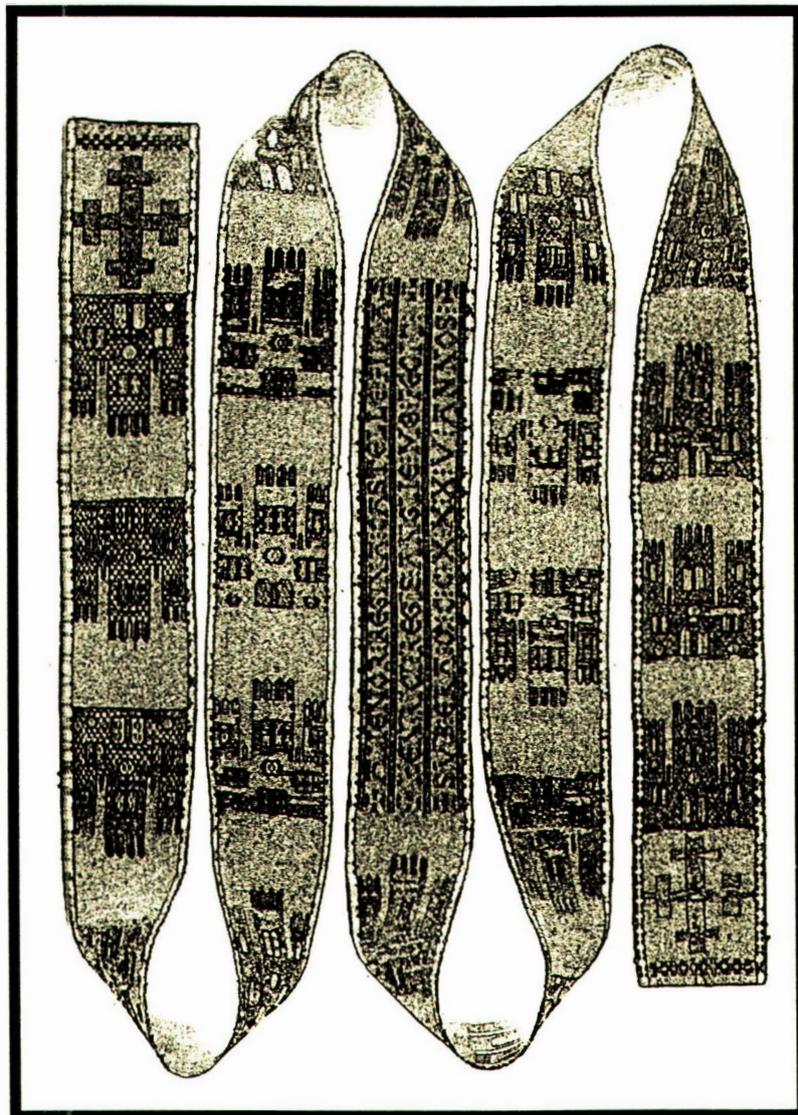


Archaeological Textiles Newsletter



12th century stole attributed to Eleanor, Queen of Castile

Production and Layout - E.E. Peacock

Printed at Vitenskapsmuseet
The Norwegian University of Science and Technology
1998

ISSN 0169-7331

From the Editorial Board

Editorial

In this issue our contributors from many countries again cover different aspects of the study of archaeological textiles. First, two articles deal with experimental work on vegetable fibres by practical methods of growing and processing milkweed and flax. Dr. Ryder's discussion of the textiles buried in the Overton Down experiment is informative and thought-provoking. As he notes, there were flaws in the procedures initially set up for the experiment. Nonetheless the observations he makes provide an important base line from which further studies may be developed. Generally speaking the increasing tendency towards practical experiments based on accepted scientific methods is an essential part of the discipline of the study of archaeological textiles. Since archaeology itself consists in the main of analysing others people's rubbish randomly discarded, it is only through rigorous methods of study that we can produce acceptably sound results.

Ariane Marcar's commentary on Aegean Bronze Age menswear develops the theme of the study of dress from contemporary art and illustrates the difficulties of interpretation and nomenclature. In analysing Queen Eleanor's stoles Nancy Spies puts firmly on the record the technical details and history of two important textiles.

The new radiocarbon date for the Orkney Hood is welcome, and even more so as an addition to the small corpus of survivals of Iron Age dress in the British Isles.

We hope that in this issue we have reflected the interests and concerns of our subscribers and so continue to play an ongoing role in the development of textile studies.

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Experimental Archaeology

Milkweed: Fibres to Fabric

Beginning with a special thesis study on milkweed (*butz* or *shesh* in Hebrew), Dr. Zohar Amar, Bar Ilan University, Israel, located early sources from the Byzantine and medieval periods referring to the production of delicate, fine clothing made in the Israel region using the milkweed plant. Identifying *butz* as a kind of linen is derived from a majority of Biblical commentators. In addition, there is identification offered by medieval commentators who wrote in Arabic (*uschr* or *oscher*) and were active in the land of Israel during the Middle Ages. Similar identification appears in the Christian and Samaritan literature.

The Plant

The milkweed plant (*Calotropis procera*) is a tree or bush of the family *Asclepiadaceae* and is quite common throughout Israel. The plant grows to a height of 2-6 metres and has large, rounded leaves with a thick shell composed of a layer of cork, and all parts of the plant contain a milky juice which is poisonous. The fruit is shaped like a large, green ball, somewhat like an apple but the interior is spongy containing many seeds tufted with long, white silky, slender hairs. The outward appearance of the fruit is attractive and inviting, but inside it is hollow except for the floss. Many of the Christian pilgrims who visited the Holy Land during the Middle Ages described this plant found in the Dead Sea area as part of the pilgrim experience which brought to life the Biblical events which had transpired on that site.

In ancient times, wicks were produced by sucking out the long, thin hairs of the milkweed plant, and as the fruit contained a flammable material, it was excellent for igniting fires. Bedouin would peel the plant and plait bands and wicks for their muskets, and weave fine, large fishing nets. It was also used for stuffing pillows, quilts and cushions.

According to Dr. Amar, Beit Shean (Israel) was renowned throughout the world for its superior linen fabrics during the Roman and Byzantine periods, and this was attributed to the milkweed plant which grew in this area. It is possible that Beit Shean's flax industry was based on a weave with a blended flax thread which gave the garment durability and strength, together with a thread spun from the milkweed plant - considered by the ancients to be a kind of flax - giving the garment its delicacy, lustre and celebrated excellence.

Early Native American Indians also used a species of milkweed (*Asclepias Syriaca*) for spinning and weaving fabrics combining the fibres with wool and goat hair.

Harvesting Milkweed

The fruit must be harvested at the end of summer between July and September when it is still closed and green. The largest fruits should be selected and placed in a closed, well-ventilated place. After 4-8 days the fruit opens in the middle and the peel begins to dry out. At this state the seeds which are arranged in the fruit in two rows are greenish-brown in colour and still not ripe.

The drying and shrinkage of the fruit peel takes two weeks, and during this time the seeds begin to ripen and turn a dark brown hue. When the seeds begin to separate from each other, the tufts connected to the seeds also begin to separate into thin, smooth fibres. This timing was designed to guarantee the dispersal of the seeds by the wind at the right time. The stage where the seeds are optimally ready for dispersal by the wind is the best time for collecting the fibres. At this stage, grasp the entire cluster of seeds between the thumb and index finger with the other fingers left open. With the other hand, separate the tufts from the seeds. The process of extracting the fibres from the fruit must be carried out in a place sheltered from the wind.

Each milkweed bush/tree can produce 50 to 100 pods annually. The fibres obtained from one tree are sufficient to spin thread to weave 1-2 meters of fabric. This of course depends on the thickness of the thread and the type of weave.

Fibre Preparation and Production

Following the summer's harvest, Toni Friedman, Israel Fibre Arts Guild and Israel Designer-Craftsmen Assoc., joined the project to begin the hands-on work with the milkweed fibres provided by Dr. Amar. This part of the project was divided into fibre processing stages and several additional stages to study its adaptability to newer methods.

Scouring

The optimum time to spin milkweed fibre is within a few days of harvesting but as this is not always feasible, the fibres must then be scoured to be manageable. Following a few days of gathering, they

soon begin to dry out and become brittle and slippery to spin. Insert the fibres into a synthetic net bag and place in a bowl of hand-hot water with 1 Tbsp. of liquid washing-up liquid. After the water begins to cool, remove the bag of fibres and rinse in warm water. Once removed from the bag the fibres are spread out onto a screen frame to dry.

Note: Cover the screen and fibres with a synthetic net or with another screen frame. Otherwise, you will not find any fibres on your screen when you've returned. These fibres love to fly when dry!

Carding

Although it is possible to spin the fibres without carding (combing process), I prefer a puni-arrangement (small combed package of fibres). Use fine hand carders (cotton carders) rather than traditional wool carders. The dense tine configuration affords an even carding. Card with a very light stroke and roll the fibres off onto a 5 cm diameter dowel

slightly compacting the fibres as you roll. Store the punis in a box or basket and cover when not using.

Note: Again, work in a closed area to avoid fibres flying about. If you find that the fibres do float and often up your nose, it is advisable to cover your face with a protective mask during the carding preparation.

Spinning

Working with a handmade support spindle (30.5 cm length, 17 g weight) and spinning the fibres dry-spun produced a rather hairy uneven yarn. The heaviness of the clay whorl and thicker bamboo shaft spun at a slower rate prevented overspin and breakage of the thread. Changing to a wet-spun yarn (the addition of water while spinning), and spinning in a Z-twist direction, produced a yarn that was even and smooth. The milkweed fibres are similar to cotton when spinning in that they are easily reattached when broken during the spinning process.



Figure 1 Milkweed fruit with flowering of new fruit including escaped fibres from opened fruit.



Figure 2

Note: Avoid yarn overspin if using a lighter weight support spindle as it will constantly snap. A heavier support spindle is recommended.

Single yarns were spun for both warp and weft with the addition of a variety of wool blends (mohair, Corriedale and merino) with the milkweed fibres. The blended yarns were plied using a Peruvian technique because of the small amount of yarn. A cotton/milkweed blend was also produced but proved to be weak and unsuccessful.

Weaving

Three samples were made for this project using the small amount of fibre available (50 gm). The samples were warped on an 18 x 20 cm sampler hand loom weaving set: 11 tpi, 6 tpi and 7 tpi respectively. String heddles were added for weaving with a small miniature stick shuttle and Navajo fork. Although I did not use a warp solution to avoid fraying warp and weft threads, it is advisable to use a sizing to protect these delicate milkweed threads.

Sample 1: 100% milkweed singles, natural colour, dry-spun, Z-twist. The sample is lighter than air and very fragile.

Sample 2: 100% milkweed singles, natural colour, wet-spun, Z-twist. Thread spun thick and thin allowing for prominent surface lustre.

Sample 3: Flax warp, milkweed weft. Natural colour, wet spun, Z-twist, weft-face weave. Very even and smooth woven sample.

Dyeing

An initial scouring must be done prior to dyeing to remove all grease, wax or oils which would otherwise prevent an even dyeing of the milkweed fibres. Place fibres inside a synthetic net bag and insert in warm water for 0.5-1 hour.

Although I usually work with natural dyes (e.g. indigo, cochineal, madder and imbuya wood), I chose to use a synthetic dye because of the time schedule of this project. As part of the fibres had been spun in their natural state and I did not weigh the remaining fibres, I used a larger amount of dye to guarantee a darker colour of the French (Ideal) synthetic dye (15 g dye to 150-250 g fibre). Following the first 30 min of dyeing on simmer, 10 Tbsp. of vinegar were added to the dye pot to set the dye, followed by another 30 min simmer. The fibres were left in the dye pot to cool overnight to absorb as much dye as possible. The dyed fibres were removed the next morning, spread out and left to dry on a screen.

Note: Don't forget to cover the fibres while they are drying!

Feltmaking

Two samples were felted using 50% merino and 50% milkweed, and 20% merino and 80% milkweed. The 50%/50% was made up of three layers of fibres and the 20%/80% of five layers respectively.

The merino and milkweed fibres were blended and carded on a Louet drum carder into light, silky, shiny batts making it very easy to lay out the layers for felting.

The 50/50 blend is similar to a silk/wool blend on inspection and would not be detectable except under close scrutiny with a high-power magnifying glass. The milkweed fibres gave an overall sheen to the felt sample and a very light weight. As the fibres were not a factory blend but rather a hand blend, the milkweed fibres appeared in small squiggles throughout the felted surface because of their non-felting properties. The 20/80 blend containing the greater amount of milkweed fibres produced an overall evenness of both blend and sheen as well as being very light in weight.

Milkweed, left in its natural cream colour or dyed with a natural or synthetic dye, will add a beautiful sheen-like silky surface to your work. Although spinning with this very delicate fibre may be time consuming, I recommend it very highly. As each day passes we find ourselves further and further away from nature, and it is nature that gives us our raw materials for free. Many that have worked before us have looked to the past for old techniques, methods and raw materials, and have re-interpreted them for the present. There is now room for a return to milkweed.

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This article was also published in *Shuttle, Spindle & Dyepot*, Spring 1997.

An Archaeological Experiment with Buried Textiles

In 1960 the British Association for the Advancement of Science constructed an experimental earthwork. This was sited at Overton Down, near Marlborough, Wiltshire, and comprised a bank alongside which was a ditch from which the earth to make the bank had come (Jewell 1963). The object was to ascertain the rate of weathering of the bank and how long it took for the ditch to silt up. But the experiment was also used to study the rate of decay of objects, including cloth, buried within the bank. Sections of the bank were excavated after two, four, eight, 16 years, and this article summarises my investigation of the cloth samples recovered after 32 years (Ryder, 1996).

There were two samples of half-bleached linen, a sample of cotton khaki twill, a sample of woollen contrast cloth (tweed), and a sample of wool worsted gabardine. It is unfortunate that modern, machine-made fabrics with synthetic dyes were used. Only the linen cloth was of the kind encountered on prehistoric sites. Each wool cloth was made from an inappropriate, imported fleece type unknown in prehistory, and the gabardine was made using the modern worsted process. It would have been more informative to have used hand spun and woven wool cloths made with primitive fleeces having a natural pigment.

Most prehistoric wools (e.g. brown Bronze Age Soay) had at least some natural pigment and it would have been interesting to note the effect of burial on this. Non-pigmented wools (e.g. white Iron Age Shetland) could have been included and dyed with plant dyes. It would have been useful to include silk (known from Roman times), and other natural plant fibres such as hemp. Since the different yarn systems in the archaeological material are investigated separately (often having different fleece type) some sort of marker to indicate which was which should have been included. It was a mistake to request material from textile research organisations with little or no interest in archaeology.

When the bank was constructed, one set of examples was included within the bank, which was of chalk, and another set on the turf beneath the bank. After 32 years no samples of textiles were recovered from the turf and so they were presumed decayed. The wool as well as the plant fibres had survived in the chalk. A quantitative study was made of the extent to which the weave might have changed during burial by making yarn counts per unit length and width of the cloth. Yarn thickness was measured and it was noted to what extent the direction of the spinning twist could still be discerned. Comparisons were made with the unburied control material that had been kept since

1960. Fibre diameter measurements were made by the International Wool Textile Organization (IWTO) method I use for archaeological material. To allow more precise comparisons of mean fibre diameters confidence limits were calculated from the standard deviations.

It was impossible to distinguish the warp from the weft and so the two yarns were designated (a) and (b). Except in the woollen cloth, which had a dyed weft, it was not possible to match up the buried yarns with the control yarns. In Table 1, giving the fibre diameter measurements, the yarns are listed in pairs with separate identification letters.

It was important to distinguish the damage that can result from the wear of a textile from the decay occurring during burial. I could not recall any degeneration of flax or cotton, which are single cells, that would indicate what to expect in this burial material. With wool, fibre damage takes several forms: garment wear results in *flexing* damage in which a fibre appears bent and split to reveal cortical cells forming the bulk of the fibre. Carpet wear results in *abrasion* damage in which the ends of the fibres appear smooth and rounded and there is no fraying. Moth damage literally appears like a *bite-out* of the fibre.

Burial degeneration of wool also takes several forms: 1. fibre breakage, which can be (a) *clean* across the fibre, (b) *step-wise*, thought to occur along the boundary between the two halves of wool fibres, the ortho- and para-cortex and (c) *concentric*; 2. loss of the thin outer cuticle so that the cortical cells within are seen as longitudinal striations; and 3. further degradation which occurs as fraying or splitting into the individual cortical cells.

Gross Observations

It was mostly possible to discern the spinning twist of the yarns as easily as in the controls and as expected there had been no modification. One half-bleached linen sample appeared as a gray-black sheet with no evidence of weave, while the other still had the creamy colour of flax fibre, and the plain weave remained clear. There was no change in yarn thickness. One system was finer (0.25 mm) and more tightly spun (presumed warp), while the more loosely-spun (presumed weft) was 0.5 mm thick. Each system had 31 yarns per inch, which compared with counts in the control material of 32 in one system and 36 in the other. This confirmed the visual impression that the weave had become more open with burial.

Table 1 - FIBRE DIAMETER MEASUREMENTS (microns)

Sample	Diameter range	Mean +/-Confidence limits	Mode

Linen cloth (flax fibre) buried			
yarn (a)	6 - 34 40 46	14.12 +/-1.20	14
yarn (b)	8 - 24	14.51 +/-0.96	16
Linen cloth (flax fibre) control			
yarn (c)	8 - 28	15.47 +/-0.82	16
yarn (d)	8 - 32, 36	15.58 +/-1.05	16
Cotton buried			
yarn (a)	8 - 20, 22	12.38 +/-0.91	12
yarn (b)	8 - 20	13.81 +/-0.87	12
Cotton control			
yarn (a)	8 - 24	13.35 +/-0.66	12
yarn (b)	8 - 20, 24	13.54 +/-0.68	12
Woollen buried			
dyed (1)	8 - 30, 38	17.30 +/-1.28	16
weft (2)	8 - 28	16.08 +/-0.88	16
Woollen control			
weft	12 - 28	19.08 +/-0.84	16
warp	12 - 38,42,44,48	23.83 +/-1.34	22
Wool worsted buried			
yarn (a)	8 - 36, 40	18.30 +/-1.22	16
yarn (b)	8 - 30	16.70 +/-0.87	16
Wool worsted control			
yarn (c)	12 - 32	19.74 +/-0.93	16
yarn (d)	14 - 30	19.64 +/-0.76	18

One micron=0.001mm. Diameters outside the main range are listed separately. The mode is the most frequent diameter.

The cotton khaki twill had become slightly paler than the control. Each system had 48 yarns per inch. This compared with 44 and 48 in the different systems of the control, which suggests slight shrinkage of the buried material in one direction. The yarns were only about 0.1 mm thick as in the control. The woollen contrast cloth was black and had disintegrated into yarn fragments, so no thread count was possible. The yarns were about 0.5 mm thick compared with 1mm in the control. Microscopic examination of the buried material revealed only dyed yarns, so the undyed warp had not survived. Limbrey (1976) noted that the dyed wool yarn was less decayed than the undyed one after 16 years unlike the worsted. The original light brown colour of the wool worsted gabardine had not changed greatly. The cloth had become darker around

the edges, but was paler within a fold. Comparisons with the control showed that, except at the edges, the integrity of the cloth and 0.1 mm yarns had been maintained. It was impossible to make a thread count on either this or the control, owing to the tight twill weave.

Microscopic Observations and Measurements

The flax fibres in the intact sample of buried linen cloth mostly lacked discolouration as in the controls, but the periodic nodes were less clear. For mounting, it was even more difficult to separate the fibres from the yarns than in the controls. The fibre diameter modes were nearly all the same (14 and 16) (Table I). Although the mean fibre diameters in the buried flax

(14.1 ± 1.2 and 14.5 ± 0.96) were lower than those of the controls (15.5 ± 0.8 and 15.6 ± 1.05) the differences are only about 1 micron, which is equivalent to the experimental error. If the confidence limits are added to the means of the buried yarns, the values approximate more closely to those of the controls.

The single-cell cotton fibres in the buried khaki twill appeared colourless under the microscope (as in the control) and as with the flax, no damage or decay was observed. The mean fibre diameter measurements shown in Table I are remarkably consistent, and again all the modes were the same. The greatest difference is that of 1.43 microns between the two buried yarns compared with 0.19 between the two yarns of its control. Although buried yarn (a) has a lower mean fibre diameter than both of the control yarns, yarn (b) has a higher mean diameter than both of the controls. From these similarities, as with the flax, there does not appear to have been any changes of fibre diameter through burial.

Since each yarn sub-sample of the buried woollen was dyed it seems that only the weft remained (having been inadvertently sampled twice). None of the scales of the outer cuticle were seen and so these may have been lost because the scale edges were very obvious in the control fibres. Some fibres had frayed into the constituent cortical cells; others had stepwise breakage. In some fibres the stepwise breakage was concentric so that a 20-micron fibre had a sudden reduction to one with a diameter of only 16 microns.

Wool is much more variable than either flax or cotton (illustrated by the inclusion of coarser fibres in the warp control - Table I) and this explains why the repeat measurements of the dyed weft are not identical, but they nevertheless differ by no more than the experimental error. When the confidence limits are taken into account to consider the apparent lower mean diameter in the buried samples, it is clear that any reduction is only about 1 micron. For instance, in the buried weft (2) the mean of 16.08 plus 0.88 equals 16.96 and in the buried weft (1) the mean of 17.30 plus 1.28 equals 18.58, while the mean of 19.08 in the control weft minus 0.84 equals 18.24. The diameter distribution showed a shift to finer fibres in the buried material, but the mode was the same at 16 microns. As with the flax and cotton it would be unsafe to say from these few measurements that burial necessarily causes a reduction in wool fibre diameter, although with wool the reduction could be due to the loss of the cuticular scales. But the shape of the diameter distribution, which defines fleece type, had not changed.

In the wool worsted, the dye was on the whole as clearly visible in the buried, as in the control, fibres. Burial had not obscured the well-known phenomenon

in which dye is taken up more readily on one side of the fine fibres (the ortho-cortex) than the other. No surface scales were visible on either the buried or the control fibres. Although some fibre ends had frayed there was no general disintegration into constituent cortical cells. A few fibres had the bite-out form of decay.

Although the buried samples had a finer lower limit to the diameter distribution (Table I), the mode was the same and the mean was within the range of experimental error indicated by the confidence limits. The buried sample with the lowest mean (16.76) could be as high as 17.57 and the control with the highest mean (19.74) could be as low as 18.81, so as with the woollen, any reduction in fibre diameter is only of the order of 1 micron.

Discussion and Conclusion

The remarkable feature of the 1992 excavation was that the wool as well as the plant fibres had survived in the chalk environment; it was expected that the wool keratin would have been attacked by the alkali of the chalk since the protein does not usually survive on chalk sites. Because wool has a cellular structure, it showed more disintegration than the single cells comprising the plant fibres. The different forms of burial decay observed previously in archaeological material (described above) were found in this experimental material. It is very interesting that wool fibres with a bite-out were observed, and so the present investigation has confirmed that this can occur during burial, and so such damage in archaeological material is not necessarily due to moth damage prior to burial. Most of the samples were remarkably well preserved.

This leads to two comments based on my study of thousands of textile remains over the last 35 years: 1. If a sample has survived for a few years, it could well survive very many years. Whether or not a textile will survive, as with fossilisation, appears to be largely determined by the initial burial conditions. 2. Survival tends to be an all or nothing effect - degraded textile fibres are uncommon. Thus most samples were preserved in the chalk environment (pH 8.2), whereas nothing was found in the turf environment (pH 5.6). There was more microbiological activity in the soil than the chalk, which could explain the lack of survival in the soil. The insolubility and relative dryness of the CaCO_3 of the chalk may have killed micro-organisms yet not been strong enough to dissolve the protein of the wool. Folding of the cloth was important in preserving those parts on the inside. Not only does the synthetic dye appear to have survived better than natural dye, but it seems to have preserved the wool. But this is still a short time compared with most archaeological material.

There appeared to be little change in overall dimensions. Yarn counts suggested slight expansion of the linen cloth and slight shrinkage of the cotton cloth. Some of the buried yarns appeared to be thinner than in the controls, particularly those in the woollen cloth. Although the wool as well as the plant fibres each had hints of a slight fall in mean fibre diameter, more samples would have to be measured and the data subjected to statistical analysis to prove such a decrease. One might expect that finer fibres would decay more readily, but the decreased mean was associated with an increase in the proportion of finer fibres, the mode remaining the same. Where differential decay has been observed previously it has not occurred in the coarsest, heavily medullated (and therefore brittle) hairy fibres of a fleece, which has had the effect of increasing the proportion of fine fibres. The omission of any hairy fleeces from this experiment precluded an investigation of this phenomenon.

If the changes in dimensions should prove to be real, they would not cause an error in the identification of fleece type because this is made on the shape of the fibre diameter distribution. There is strong evidence that flax and wool do not change much in diameter with burial since flax values have remained the same since earliest times and wool fibres of the same category, e.g. fine and medium, have had the same diameter throughout history.

Prehistoric Flax

During the past six years flax (*Linum usitatissimum* L.) has been grown in a *prehistoric* manner. Each year the flax seeds of the previous year have been sown, stored, harvested and handled in a different way.

One of the remarkable results was that, apart from producing white, golden and gray flax fibres, a green flax fibre/yarn was also been obtained.

The green colour was obtained following the following preparation of the harvested flax:

- wet retting for 14 days in a freshly hewn poplar container (dug-out canoe) filled with 12 °C ditch water and 8% duckweed, and an average daytime temperature of 14 °C.

- dry retting for 15 days. The first eight days had an average daytime temperature of 13 °C, while the remaining seven days had a temperature of 12 °C.

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The flax stems were lying on wooden blocks allowing free circulation of air under the stems.

The green colour remained for three years. The fourth year the colour faded away. During the four years of storage the fibres and yarns were kept on a shelf in the corner of a room four meters from the nearest window.

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Comment

Garment Definition: Aegean Men's Wear in the Middle and Late Bronze Age

Paul Rehak's recent account of Aegean men's wear, Aegean breechcloths, kilts, and the Keftiu Paintings, *American Journal of Archaeology* 100(1) (1996) 35-51, has left me concerned as I find the terminology and reconstructions proposed misleading and confusing. The apparent discarding of the term *loincloth* is too significant to be ignored.

These problems of definition have occurred because our knowledge of Aegean dress is predominantly based on figural representations (e.g., the Knossos frescoes, date range: Late Minoan IA (LMIA) to LMIB [c. 1500-1450 BC], and those of Akrotiri on Thera, LMIA). Furthermore the figures are often associated with cultic, mythological or festive scenes which means that the existence of specific elements or even entire garments can be disputed.¹ In addition the identification of ethnic groups and subgroups needs to be investigated as the differences between Minoan and Mycenaean remain unclear - this is vital as the Mycenaeans appear to have conquered Knossos and Crete by LMIB. This question of ethnic groups is complicated by the fact that multi-directional transference between the two cultures and that of the Cyclades has a long history.

As Bronze Age Aegean artists appear often to have reduced objects, figures and garments to simple forms where only the essentials were displayed, such as gender, status or race, our analysis of garment types will remain problematic. As a result, the iconographic decoding and understanding of garment construction become a complex affair.

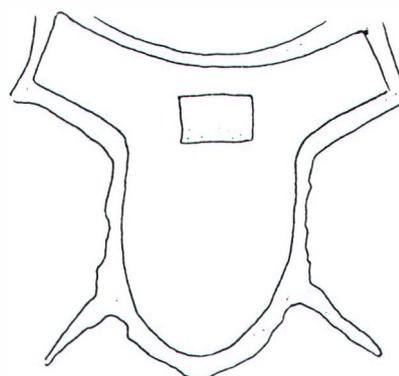
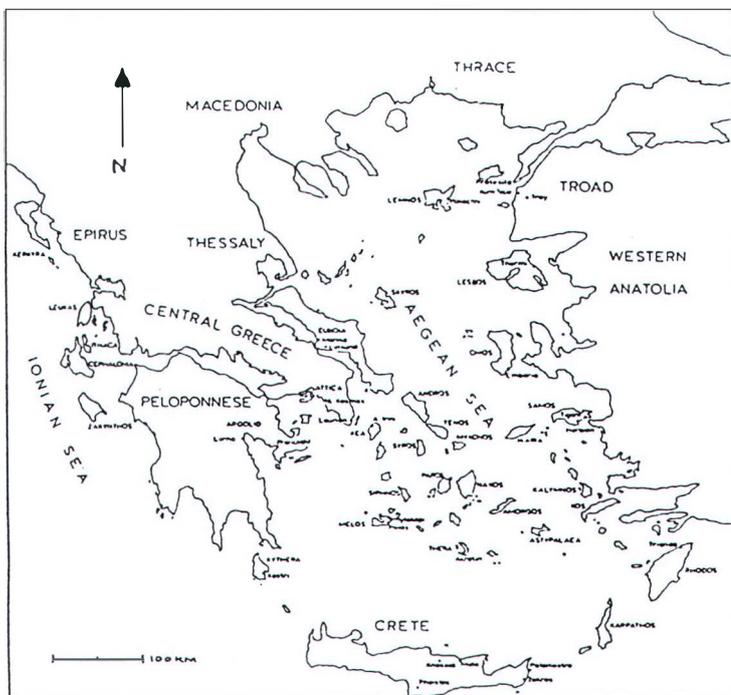


Figure 1 Maiherperi's gazelle-skin loincloth, XVIIIth Dynasty (after Hall, fig.23).

Despite these problems, the analysis of artistic skills and technical traits used to depict garments - mainly seal engraving, wall painting and sculpting in clay and bronze - should lead to increased understanding of their overall significance and type. Understanding the role and function of the arts is therefore key. Each costume is comprised of a consistent set of elements with which the viewer was familiar. Similarly, differing artistic conventions and traditions were used between mainland Greece, the Cyclades and Crete to depict figures who shared similar, if not identical, garment types. Therefore the identification of regional differences in common garment types should lead to a greater understanding of their construction.

Overall, the presence of these differences suggests that crafts were not strictly codified throughout the Aegean world. This would explain why artistic renditions of known garment types vary. This situation means that comparisons drawn between garments depicted on wall paintings and those represented for instance on seals or figurines should be undertaken cautiously. Before adopting Rehak's



The Aegean

terms, a brief definition and clarification of basic Aegean male garments is needed.

The **codpiece** is an appendage, like a small bag or flap that is found at the front of a man's breech.² This implies it is a separate item that is either added or attached to cover the loins. In the case of the Aegeans a small supple or stiff bag-shaped item (or fine loincloth) may have been worn as an undergarment for support. Certainly a tie or length of cloth would have been passed between the legs in either case. This garment is widely seen in representations of Minoan Crete and appears to have been a standard element of male dress.

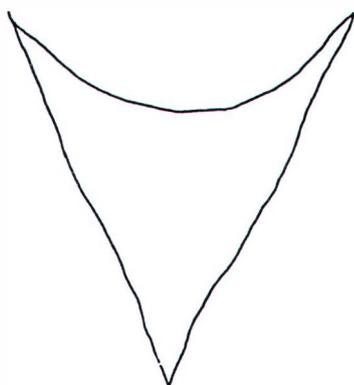


Figure 2 The triangular shape of Kha's loincloth, XVIIIth Dynasty (after Hall, fig.24).

The **loincloth** is a length of cloth that is also passed between the legs and secured around the waist at the front or back, worn mostly as a sole garment. The thighs on either side remain visible, whilst the buttocks are covered. In essence, the loincloth can be paralleled to some types of modern day underwear or the Indian male *dhoti*.

The loincloth was widely used in the ancient world and several versions are known (e.g., Nubians in Rehmire's and Menkheperasonb's tombs wear loincloths which are secured at the front³, closely resembling those attested on early Peak Sanctuary Cretan figurines). Loincloths (and codpieces) are also seen on later wall paintings, vases and seals in the Aegean (e.g., a Mycenaean seal depicts a loincloth secured at the back by a bow or knot).⁴ Simply shaped leather loincloths which incorporated ties (or small narrow belt) are known to have been used for several purposes in ancient Egypt, and a number of complete examples have been recovered. Two very fine 18th Dynasty gazelle skin loincloths were found in Maiherperi's tomb in the Valley of the Kings (Fig 1). Triangular linen loincloths designed to be worn as

underwear were also found in the contemporary tomb of Kha (Fig 2).⁵ These provide tangible evidence to reveal how the crotch area was treated by tailors at this time. In addition, we know that triangular linen loincloths were worn beneath skin versions.

Similarly the roughly contemporary processional male figures that adorn the stairway in LMIA Xeste 4 at Akrotiri (Thera) appear to wear loincloths beneath their kilts as a white rolled band of cloth protrudes above the waistband/belt (Fig 3).⁶ During the New Palace Period an item resembling an apron (worn back or front) appears to have been added to the tightly belted loincloth or codpiece. These may have been secured by a bow at the back as attested on a number of seals and the crouched boxer on the Ayia Triada Boxer Rhyton.⁷ As far as the Keftiu emissaries in the tombs of Senmut, Useramon and the early versions in the tomb of Rehmire are concerned, the appendages that have been labeled codpieces could, as Barber and others have suggested, also represent the endflap of the loincloth which is secured under the belt and left to hang in the front.⁸

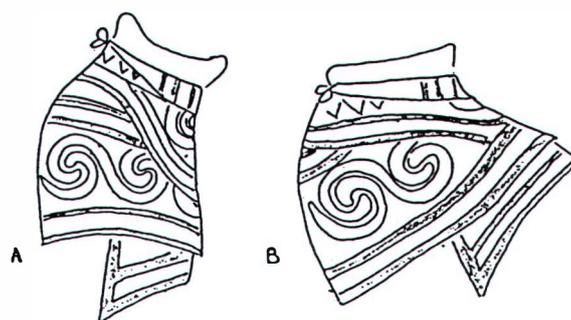


Figure 3 Rough sketches of the LMIA kilts seen at Xeste 4 (after Doumas, pl.138): A) Figure standing with legs together, and B) Figure with legs parted. A feasible fresco parallel to the parted kilts represented on seals and metalwork.

This brief overview not only shows that a number of distinct loincloths coexisted but that Rehak's long narrow band (and waistband/belt) is not suitably shaped to cover genitals and buttocks. To my knowledge his reconstruction is not based on any firm ancient or modern day parallels. Moreover, the same outfit (loincloth/codpiece) appears to have two labels: "belt with breechcloth" (Fig 4) and "belt with codpiece".⁹

The use of the word *breechcloth* is ambiguous as it refers solely to the area of the buttocks. As a loincloth or codpiece may incorporate a belt, it may

not consist of two separate items as drawn by Rehak. Clearly, if one attempted to wear this garment the first problem would be that the band would ride up between the buttocks leaving them visible, even with the extension of the narrow band he calls "backflap and frontflap" (intended to portray the aprons). The awkward shape and absence of measurements make it an unlikely reconstruction. His diagrams cannot easily be paralleled with the garments depicted in Minoan or Mycenaean art. Hence the original term *loincloth/codpiece* coined by Aegean scholars is in fact the most appropriate, especially as one or both could have been worn simultaneously.

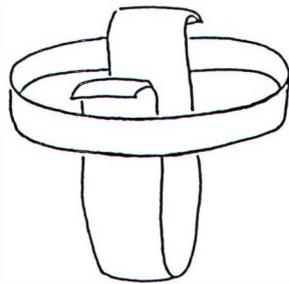


Figure 4 Rehak's reconstruction of a Minoan loincloth/codpiece (after Rehak, fig 2A and C, "belt with breechcloth" or "belt with codpiece"). How the belt is attached is unclear.

The **kilt** (Fig 5) is a single, rectangular piece of cloth which is large and wide enough to be wrapped around the waist and cover the upper thighs. It is in fact a short wrapskirt that overlaps in the front so as to keep the thighs covered and therefore very distinct from the tightly belted loincloth/codpiece.¹⁰ In movement, the front sections which overlap, part or separate so as to facilitate walking and running. The Middle Cretan III (MCIII) fishermen on a pottery stand from Phylakopi wear a basic type of kilt which rises up at the front.¹¹ This is characteristic of what happens when one wraps a towel around one's waist and folds or rolls the upper ends into the waist. Though no knot or parting of the front sections is apparent, this appears to be the earliest depiction of a kilt in the Cyclades. The earliest representations of patterned kilts in the Cyclades are those from the male procession scene in Xeste 4 (LMIA) at Akrotiri. Here, a bold running spiral motif is edged with decorated bands on either side. The artist has clearly depicted how this rectangular length of cloth has been simply wrapped (as the motif follows the winding motion) around the body like a towel onto which a waistband with ties or belt was used. Unlike wrapskirts or kilts of today which have an inner button on the waistband

to hold the first under section in place, here it hangs down forming a pointed end (reminiscent of the pointed kilts represented in Rechemire's tomb and the Procession Fresco at Knossos).

The kilts appear to have been loosely wrapped around the waist over a loincloth or codpiece. These two identical examples are the only ones we possess that reveal in which direction the kilt was perhaps wrapped (apparently left to right). Unfortunately, the last and upper band (immediately below the waistband/belt which is knotted at the back) is depicted going in the opposite direction. Hence, how naturalistic is this kilt? Was the artist familiar with the garment, had he ever seen it, or was he more preoccupied with its symbolism?

A handful of seals and finger rings depict warriors or hunters in *parted kilts*¹² (as the hips are covered). The depiction of this class of garment appears to be restricted to seal engravers and metalworkers and are commonly associated with hunting or warfare scenes. More significantly, they are predominantly found in or associated with mainland Greece. Variations and inconsistencies in the shape, size and decoration of this garment are also attested (e.g., *Corpus of Mycenaean/Minoan Seals* I: no.9, no.16). More importantly, this type of kilt occasionally incorporated long ties that sometimes ended in tassels. These are seen hanging to the front or between the legs of individuals. The absence or presence of *flounces* shown on these garments needs to be explained.

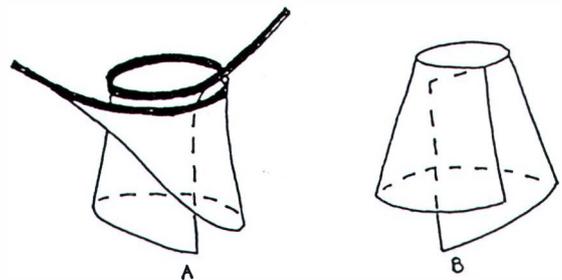


Figure 5 A) Example of a shaped kilt with waistband and ties incorporated. B) The concept of the kilt: a rectangular piece of cloth long and wide enough to be wrapped around the hips.

The engravers have apparently successfully reduced this garment to two or three horizontal slashes cut across the thigh. I believe this is to indicate to the viewer that the figure is clothed, male and in rapid movement. Nevertheless, the variations raise a number of issues. Are we looking at one or several types of garments? How familiar were the artists with

this garment type? Do the variations in shape and style imply we are dealing with the introduction of a new garment whose depiction was not yet formalized? If so, can the high level of abstraction be used to reinforce this notion?

One possibility is that if a kilt with flounces was worn by men, their similarity with the conventionalized woman's flounced skirt may have posed an artistic dilemma (though not apparently to wall painters and sculptors). Did the seal engravers and metalworkers who were restricted spatially opt for the convention of slashed thighs or bands on parted legs to avoid confusion between the sexes?

At first glance, these horizontal slashes which run across and occasionally past the thighs on men whose legs tend to be parted, are suggestive of shorts or flounced skirts. This is probably what led Paul Rehak to define them as *shorts* in his fig 2G (Fig 6D). Although he accepts these are not shorts in the true sense, it is hard to comprehend why such a misleading term was chosen. It clearly implies a level of tailoring that most would dismiss and a garment made in at least two parts which requires numerous seams. Furthermore, by labeling his illustration of a rather strange flounced skirt/kilt (with waistband but no method of fastening) as "shorts" he is liable to confuse scholar and layman.¹³ Despite the similarities, I believe the artists have attempted to depict a kilt with parted front sections (often with two decorated border bands).

To strengthen my argument, I would like to offer a hitherto unrecognized fresco parallel: the Captain of the Blacks (LMII-III A) at Knossos (Fig 6C). The latter is running (legs parted) and wears a short kilt which comes to a point or V shape at the front. The wall painter has drawn a vertical line from the hem up, where the two sections of the kilt would have parted. The large decorated border on the lower half of the kilt can be likened to the decorated bands or the two or three horizontal lines seen slashed across the thighs (e.g., the Lion Hunt dagger and the Silver battle krater, Figs. 6A and 6B).

These slashes and bands can be interpreted in a number of ways. Firstly, as woven band(s) which were added to the lower half of the kilt (technically this would have the advantage of making the kilt bottom heavy and therefore hang straighter). Secondly, as woven border patterns, and thirdly, as a series of bands meant to overlap each other to create flounces. If flounced elements were added to this garment, it seems likely that they would have been better suited to the kilt, for the use of modern day type shorts with flounced legs in the Bronze Age is surely doubtful.

As the representational history and the development of Aegean dress need to be analyzed before secure garment definitions can be offered, the interpretations presented here must continue to be tested.

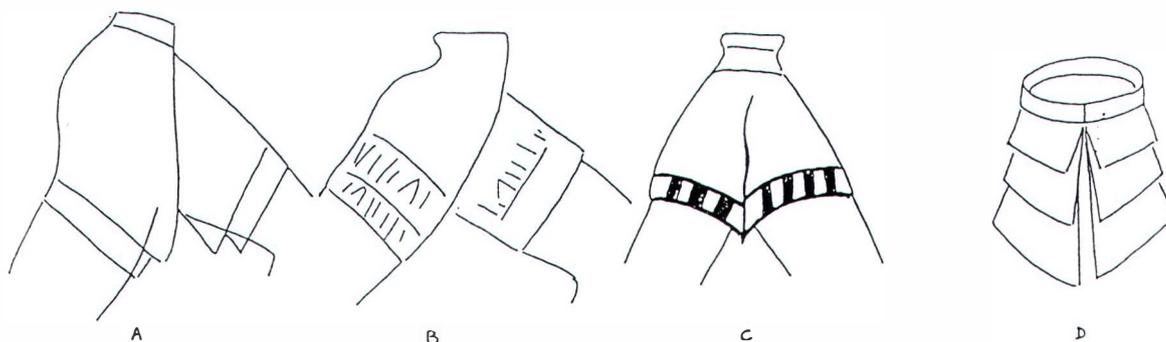


Figure 6 Some sketches of the types of kilts worn by men in action and lastly Rehak's reconstruction. A) The Lion Hunt dagger, Mycenae Shaft Grave IV, (LMIA); first figure on the left (after O. Dickinson, *The Aegean Bronze Age*, Cambridge University Press (1994) Pl.5.1). B) Silver battle krater, Mycenae Shaft Grave IV, (LMIA); third figure from the left (after A. Sakellariou, in *Antik* 17 (1974) 5, fig.1a). C) The Captain of the Blacks, Knossos, LMII-LMIII A (after PMII.2, pl.XIII). D) Rehak's "shorts" (after Rehak, fig.2G).

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1. E.g., at Xeste 3 (Thera), the "Mistress of the Animals" in the saffron gathering scene is portrayed with wings. Hood, M.S.F. (1978). *The Arts in Prehistoric Greece*. London. Fig 223f of a human figure with goat's head and wings.
2. *Concise Oxford Dictionary*, 8th ed. (1990).
3. de Garis Davies, N. (1943). *The Tomb of Rekh-Mi-Re' at Thebes*, The Metropolitan Museum of Art, Egyptian Expedition, vol. II. de Davies, N. and deDavis, N. *The Tombs of Menkheperasonb, Amenmose, and Another*. The Egypt Exploration Society, London.
4. *Corpus of Mycenaean/Minoan Seals I* (1964) no.112.5. Hall, R. (1986). *Egyptian Textiles*. Shire Egyptology. Shire Publications Ltd. Figs. 23 and 24.
6. Dumas, C. (1992). *The Wall-paintings of Thera*. Athens, The Thera Foundation, p 177, pl.138 (Xeste 4 kilts).7. Zervos, C. (1956). *L' Art de la Crete, Neolitique et Minoenne*.
8. Barber, E. J. W. (1991). *Prehistoric Textiles*, Princeton University Press, p 335, footnote 11.
9. Rehak, P. (1996). Aegean breechcloths, kilts, and the Keftiu Paintings. *American Journal of Archaeology* 100(1), (35-51), figs. 2A and 2C.
10. It should be noted that though Rehak argues for the use of the kilt and the tunic by the Minoans, at present, the first kilts are represented at Phylakopi in MCIII, Akrotiri and Ayia Irini in LMIA and on mainland Greece such as from Shaft Grave IV (Mycenae), also dated Late Helladic (LH)/LMIA. Though the Cretans may have known of the kilt by Middle Minoan II-III (MMII-III) as attested by the Mallia acrobat depicted on a sword pommel (see Hood, M.S.F. (1978). *The Arts in Prehistoric Greece*. London, fig 171), the sparse and insecurely dated Minoan and Cretan examples remain inconclusive in proving that this garment was part of their ethnic identity. (Incidentally, the tunic only seems to appear in Crete during the Mycenaean period from ca. LMIB-LMII onwards, as attested at Knossos, e.g., the Procession Fresco LMII-LMIIIA1. Though this garment is seen in the Cyclades by LMIA at Ayia Irini.)
11. See the fishermen lamp stand, *Excavations at Phylakopi in Melos*, The Society for the Promotion of Hellenic Studies (1904), suppl. IV, pl.XXII.
12. Hood, M.S.F. (1978). *The Arts in Prehistoric Greece*. London, figs. 178, 228A, 228B and 229. For examples of parted kilts see, the Lion Hunt dagger Mycenae Shaft Grave IV (LMIA), impressions from gold flattened cylinder seals from Shaft Grave Circle A at Mycenae ca. 1500-1400 BC, and bezel of the Danicourt signet ring (LHIIB).
13. Morgan. L. (1995). The wall-paintings of Ayia Irini, Kea. *BICS* 40, new series 2, 243. Worryingly, Morgan has recently chosen to use the term shorts when she refers to some of the Ayia Irini men depicted on the wall paintings at Kea (Cyclades).

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Analysis

Two Twelfth Century Stoles Attributed to Eleanor, Queen of Castile

Eleanor ('Leonor' in Spanish), the sixth child and second daughter of King Henry II of England and his second wife, Eleanor of Aquitaine, was born in 1161 and later married King Alfonso VIII of Castile, the son of Sancho III whom he succeeded to the throne at the age of three years. Both Eleanor and Alfonso died in 1214 and were buried in the royal sepulchre at the Monasterio de Santa Maria la Real de Huelgas, the church of the ruling family of Castile, in Burgos, Spain. Two exquisite brocaded tabletwoven stoles attributed to Eleanor are found, however, in the Real Colegiata de San Isidoro in León, and these textiles have recently been available for closer analysis.

The church of San Isidoro was consecrated in 1063, and the Gothic cathedral built later on the spot was begun in 1195. Although the stoles are now in this lovely church, it would appear that this was not their original location. It is probable that they were woven in Burgos and later transferred to León, a not unlikely scenario when it is known that Eleanor's daughter, Berenguela, married Alfonso IX and became herself Queen of León in 1190.

The two brocaded bands are generally considered to be stoles although one is approximately half the length of the other and still has red and white fringes at both ends. The shorter one is considered to be too long to be a maniple. The stoles are tabletwoven in the 'classic' tablet weaving technique which gives a surface appearance of chevrons, to which supplemental brocading wefts were added. With warp of yellow silk edged with red silk borders, both stoles are patterned with the Castilian family motif of a 3-towered castle which repeats vertically and with the castles oriented out from a centre field of Latin words in Gothic capitals. At each end of both pieces, there is a single large 'cross crosslet', and the red borders are checkerboarded with small white squares. The wording on the stoles states that Eleanor had them made, although an initial reading would seem to indicate that this would have been difficult as the dates on the stoles, MCCXXXV (1235) on the long one and MCCXXXVI (1236) on the shorter one, are later than her death in 1214. However, the dates on the stoles are given in medieval Hispanic time which was 38 years ahead of medieval Christian time. After recomputation, the dates on the stoles become 1197 and 1198, respectively, which places their manufacture well before Eleanor's death.

Both textiles are in excellent condition, only missing some brocading from the castles on both pieces and with most of the wording on the shorter stole now gone. They bear a very strong resemblance to the beautiful brocaded tabletwoven bands from the 13th and 14th centuries which were discovered in the royal tombs in Burgos, Spain.

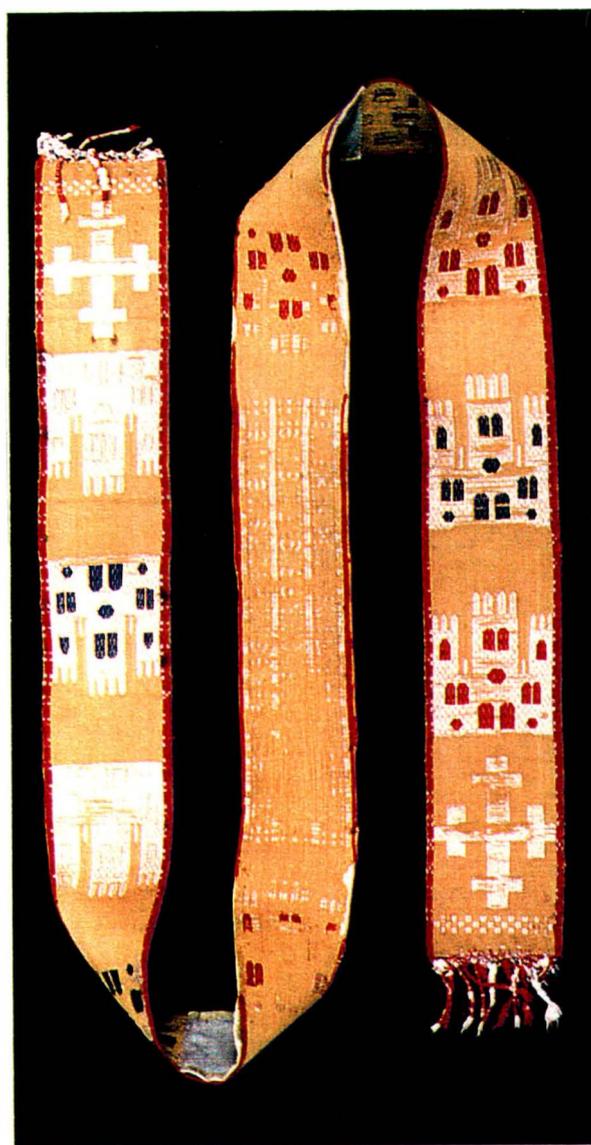


Figure 1 The short stole. (Photo: Archivo MAS.)

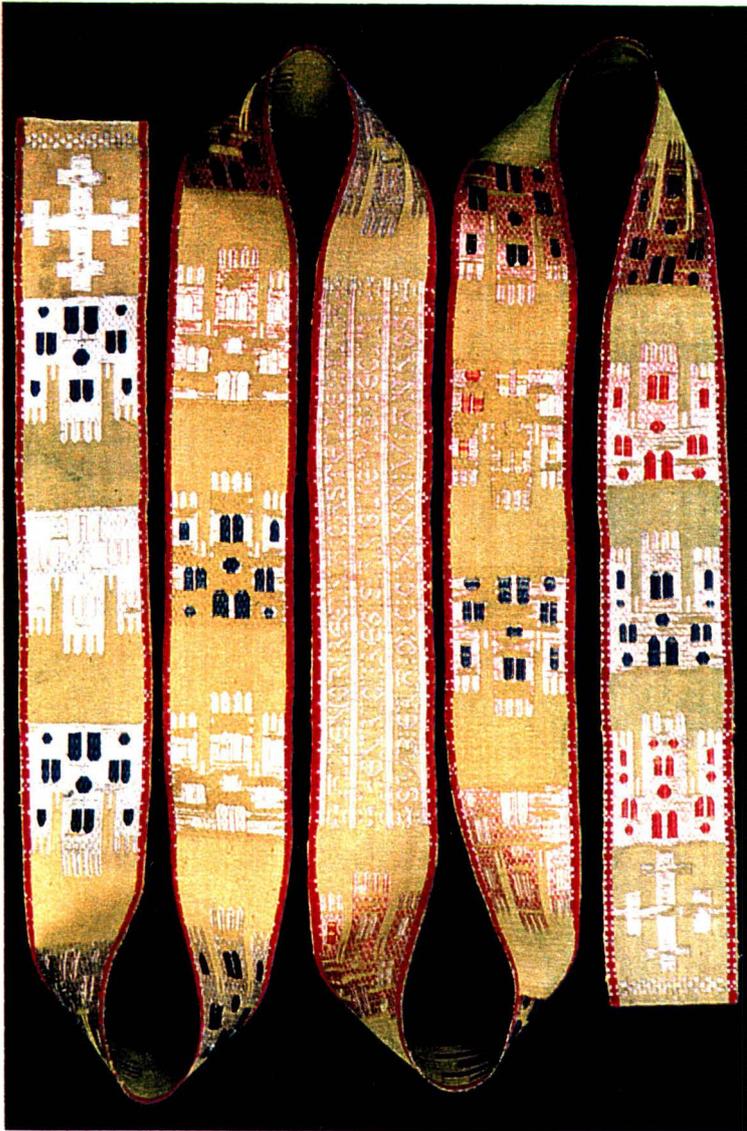


Figure 2 The long stole. (Photo: Archivo MAS.)

The Short Stole

Width: 6.0 cm

Length: less than 145.0 cm (ca. half the length of the stole)

Number of tablets: ca. 81 (ca. 7 in each border, ca. 67 in center)

Threading per tablet: all four holes = ca. 324 warp ends

Orientation of tablets: alternating S and Z

Warp: red and yellow silk (1 outer tablet yellow, ca. 6 border tablets red, ca. 67 center tablets yellow)

Brocading wefts: white, blue and red silks

Border pattern: checkerboard in white silk on red silk ground

Main pattern: on yellow silk ground, a large 'cross crosslet' in white silk at each end with single 3-towered castles in white, blue and red silk oriented vertically down the maniple (5 castles on each side) from a central field of Latin words in Gothic capitals, now almost completely missing (but originally with the date MCCXXXVI on it as well as words almost identical to those on the long stole), worked in white silk with the three lines of text each separated by double straight lines in white silk;

some floats visible on back

Additions: a red and white fringe at both ends; some of the back now covered by white cloth

The Long Stole

Width: 6.0 cm

Length: less than 290.0 cm (2.9 m)

Number of tablets: ca. 81 (ca. 7 in each border, ca. 67 in center)

Threading per tablet: all four holes = ca. 324 warp ends
orientation of tablets: alternating S and Z

Warp: red and yellow silk (1 outer tablet yellow, ca. 6 border tablets red, ca. 67 center tablets yellow)

Brocading wefts: white, blue and red silks

Border pattern: checkerboard in white silk on red silk ground

Main pattern: on yellow silk ground, a large 'cross crosslet' in white silk at each end with single 3-towered castles in white, blue and red silk oriented vertically down the stole (10 castles on one side, 11 on the other) from a central field of Latin words in Gothic capitals in three rows divided by double straight lines worked in white silk; some floats visible on back

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I would like to thank Camino Redondo of the Real Colegiata de San Isidoro in León for making arrangements for the photographs and for clarifying some historical information. The photographs were taken by Archivo MAS, Astorga (León), Spain.

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Worth Noting

Update

An Update on the Orkney Hood

One of the finest items of ancient costume in the National Museums of Scotland is the unique woollen hood, with tablet woven bands and an elaborate corded fringe, which was found in a bog in the parish of St Andrew's, Orkney some time before 1867 (Anderson 1880, 80-3; NMS cat no: NA 3). Early commentators drew Irish, Danish and Greenlandic parallels, and argued variously for Bronze- or Viking-Age dates. The hood was first described in detail by Audrey Henshall (1952, 9-15, pl 1), but the question

of its date again had to be left open. Henshall leant towards a Viking or even pre-Viking date on the basis of its workmanship, but noted that hooded garments were in use as late as the 17th century AD.

However, the long-standing uncertainty regarding its date has now been resolved. For several years, Dr Alison Sheridan of the National Museum's Department of Archaeology, has been co-ordinating a programme of direct radiocarbon dating of organic artefacts in the museum's collections. In 1991, a sample of wool from the hood was submitted to Oxford University Radiocarbon Accelerator Unit and



Figure 1 The Orkney Hood, an engraving of 1892.

this produced a date of 1595±80 BP (OxA-3535). Calibrated (to 2 sigma), this gives a calendar date of AD c 250-615 (Hedges et al. 1993, 155).

Some of the results of this dating programme, which have also included a possible fragmentary garment from Sheshader in Lewis (see Ryder 1995), have recently been described in an article in *Current Archaeology* (Sheridan 1996). However, it should be noted that in the caption which accompanies the illustration of the Orkney hood in that article, the median date has inadvertently been cited in error as a BC *instead of* an AD date.

Readers of *Archaeological Textiles Newsletter* ought also to be aware that the Scottish archaeology galleries in the NMS are now closed to the public in order to allow work on the collections in preparation for the new Museum of Scotland, which will open in November 1998.

Acknowledgements

I am grateful to Trevor Cowie and Alison Sheridan for their assistance with the preparation of this note.

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I am a PhD student at the University of Bonn, Germany, writing my thesis on function and iconography of late antique/early Byzantine/early Islamic Egyptian wood carvings. Most of the about 550 objects I have catalogued thus far in different museums have no definite provenance. Therefore I am very interested in wooden finds from current excavations, and it would be of great help to find out

about excavations, and those excavating, where wooden finds might occur. I would also be grateful for any information or references on woodcarvings in private collections.

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The *Archaeological Textiles Newsletter*, No. 24, 1997 is published at Vitenskapsmuseet, The Norwegian University of Science and Technology, N-7034 Trondheim, Norway.

Editorial board: L. Bender Jørgensen, A.M. Docog, K. Tidow, J.P. Wild and E. Wincott Heckett.

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Publication dates: twice-yearly, Spring and Autumn.

ISSN: 0169-7331