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Chinchorro Twined Shrouds

Vicki Cassman, Nancy Odegaard, Bernardo Arriaza

Twined textile shrouds, beginning at least nine thousand years ago, were an integral and relatively unchanging feature of Chinchorro mummy bundles, though Chinchorro mummification practices dramatically varied through the millennia. Twined mats were used like casings, enshrouding the bodies, like a postmortem amniotic sack made from vegetal fibers. They carried the individuals to the after world protected in the belly of the earth. Chinchorro mummies beginning with the earliest dated individual, known as Acha Man, from 9,000 B.P. through and into to the next cultural phase, Formative 3,000 -1,500 B.P., were enveloped in a reed shroud. The use, materials, structures and overall forms of these textiles reveal aspects about the people who produced them and the people they protected in their journey to the after life.

Who used them?

In Arica, Chile there are at least 9,000 years of twined mats. Within this long period of sustained textile tradition most evidence comes from mortuary contexts. Though very little attention has been paid to the twined mats, they were the most enduring Chinchorro characteristic. The presence of a mat shroud is a constant and diagnostic feature of Chinchorro culture. The mummies themselves were found in a variety of styles according to Arriaza et al. (2008), Arriaza (1995), Guillen (1992), and Standen (1991) that range from natural mummies, complex black mummies, complex red mummies (see image), bandage/striped mummies, to mud or cement coated mummies that relate to some extent with temporal differences. However, all mummy styles were found in an extended position and wrapped in twined mats, the distinguishing mortuary characteristics denoting the Chinchorro. In contrast later Quiani peoples, with distinctive flexed burials, used camelid twined and woven cloth as well as dyed turbans of camelid yarns for personal adornment. The mortuary mat shrouds made of vegetable fibers were used for all burials of the Chinchorro period and continued to be common in this later culture known as Quiani (3000 BP) that marked a transition to the Formative Period and different mortuary traditions. Later in the Formative Period the mats became much coarser, and more like architectural features than shrouds. The twined mats were used as divisions between layers of individuals in mortuary mounds. Though little effort in the Formative Period (3000 – 1500 BP) was placed on mat making in terms of quality, loom weaving had arrived and basketry in general took on greater importance and was impressive in quality.

Chinchorro archaeology has little evidence for non-mortuary uses of mats so far, but it is likely that production was not limited to funerary shrouds. The even consistency of the twining technique does not reflect occasional production, but a regular and practiced activity. The evenness of the wefts and the regular nature of the Z-weft twining reflected habitual production for daily life, perhaps as protection from the ocean mists, or shelter while on an ocean craft. There is no direct evidence that boats or rafts were used but there is evidence of consumption of deep sea fish such as Corvina (Schiappacase and Niemeyer 1984). The mats were likely used for the sides or floors of their shelters as well. Only a few settlements from the Chinchorro period have been found so far. The Acha camp (radiocarbon dated to 8900 BP) is one of the few described to date, with stone foundations and partial posts remaining from these structures

(Munoz et al. 1993: 26-30). However, twined mats were the most likely architectural enclosure for their small homes. , above coarse twined mats were ubiquitous in the later mounds from the Formative period 3000-500 BP, and continued to be used as roofing materials as evidenced by the later but pre-Inka habitation site excavated by Ivan Munoz, called San Lorenzo in the valley of Azapa, Arica (Munoz 1983). This site had the remains of large sections of collapsed twined roofing structures probably dating to approximately 500 BP. Finally, William Conklin has documented twined Inka style colonial roofs still in existence in Northern Chile today (Conklin 2001). It is likely that these later roof materials were a tradition handed down for millennia from the Chinchorro culture, the first human inhabitants in the area. This also is a testament to the enduring nature of the twined mat. It endured as a mortuary shroud for more than 8,000 years and likely as a roofing material for 10,000 years!

The weft twined mats and shrouds of the Salish groups of the Northwest Coast of North America, from contact periods, provide compelling technological similarity to the Chinchorro fragments. Like the Chinchorro, the Salish examples reveal meticulous craftsmanship. From the late 18th century to late 19th century explorers and ethnologists remarked on the skilled manufacture of their mats. Mats were used in many areas of daily life such as insulation and cover from the weather, in watercraft, clothing, ceremonial screens, and for wrapping the dead. Many beautiful examples survive in museum collections and through photographic and illustrated documentation. Among the Aleut people in Alaska, basketry and matting made with grass fibers in Z twist, open weft twining remains an ongoing practice. The important discovery of 1000 year old human remains that were ceremonially mummified and wrapped in finely woven mats for burial suggests a long tradition also (New York Times September 2, 1990). Among the Chumash, Yokuts, and other indigenous peoples of Southern California, S twined mats and S twist open twined baskets were made, and archaeological examples illustrate technological similarities despite wider weft spacing (Campbell 1999: 169-172, Mohr and Sample 1967:39). Basketry fragments from inland cave sites in Utah indicated that Z twist twined containers and matting were in use from 7000 BC (Wright 2001: 146). Chinchorro twined mats sit firmly in a Pan-American tradition of great antiquity, but what distinguish the Chinchorro evidence are the numbers, preservation and potential for contexts with associated individuals.

Usually Chinchorro mats are placed with single individuals; however, there are examples of larger mats covering a group of Chinchorro individuals (Munoz et al. 1993:115-116). Most Chinchorro mummies are found in aggregates, as opposed to single occurrences, but it is most common to find bodies individually wrapped. In the case of a twined mat covering several individuals, one must wonder about the interconnectedness of the individuals so canopied. Were these individuals buried simultaneously? Did these individuals die simultaneously? Was the burial site completely opened up when a new individual was added, for ritual and/or accounting purposes and a new mat added? Does the twined mat unify a family unit, tying together generations? Radiocarbon dates and DNA analyses could answer some of the questions raised by the placement and unification symbolized by the twined mats. These analyses have not yet been undertaken. In addition, new radiocarbon dating evidence indicates intriguing relationships between the mat and the individual it shrouds. In the case of MO1 T1 C5, the child had a radiocarbon date substantially earlier than the date of its twined shroud. This indicates the body

was rewrapped generations later. This too will need to be formally tested with further sampling and radiocarbon dating.

Twined shroud partially removed during rescue excavation of a red mummy (T7C5) from the Morro 1 site in 1983. Photo courtesy of Bernardo Arriaza.

What are twined mats?

Most remaining Chinchorro textiles (approximately 9000 – 3000 BP) were twined vegetable fiber mats/shrouds measuring up to approximately 2 x 1.5 meters, or fringe skirts. The construction of the mats/shrouds relates to a tradition of basketry technology known as open twine yet the suggestion of tension suggests the concept of textile manufacture. Unlike three dimensional basket making or mats made by plating, the Chinchorro fragments suggest the use of a brace or partial frame. This was needed to provide tension that is not inherent in the materials themselves. Based on the fragments that have survived a starting or heading cord, composed of plied cord under tension, and was likely used to create an edge different from any of the other edges of the mat. Warps appear to have been simply hung over this cord and were lashed down with a simple, coarse, and somewhat uneven twined weft. Several rows of close twining at the beginning created a firm and strong edge. A right handed weaver, working to the right used pairs of wefts in a 2-strand Z-twist weft twining motion to cross the warps for the width of the textile. The plant material used as the warp and weft might have been prepared by collecting stems, perhaps softening in water, retting or beating, and twisting. Weft pairs twined about one another and enclosed successive warps or warp groups. Wefts appear more processed than warps. Though we have not looked at all of the Chinchorro samples yet, those from the Morro-1 site, fifteen examples, had a consistency in the use of this technique. All are spaced or open weave (as opposed to closed or compact) though distances vary. Weft pairs are about 1 cm or a finger width apart, and 2-strand Z-twist.

The side selvages are constructed when the weft element reaches an edge. The weft elements are often wound around the selvage warp before returning on another course across the warps. This

wrapping, as many as seven spirals, seems to provide greater strength to the selvages. Finally, the bottom edge may have had a few rows of closer weft twining followed by a fringe of warps. The fringe was either left as plain fringe or they were twisted and knotted into regular or irregular tassels. The length of the fringe varied greatly. This treatment of the warp ends was in sharp contrast to the very regular spacing and strict Z-twining of the weft. However, there was great consistency on the late phase camelid twined shrouds, which exhibited rigorous uniformity of all edges and a much more fabric as opposed to a basket-like consistency.

Some of the later mats associated with the Chinchorro-Quiani transition (approximately 4000-2500 BP), are distinct, since they are made from camelid fibers. Often camelid fiber shrouds have striped warps taking advantage of the natural pigmentation of the animals, and there are examples of experimentation with early dyeing techniques for dark colors. Dark brown stripes of camelid yarns appear to have been dyed and in the process "tendered," since these stripes are now carbonized, and this type of deterioration is typical of over-mordanted textiles. Though camelid yarns lend themselves more to weaving than relatively stiff vegetable fibers, the Chinchorro continued to employ the same twining technique for camelid shrouds, though now using a more compact system of twined wefts. Whether their devotion to twining was due to a lack of familiarity with the weaving process or a preference for known traditions and the expedience of local materials it is not clear, but it appears Chinchorro camelid twined mats have a relatively short duration, being replaced with woven textiles in the Formative Period.

What are the shrouds made from?

In a desert oasis such as Arica, the Chinchorros had access to various plant fiber sources in the deltas of the two rivers that flowed through the Lluta and Azapa valleys into the Pacific Ocean. The delta of the Lluta River still exists today in its relatively natural state, though the San Jose River (from the Azapa Valley) delta has been obliterated by intensive agriculture and the placement of the modern city of Arica. Plant fiber samples were collected from the Lluta Valley river delta with the help of botanist Eliana Belmonte from the Universidad de Tarapacá, Arica. The seven possibilities we found in the delta were *Scirpus americanus* var. *ordalus* (Cyperaceae), *Scirpus americanus*, variety with a triangular stem (Cyperaceae), *Scirpus americanus* var. *monofilus* (Cyperaceae), *Equisetum giganteum (*Equisetaceae*), Cortaderia* sp. (Gramineae), *Distichlis* sp. (Gramineae), and *Polypogon* (another Gramineae). In December of 2000 Dr. Harry Alden, microscopist at the Smithsonian Center for Materials Education, sectioned, stained and compared the reference samples to a mat sample taken from a mortuary context from the Morro 1 site (MO1 T- 1 C-6). We used polarized light microscopy, as well as scanning electron microscopy to analyze the samples. The study of these fibers is challenged by their brittle, oxidized, and fragmentary condition. With polarized light microscopy it was possible to eliminate several of the reference samples from the pool of possible plant sources. These included the Gramineae, or grass family, which have distinctive features such as undulate epidermal cell walls, that our twined mat sample MO 1 T- 1 C-6 did not have, and the *Equisetum giganteum* or horsetail, which has a very different microanatomy and is far too brittle to be a candidate. This left the Cyperaceae family, which contains the sedges (*Carex*, *Cyperus*, *Scirpus*, *et al*). With polarized light microscopy it was clear we were on the right track, but which did the Chinchorro use? *Scirpus* is commonly known as bulrush, and it is found in marshes. The different form or varieties are usually found in different locations depending on the quality of the soil, however, our samples were found growing within a few meters of each other. The

triangular stemmed *Scirpus* is known to tolerate soils with higher salt content which the Lluta delta certainly has. Sedge plants in general are a good choice for matting as the spacing of the transverse wefts in the twined fabrics requires that the fiber not slip out of position. Scirpus americanus is generally found as a triangular stemmed species but near Arica there is a round stemmed variety as well. Ethnographically it has been reported that *Scirpus* was used for mats and as a minor food source in the Lake Titicaca region. Preliminary results, based on stomatal anatomy indicate that the unknown sample is a genus in the Cyperaceae, most likely *Scirpus*.

In 2008 Rachael Freer, fiber analyst was given a sample of modern Lluta Valley *Scirpus* plant and a sample of another mat (MO1 T-28 X-2 warp), and she concurred that these samples had anatomically similar vascular bundles and cellular patterns. She also saw some evidence of possible processing since the cuticle was interrupted on the archaeological sample. A larger sampling of the fibers used in these twined mats would be ideal, but from the consistency of visual characteristics and overall similarities of preservation, it is probable that *Scirpus* was specifically used for making Chinchorro mortuary shrouds. This however will need to be determined in future microscopic analyses of a sufficient number of different shrouds and compared to vouchered herbarium materials.

Production methods must be gleaned from the mats themselves since we have not found any mats in production in the archaeological record or isolated tools. Due to the fragmented nature of the mats we must piece together likely manufacturing techniques. There is no evidence for a loom such as wooden structures or loom weights as controversial archaeologist James Mellaart in 1989 suggested for contemporary twined fabrics from Çatal Hüyük, though there are Chinchorro fishing weights that are still attached to cotton fishing lines among the mortuary offerings.

The heading edge rarely survives, but we have a few fragments. The width of the finished product was determined by the amount of warp material added to the stretched heading cord. It is unlikely that this cord was suspended between uprights as illustrated in Broudy's Book of Looms (1993) for Ojibway (and Zia?) cultures. A more fitting analogy is that of the fisherfolk and pre-contact indigenous cultures of the Northwest coast of the United States and Canada. These mats were likely worked on the ground with a header stick or cord that was held taut so that warp strands could be held in place by the weaver's knees or by placing warps over a cord held by tension (Stewart 1984: 138 and 144). For example, the Chinchorro, sitting or kneeling on the ground, may have used two stakes planted in the ground, with a cord stretched between these. It is unclear if the cord under tension was alternatively lashed to a stick for rigidity and then the stick removed after finishing the mat. Even in Chinchorro times wood was not plentiful in the Atacama Desert and nice long straight sticks would have been coveted. Competition for straight sticks included reinforcements of the internal structure of the complex prepared mummies. But a single strong stick could have been used repeatedly by lashing it to the header cord and then reused innumerable times. The advantage of using a stick is that the mat could have been moved or turned over to make the pairs of weft twining in every other direction easier. We do not have a mat that survives that is in the process of being worked so this part of the manufacturing process remains unclear.

The *Scirpus* shrouds were both plain and decorated and at the Morro 1 site ten of fifteen shrouds examined so far were decorated. They are sometimes painted with red and yellow ocher, as well as manganese pigment for black. Painted shrouds are found among the earliest examples for instance that of Acha Man, dated to 9000 BP, and some of the latest burials of the Morro-1 and Morro 1-6 sites. Stripes and simple overall geometric designs reign. In addition to the painted examples that span the entire 6000 years of shrouds, many have embroidered designs or supplementary dyed camelid fibers in red, yellow, purple, brown and black. In 2004 a red camelid embroidered sample was identified as cochineal using UV-VIS Spectrometry. Cochineal is not found until after 1000 BP in Arica and it is derived from an insect that is not found in the Arica region. Therefore, this textile was resampled in 2007 and Cole (personal communication 2008) using HPLC has recently disputed this finding stating she is confident there is no carminic acid or cochineal in the sample and she is now comparing the sample to South American Madder and attempting to identify other Chinchorro embroidery colors.

Most common were embroidered designs in brown and yellow camelid yarns along the edges and as linear geometric symbols on the surfaces. They often involved a wrapping technique when the direction of travel is along the warp, and embroidery or interlacing into the wefts when traveling in the weft direction. As of yet shrouds have not been compared with mummy styles, due to the difficulty of assigning context to many of the shrouds removed from the bodies during or initially after excavation. Red yarns are used within the body of the mats and browns and yellows within the body and at the edges. However, in one exceptional case that I saw in 1984, a few months after the initial excavation, there were small elegant symbols in bright purple and yellow dyed camelid fibers (as opposed to yarns or they were highly abraded yarns) interlaced with the twined wefts to create geometric symbols. The symbols were so carefully placed on the large twined shroud, yet the small fuzzy symbols floating on the large canvas could be seen only on close inspection, not from a distance. In a culture that did not have access to bold colorful textiles, these may have been personal messages, precious gifts or amulets for the deceased to carry to the afterlife. These likely represent some of the earliest experiments with dyeing and preparing camelid fibers. Perhaps these camelid fibers were dyed using shellfish purple, a colorant that most Chinchorro surely would have been familiar with since scallops were a common food source of the Chinchorro (as noted in their immense shell middens). Anyone whose job it was to shuck the shells would have ended up with deep purple hands, and it would have been possible to have quickly added a few fibers to a newly opened shell to soak up the yellow reduced form of the dye before it oxidized in the air and turned purple. No blue dyes were available yet to combine with red to make a purple dye so this purple was especially intriguing. Unfortunately, when I returned to look for these purple embroidered symbols, to analyze the dye, they were no longer available. It is likely that their pristine state made them an especially scrumptious meal for webbing clothes moths or other protein loving insects. Remaining are a few sketchy notes made 24 years ago when I first saw them and a vivid memory of something special, significant and intimate relating to mortuary ritual and communications with the afterworld.

What can the shrouds tell us?

In an excavation, the shrouds are the first and most obvious indicator of early burials. They both conceal and reveal simultaneously. They cover and protect the body from the desert sands, and they reveal cultural identity and sometimes provide symbolic messages through the symbols

painted or embroidered on their surfaces. It is exactly this ability to protect and to enshroud that has prevented their receiving the respect and attention they deserve. Chinchorro twined mats are usually removed upon initial discovery in order to get to the body. Due to the excitement, the need to see the bodies, for preventing looting of early sites, and to efficiently move the individuals to the museum, there is a rush to remove the top layer of mats. Many Chinchorro mummies have suffered immediate damage from the shock of excavation, exposure to the sun, the rapidly changing humidity, insects and most of all the handling. Therefore one must know what kind of mummy and in what condition it is in right away. Chinchorro mummies are made up of a variety of organic and inorganic materials and though they were once strong and statue-like they are now extremely fragile with the passing of 3000-9000 years. The mat shrouds are secondary to the mummies in the attention they receive, and in an overwhelming rescue excavation of approximately 100 individuals, as was the case of the rescue of the Morro-1 site, shroud contexts were sometimes lost.

In future studies it is hoped that contexts can be pieced together in order to answer more pointed questions. For instance do twining styles or mat forms change with time, site or mummy styles? And how were children wrapped as compared to adults? Who had embroidered versus painted or plain shrouds? Were children treated differently and did status play a role here since children were obviously revered in a culture that was so affected by arsenic poisoning and spontaneous abortions (Arriaza et al 2006). In addition, where context has been maintained and radiocarbon studies of the individual and the mat have been undertaken, we are led to question whether the mummies were kept potentially above ground for generations before final burial, or the individuals were periodically unearthed, revisited and cared for by replacing mats. Only further study will help us answer these questions. In either case the shrouds show us that veneration for ancestors extended through numerous Chinchorro generations.

As a sedentary hunting and gathering society with subsistence based on marine resources and delta plants, the Chinchorro relied heavily on coastal resources as opposed to those from the altiplano. The shrouds too were basically made from local resources, with the exception of camelid yarn. Wild camelids surely visited the coast. There was evidence from the Acha settlement of concentrated camelid feces that indicated a few live camelids were kept close to the huts. Camelid meat and leather clothing was not apparently a regular or common feature of Chinchorro life. On the other hand, coprolite analyses show the Chinchorro consumed many varieties of plants including Scirpus (Reinhard et al 1995 and Arriaza et al 2008 ms). The camelid embroidery was not profuse and indicates a reserved use of this decorative resource until late in the Chinchorro tradition with the change to completely camelid fiber twined shrouds that are very short-lived.

The shrouds provide our best evidence of the first uses of dye technology in the Andes. The precious dyed purple fibers and the frugal use of dyed red, yellow and brown camelid embroidery yarns likely represent early experiments with textile technology, and early symbolic communications. The judicial use of the dyed camelid yarns could be evidence of limited access as would be the case for dyed yarn that had to be traded for with others outside the coastal valleys. Or it could reflect the limited ability to dye larger quantities of yarn since no ceramics or other large containers for boiling the dye liquor were present. In general the yarns are well-dyed not like some later obviously experimental Quiani dyed fabrics, where the dye has not

penetrated the yarns. So the question remains were the Chinchorro dyeing their own yarns or were they acquiring these as exotic goods from others? Another interesting observation is they did not use the dyed yarns to decorate their bodies, only the mats. The experimental embroidered and painted iconography found on the shrouds probably provided a mode of communication or expression that in some way complimented their other major and more visible artistic media, body and rock paintings.

Archaeologists and textile specialists generally agree that basketry technology preceded the production of cloth, but so far the Chinchorro have not left us with what we consider to be traditional baskets, only the mats. The twined fabrics/mats used to wrap the skeletal remains from the burials at the Morro Site in Arica, Chile are similar to other burial wrappings found at other archaeological sites as well as to ethnographic fabrics collected from cultures along the Pacific coast of North and South America. Most are open work weft twined with a Z twist. The use of a heading band or cord with tension is a precursor to the use of a frame or loom which does not appear within the Chinchorro cultural period, but comes soon after. Contemporaneously in the Old World at the Cayonu site in Turkey (9000 BP) (Wilford 1993), at a cave in Nahal Hemar in Israel (8500 BP) (Barber 2000:7), and at Catal Huyuk in Turkey (8000 BP) (Burnham 1965: 171), small fragments have been found of twisted plant fibers in weft pairs that are interlaced around single warps. Woven textiles on a loom are present at these Middle Eastern sites too but are later in date than the twined archaeological fragments.

If one tries to imagine Chinchorro society, one has to acknowledge the dual nature of matting and cordage, and how vital a resource these organic materials must have been for practical and symbolic uses in the everyday lives of the Chinchorro and those who lived along the pacific coastal regions of the Americas. These materials clothed, decorated the body, sheltered, and provided nets for fishing and gathering marine resources to eat. Within the mummies themselves, cordage replaced human muscles and fragments of mats replaced ligaments, while whole twined mats provided the vehicle and environment for transporting or holding the body for the journey to the after world. Also, they were a mode of communication with their geometric symbols. Their importance then should be reflected in our efforts toward their preservation and study. The case of the Chinchorro shrouds points yet again to the existence of a general tendency towards treating organic materials as too ephemeral for serious analyses, and they are not given the same respect as other archaeological materials. Gentle reform is needed to be sure contexts and proper storage is provided for organic materials. There is no doubt they do require different efforts on their behalf for preservation, but the extra effort can be well rewarded in the information acquired. This paper began with the image of a postmortem amniotic sack made from vegetal fibers, carrying and protecting the Chinchorro, and they have served their purpose well. They are an integral part of the preservation of the mummies, providing ballast or environmental buffering from environmental changes. By removing and casting aside the mats and their protective soils and not replacing them, we have exposed the mummies to unnecessary climate changes in our museums. We have also been too quick to cast aside these canvases of expression with resulting loss of context. This is a plea for more care for these mats and the new Chinchorro storage area under construction at MASMA we hope will be the start of new preservation potentials.

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