

# Tools and Textiles - Texts and Contexts

## Bronze Age textiles found in Crete

Susan Möller-Wiering

8.8.2006

- 1 Introduction
- 2 Textiles from Chania
- 3 Textiles from Mochlos
- 4 Other textiles
- 5 Conclusion
- 6 Bibliography

### 1 Introduction

Although the written documents from Crete offer a great deal of information about the production of woollen as well as linen textiles only very few fragments of Bronze Age textiles seem to have survived. Some pieces are kept in the Archaeological Museum at Chania in West Crete, others at the Instap in Pacheia Ammos in eastern Crete<sup>1</sup>.

Because of the information provided by the Linear B tablets woollen fabrics might be expected on the island. However, an overview of the textiles found in the Eastern Mediterranean from the Neolithics to the beginning of the Iron Age (see project report "State of Research") reveals a different situation:

- Linen was more often found than wool.
- In the case of linen, it would be unspliced if it were a local product. Splicing (see below) would point to Egypt.
- In the case of wool the fibre diameters might be compared to Michael Ryder's hypothesis of "hairy medium" and "generalised medium" qualities in that they are typical for Bronze Age fleece (see project report "State of Research").
- According to Barber (1992:66) s-spin was used in Egypt while in the other regions z-spin prevailed. Although this cannot be maintained for Northern Europe where many s-spun material has been found and although it is not unequivocal for the Eastern Mediterranean (see project report "State of Research"), hypothetically, z-spin may be expected.
- The most common weaves were tabby or variants like rep but more complicated weaves have also been known.

### 2 Textiles from Chania

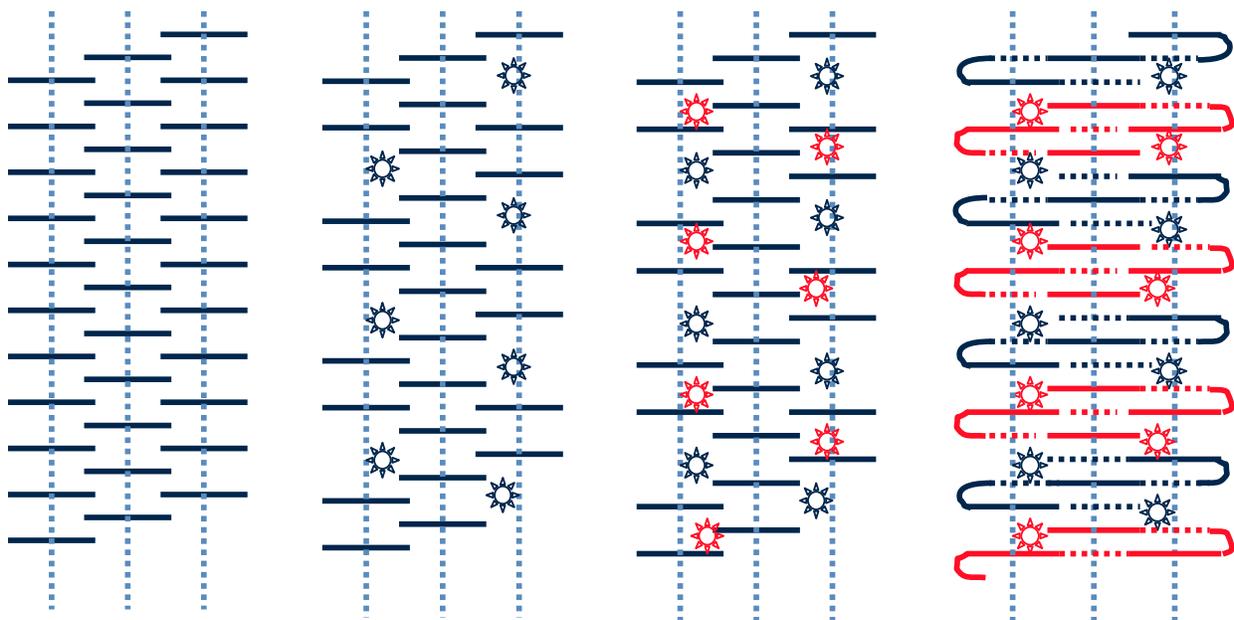
---

<sup>1</sup> For all their help before as well as during the studies on Crete, I am grateful to Yannis Tzedakis, Director of GES in Chania, Erik Hallager, Director of the Danish Institute in Athens, Maria Vlasaki, Director of the Archaeological Museum in Chania, and Anna Mylona, Chief Conservator in Chania, as well as Thomas Brogan, Director, Stefania Chlouveraki, Chief Conservator, Evi Sikla, Librarian, Chronis Papanikolopoulos, Chief Photographer, and Kathy Hall, Senior Conservator of the Instap in Pacheia Ammos.

The Bronze Age textiles in the Archaeological Museum of Chania (GSE 84 Misc 127) may be described as an assemblage of 22 pieces of considerable size plus debris. Twenty of them belong to one textile: a weft-faced rep band (textile A). Its width is about 6 mm, its preserved length about 9 cm when all pieces are counted together. The largest fragment measures 10 mm in length.

The warp consists of only three threads (fig. 1). The thread count which is usually given in threads per cm in warp and weft, is only arithmetical since the band is less than one cm wide: 3 warp threads on 6 mm make up 4-5 threads per cm. Along the selvages, there are about 10 weft threads per cm. So the arithmetical thread count for this textile is 4-5 x 10 threads per cm<sup>2</sup>. The warp is 0,8 mm thick, the weft 0,8-1,2 mm, the latter figure due to pressing. The weft is packed so closely that it covers the warp completely. But on the surface of some fractures the warp is visible. There is hardly any spin to notice in it - just a very slight z-spin. On the surface of the band a similarly slight s-spin seems to be discernable in the weft. In the cross sections, however, i. e. on the surface of the fractures, the parallelity of the fibres in the weft is striking and no spin is determinable.

On some spots of the band, tiny brushes of fibres stick out of the fabric resembling the cross section of a yarn. These groups of fibre ends occur in two rows in a regular system on both sides of the band. At these spots where the fibre ends come up, there is no weft thread running around the selvage (fig. 1b). As a consequence there are more weft threads per cm to count in the middle of the band than along the selvages. In some cross sections it is clear that these brushes belong to the weft. Usually they are broken or cut off immediately above the surface. Only in few cases do they continue over a very short distance before they end. Thus originally, they may have been somewhat longer. Theoretically they could be interpreted as floating wefts which were re-integrated into the weave some picks later. But no hint was found that they were incorporated again into the weave. Instead, such rather long fibre brushes create a fan-like pattern on the surface which indicates the original yarn length with split up thread ends. The brushes occur on both sides in a similar pattern (fig. 1c). Fig. 1d gives the most probable structure of the band which results from connecting the brushes with one another.





The question of material is difficult to answer because the pieces are carbonized and the magnification was limited. Still, some observations may be made. The warp appears to be made of plant fibre while the weft is made of hair. Both materials could not be identified more precisely. Within the hair bundles, the single fibres are very straight and strikingly similar in their diameter which means that it cannot be a hairy medium or generalised medium wool because these are specific mixtures of different diameters. The diameters could not be measured. Judging from experience they might be called fine but do not seem to be as fine as Mouflon wool. Their cross sections are circular to slightly oval<sup>2</sup>.

As the overview (see project report "State of Research") has shown, a combination of vegetal fibre and hair has not been known from the Eastern Mediterranean up to now. The two maybe closest parallels were found north of the Alps. One is a fabric belonging to the Early Bronze Age which was excavated in Unterteutschenthal in Germany (Schlabow 1972:9f, Bender Jørgensen 1992:225). The other is a ball of yarn found near Zurich in Switzerland. The vegetal thread is very curly the reason for which should be that it was plied together with a woollen thread originally (Ruoff 1981:252). The ball seems to be Neolithic. - A weft-faced rep band with only three warp strands was found among the Chalcolithic finds in the Cave of the Treasure in Nahal Mishmar/Palestine. According to Barber (1992:165) it is made of wool while Shamir (2002:19ff, 2005:20) reports the oldest woollen textiles found in Israel as belonging to the Middle Bronze Age.

Besides the band, there are a few fragments of other material (textile B). These pieces consist of plant fibres which resemble the warp of the band. But in contrast to that warp, there is a clear spin in these yarn sections. They are plied at first in S and then in Z. Some spots look like they might have been spliced. Splicing is typical for fine Egyptian fine linens. It is a special way of connecting the ends of the long fibres individually and then twining such strands. Thus, in a woven fabric, there appear obviously twined sections among seemingly evenly spun threads. However, this could not be verified and does not even seem probable (see project report "State of Research") and so these pieces may just be described as fragments of thread.

### **3 Textiles from Mochlos**

The textiles found in Mochlos are kept at The Institute for Aegean Prehistory - Study Center for East Crete. They were preserved on the surface of some bronze objects. The weave is tabby with about 9 x 18 threads per cm. The thickness of the yarns measures about 0,2 - 0,3 mm and the spinning direction seems to be S both in warp and weft. The fibres are light in colour, rather even in diameter and fine. They look like vegetal fibre - probably flax - but this has not been verified yet. In case that it is not plant fibre but hair, it is not a hairy or generalised medium quality since unusual thick fibres are missing. In some cases, the threads seem to fall apart as if they were plied or perhaps spliced but again, the latter seems rather unlikely. No seams, hems, selvages or other features have been observed.

### **4 Other textiles**

Besides the before mentioned textiles some further information can be given:

<sup>2</sup> An SEM investigation might reveal more. The debris should contain enough material for this purpose.

- a thread found in a helmet
- traces of linen on a sword
- impressions of fibres on a seal
- impressions of baskets

Within the decorative top of a helmet found in Azoria (see Hoffmann 1972:Tafel 13) a piece of a thread was preserved<sup>3</sup>. It is *ca.* 3 mm thick, spun in z-direction and seems to have been a sewing thread. The fibres are very fine and build up bundles. A few dislocations point to some kind of bast fibre.

Evans (1935:866, quoted after Åström 1965:111) mentions a Late Minoan sword with some traces of linen.

A seal found in Chania preserved the impressions of some fibres<sup>4</sup>. However, this material has not been investigated any further as yet.

Although baskets are not made up of spun yarn and not woven they are usually counted as textiles as well. In 1990, Betancourt et al. published the impressions of baskets found in Kommos. They were discovered on the surface of clay vases which were produced by coating the inside of baskets with clay. While firing the vases the baskets burnt away, leaving their impressions on the outside (*ibid*:73ff). According to the authors, the closest parallels for these coiled baskets come from Egypt. In Kommos they belong to different periods, from MM IB to LM III.

## 5 Conclusion

The most important Bronze Age textile finds were excavated in Chania and Mochlos respectively. The assemblage of textile pieces from Chania mainly contains fragments of a rep band. It is 6 mm wide and made up of three vegetal warp threads with very little spin (z). The arithmetical thread count is 4-5 x 10 threads per cm<sup>2</sup>. The weft does not consist of a spun thread but of short bundles of hair so that the band has to be called plaited rather than woven. The hair most probably does not derive from sheep or their ancestors. It is not only the structure of the band which is extraordinary but also the combination of plant fibre and hair. The other fragments found together with the band are pieces of a plied thread made of plant fibre.

The fabric found in Mochlos might be made of linen though this could not yet be verified. It is a tabby with 9 x 18 threads per cm<sup>2</sup> and with an s-drill of the threads. A yarn preserved in a helmet found in Azoria is z-spun and probably made of bast fibre.

When these results are compared with earlier finds in the region, as discussed above, the following may be stated:

- The textiles found in Chania and Mochlos meet expectations on one point: they were produced as rep and tabby respectively.
- If the Mochlos textile is indeed made of flax, it would fit into the picture as well.
- Its spinning direction and a possible splicing, however, may point to Egypt rather than to a local product.
- Another hint to Egyptian connections might be the baskets whose impressions have been found in Kommos.

<sup>3</sup> I would like to thank Kathy Hall, Instapac, for showing me this piece.

<sup>4</sup> Personal communication from Erik Hallager, CTR Workshop, Athens, January 2006.

- No parallel can be found for the plaiting technique of the band found in Chania.
- The combination of material chosen for this textile is also unique for the period and region.

Thus, the Bronze Age textiles from Crete revealed unexpected features, and especially the one from Chania sheds new light on the techniques of the time. But probably none of them could be called an example of the “mass production” of woollen textiles as it is known from the documents found on the island.

## 6 Bibliography

Åström, Paul (1965): Remains of Ancient Cloth from Cyprus. - *Opuscula Atheniensi* V, 1965, 111-114

Barber, E. J. W. (1992): *Prehistoric Textiles. The Development of Cloth in the Neolithic and Bronze Ages with Special Reference to the Aegean.* - 3<sup>rd</sup> printing, Princeton, New Jersey 1992

Bender Jørgensen, Lise (1992): *North European Textiles until 1000.* - Aarhus 1992

Betancourt, P., L Berkowitz & R. L. Zaslow (1990): Evidence for Minoan Basket from Kommos, Crete. - *Cretan Studies* 2, 1990, 73-77

Evans, A. (1935): *The Palace of Minos.* - Vol. IV, London 1935

Hoffmann, Herbert (1972): *Early Cretan Armors.* - Mainz 1972

Ruoff, Eeva (1981): Stein- und bronzzeitliche Textilfunde aus dem Kanton Zürich. – *Helvetia archaeologica* 12, 1981, 252-264

Schlabow, Karl (1972): Ein Beitrag zum Stand der Leinengewebeforschung vorgeschichtlicher Zeit. - *Die Kunde, N. F.* 23, 1972, 1-19

Shamir, Orit (2002): Textile Production in Eretz-Israel. - *Michmanim* 16, 2002, 19-32