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STRUCTURE AS MEANING IN ANDEAN TEXTILES[1]

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ABSTRACT

Ordinary thought in the non-Andean Western world generally sees a clear distinction between the art of an object and the support structure used for that art. This paper suggests that this was not so in the ancient Andean world, that art and technology were not separate, and uses textiles as the prime example.

The broad importance in the Andes of fabric technology is noted. In addition to garment creation, the symbolic value of textiles is noted and the uses of fabric technology in architecture and in warfare are noted. The sculptural representation of textiles in Tiwanaku is pointed out. The identification of individual Andean cultures with special textile structures is described. Examples of textile structure that carry religious meaning are cited as are the uses of string textiles to carry complex messages.

The uses of a design motif that represents textile structure in the Altiplano is examined in a two millennia long series of images ranging from Pucara to Inka. The paper in general notes that the whole truth about the subject will never be known.

RESUMEN

En el pensamiento no andino occidental se establece, normalmente, una clara separación entre lo artístico de un objeto y el soporte estructural usado para su creación. En este artículo sugerimos que esto no ocurrió en el mundo andino precolombino, que el arte y la tecnología empleados para su realización no estaban separados y para ello se presentan casos de la textilería, como ejemplos primordiales.

La amplia importancia de la tecnología textil en los Andes se pone de relieve. Además de ser piezas de vestir, el valor simbólico de los tejidos es reconocido como así también su aplicación tecnológica en la arquitectura y en las prácticas guerreras. Se enfatizan las representaciones esculturales de los textiles Tiwanaku. Se describen algunas culturas andinas identificadas con estructuras textiles propias. Se presentan ejemplos de estructuras textiles con significado religioso, como así también el uso de fajas textiles portadoras de complejos mensajes.

Los usos del diseño de un motivo que representa estructuras textiles en el altiplano se analizan a través de una larga serie de imágenes desde Pukara hasta el Inka. En el artículo hacemos notar que muchas de las representaciones de estos objetos no podrán ser nunca conocidas en su totalidad.

Visual imagery in the Western tradition is characteristically thought of as secondary to written communication — as illustration of the basic story that is always told in words. The Western world considers this relationship between "word" and "image" as normal. Words always dominate whether in an illuminated manuscript from the European Middle Ages, in a modern comic book, or even in an article on an essentially visual subject such as this one. However, there is evidence to suggest that in the ancient Andean world, not only the images and patterns on the textiles, but also the structure of the textiles directly conveyed ideas to the user and to the viewer.

The five centuries since the European conquest of the Andes, have seen a slow change in our perceptions of the nature of the conquered ancient Andean cultures. Within the last century, the ancient arts and architecture of the Andes have begun to receive recognition, and remarkable living cultural traditions in the Andes have been discovered and have been brought to the world's, attention. However, it is really only within the last few decades, that

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the central communicative medium of Andean thought has begun to be understood —and that medium has proven not to be writing, but astonishingly enough— weaving. These discoveries are the result of work by several allied disciplines: ethno–historians, ethnographers, art historians, and archaeologists, as well as archaeological textile specialists. An obvious, but long overlooked, clue to the importance of the structure of textiles is the fact that textile structure is often itself represented in the imagery of Andean textiles (Figure 1).

Figure 1. Paracas tunic: The design on this Paracas style tunic from Ocacuje appears to represent plyed threads in large scale. The threads used in the actual tunic are two plyed, with the structure of simple looping (Benson and Conklin 1981: 42)

Perhaps the obstacle to understanding lay in the preconception of researchers who believed that there must have been a written language like one of ours. The new discoveries do not point to such an equivalency, but to quite other modes of conveying their "word," modes that involve formal visual constructions that were used across the culture and conveyed complex meanings.

It is easy to believe that the appearance of textiles was of significance to the people of ancient Andean societies, because much of the art of those textiles is appreciated and highly accessible to the modern mind. It is however difficult for that modern mind to understand that the detailed technical aspects of textile structure apparently carried just as much significance for the ancients as did appearance.

Structure as a carrier of meaning is a strange phrase for modern ears because of the utilitarian role that we in western society characteristically assign to technology. Before beginning a consideration of the meaning of structure in ancient Peruvian textiles, let us consider the viewpoint in this matter that is the source of our difficulty.

Virtually every field of modern Western life that is concerned with the production of physical objects divides their creation into two aspects — the "art" side and the "technical" side. Architects, for example, are primarily responsible for the conceptual and visual design of buildings, but engineers are responsible for the technological support for those buildings. This separation of the qualities of an artifact into an "art" side and a "technical" side is a wholly modern and western conception.

Although this separation seems "natural" to us, it is merely the style of our culture —the characteristic way we think. The dualism between the conceptual act of art and the methodological act of technology is probably part of our inheritance from European and hence Greek and Roman thought. Because this dualism is so deeply buried in western culture, it is especially difficult for us to realize that the Andean world offers alternatives to this schism.

What comes to mind most quickly when the word "art" is used in the modern western world is an oil painting. On a pound-for-pound or inch-by-inch basis, oil paintings are probably the most valuable products of our culture. They have come to represent the primary definition of the word "art" for our time. A careful look at their construction reveals that the "art" is carried in a thin layer that adheres to the surface of a foundation textile, the canvas. Typically, the "art" layer entirely covers the canvas and obscures it from view. The canvas plays a purely utilitarian, supportive role, serving only as the structural foundation of the work. In an oil painting, the textile is only the subservient carrier for the surface that alone carries the "art".

The "art" of the surface is hand made and each surface image is highly individualized. The underlying canvas, on the other hand, is now always machine made, has no intrinsic worth, and is relentlessly regular and anonymous. This schism between the "art" of the painted picture and the "technology" of the backing is characteristic of our products as well as of our thoughts.

If an ancient Andean were to view a modern oil painting, it might prove difficult for them to have a favorable response because the opaque paint used to create an oil painting totally covers the textile. Ancient Andean textile painting, on the other hand, always uses only transparent paint enabling the textile structure to always remain visible. All the techniques used, background dying, resist patterning and linear painting, rely on transparent materials so that an integrated work of art is formed, incorporating both the paint and the textile.

Andean culture certainly produced what the world today calls "art", although their dominant languages (Quechua and Aymara) had no general words for either artist or technician - only words for various kinds of specific "makers." Prominent in both languages are a variety of words that signify weaving and which refer to actions that include both the arts of textile design and the technology of textile creation (Murra 1962).

Several twentieth-century authors have noted the extraordinary importance which textiles had in ancient Peru with most of their evidence coming from Inca and Colonial sources. Notable among those authors is John Murra: "A primary source of state revenues, an annual chore among peasant obligations and a common sacrificial offering, cloth could also serve at different times and occasions as a status symbol or a token of enforced citizenship, as burial furniture, bride-wealth, or armistice sealer. No political, military, social, or religious event was complete without textiles being volunteered or bestowed, burned, exchanged, or sacrificed" (Murra 1962), here refers exclusively though to the special importance of textile "products" such as Inka tunics. The more difficult perceptions though, are those that concern textile "processes" rather than products. Understanding the process of the creation of a textile is critical to an appreciation of the "hi-tech" nature of the Andean fabric tradition and the importance of structure as a conveyor of meaning.

Andean fabric technology

In that "age of textiles" — and that is what we could reasonably call the final four thousand years of the Andean tradition— the technology of fabric construction was by far the most widespread and complex material-manipulating system of Andean society. Fabric technology, which must have begun at least by the third or fourth millennium BC with fishing nets and cordage, was soon used for the creation of textiles with complex designs. Once textiles were used for clothing though, the design goal seems not to have been primarily utilitarian, that is for environmental protection of the human body, but to have been primarily communicative. The image aspect of textile creation seems to have always been dominant over the utilitarian aspect.

Over the four thousand years of textile evolution available for our perusal, when innovations or outright inventions were made in textile construction, the motivation for their creation seems to have been primarily artistic. The purpose of an innovative technology was generally a new look. In the ancient Andes, art, not necessity, seems to have been the mother of invention.

Fabric technology in architecture

To understand the meaning of structure, we need also to understand the extensive role of fabric technology in ancient Peru, its utilization beyond the sphere of clothing but within a large portion of their material culture. Consider for example, the widespread use of fabric technology in the architecture of the Andes. Even today the native traditions in fabric architecture continue in the construction of indigenous housing (pueblos jóvenes), where architectural enclosures often consist primarily of twill-patterned fiber matting (esteras).

The great coastal cities of ancient Peru such as Chan-Chan, now preserved as low-lying broken walls, would have been largely evident then as a sea of thatch roofs, a fabric technology, and of woven mat walls.

The temples of the north coast of Peru were primarily adobe pyramids but received their culminating expression with roof structures that had elaborate roof combs projecting vertically from their ridges. These roof combs were fiber constructions like turned up-brooms, evidence for which appears in a few Moche ceramic representations, in many late Chimú ceramic temple representations and in a few Chimú textiles (Figure 2).

In the highlands, although it is the stonework of the Inca cities that remains as in Machu Picchu and Cuzco, such cities must, in their time, have been visibly more thatch than stone. Double-pitched, single-ridge thatched roofs must have been the most common, but ethnographic and archaeological information indicates the presence of conical woven thatch roofs in both Inca and pre-Inca times (Gasparini *et al.* 1980).

Ephraim Squier saw an elegant example of a conical thatch roof, one which he felt dated back at least to the 16th century, and described it as follows: "The dome of the Condor-huasi is perfect, and is formed of a series of bamboos of equal size and taper, their larger ends resting on the top of the walls. They are each bent evenly to a central point, over a series of hoops of the same material and of graduated sizes. At the points where the vertical and horizontal supports cross each other, they are bound together by fine cords of delicately braided grass, which cross and re-cross each other with admirable skill and taste. Over this skeleton dome is a fine mat of the braided epidermis of the bamboo or rattan, which, as exposes no seams, almost induces the belief that it was braided on the spot. However that may be, it was worked in different colors, and in paneling conforming in size with the diminishing spaces between the framework, that framework itself being also painted. I shall probably shock my classical readers, and be accounted presumptuous, when I ven-

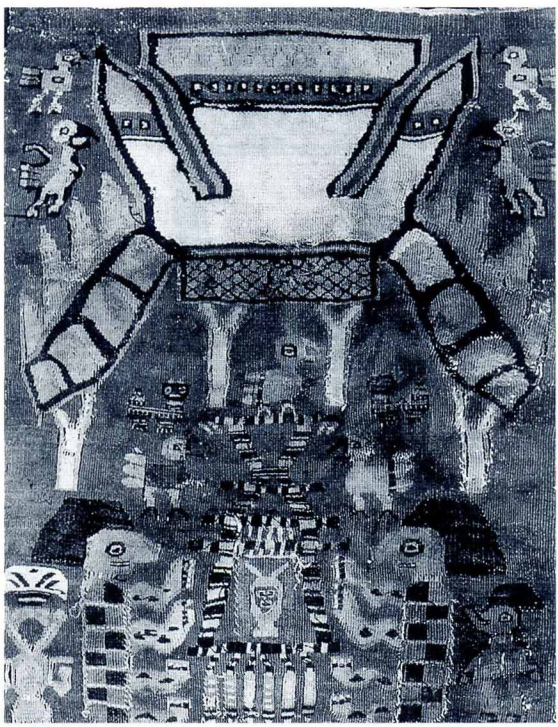

Figure 2. Chimu textile with a temple. This small panel of slit tapestry is probably from the site of Pacatnamu on the north coast of Peru. The image shows a Chimu temple with an elaborate fiber–construction roof comb. No such roof structures have survived but they are also represented in ceramics (Private collection, photo by author)

ture a comparison of the Azangaro dome, in style and effect with that of the cella of the Temple of Venus, facing the Coliseum, in the Eternal City (the Pantheon in Rome). Over this inner matting is another, open, coarse, and strong, in which was fastened a fleece of finest ichu (grass), which depends like a heavy fringe outside the walls. Next comes a transverse layer of coarser grass or reeds, to which succeeds ichu, and so, the whole rising in the centre so as to form a slightly flattened cone. The projecting ends of the ichu layers were cut off sharply and regularly, producing the effect of overlapping tiles" (Squier 1877), (Figure 3).

Other large-scale constructions were evidently also fabric-like in their technology. The bridges over the mountain rivers (Garcilaso de la Vega 1966; McIntyre 1973), built for use by both people and animals, were entirely fiber constructions, borrowing heavily from the spinning and plying technology of loom constructions. The boats that were, and still are, used for transportation across Lake Titicaca, and the boats used for fishing up and down the Pacific Coast utilized interlinked weft wrapping in their all-fiber constructions (Zeballos 1975).

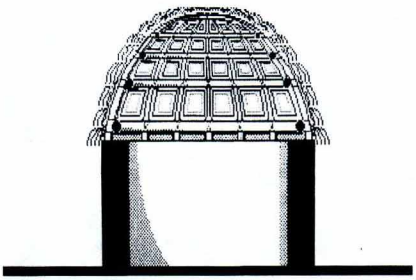

Figure 3. Squier's Dome. This reconstruction drawing follows the technical description of the great Inka fiber dome of a suntur wasi as seen and recorded by Eplrim Squier in the 19th century, but the size is not known (Drawing by the author)

Fabric technology in warfare

Even in warfare, defensive body armor was a form of heavy quilting, shields were woven constructions with weft-wrapped rigid reed warps, and a major offensive weapon was the tubular oblique interlaced sling. In such cases, the design consists of a single structural solution that carries both function and meaning (Cahlander *et al.* 1980; Guamán Poma 1936).

Fabric expression in sculpture

Most Andean construction actually utilized textile technology and surprisingly, textiles even influenced stone construction. The visual evidence provided by the carved stone stele still standing in the Altiplano capital city of Tiwanaku, illustrates the many roles of textiles in the prehistoric Andes. Such Tiwanaku sculptures are not of bodily persons in the Greek sense of figurative sculpture, but rather are stone monuments depicting elaborately clothed shaman. The stele all have flattened surfaces made at the expense of human body representation, but are surfaces that permit proper illustration of the textiles. The flat surfaces permit the textile designs to be portrayed and understood. These Tiwanaku sculptures are stone sculptures of textiles and of the figures which proudly display their garments, but the sculptures seem to convey nothing to us concerning the individual shaman. More than any other information available to us, these sculptures convey to us the mythic power which textiles had for the ancient Andeans.

The culture of fabric technology

We know that textile expertise permeated the thought of ancient Andean culture. Every man, woman and child knew how to weave. The chroniclers tell us (Garcilaso de la Vega 1966) that the highest —ranking sons of the highest— ranking Incas, not just the daughters of the servants, learned weaving as an educational fundamental. The total man and woman hours devoted to weaving must have far exceeded that of any other technical activity. Of course, with a populace so knowledgeable, critical standards and perceptions must have been extraordinary.

Image and structure in Ancient Andean cultures

This review of the high status and widespread occurrence of Andean fabric technology in the cultures of the ancient Andes, provides background for considering "structure as meaning" —a phrase that suggests that the way of structuring a textile, as well its appearance, carried meaning for Andean people. In a general sense, an Andean textile is perceived today by observation of the color patterning. In descriptive articles on Andean art, or even in articles specifically concerned with Andean textiles, it is the pattern or iconography that is usually discussed. In scholarly articles, in addition to analysis of the pictures, technical notes on the construction of the textiles are provided.

For example, a typical Huari tunic (Figure 4) has a pattern of profile facial images and stepped geometric figures in a complex alternating pattern. Also the tunic is constructed in the interlocked tapestry technique with cotton warps and camelid wefts, both of which are two plies, S spun and Z plied: thus the two forms of descriptive data. These two forms of data (which we use to describe the single unified artifact) are rarely perceived in an integrated way because it is difficult for us to perceive the unified thought that formed the textile. This separation reflects our distinctions between art and technology and demonstrates how thoroughly our cultural biases permeate even our most scholarly studies. Each ancient Andean textile was however, in its fully constructed reality, one integrated artifact -not the dual reality that our photographs and technical data imply.

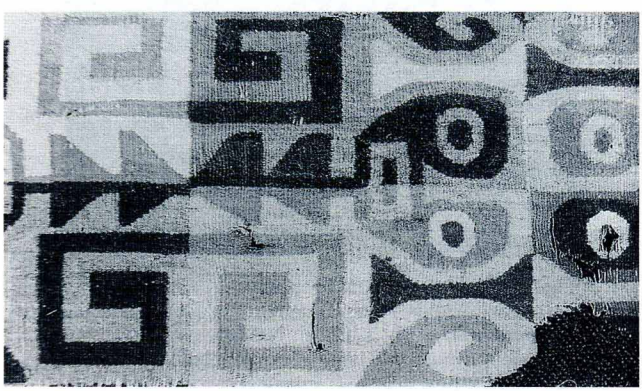

Figure 4. Huari and Tiwanaku interlocking pattern. This design from a Huari fragment, is also found in Tiwanaku tapestry. In both cultures, interlocked tapestry was the elite textile structure. Interlocking images, such as these, were characteristically used in the art of both cultures (Private collection, photo by author)

The postulation that structure as well as design carried meaning in the ancient Andean cultures is really based upon a series of hints —hints which however seem coherent and together suggest a larger view. Three of these hints will be enumerated and illustrated.

The first hint that specifically indicates a relationship between structure and meaning in ancient Andean textiles comes from the identification of certain weaving technologies with specific cultures. The second concerns the utilization of weaving technology for religious purposes, and the third relates fabric structure and numerical meaning. The three together suggest the levels of meaning once probably associated with the technology of all fabric constructions.

1. ANCIENT CULTURES AND THEIR ASSOCIATED WEAVING STRUCTURES

The general identification of weaving structures with specific cultural groups is familiar to every student of Peruvian textiles. Consider the cultural identification of four textile structures with their respective cultures.

Paracas embroidery

Embroidery, and specifically stemstitch embroidery, can clearly be identified as the dominant expressive textile structure of the inhabitants associated with the burials on the Paracas peninsula (Paul 1990). The Paracas weavers built upon the idea of add-on colored thread, which first appears in the earlier Chavin textiles (Conklin 1973), and gradually developed their extraordinary embroidery techniques. In classic Paracas tunics, the entire surface of the ground weave is covered by the embroidery. Though Paracas textiles are very early, dating from 450 to 175 BC, their influence on other Peruvian cultures seems surprisingly negligible. However for the Paracas culture, embroidery was undoubtedly the prestige textile structure (Emery 1966; Bird 1954; Paul 1990) (Figure 5).

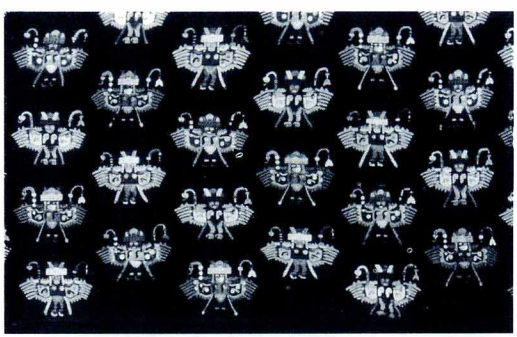

Figure 5. Paracas embroidered mantle. The repetitive figure shown in this Paracas mantle is a mythical being equipped with wings and other butterfly parts. The images are constructed of embroidery with both the embroidery and the figures distinct from their backgrounds (Museum of Fine Arts. 16.34 a, Boston, Mass. Denman Waldo Ross Collection)

Altiplano interlocked tapestry

Interlocking weft tapestry, a textile structure in which wefts of adjacent color areas are interlocked together, is strongly identified with the highland cultures of the southern Andes, the Altiplano. Pucara, Tiwanaku, Huari, Inka (Conklin 1983). This series of closely related mountaintop cultures all utilized interlocked tapestry as their prestige textile structure (Conklin 1996).

Peruvian coastal slit tapestry

On the other hand, slit tapestry that uses non interlocked wefts at the intersection of adjacent color areas, is strongly associated with the northern Moche tradition and with its de-

scendant later cultures, Chimu, Sican, and Chancay of the northern and central coasts of Perú (Conklin 1979).

Chimu doubled warps

Paired single yarn warps in plain weave appear to be characteristic of and closely associated with the Chimú culture according to a study by Rowe (1984). This identification, with supplemental considerations of spin and ply, is a very precise one and seems to identify textiles from Chan-Chan, the capital of the empire, distinguishing them from textiles made in weaving centers within the Chimú empire but outside the capital.

Such characteristic structures are fundamental keys to the identification of textiles that lack provenience or associations. Such specialized techniques of textile construction are as fully and deeply culture-specific as are the design images the textiles may carry. However, it is easier to develop possible meanings and interpretations for the design images than it is to understand why different textile structures became identified with, or perhaps did themselves identify special cultural groupings.

Cultures and their related textile structures

To explore the possible meanings for the culture of such culture-specific textile structures, consider two of the examples: Embroidery is the common term used to describe a variety of accessory stitches (including the stem stitch as used in Paracas mantles) on a ground weave. In embroidery, the design is sewn onto an already completed textile. It is an additive technique, in which the accessory stitching uses colors that are different from that of the ground weave. This produces an image that not only differs in color from its background but also is not co-planar with the underlying woven surface. The embroidered image is slightly above the base textile —an image not "of" the textile but "on" the textile.

The designs on Paracas mantles consist of distinct figurative images that are conceptually independent of their backgrounds —figure and ground are conceptually separate (Figure 5). In some mantles, the backgrounds themselves are colored by all-over accessory stitches, but even in these cases the images represent figures which appear against a separable background. Embroidery as the dominant textile structure in Paracas mantles is thus coherent with the artistic concepts of Paracas implying the presence of a consistent set of cultural values resonant with the textile structure.

On the other hand in highland interlocked tapestry, the design is formed by the structural weft of the textile and the design appears when the textile is made, not later. The design involves weft color changes within one textile structure, thus design and background are technically indistinguishable and interdependent.

The design patterns used on most Huari tunics (as well as on some Tiwanaku tunics) are seemingly abstract and many of the patterns involve mirror image reversal and figure/ground reversal (Figure 4). This most common tunic design pattern involves figure and ground interchange in what seems like optical play, involving many forms of symmetry and positive/negative image reversal —that is, the patterns involve the creation of two interlocking images that, together, exactly fill up the available field; one image does not have absolute priority as figure over ground, thus the design has an intellectual structure of figure ground interchange exactly like that of the structure of the textile itself.

Thus the structural concept of Middle Horizon Altiplanic tunics (the interlocking wefts) and the characteristic art concept of their patterning (the interlocking images) have a profound resonance and seem to be informed by the same viewpoint. The design and the structure have resonating meanings with both forms of data concerned with forms of symmetry, interpenetration and interdependence that must have characterized highland thinking.

An embroidered Huari tunic thus would be an anomaly because the meaning of the image would be entirely different from the meaning of the structure. In Andean textiles, there is a deep harmony between image and structure.

2. WEAVING TECHNOLOGY AND RELIGION

The identification of weaving technology with religion (the second set of hints concerning the ancient role of textile structure as a carrier of meaning) can be illustrated with three related examples: all concern the most fundamental technical aspects of textile creation the spinning of yarn—. The examples come from three different time periods: the tenth century BC, the fourteenth century AD, and the twentieth century AD.

Spinning direction

Perhaps nowhere within the contemporary Andean area are the weaving traditions of ancient times more nearly preserved than in the regions of Bolivia where Aymara is still spoken as the native language. The forms and some of the patterns of their 19th and 20th —century textiles with the aid of archaeological examples, can be traced back through time to pre-Columbian prototypes (Adelson *et al.* 1983).

In the late 1960's Grace Goodell made an extensive field study of such Bolivian weaving, and took special note of the critical importance of the rotational direction used by the weaver in spinning the yard. Only two directions are possible, clockwise producing S-spun yarn and counterclockwise, producing Z-spun yarn. The two directions are structurally identical so it is spinner's choice.

Goodell (1969) reported on the general religious significance of textiles and, specifically, on the matter of spinning direction: "In this area of Bolivia, where textiles are so important in daily life, even the spirits of the mountains value the yarn and the loom. In communities like Ayrampampa, Saint Isidore, the patron of farmers and a peasant himself, must also have a poncho; so a local weaver is commissioned to keep his statue well attired with a bright new garment on his feast day every year. Furthermore, at planting time and harvest time the earth goddess may demand her annual tribute wrapped in a specially woven cloth. To ward off evil spirits, magical "lloq'e," a yarn spun in the reverse direction from the normal spinner's twist, is tied around the ankle or wrist. This is worn by travelers, pregnant women, and the ill — by anyone hoping for good luck. Even the statues of the saints in the churches sometimes find it advisable to wear 'lloq'e' on their wrists" (Goodell 1969).

We, of course, have no proof that spinning direction in the ancient past carried such religious connotations, but the broad continuity of Andean textile traditions makes such continuity plausible. Under those conditions when there is no apparent structural or visual explanation of comparable oddities in the matter of spinning direction in ancient textiles, it seems reasonable to postulate religious connotations.

Another example of a possible religious role for spinning direction in ancient Peruvian textiles comes from the patient observation of the late Dr. Junius Bird who noted that in many of the gauze fabrics from the tombs of the Chancay Valley there were curious variations in spinning direction within a given textile (Bird 1962). Generally such textiles from Chancay are constructed entirely of S-spun yarns, but Dr. Bird noted that in some of the patterns, certain aspects of the figures were conveyed with Z-spun yarns. In some figures, it was the outlines that used the reverse thread; in other cases, it was the faces that were accomplished with the reverse spun thread. Again, the difference is not visible to the naked eye, or at least to the naked eye of the modern observer, and there is no plausible structural explanation. Bird offered the following: "The deliberate use of counterspun yarns

for the outline may have been for magical reasons and suggests the term "witching veils" for such articles" (Bird 1962). Perhaps it was the counterspun yarns which "animated" the figures or kept them from becoming evil.

A third possible illustration of spinning as a carrier of meaning, comes from the very early and curious spinning provided from the textiles excavated by this author at the site of Pampa Gramalote (Conklin 1975) which date from the Initial Period. They show great structural ingenuity and use a wide variety of structures. Twining was used for all special textiles, that is, those with patterned designs, and weaving was used for the utilitarian ones. In about a third of the textile fragments that were twined, the warp consisted of an unequal pair of a single yarn and a plied yarn, with the spinning in both cases in the "S" direction and with the plying in the "Z" direction. The asymmetry of the combination was accentuated by pairing a very large diameter Z-plied yarn with a very small S-spun single. The combination of the two yarns, side by side, produced a slight herringbone effect visible under the microscope. No structural explanation for the construction has ever been offered. But the pairing of large and small, of two ply with single ply, of S spinning with Z plying, seems like a conscious combining—of—opposites, and suggests that some religious or conceptual idea about dualism may have been governing the construction.

That early complex pairing found in the Pampa Gramalote textiles may have been a cultural precedent for the simpler warp pairing which Anne Rowe has noted in Chimu textiles (Rowe 1984). Although the sites of Chan Chan and Pampa Gramalote are very close together, the Chimu evidence comes from some three thousand years after Pampa Gramalote. Such is the continuity and grandeur of the ancient Andean weaving tradition that the early data may indeed provide clues to the meaning of the Chimu warp doubling.

3. FABRIC CONSTRUCTIONS AS DATA BANKS

Perhaps though the most unusual role of textile structure in conveying meaning was in the use of textile structures to carry a variety of forms of numerical data for use in daily life. In Inka society as well as in earlier Andean cultures, special sets of knotted strings called *khipus*, have plying, spinning and knotting arranged to encode information including numbers of the decimal system.

According to the information acquired at the time of the Spanish conquest, *khipus* were hierarchically arranged knotted strings for use in recording many forms of information, including accounting, the recording of history and the law. Although the use of *khipus* seems somewhat similar to the use of "rosaries" in Roman Catholic rituals, khipus seemed not to have performed a ritual religious function, but rather a variety of secular functions as depicted in many of the illustrations of Inka life created by Huaman Poma de Ayala (Guaman Poma 1936).

Though the full range of meaning buried in the *khipus* still eludes us, analysis of their makeup has established a rough chronology, with some *khipus* dating to the time of the Huari textiles (Conklin 1982). Numbers represented in the Inka *khipus* can be read, but what the numbers, together with the spinning and the plying, represent can not yet be identified. Perhaps someday, they will be decoded.

The range of meaning attributed to Inca *khipus* by the chroniclers actually goes far beyond numerical data to many forms of qualitative data such as letters, history, laws, and traditions. We still lack detailed examination of *khipus*. Most of them exhibit a subtlety in colors, knot forms, spinning and plying, that suggests information far beyond the direct numbers. However, none of these qualitative data have been assembled or interpreted. No study of even the spinning direction used in khipus has been made. Their importance for this subject, "The meaning of structure in Andean textiles" can hardly be overestimated.

The variations in cord attachments, spinning, and dyeing must all have conveyed meaning on a far more detailed level than simply the numbers in the knots. Probably the meaning buried in the complex technical aspects of *khipus* was resonant with the meaning of those same technical aspects in other textiles as well.

These, then, are the hints concerning the relationship of textile structure to religion, mathematics and broadly to Andean culture that are available to us. Together these hints suggest that ancient Andean thought embodied concepts of structures and relationships that informed all aspects of Andean life, with textile structure and its representation probably being a major conveyor of those beliefs.

An altiplanic motif derived from textile structure

We can test these general conclusions by examining the significance of a two thousand year long sequence of variations on a design motif —a motif that seems to have been derived from textile structure (Figure 6). Its multi-cultural longevity speaks of its significance but also speaks generally of the importance of textile structure as a conveyer of meaning. We can speculate, after examining the evidence, concerning the possible meaning of the motif. The examples of the motif occur in a sequence of Altiplanic textiles.

Figure 6. The Over—and—under motif (Drawing by author)

The design motif that we have selected for examination, an undulating line (Figure 7) with accompaniments, occurs primarily, but not exclusively, in textiles. This wavy line motif, or zigzag, is graphically similar to the voltage pattern of alternating current. Though it is a symbol without a name, the design does seem to be a cross section through weaving and to graphically suggest action and continuity. We can call it the "over—and—under" motif for short.

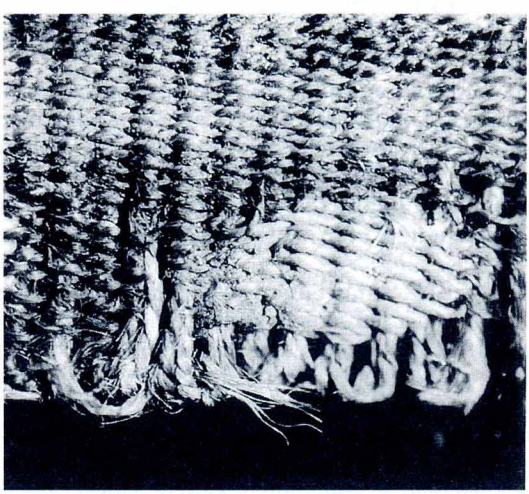

Figure 7. Pucara textile structure. In this close–up view of the tapestry structure of the Pucara textile illustrated in Fig. 9, the doubled warps, which are shown vertically, can be detected. The structure appears to be that represented in the headband of the figure (photo by author)

Figure 8. Pucara sculpture. This sculpture is as remarkable for its abstraction as for its icons which seem to be body painting or perhaps tatoos. The image on the right wrist of the arm of the figure appears though to be a wristlet with a version of the zig-zag motif circling the wrist. Kidder, Alfred, II "Some Early Sites in the Northern Lake Titicaca Basin," (*Peabody Museum Papers* Vol. XXXVII-No. 1 p.8, Cambridge, MA 1943)

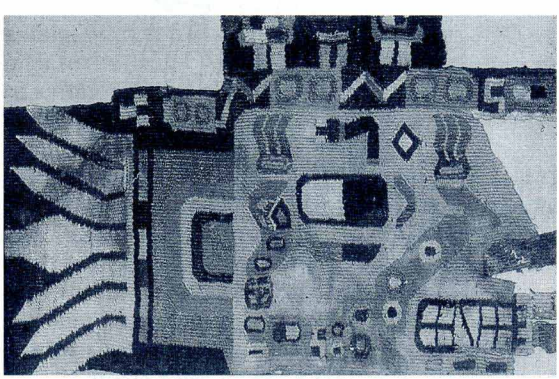

Figure 9. Pucara textile image. The headband that the figure is wearing has a sequence of images represented —two circles which alternate with a zigzag motif. The zigzag has two colors possibly representing the parts behind and in front. (photo by author)

We will review ten uses of the design in the Altiplano over a period of two thousand years, noting its changing uses and meanings. We will then ask the question as to what, if any, is the nature of the continuity suggested by these millennia of use and we can suggest a possible meaning.

The over—and—under icon in Pucara sculpture

We have the record of a stone sculpture collected by Alexander Agassiz from Moho on the northeastern coast of Lake Titicaca, and identified by Kidder as clearly Pucara in style (Kidder 1943). The figure (Figure 8) seems to wear only icons for clothing and shows a wristlet worn on the right wrist —a wristlet that has a simple, but clear version of the zigzag motif.

The over—and—under icon in a Pucara textile

An elaborate use occurs in a Pucara headband represented in a Pucara textile image. No excavated textiles from Pucara exist, but several textiles found in coastal burials can be reasonably attributed to the Pucara culture. One of these is illustrated in (Figure 9). It is constructed of interlocked tapestry over paired warps. The interesting and unusual structural feature of paired warps is apparently represented in the headband of the textile itself. It is as if the zig-zag or wavy line motif were a cross section through the textile structure itself, with the zig-zag seeming to represent the weft and the sequence of two dots representing a cross section through those paired warps (Figure 9).

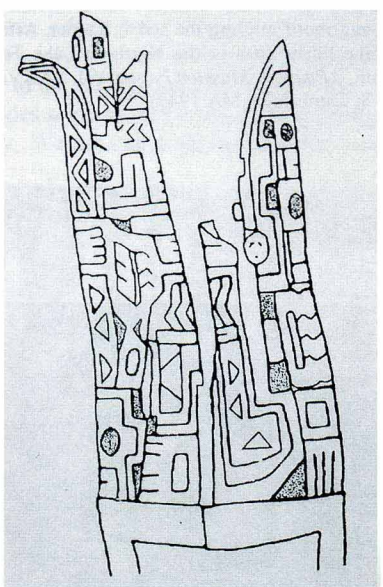

Figure 10. Toconao snuff tablet. This wooden snuff tablet contains the image of a Tiwanaku figure holding an upturned staff. The staff is represented with a carved version of the over—and—under motif (Drawing by Constantino and Donna Torres). Museo Arqueológico, San Pedro de Atacama

The over—and—under motif in Tiwanaku iconography

Chronologically next in the series of uses is an early Tiwanaku use in the staff band of a Tiwanaku style figure carved on a snuff tablet from Toconao, Chile (Figure 10). The design, a zig-zag version of the over—and—under motif, is stylized and occurs vertically. It is of special interest because it is the earliest dated Tiwanaku style object 250AD (Torres and Conklin 1995). This vertical form of the motif is frequently found on Tiwanaku staffs but the motif also occurs commonly in the headbands of the typical Tiwanaku anthropomorphic figures.

The over—and—under icon in a burial from San Pedro de Atacama, Chile

Two examples of its use occur in an elaborate San Pedro de Atacama burial, Solcor 3, Tomb 107 excavated by Timoteo Cruz and others and disassembled subsequently by this author under the direction of Agustin Llagostera of the Museo San Pedro de Atacama. The snuff tablet has a classic Tiwanaku (Figure 11) with a headband that carries the zig-zag motif recalling its very similar use in the Pucara headband. But the identical motif is also used in the vertical staff that the figure carries in front. Perhaps the staff with its attachments which Tiwanaku figures carry was a wrapped bundle and not a weapon/stick. No such artifact though has ever been found archaeologically.

However, the same grave, T-107, which contained a Tiwanaku tapestry tunic and snuffing kit, also contained many simpler locally constructed textiles. One of these accompany-

Figure 11. San Pedro de Atacama snuff tablet. This wooden snuff tablet was found in Tomb 107 from the Solcor 3 graveyard and was excavated and disassembled under the direction of Dr. Agustin Llagostera. The zig-zag motif is represented in the headband of the figure, in a use very similar to the earlier Pucara representation of a headband illustrated in Fig. 8. The motif is also used on the representation of the staff which the figure holds. Perhaps the staff was actually a basketry or reed structure. However no such Tiwanaku artifacts have ever been recovered. Museo Arqueológico, San Pedro de Atacama, Solcor 3, T-107, N° 8432 (photo by author)

ing textiles was an empty, warp-faced bag, simply made, showing no sign of use but having a simple version of the up—and—down design (Figure 12). The incompleteness of the design suggests that it had been made hurriedly and specifically for the burial. The design motif on the bag exactly expresses the nature of the textile structure, for the linear over and under design coincides with the warp direction. This common, utilitarian use of the motif coming straight from the weaver's own vocabulary suggests that the motif was not the exclusive property of the religious elite but was commonly understood.

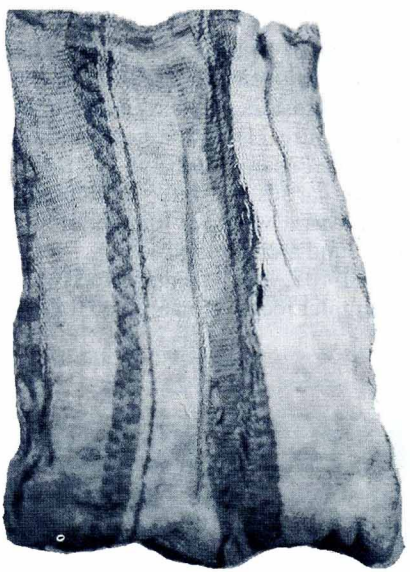

Figure 12. Man's bag. This simple warp-faced bag from the same tomb as the snuff tablet shown in figure 11, was very hurriedly and simply constructed. It was then divided into two vertical compartments by rough stitching and was used to carry food for the buried person. For design, it has a simple but clear version of the over—and—under design motif. Museo Arqueológico, San Pedro de Atacama, Solcor 3, T. 107, No. 382.1 (photo by author)

The over—and—under icon in a Tiwanaku pulcera

The motif though is also found on an elite Tiwanaku pile work wristband from a Tiwanaku shaman's paraphernalia found as part of a burial in Tomb 132. The kit contained a Tiwanaku style tapestry headband, various bags, tubes and trays, but also a pair of wrist-sized pile bands with designs, one of which is the wavy design (Figure 13). The colors of the tufts were sequenced to form the desired pattern (Figure 14).

One bracelet had a zig-zag pattern, the other a sequence of squared rings. Comparison with the earlier Chiripa carved stone image suggests that the wristlet with the zig-zag pattern might have been for the right wrist. However the designs, in this instance, do not carry literal references to their associated textile structures for three reasons:

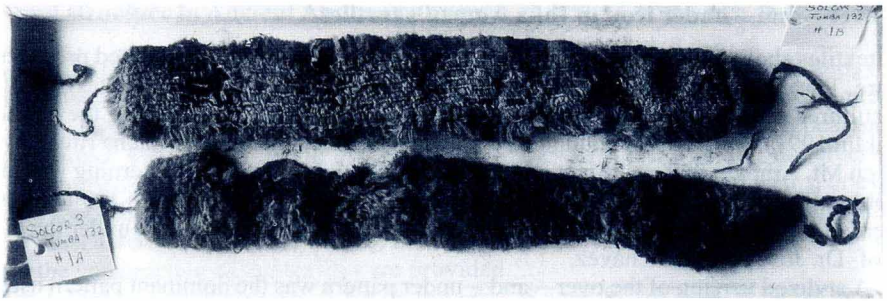

Figure 13. Wristlets from San Pedro de Atacama. Tomb 132, Solcor 3. The backside of one wristlet is shown on the top and the furry front side is shown on the bottom wristlet. The top wristlet has the zig-zag design and the bottom one has a pattern of squares. The wristlets were part of a Tiwanaku style snuffing kit associated with the body. The body was excavated by Agustin Llagostera and disassembled by the author under the direction of Dr. Llagostera. Museo Arqueológico, San Pedro de Atacama, Solcor 3, T. 132, Cons. Nos. 1 and 2 (photo by author)

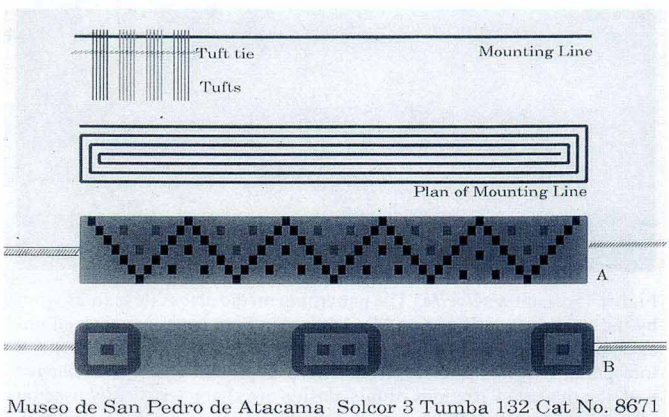

Figure 14. Wristlet construction diagram. The wristlets shown in Fig. 13 were constructed by assembling tufts of colored alpaca fiber in a sequence on a string. This string of tufts was then coiled into a square spiral and sewn together to form the wristlets with the tufts forming patterned pile. The design of one of the wristlets with its version of the over—and—under motif is very similar to the wristlet shown on the Pucara sculptural image in Fig. 7 (drawing by author)

- The pulceras are not created by any form of over—and—under interlacing as implied by a literal reading of the image.
- The over—and—under design has three dots in each position, and three does not seem to present in the actual textile structure.
- And the left and right images differ, though the two pulceras are structurally identical.

The over—and—under icon in Inka women's textiles

Inka textiles show remarkable technical continuity with those of their claimed predecessor culture, Tiwanaku (Conklin 1983). However, design continuity between the textiles of the two cultures is not so readily apparent. Recently, in the course of recovering the garments (Conklin 1997) worn by the young girl who was sacrificed in a Kapak Hucha ritual by the Inka on Mt. Ampato in Peru, direct and intensive study of Inka textile patterning was made possible. The frozen body of the girl, now called Juanita, together with her textiles, is preserved by the Universidad Católica de Santa María in Arequipa, Peru, under the direction of Dr. José Antonio Chávez.

A stylized version of the over—and—under pattern was the dominant pattern used on the clothing of the sacrificed girl and was the most common pattern on Inka women's textiles (Figure 15). It occurs elegantly on her *llyclla* where it is doubled, reversed, geometricized and used as an edge to edge pattern. The direction of the pattern xhen worn would have bean horizontal.

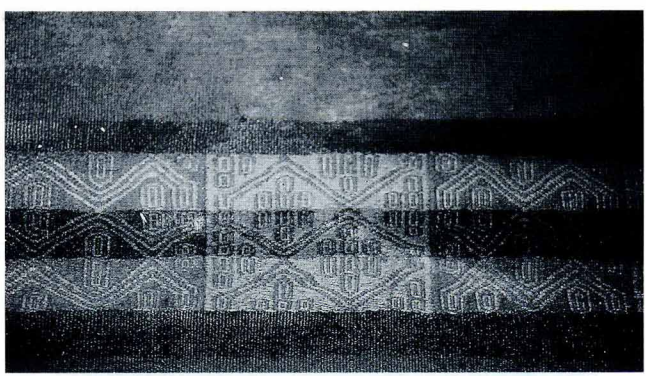

Figure 15. Juanita's *llyclla*. The patterning on the elaborate textiles worn by the Inka girl sacrificed on Mt. Ampato in Peru contains repeated images of the over—and—under pattern. The design, though, is segmented into parts, repeated and reversed. The background colors also change with the repeats. Variations of this design are characteristically used on all Inka women's clothing with the design direction always horizontal. Universidad Católica de Santa María in Arequipa, Peru (photo by author)

The same pattern also occurs in the Inka female burial found on Mount Esmeraldas near Iquique, Chile. The pattern as worn, again would have been horizontal. However, we must ask the question, assuming that the pattern does represent textile structure, does the design represent warp or weft interlacing? These Inka textiles provide an important clue. It is very difficult to distinguish warp from weft on many Inka textiles: the weavers could and did weave the same design either way. The wave design in these Inka textiles, coincides with the direction of the visible surface element, and the dots coincide with the direction of the hidden element, whether such elements are warp or weft. A review of our previous examples indicates that where the design was used with interlacing, this was always the case. The linear direction of the design coincides with the surface element and not the inner element. The Inka perhaps saw the elements of their textile constructions in accordance with their position in the weave, not in accordance with their position in the loom as we do, that is as warp or weft. They saw weaving more as a relational structure rather than as a product named for the instruments with which it was created. Our terms of warp and

weft betray our instrumental orientation. We name the parts of a textile after the parts of the loom and after the process by which the textiles were created and not by relational positions. This understanding provides us with an important clue concerning the significance of the design motif.

The over—and—under icon in Inka men's textiles

We can detect the pattern in Inka male clothing as well. A male burial from Purochuco contained a *chuspa* or coca bag with the pattern (Figure 16) placed vertically as it always is on Inka men's clothing. The design then is in line with the expressed element in what we would call a warp-faced structure.

Figure 16. Man's *chuspa*. A figure now on display at the site museum in Purochuco, Perú is clothed with garments from graves found in Purochuco. This coca bag, hanging from the shoulder, contains the over—and—under motif used vertically. Striping and patterning is normally vertical on all male Inka clothing as well as on other male altiplano clothing (photo by author)

The over—and—under icon in Inka keros

One of Juanita's accompanying offerings was a pair of carved wooden keros that were encircled with a simple version of the motif. A more elaborate version occurs on two Inka keros in the Banco Central collection in Quito, Equador (Figure 17). The encircling aspect of the pattern is reminiscent of its earlier use in headbands or in wristlets, but the design has been broken into two segments, an "S" and a "Z" form and the design in the Quito keros has been animated. The two dots have become eyes of a face, and the band terminations have received fingers and toes. Such visible expressions of animation are rare in Inka art.

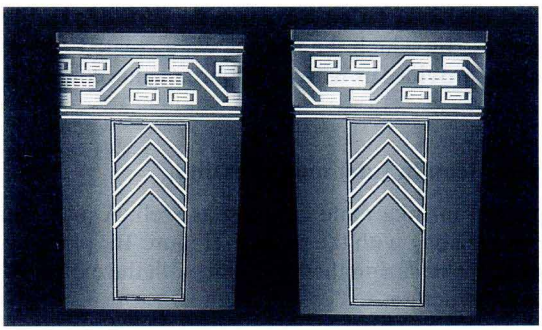

Figure 17. Inka keros. This pair of Inka carved wooden keros is on display in the Banco Central exhibition in Quito, Ecuador. The keros have a version of the over—and—under motif which has become animated. Two of the dots of the motif have become eyes, and the third has become a mouth with teeth so that a face is represented by the three dots of the motif (drawing by author)

The over—and—under motif as a *tocapu in* an Inka tunic

In some Inka male tunics, as in the miniature Inka tunic now in the collection of the Field Museum (Figure 18), the design is separated into parts and is treated abstractly, but retains its continuous over and under quality.

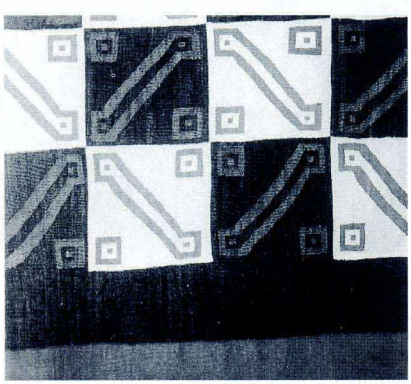

Figure 18. Inka miniature tunic. In this miniature Inka tunic in the collection of the Field Museum in Chicago, Ill., the motif has been separated into two parts, with each part represented in it own separate *tocapu*. If the *tocapu* series are read together, though, they represent a continuous up and down line and are a version of the over—and—under motif (photo by author)

The Dumbarton Oaks Inka tunic, however, offers the most abstract Inka use of their inherited designs. One of the tocapu represents one half of the over—and—under icon (Figure 19). Both left and right halves of the icon appear in various places on the tunic, but they are never shown as a coordinated pair. Perhaps the two parts of the image had separate meanings, just as our "S" and "Z" have.

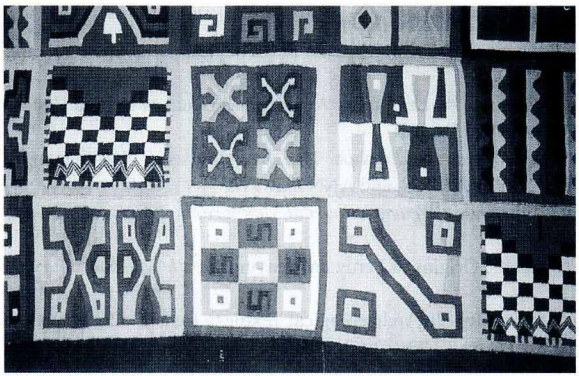

Figure 19. Inka tunic. Illustrated is a portion of the elaborate pattern of *tocapu* in the well—preserved all *tocapu* Inka tunic in the Dumbarton Oaks pre-Colombian collection. The tunic contains a variety of images in the *tocapu*, but two of the *tocapu* are parts of the over—and—under motif. The two halves of the image are never used side by side in the tunic, however, suggesting that the two parts of the image had separate connotations. Dumbarton Oaks Cat. B-518 (photo by author)

CONCLUSIONS

Although the design motif seems continuous over two millennia of time and over much of the Altiplano, the meaning no doubt shifts greatly. It seems unlikely that the design when used on the keros could be a simple reference to weaving. Can we then argue that this use of a design, which is sometimes clearly a symbolic reference to textile structure, sometimes perhaps just a "design", nevertheless represents some kind of cultural continuity? I think that we can so argue, by considering some peripheral and some negative evidence.

First: all of the designs, though coming from differing time periods and cultures with differing names, do come from an area of the world which has certain other continuous traditions —one of those traditions being the use of interlocked tapestry for elite textiles. A map of the Andean highland cultures that made use of interlocked tapestry would look very much like a map showing the cultures that used the over—and—under symbolic motif.

Second: the design motif does not occur in the coastal regions. A search through thousands of textile images from the coastal art of the Andean world reveals no clear use of the motif in coastal textiles.

Third: it seems likely that although we can cite in many cases explicit referential meaning as to weaving, cases exist where the reference seems unlikely to be to weaving, and therefore, the implicit reference must be to some underlying larger meaning: something concerning the nature of continuous interactive action —something to do with an Andean sense of over—and—under—ness which is held in common by all of the references.

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