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## **Wrap the Dead : The funerary textile tradition from the Osmore Valley, South Peru, and its social-political implications**

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### 3.1 Textile assemblages selected

In this study, textiles are analysed from one site in the middle Osmore valley, Chen Chen, and from three sites in the lower Osmore valley: La Cruz, El Descanso, and Algodonal Ladera. In addition, one textile found at the mouth of the Osmore River (an area called Boca del Río) was analysed since it concerns a unique specimen with features relevant for this study (fig. 1.2). All of these sites were chosen because of their alleged affiliation with the final phases of the Tiwanaku culture. Three of the sites had been excavated on two or more occasions, each focusing on different sectors of the site. When required for clarity, these excavations will be differentiated by adding the year of excavation to the site name: Chen Chen (1988) and (1995), La Cruz (1993) and (1998), and El Descanso (1998) and (1999, first and second period).<sup>[1]</sup> Algodonal Ladera was excavated in 2000, as one sector of the larger site El Algodonal that had been excavated earlier by Owen (1989-1990).

Practically all textile specimens have been excavated in cemetery areas during small-scale rescue excavations in the lower Osmore valley. Only the Chen Chen 1988 and 1995 campaigns were long term and multidisciplinary excavations. All sites have been heavily disturbed by modern looting. As a result, 38.7% of all of the textiles were found out of context and were collected as surface finds ('rescate superficial').

During and in the weeks following each excavation, all cultural material taken from the field was cleaned and separated according to its category. Some of the funeral bundles ('fardo') were unwrapped prior to their storage, in order to improve the conservation of both the human remains and textiles. Only the mummy bundles of La Cruz (1993) were unwrapped some considerable time after the excavation, and then recorded with detailed descriptions and drawings of the unwrapping procedure.<sup>[2]</sup> Finally, the textile specimens were stored within the 'Textil' section in the depositories, subdivided by each site and year, and separated from the human remains. The textiles of the La Cruz site (1993) are

divided between Museo Algarrobal and Centro Mallqui in Ilo.<sup>[3]</sup> The textiles of the sites La Cruz (1998), Algodonal Ladera and El Descanso (1998 and 1999) are stored in Centro Mallqui, the Chen Chen textiles (1988 and 1995) in Museo Contisuyo in Moquegua.<sup>[4]</sup> The above mentioned textile specimens were analysed during three field campaigns, which amounted to a total of 18 weeks, between 1999 and 2002.

All available textiles from the sites La Cruz, El Descanso and Algodonal Ladera have been analysed for this study, be it surface finds, textiles from unwrapped bundles or additional grave gifts. This was done in order to obtain a complete inventory of the textile tradition of each site. However, not all textile specimens analysed in this study originate from comparable contexts: the specimens from Algodonal Ladera and Chen Chen (1988 and 1995) are all derived from tomb context, including both textiles wrapped around the deceased individual as additional textile grave gifts. Textiles from El Descanso (1999 2nd period) and La Cruz (1993) are derived from the unwrapping of mummy bundles, whereas the specimens from El Descanso (1999 1st period) represent only the additional grave goods of a tomb, found outside the mummy bundle. Also present are textile specimens from the dry sieving of the unit excavations ranging from a single yarn to complete fabrics. The textiles from La Cruz (1998) and El Descanso (1998) appear to represent additional grave goods, although contextual data lack to confirm this impression. Algodonal Ladera and Descanso (1998 and 1999), however, had a mixture of these categories: those bundles in poorest condition had already been unwrapped and the textile finds stored separate from the human remains, while well-preserved funeral bundles were stored as a unit in order to keep the cultural remains as intact as possible. All sites except Chen Chen (1988 and 1995) include textile specimens found out of context (surface finds).

The complete textile collection of the Chen Chen 1995 excavation has been analysed, except for most of the

Name site	textiles with context	textiles without context	mummy bundle info	field data	field inventory	final report
Chen Chen 1987-1988	27	0	no	no	yes	yes
Chen Chen 1995	38	0	no	no	yes	yes
La Cruz 1993	117	1	yes	no	no	no
La Cruz 1998	20	72	no	no	no	no
Descanso 1998	23	35	no	no	no	no
Descanso 1999 (1st period)	54	115	no	yes	yes	no
Descanso 1999 (2nd period)	8	2	no	yes	yes	yes
Algodonal 2000	59	17	no	yes	yes	yes
Boca del Río	1	0	no	yes	no	no
<i>Total number textiles</i>	<i>347</i>	<i>242</i>	<i>589</i>			

Table 3.1 Studied textiles and their contextual data

cords and ropes. Of the Chen Chen 1988 excavation, however, a random selection of about 20% of the textile collection had to be made due to time restrictions. As for the lower Osmore sites, all available textile specimens from were analysed. However, as the unwrapping of mummy bundles was not part of this research, those textiles still wrapped around the mummies were excluded from this study. For each of the three sites, more than half of their textiles has been analysed here.

Another complicating factor in this study derives from the fact that although all excavations were carefully recorded in the field, not all excavation records could be located. They proved to be completely missing for the sites of La Cruz (1993 and 1998) and El Descanso (1998).<sup>[5]</sup> Therefore, textiles, even from known tomb contexts, cannot always be related to their contextual data about the type of tomb, human remains and grave goods. Table 3.1 summarizes the analysed textiles and their contextual data.

### 3.2 Textile documentation: Textile Analysis Form

A total of 586 textile specimens have been analysed, according to the standard textile categories outlined by Clark (1993), who based her data on King's instructions (1978) and Emery's descriptive terminology (1980). At Clark's recommendation, this very comprehensive

catalogue has been adopted in its entirety, although some adjustments were made, mainly to synchronise the textile terminology with archaeological textile studies from related regions. These studies have a tendency to confuse, since many of them use their own terminology and classifications, making direct access and comparisons difficult. From those studies, Clark's system was chosen because of its completeness and its geographical and cultural proximity of materials. A generalisation of textile terminology data is prerogative, especially in such a culturally unified sphere such as the South Central Andes. The result is the Textile Analysis Form ('Ficha de Análisis Textil'), on which the textile data were recorded (*Appendix 1*) and the associated Access 2000 and Excel 2000 programme. A summary of the Textile Analysis Form and the textile terminology is given here, in order to make the Osmore textile study more accessible.

In all, seven categories are presented on the form. An eighth category 'Calculated Values' is present in the Access data base only, since it represents computed values that indicate the relative fineness, pliability, and quality of each fabric, all based on the values taken from the 'Fibre' section (see below). The first category 'Association' provides data on the contextual data of each textile specimen, while the second category 'Specimen' contains the administrative information of each individual textile specimen.<sup>[6]</sup> The other categories analyse

specific characteristics of a fabric: the 'Fibre', 'Structure', and 'Design' category each describe the basic characteristics of each textile, working up to the categories 'Form' and 'Function' dealing with the complete appearance of the specimen. However, an introduction of the textile function terminology is required in order to understand the other categories, so that in this chapter 'Function' will be described following 'Association'.

Identifiable garments as well as unidentifiable fragments have been recorded on this form, since one of the objectives of this research is to provide a complete inventory of each site examined. Photographs have been taken of each specimen and its diagnostic details. Only the most fragmented and non-diagnostic specimens were not photographed. Slides have been made of the specially diagnostic specimens. The photography took place outside the laboratory in a shaded area.

All complex structures, (that is, woven and braided fabrics), except for the most fragmentary ones, and some diagnostic plied or replied single elements, have been drawn at a 1:10 scale. For accurate drawing, a wooden frame of one square metre was used, internally subdivided by cotton yarn into units of 10 cm, horizontally as well as vertically. Woven and embroidered designs were drawn in colour at a 1:1 scale.

### 3.3 Textile Analysis Form: Association

All available contextual data on the tombs, the human remains, and grave goods inside the tombs have been gathered under the section 'Association'. Information on the physical remains of the individuals, as well as on the tomb form and grave goods, have been taken from the Centro Mallqui 'Burial Excavation Form' (*Ficha de excavación de entierros*), recorded in the field for each excavated tomb. Information on grave goods was taken from the Centro Mallqui 'Inventory' (*Inventario*), registering all specimens collected in the field, and from the Centro Mallqui 'List of Boxes' (*Relación de Cajas*), listing all specimens according to categories (textiles, ceramics, botanical remains, etc). Some additional information was found in the *'Informe final'*, a final report written after the completion of the excavation and storage. All lists of inventories are stored in either Museo Algarrobal in Ilo or Centro Mallqui in Ilo and Lima. In some cases, the field reports or final report designated a cultural affilia-

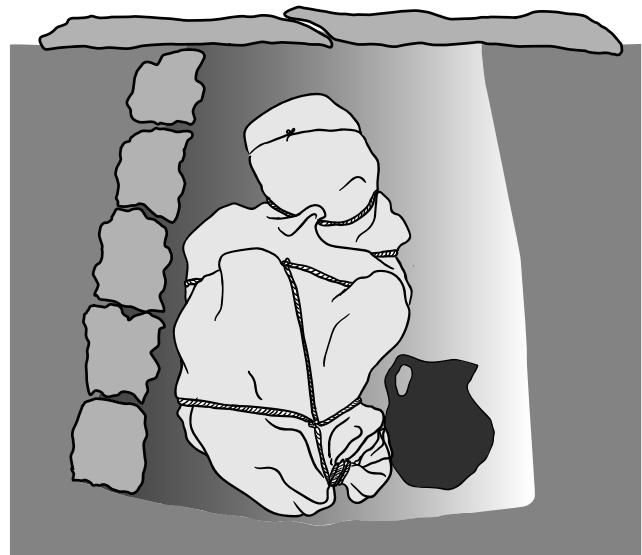


Fig. 3.1 Typical cylindrical tomb from Osmore valley, stone-lined

tion to the tomb and/or to its contents, although this assignment was not always clear.

#### 3.3.1 TOMB

Each tomb was designated a number during the excavation. This number and, if present, the tomb's unit numbers and North and East coordinates, are recorded. Maps with the locations of the tombs have been found for the sites Chen Chen (1995) and El Descanso (1999) only. Each tomb was identified as being intact or disturbed, and its type, diameter and depth were noted. The tomb types can roughly be divided into: urn with infant's body buried inside shallow pit; shallow and unelaborated pit; subterranean cylindrical tomb; and subterranean rectangular tomb (see Chapter 10). A cylindrical tomb was often (partially) lined with angular field stones set in one or more rows and narrowed to the opening. The floor was always formed by compacted earth. Intact tombs normally had their mouth sealed off with large stone slabs. Most tombs had been covered by a layer of sand and not marked, while other tombs appear to have been marked with a stick reaching into the tomb (fig. 3.1).

On the Textile Analysis Form, the diameter and depth of each tomb were recorded. If known, the presence of associated structures was included in the data base: a tomb could be located in a separate cemetery area; in a domestic area; or in a refuse midden.

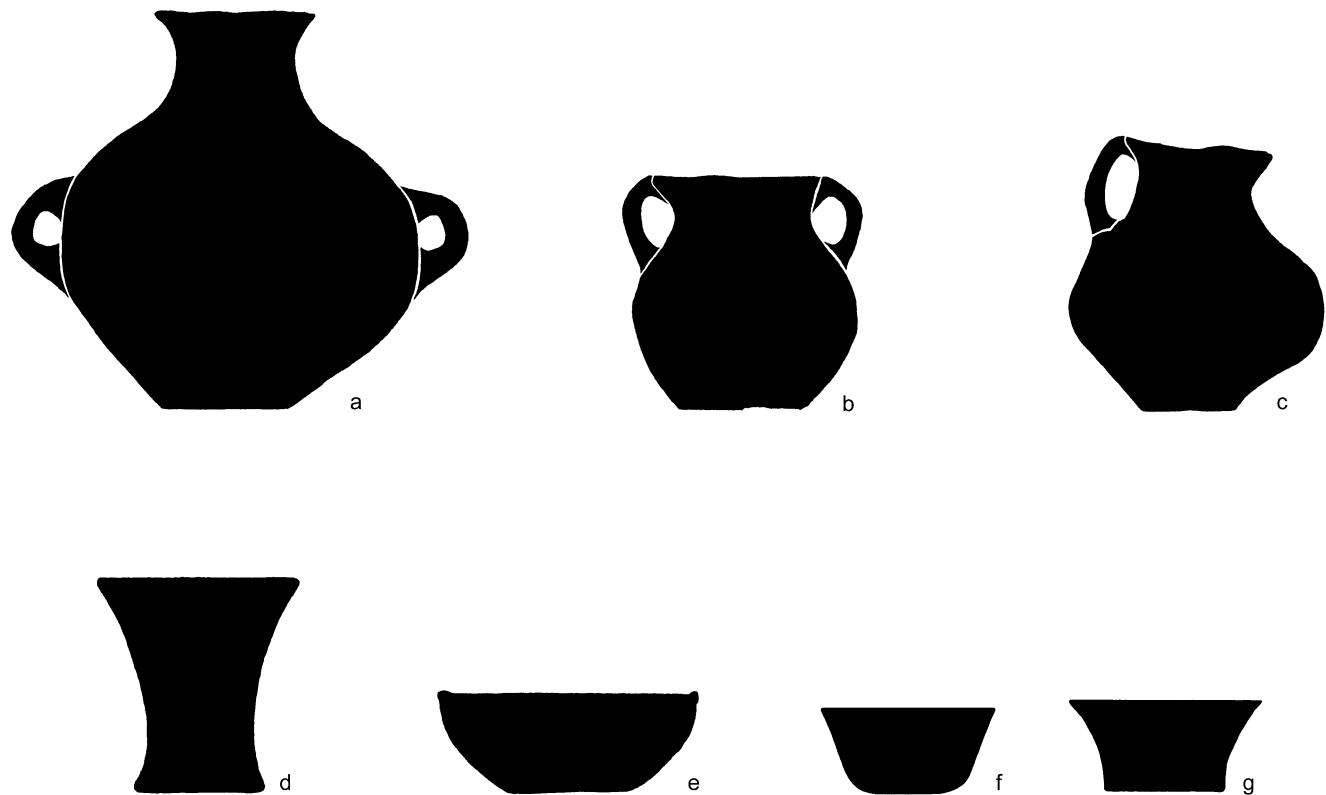


Fig. 3.2 General appearance of Osmore's ceramic forms: cántaro (a), olla (b), jarra (c), kero (d), cuenco (e), vaso (f), and tazón (g) (after Burkholder 2001, 219 and Clark 1993, 340)

### 3.3.2 TOMB OFFERINGS

Offerings were placed inside the tombs or within the urns. They would be placed at the sides and feet and/or on top of the interred individual, to accompany the individual in his or her final resting place. Some tombs appear to have offerings placed on top of the sealed tomb. All associated objects mentioned in the field notes and in the general specimen inventory were recorded on the Form.

Non-textile objects were recorded in the category of “Associated Objects” (Table 3.2; see Appendix 2). Botanical and faunal remains have been subdivided by species. A distinction was made between an unworked item and an artefact. Ceramics were subdivided into functional forms (fig. 3.2).

In the category “Associated Textiles”, all textile specimens from a tomb context as recorded in the field notes were listed. This list may include specimens that were not stored in the boxes in the textile depository, and therefore have not been analysed in this study.

### 3.3.3 HUMAN REMAINS

The orientation, posture of the individual and the presence of multiple interments inside one tomb were noted, together with the degree of natural mummification and disturbance of the tomb and funeral bundles.<sup>[7]</sup> The human remains of El Descanso (1998) have been superficially examined by Rosalía Choque, while the human remains of La Cruz (1993) were only superficially examined by non-specialists during the unwrapping of the funeral bundles. The human remains of all other excavations have not yet been examined, although sometimes indication about age or sex were noted in the field records.

#### Sex

The sex would be categorized as male, female, or undetermined. The determination appears to have been made on skeletal data and in some cases on mummified genitalia or breasts. No determinations based on X-rays were mentioned in the available records.

Botanical remains	Botanical artefacts	Faunal remains	Faunal artefacts	Ceramics	Other
Ají (pepper)	Aguja (needle)	Camélido, pata (camelid foot)	Chanque (shell species, spoon)	Cántaro (large jar)	Coprolito (coprolite)
Algodón (cotton)	Alfiler (pin)	Camélido, cabeza (camelid head)	Chorro (mussel valve as spoon)	Cuenco (bowl)	Lítico (lithic)
Cacto (cactus)	Antara (panpipes)	Camélido, piel (camelid fleece)	Cuenta crisocola (shell bead)	Jarra (pitcher)	Metales (metal item)
Calabaza (gourd)	Balsa (raft)	Camélido, lana cruda (raw fibre)	Porta hilo (yarn spool of digit)	Kero (tall, flaring cup)	Ocre (Ochre)
Camote (vegetable)	Bastón (staff)	Cuy (entero) (entire guinea pig)	Wichuña (bone pick for weaving)	Olla (pot)	Ofrenda externa
Carbón (charcoal)	Caja (box)	Cuy, pata con hilo (paw with yarn)			Tiesto (sherds, not diagnostic)
Coca (coca leaves)	Calabaza (container)	Huesos de animal (animal bones)			Vaso/Tazón (cup)
Frijol (beans)	Caña (reed matting)	Huesos de pescado (fish bones)			Urna (urn made of olla)
Guayaba (fruit)	Cuchara (wooden spoon)	Huesos humanos (human bones)			
Junquillo/Junco (reed)	Peine (comb of cactus needles)	Perro, pelo/piel (dog hair a/o pelt)			
Lúcuma (fruit)	Trompo (bottle stopper)	Pluma (feather)			
Maíz (maize)	Undetermined artefact				
Molle (vegetable)					
Pacae (fruit)					
Totora (reed)					
Yuca (vegetable)					
Unidentified botanic remains					
Unidentified wood					

Table 3.2 Associated objects; artefacts and other items found in funeral context.

### Age

The age indication was copied from the records. Some records would use broad descriptions such as adult ('adulto'), child ('niño'), etc., whereas other records listed the age in ranges of several years, or gave no information on age at all. In the data base, the ages have been subdivided into general age categories, being: 'infant <2; year; child 3-11 years; adolescent 12-18 years; adult 19-45 years; senior 46>'. Two years is more or less the age that Andean toddlers are acknowledged into the social world by having their hair cut in a ritual called 'rutuchikuy'. This indigenous ritual is so important that it survived up to present, together with the Christian baptism. The category 'adolescent' refers to 'young adults' rather than to older children, as the individuals of 12 years and older of the related archaeological population of Azapa were found to wear adult style clothing. According to Cassman (1997, 78), it appears that these young individuals were considered to be adults by their contemporaries in some if not all aspects. She finds confirmation of such ideas in ethno-historic sources, such as in Cobo's account of the Capac Raymi festival in Inca times, during which Inca nobility boys and girls were given new cloths and a permanent name around the age of twelve to fifteen (Cobo 1990 [1653], 126).

### Pathology

Evidence of caries, broken bones, abscess, anemia, tuberculosis, osteoporosis, arthritis or malnutrition was recorded. However, many bodies have been examined by non-specialists during the unwrapping of the mummy bundle. This information therefore is not expected to be complete.

### Body decoration and hair style

Some of the better conserved human remains had their soft tissues and hair still intact. This allows the identification of body decoration, such as ear piercings, tattoos, body paint and hairstyles. Hairstyle is distinguished into short and long hair, with loose hair for both categories. The long hair category had additional options for: two simple (3-strand) braids; multiple (3-strand) braids; multiple 3-strand braids interworked into one or more braids; multiple 3-strand braids bound together; and oblique interlaced braids with one flat multiple (more than 3-strand) braid ('*tipo paño*', according to Arriaza *et al.* 1986).

### Cranial deformation

Cranial deformation is a permanent form of body modification and was generally applied in the Andean region. Artificial deformation of the cranium is effected during the earliest infancy when the fontanelles are closing. Deformed crania were desirable as a means of life long expression of group membership at regional, community, and/or lineage level, that permanently set one group of people apart from their neighbours. In particular the leaders prided themselves in a manipulated head shape (Hoshower *et al.* 1995, 146). The process and appearance of such deformation was witnessed by the early Spanish chroniclers. For example, Cobo describes the extremely elongated annular cranial form of the Aymara speaking Colla people from the Titicaca Basin, who accentuated their head shape even further by wearing a narrow wool hat. He also mentions the prominent role that the completion of the head deformation played in their society: according to the indigenous people, deformation was a healthy practice and would give the individual more esteem and prestigious tasks (Cobo 1964 [1653], 245-246).<sup>[8]</sup> Diez de San Miguel accounts of the annular cranial deformation practised by the Lupaqa of the Titicaca Basin, and mentions that the procedure was not devoid of dangers, as many children died, or suffered from deafness or visual problems due to the tight wrapping of the cranium (Morales 1917, 237; Hoshower *et al.* 1995, 147-8).<sup>[9]</sup>

A large percentage of modified skulls have been found in the Andean archaeological context, including the Osmore drainage. On the Centro Mallqui forms, only general categories of deformation are mentioned: the broad 'fronto-occipital' form and annular or 'tubular' form (fig. 3.3). The fronto-occipital deformation was known as '*palta uma*' in Quechua (González Holguín 1952 [1608]). It resulted in a flat-head shape by pressure exerted on the forehead by a board or pad, while the occipital (back) region is flattened by the counter-pressure of a similar board or a cradle to which the frontal pad is attached. The result is compensatory lateral growth. The annular/tubular deformation was known as '*caytu uma*' in Quechua and resulted from bandaging the head, causing a round, elongated, conical shape and a compensatory growth limited to the dorso-vertical direction (Tacoma 1991, 45-46).<sup>[10]</sup>

## 3.4

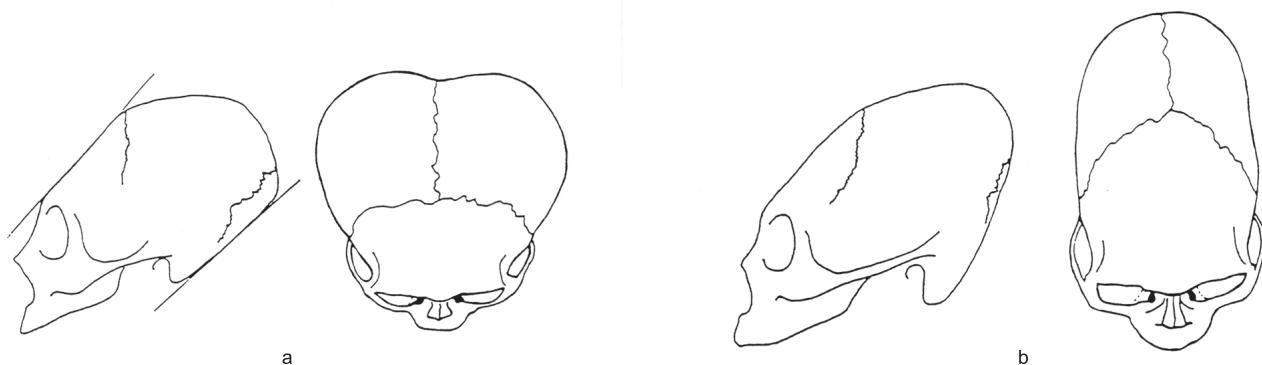


Fig. 3.3 Head deformation: broad or 'fronto-occipital' form (a), and annular or 'tubular' form (b) (Lozada 1998, 139, 141)

### Textil Analysis Form: Specimen

The data from the identification label of each textile specimen are given under the heading of 'Specimen'. This section includes administrative information such as name and date of excavation, the unique local inventory number of each specimen, the tomb number, and when given, the North and East coordinates of the location of the specimen. Surface finds are recorded '*rescate superficial*', abbreviated as 'r/s'. The name of the depository and number of storage box was noted, as well as the numbers of the photographs, slides and drawings. The administrative number of the human remains was added from the inventory list. If known, the placement of each textile specimen on the individual's body or inside the tomb was recorded. If unambiguous, the cultural affiliation of the textiles was added.

If a textile specimen proved to contain fragments of more than one original fabric, each separate specimen was identified by adding two digits to the original specimen number. For instance, specimen 056 of El Descanso (1999) in fact consists of two fabrics: 056.01 and 056.02. Vice versa, when two separately stored textile fragments (usually surface finds) were found to be part of one original, the fragments were described on a single Textile Analysis Form to prevent double counting of the specimen. After analysis, these matching fragments were stored in one bag, but remained separately wrapped with their original specimen number.

When the textile data were processed into the Access data system, the author's identifying code was added to the specimen data. This code comprises five numbers, the first two indicating the year of textile analysis, the

latter three numbers indicating each individual textile specimen, dependent on the arbitrary sequence of processing. For instance, #00052 is specimen 052 analysed in the year 2000, whereas #99327 is textile 327 analysed in 1999.

### 3.5 Textile Analysis Form: Function

The primary and/or secondary function of each textile specimen is identified in this section. Due to the often excellent conservation of organic material of the four sites of the Osmore valley and the contextual data of a textile specimen, the function of the majority (74.8%) of the textile specimens could be identified. This percentage is even higher when leaving out the fragmented specimens derived from the dry sieving of El Descanso (1999): 80.0% (see *Chapter 8*). When the function of a specimen is not obvious, its association may identify its original use(s): a specimen may have been worn by the deceased in the way as he would have in daily life (for instance, a camisa or taparrabo), or it may have served to hold certain objects (bolsas, pañuelos), or it may have been placed in the tomb for specific ritual purposes (such as a pañuelo covering the face). Unfortunately, many authors use different names to identify a similar functional type of textile, making a comparison of Andean garments and accessories complicated. Following Clark's advise (1993, 195), the common Spanish names used for Andean textiles are applied in this study, despite the fact that many Quechua and Aymara terms for textiles and their production methods are still in use by the modern

population of the Andean region, and many more terms have been recorded by Spanish chroniclers for both these and other native languages (*Table 3.3*).<sup>[11]</sup> However, Quechua certainly was not, and Aymara highly unlikely, the language spoken by the inhabitants of the lower and middle Osmore valley, although the latter language and the highland language Pukina were spoken in the higher reaches of the Osmore valley in Inca and colonial times.

Therefore, the choice of terminology of any of these languages would be arbitrary. A comparative list of terminology for the functional textile names is represented in *Appendix 3* in order to make cross-referencing of the various textile terms in Spanish, English, Quechua, and Aymara possible. Here, it suffices to list the textile types identified in the archaeological record.

Nonetheless, the woven bags have been named after the modern bags costal, talega and ch'uspa from the southern Andean highlands, in order to make a better categorization. In addition, two bag types only known from archaeological context, bolsa faja and miniature bags, have been added to the variety of woven bags.

#### 3.5.1 WEAR AND REPAIR

The type and location of wear and repair often indicate how a specimen had been used. Wear evidence was subdivided by their extent of wear damage, that is, either apparently unworn; moderate (yarns are felted from friction or distorted from stress); heavy (some yarns are broken); to extreme wear (some elements are missing entirely and others hanging loose). The location of such wear is determined for more or less complete specimens. Camisas, for instance, may show wear at the base of the neck and the arm openings, due to the stress on these openings, while the bottom may be frayed and the shoulders bulging in a rounded form.

Specimens with heavy wear were often repaired, sometimes demonstrating several kinds and sequential stages of repair. Possible repair techniques are: knotting of loose elements; darning in warp and/or weft direction; patching; re-seaming; selvage repair; and all their combinations. The locations of repair work in the garment were recorded similar to those of the wear locations.

Some specimens were modified to serve a secondary function. Usually the re-used textiles had been cut out of adult-sized camisas and reworked into child-size camisas

or ponchos, but more often into various sizes of cloth (paños) that appear to have been used as nappies and wrappings for infants.

#### 3.5.2 SIZE

Finally, in case of the camisa, the size was estimated to be that of an adult; adolescent; child; or unknown if too fragmented. The existence of various sizes of camisas indicates that these garments were actually manufactured to fit a particular person, presumably the owner. The distinction between an adult and adolescent was rather arbitrarily chosen to be 77 cm in both warp and weft direction, based on the contextual data of the individuals with whom these camisas had been entombed.

### 3.6 Textile Analysis Form: Fibre

Natural fibres may be of animal, plant, or mineral origin (Emery 1980, 4-5, 8-14).<sup>[12]</sup> The fibre data were collected for each type of element, be it a single element (yarn or rope); or one set of elements (braided structures); or two sets of elements (warp and weft in woven specimens). The type of fibre was identified with the naked eye. Only if there was doubt about the nature of the fibre, such as between camelid wool and cotton, a tiny sample of fibres was identified by burning.

#### 3.6.1 CAMELID WOOL

Camelid fibres may originate from the domesticated alpaca (*Lama pacos*) or llama (*Lama glama*), or from the wild guanaco (*Lama guanicoe*) or vicuña (*Lama vicugna*). No attempt has been made here to identify these subspecies, since earlier research has failed to distinguish crude alpaca hair from fine llama hair, or crude vicuña fibres from fine alpaca fibres.<sup>[13]</sup> Camelids are thought to have been kept in the lower Osmore valley, since large amounts of camelid remains have been found in the habitation areas, even if such low altitude and warm climate are not optimal conditions for these highlands animals (Owen 1993, 163-164).<sup>[14]</sup>

#### 3.6.2 VEGETABLE FIBRES

Vegetable fibres, including cotton, were only used in limited amounts in this southern coastal region, despite the fact that they were locally available. No attempt has been made to identify the precise source of the vegetable

**Simple construct (raw fibre or single element structures)**

<i>fibra cruda</i>	raw fibre, unprocessed or processed
<i>bolita</i>	small, rounded wad of raw fibre
<i>almohadilla</i>	large pad of raw fibre
<i>hilo</i>	isolated plied or replied yarn with diameter < 1 mm
<i>cuerda</i>	isolated plied or replied cord with diameter 1 and 7.9 mm
<i>soga</i>	isolated plied or replied rope with diameter 8> mm
<i>turbanete</i>	turban of bundles of yarn
<i>gorro simple</i>	hat made by knotted looping structure
<i>malla</i>	net bag made by looping or knotted looping structure
<i>palito de tocado</i>	± 5 cm long, thin stick with yarn wrapped around one end, sometimes holding feather
<i>hilo de tocado</i>	yarn wrapped around the head of bundled individual, either single or holding palitos de tocado
<i>portahilo</i>	object used to wind dyed yarn for embroidery purposes
<i>bolitas envueltas por hilo</i>	small balls with dyed yarn wrapped around, too small to be portahilo
<i>ramitas envueltas por hilo</i>	bunch of short twigs tied with yarn
<i>hilo amarrando trenzas</i>	yarn that fastens the ends of human braids
<i>hilo de sandalia</i>	yarn that is integral part of sandals

**Complex (interworked, multi-element construct)**

<i>tela</i>	cloth fragment
<i>cinta</i>	narrow belt with width smaller than 29 mm
<i>banda</i>	wide belt with width larger than 30 mm
<i>honda</i>	sling
<i>pañó</i>	cloth, often secondary use; probably used as nappy
<i>pañuelo</i>	small cloth used to cover head, to carry dried food, or in rituals, often highly decorated
<i>taparrabo</i>	shaped breech cloth
<i>manta</i>	mantle or small blanket
<i>camisa</i>	tunic / shirt
<i>poncho</i>	poncho, tunic with lateral sides left open
<i>bolsa</i>	bag, subdivided according to size into:
<i>ch'uspa</i>	small and highly decorated bag usually containing coca leaves
<i>talega</i>	medium-sized bag with modest striping used to carry food or seeds
<i>costal</i>	large bag used for storage and transport in llama caravans (100 x 50 cm), modest striping in natural colours like the talega
<i>bolsa faja</i>	rectangular belt-bag with one opening in its long side, for coca leaves
<i>bolsa miniatura</i>	bag smaller than 7 cm to a side, may contain coca leaves
<i>atado</i>	secondary use of cloth tied up into bundle to hold objects
<i>ofrenda externa</i>	external textile offering, placed on top of tomb
<i>sin determinación</i>	undetermined textile

Table 3.3 Textiles: functional types in Spanish terminology and their English translations

fibre. Probably the local totora reed (*Typha angustifolia*, 8 mm diameter) and junco reed (*Scirpus* sp., 2.5 mm diameter) and cactus fibres have been used and basically processed into cords, ropes and basketry.<sup>[15]</sup> Cotton (*Gossypium barbadense*) is a seed hair that was sparingly used, in contrast to the cultures of the central and northern coast of Peru, where cotton is the main source of fibre for textile production.<sup>[16]</sup>

### 3.6.3 COLOURS AND DYES

The colours of the fibres are determined with the aid of a colour chart composed for this study. Dyes can be made from vegetable, faunal or mineral components. Some dyestuffs may have been obtained locally, while others may have been imported from other regions, possibly in the form of dyed yarns.<sup>[17]</sup> Mordents, such as aluminium metallic salts, natural iron ('*barro negro*'), iron or copper sulphate, or fermented urine, are indispensable in the dyeing process as they allow dye stuffs to penetrate the fibre and thus create a permanent change of colour.

The variety of natural camelid wool hues is based on fibre samples from a herders community and from markets in the region, as well as on samples of all available natural colours found in the archaeological textile collection of the Osmore valley.<sup>[18]</sup> The natural camelid fibres range from off-white, grey to black, and from beige to very dark brown. In all, fifteen natural colours for wool and cotton fibres were found among the collected archaeological specimens. Indigenous cotton not only yields a natural white to off-white colour, but also a light, rusty and dark brown and even lilac-tinted grey. This range of colours is caused by photosynthesis at the moment the seed case opens (Lugtighed 1988, 59-60). The colours of the dyed yarns are based on fibre samples taken from broken archaeological specimens. Most dyed fibres still retain their brilliant colours, despite the centuries that have past. In total, 36 dyed colours were identified, including various hues of orange, red, pink, purple, blue, green, grey and black. However, various colour hues, especially the reds, can be found within one specimen. Such colour variation may be the result of inconsistent dyeing, of using different mordents or various shades of natural fibres as ground colour.<sup>[19]</sup> In addition, the original colour may have faded differentially, while other dyed fibres have degraded up to a point that determination of the colour is no longer possible. The degradation of fibres may be

the result of exposure to the sunlight and salty sea winds, and in case of the lower Osmore valley, of exposure to the contaminated fumes of the copper smelter some 15 kilometres to the north of Ilo. Degradation may also be caused by oxidation inside the tomb, which renders the textiles brittle and turns them dark brown (the so-called 'carbonization').<sup>[20]</sup> In all these cases, the best preserved colour was considered as the original colour. Each of the 51 colours was given a preliminary identifying number. In a later stage, these colour samples were identified with the aid of the extended Munsell Chart, to make the precise nature of the colours accessible to any researcher (Appendix 4).<sup>[21]</sup> However, in the text, the more accessible preliminary numbers will be used. They are indicated between brackets and apostrophes, for instance ('11').

### 3.6.4 YARN PRODUCTION

The yarn production was recorded in terms of the spin and ply directions, the number of yarns plied together, the degree of ply (ply angle), and the diameter. Single elements and one set of elements-structures only had one element measured, while two element structures had both warp and weft elements measured.

Fibres are spun by drawing and twisting together fibres of limited length in a continuous yarn. Two or more spun single yarns may then be twisted together to form a plied yarn (see Chapter 4).<sup>[22]</sup> The majority of the yarns of this study are spun in a 'Z' (clockwise) direction and then plied with two yarns together in a 'S' (anti-clockwise) direction (fig. 3.4a), although few yarns are spun 'S' and plied 'Z' (fig. 3.4b). Such two-plied yarn is recorded as 2\|. Cords, ropes and heading cords were often plied: if a two-ply yarn 2\| is plied with two yarns, this procedure reverses the ply direction back to a Z twist, coded as 2\|2/ (fig. 3.4c).

The degree of ply is recorded by measuring the angle that the slant of the twist makes with the vertical axis of the yarn. These numerical outcomes were then grouped into one of four categories as suggested by Emery (1980, 11-12): loose twist (0-10°); medium (10-25°); tight (26-45°); very tight (46° and more) (fig. 3.5).

Warp and weft diameter is measured on two different locations, by magnifying intact yarn fragments under a polarizing light microscope with 100x magnification. The average of two diameters is used for further computations (see below).

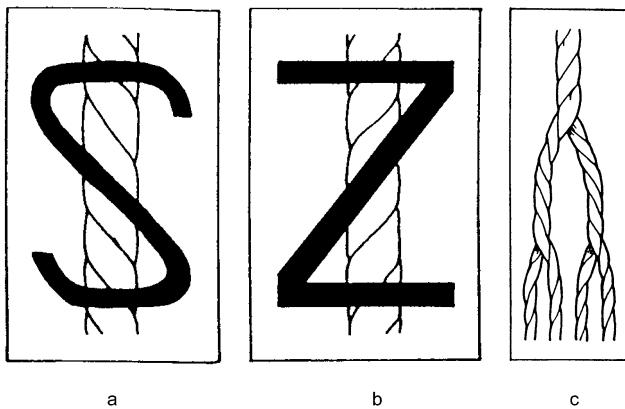


Fig. 3.4 'Z' spun and 'S' plied yarn /2\ (a), 'S' spun and 'Z' plied yarn \2/ (b), replied yarn in 'Z' twist /2\2/ (c) (Clark 1993, 292)

For woven specimens, the warp and weft count are recorded, that is, number of warps and wefts per centimetre, respectively. Only the number of warps lifted by a single weft insertion (so called 'ground warps') are counted, not the underlying counterpart. Since wear of garments may affect the yarn density, the number of warps and wefts are counted in at least three different areas of the textile that appear to be most intact. Usually the central parts are most vulnerable to distortion, whereas the fabric near the selvages remain more or less intact. An average of these measured warp and weft densities will smooth over intentional or inadvertent variation, and is used for further computation.

Finally, the total length and width of each fabric is recorded under this section, since this information was directly related to the total length of the warp and weft elements. It is recorded whether the measurement represented a complete or an incomplete size of the fabric.

### 3.7 Textile Analysis Form: Structure

Fabric structures are recorded using terms that have been standardised by Emery (1980) and Rowe (1977) and grouped for computer codification by Clark (1993). The structure is the most basic analytical unit concerning the characterization textile tradition.<sup>[23]</sup> Certain textile structures, especially in combination

with the characteristics of the yarn production and the finishing of a fabric, may be characteristic for the production of garments of a region in a particular time period, and as such, may define cultural spheres. Though designs and forms may be copied from an imported fabric, the underlying structure is harder to duplicate without instructions. When used by the majority of the population on a daily basis, such a set of structures is considered basic to the local textile tradition. Comparison of such a unit of structural characteristics with textile traditions from other areas, will contribute to our knowledge of migration and diffusion (Clark 1993, 130–132; King 1965, 356). The textiles of the Osmore valley, and in fact of the whole South Central Andean region, show an overwhelming preference for /2\ plied yarn woven into warp-faced textiles, using a single warp and weft yarn (1/1).

On the Textile Analysis Form, the section 'Structure' is subdivided into three broad categories: 'main structure'; 'secondary structure'; and 'final structure'. The structural terms for each of the three categories have been taken from Clark's 'Master Catalog' (Clark 1993, 1389–1406).

#### 3.7.1 MAIN STRUCTURES

The main structures are classified in five categories:

##### *No structure*

A textile artefact without structure is, for instance, a wad of raw wool or cotton fibre.

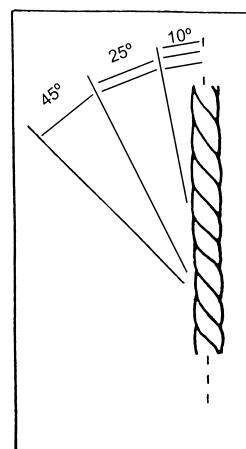


Fig. 3.5 Degree of ply (after Clark 1993, 293)

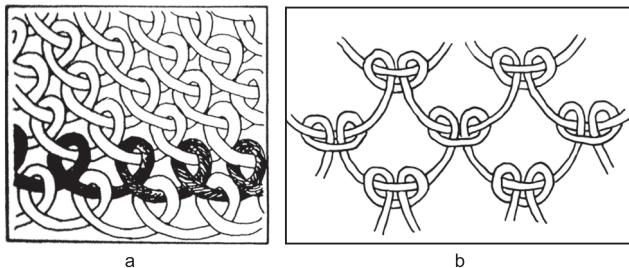


Fig. 3.6 Single element-structure: looping (a) (Clark 1993, 206); single element-structure: knotted looping with alternating faced knots (b) (after Rowe 1996, 408)

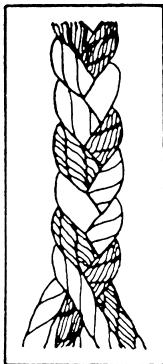


Fig. 3.7 Oblique interlacing: 5-strand braiding (Clark 1993, 255)

#### *Single element-structures*

A single element-structure can be as limited as a spun, plied or replied element, such as a yarn, cord or rope, or can be built up by the repeated interworking of a single continuous element with itself, known as looping (fig. 3.6a). A single element may be looped spirally to form a tube-shape, or looped back and forth in the same plane to produce a fabric with selvages (Emery 1980, 30). The looped structure may include knots worked open into a net, or worked close into a hat. If worked in the round, the knotted loops will usually be single faced, meaning that all knots face the same direction. When the knotted looping is worked back and forth in a fabric with selvages, the result will have alternating faced knots (fig. 3.6b).

#### *One set of elements-structures*

One-set-of-elements-structures usually have all elements coming out from a common starting point. From there, the individual elements interwork diagonally from side

to side, so that the course of the elements is oblique to the edge of the fabric, instead of perpendicular as in woven structures. Its simplest manifestation is the three-strand braid, the so-called 'oblique interlacing' structure. Elaborations are created by increasing the number of elements ('strands') employed in a round or flat braid (Emery 1980, 60-62) (fig. 3.7).

#### *Two sets of elements-structures*

Two-sets-of-elements-structures have a set of parallel, longitudinal elements called warps interworked with another set of parallel elements, called wefts, that cross the warp elements at more or less right angles. The warps are put on the weaving loom before the actual weaving process can start. To withstand the tension and abrasion on the loom, they must be firmly plied. The unique Andean tradition of warping and weaving is explained below.

Warp and weft elements may 'interact' (a process called twining, see Secondary structures), or 'interlace', generally referred to as 'weaving'. This latter category is immensely varied, as additional sets of elements may differ either directionally or functionally from the basic sets. The latter weaves are called 'compound weaves', whereas the basic one warp/one weft structures are referred to as 'simple weaves' (Emery 1980, 27, 74).

- a. The simplest possible interlacing structure is the 'plain weave', in which each weft passes alternatively over-one and under-one each successive warp, reversing the over-under order from one weft passage to the next. This plain weave is 'balanced' (also called 'tabby' and 'linen') if the warp and weft elements are equally spaced and approximately equal in size and flexibility (fig. 3.8a).
- b. Variation of structure can be effected when the warps are numerous and compact enough to completely conceal the weft, called 'warp-faced plain weave' (fig. 3.8b). In the Osmore valley, this weaving structure formed the great majority of the fabrics.
- c. If the relationship between warp and weft is reversed so that the warps are completely covered by more numerous and more densely spaced weft elements, the fabric is called 'weft-faced plain weave' (fig. 3.8c) (Emery 1980, 75-77).<sup>[24]</sup>

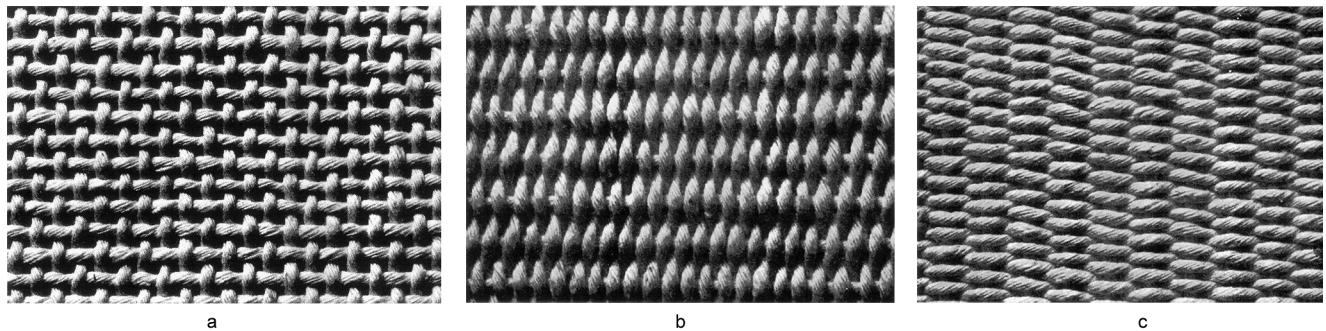


Fig. 3.8 Interlacing structure: balanced plain weave (a); interlacing structure: warp-faced plain weave (b); interlacing structure: weft-faced plain weave (c) (Emery 1980, 76)

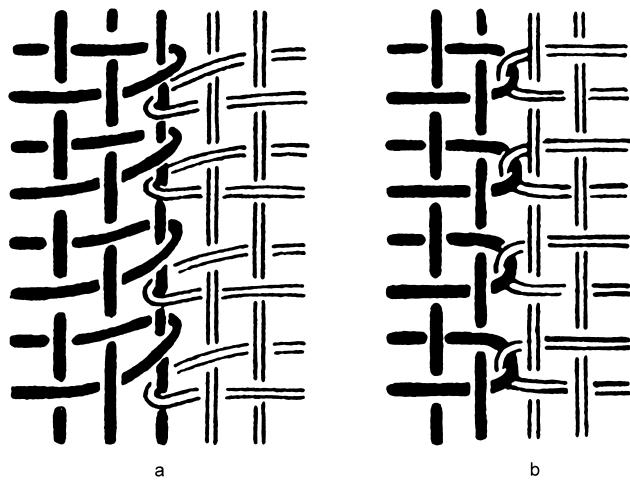


Fig. 3.9 Interlacing structure: weft-faced plain weave with dovetailing elements (a) and with interlocking elements (b) (d'Harcourt 1987, 18)

### 3.7.2 SECONDARY STRUCTURES

Among the textile collections of the middle and lower Osmore valley, secondary structures have mostly been applied to decorate the primary textile structure, rather than to shape it. Since most fabrics are warp-patterned, the secondary structures are formed by complementary and supplementary sets of warp elements, either continuous or discontinuous.<sup>[25]</sup> That implies that the prevalent decoration of woven fabrics are warp stripes, determined while warping the loom.

#### *Discontinuous warps*

Discontinuous warps, that are neither supplementary nor complementary, have been applied in camisas only

to change the colour of the outer two stripes at the shoulder line.<sup>[26]</sup>

#### *Discontinuous wefts*

In warp-patterned camisas, discontinuous wefts are applied to create the neck split in a single web camisa. The weft is returned at the middle of the fabric until the required length of the split is obtained. In weft-faced plain weave structures like tapestry weaves, discontinuous wefts create areas of solid colours.<sup>[27]</sup> The discontinuous wefts of adjacent colour areas may dovetail around a shared warp element (fig. 3.9a) or interlock between two warp elements (fig. 3.9b) (Emery 1980, 80, fig 96).<sup>[28]</sup>

#### *Supplementary elements*

A supplementary warp or weft element can be added at will as the weaving progresses. They are continuous if they span the full width of the fabric, reaching from selvege to selvege, or discontinuous if they are inserted inside the fabric without reaching the selvages (Emery 1980, 140-1; Rowe 1977, 34).

In warp-faced fabrics, a supplementary set of warp elements in contrasting colour may be incorporated to add textural variation for decorative purposes. If contrasting colours are used for the supplementary warp elements, a design of floating warps is created on one face only (fig. 3.10a).<sup>[29]</sup>

In addition, supplementary discontinuous warps are the main method to shape a warp-faced fabric directly on the loom without needing to cut it to the desired shape, for instance in trapezoidal or hour glass shape. In the Osmore valley, this technique has been frequently used

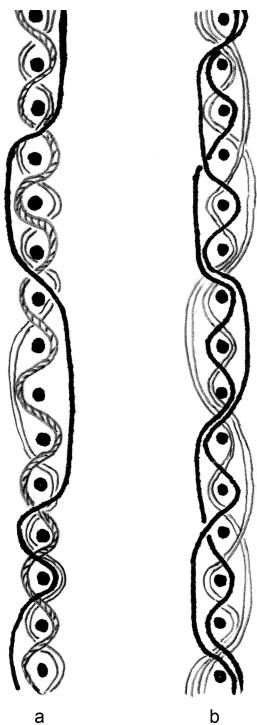


Fig. 3.10 (a) Supplementary set of warp elements; (b) Complementary set of warp elements



Fig. 3.11 Floating warp elements derived from plain weave

by the Chiribaya people to widen a camisa at the shoulders. Several techniques of inserting discontinuous warps may be used (see Fig. 8.14). The mode of manufacture of such trapezoidal shaped camisas is explained in Chapter 4.

#### *Complementary warp elements*

In warp-faced plain weaves, patterned designs are most often achieved by two sets of continuous, complementary warps (fig. 3.10b). Two sets of contrasting warp yarns interlace with a single set of weft elements in reciprocal manner. There is no 'ground weave' as in fabrics with supplementary warps, but two sets of warp elements that co-equal in the fabric, so that both faces of the fabric show the same pattern in opposite colour combinations (Emery 1980, 150; Rowe 1977, 67).<sup>[30]</sup>

#### *Floating warp elements derived from plain weave*

Warping the loom with one set of warps in two colours results in a different colour for the even and uneven warps, allowing simple angular designs without the need of an extra set of elements (fig. 3.11).

#### *Twill weave*

Twill weave is a plain-weave derived float weave characterized by regular diagonal alignment of its warp and weft floats. Adjacent wefts never float over or under the same group of warps, and for each successive passage of the weft, the warp grouping is stepped one warp beyond the previous grouping (fig. 3.12).

#### *Twining*

Twining is an interacting structure in which two sets of elements, warp and weft, are required.<sup>[31]</sup> Most common is a two-strand twining in which two weft yarns are turned around each other between every successive warp unit that they enclose by finger manipulation, instead of being pulled through the warp shed in one movement. The warps are usually grouped, rather than twined around separately. The direction in which the twining of the pair of weft elements takes place, may result in a S or Z twist, and is identical on both faces. However, the weft-twining can be countered by changing the twist in each successive twining row, resulting in a S twisted row alternated by Z twisted row (fig. 3.13).

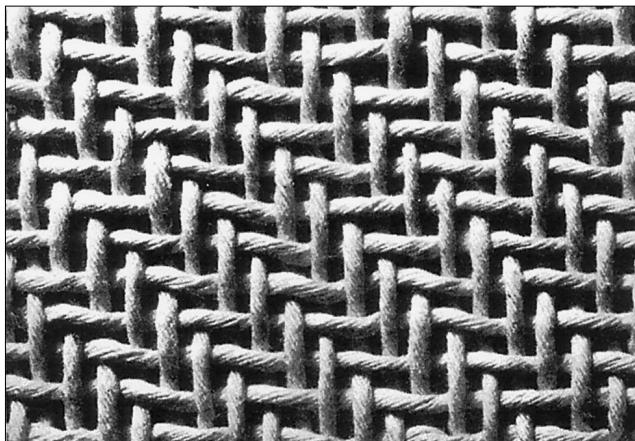


Fig. 3.12 Interlacing structure: twill weave, warp-faced (Emery 1980, 93)

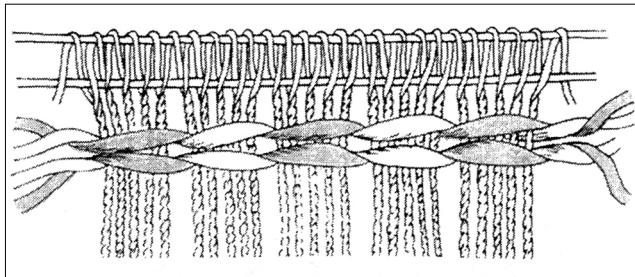


Fig. 3.13 Interacting structure: weft-twining (Brugnoli *et al.* 1998, 77)

### 3.7.3 FINAL CONSTRUCTION

Most of the accessory structures were undoubtedly developed from such practical necessities as finishing raw edges of fabrics to prevent fraying or repairing damaged parts of a fabric. However, the decorative possibilities are at times so highly developed that the original need for the work is lost sight of (Emery 1980, 233). The various possibilities of final construction are:

#### *Selvage treatment*

- overcast ('whipping') stitch: simple or solid (fig. 3.14a)
- blanket (= buttonhole) stitch (fig. 3.14b)
- cross-knit loop stitch in one or two vertical rows on the edge of the fabric (fig. 3.14c)[<sup>32</sup>]
- cross-knit loop stitch in multiple vertical rows along the edge of the fabric ('plaque'). The stitches of all

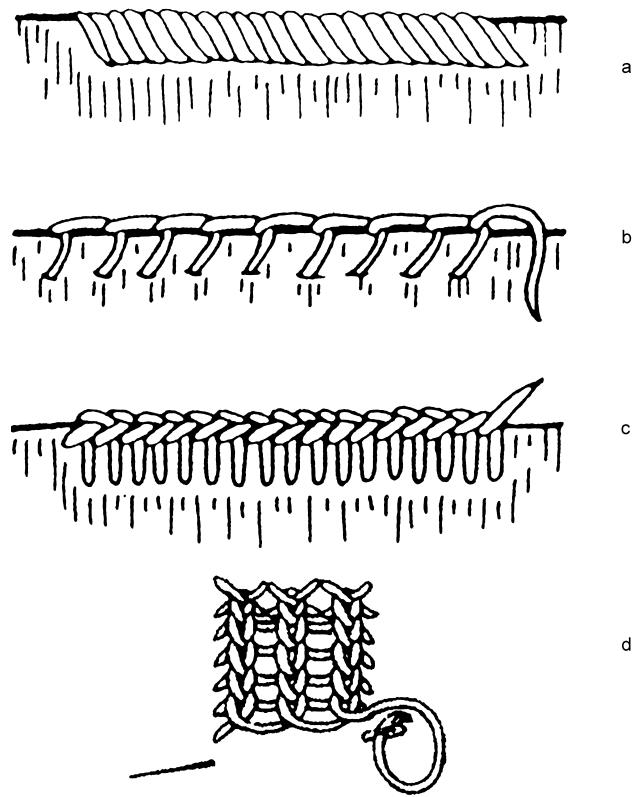


Fig. 3.14 Selvage treatment: overcast stitch solid (a); blanket stitch (b); cross-knit loop stitch in single file (c) (Clark 1993, 241); and cross-knit loop stitch in plaque (d) (Uribe and Agüero 2001, fig. 2f)

rows may be directed in the same direction, or one outer row may be reversed in direction (fig. 3.14d)

#### *Seam treatment*

- overcast ('whipping') stitched spaced or solid (fig. 3.15a)
- alternating = figure-8 stitch, solid (fig. 3.15b)
- cross-knit loop stitch in several files forming a 'plaque'

#### *Reinforcement*

- running stitch intermittent (fig. 3.16a)
- embroidered plaque at the base of the neck split, using cross-knit loop stitches lined up in multiple horizontal rows
- embroidered plaque at the base of the neck split, using close worked, horizontally oriented satin stitches ('flat stitches') (fig. 3.16b)

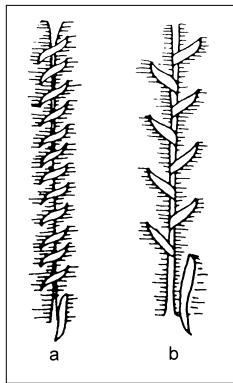


Fig. 3.15 Seam treatment: overcast stitched spaced or solid (a); alternating or figure-8 stitch, solid (b) (Clark 1993, 240)

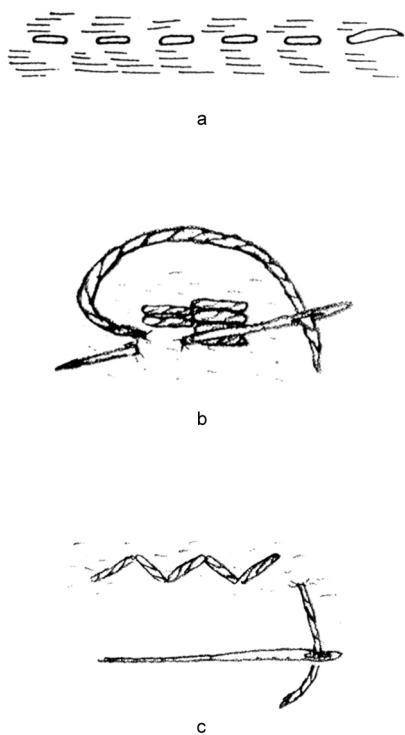


Fig. 3.16 Reinforcement at base of the neck split: intermittent running stitch (a) (Clark 1993, 240); embroidered plaque in horizontal satin stitches ('flat stitches') (b); embroidered plaque in zig-zagging satin stitches ('flat stitches') (c)

- embroidered plaque at the base of the neck split, using close worked satin stitches placed diagonally to create a zig-zagging line (fig. 3.16c)

### Repair

- darning in warp and/or weft direction in running stitch
- knotting of loose elements
- reseaming a selvage
- patching by stitching a fragment of second fabric on to the main fabric to mend a hole

## 3.8 Textile Analysis Form: Design

Textile design may be defined as '*the variety of elaboration added to the basic textile that improves or enhances its appearance*' (Clark 1993, 249). Design patterns can be created by manipulation of colour or structure. The colour design can be achieved at the level of the yarn production, during the weaving process, or as finishing touch. Under the 'Design' section of the Textile Analysis Form, the placement of the design, the applied colours and the type of motifs are recorded, both for the decoration of the main structure, as for the decoration of the final construction. The total number of applied colours per textile specimen was recorded, both natural and dyed, as it formed one of the parameters of the Quality Score (see below).

### 3.8.1 DESIGN IN MAIN STRUCTURE

#### Design lay out

The general lay out of the design area was described by choosing one of the categories:

- no design present
- symmetrical: lateral; all-over; lateral + centre; or terminal design
- asymmetrical: lateral; all-over; or lateral + centre design
- seam/selvage: symmetrical or asymmetrical design
- design present but undetermined.

Bilateral symmetry was created by mirroring the design around a vertical axis ('lateral symmetry'), or, rarely, a horizontal axis ('terminal symmetry'). Such symmetry can extend over the entire width of a specimen ('all over'), concentrate at the lateral or terminal selvages, or concentrate laterally and in a central design area ('lateral + centre'). A combination of lateral and terminal selvage decoration is rare, and limited to taparrabos and pañuelos, in which the lateral designs are woven and the terminal design weft twined.

### Design patterns

Camisas, bolsas, pañuelos and mantas have been subdivided into design categories using Cassman's classification of textiles from the valley of Azapa in northern Chile, which date to the Late Intermediate Period. This region is known for its millennium old cultural connections to the coastal valleys in the extreme south of Peru (see Chapter 6). A direct comparison by using the same classification of design patterning is another attempt to synchronize archaeological textile studies, especially in a region that is culturally so closely related.

#### a. *Camisa (tunic) design patterning*

Cassman divided the camisa patterning into seven basic design categories, based on visual differences resulting from a combination of structure and design factors (Cassman 1997, 97-101).<sup>[33]</sup> For this study, only relevant categories and their sub-types have been adopted and new sub-types have been added (marked with an asterisk \*), resulting in 6 design categories with a total of 24 sub-types (Table 3.4). Cassman codes consist of a number (1 through to 6) to indicate the general design category, plus a capital letter and often a small letter (figs. 3.17 and 3.18). Capital 'A' refers to the basic design pattern of that category, whereas capital 'B' indicates the presence of discontinuous warps to change the colour of stripes at the shoulderline. Capitals 'BW' refer to a trapezoidal shape created by discontinuous warps inserted throughout the camisa. The small letter 'd' indicates the presence of an embroidered neck plaque. Finally, the small letters 'a', 'b', or 'c' refer to subtypes within that design category. All camisas except category 2 were (originally) fabricated out of one web, and all categories except type 2 were found either with or without neck plaques.

#### b. *Bolsa (bag) design patterning*

Bags may be rectangular, square or trapezoidal shaped. Cassman's types 11, 12, and 13 ('mallá', 'costal' and 'atado', respectively) have been omitted, since they imply a function rather than a design type. Seven of Cassman's categories have been found among the Osmore bolsas, while four new sub-types have been added for the Osmore collection (indicated with \*). In Table 3.5, these sub-categories have been ordered according to the design complexity and not by the

### Camisa Lay Out

#### Style 1: Plain camisas (square, rectangular, or (semi-)trapezoidal)

- 1A monochrome, plain camisa
- 1Ad idem, with embroidered neck plaque
- 1Aa\* plain camisa with discontinuous supplementary warp elements

#### Style 2: Two-web camisas

- 2A two webs, monochrome camisa with selvages seamed vertically at centre
- 2Sa\* two webs, tapestry camisa with selvages seamed horizontally at shoulder line

#### Style 3: Plain woven camisas with colourful embroidery

- 3Ab monochrome camisa with 4 to 7 rows of embroidery along lateral seam
- 3Adb\* idem, with embroidered neck plaque
- 3Ac monochrome camisa with more than 7 rows of embroidery along lateral seam
- 3Adc\* idem, with embroidered neck plaque

#### Style 4: Laterally striped camisas with a maximum of ten lateral stripes

- 4Aa\* camisa with one thin lateral stripe (2-15 mm)
- 4Ab\* camisa with one broad lateral stripe (16-40 mm)
- 4Abd\* idem, with embroidered neck plaque
- 4A camisa with 2 to 10 lateral stripes
- 4Ad\* idem, with embroidered neck plaque
- 4B camisa with 2 to 10 lateral stripes with 2 discontinuous warp stripes at lateral side changing colour at shoulder line
- 4Bd\* idem, with embroidered neck plaque
- 4BW camisa with 2 to 10 lateral stripes with discontinuous warp stripes in background creating a trapezoidal shaped camisa

#### Style 5: Laterally striped camisas with a minimum of eleven lateral stripes

- 5A camisa with a minimum of 11 lateral stripes
- 5Ad\* idem, with embroidered neck plaque
- 5Aa\* camisa with a minimum of 11 lateral stripes + group of central stripes
- 5B camisa with a minimum of 11 lateral stripes with 1 to 4 discontinuous warp stripes at lateral side that change colour at shoulder
- 5Bd\* idem, with embroidered neck plaque

#### Style 6: Completely striped camisa

- 6A completely striped camisa
- 6Ad\* idem, with embroidered neck plaque

Table 3.4 Camisa design patterning (after Cassman 1997)

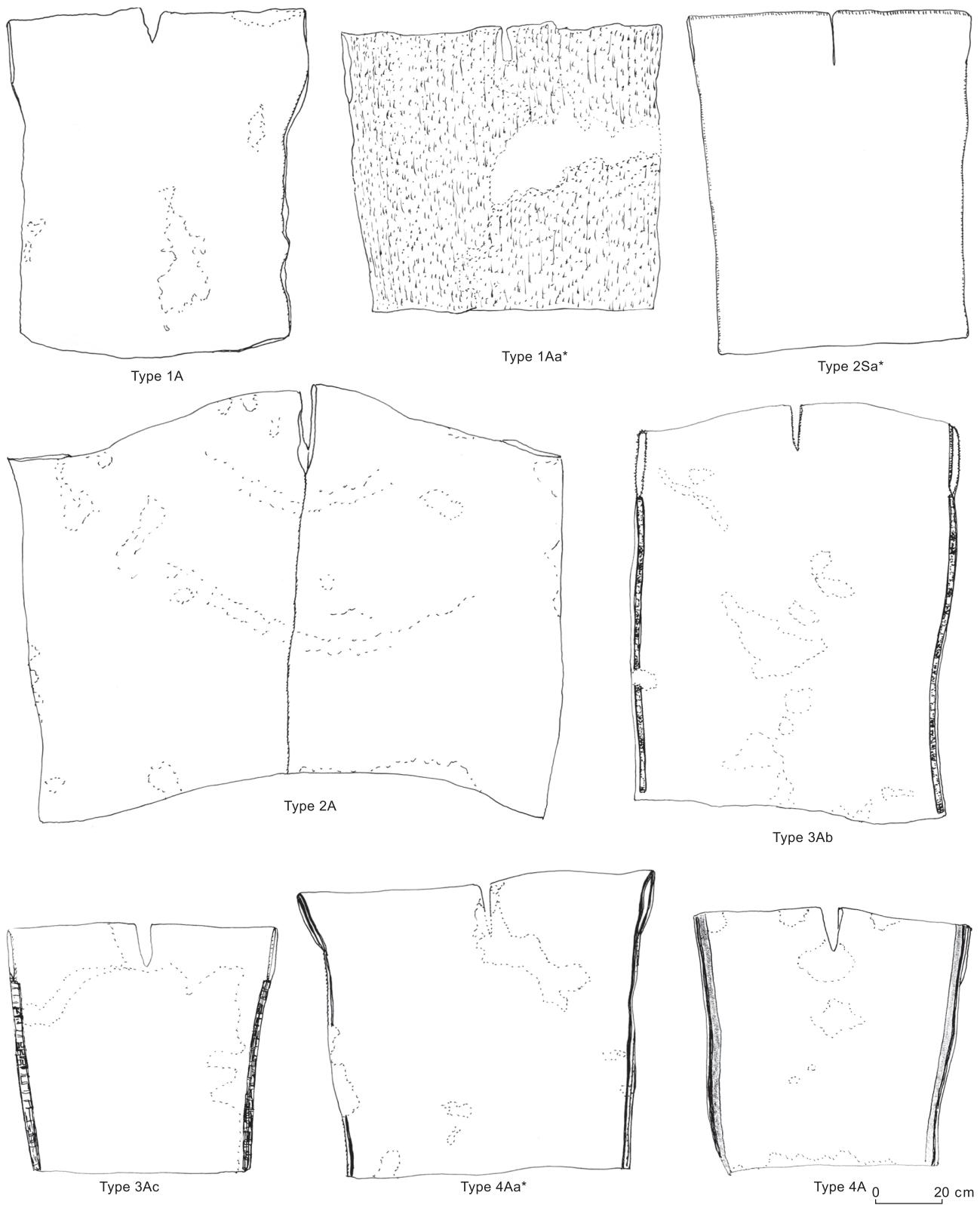


Fig. 3.17 Camisa types

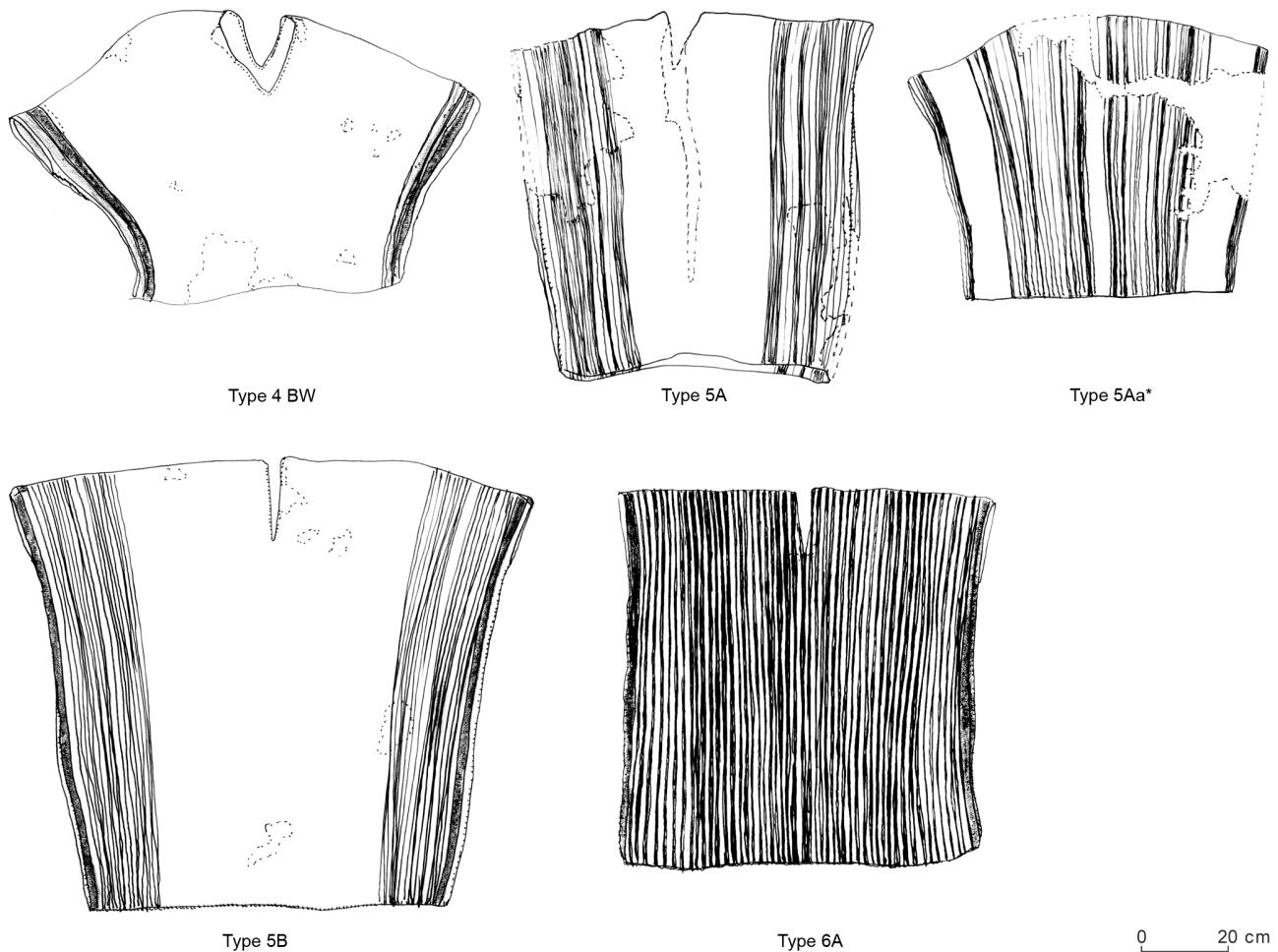


Fig. 3.18 Camisa types (continued)

codes Cassman had designated to these categories. The woven bolsas are rarely plain (type 15) or striped all over (type 7A\*) (fig. 3.19). More often they are decorated with solid or with patterned stripes. These stripes can be placed at the lateral sides (type 5 and 5A\*) or with an additional central stripe (type 1). Sub-type 1A\* refers to three identical figured stripes, while sub-type 14 has an aberrant central stripe. A ch'uspa with one wide central stripe containing anthropomorphic or zoomorphic figures flanked by narrow solid stripes forms type 3, while such central stripe flanked by other figured stripes forms type 3A\*. Few bolsas and all bolsa fajas are asymmetrically striped (style 10).

*c. Pañuelo (cloth) and manta (mantle) design patterning*

Since both mantas and pañuelos are square or rectangular shaped cloths, they are described using the same design types. In the Osmore collection, five out of Cassman's eighteen type categories were distinguished, while nine sub-types had to be added for the mantas and pañuelos that were not found in Azapa (indicated with \*) (Table 3.6). The appearance of cloths may be monochrome (type 1) though they may have colourful embroidered selvage decoration (type 1A\* and 1B\*). Other cloths are striped laterally (type 2, 2A\*, 2B\* or 2C\*) or all-over (type 7, 7.5, and 7A\*). Rarely, figured stripes made of two sets of continuous, complementary warps are present (type 9 and 12A\*).

**Bolsa lay out**

- 15 monochrome
- 7A\* striped all over with solid stripes
- 5A\* 2 groups of solid lateral stripes
- 1 1 central stripe and 2 lateral (groups of) solid stripes, all 3 similar
- 1A\* 1 central stripe and 2 lateral (groups of) figured stripes, all 3 similar
- 14 1 central stripe and 2 lateral (groups of) figured stripes, central (group of) stripes wider and with similar or different figure
- 3A\* 1 wide, central stripe with anthropomorphic or zoomorphic figures, flanked by figured stripes
- 10 bolsa faja with irregular striping (solid stripes and some ladder stripes)

Table 3.5 Bolsa design patterning (after Cassman 1997)

**Pañuelo and manta lay out**

- 1 monochrome cloth
- 1A\* monochrome cloth with 1 to 3 rows of colourful cross-knit loop embroidery on two or all four selvages
- 1B\* monochrome cloth with plaque of colourful cross-knit loop embroidery on corners
- 2 lateral stripes, solid, 10<
- 2A\* lateral stripes, solid, 11>
- 2B\* standardised 2 broad lateral stripes
- 2C\* 1 lateral stripe, solid
- 7 striped all over without figured stripes
- 7.5 striped all over, colour combinations change halfway across
- 7A\* striped all over, but lateral stripes differ in colour and/or pattern
- 9 lateral stripes, solid and figurative
- 12A\* 3 groups of stripes, figurative, central stripes wider
- 19\* tapestry figurative decoration
- 20\* asymmetrical lateral striped: with single stripe or grouping

Table 3.6 Manta and pañuelo design patterning (after Cassman 1997)

**Faja lay out**

- 1 monochrome
- 2 2 groups of 3 thin warp stripes in 2 colour exchange, at 1/3 and 2/3 of fabric
- 3 checkerboard stripes all over, each stripe separated by 3 thin lines
- 4 3 groups of triple stripes with figurative designs, horizontally repeated in alternating colours
- 5 twill weave with zig-zagging diagonals

Table 3.7 Faja design patterning

Rare manta designs are either asymmetrical (type 19\*) or figurative (type 20\*) (*figs. 3.20 and 3.21*).

*d. Faja (belt) design patterning*

The various belts have been subdivided into five decoration styles (*Table 3.7*). Cassman had no faja design classification (*fig. 3.22*).

*Design motifs*

Motifs in textile fabrics may be the result of manipulation of colour or structure, and may occur at the basic level of spinning or plying, or during the more advanced stages of weaving or final constructions. In order to classify a textile design, names have to be attributed to the motifs created by the ancient weavers. However, any such name will be subjective, imbued with cultural concepts of the investigator. The numerous and often impressionistic names used in literature complicate the comparative research on decorations greatly, especially when no illustrations are present to clarify the actual motif. And yet, classifications are required in order to quantify the data. Therefore, general descriptive English names were chosen to name the archaeological textile designs of this region, basically following Oakland's terminology (1986, 316). Those designs that are still woven by the indigenous weavers of the South Central Andes region also have Quechua and Aymara names mentioned.

*a. Decoration of single-elements structures*

Structural design on the level of a single element starts by varying the thickness or evenness of a spun yarn; by reversing the spin and ply direction; or by reversing

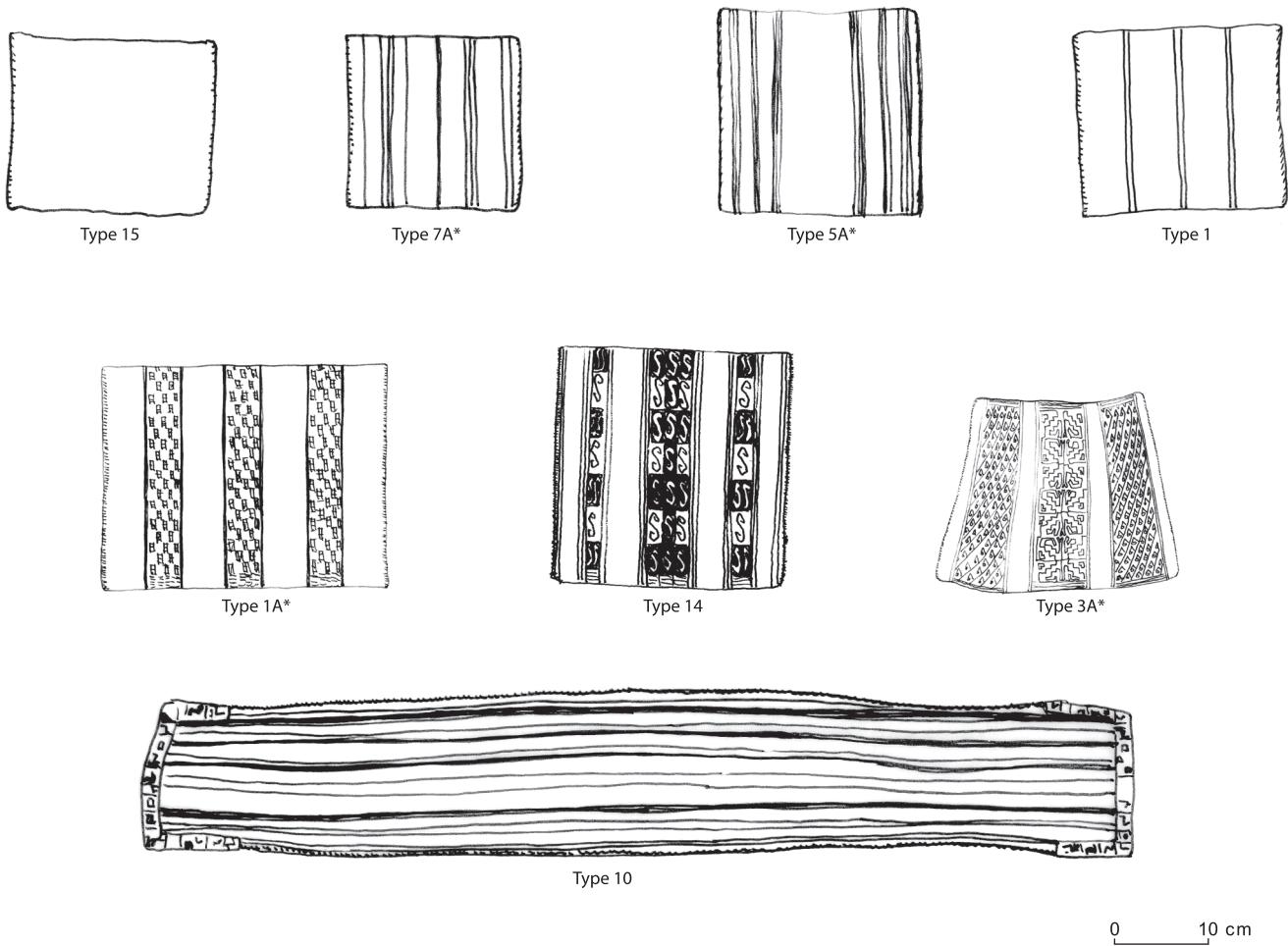


Fig. 3.19 Bolsa types

the face of knotted loops which results in geometric relief designs.

*b. Decoration of one-set-of-element structures*

Flat or round braids used as cords, ropes, or fajas are often decorated by the use of contrasting (natural) colours.

*c. Decoration of two-or-more-sets of elements structures*

Two or more sets of elements are subdivided into interacting and interlacing structures:

*Interacting structures*

An interacting structure such as weft twining can create designs that depend on the number of twined rows employed, direction of their twist and the colours

applied. The counteracting and the change of colour may form connected rhomboids (*Plate 6.1*).

*Interlacing structures*

Weft-faced interlacing specimens have the greatest freedom of decoration, as the motifs are created during the insertion of each weft throughout the weaving process. The result are figurative motifs made by solid colour blocks.

Warp-faced interlacing structures create design by structure or colour variation:

*Structural variation:*

- Supplementary discontinuous floating warps yield a subtle striping of the fabric's surface due to their larger diameter, and/or lighter or darker natural

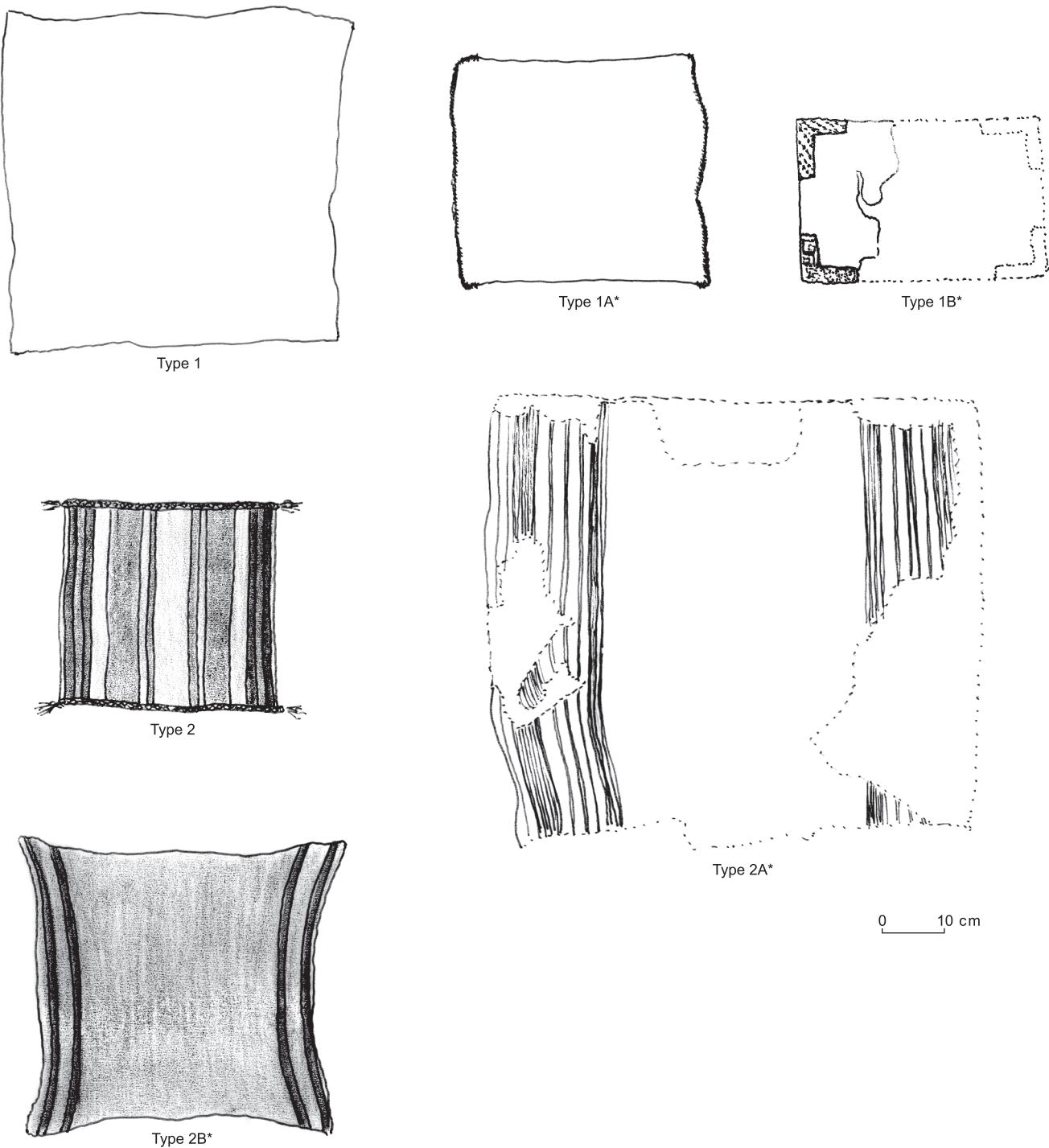


Fig. 3.20 Pañuelo and manta types

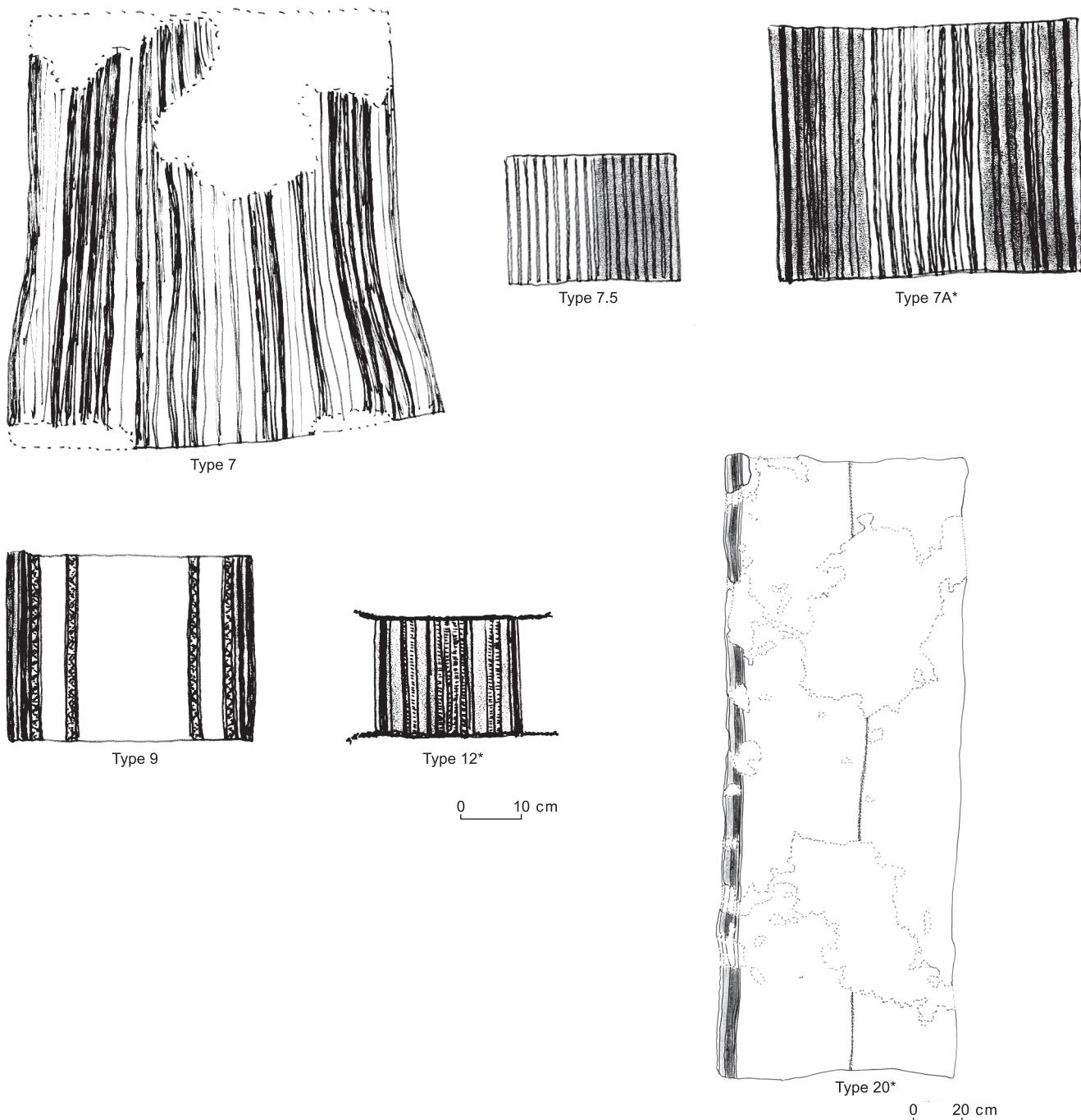


Fig. 3.21 Pañuelo and manta types (continued)

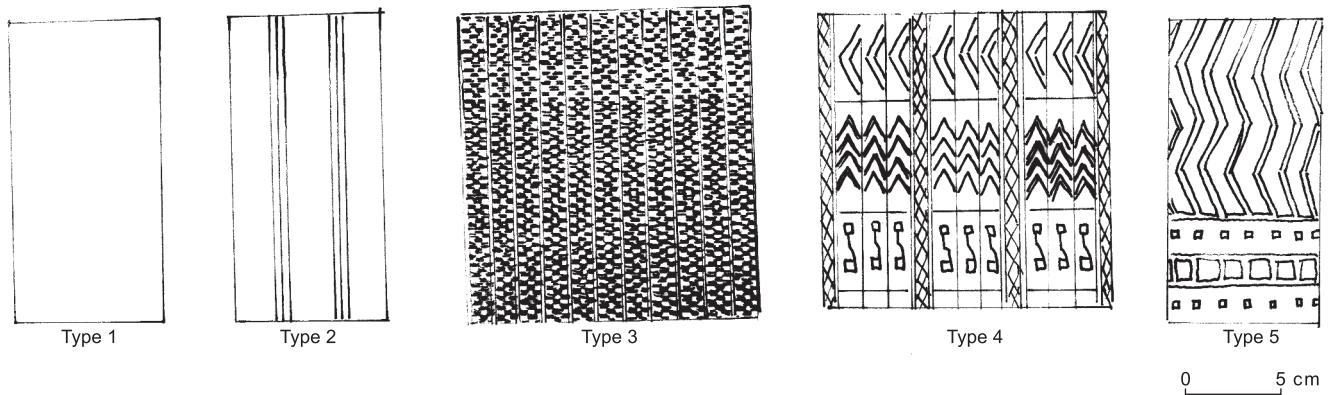


Fig. 3.22 Faja types

colour, and their floating over the underlying structure (usually over two wefts). Two to four of these floating warps are grouped together (0.5 to 1 centimetre wide) and regularly interspersed by more or less one centimetre of warp-faced plain weave.

- Twill weave is characterized by diagonal alignment of its warp floats. The resulting zig-zagging ('herring-bone') design is created by a 2/2 float span ratio with paired warps over an extra thick single weft. The design may be accentuated by the use of two colours (fig. 3.22 Type 5).

#### Colour variation, solid colours

- Brindle: faint warp stripes, resulting from plying two colours of spun yarns together, or from combining warps of various natural shades

- Solid warp stripes:
  - Pattern in solid warp stripes: Tiwanaku style (fig. 3.23a)
  - Pattern in solid warp stripes: Ilo-Tumilaca/Cabuza style (divided stripe) (fig. 3.23b)

*Colour variation, design by one set of floating warps derived from plain weave, warped in two colours (not complementary)*

- Ladder: horizontal bars over the whole width of the stripe<sup>[34]</sup> (fig. 3.24a)
- Simple ladder: horizontal bars change colours once, resulting in double ladder motif<sup>[35]</sup> (fig. 3.24b)
- Multiple ladder: horizontal bars change colours more than twice, creating a checker motif (fig. 3.24c)
- Block-ladder figure combines horizontal with vertical lines into blocks (fig. 3.24d)

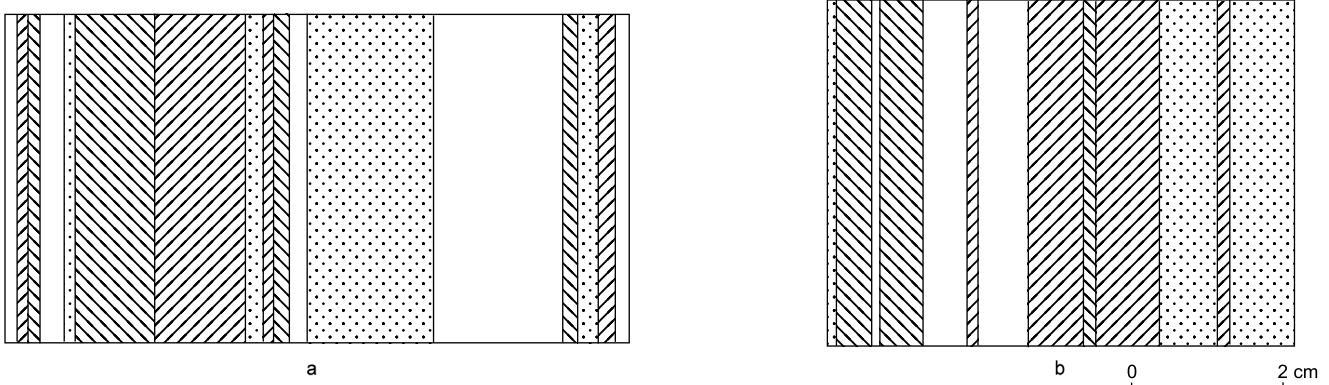


Fig. 3.23 Solid warp stripe pattern: broad stripes separated by few thin stripes (Tiwanaku style, a) and broad stripes divided by one or few thin stripes (Ilo-Tumilaca/Cabuza style, b) (colour combinations random)

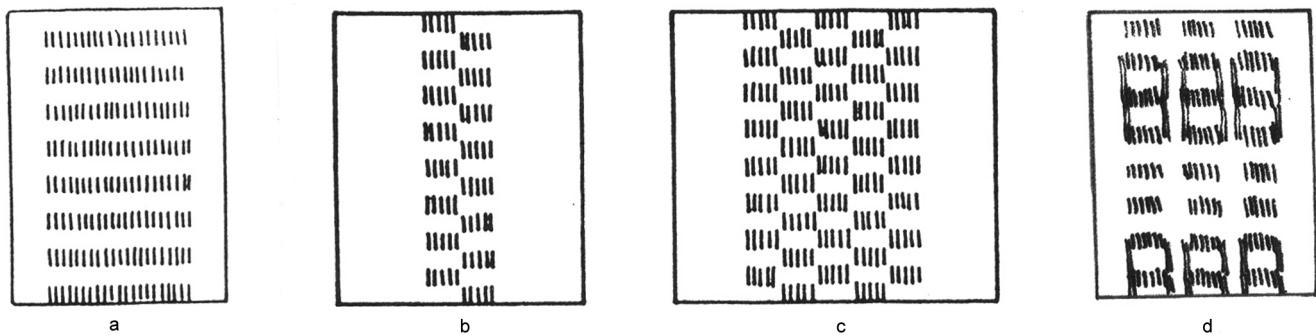


Fig. 3.24 Woven motif: ladder over whole width of stripe (a); simple or double ladder (b); multiple ladder or checker motif (c) (Clark 1993, 268); block-ladder motif (d)

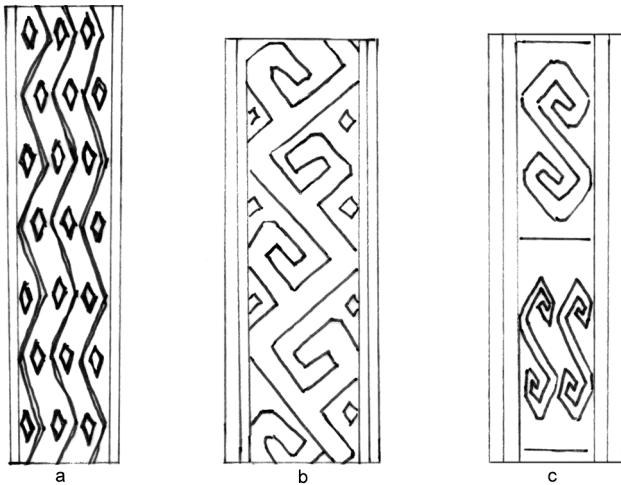


Fig. 3.25 Woven motif: zig-zagging line with circles ('eyes') (a); zig-zagging line with appendages (b); repetitive geometric figures repeated in alternating colours (c)

*Colour variation, design by patterned stripes in two complementary warp sets*

- *Continuous pattern*  
zig-zagging line with nested circles ('eyes') or one/more dots (fig. 3.25a)  
zig-zagging line with single scrolls (angular or triangular appendages) (fig. 3.25b)
- *Repetitive pattern*  
single geometric figures repeated in alternating colours, for instance curvi-angular 'S' or 'Z' (fig. 3.25c)  
geometric, zoomorphic, or anthropomorphic figure (Chiribaya tradition) (see Chapter 7, fig. 7.31 to 7.35)

### 3.8.2 DESIGN IN FINAL CONSTRUCTION

The stitches that are applied to finish selvages and to close seams, may be considered a decoration when they are executed with more elaboration than is functionally required.<sup>[36]</sup> Most final constructions display a random sequence of various colours in their solid overcast stitches, figure-8 (alternating overcast) stitches, or a single or double row of cross-knit loop stitches. Only those final constructions are included as 'design', that required at least four rows of stitches to create embroidered plaques, cover the lateral seams or selvages of camisas, pañuelos, and bolsa fajas and enforce the base of a neck slit of a camisa.

#### *Embroidered plaques on seams and selvages*

Plaques embroidered in cross-knit loop stitches vary in size of stitches and numbers of rows (4 to 16). Most plaques have one row of stitches forming a contour while the rows inside create design units that may be repetitive, alternated, or continuous:

- repetition of one symmetrical figure in separate units and in alternating colours (for instance, angular S or Z (fig. 3.26a))
- repetition of one asymmetric figure in separate units and in alternating colours (fig. 3.26b)
- alternating (a)symmetric figures in alternating colour combinations
- continuous diagonal lines in alternating colours (fig. 3.26c)
- angular S figures forming a continuous meander with check in its curves

#### *Embroidered neck plaques*

Neck plaques may be found on one or both sides of a camisa. Front and back plaque usually show similar

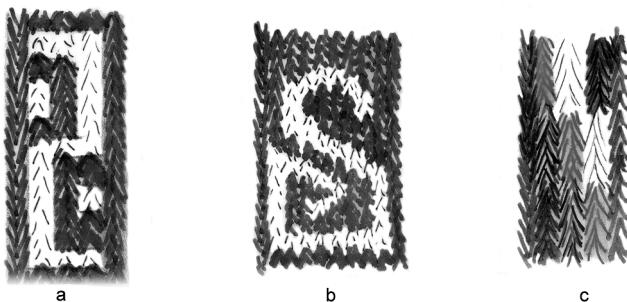


Fig. 3.26 Embroidered motif: symmetrical figures in separate units and in alternating colours (a); embroidered asymmetrical figures in separate units and in alternating colours (b); embroidered continuous diagonal lines in alternating colours (c)

design and size and if lateral plaques are present, the neck plaques usually echo its structure, colours and motifs. Apart from cross-knit loop stitches, close-worked horizontal or zig-zagging satin stitches have been used as well for the neck plaques. The plaque design may be asymmetrical or hold horizontal or vertical stripes that usually have their colour sequence inverted along vertical or horizontal axis (see Chapter 8).

### 3.9 Textile Analysis Form: Form

Under this section, the form of each complete specimen was determined, as well as the number of separately constructed webs needed to produce the finished form of the specimen. Possible fabric forms are: long narrow strip; rectangle; with warp longer than weft or with weft longer than warp; square; trapezoidal or semi-trapezoidal; irregular three-dimensional mass (for masses of raw wool or cotton); circular or rectangular cross section (for yarn, cord, and rope); cannot determine. The completeness of a specimen was indicated by the number of warp and weft selvages present and the estimated percentage that remained of the original specimen.

The conservation of each textile was expressed with the Centro Mallqui classification codes 1, 2, or 3: a textile of category 1 is a diagnostic piece and suitable for exposition; category 2 is a slightly damaged fabric of little diagnostic value; category 3 is a textile in fragmentary state without diagnostic value.

### 3.10 Textile Analysis Form: Calculated Values

Several calculations can be made with the objective of characterizing the density and fineness of the fabric. The warp and weft count and the average warp and weft diameter are crucial for these computations. Giving each woven fabric meaningful quality indices allows comparisons of textile traditions on intrasite and intersite level.

#### *Warp count, weft count and fabric count*

The warp count and weft count are simply the number the warps and wefts inserted in one woven centimetre. In case of warp count, only the upper half of the warps is counted. The fabric count is the sum of warp and weft count:  $\text{nr warps/cm} + \text{nr wefts/cm} = \text{fabric count}$

The higher the outcome, the more warp and weft elements were inserted in a square centimetre, and therefore the finer the woven fabric will be.

#### *Warp density and weft density*

The warp and weft density are calculated by multiplying the number of elements per centimetre by the yarn diameter in millimetres:

$$\text{nr warps/cm} \times \text{warp diameter (mm)} = \text{warp density}$$

The outcome indicates a degree of fineness of the corresponding element: a fine warp yarn with close worked elements will result in a lower density number than a thick warp yarn that count less warps per cm.

#### *Fabric density*

Fabric density corresponds to the pliability of a fabric. The goal of calculating the fabric density is the ability to distinguish fine, average and coarse weaving categories (Cassman 1997, 85-86). However, the formula used by Clark (1993, 1629) to calculate the fabric density by simple adding warp density up to weft density, is shown by Cassman (1997, 86) to be '*an oversimplification and inappropriate*' for her investigation on opaque Andean archaeological textiles.<sup>[37]</sup> She points out that the formula used by Clark could give nearly an identical fabric density to two visually very distinct fabrics. Cassman convincingly demonstrates how the use of ratios of yarn diameters and yarns/unit is more accurate, since such ratios characterize the combination of the fineness of the yarns used and how closely they are spaced in the fabric (Cassman 1997, 87). Her formula gives a higher score to the textiles with widely spaced,

thick yarns. Automatically follows that the lower the number, the more pliable the textile will be. Cassman chose the fabric density outcome of 1.4 to be the maximum value to indicate a finely woven fabric. All fabrics with an outcome below this limit would be rewarded with an extra point in the Quality Score calculation (see below). However, it remains unclear why Cassman chose to change the unit of warp and weft density from centimetres into millimetres. In order to stay close to other fabric studies (Clark 1993, Kuttruff 1993), it was decided to stick to the centimetre as unit for yarn densities for this study. This implies that Cassman's limit of 1.4 as the maximum Fabric Density to be rewarded the extra point in the Quality Score, had to be adjusted to a Fabric Density of 0.14.

Therefore:

$$\frac{(\text{warp diameter (mm)} + \text{weft diameter (mm)})}{\text{warp/cm} + \text{weft/cm}} = \text{fabric density}$$

#### *Quality score*

Quality score includes the number of decisions and the amount of labour involved in the manufacture of textiles. The quality score is calculated for each fabric in order to assess the relative 'quality' of each specimen. The total quality score for all textiles placed in each funeral bundle can distinguish high and low status individuals. There are two methods for calculating a quality score, one developed by Kuttruff (1988, 1993) and also applied by Clark (1993), the other one developed by Cassman (1997).<sup>[38]</sup> Both methods are based on the production step measurement used by Feinman *et al.* (1981) for ceramic production. Though both Kuttruff and Clark distinguish the same basic production steps, Cassman's textile quality calculation method was considered to be more useful for this study as it facilitates a direct comparison with her collection for the northern Chilean Azapa valley, a region that is geographically and culturally closely related to the Osmore drainage (Table 3.8). Cassman (1997, 94) prefers to add one half to a whole point for labour costs for large fabric sizes, rather than Kuttruff's more sensible choice of using fabric count as a meaningful textile attribute, since many archaeological textiles will be fragmented and their original sizes cannot always be assessed (Kuttruff 1993, 135). Kuttruff (1993, 135) and Clark (1993, 302-304) on the other hand, both award some points to characteristics

that indeed involved more decisions, but did not necessarily contribute to labour costs, like the fibre complexity (number of different fibres used). They award each different fibre with a point, even though several yarns can be produced with the same procedure and even from the same fleece, resulting in varying colours, thickness, or twist direction, without adding any labour costs.

What lacks in both calculations, however, is a means of taking into account the enormous amount of extra work required for weft-faced fabrics, as the wefts need to be densely packed to cover the warps, requiring many more weft insertions and thus much more weaving time. In addition, the design is created during the weaving procedure itself, requiring constant attention, in contrast to the pre-planned warp-faced fabrics. Therefore, in this study it is chosen to give weft-faced fabrics an extra point.

#### *Time and yarn expenditure calculation*

The time and quantity of material needed to produce yarn and to weave large sized fabrics in warp-faced plain weave structure can be calculated if the original dimensions of fabric are known. This calculation has been based on the field work done in the Quechua community of Rotojoni/Cuyo Cuyo in the Department of Puno (Minkes 2000), supplemented by the textile production data collected by Franquemont in Chinchero (1986). Therefore, it will be explained in the following chapter.

#### NOTES

1. The site La Cruz was excavated between December 1993 and January 1994. In this study, the year of excavation has been abbreviated to 1993, since the bulk of the cultural material has excavated in December 1993. Likewise, the first excavation of Chen Chen took between August 1987 and June 1998, and has been abbreviated to 1988.
2. The unwrapping and recording of the La Cruz 1993 mummy bundles was executed by Nilda Juárez and Verónica Cruz between April 10th and June 5th of 1996 in Centro Mallqui.
3. At least, this was the situation prior to the earthquake of June, 23rd in 2001. The earthquake damaged the museum and destroyed nearly all the structures of Centro Mallqui. Fortunately, the main deposit was preserved so that hardly any damage was done to the archaeological objects. After the earth

### Quality score for textile production steps

production steps:		
for:		
<b>Add</b>		
1	spun yarns,	<i>or:</i>
2	plied yarns	
1	non-loom technique,	<i>or:</i>
2	loom woven technique,	<i>but:</i>
2.5	if fabric is loom woven and one dimension is larger than 80 cm, <i>or:</i>	
3	if fabric is loom woven and one dimension is larger than 130 cm, <i>or:</i>	
4	if fabric is weft-faced	
1	fabric density is finer than 0.14	
1	one dyed colour used,	<i>or:</i>
2	two to five dyed colours used,	<i>or:</i>
3	six or more dyed colours used, or five dyes and no natural colours	
1	ornamental embroideries used	<i>but:</i>
2	if the embroidery counts more than 5 parallel rows of stitches	
1	striped design with continuous warps,	<i>but:</i>
2	if there are discontinuous warps stripes present	
1	exotic items (i.e. feathers, shells, etc.)	
1	complementary warp techniques	
1	supplementary pile	
<b>Subtract</b>		
	for:	
-1	1-10 % repairs,	<i>or:</i>
-2	11-50% repairs,	<i>or:</i>
-3	more than 50% repairs	
-3	reutilization (but no repairs)	

Table 3.8 Quality score for textile production steps (Cassman 1997, 95)

quake, some relocation of the archaeological material was necessary, so that today all the textiles are stored in the new depository of Centro Mallqui.

4. Permission to study these collections were given by the Municipalidad de Algarrobal for the Museo Algarrobal material, by Sonia Guillén for the Centro Mallqui textiles, by Bruce Owen for the Chen Chen (1995) material, and by Bertha Vargas for the Chen Chen (1987-1988) material.

5. Records may have gone missing as a result of the earthquake and subsequent hasty replacement of archaeological material and records, or maybe during shipment between Centro Mallqui in the Osmore valley and the central office in Lima.

6. Since all research data have been processed in the nested structure of an Access file, the category on contextual data under 'Association' actually formed the top level of all textile data: a tomb is placed at the highest level of context, since it theoretically can contain more than one individual, each of which can be wrapped in one or more textiles.

7. The extraordinary organic preservation is the result of a combination of the hot and dry desert environment that quickly desiccates the body, the salts and nitrates that arrest the development of bacteria, and the burial in shallow areas in which the sand allows a rather constant temperature and humidity (Guillén 1992, 30).

8. Los Collas formaban la cabeza larga y puntiaguda, con tanto extremo, que pone admiración ver los viejos que yo alcancé con aquel uso de su gentilidad. (...). Decían ellos que ponían desde talles las cabezas porque fuesen más sanos y para más trabajo; y hacíanles el primer bonete con muchas ceremonias y supersticiones, así en el hilar la lana como en el tejerla (Cobo 1964 [1653] Bk. XIV, Ch. VI, 245-246).

9. (...) 'hay tan exceso que ordinariamente vienen a morir de ello muchos niños y los que quedan por la mayor parte se crían enfermos y traen los ojos malos y quedan sordos como lo he visto y entendido en la dicha visita y aún ha acaecido salírsele a alguno los sesos por las orejas (...)' (Diez de San Miguel 1964 [1567], 224). The catholic Europeans unanimously declared this practice to be unhealthy and even sacrilegious, and soon had it prohibited. By 1585, a decree from the Ecclestial Court of Lima was issued against the practice of cranial deformation. It forbade parents, under specified penalties, to compress or distort the heads of their children. However, the custom proved to be so persistent that authorities were still fighting it in the mid 18th century (Morales 1917, 237; Hoshower et al., 1995, 147-148).

10. Allison et al. (1981) even identified eleven distinct types of deforming apparatuses and fourteen related forms of cranial deformation in the north of Chile. They relate the distinct shapes to specific cultural and geographical areas.

11. The dictionaries compiled by González Holguin for the Quechua language (1608) and by Bertonio for the Aymara language (about 1612) are especially useful sources of Spanish colonial chroniclers.

12. 'Fibre' is a general term referring to the structural components of any animal or plant tissue, or fibrous material, used in the construction of fabrics. An example of mineral fibre is asbestos, and will not be discussed here, since its prehistoric use was limited to the Old World (Emery 1980, 9; King 1978, 91-92).

13. Not only the fibres are difficult to assign to one of the subspecies, also the skeletal remains (especially incisors) show little to no readily apparent morphological characteristics to separate camelids. Although the species generally variate in size, they overlap and are able to interbreed (Shimada and Shimada 1985, 18; Wing 1972).

14. Archaeozoological data indicate that llamas and perhaps alpacas were successfully bred and maintained on the North Coast of Peru, a subtropical area and warmer than the far south coast of Peru from at least the final phase of Moche culture (A.D. 600) onward. Here, the presence of large herds was noted by early Spanish chroniclers Xeres (1533) and Estete (1534) (Shimada and Shimada 1985, 8-17). Physiological data agree that alpacas as well as llamas are capable of living in the coastal Peruvian environment. However, llamas have a more efficient system of adapting to lower altitudes than alpacas and could be kept as a coastal staple to produce items necessary for self-sufficiency. Alpacas, on the contrary, may survive but do not breed well nor do they produce good quality fibre at low and warm altitudes (Topic et al. 1987, 834).

15. Though basketry structurally belongs to fibre-based specimens just like woven or braided specimens, it has not been included in this research, which focuses on garments and textile artefacts.

16. *Gossypium barbadense* grows like a bush as tall as a man. The plant will produce within one year and up to six years. It can grow in marginal soil and withstand both drought and flood and a variety of insect pests (Rowe 1984, 18).

17. A planned analysis of the dye stuffs had to be cancelled due to the lengthy delay of shipment of several dozens of dyed yarn samples and the absence of the proper legalizing paperwork.

18. The wool samples were taken from the community of Cuyo Cuyo and its herders *anexo* of Qeyo, in the Department of Puno (Minkes 2000).

19. Experiments with dyeing fibres were conducted in the community of Cuyo Cuyo (Minkes 2000).

20. Carbonization usually affects the textiles wrapped around the lower part of the mummy bundle, due to the autolytic decomposition of the individual's organs (Guillén 1992, 31).

21. The Textile Department of the Museo Arqueológico San Miguel de Azapa near Arica in Northern Chile, kindly allowed me to use the three volumes of the Munsell Colour Chart.

22. In literature, the procedure of 'plying' a yarn is also referred to as 'twisting', 'doubling', or 'twining' (Emery 1980, 10).

23. ‘Technique’ is not a synonym for ‘structure’. The technique refers to the method of manufacture and cannot always be inferred from the structure. Several quite different techniques will produce visually identical results (King 1978, 91).

24. Weft-faced plain weave structures have been traced to the Early Horizon, but the interlocking tapestry structure would gain major importance during the Tiwanaku and Wari cultures in the Middle Horizon and the Inka culture in the Late Horizon (Rowe 1977, 29, 113).

25. According to Rowe (1977, 113–114), warp-patterned weaves were probably developed in southern highlands during Tiwanaku hegemony. On the far south coast, a variety of these structures, executing in all-alpaca yarns, would remain predominant, contrary to the north coast weaving development.

26. Rowe (1977, 26, 113) suggests that warp-faced plain weave fabrics with discontinuous warps dovetailing around a common weft may be of highland origin, based on the fact that the known examples are entirely of alpaca yarns and with designs that show no relation to coastal styles. The earliest examples of discontinuous warp structure has been found in Ocuaje and Paracas finds dated to the end of the Early Horizon.

27. According to Bird (1963, 65), tapestry weave first appeared in Peru in the Chavín horizon (900–200 B.C.). Although the technique can produce a high degree of realism, this did not occur until the 16<sup>th</sup> century, under the influence and encouragement of the Spanish. Before that, the Andean weavers preferred to produce a rather rigid expression of motifs, suggesting that tapestry design was strongly influenced by what was produced in more prescribed textile techniques.

28. No interlocked tapestry, characteristic of fine tapestry camisas from the Tiwanaku culture 7), were found in this study, nor slit tapestry which is characteristic of the north and central coast of Peru.

29. The earliest fabrics with supplementary warps are found at the site of Pachacamac in a context which suggests a late Middle Horizon or early Late Intermediate Period date (VanStan 1967 in: Rowe 1977, 35).

30. Complementary warps are first found in narrow figure bands in the Ocuaje fabrics dating to the end of the Early

Horizon. Large designs (in three-span floats in alternating alignment) are not created until the later part of the Middle Horizon and are probably of highland origin (Rowe 1977, 69).

31. In Peruvian textiles, cotton weft twining precedes interlacing structures as the common method of combining two perpendicular sets of elements, appearing in the Preceramic Period by about 3000 B.C. It loses its importance as soon as heddle loom weaving technology develops at the beginning of the Initial Period (Rowe 1977, 107; Versteylen 1974, 96).

32. Cross-knit loop stitches used as edge binding have been found in late Nasca style bolsas (plate 13 and 20, in: Brommer 1988). Also used on Inca style warp-patterned textiles and on tapestry-woven tunics (Rowe 1977, 36, 72).

33. None of the camisas that Cassman grouped into the rest category style 7, ‘miscellaneous’, (1997, 101) have been found in Osmore.

34. The ladder motif is called ‘*peine*’ in Spanish or *k’utu* in Aymara.

35. This motif is called ‘*peine doble*’ or ‘*línea ajedrez*’ in Spanish.

36. Clark (1993, 263) limits her classification of design types for final construction to structural terms, that allow no comparison among the actual design. Therefore, in this study her classification is refined by adding descriptions of the designs.

37. Kuttruff (1993, 135–143) applied this fabric density calculation for textiles with many voided areas, for which it would be useful, contrary to fabrics that are visually opaque.

38. Cassman (1997) confuses the reader by using two versions of Quality Scores that do not yield the same outcome: one explained in the text on page 95 and one in Appendix B on page 191. For this study, the scheme of page 95 is used, as this same scheme was also shown in Cassman’s article that synthesized her thesis (2000a, 259, Table 13.1).