same cord. The context and the utilitarian structure of 06-019-041-M and the other simple, undecorated cotton cords from this tomb suggests that they may have been used to secure a mummy bundle (Clark 1993).

Groups 06-019-043-F (n=5) and 06-019-043-G (n=2) also appear to have been used to tie up a mummy bundle. The 06-019-043-F cords are Z(2S(9S(2Z))) and cotton; the 06-019-043-G cords are Z(3s), smaller in diameter (3.7 mm as opposed to 7.1 mm), and made of an unidentified, stiffer, vegetal fiber (fourcroya?). A knot, whose structure is obscured by damage, connects a sections of 06-019-043-F and 06-019-043-G. Another length of 06-019-043-F cord is interlocked with a length of 06-019-043-G, and encrusted together with organic material.

Two types of square braids, or tubular oblique interlacing, were analyzed from this tomb. Specimen 06-019-041-F is a segment from a 10-strand square braid with a chevron texture that is created as the strands interlace in the center of each face (Rowe and Cahlander 1980:25-27). The component yarns are standard configuration and wool. Specimen 06-019-041-U is a segment of a square braid that was accomplished by interlacing four active strands around a core and creating alternating bands of color by

changing the active and inactive yarns (Cahlander 1980:12). All of the fiber is wool and the active strands seem to be composed of two standard configuration yarns. The yarns colors are brown (7.5R 5/4), dyed red, and dyed blue.

Specimen 06-019-041-V is a segment of a balanced oblique interlaced flat braid with a color effect design (Speiser 2011 [1983]:19-22). One of the ends is preserved and, though damaged, appears to be the start of the braid. The component yarns are folded 180° over a wool (?) cord, doubling the number of working yarns. The scaffolding cord is frayed as it exits both sides of the interlacing and it is unclear whether it was intentionally cut or otherwise lost. The elements are bundled into 16 strands that are composed of two standard configuration wool yarns and come in three colors, yellow (10YR 7/3; n=10), dark grey (10YR 4/1, n=2), and dyed red (n=4). Red parallelogram shapes are created by the spacing of the different color yarns in the interlacing.

Seven groups of undecorated plain weave textiles were analyzed from this tomb. Groups 06-019-041-N (n=1) and 06-019-043-B (n=1) are WFPW textiles with standard configuration cotton elements. Group 06-019-043-C (n=2) is another WFPW textile; however, the piece is heavily soiled and it is difficult to determine the fiber and configuration of the yarns. Groups 06-019-041-S (n=2), 06-019-043-A (n=1), and 06-019-043-D (n=1) are balanced plain weave textiles with standard configuration cotton elements; 06-019-043-A has a preserved section of end selvedge composed of three header cords with Z(3s(2z)) configuration. Specimen 06-019-041-T is a single fragment that represents a portion of textile of unknown function. The primary structure is of a balanced plain weave with standard configuration cotton warps and wefts. Portions of both side selvedges and one of the end selvedges remain. The end selvedge is composed

of three cotton header cords with a Z(3s(2z)) configuration. The textile was folded lengthwise so that the side selvages meet, it was then folded lengthwise again and a running stitch (Emery 1966: 234), Z(2s(2z)) configuration, sewn through the layers along the edge with the side selvages. The remaining short edge, with the end selvedge does not appear to have been closed. This creates a sleeve-type construction but the function is unknown.

Three specimens, 06-019-042-C, 06-019-042-D, and 06-019-042-E, are composed of WFPW textiles that are similar enough that they may be from the same garment or other construction. All of the sets of warps and wefts are standard configuration cotton yarns. Specimen 06-019-042-C is a single fragment of a WFPW textile with narrow, folded hem secured by a straight stitch, a Z(2s(2z)) configuration cotton yarn. The hem may be along the end selvedge, however, damage to the edge prevents positive identification. Specimens 06-019-042-D and 06-019-042-E are composite textiles each composed of four layers. Two types of cotton sewing yarns used in 06-019-042-D: Z(3s(2z)) and doubled standard configuration. The top layer has been sewn to the piece like an applique, with the two remaining edges folded over and sewn to the piece. The second layer (from the top) has a portion of the end selvedge remaining, three header cords of Z(3s(2z)) configuration, as well as a portion of a folded hem remaining. Specimen 06-019-042-E has Z(3s(2z)) configuration cotton sewing yarns and similar folded and hemmed patchwork/applique construction. One of the pieces has an end selvedge remnant with three Z(4s(2z)) configuration header cords and another piece has a side selvedge remnant. It is difficult to make sense of what the final construction might have looked like. Composite textiles that covered mummy bundles like extra-large tunics

have been described, but these pieces are too small and irregular to make any strong suggestions regarding function (VanStan 1971).

Specimen 06-019-041-D is a single fragment of a camelid wool textile. The elements are of dyed red wool fiber and are the standard configuration. The dyed fibers are the only “decorative” element to the piece. The primary structure of the textile appears to be a WFPW, but it could be a weft-faced weave, there are no preserved selvages to facilitate positive identification.

Specimen 06-019-041-A represents most of a tunic in five fragments. The textile structure is WFPW with standard configuration cotton elements. Specimen 06-019-041-C (n=1) was analyzed separately, but is structurally consistent with tunic fragments and may originally be from the same garment. The tunic was constructed by attaching three finished panels along the side selvages with an alternating, herringbone stitch made with a Z(7s) cord. The sides of the tunic were open along the outside side selvages, and the outside selvages finished with a whip stitch (Z(2s(2z)) cotton cord). The only end selvages remaining are located along what would have been the base of the tunic/garment; the selvages that would have been located near the neck openings no longer remain. There is a short, between two and three millimeters, fringe was located along the bottom of the tunic. It was created by allowing the length of warps that wrapped around the loom bar to twist back on themselves after the textile was removed from the loom. The last two wefts before the fringe begins are doubled standard cotton yarns.

Specimen 06-019-041-B consists of a two plain weave textile fragments connected by a S(2z(6s(2z))) configuration cotton cord pulled/sewn through both pieces.

Both of the textiles are completely composed of cotton fiber yarns. One piece has standard configuration warps and wefts. The other has doubled standard configuration wefts and standard configuration singles for the warps. Sections of both the side and end selvedge are preserved on the second fragment. The end selvedge is composed of three header cords with a Z(3s(2z)) configuration. There is an additional fragment of the textile composed of standard configuration sets of elements.

Specimen 06-019-041-O is a textile fragment that is probably another piece of the half-basket plain weave textile in 06-019-041-B. The basics of the primary structure are the same and there are three or four holes (1 cm dia.) that likely represent the locations that a cord, probably the one that is preserved in 06-019-041-B, was pulled through the fabric. Two features were observed in this fragment that either are not preserved in the piece that is part of 06-019-041-B (warp extensions) or are not as apparent (color variation in the warps). Less than one-third of the warps have barber pole color patterning with slight variation in color. There is not an obvious repeating pattern, but this color variation probably gave the textile a mottled appearance. This fragment preserves a section side selvedge. Along this selvedge, approximately seven cm apart, two weft elements extends past the edge by seven mm before turning 180°, replying around themselves, and reincorporating into the textile. The spacing of these extended wefts seems to eliminate the idea that they functioned as a fringe, but otherwise, the purpose is unclear.

Specimen 06-019-041-P is one fragment of a tapestry weave in which both sets of elements are standard configuration yarns. The warps are cotton and pale yellow (2.5Y 7/4); the wefts are wool and there are five colors: light olive brown (2.5Y 5/6); dyed red;

olive brown (possibly dyed; 2.5Y 4/3); and black (possibly dyed; 2.5Y 2.5/1). The pattern executed by the warps is geometric with stripes and small rectangles.

Specimen 06-019-041-R consists of one fragment of a tapestry weave with a preserved section of side selvedge. Both sets of elements are standard configuration wool yarns. The warps are brown (7.5YR 3/2) and there are three weft colors: very dark grey (Gley1 3/N); brown (7.5YR 3/2); and very dark greenish grey (Gley1 3/10Y). Due to the small size of the fragment and level of damage to the piece it is difficult to make sense of the remaining design although the forms appear to be geometric. The tapestry structure has two distinctive features: 1) between the color fields, the wefts are connected by single interlocking, a single linking between two different color wefts as they meet and turn 180° (Emery 1966: 81); 2) the very dark grey wefts are carried through the fabric along the warps presumably to be used in other color fields.

Specimen 06-019-041-E is a fragment of WFPW that is partially covered by columns of satin stitch embroidery (Emery 1966:237). The warps and wefts of the ground cloth are standard configuration brown (10YR 3/3) wool yarns. The embroidery yarns are standard configuration, wool, and are black (5Y 2.5/1) and the same brown as the ground cloth elements. The embroidery was likely executed while the ground cloth was still in the loom and the width of the columns was probably kept intentionally narrow to prevent the stitches from distorting (Harcourt 1962: 121). Despite damage to the fragment, the remaining embroidery and the holes left by lost yarns suggest that the design was most likely a border consisting of solid blocks of black and brown. The width of the border is three columns wide, approximately two cm, and encompasses about 6 warps in each column.

Specimen 06-019-041-Q is a single fragment of a band or belt with a WFPW double cloth structure. *Double cloths* structures are textiles composed of two layers, two distinct sets of warps and wefts, “which interpenetrate each another in such a way as to form patterns” (Cahlander and Baizerman 1985:7) The oldest surviving double cloth textiles come from the South Coast and date to the Early Horizon. These early examples are balanced plain weave, which overall is more common than warp-faced double cloth. The warp-faced variety seems to have been introduced around (or developed in) Nasca during the middle of the EIP. The technique continued to be popular through the Middle Horizon and LIP (from which most extant examples date to). This color and fiber combination in this fragment is unusual when looking at double cloths throughout the Pre-Hispanic Andes, but more typical of the Middle Horizon. The standard LIP plain weave double cloth was executed in brown and white cotton (Rowe 1977:94-95; Cahlander and Baizerman 1985:7-8). This piece is completely wool and four warp colors are used in this piece: dyed dark red, dyed dark green-blue, dark brown (7.5YR 3/4), and reddish black (2.5YR 2.5/1). Each color yarn only interacts with one other color (*i.e.*, the dark red and dark green-blue warps only interpenetrate each other). In the pattern created by the warps the strip of dark brown and reddish brown pattern is flanked on one side by the strip of dark red and dark green blue pattern and a narrow solid red band. All of the wefts are dyed red and all of the elements are standard configuration wool yarns. Damage to the fragment has made discerning the design executed with the dark brown and reddish black yarns difficult, but the dark red and dark blue-green design is more clear. The design consists of interlocked stepped frets and may be an abstract representation of twisted yarn/cordage (Frame 1986).

Specimen 06-019-041-W, an end fragment from a belt, is structurally unique in this assemblage. The primary structure is discontinuous turned weft-wrapping which creates a tapestry-like effect. *Weft-wrapping* is simply encircling, or wrapping, the warp elements with the wefts as the method of interworking. From there the weft can either move horizontally or continue to move down the same weft. It is not considered interlacing and, therefore, not technically weaving, but twining. Turned weft-wrapping is a technique that keeps the texture of both faces of the fabric, thick ribs in this case, identical by changing the “front” face of the fabric after every row (Emery 1966: 214-216; Seiler-Baldinger 1994:57-59). This piece was constructed by taking the component standard configuration wool yarns, folding them over a thin horizontal scaffolding, likely something stiff like a cactus needle, but possibly a taut cord. Pulling damage at one corner of the end may have happened when the scaffolding was removed. The yarns move back and forth between functioning as “warp” and “weft” in this piece, being part of one of eight passive warp elements until they are needed to act as wefts. Once the weft function terminates, the yarn rejoins the warps and is carried down the fabric until it is needed again. This technique is still commonly used in the Andes (Cahlander 1980). The pattern forms on this belt are lines and chevrons created using four yarn colors, yellow (10YR 7/8), brown (10YR 4/3), black (10YR 2/1; possibly dyed), and dyed red. The yellow and black yarns are not observed among the folded yarns at the end of the belt, they may either be obscured by the more numerous red and brown yarns or they may have been introduced as needed into the structure.

Tomb 41 Sector III

From this tomb, only one fragment of oblique interlacing has a coherent enough structure to analyze. Specimen 09-024-019-A consists of one fragment of flat oblique interlacing using six strands and three colors of wool or hair to create a chevron pattern. Each strand is composed of approximately four S(2z) yarns and the yarns colors are dyed red, reddish black (2.5R 2.5/1), and yellow (10YR 8/6). The red and yellow yarns are camelid wool, the black yarns may either be wool or human hair. The chevron pattern is created by bringing the yarns from the outside and interlacing them in the center of the braid (Cahlander 1980: 33).

Two textiles with a WFPW structure were analyzed, both are entirely cotton. Specimen 09-024-020-A is a small side selvedge fragment with standard configuration elements. Specimen 09-024-020-B consists of a single fragment with a portion of the end selvedge preserved. This fragment is probably from a cinch-closure bag, as the textile is still shirred along the two tripled standard configuration header cords.

Three groups of belts or bands were also analyzed from Tomb 41. Groups 09-024-019-B and 09-024-019-C are both slit tapestry weaves with cotton warps and wool wefts. It is possible that they were originally part of the same piece, but the design and width of the two groups is different enough to suggest otherwise. For 09-024-019-B (n=1), the warps are yellow (10YR 8/6) standard configuration cotton yarns. The wefts are wool, standard configuration, and four colors are used to create the pattern of offset bands: yellowish brown (10YR 5/6), very dark grey (7.5YR 3/1), dyed pink/red, and dyed blue. For 09-024-019-C (n=3), the warps are very pale brown (10YR 8/4), cotton, and the ply configuration is undetermined due to damage and warp loss. The wefts are wool, standard configuration, and are of three colors: very dark brown (10YR 2/2), yellowish brown

(10YR 3/4), and dyed pink/red. The tapestry design is abstract with forms that have jagged edges.

Specimen 09-024-019-D consists of four fragments of a belt with a complementary warp-weave based on a 2/2 diamond twill structure (Rowe 1977:67-68). *Twill weaves* utilize floats that are aligned diagonally. In diamond twills, the float alignments intersect (Emery 1966:92-97). *Complementary sets of elements* occur when there is an additional set(s) of elements oriented in one direction, the warps in this case, that are “co-equal” in the structure. The fabric will be double-faced, with the two complementary elements interlacing synchronously but mirrored (Emery 1966: 150). 09-024-019-D: four fragments of a belt with a complementary warp-weave based on a 2/2 diamond twill structure (Rowe 1977:67-68). All of the elements are Z(2s(2z)) configuration wool cords and the wefts are red (2.5YR 4/6). The main body of the strap has complementary warps; however there is a narrow band along either side selvedge in which two warps, red, interlace with the weft like a typical plain weave. One set of warps is dark reddish grey (2.5YR 3/1). There are two colors, red and yellowish brown (10YR 5/6) among the second set of warps and they alternate colors every three warps. Rowe (1977:69) describes a garment dating to the Middle Nasca Phase that has a band with a complementary warp-weave based on a 2/2 diamond twill structure.

LATE INTERMEDIATE PERIOD (AD 1000-1476)

Unit 11 Level B Sector V

Fabric artifacts recovered from this unit were all cotton and include cordage, textiles, and loose yarns. The loose yarns were standard configuration as were the warps and wefts from all of the textiles (04-063-001-E, F, G and J). All of the textiles fragments

also have WFPW structure. The side selvedge of specimen 04-063-001-E is contained within a rolled hem has been reinforced with a whip-stitch of $Z(5s(2z))$ configuration. Specimens 04-063-001-F and G both have a cord, $Z(3s(2z))$, sewn parallel to the side selvedges possibly indicating that they are fragments from the same fabric artifact. There is a knot in the sewing cord from 04-063-001-G which joins it to a dual color cord, also $Z(3s(2z))$, in a complicated knot whose structure I cannot identify and which may incorporate yarns from the textile.

There is a short length of compound cordage with a $Z(4s(2z))$ structure (04-063-001-E). There are two specimens which consist of a loop of cordage created with a knot. Specimen 04-063-001-D is a roughly finger-sized loop of $Z(5s)$ cord closed by an overhand knot, and 04-063-001-I consists of an unidentified knot resulting in two loops on a $Z(2s(2z))$ cord. Specimen 04-063-001-H may have been another knot and loop combination, but has become tangled and indecipherable. The cord is a $Z(2z(2s(2z)))$ structure. The most complex cord and knot structure from this unit, 04-063-001-B, is a light colored cord with two knots, one of which creates a loop with a contrasting strong brown pendant cord attached to the loose body. The structure of the main cord is $Z(8s(2z))$ in the most intact section. The loop is created using what looks like a figure-of-eight knot and there is another knot, probably an overhand knot along the body of the loop.

Unit 13 Level B Sector V

Also may contain Late Horizon material (see La Tiza Chapter). Two fabric specimens were recovered from this unit. The first (04-063-002-A) is a WFPW fragment with end selvedge. It was difficult to determine many of the attributes of this fragment

because it was still covered dirt, but too fragile to easily clean without damaging the piece. However it does appear to be cotton and undecorated with standard structure warps and wefts. The second specimen (04-063-002-B) was unique to the site. It is a short band approximately 5 cm long and 1.5 cm wide. The length measurement is complete and the width measurement is taken from a section that appears to be intact. The body of the piece was created by folding and winding wool yarns back and forth to create the short rectangular band which was secured with rows of stitches perpendicular to the main body yarns. The spin/ply configuration (possibly standard) of the main body yarns is difficult to assess even in the most intact portion possibly because they were never very tight yarns. There are five complete or partial rows of perpendicular stitches remaining, but permanent creases and voids from lost stitches indicate that there were originally 12 rows. The stitches are wool yarns of standard spin/ply configuration. The function of this piece is unknown, but it could have served as a short strap or some kind of decorative addition.

Unit 14 Levels A and B Sector V

All of the textile fragments recovered from this unit are WFPW structures. Groups 04-063-003-A, B, and C are all fragments with a WFPW structure. They were recovered from the same level, A, and appear similar enough that they could be from the same textile. All the yarns are cotton and standard configuration and there is a small section of a side selvedge remaining on specimen 04-063-003-A.

Two WFPW textile specimens (04-063-004-B and C) with standard cotton yarns were recovered from Level B as well as several other cotton yarns (not analyzed) and loose cotton fibers. There was also a much more complex piece recovered from this level,

04-063-004-A. This is a corner fragment of a complex pouch, garment, or other structure. The main body (6 x. 4.5 cm) of this specimen is a WFPW textile that is decorated with a stripe created using supplementary wefts and a fringe. Both sets of the main elements are pinkish white (7.5 YR 8/3) standard configuration cotton yarns. A section of the end selvedge of the main body textile remains and consists of three or four Z(4or5s(2z)) configuration header cords. The stripe is just under one cm wide and composed of yarns in (probably) dyed brown-red and dyed blue. The blue wefts are dyed cotton with a 4 S(2z) configuration. The red wefts are dyed camelid wool and it is likely they would have been originally spun (otherwise they could not have been woven in), but they have come undone. The pattern in the stripe is three sets of two red wefts with one blue weft separating the sets (RRBRRBRR). The supplementary wefts were inserted into the fabric before it was folded over and a whip-stitch (standard configuration cotton yarn) used to hold and reinforce the folded edge. The long (originally >10 cm) fringe was made by twisting warps together to create S(2z(4s(2z))) cords that are finished in a sinnet knot (Graumont and Hensel 1952). The piece has also been patched/repared with another piece of WFPW (with preserved end selvedge consisting of three Z(5s(2z)) configuration header cords). A cotton cord with a Z(6s(2z)) attached the patch to the main piece and a Z(5s(2z)) configuration cord sewn along the top of the “pouch” and may have been a cinch cord.

Unit 15 Levels A and B Sector V

Two plain weave textiles were analyzed from this unit. Specimen 04-063-005-A consists of a small fragment of a WFPW textile. The structure is confirmed by the presence of a section of side selvedge. Both sets of elements are cotton standard

configuration yarns. Specimen 06-063-006-A is a single fragment of a half-basket (weft) plain weave. It is assumed that the wefts are the doubled element despite the lack of preserved selvages as the only other half-basket plain weaves in the assemblage have had doubled wefts, not doubled warps. The component elements are standard configuration and doubled standard configuration cotton yarns.

Unit 34 Level B Sector IV

Three balls of yarn and associated loose yarns were analyzed from this unit. The balls and the loose yarn are all Z spun cotton singles. Each ball is a different shade of brown: 05-041-001-A is very pale brown (10YR 8/2); 05-041-001-B is brown (10YR 5/3); and 05-041-001-C is moderate brown (5YR 3/4). There is also a short length of standard configuration wool yarn, that has almost completely come undone, 05-038-009-A, and two fragments of a balanced plain weave textile with standard configuration cotton elements, 05-038-010-A.

Unit 35 Level B Sector V

This unit was located within Sector V and associated with a higher status residential structure (Conlee 2015:25). Several textile fragments, all cotton WFPW with standard configuration elements, were recovered from this unit, but none were analyzed as part of this project because that structure is ubiquitous. The cordage and non-textile interworked structures from this unit were more unusual and, thus, were focused upon. There were two short lengths of cordage and five interworked human hair structures that all (with the exception of 05-065-006-D) use the unusual S spun yarns as the basis for the element structures.

Specimen 05-065-008-A is a short length of Z(6s) configuration cord. The raw fiber of the cord was originally identified as cotton; however, during later examination of the photos, fibers that are the same color as the cord, but which are too long and kinked to be identified as cotton, can be seen clinging to the cord. The fiber exposed at the frayed ends does appear to be cotton, therefore, it may be that this cord is comprised of cotton supplemented with another unidentified fiber. Specimen 05-065-008-B is a short length of S(2z(2s)) configuration cord. The component fiber appears to be human hair, but might be camelid wool.

Specimen 05-065-006-A is possibly a braid of some type that has become damaged to the point where the structure is unclear. The raw fiber is human hair and the apparent structure of the basic element is Z(2s). Specimen 05-065-006-B is a loop, approximately 8 cm long when flat, of interlaced human hair cordage secured with a knot (structure unidentified). The cord structure appears to be a simple three strand pigtail-style interlacing/braid with the strands of the braid composed of three S spun yarns of human hair. The size of the piece suggests that it could have been a bracelet or a handle. Specimen 05-065-006-C is a structure composed of cords made of an unidentified number of S spun yarns plied together. What remains of the piece structurally is two sub-parallel cords that function like warps with a “weft” cord wrapping 180° around one cord, then under and around the other cord 180°, going back and forth for just two or three passes with the distance between the “warps” gradually widening. After a couple passes, it appears that a third “warp” was inserted between the two outside “warps” and then a more typical over-under interlacing began. Specimen 05-065-006-D is a small, sub-rectangular mat of human hair. The artifact appears to be complete, but the structure by

which it retains its shape is difficult to identify. The piece currently has a felt-like appearance, but that may be due to damage and not the intended structure. It is unclear if any of the fibers making up the mat were originally separated into individual elements and/or spun. Specimen 05-065-006-E is another segment of interlaced/braided human hair. The piece is damaged and the type of interworking used difficult to identify, but the component elements are yarns of S spun human hair.

Interworked hair pieces have been encountered at many LIP South Coast sites, such as Pajonal Alto (Conlee 2000:255-257) and Estuquiña (Clark 1993:775). These pieces are often described as decorative (*e.g.*, decorative elements to hats/headdresses) or utilitarian (*e.g.*, tie cords for bags). However, the abnormal direction of initial spin on the yarns suggests that the interworked hair pieces from this unit may also have had a supernatural function. This will be discussed in greater detail later.

UNITS WITH MIXED COMPONENTS

Unit 32 Level C Sector IV (Early Nasca, Middle Nasca, and LIP)

Specimen 05-038-005-A consists of three fragments from a S(2z(2s)) wool cord. Most of the remaining cord is barber-pole and composed of very dark grayish brown (2.5Y 3/2) and pale yellow (2.5Y 8/4-7/4) yarns. However, near one of the frayed ends of one of the segments, the darker yarn has had yellow fiber spliced into it, creating a mottled brown and (mostly) yellow cord. There are also two knots located along the cord segments, a figure-of-eight knot and an overhand knot.

Unit 46 Level A Sector V (Early Nasca and Middle Horizon)

The only group analyzed from this unit consists of two short lengths of a cotton oblique interlaced braid. One of the pieces is in poor condition; however, the other piece

is in good shape and appears to be complete. The braid was started by taking a number of fine standard configuration cotton yarns and folding them in half, doubling the number of strands. These strands were then sub-divided into three groups/strands and then interlaced, basic hair-braiding style. The end is cut and there is not obvious method for securing the end from fraying, but it is still tidy suggesting that this is the intended length of the braid. The piece that is in poor shape is approximately the same length as the finished piece and these pieces might have functioned as tassels.

Unit 53 Level B Sector I (Archaic, Early Nasca, and LIP)

Specimens analyzed from this unit include five cordage fragments, each representing a different type. Specimen 09-012-002-A is a length of Z(6s(2z)) cotton cord with a double overhand (?) knot along it. The knot seems to be the location at which new yarns are spliced into the older cord. There are both frayed fibers and the beginnings of S(2z) yarns emerging from the knot supporting this. Specimen 09-012-003-A is a length of wool yarn with Z(2s) ply configuration, 09-012-003-C is a standard configuration yarn that appears to be wool, and 09-012-003-D is a standard configuration cotton yarn. Specimen 09-012-003-B is an overhand (?) knot along a length of standard configuration cotton yarn.

CHAPTER VII

DISCUSSION AND CONCLUSION

To introduce this discussion, it should be emphasized that due to the small sample sizes of fabric specimens from the Archaic, Late Formative and Early Nasca Periods, the inferences made with data from these components should be regarded as highly tentative within the current study, but may hopefully prove useful to studies with a larger scope. Only a single fabric specimen from La Tiza can confidently be attributed to the Archaic occupation. This cotton fabric (09-012-001-A; Unit 52) dates to approximately 3600 BC within the Middle Archaic. This is notable because technological innovation in the Nasca Region seems to have lagged behind what was happening in more northern parts of the coast. The available evidence implies that incipient agriculture (including cotton cultivation) in the region around La Tiza seems to have begun during the Late Archaic. This is likely related to logistically complicating environmental factors in the South Coast (*i.e.*, resources being widespread; Conlee 2015). Thus the presence of a cotton fabric dating to the Middle Archaic suggests either that cotton was moving into La Tiza from the north or that wild cotton was being collected and processed. The construction technique, cross-knit looping, was almost certainly introduced from outside the region as it is one of the earliest documented techniques for creating flexible, planar fabrics (Adovasio and Lynch 1973).

With regards to the structure of the yarns, the Archaic cross-knit looping fragment is composed of Z(2s) configuration yarns. All of the constituent elements analyzed from Late Formative and Early Nasca affiliated units are Z spun yarns that are then plied into

more complex yarns or cords. Although the total number of fabric specimens is small, there is a shift from initial S spinning during the Archaic to an overwhelming dominance of initial Z spinning in the Late Formative and thereafter. This probably indicates a change in technique and possibly changes in the level of fabric production at the site. The most efficient structure to achieve with the thigh spinning technique is a Z(2s) configuration yarn. This is done by first creating two separate yarns (simultaneously) through rolling two strands of drafted fiber away from the body and then plying them by allowing the two yarns to twist together as they are rolled back towards the body (Tiedemann and Jakes 2006). Yarns with an S(2z) structure are less likely to have been produced through thigh spinning and this suggests a local adoption of spindle spinning sometime before or during the Late Formative. The introduction of spindle and whorl spinning would also suggest an intensification of fabric production since it seems that spindle spinning only becomes timesaving compared to thigh spinning as the spinner becomes increasingly proficient at the technique (Tiedemann and Jakes 2006). Due to the small sample size, it is difficult to make inferences with any degree of confidence. However, at La Tiza, there are spindle whorls recovered from Late Formative contexts. If this is when spindle whorls were introduced, following the logic of Tiedmann and Jakes (2006) findings, it seems that it took from the Late Formative until the Early Nasca Period for there to be a paradigm shift in the local modes of production that favored spindle spinning.

The dominance of Z-spun yarns as the basis for the more complex plied yarns and cords continues through both the Middle Horizon and LIP. From these two time periods, there are only 11 total fabric specimens (or groups of specimens) that have a component

element that is not based on Z-spun yarns at the Stage I level. Five date to the Middle Horizon and six date to the LIP. One of the Middle Horizon specimens, 06-032-007-A (Unit 45), has unspun vegetal (not cotton) fiber as its Stage I component. The other specimens are all S-spun at Stage I. Three of the other Middle Horizon specimens are unremarkable cordage. The undyed wefts from 06-053-018-D (Middle Horizon - Tomb 2 Sector V), are S spun singles (however, the dyed pink wefts that form the stripes are Z spun singles). All of the LIP specimens are concentrated in Unit 35 (Sector V). Clark (1993) has suggested that this discrepancy between Z and S spun yarns may be the result of social divisions of labor around fabric production, and there is ethnographic evidence (Goodell 1968; Zorn 1982) to support the assumption that women produced the majority of woven fabrics and would have been responsible for most of the spinning, especially yarn that would end up in woven textiles. Men also produced fabrics, but seem to have been responsible for non-woven fabrics such as cordage, especially square braids (Cahlander 1980), and nets. These may have been more likely to produce elements based on S spun yarns that would be produced without spindle whorls (Zorn 1982; Goodell 1968). This does not explain the S spun yarn present in undyed wefts from 05-053-018-D. Additionally, it is unusual that there is a concentration of opposite spun yarns associated with Unit 35. There is a tradition of purposeful use of opposite spun yarns that seem to intentionally communicate, either to the natural or supernatural world which will be addressed below (Goodell 1968:6; Clark 1993:843).

The earliest dyed fiber artifact from the La Tiza assemblage also happens to be one of the earliest example of camelid fiber at the site. Cord 09-012-004-A is of dyed red wool and dates to the Early Nasca period. Dyed fibers, mostly wool and some cotton

(blue only), are most abundant during the Middle Horizon (Table 2). Dyed colors observed in Middle Horizon fabrics include: pink, red, orange-red, blue, blue-black, black, green, green-black, and possibly yellow. Red is the most common dyed color. The Middle Horizon is the only La Tiza component in which one or more of the main sets of elements of a textile were dyed. By the LIP, dyed fibers are extremely rare. The only observed LIP dyed fiber is found in the supplementary wefts (blue and red) of specimen 04-063-004-A (also notable for the use of wool, see below).

The earliest textiles in the assemblage date to the Late Formative: two plain weave textile fragments – one balanced and one (probably) WFPW. In all subsequent components, the Early Nasca period through the LIP, warp-faced weaves including warp-faced plain weaves (WFPW) are the most commonly observed category of structures. They make up about 68% of the textile groups. The first patterned warp-faced weaves appear in the assemblage during the Middle Horizon and the patterning techniques which utilize the warp-faced structures are mostly associated with Wari textile traditions. The exception is warp-faced double weaves which have stronger associations with Nasca Culture textile traditions. The basic structural techniques for double weaves were in use in the South Coast during the Nasca Culture Phases but were strongly influenced by Wari aesthetics during the Middle Horizon (Rowe 1977).

At La Tiza, the only warp-faced double weaves encountered come from the Middle Horizon Tombs 3 (06-045-036-E) and 6 (06-019-041-Q) and none were recovered that could be dated to the Nasca Culture phases. Additionally the only hint of decorated textiles at La Tiza dating to the Nasca phases is the dyed wool yarn from Unit 54 (09-012-004-A). During the Nasca phases, camelid fiber was generally reserved for

high status, decorated pieces (Frame 2006). If preservation had been better, decorated Nasca Culture textiles would be expected. La Tiza was a large site with evidence for a relatively complex social hierarchy (Conlee 2015:14). Elite and ceremonial textiles would likely have decorated elite houses and bodies and been interred in burials.

By far, the Middle Horizon fabrics are the largest component to the total La Tiza assemblage. However, if you do not include the fabrics from the elite Middle Horizon tombs, the Middle Horizon and LIP assemblages are much more equitable both in terms of quantity and variety of structures analyzed. It is important to keep in mind that the following number are from a sample that was biased towards unique and decorative structures. From the non-mortuary Middle Horizon units, 14 groups of non-interworked yarns and plied cords and 6 groups of interworked constructions were analyzed. From the LIP units, 4 groups of non-interworked yarns (including the three balls of yarn: 05-041-001-A, 05-041-001-B, and 05-041-001-C) and 12 groups of interworked constructions were analyzed. The variety in element structures between the LIP and non-mortuary Middle Horizon components is comparable, both with eight types of ply configuration. The number fabrics and variety in structures recovered from the Middle Horizon elite tombs is staggering by comparison. There is 2.5 times more variety in element structure than in either the non-mortuary Middle Horizon or LIP components, with 21 different ply configurations observed. Fourteen groups of non-interworked yarns and cords and over 80 interworked structures were analyzed from the tombs as well. These tombs also had the overwhelming majority of the decorated and complex textiles and braids. Some of the discrepancy in variety between the Middle Horizon tombs and the domestic contexts (Middle Horizon and LIP) could be the result of the better preservation of perishable

materials in the relatively protected tombs. However, the purposeful internment of expensive and exotic grave goods with elite individuals is probably responsible for the greater portion of the variety.

There is also a notable difference in the proportion of camelid wool fiber between the Middle Horizon and LIP components. Wool fiber is common among both the mortuary and non-mortuary Middle Horizon fabrics. The abundance of wool fiber during the Middle Horizon is not surprising considering a connection between the local population and the highland Wari Empire has been well-established (Conlee 2010a). However, wool fiber is only minimally present in the LIP fabric assemblage. The sole occurrence of this fiber is one of the two supplementary decorative weft colors from the mostly cotton 04-063-004-A (Unit 14 Sector V). This significant decrease suggests one or both of the following scenarios: imports of wool fiber, raw or processed, significantly dropped off during the LIP or local wool fiber production ceased or dropped off significantly. Interestingly, Conlee (2000) has identified a different pattern at the site of Pajonal Alto located a little over 10 km to the SSW of La Tiza. Even though the site is much smaller than La Tiza, the LIP fabric assemblage has a larger proportion of camelid fiber. The suggestion is that locally produced cotton was being traded for dyed wool imported from the highlands (see also Conlee 2003).

At La Tiza, the evidence from the fabrics suggests that a reduction in highland imports is the main factor for the decrease in the proportion of camelid fiber during the LIP. The Middle Horizon textiles that utilize wool yarns for at least one of the basic sets of elements, also use wool yarns for the second set (*i.e.*, both warps and wefts are wool) suggesting that those fabrics were imported from the highlands (Rowe 1977:8). If one

of the two wool elements is hidden (*e.g.*, in a warp- or weft-faced structure), the suggestion is even stronger. At La Tiza, textiles with at least one wool set of elements were only observed during the Middle Horizon. Thirty-one of those are composed of wool warps and wefts even though 30 have a concealed element (mostly the wefts in warp-faced weaves). There are only four examples of textiles that are wool element-faced with the concealed element composed of cotton. All four of these are weft-faced textiles, three tapestry and one weft-wrapped structure (06-019-041-W from Tomb 6; actually a twined fabric, not a true textile). Interestingly, two of the tapestries with cotton warps and wool wefts (09-024-019-B and 09-024-019-C) are slit tapestries, a coastal-affiliated tradition (the third, 06-019-041-P, has an undetermined style of defining the boundaries of the color fields). Of the textiles that have two sets of wool elements, two tapestry groups. One, 05-053-027-A, is also a slit tapestry; however, the other, 06-019-041-R, has interlocked wefts that join the color fields. Interlocked tapestries do not appear on the South Coast until the Middle Horizon and the assumption is that the technique was introduced by the Wari (Rowe 1979: 186).

In general, all textile decoration peaks during the Middle Horizon and is almost completely concentrated within the elite tombs. Fourteen different decorative techniques were observed on 29 different textiles from the elite Middle Horizon tombs. Only one decorated textile, an embroidered piece (06-032-006-A – Sector V Unit 45), comes from a domestic Middle Horizon context. Similarly, only a single decorated textile fragment was recovered from the LIP units, the previously discussed 04-063-004-A (Sector V Unit 14) with both supplementary wefts and an attached fringe. That are both decorated domestic-associated textiles were recovered from Sector V, suggests that this portion of

the site continued to be important from the Middle Horizon to the LIP despite a long break between the two occupations. Also supporting the suggestion that Sector V may have been an extraordinary location is the concentration of fabrics with opposite spun yarns in Unit 35.

Ethnographic accounts have mentioned yarns intentionally spun in the opposite direction of the normal spin (see Clark 1993:843 for a list of accounts). These yarns are sometimes supposed to have supernatural powers, either to protect or to harm. Although sometimes they have utilitarian functions (such as helping to preserve the shape of corners in woven textiles) or are the result of technique (*i.e.*, male-spinning which was often done against the thigh). At least some pre-Hispanic fabrics incorporate opposite spun yarns in a way that appears deliberate, meaning that the way the yarn is used marks it is special (Bird 1962). Opposite spun yarns are called *lloque* (many alternate spelling but the word is found in both the Quechua and Aymara languages) regardless of function. The supernatural variety can be worn simply, as a cord tied around the wrist or ankle, or incorporated into interworked fabrics (Clark 1993:843-846; Conklin 1997:188-119).

Relatively few *lloque* yarns were observed in the La Tiza assemblage. That there is a concentration around the elite house associated with Unit 35, and that many of the pieces are made with human hair, suggests that an individual or a group of people felt that a concentration of supernatural force was needed around that house. Other ritual-affiliated artifacts found in this unit seem to support that assumption (Conlee 2015). While there are other *lloque* yarns in the La Tiza collection. The only other one in which the direction of spin seems to have a non-utilitarian function is 05-053-018-D which was recovered from one of the Middle Horizon elite tombs, Tomb 2 in Sector V.

There is one other aspect to some of the component elements observed in the La Tiza assemblage that strongly suggests a function beyond utility or decoration. The use of barber-pole yarns in quipu has been proposed as one of the components to the binary communication system that Urton (2003) has proposed. Recently, a study conducted on a system of colonial-era church record keeping that both utilized both quipu cords and alphabetic text seems to confirm that binary information was stored on cords (Hyland et al. 2014). Specifically, they were able to demonstrate this using knot directionality, but the principle stands. No quipu were identified at La Tiza, but barber-pole yarns were incorporated into several fabrics. In some instances it could be argued that the use of barber-pole yarns may have had a decorative function, possibly to give the piece a mottled visual texture (such as 05-053-025-A from Tomb 2). However, there are specimens such as 06-018-029-D (Tomb 5) that suggest the possibility that the barber-pole yarns have an extra aspect to them. Specimen 06-018-029-D is a tapestry weave textile and the concealed warps are the barber-pole element. For artisans who are so deliberate in their choices, the use of a distinctive element that will not be seen must have a function. Interestingly, the use of concealed barber-pole warps is common in the highland tapestry traditions (Conklin 1983; Rowe 1986). I suspect that, at least in some instances, barber-pole yarns might have been imbued with a supernatural quality, similar to the lloque yarns.

CONCLUSION

For Clark (1993:131), the textile tradition can be “defined largely by the multiple structural choices made in creating articles.” It can be applied at any resolution of a society, but she applies it to a single site, Estuquiña. The research being presented in this

paper also focuses on a single site, La Tiza; however, it deals with fabrics, not just textiles. Otherwise Clark's definition can stand. But because the archaeological record of any site is incomplete, any defined textile tradition will also be incomplete and biased. At La Tiza, poor preservation from the earlier components makes it difficult to arrive at any strong suggestions regarding the fabric traditions before the Middle Horizon. What can be said is that warp-faced weave textile structures dominate the assemblage and that dominance probably dates back to the Late Formative period and becomes pronounced in the Middle Horizon and LIP. Middle Horizon textiles are far more likely to reflect highland influences, including use of wool, highland-derived or -influenced decorative structures (including warp-faced decorative weaves and interlocked tapestry). Also, it does not seem coincidental that the variety in fabric structures, methods of decoration, and dye colors used is greatest during the Middle Horizon, particularly in those recovered from elite mortuary contexts. Textiles from the LIP reflect a waning highland influence as La Tiza becomes a more localized polity. Less time is spent making elaborate fabrics and exotic fiber and costly dyes are used sparingly. This is a summary of the major trends that are specific to La Tiza. Integrating textile structure data from several sites in the region might help highlight patterns in textiles structures that could advance our understanding of how less common structures may have functioned or what they meant.

APPENDIX SECTION

- A. Codes Used in Summary Data Tables
- B. Summary Data for La Tiza Textiles
- C. Summary Data for La Tiza Cordage
- D. Description of Fabric Artifacts by Unit

APPENDIX A: CODES USED IN SUMMARY DATA TABLES

Sec – Sector

Lvl/Feat – Level or Feature

PlyFor – Ply Formula _

- 1- S(2z)
- 2- Z(2s(2z))
- 3- 2 S(2z)
- 4- Z
- 5- Z(4s(2z))
- 6- Z(8s(2z))
- 7- S(2z(2s))
- 8- Z(5s)
- 9- Z(5s(2z))
- 10- Z(3s(2z))
- 11- Z(2z(2s(2z)))
- 12- 3 S(2z)
- 13- Z(6s(2z))
- 14- 4 S(2z)
- 15- S(2z(4s(2z)))
- 16- Z(2s(9s(2z)))
- 17- Z(3s)
- 18- S(2z(9s(2z)))
- 19- S(2z(3s(2z)))
- 20- 2 S(2z)
- 21- Z(7s)
- 22- S(2z(6s(2z)))
- 23- S(2z(8s(2z)))
- 24- S(2z(10s(2z)))
- 25- S(2z(12/13s(2z)))
- 26- S
- 27- Z(2s)
- 28- 3 S
- 29- Z(6s)
- 30- Z(2s(2s(2z)+Ss(2z)))
- 31- Z(7s(2z))
- 32- S(2z(3z))
- 33- Z(2s(3i))
- 34- 2 Z(2s(2z))
- 35- S(4s(2z))
- 36- Z(?s(2z))

Fib – Raw Component MaterialFiber

- 1- cotton
- 2- camelid wool
- 3- human hair
- 4- unidentified fiber
- 5- camelid wool or hair
- 6- unidentified vegetal fiber

CdDia – Cordage Diameter (Average Recorded in mm)

CdDiaRange – Cordage Diameter Range (Recorded mm)

StrDia – Strand Diameter (Average Recorded in mm)

StrDiaRange – Strand Diameter Range (Recorded mm)

Space – Space between Elements

Angle – Angle of Spin in Degrees

EPcm – Elements per cm

EPhcm – Elements per half cm

APPENDIX B: SUMMARY DATA FOR LA TIZA TEXTILES

ID #	Temporal Association	Sheet	Unit	LaFF cat	Structure	Subtype	Py/Fiber	Fib	Color	C dLbs	C dChange	Stretch	StretchRange	Spence	SpenceRange	Angle	AmplitudeRange	Efrom	Efrom
06-022-002-A	Lae Feminine	II	7	D	Balanced Plain Weave	solid	1	4	na	0.6	0.53-0.65 (3)	na	na	none	na	na	na	na	9
06-022-002-B	Lae Feminine	II	7	D	WFPW	none	4	na	na	0.85	0.85 (1)	na	na	na	na	na	na	na	9
06-038-001-A	Early Neusa	III	21	B	WFPW	solid	1	1	10YR 6/4	0.55	0.45-0.7 (2)	0.55	0.45-0.55 (2)	0.25	0.25-0.3 (2)	50	50 (1)	na	6
06-051-001-Aa	Middle Horizon	IV	19	B	WFPW	solid	1	1	10YR 5/4	0.5	0.45-0.7 (2)	0.55	0.45-0.55 (2)	0.25	0.25-0.3 (2)	50	50 (1)	na	6
06-051-001-Ab	Middle Horizon	IV	19	B	Plain Weave	none	1	1	10YR 5/5	0.5	0.5 (3)	0.235	0.3-0.35 (2)	na	na	67	67 (1)	na	5
06-051-001-E	LIP	V	11	B	WFPW	solid	1	1	10YR 6/4	0.66	0.6-0.75 (4)	0.4	0.35-0.45 (3)	na	na	63.33	60-65 (3)	na	5
06-063-001-F	LIP	V	11	B	WFPW	solid	1	1	10YR 6/4	0.45	0.4-0.65 (3)	0.235	0.3-0.35 (2)	0.45	0.4-0.5 (2)	57.5	50-65 (2)	na	5
06-063-001-G	LIP	V	11	B	WFPW	solid	1	1	10YR 6/4	0.55	0.55 (2)	0.35	0.3-0.4 (3)	0.18	0.15-0.2 (2)	60.5	53-68 (2)	na	5
06-063-001-I	LIP	V	11	B	WFPW	solid	1	1	10YR 6/3	0.46	0.35-0.75 (9)	0.3625	0.3-0.4 (4)	0.45	0.45 (1)	66.5	40.5-52.5 (2)	na	5
06-063-001-J	LIP	V	13	B	WFPW	solid (?)	1	1	na	0.46	na	na	na	na	na	na	na	na	5
06-063-002-A	LIP	V	13	B	WFPW	solid	1	1	10YR 5/4	0.56	0.5-0.65 (4)	0.3	0.3 (2)	0.6	0.6 (2)	44	36-52 (3)	na	4.5
06-063-003-A	LIP	V	14	A	WFPW	none	1	1	10YR 5/4	0.56*	0.5-0.65 (4)*	0.3*	0.3 (2)*	0.6*	0.6 (2)*	44*	36-52 (3)*	na	4.5*
06-063-003-B	LIP	V	14	A	WFPW	solid	1	1	10YR 5/4	0.56*	0.5-0.65 (4)*	0.3*	0.3 (2)*	0.6*	0.6 (2)*	44*	36-52 (3)*	na	4.5*
06-063-003-C	LIP	V	14	A	WFPW	solid	1	1	10YR 5/4	0.5	0.45-0.55 (2)	na	na	0.5	0.5 (1)	na	na	na	5
06-063-004-Aa	LIP	V	14	B	WFPW	solid	1	1	10YR 6/3	0.5	0.45-0.55 (2)	na	na	0.5	0.5 (1)	na	na	na	5
06-063-004-Ab	LIP	V	14	B	WFPW	solid	1	1	10YR 6/3	0.38	0.25-0.5 (4)	0.275	0.2-0.35 (2)	na	na	43.75	43-44.5 (2)	na	4.5
06-063-004-B	LIP	V	14	B	WFPW	solid	1	1	10YR 7/3	0.43	0.4-0.5 (3)	0.3	0.25-0.35 (2)	na	na	57.25	50.5-64 (2)	na	4.5
06-063-004-C	LIP	V	15	A	WFPW	solid	1	1	10YR 5/4	0.43	0.3-0.55 (3)	0.3	0.25-0.35 (2)	na	na	na	na	na	4.5
06-063-005-A	LIP	V	15	B	Half-Chained Plain Weave	none	1	1	10YR 5/3	0.67	0.55-0.8 (2)	0.4	0.4 (2)	na	na	51	51 (1)	na	5
06-032-006-A	Middle Horizon	V	45	B	WFPW	solid	1	1	2.5Y 5/4	0.58	0.55-0.65 (4)	0.4	0.4 (1)	na	na	na	na	na	5
06-032-006-B	Middle Horizon	V	45	B	Balanced Plain Weave	solid	4	1	2.5Y 5/4	0.24	0.2-0.35 (8)	na	na	na	na	na	na	na	5
06-032-006-C	Middle Horizon	V	45	B	Balanced Plain Weave	solid	4	1	10YR 6/4	0.29	0.2-0.35 (5)	0.35	0.3 (1)	0.58	0.55-0.6 (3)	44	44 (1)	na	5
06-032-006-D	Middle Horizon	V	45	B	Balanced Plain Weave	solid	1	1	10YR 6/4	0.45	0.4-0.5 (4)	0.35	0.35 (1)	0.15	0.1-0.3 (4)	49	40-50 (2)	na	7
06-038-010-A	Middle Horizon	IV	34	B	WFPW	solid	4	1	10YR 6/4, 6/4	0.4	0.3-0.55 (6)	0.28	0.25-0.3 (2)	0.44	0.3-0.45 (3)	65.75	63.5-68 (2)	na	5
06-053-011-A	Middle Horizon	V	2	B	Balanced Plain Weave	solid	4	1	2.5YR 4/6	1.07	1-1.15 (3)	na	na	0.75	0.7-0.8 (2)	62.5	62.5 (1)	na	3
06-053-011-B	Middle Horizon	V	2	B	WFPW	solid	4	1	2.5YR 4/6	0.28	0.2-0.45 (3)	na	na	0.3	0.25-0.4 (4)	62.5	62.5 (1)	na	11
06-053-011-C	Middle Horizon	V	2	B	Balanced Plain Weave	solid	4	1	2.5YR 4/6	0.35	0.25-0.45 (3)	na	na	0.18	0.15-0.2 (3)	30	30 (1)	na	9
06-053-011-E	Middle Horizon	V	2	B	LIP-and-3 (Weft/Warp) Plain Weave	solid	26	1	dyed na	0.33	0.3-0.45 (3)	na	na	0.23	0.2-0.25 (2)	45	45 (1)	na	3.5
06-053-011-A	Middle Horizon	V	2	B	WFPW, Weft-face Plain Weave or Taperity Weft-Faced Plain Weave, Taperity, or WFPW	solid	1	2	10YR 5/4	0.55	0.5-0.6 (2)	0.45	0.45 (3)	na	na	66.75	42-51.1 (2)	na	11
06-053-011-B	Middle Horizon	V	2	B	WFPW, Weft-face Plain Weave or Taperity Weft-Faced Plain Weave, Taperity, or WFPW	solid	1	2	5YR 5/4	0.92	0.85-1.0 (3)	0.45	0.45 (3)	0.84	0.75-1.0 (4)	na	na	na	3
06-053-011-C	Middle Horizon	V	2	B	WFPW, Weft-face Plain Weave or Taperity Weft-Faced Plain Weave, Taperity, or WFPW	solid	1	2	2.5YR 5/4	1.05	1.05 (1)	0.7	0.7 (1)	0.67	0.65-0.7 (3)	na	na	na	3.5
06-053-020-A	Middle Horizon	V	2	B	WFPW	solid	1	2	10YR 5/8	0.88	0.8-0.95 (2)	0.23	0.2-0.25 (3)	na	na	na	na	na	4
06-053-020-B	Middle Horizon	V	2	B	WFPW	solid	1	2	2.5YR 5/8	0.4	0.35-0.45 (3)	0.13	0.15-0.2 (3)	na	na	na	na	na	4
06-053-021-A	Middle Horizon	V	2	B	Taperity	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-B	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-C	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-D	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-E	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-F	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-G	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-H	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-I	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-J	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-K	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-L	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-M	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-N	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-O	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-P	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-Q	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-R	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-S	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-T	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-U	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-V	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-W	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-X	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-Y	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-021-Z	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-022-A	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-022-B	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-022-C	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-022-D	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-022-E	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-022-F	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-022-G	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-022-H	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-022-I	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-022-J	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-022-K	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-022-L	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-022-M	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-022-N	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-022-O	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-022-P	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-022-Q	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na	na	na	23
06-053-022-R	Middle Horizon	V	2	B	WFPW	solid	1	2	dyed na	0.45	0.45 (2)	na	na	na	na	na			

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APPENDIX C: SUMMARY TABLES FOR LA TIZA CORDAGE

ID #	Temporal	Unit	LxFeet	PhysFor	Color	Fib	CdDia	CdBrRange	SerDia	SerBrRange	Angle	AngleRange	Notes
00-012-001-A	Middle Horizon	52	B	27	10YR 5/6	1	1.07	1.05-1.1 (2)	0.65	0.65 (1)	inlet		cross-hair booping yarn
00-022-001-A	Late Formative	7	D	1	7.5YR 4/6	2	1.5	1.5	1	1 (1)	inlet		
00-038-001-A	Early Nasca	21	B	12	10YR 6/4	1	0.5	0.35-0.65 (3)	0.375	0.25-0.5 (2)	65	50-80 (2)	reticulating whip-sticks
00-038-001-C	Early Nasca	21	B	2	10YR 7/3	1	1.7	1.7 (1)	0.85	0.85 (1)	inlet		sewing sticks
00-038-001-E	Early Nasca	21	B	1	10YR 3/3	1	inlet		inlet		inlet		too loose for accurate measurements - may be a yarn from textiles recovered from that unit
00-041-001-A	Early Nasca	54	B	2	dyed/red	2	1.55	1.45-1.55 (2)	0.93	0.85-1.0 (2)	32.5	32.5 (1)	smallest yarn: 0.5 [0.45-0.55 (3)] angle=40 [36.5-42.5 (3)]
00-051-001-A	Middle Horizon	19	B	3	10YR 5/4	1	1.6 (0.85)	1.6 (1) (0.8-0.9 (2))	0.55	0.55 (1)	50	50 (1)	whip sticks: sewing two textile fragments together
00-051-002-A	Middle Horizon	20	B	4	10YR 6/6	2	0.75	0.75 (1)	n/a	n/a	inlet		
00-033-005-A	Middle Horizon	45	A	1	10YR 4/6	2	1.35 (7)	0.35-0.7 (3)	0.35	0.35 (2)	57.5	57.5 (1)	
00-033-005-A	Middle Horizon	45	B	1	10YR 4/3	2	1.35 (7)	1.34 (1)	inlet		inlet		header cords
00-033-005-E	Middle Horizon	45	B	30 and 2	dyed/red	2	3.75	3.25-4.05 (4)	1.25 (3.2	1.2-1.25 (2) 1.15-1.25 (2) 1.1	31 (1)	31 (1)	embroidery
00-033-005-F	Middle Horizon	45	B	31	7.5YR 3/2	2	2.65	2.15-2.05 (3)	0.74	0.65-0.9 (4)	45.5	43.5-47.5 (2)	two-ply yarns - 1.08 (1.05-1.1 (2))
00-033-005-G	Middle Horizon	45	B	9	7.5YR 3/2	2	1.49	1.35-1.55 (4)	0.52	0.5-0.55 (3)	39.5	39.5 (1)	
00-033-005-H	Middle Horizon	45	B	2	10YR 4/3	2	1.63	1.4-1.9 (4)	1.13	1.0-1.25 (2)	31.5	31.5 (1)	
00-033-005-I	Middle Horizon	45	B	1	2.5YR 6/4	2	1.5	1.5 (2)	0.8	0.8 (1)	inlet		
00-033-005-J	Middle Horizon	45	B	32	10YR 5/6	2	1.87	1.65-2.05 (3)	1.06	1.05-1.15 (3)	27.25	24.30-5 (2)	
00-033-005-K	Middle Horizon	45	B	2	10YR 7/6	2	1.38	1.25-1.3 (2)	0.73	0.7-0.75 (2)	36.5	36.5 (1)	
00-033-005-L	Middle Horizon	45	B	29	10YR 5/4	2	1.19	1.05-1.3 (4)	0.46	0.4-0.6 (5)	34.5	34.5 (1)	total cord dia is 2.0 mm
00-033-005-M	Middle Horizon	45	B	2	10YR 5/4	2	0.45	0.45 (1)	n/a	0.37-0.39 (2)	29.5 (7)	29.5 (1)	
00-033-007-A	Middle Horizon	45	B	33	10YR 5/6	6	0.68	0.68 (1)	0.38	0.35 (1)	39.5	39.5 (1)	reticulating whip-sticks: * these measurements are from a single yarn of the tripled element
00-033-008-A	Middle Horizon	45	B	12	10YR 6/4	1	0.42*	0.4-0.45 (3)	0.35	0.35 (1)	44	44 (1)	finishing hem sticks: smallest units: 0.33 [0.3-0.35 (3)]
00-033-008-A	Middle Horizon	45	B	10	10YR 6/4	2	1.4	1.35-1.45 (2)	1.08	1.0-1.15 (2)	21.5	21.5	*this is clearly not the final configuration of the cord which would have been a bi-color piece
00-033-010-A	Middle Horizon	47	A	1*	10YR 2/2, 2.5Y 6/8	2	2	2.0 (2)	0.68	0.65-0.7 (2)	40.5	40.5 (1)	
00-033-011-A	Middle Horizon	47	B	1	dyed/blue	2	1.25	1.25 (1)	2.23	2.05-2.4 (2)	inlet		twist is 6.65 wide and 26.65 long
00-053-029-A	Middle Horizon	17	B	1	inlet	5	3.73	3.6-3.85 (2)	2.23	2.05-2.4 (2)	inlet		
00-053-029-B	Middle Horizon	17	B	1	inlet	1	inlet		inlet		inlet		
00-053-029-C	Middle Horizon	27	B	7.5YR 5/8	2	2.18	2.15-2.2 (2)	1.25	1.25 (1)	inlet			
00-053-029-D	Middle Horizon	12	B	10YR 2/2	2	1.93	1.8-2.05 (2)	inlet		inlet			
00-053-029-E	Middle Horizon	36	B	7.5YR 5/4	2	0.95*	0.95-0.7 (3)	inlet		inlet			
00-053-029-F	Middle Horizon	36	B	7.5YR 4/6	2	2.03	1.9-2.15 (2)	0.7	0.7 (1)	inlet			
00-053-029-A	Middle Horizon	3	B	7.5YR 4/6	2	2.43 (0.135	1.8-2.15 (2)	0.63	0.5-0.55 (2)	32	32 (1)	headband cord/fringe: smallest strand measurement: 0.47 [0.35-0.55 (3)]	
00-045-015-A	Middle Horizon	34	B	10YR 2/2	10YR 6/6	2	1.1	1.1 (2)	0.53	0.45-0.49 (4)	26.5-33 (2)	26.5-33 (2)	* these measurements are from a single yarn of the doubled element; whipping stitches
00-045-015-A	Middle Horizon	2 or 34	B	10YR 2/2	10YR 6/6	2	2.18	1.9-1.3 (3)	0.45	0.45 (2)	inlet		plaited belt body
00-045-015-A	Middle Horizon	35	B	10YR 2/2	10YR 6/6	2	1.92	1.7-2.05 (3)	1.18	1.0-1.3 (3)	inlet		secondary bands
00-045-016-C	Middle Horizon	17	B	35	7.5YR 3/2	2	inlet		0.8	0.8 (1)	inlet		cord fringe - smallest unit - 0.45 [0.45 (2)]
00-045-016-E	Middle Horizon	17	B	inlet	7.5YR 3/2	2	inlet		inlet		inlet		broader yarns
00-045-016-G	Middle Horizon	17	B	inlet	10YR 2/2	10YR 6/6	2	inlet	inlet	inlet			hem sticks
00-045-016-E	Middle Horizon	17	B	inlet	10YR 2/2	10YR 6/6	2	inlet	inlet	inlet			four sets of quilted or sepiated elements
00-013-023-A	Middle Horizon	10	B	10YR 5/6	2	0.88	0.8-0.95 (2)	n/a	0.75-0.85 (2)	38	38 (1)		
00-013-023-B	Middle Horizon	10	B	10YR 5/6	2	0.87	0.8-1.05 (3)	inlet		inlet			3 header cords from a balanced plain weave fabric
00-019-043-A	Middle Horizon	16	A	10YR 7/6	10YR 3/4	1	5.47	4.8-6.05 (3)	0.34	0.3-0.35 (4)	23.8	21.5-26 (2)	
00-019-043-E	Middle Horizon	16	A	10YR 7/4	10YR 6/6	1	7.1	6.5-7.3 (2)	1.18	1.05-1.3 (3)	50	50 (2)	
00-019-043-G	Middle Horizon	17	A	10YR 6/6	10YR 6/6	6	3.65	3.35-4 (3)	2.03	1.95-2.2 (3)	24.8	24.8 (1)	
00-019-043-H	Middle Horizon	18	A	10YR 8/3	10YR 8/3	1	10.63	10.2-11.05 (2)	6.6	6.02-7 (2)	81.9	81.9 (1)	
00-019-043-I	Middle Horizon	2	A	2.5Y 7/5	2.5Y 7/5	1	3.6	3.3-4 (3)	2.45	2.4-2.5 (2)	38.3	37.5-38.8 (2)	
00-019-043-C	Middle Horizon	3	A	2.5Y 7/5	2.5Y 7/5	1	1.55	1.55 (1)	1.15	1.15 (1)	38.5	38.5 (1)	hem sticks
00-019-043-D	Middle Horizon	3	A	2.5Y 6/5	2.5Y 6/5	1	0.78*	0.65-0.8 (2)	0.45	0.45-0.6 (2)	42	40-43.5 (2)	sewing cord: *these measurements reflect the single cord from a doubled element
00-019-043-F	Middle Horizon	10	A	2.5Y 6/5	2.5Y 6/5	1	1.05	1.05 (1)	0.45	0.4-0.5 (3)	inlet		three header cords
00-019-043-J	Middle Horizon	20	A	2.5Y 7/2	2.5Y 7/2	1	0.9	0.9-1.05 (2)	0.46	0.45-0.5 (2)	inlet		sewing and hem sticks
00-019-041-A	Middle Horizon	21	A	2.5YR 5/4	2.5YR 5/4	1	0.78	0.75-0.8 (2)	inlet		inlet		doubled header cords - measurements taken from single yarn
00-019-041-A	Middle Horizon	2	A	10YR 8/4	10YR 8/4	1	inlet		0.74	0.74 (1)	inlet		hemming/picking sticks
00-019-042-E	Middle Horizon	5	A	10YR 6/3	10YR 6/3	1	0.9*	0.9 (1)	0.4	0.45-0.5 (2)	inlet		whip sticks
00-019-042-E	Middle Horizon	10	A	10YR 6/3	10YR 6/3	1	1.28	1.2-1.35 (2)	0.48	0.45-0.45 (3)	24.8	22-27.5 (2)	sewing sticks
00-019-041-38a	Middle Horizon	22	A	2.5Y 6/4	2.5Y 6/4	1	2.5	2.5 (1)	0.96	0.85-1.1 (2)	40	40 (1)	header cords
00-019-041-38b	Middle Horizon	22	A	2.5Y 6/4	2.5Y 6/4	1	8.35	8.35 (1)	4.48	4.45-4.5 (2)	35.6	35.6 (1)	cord sewingthrough 00-019-041-38a and 00-019-041-38b

06-019-041-E	Middle Horizon	Tomb 6	A	1	10YR 3/3	2	inlet	0.2-0.25 (3)	inlet	0.15 (1)	inlet	30 (1)	black embroidery yarn; the yarns are in poor shape and therefore metrics are questionable)
06-019-041-F	Middle Horizon	Tomb 6	A	1	5Y 2/01	2	0.23*	0.2-0.25 (3)	0.15 (1)	0.15 (1)	30 (1)	black embroidery yarn; the yarns are in poor shape and therefore metrics are questionable)	
06-019-041-G	Middle Horizon	Tomb 6	A	1	10YR 3/4	2	0.48	0.45-0.5 (3)	0.26	0.25-0.3 (2)	30.25	25-35.5 (2)	
06-019-041-H	Middle Horizon	Tomb 6	A	23	2.5Y 7/2	1	7.75	7.75 (1)	1.33	1.3-1.35 (2)	37.4	37.4 (1)	
06-019-041-I	Middle Horizon	Tomb 6	A	22	10YR 7/2	1	7.15	7.15 (1)	1.3	1.25-1.35 (2)	45.5	42-48.5 (2)	
06-019-041-J	Middle Horizon	Tomb 6	A	16	10YR 5/4	1	6.2	5.55-6.85 (2)	0.82	0.75-0.9 (3)	43.75	42-45.5 (2)	
06-019-041-K	Middle Horizon	Tomb 6	A	24	2.5Y 7/4	1	5.83	5.25-5.9 (2)	0.83	0.65-1.05 (4)	38 (1)	38 (1)	
06-019-041-L	Middle Horizon	Tomb 6	A	25	2.5Y 7/4	1	7.1	7.1 (2)	1.18	1.05-1.3 (2)	46.75	45.5-48 (2)	
06-019-041-M	Middle Horizon	Tomb 6	A	25	2.5Y 7/4	1	8.1	8.1 (3)	1.41	1.1-1.55 (4)	40.95	35.5-46.5 (2)	
06-019-041-Nb	Middle Horizon	Tomb 6	A	24	2.5Y 7/2	1	7.8	7.8 (3)	1.1	0.9-1.15 (3)	59 (1)	59 (1)	
06-019-041-T	Middle Horizon	Tomb 6	A	10	2.5Y 7/2	1	1.84	1.5-2.4 (4)	0.82	0.4-1.05 (3)	49-53.5 (2)	49-53.5 (2)	
06-019-041-T	Middle Horizon	Tomb 6	A	10	2.5Y 6/4	1	1.6	1.6 (1)	0.83	0.65-1.0 (2)	52.75	48.5-57 (2)	
06-019-041-V	Middle Horizon	Tomb 6	A	—	7.5R 5/4; dyed red; dyed blue	2	4	4.0 (1)	0.96	0.95-1.0 (2)	44.5	44.5 (2)	
06-019-041-V	Middle Horizon	Tomb 6	A	—	10YR 7/2; 10YR 4/7; dyed red	2	width - 8.0	7.95-8.05 (3)	1.03	1.0-1.05 (3)	inlet	inlet	
06-023-019-A	Middle Horizon	Tomb 4	A	1	dyed red	2	0.83	0.75-0.85 (3)	0.45	0.4-0.5 (2)	26 (1)	26 (1)	
06-023-019-A	Middle Horizon	Tomb 4	A	1	2.5R 2.5/1	2	0.81*	0.75-0.95 (4)	0.5	0.5 (1)	57 (1)	57 (1)	
06-024-020-B	Middle Horizon	Tomb 4	B	12	10YR 5/6	1	1.05*	0.95-1.15 (3)	0.62	0.45-0.7 (3)	55 (1)	55 (1)	
06-024-020-C	Middle Horizon	Tomb 4	B	14	7.5YR 5/6	1	1.55	1.45-1.65 (2)	0.5	0.45-0.55 (2)	66 (1)	66 (1)	
06-063-001-A	LIP	Tomb 4	B	5	10YR 8/3	1	1.6	1.6 (1)	0.45	0.4-0.55 (3)	55	45-61 (2)	
06-063-001-B	LIP	Tomb 4	B	7	7.5YR 4/6	1	1.2	1.15-1.25 (2)	0.675	0.65-0.7 (2)	44	44 (1)	
06-063-001-C	LIP	Tomb 4	B	11	7.5YR 4/6	1	0.4	0.3-0.45 (3)	0.3	0.2-0.4 (2)	42.5	41-44 (2)	
06-063-001-D	LIP	Tomb 4	B	8	10YR 7/4	1	1.775	1.75-1.8 (2)	0.63	0.5-0.75 (3)	37	37 (1)	
06-063-001-E	LIP	Tomb 4	B	9	10YR 6/4	1	1.385	1.35 (2)	0.51	0.45-0.65 (4)	inlet	inlet	
06-063-001-F	LIP	Tomb 4	B	10	10YR 6/4	1	0.975	0.85-1.1 (2)	0.52	0.45-0.57 (3)	28.25	25-31.5 (2)	
06-063-001-G	LIP	Tomb 4	B	11	10YR 6/4	1	1.05	1-1.1 (2)	0.54	0.48-0.57 (3)	28.25	17-40 (2)	
06-063-001-H	LIP	Tomb 4	B	10	10YR 6/4 and 7.5YR 5/6	1	0.95	0.95 (1)	0.425	0.4-0.45 (2)	51.375	49-55.45 (4)	
06-063-001-I	LIP	Tomb 4	B	11	10YR 6/4	1	1.1	0.9-1.3 (2)	0.76	0.6-0.85 (3)	60.3	48-72.5 (2)	
06-063-001-L	LIP	Tomb 4	B	11	10YR 6/4	1	1.5	1.35-1.65 (2)	0.6	0.6 (2)	58 (1)	58 (1)	
06-063-001-L	LIP	Tomb 4	B	2	10YR 6/5	1	1.05	1.05 (1)	0.6	0.6 (2)	58 (1)	58 (1)	
06-063-001-L	LIP	Tomb 4	B	57	7.5YR 8/3	1	1.65	1.65 (1)	0.5	0.45-0.55 (3)	30.5	30.5 (1)	
06-063-001-L	LIP	Tomb 4	B	14	7.5YR 8/3	1	1.85	1.85 (1)	0.3625	0.3-0.45 (4)	43	43 (1)	
06-063-001-L	LIP	Tomb 4	B	13	7.5YR 8/3	1	1.35	1.35 (1)	0.6	0.6 (2)	68	68 (1)	
06-063-001-L	LIP	Tomb 4	B	14	7.5YR 5/6	2	1.05	0.95-1.25 (3)	0.333	0.3-0.35 (3)	44	44 (1)	
06-063-001-L	LIP	Tomb 4	B	14	dyed blue	1	1.25	1.05-1.25 (2)	0.35	0.35 (1)	44.5	44.5 (1)	
06-063-001-L	LIP	Tomb 4	B	14	7.5YR 8/3	1	0.5	0.5 (1)	0.35	0.35 (1)	45	45 (1)	
06-063-001-L	LIP	Tomb 4	B	9	7.5YR 8/3	1	1.15	1.1-1.2 (2)	0.28	0.25-0.3 (3)	45	45 (1)	
06-063-001-L	LIP	Tomb 4	B	15	7.5YR 8/3	1	2.175	2.15-2.2 (2)	1.5	1.4-1.6 (2)	37.4	37.4 (1)	
06-063-001-L	LIP	Tomb 4	B	1	10YR 6/6	1	inlet	0.25-0.35 (4)	inlet	inlet	55 (1)	55 (1)	
06-063-001-L	LIP	Tomb 4	B	4	10YR 8/2	1	0.3	0.25-0.35 (4)	inlet	inlet	39	39 (1)	
06-063-001-L	LIP	Tomb 4	B	4	10YR 5/3	1	0.36	0.3-0.45 (4)	inlet	inlet	39	37.5-40.5 (2)	
06-063-001-L	LIP	Tomb 4	B	4	5YR 3/4	1	0.31	0.2-0.4 (5)	inlet	inlet	41.5	41.5 (1)	
06-063-006-A	LIP	Tomb 3	B	35	10YR 4/4	3	3.68	3.55-3.8 (2)	1.72	1.65-1.75 (3)	41.5	41.5 (1)	
06-063-006-A	LIP	Tomb 3	B	27	7.5YR 2.5/0	1	1.28*	1.25-1.3 (2)	inlet	inlet	39.67	33.5-43 (3)	
06-063-006-A	LIP	Tomb 3	B	28	7.5YR 2.4/9	3	1.95	1.95 (1)	0.85	0.55-1.15 (2)	71.25	67.5-75	
06-063-006-A	LIP	Tomb 3	B	29	10YR 6/6	5	2.4	2.2-2.9 (4)	1.68	1.6-1.8 (3)	67.5	67.5-75	
06-063-006-B	LIP	Tomb 3	B	35	10YR 2/2	1	1.35	1.35 (1)	inlet	inlet	39.67	33.5-43 (3)	
06-063-006-B	LIP	Tomb 3	B	7	7.5YR 4/6	2	0.45	0.35-0.55 (3)	inlet	inlet	71.25	67.5-75	
06-063-002-A	LIP	Tomb 13	B	1	2.5Y 3/2; 2.5Y 8/4-7/4	2	3.39	2.4-3.2 (4)	1.74	1.6-1.85 (3)	39 (1)	39 (1)	
06-063-002-A	LIP	Tomb 13	C	4	10YR 7/6	1	0.43	0.25-0.6 (5)	0.56	0.5-0.65 (3)	38.17	32-48.5 (3)	
06-063-002-A	Mixed	Tomb 13	B	13	10YR 8/6	2	2.13	2.05-2.2 (2)	1	0.65-1.35 (2)	36.5	36.5 (1)	
06-063-002-B	Mixed	Tomb 13	B	27	7.5YR 7/8	2	2.9	2.9 (1)	1.65	1.65 (1)	24 (1)	24 (1)	
06-063-002-C	Mixed	Tomb 13	B	1	inlet	2	0.8	0.8 (1)	0.4	0.4 (1)	52.5	52.5 (2)	
06-063-002-D	Mixed	Tomb 13	B	1	10YR 7/8	1	0.55	0.55 (1)	0.45	0.4-0.5 (2)	52.5	52.5 (2)	

APPENDIX D: FABRICS ANALYZED BY UNIT

Unit 7 Level D Sector II – Late Formative

Year 2004 Box 022 Bag 001

04-022-001-A: a length of yarn approximately 6 cm in length (when gently and loosely stretched); standard configuration strong brown (7.5YR 4/6) wool yarn; the fibers that have come loose from the cord are 3-5 mm in length and slightly course and one slightly longer fiber, similar in color, but very fine, is approximately 15 mm long

CdDia	CdDiaRange	StrDia	StrDiaRange	Angle	AngleRange
1.07	1.05-1.1 (2)	0.65	0.65 (1)	indet	
1.5	1.5	1	1 (1)	indet	



Specimen 04-022-001-A

Year 2004 Box 022 Bag 001

04-022-002-A: two fragments (1.2 x 0.5 cm x 0.1 cm thick and 1.6 x 1.0 cm x 0.1 cm thick) of a balanced plain weave textile; one of the fragments has a preserved section of side selvedge; the fragments are stiff and discolored, either from charring or through prolonged contact with human decomposition fluids, which inhibits fiber identification; the condition of the fabrics also makes it difficult to ascertain the spin/ply of the component elements, but they appear to be standard configuration



Specimen 04-022-002-A



Detail of weave (note side selvage)

CdDia	CdDiaRange	StrDia	StrDiaRange	Angle	AngleRange
1.07	1.05-1.1 (2)	0.65	0.65 (1)	indet	

04-022-002-B: single fragment (1.6 x 0.9 cm x 0.15 cm thick) of a warp- or weft-faced plain weave textile; also stiff and discolored inhibiting fiber identification and spin/ply configuration of elements (though likely standard configuration)



Specimen 04-022-002-B



Detail of weave

Unit 11 Level B Sector V – LIP

Year 2004 Box 063 Bag 001

04-063-001-A: a complex yellow (10YR 8/8) cotton cord with a Z(4s(2z)) configuration; approximately 11 cm long



Specimen 04-063-001-A



Spin/Ply Detail

04-063-001-B: consists of a light colored (very pale brown 10YR 8/3) cord with two knots, one of which creates a loop and a contrasting strong brown (7.5YR 4/6) pendant cord (>10 cm long) attached to the main cord; the structure of the main cord is Z(8s(2z)) in the most intact section; the loop is created using what looks like a figure-of-eight knot and there is another knot, probably an overhand knot, along the body of the loop.



Specimen 04-063-001-B (knots indicated)



detail of pendant cord attachment



Pendant Cord Finish



Knot Creating Loop



Knot along Loop

04-063-001-C: a bundle of standard configuration cotton yarns that is similar in color (7.5YR 4/4) and size to the Stage II portion of the pendant cord from 04-063-001-B.



Specimen 04-063-001-C



Detail

04-063-001-D: a roughly finger-sized loop of Z(5s) cotton cord closed by an overhand knot; pinkish white (10YR 7/4)



Specimen 04-063-001-D

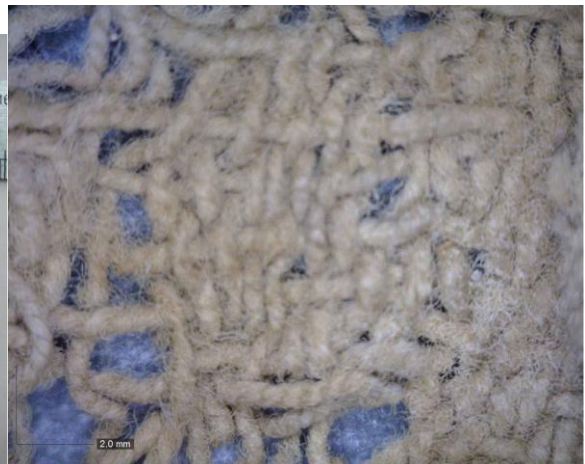


Detail of Knot

04-063-001-E: a fragment of an all cotton WFPW textile, 8 x 3 cm, with a rolled hem reinforced with a whipstitch, Z(5s(2z)) configuration, that appears to contain the side selvedge; both sets of elements are standard configuration; light yellowish brown color (10YR 6/4)



Specimen 04-063-001-E



Weave Detail



Hem Detail



Detail of Sewing Cord

04-063-001-F and 04-063-001-G: originally recorded as two separate specimens (individual fragments), but probably from the same textile; all cotton WFPW with the remnant of a cord, Z(3s(2z)) configuration, sewn parallel to the remaining side selvedge on both fragments; there is a knot in the sewing cord from 04-063-001-G which joins it to a dual color cord, also Z(3s(2z)), in a complicated knot whose structure I cannot identify and which may incorporate yarns from the textile; 04-063-001-F is approximately 20 x 5 cm and 04-063-001-G is approximately 4 x 2.5 cm; mostly light yellowish brown (10YR 6/4), but the bi-color cord is very pale brown (10YR 7/3) and strong brown (7.5YR 5/6)



Specimen 04-063-001-F



Specimen 04-063-001-G



Weave Detail (04-063-001-F)



Sewing Cord



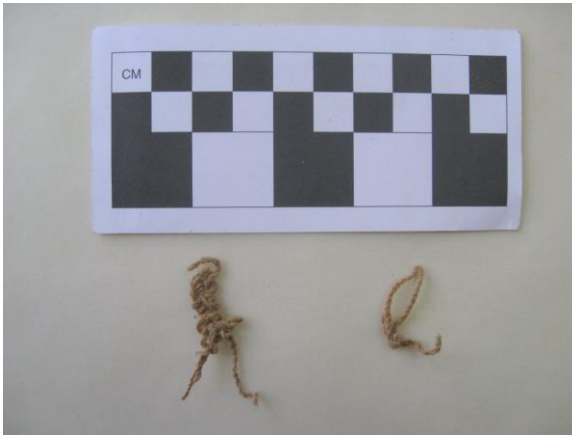
Knot Detail



Detail of Bi-color Cord

04-063-001-H: a very complicated knot made of a $Z(2z(2s(2z)))$ configuration light yellowish brown (10YR 6/4) cotton cord

04-063-001-I: A loop and knot on $Z(2s(2z))$ configuration yellowish brown (10YR 6/5) cotton cord.



Specimens 04-063-001-H (left) and 04-063-001-I



Knot Detail from 04-063-001-I

04-063-001-J: fragment from a cotton textile, probably WFPW; both sets of elements pale brown (10YR 6/3) standard configuration cotton yarns



Specimen 04-063-001-J



Weave Detail

Unit 13 Level B Sector V – LIP and Late Horizon

Year 2004 Box 063 Bag 002

04-063-002-A: a fragment (24 x 12 cm) of a WFPW with a rolled hem similar to some of the fragments from Unit 11; appears to be all cotton with standard configuration elements, but the piece is very soiled and fragile

04-063-002-B: a short, strong brown (7.5YR 4/6), band approximately 5 cm long and 1.5 cm wide - the length measurement is complete and the width measurement is taken from a section that appears to be intact; the body of the piece was created by folding and winding wool (yarns?) back and forth to create the short rectangular band which was secured with rows of stitches perpendicular to the main body yarns; the spin/ply configuration (possibly standard) of the main body yarns is difficult to assess even in the most intact portion possibly because they were never very tight yarns; five complete or partial rows of perpendicular stitches remaining, but permanent creases and voids from lost stitches indicate that there were originally 12 rows; the stitches are wool yarns of standard spin/ply configuration



Specimen 04-063-002-A

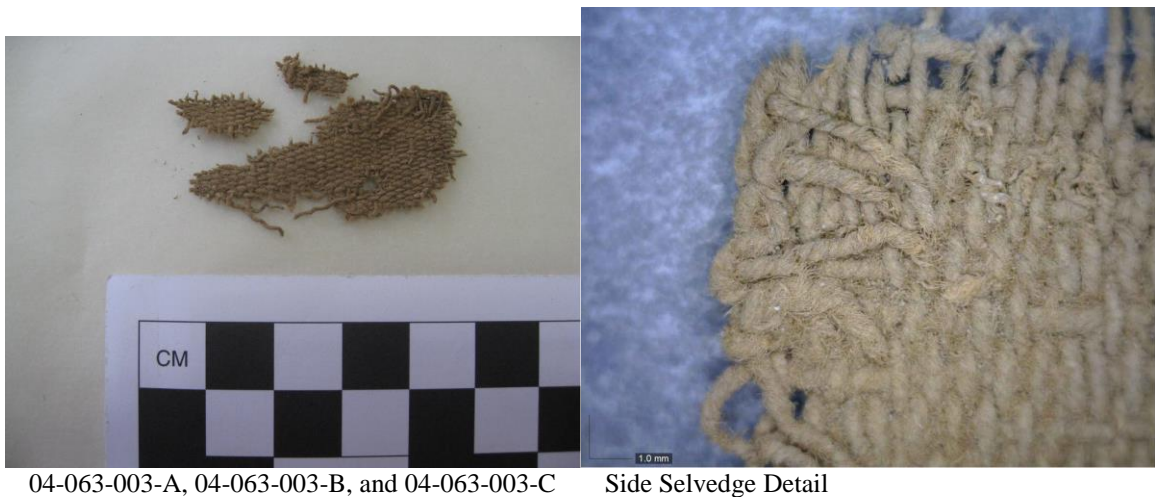


Specimen 04-063-002-B

Unit 14 Level A Sector V – LIP

Year 2004 Box 063 Bag 003

04-063-003-A, 04-063-003-B, and 04-063-003-C: three fragments originally analyzed separately, but are similar enough that they may be from the same textile; 04-063-003-A is 4.1 x 2.8 cm, 04-063-003-B is 1.6 x 0.6 cm, 04-063-003-C is 1.1 x 0.4 cm; all approximately 0.1 cm thick; all are WFPW with yellowish brown (10YR 5/4) standard configuration cotton elements; a section of side selvage is preserved on 04-063-003-A



Unit 14 Level B Sector V – LIP

Year 2004 Box 063 Bag 004

04-063-004-A: a fragment from a decorated bag/pouch or garment; main body: 6 x. 4.5 cm and a WFPW textile that is decorated with a stripe created using supplementary wefts and a fringe; both sets of the main elements are pinkish white (7.5 YR 8/3) standard configuration cotton yarns; a section of the end selvage of the main body textile remains and consists of 3 or 4 Z(4or5s(2z)) configuration header cords; stripe is just under 1 cm wide and composed of yarns in (probably) dyed brown-red and dyed blue; blue wefts are dyed cotton with a 4 S(2z) configuration; red wefts are dyed camelid wool and it is likely

they would have been originally spun (otherwise they could not have been woven in), but they have come undone; the pattern in the stripe is three sets of two red wefts with one blue weft separating the sets (RRBRRBRR); the supplementary wefts were inserted into the fabric before it was folded over and a whip-stitch (standard configuration cotton yarn) used to hold and reinforce the folded edge; the long (originally >10 cm) fringe was made by twisting warps together to create S(2z(4s(2z))) cords that are finished in a sinnet knot; has also been patched/repared with another piece of WFPW (with preserved end selvedge consisting of three Z(5s(2z)) configuration header cords); cotton cord with a Z(6s(2z)) attached the patch to the main piece; Z(5s(2z)) configuration cord sewn along the top of the “pouch” and may have been a cinch cord



Specimen 04-063-004-A



Detail of Main Body End Selvedge



Voids from Stitches down Patch



Possible Cinch Cord



Sewing Stitch



Supplementary Weft Stripe



Detail of Fringe Origin



Detail of Fringe Finish

04-063-004-B: one WFPW fragment (3 x 2.5 cm) with standard configuration pale brown (10 YR 6/3) cotton warps and wefts



Specimen 04-063-004-B



Weave Detail

04-063-004-C: one WFPW fragment (1 x 2.5 cm) with standard configuration very pale brown (10YR 7/3) cotton warps and wefts



Specimen 04-063-004-C



Weave Detail

Unit 15 Level A Sector V – LIP

Year 2004 Box 063 Bag 005

04-063-005-A: a single fragment (1 X 1 cm and 0.25 cm thick) of a WFPW textile; a portion of a side selvedge is preserved; both sets of elements are standard configuration yellowish brown (10YR 5/4) cotton yarns

Unit 15 Level B Sector V – LIP

Year 2004 Box 063 Bag 006

04-063-006-A: a single fragment (7.5 x 4 cm) of a half-basket (weft) plain weave; structure is assumed as the only other half-basket plain weaves in the assemblage have had doubled wefts, not doubled warps; standard configuration and doubled standard configuration brown (10YR 5/3) cotton yarns



Specimen 04-063-005-A



Specimen 04-063-006-A

Unit 19 Level B Sector IV – Middle Horizon

Year 2004 Box 051 Bag 001

04-051-001-A: a fragment (7.0 x 4.5 cm and 0.15-0.5 cm thick) of a construction composed of two textiles, a WFPW and another probably WFPW, sewn together using a whip-stitch; warps and wefts of both textiles are standard configuration yellowish brown (10YR 5/4 and 10YR 5/5) cotton yarns; whip stitch is composed of two standard configuration yellowish brown cotton yarns and attaches the two pieces at a non-right angle.



Specimen 04-051-001-A



Reverse of Specimen 04-051-001-A



Detail of WFPW



Detail of Join and Sewing

Unit 20 Level B Sector IV – Middle Horizon

Year 2004 Box 051 Bag 002

04-051-002-A: a loose, single ply, Z-spun dark yellowish brown (10YR 4/6) wool yarn;
about 10 cm long when loosely stretched



Specimen 04-051-002-A

Unit 21 Level B Sector III – Early Nasca

Year 2004 Box 038 Bag 001

04-038-001-A: two fragments of a WFPW textile; smaller fragment is 2.0 x 1.0 cm and 0.1 cm thick; the larger of the two fragments, 4.0 x 4.5 cm and 0.2 cm thick, has had a reinforcing whip stitch, consisting of three standard yarns, sewn down the length of the side selvedge before the fragment was folded over and sewn to itself (using a Z(2s(2z)) configuration very pale brown, 10YR 7/3, cord), parallel to the side selvedge, creating a corner; warps and wefts are standard configuration light yellowish brown (10YR 6/4) cotton yarns; the whip stitch is composed of tripled standard configuration light yellowish brown yarns

04-038-001-C: a 2.4 cm long standard configuration light yellowish brown (10YR 6/4) cotton yarn; similar to the elements from 04-038-001-A



Specimen 04-038-001-A – Larger Fragment



Reverse of Larger Fragment



Specimen 04-038-001-A Corner Detail



04-038-001-A (Left) and 04-038-001-C

04-038-001-D: a 4 cm long piece of standard configuration dark brown (10YR 3/3) camelid wool yarn



Specimen 04-038-001-D



Spin/ply Detail

Unit 32 Level C Sector IV – Mixed (Early Nasca, Middle Nasca, and LIP)

Year 2005 Box 038 Bag 005

05-038-005-A: three fragments from a S(2z(2s)) wool cord; most of the remaining cord is barber-pole and composed of very dark greyish brown (2.5Y 3/2) and pale yellow (2.5Y 8/4-7/4) yarns; however, near one of the frayed ends of one of the segments, the darker yarn has had yellow fiber spliced into it, creating a mottled brown and (mostly) yellow cord; there are also two knots located along the cord segments, a figure-of-eight knot and an overhand knot; approximately 20 cm length between remaining pieces



Specimen 05-038-005-A



Overhand Knot



Figure-of-eight Knot



Yellow Fiber Splicing

Unit 34 Level B Sector IV – LIP

Year 2005 Box 038 Bag 009

05-038-009-A: short length, 2.4 cm long, of standard configuration brownish yellow (10YR 6/6) wool yarn, almost completely undone

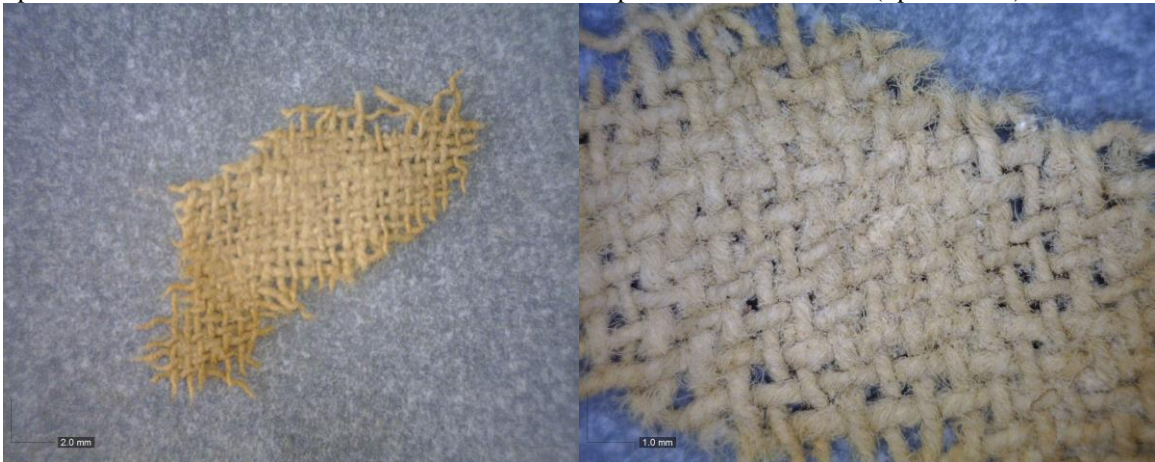
Year 2005 Box 038 Bag 010

05-038-010-A: Two fragments, 1.05 x 0.70 cm and 1.65 x 1.30 cm, of a balanced plain weave textile; both sets of elements standard configuration light yellowish brown (10YR 6/4)/very pale brown (10YR 8/4) cotton yarns; one fragment preserves a section of side selvage



Specimen 05-038-009-A

Specimen 05-038-010-A (Specimen A)



Specimen 05-038-010-A (Fragment B)

Weave Detail

Year 2005 Box 041 Bag 001

05-041-001-A: a ball of yarn of Z spun very pale brown (10YR 8/2) yarn; 5.5 cm diameter

05-041-001-B: a ball of yarn of Z spun brown (10YR 5/3) yarn; 7.5 cm diameter

05-041-001-C: a ball of yarn of Z spun moderate brown (5YR 3/4) yarn; 6 cm diameter



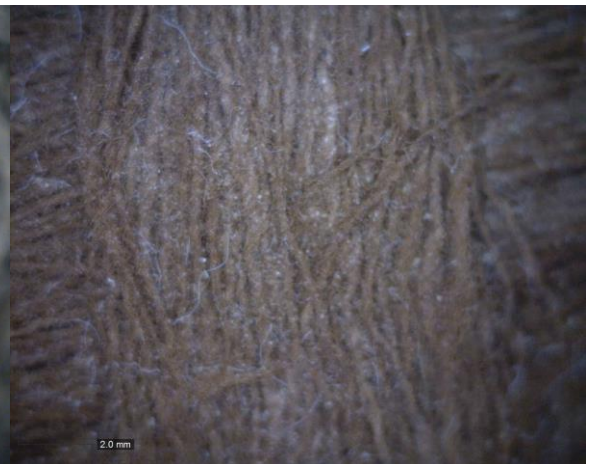
Yarn Ball (Conlee, n.d.)



Detail of 05-041-001-A



Detail of 05-041-001-B



Detail of 05-041-001-C

Unit 35 Levels A and B Sector V – LIP

Year 2005 Box 065 Bag 006

05-065-006-A: possibly a braid of some type that has become damaged to the point where the structure is unclear; raw fiber is dark yellowish brown (10YR 4/4) human hair and the apparent structure of the basic element is Z(2s); the dimensions might be complete – 32 cm long and 12 cm wide



Specimen 05-065-006-A

Reverse Side



Detail

Detail

05-065-006-B: a loop, approximately 8 cm long when flat, of interlaced very dark brown (7.5YR 2.5/3) human hair cord secured with a knot (structure unidentified; knot adds 4 to 5 cm to length of piece); the cord structure appears to be a simple three strand pigtail-

style interlacing/braid with the strands of the braid composed of three S spun yarns of human hair; the size of the piece suggests that it could have been a bracelet or a handle.



Specimen 05-065-006-B



Reverse



Structure Detail



Knot Detail

05-065-006-C: a structure composed of cords made of an unidentified number of S spun yarns plied together; what remains of the piece structurally is two sub-parallel cords that function like warps with a “weft” cord wrapping 180° around one cord, then under and around the other cord 180°, going back and forth for just two or three passes with the distance between the “warps” gradually widening; after a couple passes, it appears that a third “warp” was inserted between the two outside “warps” and then a more typical over-under interlacing began; fiber is dark yellowish brown (10YR 4/4) and probably human hair



05-065-006-C (Conlee, n.d.)



05-065-006-D (Right; Conlee, n.d.)

05-065-006-D: a small, sub-rectangular mat of very dark brown (7.5YR 2.5/3) human hair; the artifact appears to be complete, but the structure by which it retains its shape is difficult to identify; the piece currently has a felt-like appearance, but that may be due to damage and not the intended structure; it is unclear if any of the fibers making up the mat were originally separated into individual elements and/or spun; 5.5 x 7.0 cm

05-065-006-E: another segment of interlaced/braided human hair, the piece is damaged and the type of interworking used difficult to identify, but the component elements are yarns of S spun human hair



Specimen 05-065-006-E (Conlee, n.d.)

Year 2005 Box 065 Bag 008

05-065-008-A: a length, approximately 11 cm, of Z(6s) configuration cord; the raw fiber of the cord was originally identified as cotton; however, during later examination of the photos, fibers that are the same color as the cord, but which are too long and kinked to be identified as cotton, can be seen clinging to the cord; the fiber exposed at the frayed ends does appear to be cotton, therefore, it may be that this cord is comprised of brownish yellow (10YR 6/6) cotton supplemented with another unidentified fiber

05-065-008-B: a short length, 1.3 cm, of S(2z(2s)) configuration cord; the component fiber appears to be human hair, but might be camelid wool; color is very dark brown (10YR 2/2)



Specimen 05-065-008-A



Specimen 05-065-008-B

Unit 45 Level A Sector V – Middle Horizon

Year 2006 Box 032 Bag 005

06-032-005-A: length of standard configuration brownish yellow (10YR 6/6) cotton yarn with an overhand knot approximately 2 cm from one end of the fragment; total length 15 cm long



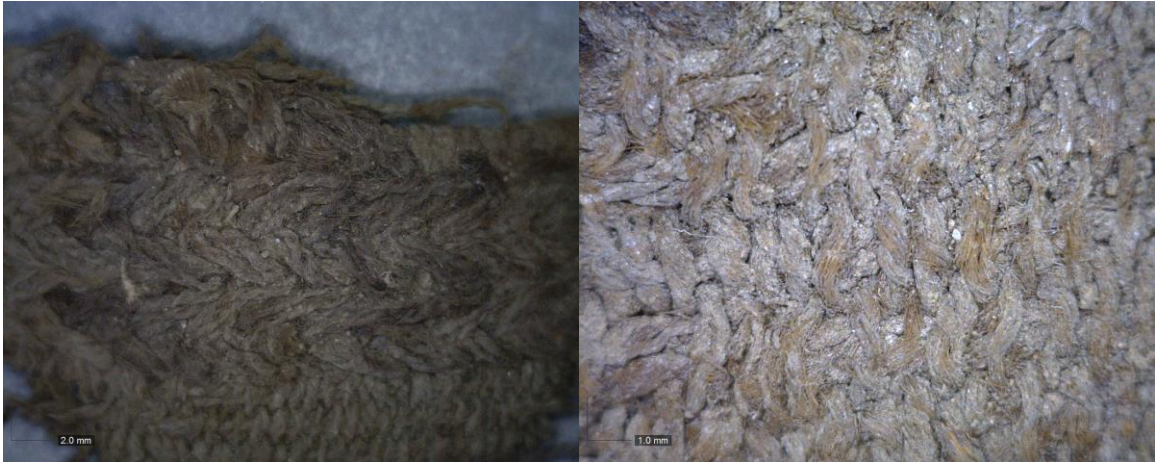
Specimen 05-032-005-A

Detail of Knot and Ply Configuration

Unit 45 Level B Sector V – Middle Horizon

Year 2006 Box 032 Bag 006

06-032-006-A: 12 fragments of a WFPW textile with embroidered trim which covered the end selvedge; fragment dimensions range from 1.0 x 1.5 cm to 10.0 x 29.0 cm; nine are plain body fragments, the remaining three have trim with end selvedges preserved (mostly concealed under trim); the warp and weft of the textile are composed of standard configuration brown (10YR 4/3) wool yarns; the embroidered trim consists of flat stitches creating three rows of chevrons; the embroidery stitches are composed of standard configuration wool yarns (the same color as the main elements) that seem to have been tripled before being pulled through the fabric

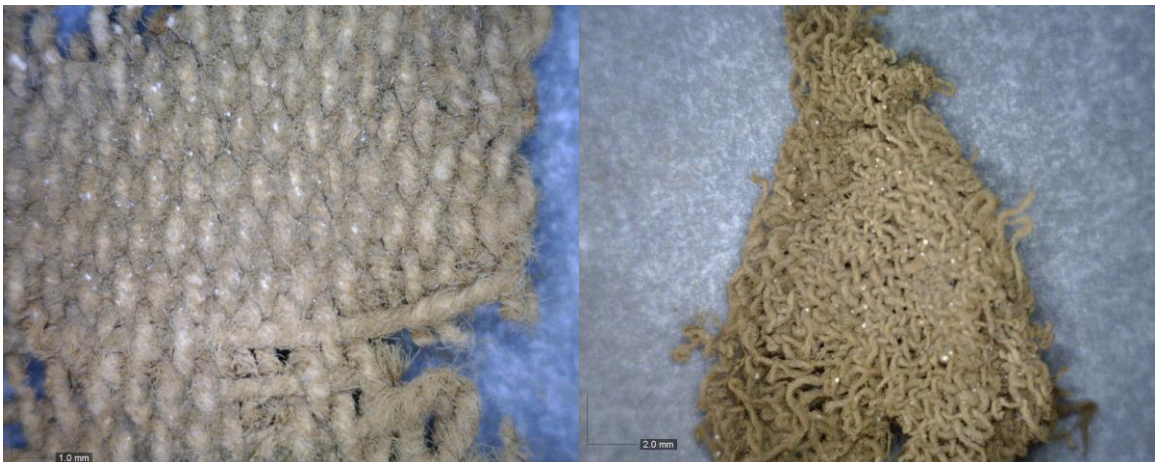


Specimen 05-032-006-A

Weave Detail

06-032-006-B: 2 fragments of a WFPW with standard configuration pinkish grey (7.5YR 7/2) cotton warp and weft elements; structure confirmed by the presence of side selvedge on two of the fragments; dimension are 4.0 x 2.5 cm and 3.0 x 3.0 cm

06-032-006-C: one fragment of a balanced plain weave composed of loosely spaced Z spun light olive brown (2.5Y 5/4) cotton yarns; dimensions are 11 x 15 cm



Specimen 06-032-006-B with Side Selvedge

Specimen 06-032-006-C

06-032-006-D: consists of two strips of plain weave fabric, probably a balanced plain weave of standard configuration light yellowish brown (10YR 6/4) cotton elements, that were S twisted to create a cord; a knot, some variation on a hitch (Graumont and Hensel 1952: 12) joins the two twisted strips; fragment is approximately 20 cm long



Specimen 06-032-006-D



Detail

06-032-006-E: a complex cord fragment, approximately 12 cm in length, composed of dyed red wool; one section of the cord has a spin/ply configuration of $Z(2s(2s(2z)+5s(2z)))$, then there is a reduction in the diameter of the cord as most of strands terminate and the loose ends tucked into the cord; the section that continues on has a $Z(2s(2z))$ structure; there is an overhand knot at the end of this section preventing additional fraying; I assume that the $Z(2s(2s(2z)+5s(2z)))$ configuration was the original structure, and the transition to the smaller diameter $Z(2s(2z))$ structure and knot were methods to prevent fraying after the original cord was damaged



Specimen 06-032-006-E



Presumed Original Ply Configuration



Fiber under 202x Magnification



Splice Detail



Splice Detail – Reverse



Reworked Structure with Knot

06-032-006-F: is a single fragment, approximately 6 cm long, of a wool cord with a $Z(7s(2z))$ structure; of the component $S(2z)$ yarns, 2 are brown (7.5YR 3/2) and 5 are tan (10YR 5/6) – un-dyed, it does not appear crafter attempted to create a regular repeating pattern with the different color yarns

06-032-006-G: undyed brown (7.5YR 3/2) wool cord with $Z(5s(2z))$ structure

06-032-006-H: a loop, about 6 cm circumference, created by tying a square knot, an overhand knot tied on top of another overhand knot (Graumont and Hensel 1952: 12), along a $Z(2s(2z))$ brown (10YR 4/3) wool cord



Specimen 06-032-006-F



Specimen 06-032-006-F - Detail of Frayed End



Specimen 06-032-006-G



Specimen 06-032-006-H



Specimen 06-032-006-H - Knot Detail



Specimen 06-032-006-H - Ply Detail

06-032-006-I: a thick light reddish brown (2.5YR 6/4) wool yarn of standard configuration; approximately 8 cm long

06-032-006-J: a yellowish brown (10YR 5/6) wool cord of S(2z(3z)) configuration;
approximately 12 cm long



Specimen 06-032-006-I

Specimen 06-032-006-J

06-032-006-K: a yellow (10YR 7/6) wool cord with Z(2s(2z)) configuration;
approximately 5 cm long

06-032-006-L: a yellowish brown (10YR 5/4) cotton cord with Z(6s) configuration;
approximately 8 cm long



Specimen 06-032-006-K

Specimen 06-032-006-L

06-032-006-M: three segments of a cord with Z(2s(2z)) configuration; segments less than 13 cm long; the component stage 2 yarns are barber-pole patterned with dark yellowish brown (10YR 3/4) and pale yellow (5Y 8/4) fiber. The yellow yarns are camelid fiber.

The brown fibers could be camelid fiber, as well, but do appear very similar to human hair under magnification



Specimen 06-032-006-M



Detail of Ply Configuration

Year 2006 Box 032 Bag 007

06-032-007-A: two lengths of cordage made from yellowish brown (10YR 5/6) vegetal fiber tied together in a knot; part of the knot and one of the lengths of cordage is degraded to the point of making structural identification difficult, however, the remaining portion of the knot suggests that it was a square knot, and the remaining cord has a Z(2s(3i)) configuration



Specimen 06-032-007-A



Reverse

Year 2006 Box 032 Bag 008

06-032-008-A: two WFPW textile fragments; warp and weft elements are standard configuration cotton yarns; one piece is in poor condition; on the other (15.1 x 3.9), the side selvedge is present and has been reinforced with two nested rows of whip-stitches which have created a rolled finish; the interior stitches are tripled standard configuration yarns; the exterior stitches have a Z(3s(2z)) configuration; all elements are light yellowish brown (10YR 6/4)



Specimen 06-032-008-A



Detail of Rolled Hem/Side Selvedge

Unit 46 Level A Sector V – Mixed (Early Nasca and Middle Horizon)

Year 2006 Box 032 Bag 009

06-032-009-A: two short lengths of a cotton oblique interlaced braid and associated loose strands; one of the pieces is in poor condition; however, the other piece is in good shape and appears to be complete (4.5 x 1.2 cm); the braid was started by taking a number of fine standard configuration yellow (10YR 7/6) cotton yarns and folding them in half, doubling the number of strands, these strands were then sub-divided into three groups/strands and then interlaced, basic hair-braiding style; the end is cut and there is not obvious method for securing the end from fraying, but it is still tidy suggesting that this is the intended length of the braid the piece that is in poor shape is approximately the same length as the finished piece and these pieces might have functioned as tassels



Specimen 06-032-009-A



Complete Tassel

Unit 47 Level A Sector V – Middle Horizon

Year 2006 Box 032 Bag 010

06-032-010-A: would have been a bi-color wool cord, brown (10YR 2/4) and yellow (2.5Y 6/8); the remaining brown fibers only exist within and exiting the overhand knot; the configuration of the yellow yarn exiting the knot is standard; the original cord configuration incorporated both the brown and yellow fibers and would be more complex



Specimen 06-032-010-A



Knot Detail

Unit 47 Level B Sector V – Middle Horizon

Year 2006 Box 032 Bag 011

06-032-011-A: 3.5 cm fragment of standard configuration dyed blue camelid wool yarn



Unit 52 Level B Sector I – Middle Archaic

Year 2009 Box 012 Bag 001

09-012-001-A: a small fragment (1.5 x 1.25 cm) of a crossed knitting of Z(2s) cotton yarns; Z(2s) yellowish brown (10YR 5/6) cotton yarns



Specimen 09-012-001-A



Reverse



Detail of Structure



Detail of Structure - Reverse

Unit 53 Level B Sector I – Mixed (Archaic, Early Nasca, and LIP)

Year 2009 Box 012 Bag 002

09-012-002-A: a length, approximately 19 cm loosely stretched, of Z(6s(2z)) brownish yellow (10YR 6/6) cotton cord with a double overhand (?) knot along it; the knot seems to be the location at which new yarns are spliced into the cord; this assertion is supported by the presence of both frayed fibers and the beginnings of S(2z) yarns emerging from the knot



Specimen 09-012-002-A



Ply Configuration Detail



Knot Detail



Knot Detail – Reverse

Year 2009 Box 012 Bag 003

09-012-003-A: a length of yellow (10YR 8/6) wool yarn with Z(2s) ply configuration; length unrecorded

09-012-003-B: an overhand (?) knot along a length of standard configuration reddish yellow (7.5YR 7/8) cotton yarn; length not recorded



09-012-003-A (lighter fiber) and 09-012-003-B

Specimen 09-012-003-B Knot Detail

09-012-003-C: a standard configuration yarn that appears to be wool; the fibers are stiff and discolored

09-012-003-D: a standard configuration yellow (10YR 7/8) cotton yarn; 3.5 cm long



Specimen 09-012-003-C

Specimen 09-012-003-D

Unit 54 Level B Sector II – Early Nasca

Year 2009 Box 012 Bag 004

09-012-004-A: two short lengths, 2.0 and 3.5 cm long, of cord, Z(2s(2z)) configuration, made of dyed red wool



Specimen 09-012-004-A



Ply Configuration Detail

Tomb 2 Sector V – Middle Horizon

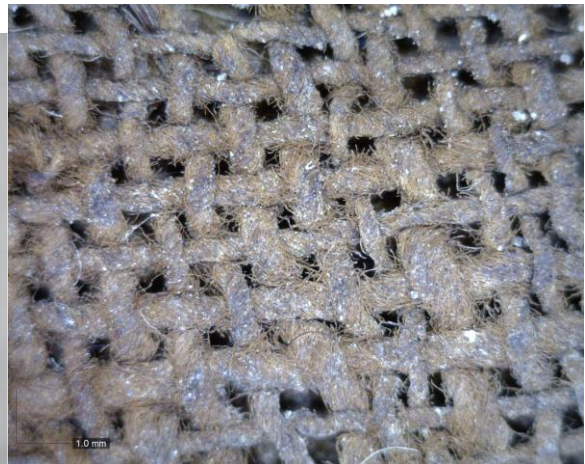
Year 2005 Box 053 Bag 018

05-053-018-A: two balanced plain weave textile fragments with loosely spaced Z spun elements composed of strong brown (7.5YR 4/6) cotton fiber; the fragments are roughly the same, irregular shape which suggests that these two fragments may be a remnant from a double-layered textile; dimensions of both fragments are 4.5 x 6.2 cm

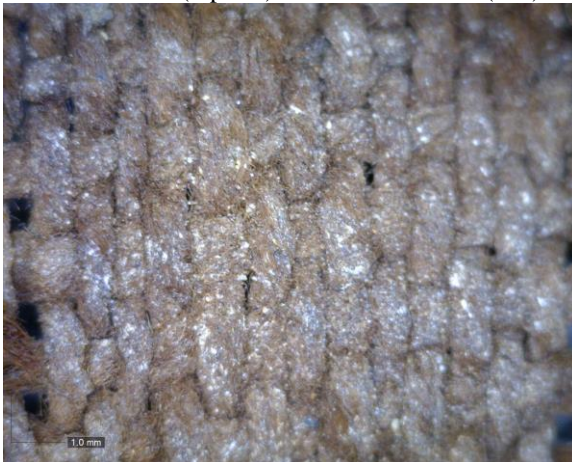
05-053-018-B: five fragments from a plain weave textile with one set of elements predominant, probably the warps; all elements are standard configuration strong brown (7.5YR 4/8) cotton yarns; fragment size range: 0.6 x 1.6 cm to 6.8 x 6.5 cm



05-053-018-A (top left) and 05-053-018-B (rest)



Specimen 05-053-018-A Weave Detail



Specimen 05-053-018-B Weave Detail

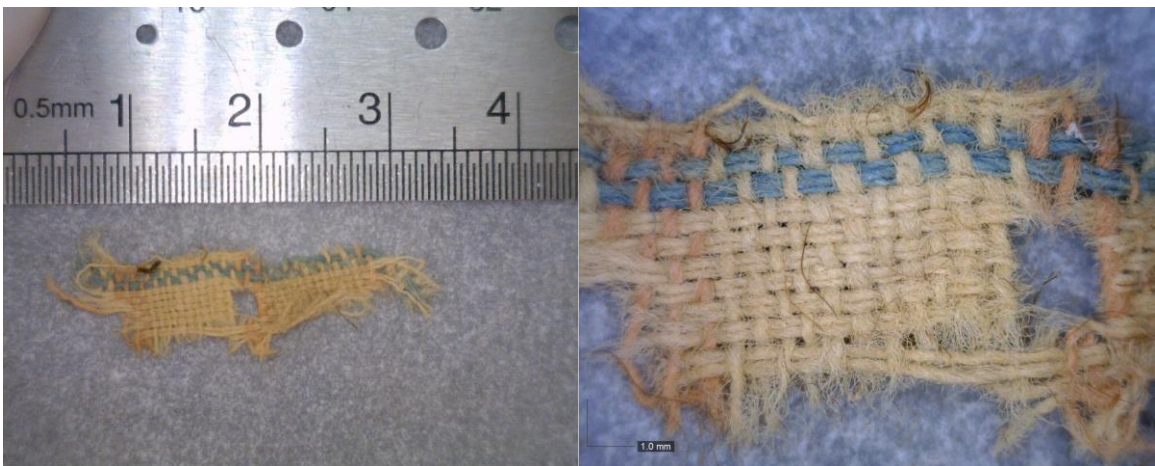
05-053-018-C: one fragment of a balanced plain weave fabric with very fine gauge, loosely spaced Z spun elements composed of strong brown (7.5YR 4/6) cotton fiber



Specimen 5-053-018-C

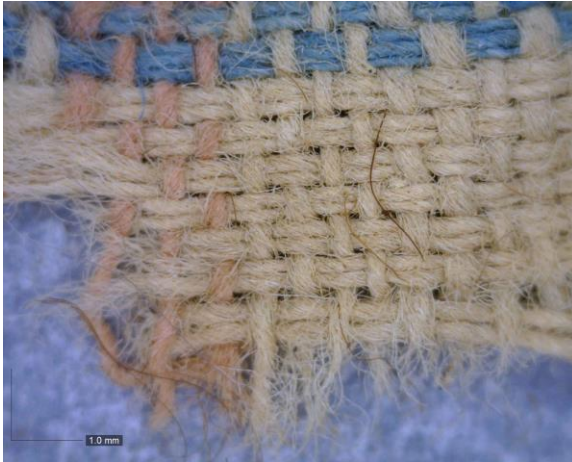
Weave Detail

05-053-018-D: a small fragment of a plaid fabric; warp and weft have been arbitrarily assigned; “wefts” are singled elements, the undyed fibers are S spun and the dyed pink fibers are “Z” spun; for the “warps”, all the yarns are Z spun but the undyed yarns are doubled and (based on the extra spacing on top of that one element), the dyed blue yarns are tripled; all of the fiber is cotton and the undyed color is pale yellow (5Y 8/4)



Specimen 05-053-018-D

Weave Detail



Note S and Z Spin of Singles

Year 2005 Box 053 Bag 019

05-053-019-A: two fragments (2.7 x 2.7 cm and 3.3 X 2.3 cm) of a textile composed of standard configuration yellowish brown (10YR 5/4) wool yarns; one set of elements if predominant, either warp or weft, but there is no selvedge to aide in the determination



Specimen 05-053-019-A

Weave Detail

05-053-019-B: six fragments (average size approximately 3 x 3 cm) of a textile composed of standard configuration wool yarns; one set of elements is predominant; there is no selvedge present; it appears that there has been some discoloration, but the two sets of elements are different colors, the predominant elements are a dark reddish brown (5YR 3/4) and the hidden elements are a very dark brown (10YR 2/2); this suggests that

there may have been a pattern in the main structure of the fabric that used more than one color of yarn, such as fields of discontinuous color (tapestry) or stripes



Two Fragments of 05-053-019-B



Weave Detail

05-053-019-C: one fragment of a textile composed of standard configuration brown (7.5YR 4/4) wool yarns; one set of elements is predominant; however, no selvage is present to help confirm structure



Specimen 05-053-019-C



Weave Detail

05-053-019-D: two fragments (3.8 x 2.3 cm and 6.8 x 6.2 cm) from a textile composed of standard configuration wool yarns; one set of elements is predominant and there is a striped pattern created using different color yarns, either WFPW with warp stripes or a tapestry weave; the hidden elements are very dark brown (10YR 2/2); the two different

colors of yarns that comprise the predominant elements, or face, of the fabric are very dark brown (10YR 2/2) and dark reddish brown (5YR 3/4)



Specimen 05-053-019-D



Weave Detail – Red Elements Predominant

Year 2005 Box 053 Bag 020

05-053-020-A: a textile consisting of two fragmented pieces of WFPW pieced together along extant side selvages using a seam stitch of doubled standard yarns; total dimensions are 18.5 x 10.3 cm; all elements of strong brown (7.5YR 4/6) wool; both sets of elements are standard yarns; end selvedge present though heavily damaged, probably three header cords; a fringe remains along these end selvages that was created by not removing the warp attachment cords and allowing the folded-over yarns to twist back on themselves, creating Z(4s(2z)) cords



Specimen 05-053-020-A



Reverse of 05-053-020-A



Weave Detail



Seam Stitch Detail



End Selvedge Detail



Detail of Fringe Ply Configuration

Year 2005 Box 053 Bag 024

05-053-024-A: two fragments (2.0 x 0.4 cm and 4.2 x 0.4 cm) that consist mostly of the side selvedge of a WFPW composed of standard configuration yellowish brown (10YR 5/8) cotton yarns; remnants of braided wool binding/border cover sections of the selvedge both protecting the edge and decorating the piece; the yarns used in the decorative border are standard configuration and a very dark grey (7.5YR 3/1)



Specimen 05-053-024-A



Weave Detail



Binding Interwoven through Main Body



Edge of Textile

Year 2005 Box 053 Bag 025

05-053-025-A: two fragments of a WFPW textile; structure confirmed by the presence of a section of side selvedge; the only decorative element to the piece is the use of barber-pole warps creating a mottled effect; wefts are standard configuration strong brown (7.5YR 5/8) wool yarns; wefts are standard configuration yarns in strong brown (7.5YR 5/8) and very dark brown (7.5YR 2.5/2); the two fragments are loosely held together by what appears to be a single remaining stitch composed of three of the barber-pole yarns; a repair was observed in which solid very dark brown (7.5YR 2.5/2) warps are woven in; total dimensions are 6.8 x 7.5 cm



Specimen 05-053-025-A



Weave Detail (Note Mottled Visual Texture)



Side Selvedge Detail



Detail of Repair with Solid Dark Brown Warps

Year 2005 Box 053 Bag 027

05-053-027-A: a single fragment (1.2 x 0.5 cm), with a side selvedge, from a slit tapestry weave; all of the component yarns are standard wool yarn; all warps and the main color field wefts are of undyed light olive brown (2.5Y 5/8) fiber; there are short, narrow strips composed of rows of dyed blue, and probably red, fiber yarns



Specimen 05-053-027-A

Reverse

Year 2005 Box 053 Bag 029

05-053-029-A: an oblique interlaced braid segment composed of three, thick standard configuration yarns; the fragment is stiff and discolored probably from long term contact with human remains, this has made fiber identification difficult, but probably camelid wool or human hair; 2.7 cm long and 0.7 cm thick



Specimen 05-053-029-A

Detail of Structure

05-053-029-B: a segment of a square braid made of wool yarns; only enough structural integrity remains to say that the braid is composed of 16 elements, each of which appears to be composed of two standard composition yarns which may or may not have been

twisted together (Z?); there has been significant discoloration to the piece, but at least some of the yarns appear to have been dyed blue or green; 2.8 cm long and 0.5 cm thick



Specimen 05-053-029-B



Detail Showing Color Variation

05-053-029-C: three segments of oblique interlaced braid; the pattern is achieved using an even number of elements and two different colors of wool yarn, strong brown (7.5YR 5/8) and very dark brown (10YR 2/2), that are taken from the outside and brought to the center creating a repeating chevron pattern; damage to the fragments has been significant, but each element appears to be composed of a Z(2s(2z)) configuration yarn; there are more dark elements than lighter elements probably a 1 to 2 ratio; lengths 5.9, 4.4, and 4.5; 0.8 cm thick



Specimen 05-053-029-C



Detail of Structure and Pattern

05-053-029-D: a textile fragment (4.5 x 4.8 cm) that consists of two pieces of WFPW that have been sewn together along their side selvages using an alternating herringbone stitch; the seam stitches are tripled standard yarns and the warps and wefts of the textile are standard configuration; all of the fiber is strong brown (7.5YR 5/4) wool



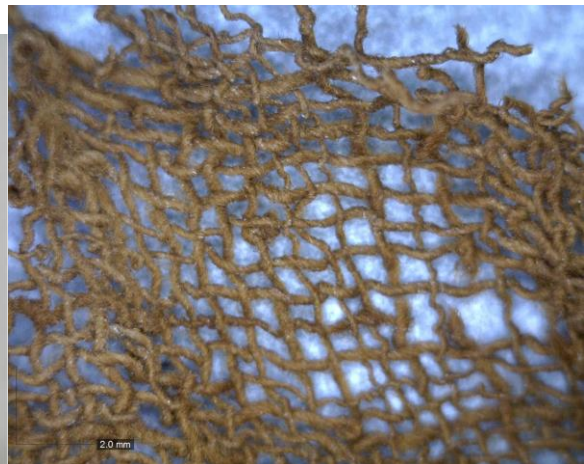
Detail from Specimen 05-053-029-D

Year 2005 Box 053 Bag 030

05-053-030-A: seven fragments of balanced plain weave textile with Z spun brown (10YR 4/3) cotton elements; dimensions are all less than 7 x 7 cm



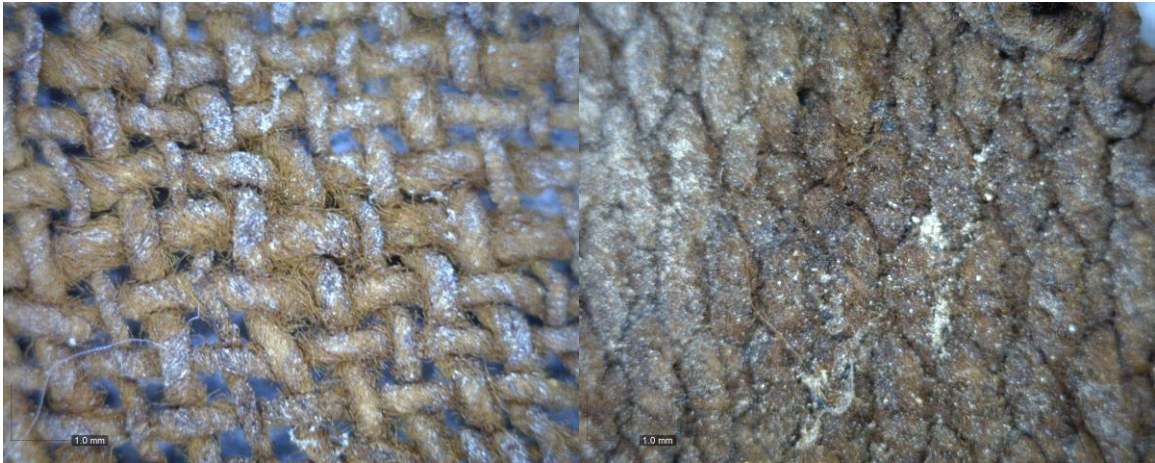
Box 053 Bag 030



Specimen 05-053-030-A Weave Detail

05-053-030-B: eight fragments of balanced plain weave textile with Z spun yellowish brown (10YR 5/4) cotton elements; average fragment size is approximately 4 x 4 cm

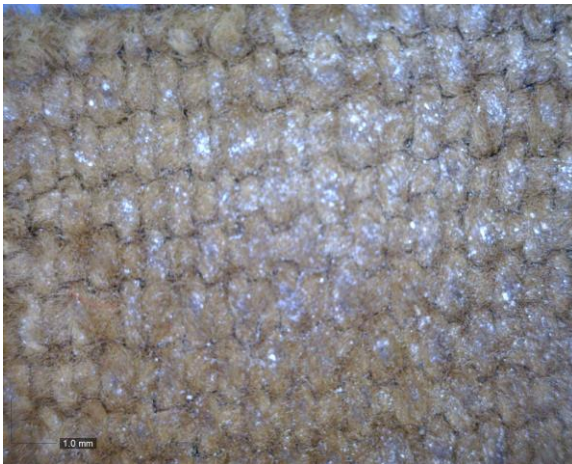
05-053-030-C: a single fragment of cotton WFPW with standard configuration dark brown (7.5YR 3/2) cotton elements; dimensions are 2.4 x 1.8 cm



Specimen 05-053-030-B Weave Detail

Specimen 05-053-030-C Weave Detail

05-053-030-D: seven fragments of WFPW with standard configuration brown (10YR 5/3) cotton elements; dimensions are all less than 7 x 4 cm



Specimen 05-053-030-D Weave Detail

Tomb 3 Sector V – Middle Horizon

Year 2006 Box 045 Bag 033

06-045-033-A: six fragments of a textile with one set of elements predominant; no selvages were observed, but the fragments appear to be WFPW, possibly a weft-faced weave; the concealed wefts are dark yellow brown (10YR 4/6) standard wool yarns; the warps are standard configuration yarns of dyed red wool fiber and under magnification appear to be of a different quality fiber than the brown yarns; dimensions of fragments ranges from 0.9 x 1.0 cm to 3.5 x 2.1 cm



Specimen 06-045-033-A



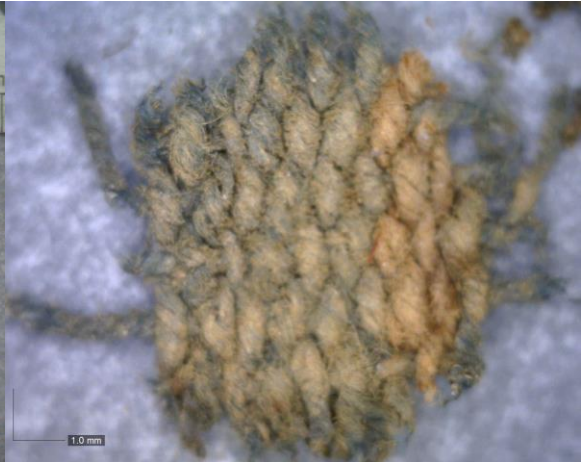
Weave Detail

06-045-033-B: six fragment of a textile with one set of elements predominant, probably WFPW although no selvages present; the wefts and the majority of the warps are dyed blue-black cotton yarns of standard configuration; the narrow warp stripe is composed of approximately four undyed brownish yellow (10YR 6/8) standard cotton yarns; dimensions of fragments range from 0.3 x 0.5 cm to 2.2 x 2.2 cm

06-045-033-C: four fragments of a balanced (?) plain weave consisting of Z spun warps and wefts of yellowish brown (10YR 5/6) cotton fiber; dimensions of fragments range from 0.5 x 0.8 cm to 1.4 to 0.7 cm



Specimen 06-045-033-B



Weave Detail from 06-045-033-B Showing Stripe



Detail of Dyed Fiber from Specimen 06-045-033-B



Specimen 06-045-033-C



Weave Detail from 06-045-033-C

Year 2006 Box 045 Bag 034

06-045-034-A: a single fragment (3.6 x 2.2 cm) of WFPW confirmed by a side selvedge; standard configuration dark brown (7.5YR 3/3) wool fiber warps and wefts



Specimen 06-045-034-A

Weave Detail

06-045-034-B: two WFPW fragments measure 1.62 x 0.89 and 1.26 x 0.89 cm; possibly part of the same textile as 06-045-033-A

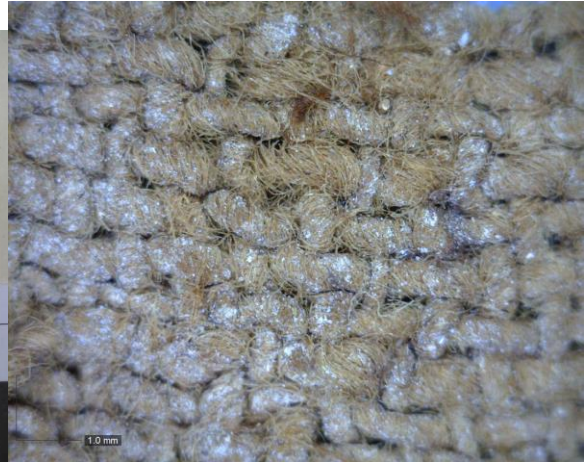


06-045-034-C: three balanced plain weave fragments with Z spun dark yellowish brown (10YR 4/6) cotton elements; one small section of side selvedge preserved; dimensions range from 1.9 x 1.3 cm to 3.3 x 1.8 cm

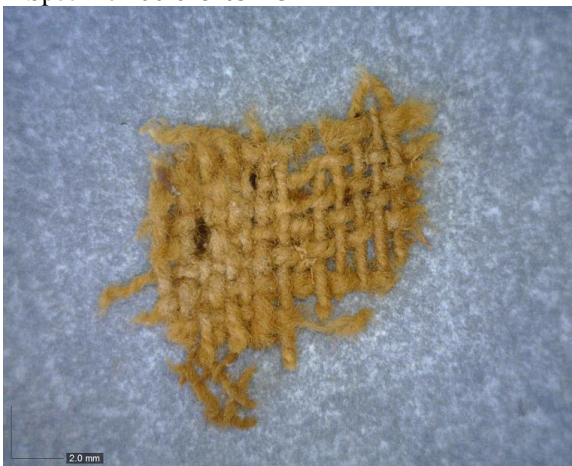
06-045-034-D: one fragment (1.0 x 1.2 cm) of a textile with brownish yellow (10YR 6/6) cotton elements; structure is degraded, but probably was a WFPW



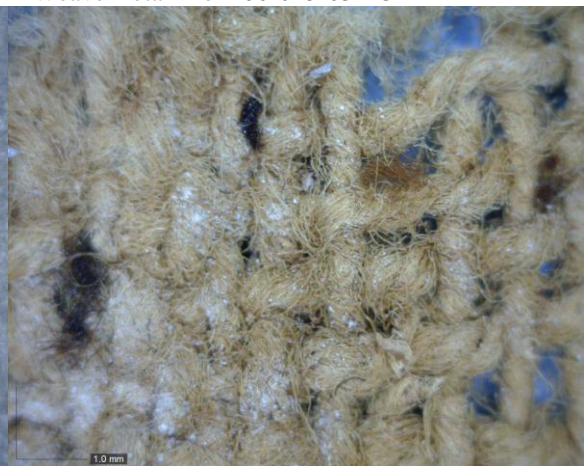
Specimen 06-045-034-C



Weave Detail from 06-045-034-C



Specimen 06-045-034-D



Weave Detail from 06-045-034-D

06-045-034-E: three fragments of an open balanced plain weave textile with Z spun dark brown (7.5YR 3/4) cotton yarns; in the figure below, the middle fragment is 3.9 x 2.7 cm



Specimen 06-045-034-E



Weave Detail

Year 2006 Box 045 Bag 035

06-045-035-A: a fragment (16.8 cm long by 3.6 cm wide) from the end of a belt in which the main body is flat twill oblique interlacing that transitions into a primary fringe of cords (average 0.5 cm dia.) of tubular oblique interlacing which is further dissected into a secondary cord (average 0.2 cm diameter) fringe; there are approximately 32 bundles composed of doubled Z(2s(2z)) wool cords, 24 very dark brown (10YR 2/2) and eight brownish yellow (10YR 6/6); the two fiber colors create a chevron pattern; the oblique interlacing is then subdivided into eight tubular oblique interlaced cords, colors evenly distributed; each tubular cords is then subdivided into four Z(2s(2z)) cords, three very dark brown and one brownish yellow; only one of these final fringe cords is finished, with an overhand knot that may be a later repair; at the other end, the belt appears to have been cut, possibly when the tomb was disturbed



Specimen 06-045-035-A

Reverse



Detail of Structure and Pattern



Exposure of Floated Interior Elements



Detail of Primary Fringe Cord



Detail of Set of Four Secondary Fringe Cords

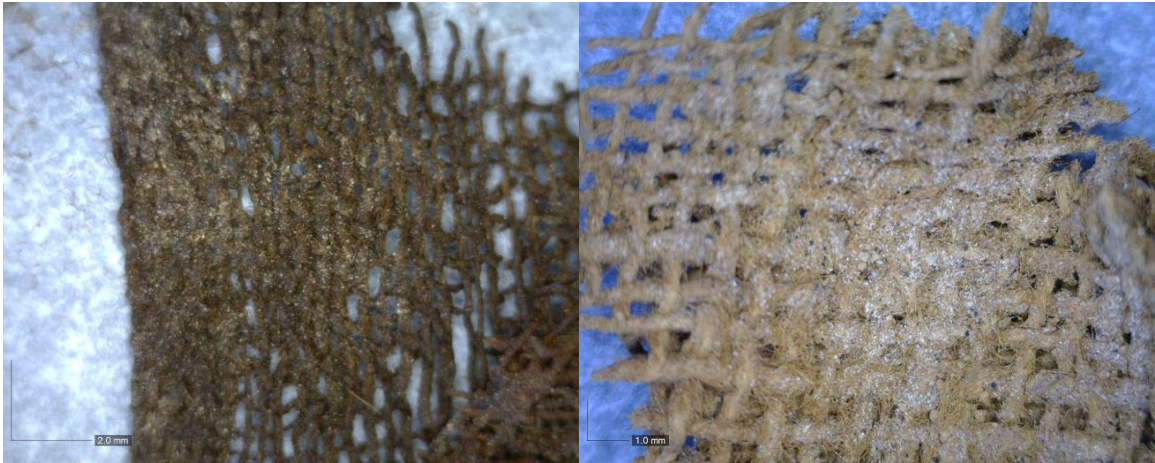


Detail of Knot at Termination of Secondary Fringe

Year 2006 Box 045 Bag 036

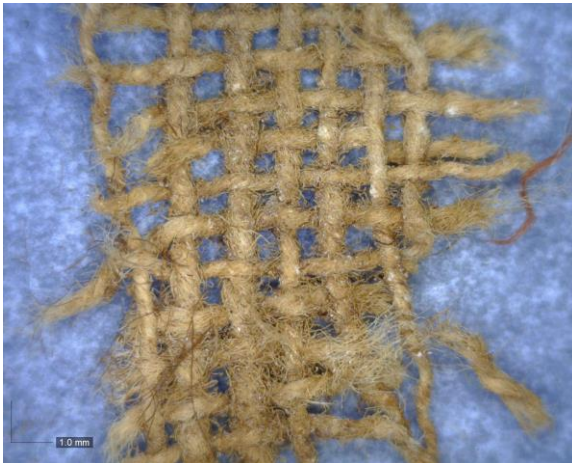
06-045-036-A: approximately 40 small fragments of a balanced plain weave textile composed of standard configuration brown (7.5YR 4/4) cotton elements; most of the

fragments are heavily stained; dimensions of fragments range from 0.3 x 0.4 cm to 5.0 x 3.5 cm



Side Selvedge Detail from Specimen 06-045-036-A Weave Detail from Unstained Fragment

06-045-036-B: One fragment of a balanced plain weave textile with standard configuration yellowish brown (10YR 5/6) cotton yarns; originally included in the previous group, but diameter of elements is inconsistent



Specimen 06-045-036-B

06-045-036-C: about 30 fragments of a WFPW textile with standard configuration wool warps and wefts; at least some of the main elements, both warps and wefts, appear to be barber-pole (dark brown 7.5YR 3/2 and dark yellowish brown 10YR 4/4) although extensive discoloration makes it difficult to determine if this extends to all of the main

body elements; a section of a covered/finished side selvedge is preserved along the largest fragment; a closely spaced whip stitch, using a S(4s(2z)) dark brown (7/5YR 3/2) wool cord, creates a one cm wide border; dimensions of fragments range from 0.5 x 0.6 cm to 15.0 x 7.5 cm



Largest Fragment of 06-045-036-C



Detail of Border Covering Side Selvedge



Side Selvedge and Barber-Pole Warps



Barber Pole Weft

06-045-036-D: clump of fabric(s) with little remaining structural integrity; there is a mesh of dyed red, Z spun wool yarns that retains enough integrity to determine a loose woven structure, maybe a plain weave; however, the clump also has a mesh of brownish yellow (10YR 6/6) yarns that maintain some semblance of a woven structure; these specimen may be what's left of a layered fabric, possibly a double-weave



Specimen 06-045-036-D



Dyed Red Wool Yarns Magnified 217x

06-045-036-E: two fragments (2.9 x 2.4 cm and 2.3 x 2.2 cm), both corners, from what appears to be a warp-face double-weave textile; small section of a design observable despite the fragments being stiff and partially discolored, likely due to contact with human remains; Very dark brown (10YR 2/2) and medium brown (7.5YR 4/6) standard configuration wool warps are used to create a rectilinear pattern; none of the wefts are exposed for analysis; there is knit or embroidered border finishing and protecting the end selvedge (confirmed) and side selvedge (presumed) on both fragments; it is difficult to identify the configuration of the border yarns, but S(2Z) yarns comprise the Stage II level of the total element



Specimen 06-045-036-E



Reverse



06-045-036-F: two short lengths of black-blue wool yarns barely holding on to their original S spin; interesting due to use of dye, but metrics not recorded



Specimen 06-045-036-F Magnified 222x

06-045-036-G: five lengths of cordage almost identical in structure and color patterning to that of the secondary fringe in 06-045-035-A but larger in diameter; the longest fragment is 5 cm long; average diameter is 0.88 cm; all but one fragment heavily damaged or soiled



Specimen 06-045-036-G



Structure Detail

Tomb 5 Sector III – Middle Horizon

Year 2006 Box 018 Bag 028

06-018-028-A: 17 fragments of a WFPW textile, confirmed by preserved sections of end and side selvages; three of the fragments are large (18.5 x 13.8 cm, 21.9 x 29.3 cm, and 16.0 x 36.5 cm; smallest fragment is 0.7 x 0.9 cm) and suggest that these are fragments from a large garment or blanket; both sets of elements are of standard configuration and composed of wool fiber; at the end selvage, there only appears to be a single header cord/element and there was no clear view of it, but the configuration seems to be a doubled yarn; the end selvage has been finished using a cross-knit embroidery stitch, a variation on the cross-knit looping technique (O’Neale 1934; Harcourt 1962; Emery 1966); the color of the embroidery yarn (standard configuration, wool fiber), black (10YR 2/1), contrasts with the warps and wefts, yellowish brown (10YR 5/6), of the textile; there are several small holes in the fabric that may be the voids left by lost embroidery yarns and cords; the voids are created, not through the breakage of elements, but by them being pushed to the side there and there does seem to be some coherent organic shapes in the series of cord or large yarn sized holes



Large Fragments of 06-018-028-A



Weave Detail



Detail of End Selvedge and Finish



Side Selvedge

06-018-028-B: seven fragments of an undecorated WFPW; all elements are standard configuration and composed of strong brown (7.5YR 4/6) wool fiber; dimensions of fragments range from 2.3 x 2.7 cm to 13.7 x 14.3 cm



Fragments of 06-018-028-B



Weave Detail

06-018-028-C: 25 fragments of undecorated WFPW; all elements standard configuration brown (7.5YR 4/4) cotton yarns; dimensions of fragments range from 1.4 x 0.8 cm to 9.3 x 7.1 cm



Fragments of 06-018-028-C



Weave Detail

06-018-028-D: three fragments of a WFPW; both sets of elements are standard configuration brownish yellow (10YR 6/6) wool yarns; one of the fragments is the corner of the textile that preserves a section of side selvedge and a rolled hem probably containing the end selvedge; the stitches creating the rolled hem are tripled standard configuration wool yarns; dimensions range from 1.8 x 1.6 cm to 4.4 x 2.9 cm



Fragments of 06-018-028-D



Weave Detail



Side Selvedge Detail



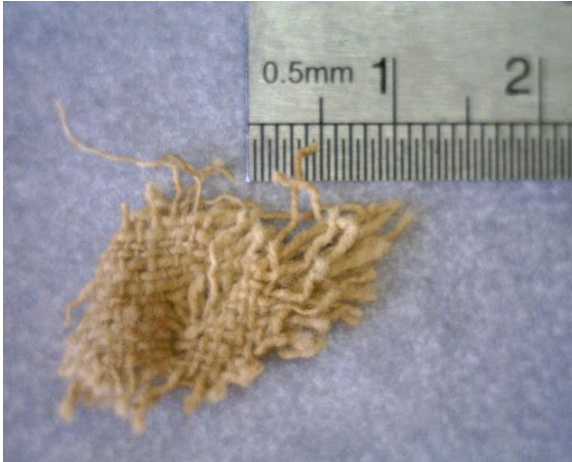
Detail of Rolled Hem (Coming Detached)

06-018-028-E: 10 fragments of a balanced plain weave textile; both sets of elements are Z spun yellowish brown (10YR 5/4) cotton yarns; dimensions of fragments range from 0.7 x 0.4 cm and 14.0 x 3.9 cm



06-018-028-F: one fragment (2.1 x 2.0 cm) of a balanced plain weave textile; both sets of elements are standard configuration pale yellow (2.5Y 8/4) cotton yarns

06-018-028-G: an overhand knot containing two different types of yarns: two Z spun, yellowish brown (10YR 5/6) cotton yarns and yarns(s) made from contrasting dark brown (7.5YR 3/2) wool fiber; not much of the wool yarns is preserved outside of the knot, and inside the knot, the configuration is distorted, precluding positive identification



Specimen 06-018-028-F



Specimen 06-018-028-F Weave Detail



Specimen 06-018-028-G



Reverse of Specimen 06-018-028-G

06-018-028-H: a segment of an oblique interlaced braid constructed in a method similar to Specimen 05-053-029-C, but with four elements, two each light olive brown (2.5Y 5/6) and very dark brown (10YR 2/2); each element is made up of quintupled or sextupled standard configuration wool yarns; 4.0 cm long x 1.1 cm wide

06-018-028-I: a segment of an oblique interlaced braid constructed in the same manner as 05-053-029-A; each of the three elements is composed of multiple standard yellowish brown (10YR 6/6) wool yarns; length 6.6 cm long x 1.3 cm wide



Specimen 06-018-028-H



Reverse of 06-018-028-H



Structure Detail of 06-018-028-H



Specimen 06-018-028-I

06-018-028-J: one fragment (6.7 x 1.6) of a relatively thick WFPW; confirmed by side selvedge; both sets of elements are $Z(2s(2z))$; component fiber is wool and has been heavily stained rendering original color indeterminate



Specimen 06-018-028-J



Weave Detail

06-018-028-K: segment of braid; structure obscured by dirt; metrics not collected



Specimen 06-018-028-K

Reverse

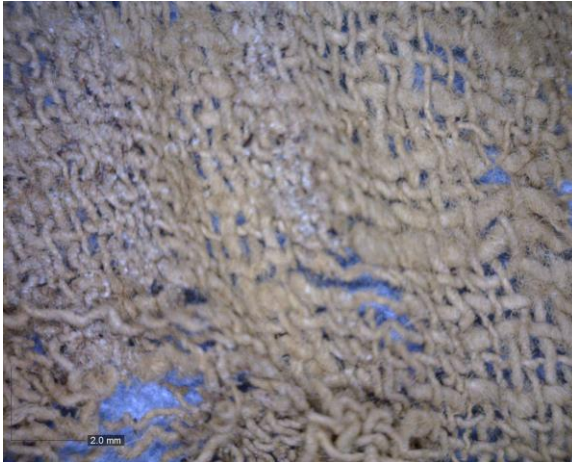
06-018-028-L: A cluster of knots composed of wool fiber; very dirty and metrics not recorded



Specimen 06-018-028-L

Reverse

06-018-028-M: three fine balanced plain weave fragments with Z spun brown (7.5YR 5/3) cotton elements; dimensions of fragments range from 2.3 x 1.7 cm to 3.6 x 3.6 cm



Specimen 06-018-028-M

Year 2006 Box 018 Bag 029

06-018-029-A: three fragments of an undecorated WFPW textile; all elements standard configuration yellowish red (5YR 4/6) cotton yarns; dimensions of fragments range from 1.3 x 1.8 cm to 3.1 x 2.9 cm



Specimen 06-018-029-A



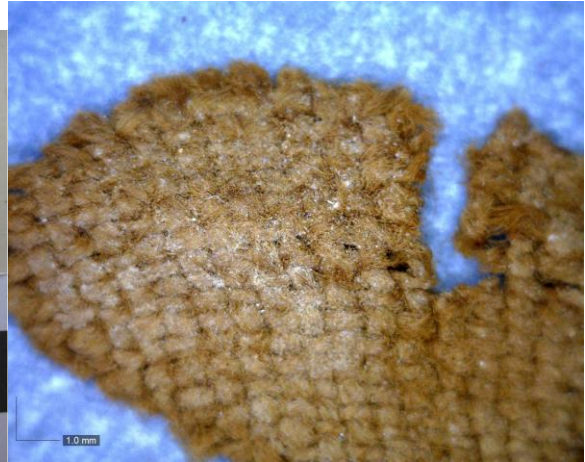
Weave Detail

06-018-029-B: one fragment (3.2 x 2.2 cm) from a balanced plain weave textile; warps and wefts are composed of standard configuration strong brown (7.5YR 4/6) cotton yarns

06-018-029-C: two fragments (2.1 x 2.1 cm and 2.7 x 4.0 cm) of a WFPW textile with standard configuration strong brown (7.5YR 4/6) wool yarn



Specimen 06-018-029-B



Weave Detail of 06-018-029-B



Specimen 06-018-029-C



Weave Detail of 06-018-029-C

06-018-029-D: one fragment (5.3 x 4.4 cm) of a textile with one set of elements predominant, it is assumed that the structure is a WFPW; all of the elements are standard configuration wool yarns and there textile exhibits two decorative design features: 1) a stripe pattern with at least three colors in the “warps” and 2) barber-pole “wefts”; the justification for assuming that this is a WFPW lies in the stipe pattern executed with the dominant elements; the colors of the stripes are yellowish brown (10YR 5/6), very dark greyish brown (10YR 3/2), and a possibly dyed red (2.5YR 4/8); the barber-pole wefts (very dark greyish brown 10YR 2/3 and yellowish brown 10YR 5/6) would have been almost completely obscured by the wefts, and may not actually be a decorative feature;

they would be considered decorative if they became visible by a change in the structure in a different section of the fabric



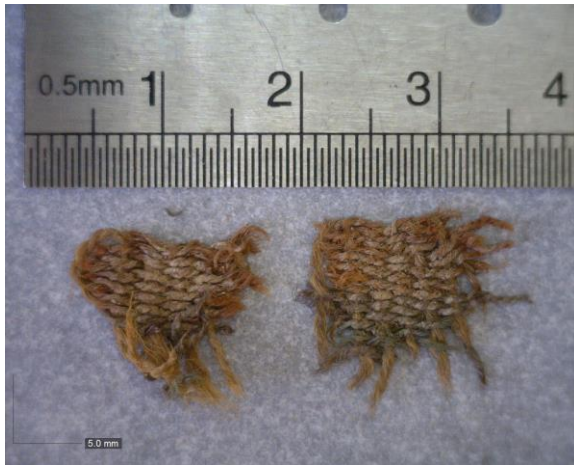
Specimen 06-018-029-D

Weave and Pattern Detail



Barber Pole Wefts

06-018-029-E: three fragments of a stripe-patterned WFPW textile; all three fragments preserve the side selvedge, confirming the structure classification; the stripes are executed by the dominant warp yarns and three colors are represented: dyed blue; dyed red; and very dark grey (7.5YR 3/1); the wefts are brownish yellow (10YR 6/8); All of the elements are standard configuration wool yarns; average fragment size is 1.3 x 1.0 cm



Fragments of 06-018-029-E



Weave and Pattern Detail

06-018-029-F: one fragment (2.3 x 2.8 cm) of a WFPW with standard configuration
yellowish brown (10YR 4/6) wool elements



Specimen 06-018-029-F

06-018-029-G: two fragments (2.4 x 1.5 cm and 4.7 x 3.5cm) of a WFPW with barber-pole warps and a finish, probably a fringe, coming off of the end selvedge; the finish is created by the attachment cords that were left on the textile; the finish is currently too tangled to analyze the original structure; all of the elements are standard configuration wool yarns; the barber pole warps are light yellowish brown (10YR 6/4) and very dark greyish brown (10YR 3/2); the wefts are light yellowish brown (10YR 6/4)



Specimen 06-018-029-G



Weave Detail with Barber-Pole Warps

06-018-029-H: is a large fragment, approximately 60%, of a cinch-close completely wool bag composed of two individual WFPW textile panels, both with warp stripes and supplementary warp floats; the warps and stripes are positioned horizontally or parallel with the bag opening; this orientation is assumed although no selvages are exposed; if any of the selvages remain, which presumably they do, they are concealed by the finishes along the side seams and opening (the bottom of the bag is missing); the side seams have been finished with crossed knit looping stitches, two wide, which seem to be utilizing the excess warps, either from one of both panels the edges around the opening are finished with what appears to be crossed knit looping stitches, one wide, of introduced yarn, Z(2s(2z)) configuration yellow (10YR 8/8) yarns. The two panels use different colors and warp float designs, but coordinate well and the designs do not clash; to facilitate discussion, the panels are identified by their dominant color, yellow or green; the wefts of the both panels are yellow (10YR 7/8) standard configuration wool yarns; for the yellow panel, the warps of main structure are standard configuration wool warps and are arranged in stripes of yellow (10YR 7/8), very dark grey (10YR 3/1), and dyed green; yellow (10YR 7/8) and very dark grey (10YR 3/1) supplementary float warps

that are obviously bulkier, S(3z), create the impression of serpentine lines and dots running down the outward facing side of the textile, the green panel has standard configuration warps arranged in stripes of dyed green, yellow (10YR 7/8), and very dark grey (10YR 3/1), this side also has S(3z) configuration supplementary warps used to create serpentine lines and dots, but in three colors: yellow, very dark grey, and light red (2.5YR 6/8); there is an oblique interworked tubular cord that probably served a decorative function attached at the middle of one of the side seams by a lark's head (cow hitch) knot (Graumont and Hensel 1952: 12). The cord is composed of approximately eight strands, six yellow and two very dark grey, of bunched standard configuration wool yarns; the current termination is frayed and damaged and the original finish has been lost; the cinch-closure cord is heavily degraded and encrusted with dirt and organics making it difficult to identify the original ply configuration, although it appears to be composed of two individual Z(2s(2z)) cords; the two ends of the cord are tied together in an unidentified (due to damage) knot; current dimensions are approximately 16 x 11 cm



Specimen 06-018-029-H – Green Side



Specimen 06-018-029-H – Yellow Side



Details of Exposed Wefts



Detail of Green Panel



Green Panel Detail



Green Panel Detail



Yellow Panel Detail



Yellow Panel Detail



Yellow Panel Detail



Yellow Panel Detail



Detail of Cross Knit Stitch Finish at Opening



Cross Knit Stitch Side Seam Detail



Cross Knit Stitch Side Seam Detail



Cross Knit Stitch Side Seam Detail



Detail of Fringe Cord Attachment



Detail of Fringe Cord



Detail of Knot on Cinch Cord



Reverse of Knot



Detail of Ply Configuration on Cord

Year 2006 Box 018 Bag 030

06-018-030-A: one fragment (1.2 x 1.1 cm) of a balanced plain weave textile with standard configuration strong brown (7.5YR 4/6) cotton elements



Specimen 06-018-030-A



Weave Detail

06-018-030-B: one fragment (1.5 x 1.5 cm) of a WFPW textile with standard configuration dark brown (7.5YR 3/4) wool elements

06-018-030-C: one fragment of a WFPW with bi-color warps; standard configuration wool elements; the wefts are dark brown (7.5YR 3/3) and the barber-pole warps are dark brown (7.5YR 3/3) and very dark grey (7/5YR 3/1)



Specimen 06-018-030-B



Specimen 06-018-030-C

Tomb 6 Sector III – Middle Horizon

Year 2006 Box 019 Bag 041

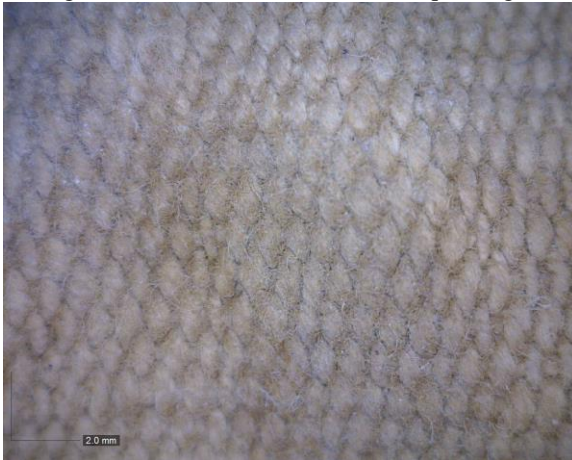
06-019-041-A: represents most of a tunic in five fragments; all fiber is reddish brown (2.5YR 5/4) cotton; the textile structure is WFPW with standard configuration cotton elements; the tunic was constructed by attaching three finished panels along the side selvages with an alternating, herringbone stitch made with a Z(7s) cord; the sides of the tunic were open along the outside side selvages, and the outside selvages finished with a whip stitch of (Z(2s(2z)) very pale brown cotton cord; that the whip stitch is a different color fiber than every other element from the garment is interesting and may suggest a later addition/repair; the only end selvages remaining are located along what would have been the base of the tunic/garment; the selvages that would have been located near the neck openings no longer remain; there is a short, between two and three millimeters, fringe was located along the bottom of the tunic; fringe was created by allowing the length of warps that wrapped around the loom bar to twist back on themselves after the textile was removed from the loom the last two wefts before the fringe begins are doubled standard cotton yarns; dimensions of the total garment are approximately 46 cm wide and 114 cm long



Large Portion of 06-019-041-A (Oblique Angle)



Additional Pieces of 06-019-041-A



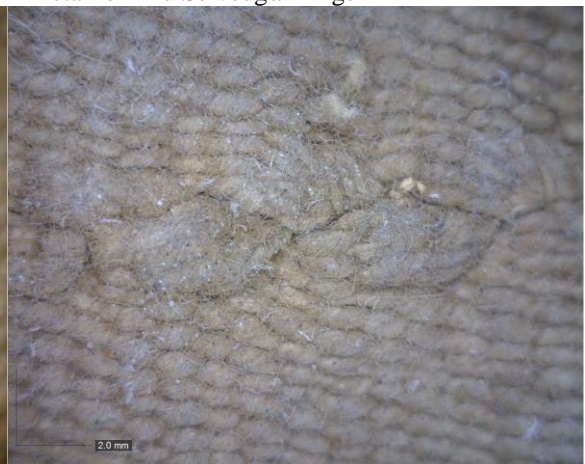
Weave Detail



Detail of End Selvage/Fringe



Detail of Outside Side Selvage and Whip Stitch



Detail of Herringbone Piecing Stitch

06-019-041-B: a two plain weave textile fragments connected by a S(2z(6s(2z))) configuration cotton cord pulled/sewn through both pieces; both of the textiles are

completely composed of light yellowish brown (2.5Y 6/4, although somewhat mottled) cotton fiber yarns; one piece has standard configuration warps and wefts and the other has doubled standard configuration wefts and single standard configuration yarns for the warps, or a half-basket plain weave structure; sections of both the side and end selvedge are preserved on the second fragment; the end selvedge is composed of three header cords with a Z(3s(2z)) configuration; there is an additional fragment of the textile composed of standard configuration sets of elements



Specimen 06-019-041-B



Weave Detail from Balanced Plain Weave Textile



Weave Detail from Half-basket Plain Weave



End Selvedge from Half-basket Plain Weave



Side Selvage from Half-basket Plain Weave



Detail of Ply of Sewing Cord

06-019-041-C: a fragment (11.5 x 10.0 cm) of a WFPW textile that is consistent with the tunic, 06-019-041-A

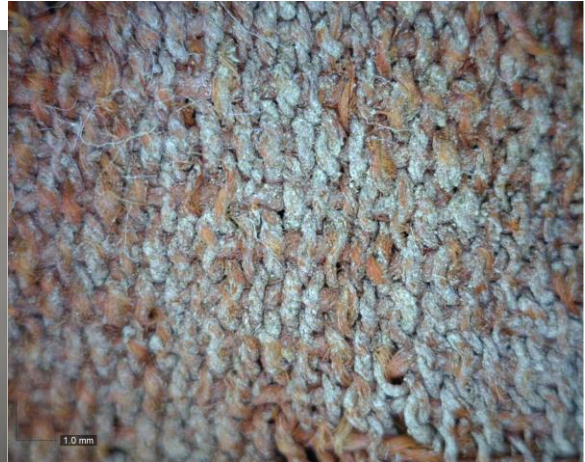


Specimen 06-019-041-C

06-019-041-D: single fragment (5.1 x 3.8 cm) of a camelid wool textile; the elements are of dyed red wool fiber and are the standard configuration; the primary structure of the textile appears to be a WFPW, but it could be a weft-faced weave, there are no preserved selvages to facilitate positive identification



Specimen 06-019-041-D (Out of Focus)



Weave Detail



Weave Detail with Concealed Elements Exposed

06-019-041-E: a fragment (4.0 x 2.0 cm) of WFPW that is partially covered by columns of satin stitch embroidery; the warps and wefts of the ground cloth are standard configuration dark brown (10YR 3/3) wool yarns; the embroidery yarns are standard configuration, wool, and are black (5Y 2.5/1) and the same brown as the ground cloth elements; the embroidery was likely executed while the ground cloth was still in the loom and the width of the columns was probably kept intentionally narrow to prevent the stitches from distorting (Harcourt 1962: 121); despite damage to the fragment, the remaining embroidery and the holes left by lost yarns suggest that the design was most likely a solid border consisting of blocks of black and brown; the width of the border is

three columns wide, approximately two cm, and encompasses about 6 warps in each column



Specimen 06-019-041-E

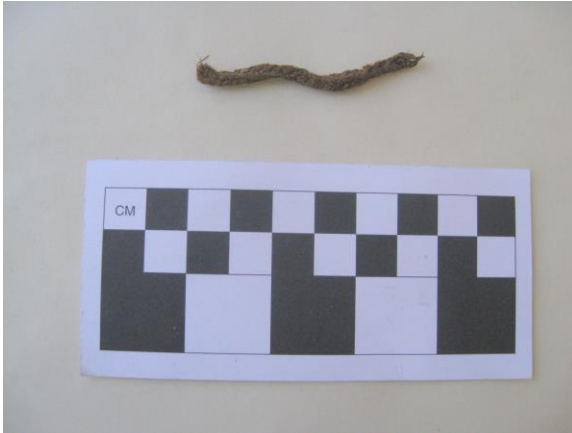


Possible Side Selvedge and Brown Embroidery



Black Embroidery Detail

06-019-041-F: a 10-strand square braid (tubular oblique interlacing) with a chevron texture (but solid in color) that is formed as the strands interlace in the center of each face; the component yarns are standard configuration and dark yellowish brown (10YR 3/4) wool; dimensions 5.5 cm long and 0.35 cm in diameter



Specimen 06-019-041-F



Structure Detail



Detail Showing Structure Unraveling

06-019-041-G: one fragment (15.9 cm long) of a light greyish yellow (2.5Y 7/2)

S(2z(8s(2z))) cotton cord



Specimen 06-019-041-G



Ply Configuration Detail

06-019-041-H: one fragment (18.2 cm long) of S(2z(6s(2z))) light yellowish grey (06-019-041-G) cotton cord



Specimen 06-019-041-H



Ply Configuration Detail

06-019-041-I: two fragments (10 cm and 8 cm long) of Z(2s(9s(2z))) configuration yellowish brown (06-019-041-I) cotton cord



Specimen 06-019-041-I



Ply Configuration Detail

06-019-041-J: two fragments (both approximately 30 cm long) of S(2z(10s(2z))) configuration pale yellow (2.5Y 7/4) cotton cord

06-019-041-K: one fragment (approximately 15 cm long) of S(2z(9s(2z))) configuration pale yellow (2.5Y 7/4) cotton cord



Specimen 06-019-041-J



Ply Configuration Detail for 06-019-041-J



Specimen 06-019-041-K



Ply Configuration Detail for 06-019-041-K

06-019-041-L: one fragment (22.3 cm long) of S(2z(12/13s(2z))) configuration pale yellow (2.5Y 7/4) cotton cord



Specimen 06-019-041-L



Ply Configuration Detail

06-019-041-M: a length of cord (4.9 cm long) that has been secured by a figure-of-eight knot of a similar cord (16.8 cm long); a splice was observed at one of the frayed ends of the cord that has the knot secured around it; the splice occurs within the Stage III component of the cord as three S(2z) yarns are interlocked around three introduced S(2z) yarns, doubling the number of component yarns in either direction to create the Stage IV, Z(10s(2z)), component; the cord is made entirely of cotton and the final ply configuration is S(2z(10s(2z))); emerging from one end of the knot is the beginning of that cord, or the location where the Stage IV cord was folded over and re-plied creating a Stage V cord; the ply configuration of the knotted cord is likely similar to the cord it secures and may be a different section of the same cord; all fiber is light greyish yellow (2.5Y 7/4)



Specimen 06-019-041-M



Reverse



Knot Detail



Reverse



Ply Configuration Detail



Detail of Splice

06-019-041-N: one fragment (21.2 x 18.1 cm) of a WFPW textile with standard configuration dark yellowish brown (10YR 4/4) cotton elements



06-019-041-O: one fragment (28.8 x 30.0 cm) of a half-basket plain weave textile with standard configuration warps and doubled standard configuration wefts; all fiber is cotton and mostly very pale yellow (10YR 8/4) part of one of the side selvages is preserved; probably part of the half-basket plain weave textile in 06-019-041-B; less than one-third of the warps are barber pole with slight variation in color or possibly the fiber throughout the piece is mottled; three or four holes (1 cm dia.) that likely represent the locations that a cord was pulled through the fabric; along the side selvedge; approximately seven cm apart, two weft elements extends past the edge by seven mm before turning 180°,

replying around themselves, and reincorporating into the textile; the spacing of these extended wefts seems to eliminate the idea that they functioned as a fringe, but otherwise, the purpose is unclear



Specimen 06-019-041-O



Weave Detail with Barber-Pole/Mottled Elements

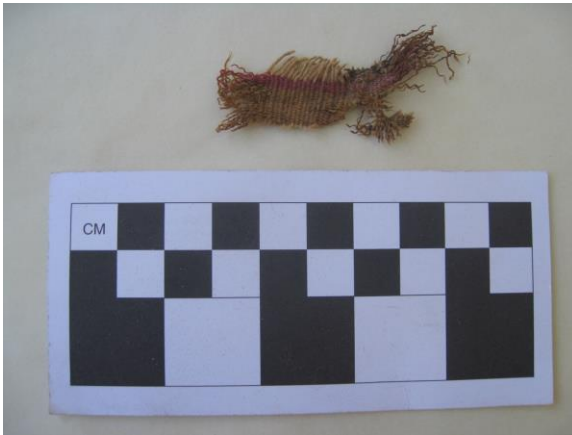


Side Selvedge Detail



Detail Showing Hole/Void in Fabric

06-019-041-P: one fragment (5.2 x 1.7 cm) of a tapestry weave; both sets of elements are standard configuration yarns; the warps are cotton and pale yellow (2.5Y 7/4); the wefts are wool and there are five colors: light olive brown (2.5Y 5/6); dyed red; olive brown (possibly dyed; 2.5Y 4/3); and black (possibly dyed; 2.5Y 2.5/1); the pattern executed by the warps is geometric with stripes and small rectangles



Specimen 06-019-041-P



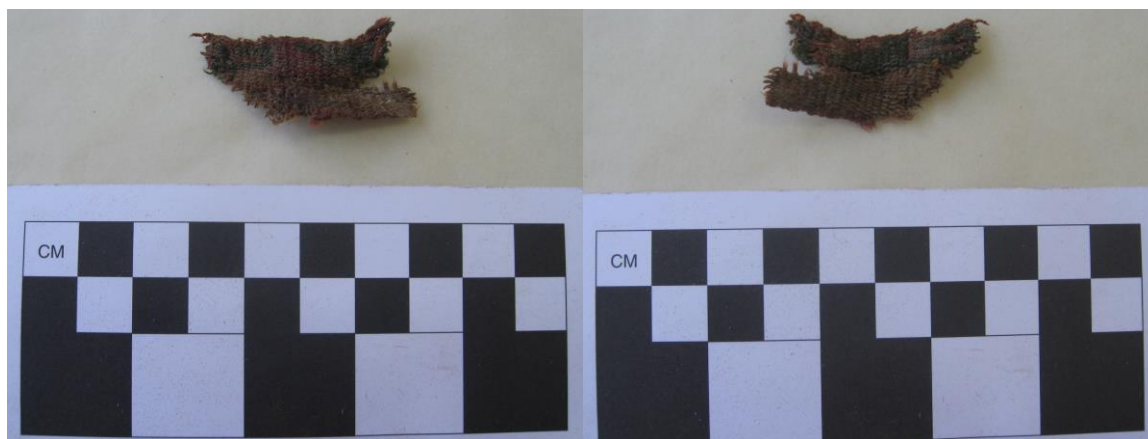
Weave Detail



Weave Detail

06-019-041-Q: a single fragment (2.9 x 1.6 cm) of a band or belt with a WFPW double cloth structure; four warp colors are used in this piece: dyed dark red, dyed dark green-blue, dark brown (7.5YR 3/4), and reddish black (2.5YR 2.5/1); each color yarn only interacts with one other color (*i.e.*, the dark red and dark green-blue warps only interpenetrate each other); in the pattern created by the warps the strip of dark brown and reddish brown pattern is flanked on one side by the strip of dark red and dark green blue pattern and a narrow solid red band; all of the wefts are dyed red and all of the elements are standard configuration wool yarns; damage to the fragment has made discerning the design executed with the dark brown and reddish black yarns difficult, but the dark red

and dark blue-green design is more clear; the design consists of interlocked stepped frets and may be an abstract representation of twisted yarn/cordage (Frame 1986)



Specimen 06-019-041-Q

Reverse



Weave and Pattern Detail



Detail Showing Exposed Dyed Wefts



Weave and Pattern Detail

06-019-041-R: one fragment (4.9 x 3.2 cm) of a tapestry weave with a preserved section of side selvage; both sets of elements are standard configuration wool yarns; the warps are brown (7.5YR 3/2) and there are three weft colors: very dark grey (Gley1 3/N); dark brown brown (7.5YR 3/2); and very dark greenish grey (Gley1 3/10Y); due to the small size of the fragment and level of damage to the piece, it is difficult to make sense of the remaining design although the forms appear to be geometric; between the color fields, the wefts are connected by single interlocking wefts; the very dark grey wefts are carried through the fabric along the warps presumably to be used in other color fields



Specimen 06-019-041-R



Specimen 06-019-041-R



Weave Detail



Detail Showing Interlocked Joins



Dark Brown Wefts Being Floated along Warps



Black Wefts Being Floated along Warps

06-019-041-S: two fragments (25.2 x 18 cm and 25.1 x 18.3 cm) of a balanced plain weave textile; side selvedge on one fragment; standard configuration light olive brown (2.5Y 5/4) cotton elements with some other fiber possibly mixed in



Specimen 06-019-041-S



Weave Detail



Side Selvedge and Possible Non-Cotton Fiber

06-019-041-T: one fragment (33.5 x 9.5 cm) that represents a portion of textile of unknown function; the primary structure is of a balanced plain weave with standard configuration light yellowish brown (2.5Y 6/4) cotton warps and wefts; portions of both side selvages and one of the end selvages remain; the end selvedge is composed of three cotton header cords with a Z(3s(2z)) configuration; the textile was folded lengthwise so that the side selvages meet, it was then folded lengthwise again and a running stitch (Emery 1966: 234), Z(2s(2z)) configuration, sewn through the layers along the edge with the side selvages; the remaining short edge, with the end selvedge does not appear to have been closed; this creates a sleeve of unknown function



Specimen 06-019-041-T



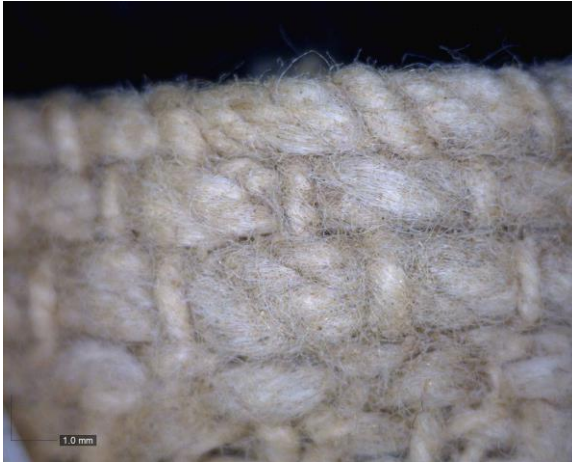
Detail



Weave Detail



Sewing Stitch Detail



End Selvedge and Header Cords Detail



Side Selvedge Detail

06-019-041-U: a segment (10.8 cm long) of a square braid that was accomplished by interlacing four active strands around a core and creating alternating bands of color by changing the active and inactive yarns; all of the fiber is wool and the active strands seem to be composed of two standard configuration yarns; the yarns colors are brown (7.5R 5/4), dyed red, and dyed blue



Specimen 06-019-041-U



Structure Detail



Dyed Red Fiber and Damage Exposing Core



Detail of Three Colors

06-019-041-V: a segment (13.2 x 0.9 cm wide) of a balanced oblique interlaced flat braid with a color effect design; one of the ends is preserved and, though damaged, appears to be the start of the braid; the component yarns are folded 180° over a wool (?) cord, doubling the number of working yarns; the scaffolding cord is frayed as it exits both sides of the interlacing and it is unclear whether it was intentionally cut or otherwise lost; the elements are bundled into 16 strands that are composed of two standard configuration wool yarns and come in three colors, yellow (10YR 7/3; n=10), dark grey (10YR 4/1, n=2), and dyed red (n=4); red parallelograms are created by the spacing of the different color yarns in the interlacing



Specimen 06-019-041-V



Detail of Pattern and Structure



Reverse of Previous Section



Origin of Braid Detail



Reverse Side of Braid Origin

06-019-041-W: end fragment from a belt; 3.2 cm long and 2.2 cm max. width; primary structure is discontinuous turned weft-wrapping (a type of twining) which creates a tapestry-like effect; this piece was constructed by taking the component standard configuration wool yarns, folding them over a thin horizontal scaffolding, likely something stiff like a cactus needle, but possibly a taut cord; pulling damage at one corner of the end may have happened when the scaffolding was removed; the yarns move back and forth between “warp” and “weft” in this piece, being part of one of eight passive warp elements until they are needed to act as wefts; once the weft function terminates, the yarn rejoins the warps and is carried down the fabric until it is needed again; the pattern forms on this belt are lines and chevrons created using four yarn colors,

yellow (10YR 7/8), brown (10YR 4/3), black (10YR 2/1; possibly dyed), and dyed red; the yellow and black yarns are not observed among the folded yarns at the end of the belt, they may be obscured by the more numerous red and brown yarns or they may have been introduced as needed into the structure



Specimen 06-019-041-W



Reverse



Corner Detail



Same Face Opposite Corner



Opposite Face Corner Detail



Same Face Opposite Corner



Structure and Pattern Detail



Structure and Pattern Detail

Year 2006 Box 019 Bag 042

06-019-042-A: one fragment (13.6 cm long) of a thick, S(2z(9s(2z))) configuration cord probably used in the securing of a mummy bundle; fiber is very pale yellow (10YR 8/3) cotton

06-019-042-B: five lengths (between 20 and 45 cm long) of very pale yellow (10YR 8/3) cotton cordage that appear to be from the same or a very similar piece; the gentle curvature observed in the lengths of several of the segments (see photo below) suggests that they may have been part of a more complex cord (which likely would have had a Z twist); current ply configuration is S(2z(3s(2z)))



Specimen 06-019-042-A



Ply Configuration of 06-019-042-A



Specimen 06-019-042-B



Ply Configuration of 06-019-042-B

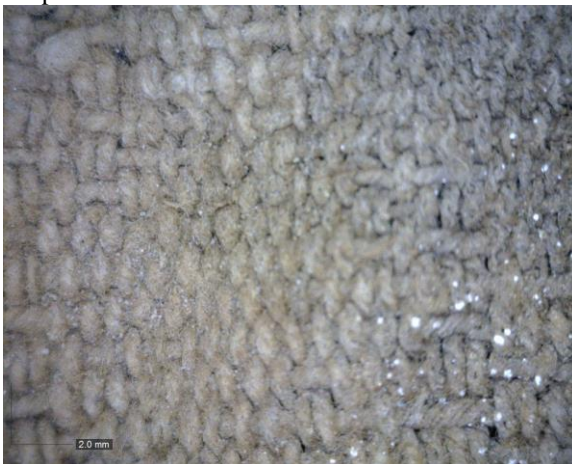
06-019-042-C: single fragment (6.3 x 7.0 cm) of a WFPW textile with narrow, folded hem secured by a straight stitch; the hem may be along the end selvedge, but damage to the edge prevents positive identification; the warps and wefts are standard configuration yarns and the sewing yarn is a $Z(2s(2z))$, all light brownish grey (2.5Y 6/3) cotton



Specimen 06-019-042-C



Reverse



Weave Detail



Hem Stitch Detail

06-019-042-D: a fragment (22.9 x 21.0 cm) of composite garment composed of four layers (labeled Da through Dd) of WFPW textile attached with two types of sewing yarns: Z(3s(2z)) and doubled standard configuration cords; all of the fiber is cotton; textile Da and the Z(3s(2z)) sewing cord are light grey (2.5Y 7/2), the doubled standard configuration sewing cord is pale yellow (2.5Y 8/3), and all of the other elements are light yellowish brown (2.5Y 6/3); Da has been sewn to the piece like an applique, with the two remaining edges folded over and sewn to the piece; the Db has a portion of the end selvedge remaining, three header cords of Z(3s(2z)) configuration, as well as a portion of a folded hem remaining



Specimen 06-019-042-D – Textile Da on Top



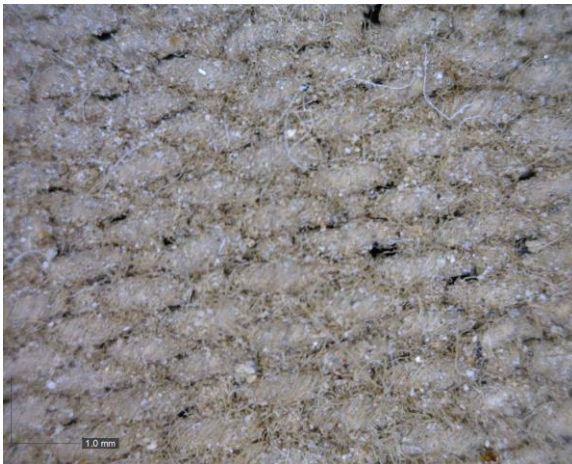
Reverse – Textile Dd on Top



Textile Da lifted to Reveal Db



Detail of Textile Da Weave and Sewing Stitch



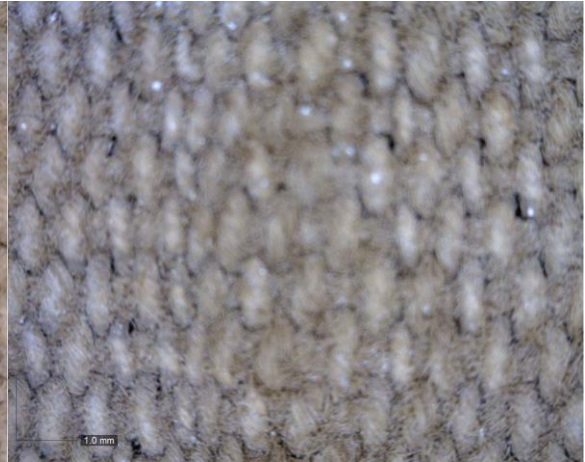
Detail of Textile Db (Warps Oriented Horizontally)



Textile Db End Selvedge and Sewing Stitch Detail



Textile Dc Weave Detail



Textile Dd Weave Detail

06-019-042-E: a fragment (27.3 x 39.3 cm) of a composite garment composed of four layers of WFPW textiles (Textile Ea through Ed); like 06-019-042-D, has Z(3s(2z)) configuration cotton sewing yarns and a folded and hemmed patchwork/applique construction; textile Eb has a preserved end selvedge remnant with three Z(4s(2z)) configuration header cords and Ec has a side selvedge remnant; all of the elements are composed of pale brown (10YR 6/4) to light yellowish brown (10YR 6/4) cotton fiber



Specimen 06-019-042-E – Textile Ea on Top



Closer View of Patchwork – Textile Ea on Top



Textile Ea Weave Detail



Textile Eb Header Cords Detail



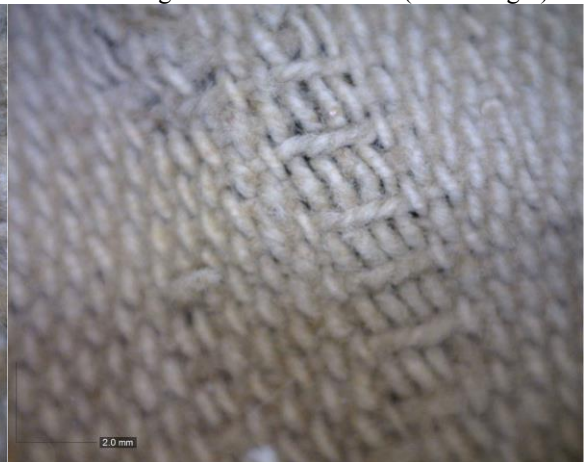
Textile Eb (Warps Horizontal) and Sewing Stitch



Side Selvage and "Corner" of Ec (Ed on Right)



Textile Ec Weave Detail



Textile Ed Weave Detail

Year 2006 Box 019 Bag 043

06-019-043-A: a balanced plain weave textile with standard configuration yellowish brown (10YR 5/6) cotton warps and wefts; section of preserved end selvedge with three header cords with Z(3s(2z)) configuration

06-019-043-B: a WFPW textile with standard configuration yellow (10YR 8/8) cotton elements

06-019-043-C: a WFPW textile; too soiled to determine fiber and configuration; possible side selvedge observed

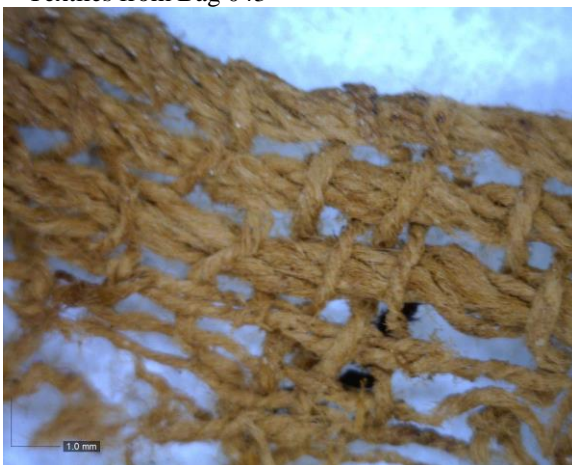
06-019-043-D: balanced plain weave textile with standard configuration brown (10YR 5/3) cotton warps and wefts



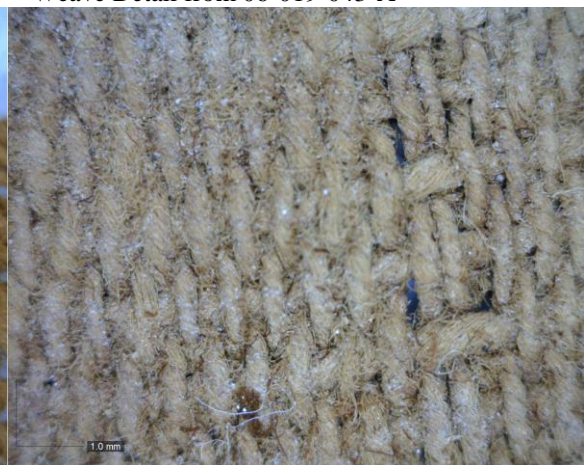
Textiles from Bag 043



Weave Detail from 06-019-043-A



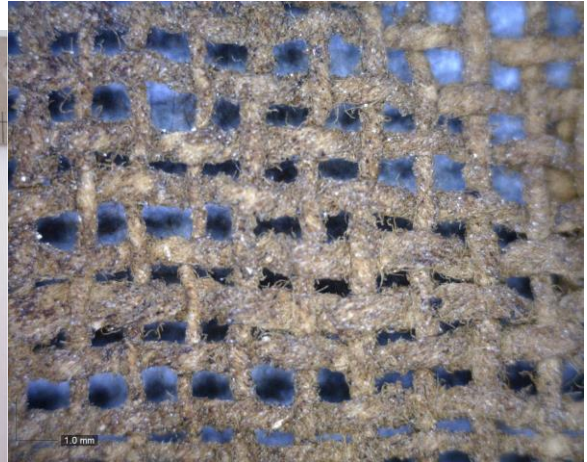
Detail of End Selvedge from 06-019-043-A



Weave Detail from 06-019-043-B



Specimen 06-019-043-C



Weave Detail from 06-019-043-D



Side Selvage (Folded Over) from 06-019-043-D

06-019-043-E: four fragments (representative length: 7 cm) of a Z(2S(9S(2Z))) configuration cotton cord; at least some of the yarns making up the cord are bi-color (barber-pole) cords: yellow (10YR 7/6) and dark yellowish brown (10YR 3/4)

06-019-043-F: five fragments (longest length 24.5 cm) of a Z(2S(9S(2Z))) configuration cord of very pale yellow (10YR 7/4) cotton fiber; there are knots, one each, along two of the fragments

06-019-043-G: two fragments of a Z(3S) configuration cord interacting with cords that are identical in color and structure to 06-019-043-E; one interaction is a knot the other is an interlinking encrusted together preserving the shape; the component fiber of the Z(3S)

cord is an unidentified vegetal (possibly a succulent) fiber, semi-flexible, and brownish yellow (10YR 6/6); dimensions are 26.3 and 18.0 cm long



Specimen 06-019-043-E



Ply Configuration Detail of 06-019-043-E



Detail with Barber-Pole Yarns from 06-019-043-E



Specimen 06-019-043-F



Ply Configuration Detail of 06-019-043-F



Detail of Knot from a Length of 06-019-043-F



Different Knot from a Length of 06-019-043-F



Specimen 06-019-043-G



Detail of Knot from Fragment of 06-019-043-G



Detail of Interlinking of 06-019-043-G



Z(3S) Cord Ply Configuration from 06-019-043-G

Tomb 41 Sector III – Middle Horizon

Year 2009 Box 024 Bag 019

09-024-019-A: one fragment (10.4 cm long and 0.9 cm wide) of flat oblique interlacing using six strands and three colors of wool or hair to create a chevron pattern; each strand is composed of approximately four S(2z) yarns and the yarns colors are dyed red, reddish black (2.5R 2.5/1), and yellow (10YR 8/6); the red and yellow yarns are camelid wool, the black yarns may be camelid wool or human hair; the chevron pattern is created by bringing the yarns from the outside and interlacing them in the center of the braid

09-024-019-B: one fragment (3.5 cm long and 1.3 cm wide) of a slit tapestry weave textile band; the warps are yellow (10YR 8/6) standard configuration cotton yarns; the wefts are wool, standard configuration, and four colors are used to create the pattern of offset bands: yellowish brown (10YR 5/6), very dark grey (7.5YR 3/1), dyed pink/red, and dyed blue

09-024-019-C: three fragments of a slit tapestry weave textile band; the warps are very pale brown (10YR 8/4), cotton, and the ply configuration is undetermined due to damage and warp loss; the wefts are wool, standard configuration, and in three colors: very dark brown (10YR 2/2), yellowish brown (10YR 3/4), and dyed pink/red; the tapestry design is an abstract rectilinear design; dimensions are 1.6, 3.1, and 3.9 cm long and 0.1 cm wide



09-024-019-A, 09-024-019-B, and 09-024-019-C



Structure Detail of 09-024-019-A



Specimen 09-024-019-B



Specimen 09-024-019-C

09-024-019-D: four fragments of a belt with a complementary warp-weave based on a 2/2 diamond twill structure (Rowe 1977:67-68); all of the elements are Z(2s(2z)) configuration wool cords and the wefts are red (2.5YR 4/6); the main body of the strap has complementary warps; however there is a narrow band along either side selvedge in which two warps, red, interlace with the weft like a typical plain weave; one set of warps is dark reddish grey (2.5YR 3/1); there are two colors, red and yellowish brown (10YR 5/6) among the second set of warps and they alternate colors every three wefts; largest fragment is 9.6 cm long and 3.2 cm wide



Specimen 09-024-019-D



Weave and Pattern Detail



Reverse

Year 2009 Box 024 Bag 020

09-024-020-A: a WFPW side selvedge fragment (2.5 x 0.9 cm); standard configuration
strong brown (7.5YR 5/6) cotton warps and wefts



Specimen 09-024-020-A

09-024-020-B: a WFPW textile fragment (3.1 x 6.1 cm) with an gathered end selvedge; possibly from a cinch-closure bag; standard configuration yellowish brown (10YR 5/6) cotton warps and wefts; the textile fragment has been cinched up along the two tripled standard configuration header cords



Specimen 09-024-020-B

Reverse



Weave and End Selvedge Detail

09-024-020-C: a fragment (2.0 x 1.4 cm) of an oblique interlaced piece, too fragmentary and degraded for much discussion; component elements are quadrupled standard configuration strong brown (7.5YR 5/6) cotton yarns



Specimen 09-024-020-C

Reverse

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