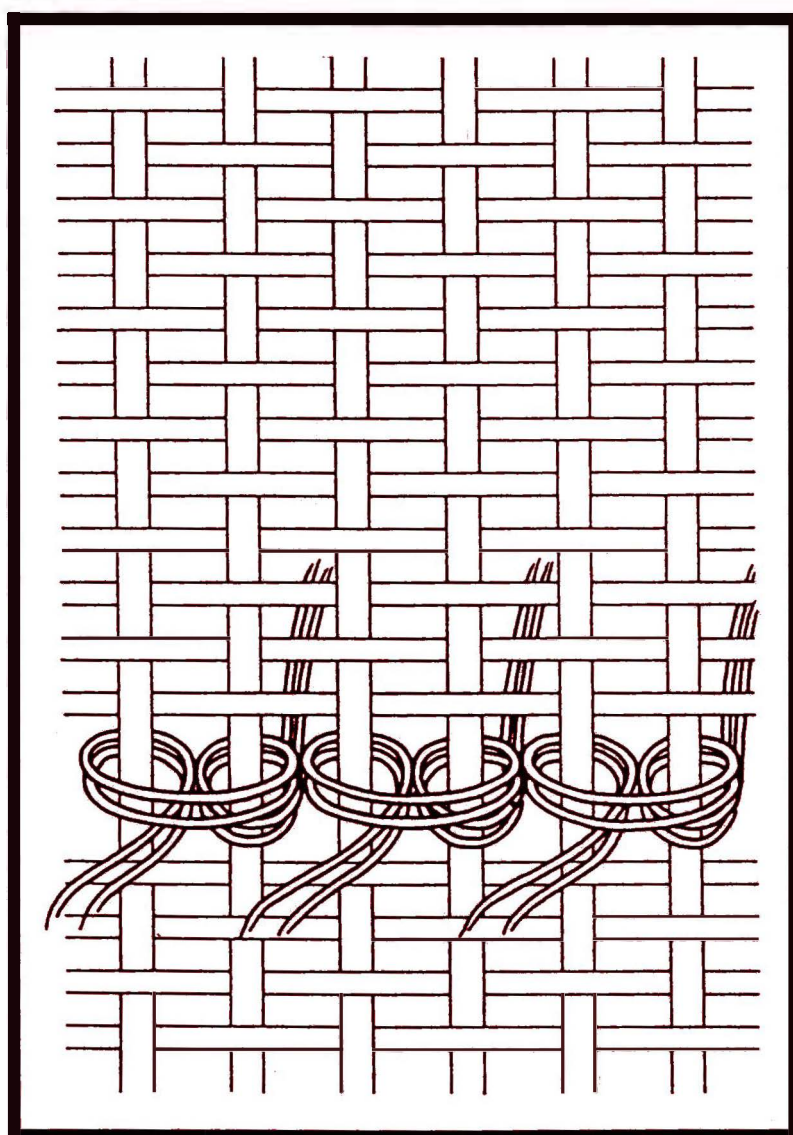


Archaeological Textiles Newsletter



Woollen knotted pile rug from Palmyra

Production and Layout - E.E. Peacock

**Printed at Vitenskapsmuseet
University of Trondheim, Norway**

ISSN 0169-7331

From the Editorial Board

Editorial

This issue of the *Archaeological Textiles Newsletter* is a double issue, **Numbers 18 and 19**, covering both May and November 1994. It also looks different, boasting a new cover and a new layout. It has a new member of the Editorial Board, Klaus Tidow of the Textilmuseum Neumünster, Germany. And it has a new Editor, Elizabeth E. Peacock of the University of Trondheim, Norway.

After almost ten years in office Gillian Vogelsang-Eastwood felt that it was time to hand over the task of editing and producing the *ATN*. Gillian has done a monumental job, founding the *Newsletter* and running it for so long, with just a little help from her friends on the Editorial Board, and from her husband, Willem Vogelsang. Without Gillian's enthusiasm and energy, the *ATN* never would have seen the light of day, and the members of the Editorial Board would like to thank her very much for her initiative and hard work.

The list of subscribers has grown substantially over the years and now numbers more than 200. This amply illustrates the success of the *Newsletter*, and the need for it. We cannot imagine life without it. Therefore we are very happy to welcome Klaus Tidow to the Editorial Board and Libby Peacock as the new Editor of the *ATN*. Gillian will continue to run the economics of the *Newsletter*, and lend a helping hand on the Editorial Board.

The present issue contains many informative feature articles and notes. Libby Heckett asks an important question: Why do we do it? Time has come to consider what we are doing with our textiles. Other topics are a frozen Princess of Siberia, a grave of one of Sweden's first bishops, textile traces from Monte Testaccio in Rome, new analytical methods, and experiments in hand-spinning and reconstruction of textiles.

Several new sites from the Sinai and the Eastern Desert of Egypt are described, and all textile scholars will be interested to learn of the new Polish excavations in the *locus classicus* of Palmyra. And a new province of archaeological textiles has appeared: New Zealand. Michael Ryder argues captivantly that a strip of a British flag put up by Captain Cook may have ended up on a mummified Maori head in the Liverpool Museum.

Several exhibitions and conferences on archaeolog-

ical textiles are advertised or reviewed highlighting the growing interest in our subject. The list of Recent Publications, Theses and Dissertations is reassuringly long. It includes an Extended Bibliography of the works of Dr. Dominique Cardon. And then, *NESAT V* is out! Klaus Tidow has done it again, producing the Proceedings of the 5th North European Symposium for Archaeological Textiles, held in May 1993, quickly and efficiently. Most of the earlier *NESAT* reports have sold out, so be quick and secure yourself a copy of *Volume V*.

Finally, **SUBSCRIPTIONS ARE DUE!** Please refer to page 33 for details.

Lise Bender Jørgensen
Göteborgs Universitet
S-403 13 Göteborg
Sweden

Table of Contents

From the Editorial Board	
Editorial	3
Why do We Do it?	4
Features	
Textiles from Jesirat Fara'un (Coral Island)	4
Traces of Cloth, Rope and Wickerwork on Oil Amphoras in Monte Testaccio	6
Silver-Spun Work Found in a Bishop's Grave at Sigtuna, Sweden	8
The New Textile Finds from Palmyra	11
El-Zerqa - A Military Post in the Eastern Desert of Egypt	13
An Early European Textile Find from New Zealand	14
The Roman-Egyptian Site of Berenike	15
Analysis	
The Characterisation of Archaeological Textile Fibres Using Advanced Image Analysis Software	16
Experimental Archaeology	
A Reconstruction of a Blanket from the Migration Period	17
Chevron Weave Patterns: An Experiment in Handspinning and Weaving	19
Worth Noting	
Information Wanted	21
Update	23
Exhibitions	25
Conferences	25
Reviews	
Conferences	26
Source Materials	
Publications	27
Audiovisual	31

Why Do We Do It?

Over the last 15-20 years we can recognize the growth of interest in, and the development of the disciplined study of archaeological and historical textiles. The establishment eight years ago of the *ATN* marked a stage in this development and the increase in subscribers from 25 to 200 today demonstrates this trend. This growing interest has been marked by regular seminars and conferences on textile-related topics. Mainstream archaeology seems now to be much more open to the idea that textiles constitute a proper area of study. As a random example the British journal *Current Archaeology* in the autumn 1993 issue featured three references to textile topics in its Science Diary.

For all these reasons this may be a good time for *ATN* readers to share with the editors their ideas on the future pursuit of knowledge in this area. Perhaps one function the *Newsletter* can fulfill is as a forum for discussion of topics important to the practitioners of the arcane art and science of textile analysis. Scholars in the field have come from many different backgrounds; some are museum people, some weavers and craftspeople, some archaeologists, conservators, scientists and historians; others were motivated originally by a simple love of textiles. The diversity has brought a great richness to the study of textiles and to the cross fertilization of ideas and approaches.

Now perhaps it would be interesting to consider some specific questions. How do we best set about the task of examining a very large body of material, a smaller sample, or indeed an individual piece? What research questions do we ask or should we ask? With the rich diversity of background textile scholars enjoy one would not seek a narrow or rigid

approach; but an interchange of ideas could be fruitful.

The *ATN* is not, and never should be, the official voice of a particular profession. Generally speaking, as our readers know, the emphasis is on work-in-progress and on encouraging the flow of information between scholars. This must continue as the most important function in such a widely scattered group of people. Indeed the editorial board can only accept contributions in good faith as they are offered. We can, however, throw open the floor to discussion of matters important to textile people, and assist in whatever way possible in the development of textile studies.

To start the ball rolling. Try these definitions for size and discard for something better fitting!

1. *Archaeological textiles* - must have been excavated.
2. *Historical textiles* - have survived through storage above ground.
3. *Excavated textiles* may be *provenanced* or *non* or *un-provenanced*.
4. Or perhaps they are *legal* or *illegal* (stolen Coptic pieces?)

Over to readers for improvement and discussion.

E. Wincott Heckett
Department of Archaeology
University College Cork
Cork
Ireland

Features

Textiles from Jesiret Fara'un (Coral Island)

In 1975-1981 excavations were carried out on the island of Jesiret Fara'un (Coral Island) in the Red Sea, south of Eilat. The excavations were carried out on behalf of the Staff Officer of Archaeology in the Civil Administration of Sinai, under the direction of A. Goren. About 1500 textile fragments, 700 basketry fragments and 700 pieces of cordage were discovered on the site. They have been dated on the basis of the pottery¹ and ¹⁴C analysis² to the last quarter of the 12th century up to the beginning of the 14th century CE. Some of them are currently

exhibited in the Israel Museum before being returned to Egypt. Some 235 textile fragments were examined, studied and catalogued.

The island on which there was a fortress guarding the entrance to the harbour of Aqaba had strategic importance, being at the junction of the Red Sea route to Southern Arabia and East Africa with the land routes to Syria and Egypt. No burials were discovered at the site. Most textiles were discovered in a waste dump; only a few were found in the

ruins of the buildings. No complete textile or garment was discovered on the site. However, by studying the fragments we could assume some of their functions as garments or other uses.

The materials of which the textiles were made of are cotton (92), linen (52), wool and goat hair (47). There are only a few (7) pure silk fragments, while there is a large group (22) of textiles known as *mulham* in the Arabic sources of the period with silk warp and a hidden weft, mostly of cotton, but also some of linen or wool. Seven textile fragments are made of other bast fibers not yet identified.

The weaving techniques used are varied. Most fragments are in various forms of tabby (plain weave). There are nine twills: eight 2:1 and one 2:2. Two are in satin weave, one of them a damask. Seven textiles are compound weaves and two fragments are non-woven wool felt. The spin directions were both S and Z, sometimes both in the same fragment.

The fragments are small. Many of them were cut and therefore it is difficult to determine their original function. Some are made of crude and heavy material which is not suitable for clothing. Some were probably used as sacks, bags or as linings for baskets. The simple, crude woollen or goat-hair fragments are probably fragments of covers or hangings. The heavy fragments, made of colored wool and white cotton in compound weave with geometric patterns, were probably used as floor coverings or prayer rugs³. The felt fragments, which are made of two layers, the lower one undyed and the top one colored, decorated with embroidery and remains of leather, could have been parts of a saddle or boots⁴.

Four fragments are woodblock-printed on undyed cotton. Three are resist-dyed blue and one mordant-dyed red. These fragments give no indication that they were used for clothing, although they are made of fine thin cotton. As is true of the many other similar textiles, they have no remains of sewing threads or any other tailoring indications. We assume therefore that they were not made or used for costumes. These fragments are early representatives of a large group of similar textiles, most of which were bought or found in Egypt, but believed to be of Indian origin⁵.

Many fragments are made of various fine, thin materials suitable for clothing. Some of them can be clearly recognized as such; part of them bear signs of tailoring such as seams, hems and remains of sewing threads. Others are similar to them, but have different patterns or decorations. Some of the fabrics are undyed and undecorated, some are dyed,

others are decorated with embroideries, brocading wefts or woven with colored threads in various patterns of checks, stripes and bands.

Some of the wool fragments found are monochrome twills, a few with a brushed nap. Such textiles were discovered also in other sites in the region as well as in many European sites which were formally parts of the Roman Empire. Such twills were widely used until modern times.

Only one item is an almost complete garment, a coif made of fine cotton, carefully sewn together at the back. The bottom is a little gathered and terminated with a rolled hem. Such coifs were probably the international *fashion* at the period. They are depicted in Medieval paintings and statues and were also found in Telem in West Africa⁶.

More parts of garments which can be identified are a strip with loops, probably a front opening of a garment. Several fragments can be clearly recognized as sleeves with cuffs, others as neck openings. Triangular or diamond-shaped fragments carefully sewn to pieces of cloth are most probably gores and gussets of garments. Some of these are made of *mulham* and are sewn on or lined with linen or cotton.

Some linen fragments are embroidered and/or brocaded with colored silk threads with geometrical motifs similar in style and technique to others originating from Egypt⁷. Many textiles were reused for patching garments and baskets or as wicks.

Textiles were of great significance in Mamluk Egypt. There were special rules regarding the costumes of the Chalifa and the Mamluks of his court⁸. Robes of honor were a customary gift which the state officials considered due to them. Textiles were part of the valuables of the ruling class. They were the principal and most important industry in Mamluk Egypt as well as dominant trade objects with all other parts of the world. Even in the small fort on an island guarding the harbor of Aqaba, textiles from many countries were found.

There was apparently an international fashion at that period. The same patterns of blue and white checks and stripes, as well as garments made of several kinds of fabrics, composed of panels, gores and gussets were discovered in excavations in the Near East, Egypt, Nubia and West Africa. Such garments were depicted in European paintings and miniatures of the period.

Those garments mentioned above, made as yard goods woven on narrow looms with repeat patterns (if there was any pattern at all), are completely

different in shape to those *woven to shape* garments of the Classical Period, which survived in Coptic Egypt up to the 12th century. This basic pattern, evidenced by the robes found on the site, has survived until now and is still a common garment worn by men in Egypt and other Arab countries.

The textile fragments from Jesiret Fara'un shed light on the everyday life of *simple people* of the period. The variety of the materials and their origins shows the international character of the Medieval Islamic world with its wide trade connections to the east as well as to the west which can be seen even in such a small remote fortress in the Gulf of Aqaba in the Red Sea.

Notes

1. Examined by J. Finkelstein.
2. Carried out by Y. Carmi and D. Segal of the Weizman Institute, Rehovet, Israel.
3. Zilu (Itting, A. (1992). Notes on a Zilu fragment dated 963/1556 in the Islamic Museum, Cairo. *Iranian Studies* 25 (37)). Similar ones were found also in Quseir al-Qadim of the same period (Vogelsang-

Eastwood, G. (1993). Unearthing history, archaeological textiles in Egypt. *Hali* 67 (85)) and in Fustat (Mackie, L.W. (1989)). Textiles. In *Fustat Expedition, Final Report. Vol.II, Fustat C*; Kubiak, W. and Scanlon, G.T. (Eds.). Winola Lake, p 86).

4. Similar pieces of felt were discovered in Fustat dated to the 13th-15th cent. (Mackie, L.W. (1989), p 26).
5. Vogelsang-Eastwood, G. (1990). *Resist-dyed Textiles from Quseir Al-Qadim, Egypt*. Paris.
6. Bolland, R. (1991). *Telem Textiles*. Leiden.
7. Mackie, L. (1989). Thompson, D. (1985). Cotton double cloths and embroidered and brocaded linen fabrics from tenth to fourteenth century Egypt: their relation to traditional Coptic and contemporary Islamic style. *CIETA* 61-62 (35-49).
8. Mayer, L.A. (1952). *Mamluk Costume*. Geneva.

A. Baginski
Har Gilo Field School
Jerusalem 91999
Israel

O. Shamir
Israel Antiq. Authority
PO Box 586
Jerusalem 91004
Israel

Traces of Cloth, Rope and Wickerwork on Oil Amphoras in Monte Testaccio (Rome)

In the south-east of Rome, near the river Tiber, there rises a spectacular artificial hill 50 m high and with a base of approximately 150 x 250 m. The whole of the hill is made up of parts of amphoras which were thrown there once their mission was over of transporting the oil imported from different parts of the Mediterranean Sea. It is difficult to determine the moment in time when this "external" sign of Roman economic opulence was born since, in order to do so, it would be necessary to get to the very heart of this gigantic heap. Such a task would cause enormous technical problems and, for the moment, it has not been undertaken.

Most of the ceramics, and the oil they carried, come from a specific area of Baetica (Spain), whose boundaries were marked by the towns of Hispalis (Seville), Corduba (Cordoba) and Astigi (Ecija). According to Prof. Remesal (see below), one of the most active areas for the production of amphoras was the village of Cerro de los Pesebres, on the left bank of the Guadalquivir, close to the mouth of the river Bembezar. This workshop was active from the end of the first century A.D. to the middle of the third century A.D. and this may give us an approximate idea of the chronology of the artifacts.

Recently (1993 was their fifth campaign), a team of Spanish archaeologists and historians from the Universities of Barcelona (Prof. J. Remesal) and Madrid (Prof. J.M. Blazquez) became responsible for the excavations in Monte Testaccio¹. The inscriptions of all kinds found on the amphoras (*tituli*

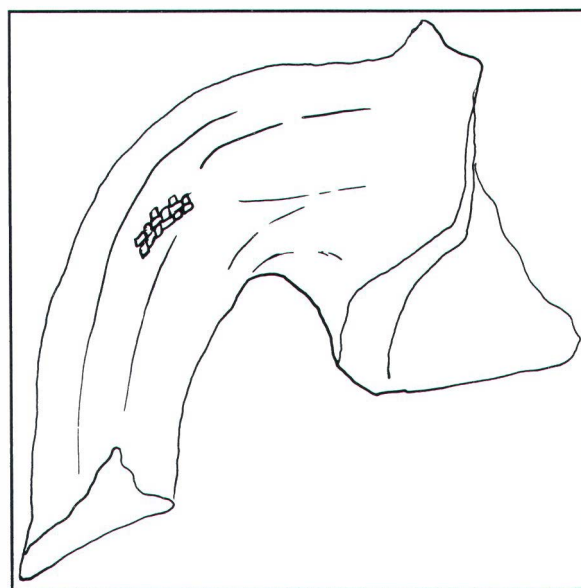


Figure 1.

picti, seals and graffiti) make it possible to carefully study the commerce and taxation system of the oil imported from the producing sources to Rome. But, apart from the information given by the epigraphic instructions which we may call *voluntary marks*, we can also gather interesting data from what we could call *involuntary marks*. In fact, on the rough clay of the Baetican amphoras (mostly Dressel 20 type) the potters unwittingly left all sorts of marks². Through their study we can find out what type of object may have grazed the soft clay. The thickness of the walls of the amphoras tells us beyond doubt that they had to be left to dry in the sun before firing. In that space of time it was likely that the tunic of the slave who handled them, the grazing of a rope or pressure of a mat would leave a large range of marks. I shall describe but a few samples³:

1. In Figure 1 (93/S1, 260-280) we can see the handle of an amphora with the mark of a rough cloth (tabby 1/1). Apparently it was woven with double threads which reached an approximate thickness of 1.5 mm. The twist is very slight, almost nonexistent. It may be woollen cloth.

2. Figure 2 (91/N1, 100-120; n. 366). On the handle of a Dressel 20 amphora the mark left by a small part of a mat is clearly visible. Its length is 8.5 cm and its width 4.5 cm. The marks left by the vegetable fibre can easily be seen. It may be quite likely unpounded esparto since its texture is perfectly recognisable. This type of mat was manufactured by sewing together the sides of various strips of different width of interwoven esparto. As a matter of fact, we have here a sample of one of these bands (a-a' in the picture). Nevertheless, due to the narrowness of the sample we cannot ascertain whether the mat was manufactured by joining to-

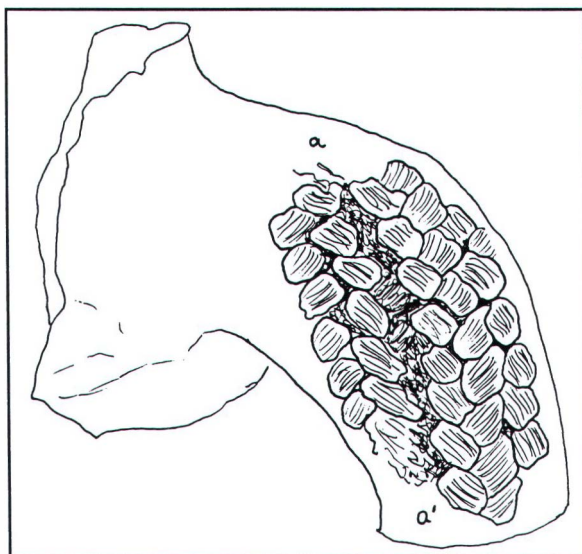


Figure 2.

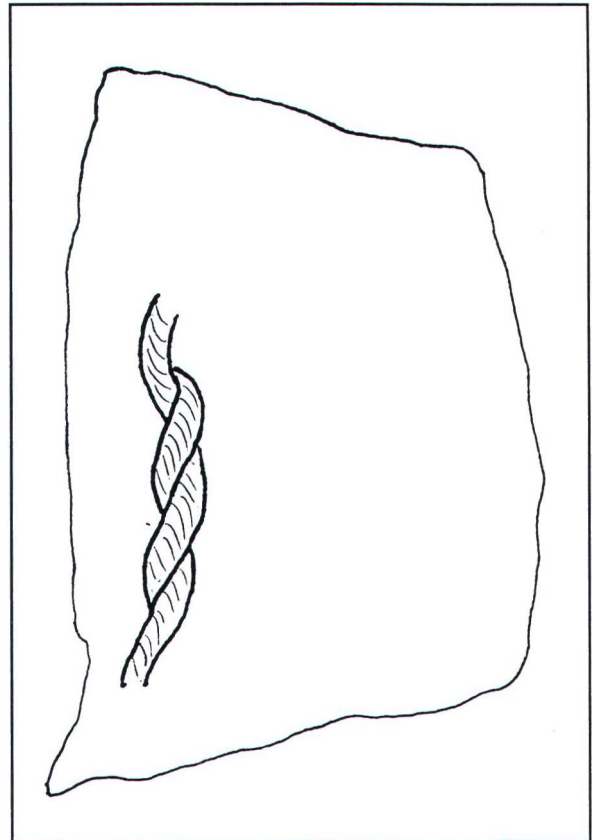


Figure 3.

gether nine wide stripes or simply three narrow strips (the two most common types in the south of the Iberian Peninsula from the Mesolithic times to our days). The esparto strips are 7-8 mm wide. These strips formed a flat surface, a mat, which may have been used to protect the pots from excessive sunlight or simply on which this part of the amphora rested heavily.

3. Sometimes the marks are so clear that it is possible to determine the technical features of the original material. For example on the small fragment of amphora (93/N2, 120-140) shown in Figure 3, the fibres (esparto?) may be very clearly seen. They are two thin S-twisted strings 3 mm thick joined together to form a double Z-twisted string which is roughly 5 mm thick.

New examples are constantly being discovered and they will no doubt give more enlightening results in the future. We can suggest that in the same way as mining in the south of Spain fostered the development of very specialised wickerwork and rope in relation to the commercialisation of oil, the manufacturing of amphoras also promoted an intense activity in these industries. Ropes, mats and protective wrappings were undoubtedly indispensable in the manufacture and transport of these large oil vessels⁴.

Notes

1. The reports of these excavations are now being published.
2. This does not seem to be the case with African amphoras, also very frequent in the area.
3. Found during the last campaign, to which I was kindly invited.

4. Suffice it to remember the *amphoras sparteas* (Cato, Agr 11,2) protected by a fibre braid. But this is a different problem.

C. Alfaro Giner
Departament d'Història de l'Antigüedad y de la
Cultura Escrita
Avda. Blasco Ibáñez 28
Apartat de Correos 2085
46071 València
Spain

"Spun-silver" Work Found in a Bishop's Grave at Sigtuna, Sweden

During the summer of 1993, a research excavation was carried out by Sigtuna Museums in the central area of Sigtuna's early medieval town. A royal manor was most likely erected in this area in connection with the founding of Sigtuna around the year A.D. 980. Finds from a mint workshop here produced evidence of the earliest coin production in Sweden. In the middle of the 11th century, the profane settlement on this site was terminated by the erection of one of the town's first Romanesque churches (Tesch 1992). This church is not known from written sources and the aim of the excavation was to establish what status it held.

In the course of excavation a grave was found which attracted special attention. The grave was located up against the nave wall and had been exposed to the church's eaves-drop, which was considered especially distinguished. One of the few objects found in the grave was an ivory crozier, and it was apparent that the skeleton was the remains of a bishop. The grave is dated stratigraphically to sometime between the end of the 11th and the beginning of the 12th century, which makes it the oldest bishop's grave excavated in Sweden. The burial had been damaged by previous investigations from the early 20th century, and only the upper half of the torso survived. Those parts of the lower arms which remained indicated, however, that the bishop had been laid out with hands placed on the lower abdomen (Fig 1). Such positioning of the arms is further support of an early dating.

On account of the unique character of the burial and the poor condition of the skeleton, it was decided that the grave should be frozen. This was carried out *in situ* using carbon dioxide ice (H₂CO₃). The excavated frozen grave was then kept in the cold storage room of the Archaeological Research Laboratory (AFL) at the University of Stockholm, awaiting excavation.

During the early spring of 1994, excavation was carried out in the form of an interdisciplinary pro-

ject, involving archaeologists from Sigtuna Museums, the author as coordinator from AFL, and an osteologist from the Museum of National Antiquities, Stockholm. The intention was to preserve the grave as intact as possible for subsequent exhibition purposes.

First of all, the grave was x-rayed as soon as it was thawed out. During the ensuing examination, it became clear that the bishop had lain in a narrow coffin of which only four iron nails with adhering remnants of wood (*Pinus*) remained. Over the abdomen lay a strongly oxidised and fragmentary metal

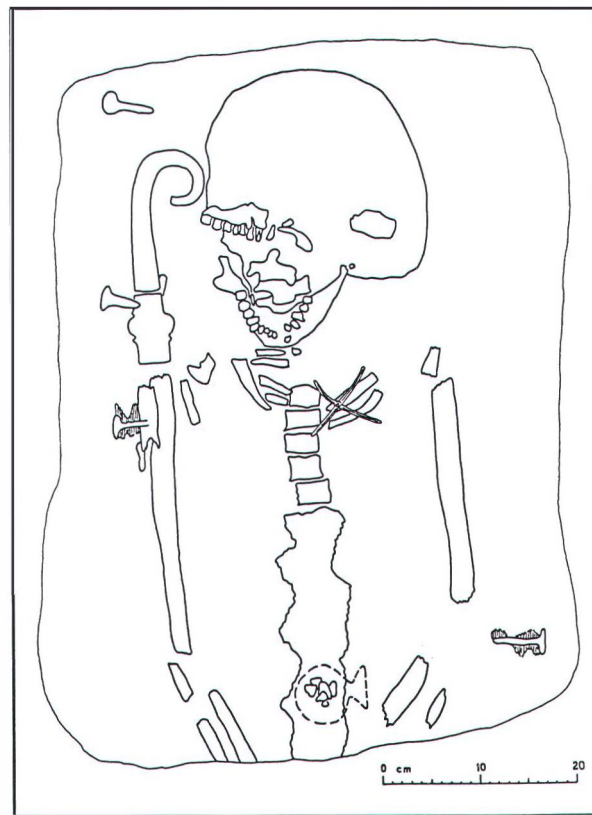


Figure 1 The bishop's grave from Sigtuna with ivory crozier, silver cross, fragments of a pewter ampulla and iron rivets. (Illustrated by Bo A. Zachrisson.)



Figure 2 The silver cross as found situated high up on the ribcage on the skeleton's left side below the chin. (Photograph: Björn Pettersson.)

object which x-ray diffraction analysis showed to be pewter, with an x-ray image in the shape of a small bottle. Probably this should be interpreted as a liturgical or pilgrim ampulla. The skeleton was embedded in soil rich in cultural deposits, and chemical analyses of this soil showed that biodeterioration had probably taken place.

As a result, the chances of discovering any textiles were considered minimal. It was therefore especially exciting to find a thin flat silver cross situated high up on the ribcage on the skeleton's left side below the chin (Fig 1). The silver cross was executed in the so-called *posament* technique, wherein applied dress ornament is made from threads of silver (or gold) strips entwined around a (usually) silk core. The cross shape is made up of two 8.5 cm long bands, each ca. 3 mm wide (Fig 2). As was the case with the pewter object, the silver bands were highly oxidised and the silver metal almost pulverized. Examination by stereo microscope (Fig 3) and scanning electron microscope (SEM) showed that each band consisted of three fishbone-patterned plaits. The bands were arched due to slight overlapping of the plaits. Each plait was made from three Z-twisted strands. These strands each consisted of flat silver strips spun around a textile core. SEM photomicrographs showed the core to be a length of silk (Fig 4). The width of each strip was ca. 0.2 mm.

Usually in *posament* work, the textile core is linen or silk, though wool has been recorded from one Polish grave (Moszcynski, 1990). In Sweden *posament* work is best known from the graves of the

Viking Age proto-town Birka, where over 40 of the 1100 graves contained this work (Geijer, 1938). These have been interpreted as indicative of garments of oriental character (Hägg, 1983; Jansson, 1988). Some of the more recently excavated graves at Birka have also produced similar work. In these however, it has been shown that the metal consists of fine *drawn* wire (Arrhenius, 1978; Holmquist Olausson, 1993). Finds of wire-drawing tools show that the technique was employed at that site. Inge Hägg has linked the technique to Russia, especially the district of the ancient Kiev empire (Hägg, 1983:208). Ingmar Jansson cites examples which include Gnezdovo near Smolensk and Šestovicja near Černigov in the Dnepr area (Jansson, 1988: 601cf.; Spicyn, 1905).

Drawn wire is generally considered by textile experts to be more primitive, spun strips being more difficult to produce. The drawn-wire technique is still used by the Saami in northern Scandinavia in their work with drawn threads of tin, which they apply especially to leather. In this aspect, Birka differs from other Scandinavian Viking Age graves producing finds of metal thread such as Mammen, Denmark, and Valsgårde, Sweden (Jansson, 1988: 597) where threads made from spun flattened strips

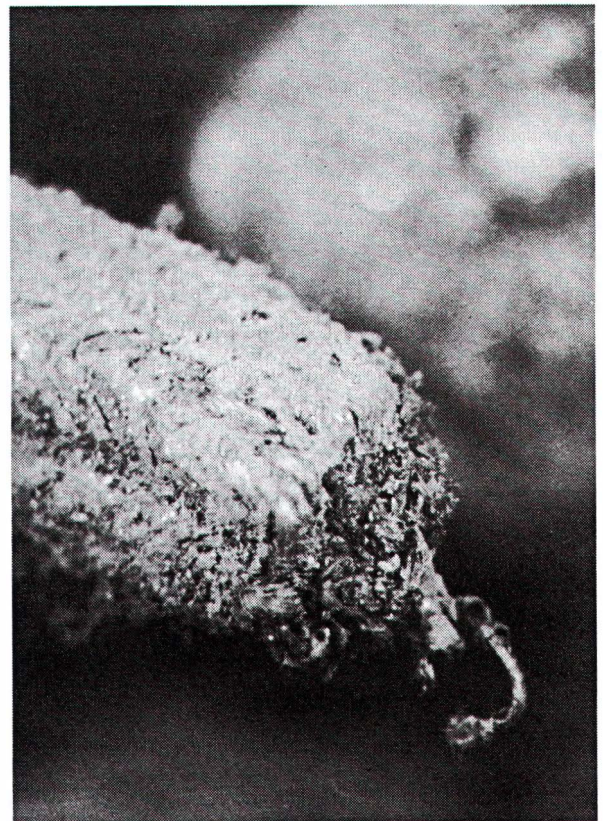


Figure 3 Detail of the silver cross. Each band consists of three plaits made from three Z-twisted strands. At the end of the band is a strand with the silk core exposed. (Ca.180x, photomicrograph: L. Holmquist Olausson).



Figure 4 Flat silver strips (width 0.2 mm) spun around a silk core. (Ca.83x, scanning electron photomicrograph: Lena Holmquist Olausson).

were used. This latter was the technique most widespread in western Europe during the Merovingian period and later, coming originally from Byzantium. The only known exception, as pointed out by Crowfoot and Chadwick Hawkes (1967:56), is the frontlet of drawn gold threads found in the famous female royal grave at Cologne Cathedral, from the first half of the 6th century A.D. (Doppelfeld and Pirling, 1966:11).

To the best of my knowledge, no other cross executed in posament technique has been found in any archaeological context, though sewn-on textile crosses in silk occurred at for example the Alamannian cemetery at Giengen an der Brenz (Hundt, 1978). Similar crosses from the 10th and 11th centuries were found in the archbishop burials from Bremen, mentioned below. In several illustrations from the 9th century and until the end of the 11th century, both from East and West, the stole is shown bearing crosses which strongly recall the silver cross from Sigtuna. Such, for example, can be seen in the 9th century *Chludov Psalter* (State Historical Museum, Moscow) (Cormack, 1977:149-150). Which technique these stole-crosses are made in, cannot be ascertained from illustration alone, though, to judge by the width of the cross arms, most likely it is metal-thread appliqué.

In conclusion, it can be said that the bishop from Sigtuna had been buried with rather simple goods, though it must be remembered that we are dealing with a missionary period in Sweden. Apparently it was only later, or in the case of archbishops in their

homeland that such burials took on the lavish form of the archbishop graves from Bremen, for example. This was excavated by textile experts and conservators in Stockholm (Nockert, 1986).

The posament cross from Sigtuna is now conserved and stabilised, and has returned to Sigtuna together with its bishop, once more to be placed below ground, though this time in Sigtuna's newly opened museum.

A collection of articles concerning this bishop and Sweden's earliest Christianization is due for publication later this year.

Acknowledgements

For discussions and literature concerning textiles, I have had great help from fil.dr. Gertrud Grenander Nyberg and dr.phil. Lise Bender Jørgensen. I render sincere thanks to both. For consultation on textile matters, I also direct thanks to tekn.dr. Ulla Cyrus-Zetterström.

(translated by Uaininn O'Meadhra)

References

- Arrhenius, B (1978). *Fynden från de undersökta gravarna vid Ormknös. Arkeologiska Undersökningar vid Ormknös, Björkö, Adelsö sn.* Rapport from Stockholms Universitets Arkeologiska Forskningslaboratorium, Nr.1, by Arrhenius, B., Holmquist, L. and Wase, K.
- Cormack, R. (1977). *Painting after iconoclasm. Iconoclasm.* Ninth Spring Symposium of Byzantine Studies. March 1975. Birmingham, edited by Bryer, A. and Herrin, J.
- Crowfoot, E. and Chadwick Hawkes, S. (1967). Early Anglo-Saxon gold braids. *Medieval Archaeology*, 11.
- Doppelfeld, O. and Pirling, R. (1966). *Fränkische Fürsten im Rheinland. Schriften des Rheinischen Landesmuseums Bonn, Band 2*, Düsseldorf.
- Geijer, A. (1938). *Die Textilfunde aus dem Gräbern. Untersuchungen und Studien, III*, Uppsala.
- Holmquist Olausson, L. (1993). *Aspects on Birka. Investigations and surveys 1976-1989. Theses and Papers in Archaeology 3.*
- Hundt, H.-J. (1978). Ein seidenes Aufnähek aus Oberflacht, Gem. Seitingen-Oberflacht, Kreis Tuttlingen. Das alamannische Gräberfeld von Giengen an der Brenz; Paulsen, P. and Schach-Dörge,

P. (Eds.) *Forschungen und Berichte zur Vor- und Frühgeschichte in Baden-Württemberg* Band 10.

Häggl, I. (1983). *Birkas orientaliska dräktplagg. Fornvännen*, 78.

Jansson, I. (1988). Wikingerzeitlicher orientalischer Import in Skandinavien. Oldenburg-Wolin-Staraja Ladoga-Novgorod-Kiev. Handel und Handelsverbindungen im südlichen und östlichen Ostseeraum während des frühen Mittelalters. *Berichte der Römisch-Germanischen Kommission* 69.

Moszcynski, J. (1990). Die Gewebe aus dem Grabfeld des 12.-16. JH. in Stry Brześć, Wojewodschaft Włocławek. *Textiles in Northern Archaeology*; Walton, P. and Wild, J.-P. (Eds.). Archetype Publications, London (131-144).

Nockert, M. (1986). En textilarkeologisk undersökning; Föremålskatalog. *Årkebiskoparna från*

Bremen. Historia i Fickformat. Statens Historiska Museum, Stockholm.

Spicyn, A.A. (1905). Gnezdovskie kurgany v raspokkack S.I. Sergeeva. *Izvestija Imperatorskoj archeologiceskoj komissii* 15.

Tesch, S. (1992). Sigtuna: the townplan - a key to urbanization and formation of state in Sweden. *Urbanism*, Conference on Medieval Archaeology in Europe Preprints, Vol.1.

Fil.dr. Lena Holmquist Olausson
Archaeological Research Laboratory
Stockholm University
S-106 91 Stockholm
Sweden

The New Textile Finds from Palmyra

In 1992 the Polish-Syrian expedition led by Professor M. Gawlikowski from the Centre of Mediterranean Archaeology of the University of Warsaw conducted research in the tomb-tower of Atenatan built by his sons Kohailu and Hairan in A.D. 9.

The first tomb in the history of research in Palmyra which had not been plundered by robbers was discovered on the third floor of this tower. The inscription *Kohailu and Hairan, Atenatan's sons and their children* was carved in the chamber in which the above-mentioned burial as well as a few others were found. The burial discovered seems to be the oldest one in this chamber. Therefore it may be one of the brothers - the founders of the tomb tower - who is buried there (Gawlikowski, 1993).

The well-preserved mummified corpse was not bandaged but wrapped in a woollen rug. Besides the rug, the remains of a few other woollen textiles and a net, instantly breaking up if touched, were discovered. All the textiles were soaked with the oils used to preserve the body.

As a result of analysis the following textiles have been distinguished:

1. A woollen knotted pile rug where the primary textile is made of tabby and the knots are tied of double threads in a system which is related to the *Ghiordes* system. The difference lies in the fact that the hanging fringes come out on both sides of the textile (Fig 1). The knots are made on two threads of the warp every 16-20 threads of the weft. However, there are no knots on some fragments of the textile, which have more than 20 threads in the

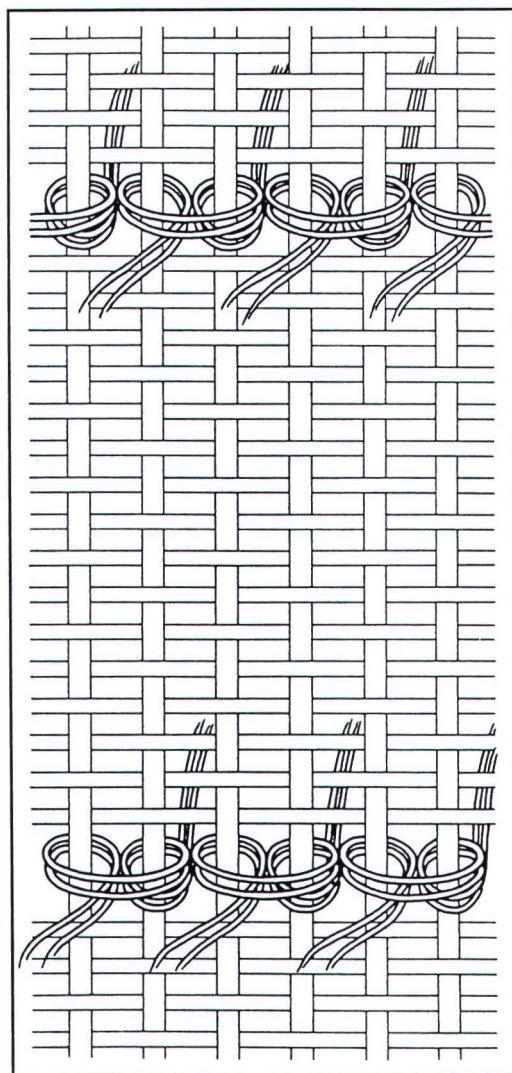


Figure 1 Knotted pile weave. (Illustrated by E. Wtorkiewicz-Marosik).

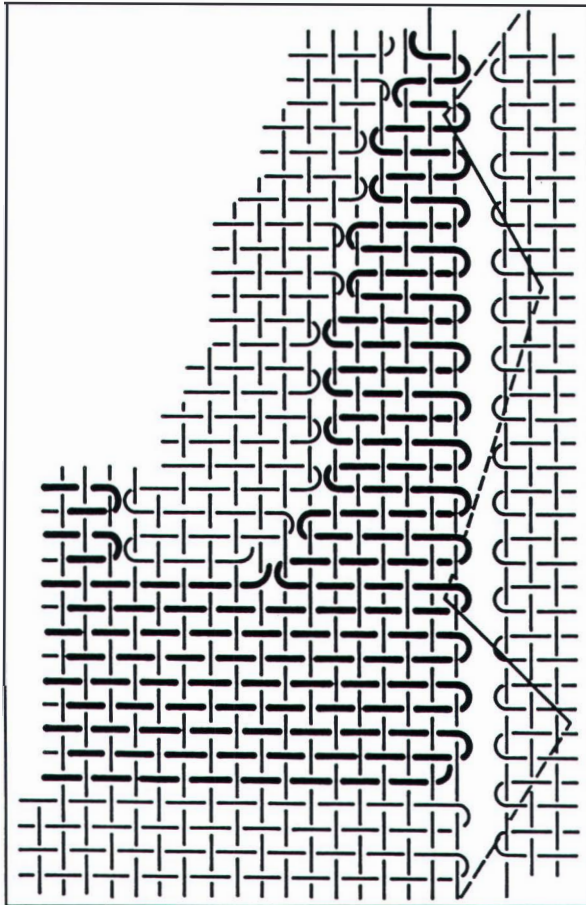


Figure 2 Tapestry. (Illustrated by E. Wtorkiewicz-Marosik).

weft. Therefore we may draw the conclusion that the knots and the fringes made of them must have been arranged in stripes. Knotcount is about 275 per 1 dcm². The rug was woven in colourful stripes: light (perhaps yellow), dark (perhaps brown) and red.

2. A woollen tapestry made of tabby, where the pattern - a stripe of the black weft with a light

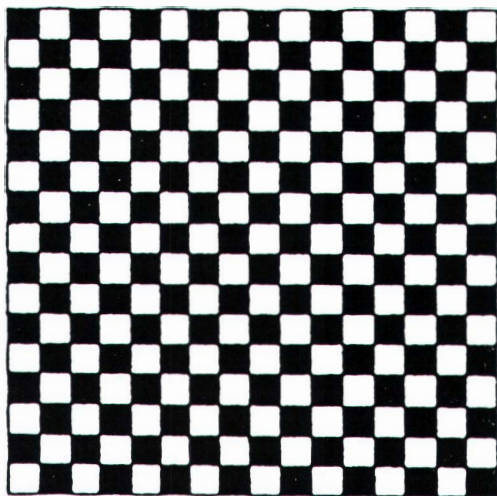


Figure 3 Tabby. (Illustrated by E. Wtorkiewicz-Marosik.)

triangle inside - is placed in the light ground. A vertical slit appears where the light and the dark wefts meet. It is sewn with plain stitch (Fig 2).

3. A delicate woollen brown textile (probably the natural colour of wool) woven in tabby (Fig 3).

4. A delicate woollen striped textile. The preserved fragment has a dark brown stripe of weft (74 threads) and a greyish-brown one, possibly originally black (48 threads). It is made of tabby (Fig 4).

5. A delicate light (perhaps dyed yellow) woollen textile decorated with a dark, possibly originally black stripe. It is woven in tabby (Fig 3).

6. A thin severely damaged net. Although the state of preservation made a detailed analysis impossible, the net seems to be a *sprang* (Fig 4).

Two facts make the above-described set of textiles especially attractive. Firstly it comes from the first tomb which has not been plundered so far. Secondly beside the typical textiles of Palmyra, the tapestry and the tabby textiles (Pfister, 1934, 1937, 1940), a knotted pile rug appears. The oldest knotted pile rug that I am familiar with, is the very primitive one coming from Barrow III in Pazyryk, in the Altai Mountains, which dates back to the 5th century BC (Maik, unpublished data).

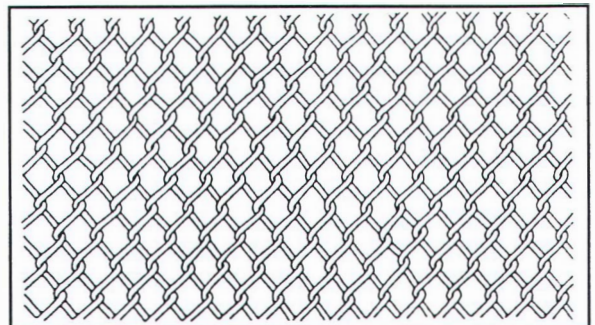


Figure 4 Sprang. (Illustrated by E. Wtorkiewicz-Marosik).

Two other chronologically related knotted pile rugs have been found on Polish territory, i.e., outside the borders of the Roman Empire. One of them comes from Pielgrzymów (German Pilgramsdorf), in the province of Olsztyn, the second from Zakrzów (German Sakrau), in the province of Wrocław. Both the textiles were lost during World War II. Moreover, the way that the results of the analyses of the rugs had been published makes it impossible to establish the techniques of knot-making (Sage, 1934; Fuhrman, 1939-40).

At present, after the rug of Palmyra has been found, we are in a position to assume that all of them (i.e.

the rugs from Palmyra, Pielgrzymów and Zakrzów) come from the territory of the Roman Empire, most probably from the Near East. They were all commodities that reached the *barbaricum*.

(translated by Zuzanna Pokewska-Parra)

Bibliography

Fuhrmann, I. (1939-40). Der Gewebefund von Pilgramsdorf unter Berücksichtigung der Gewebe von Sakrau und Anduln. *Prähistorische Zeitschrift* 30-31 (308-329).

Gawlikowski, M. (1993). Palmyra 1992. *Raporty Wykopaliskowe*, 4 (118-126).

Pfister, R. (1934). *Textiles de Palmyre*. Paris.

Pfister, R. (1937). *Nouveaux Textiles de Palmyre*. Paris.

Pfister, R. (1940). *Textiles de Palmyre, Vol.3*. Paris.

Sage, G. (1934). Die Gewebereste aus den Fürstengräbern von Sakrau unter besonderer Berücksichtigung der Brettchenweberei. *Altshlesien* 5 (272-284).

Jerzy Maik
Polish Academy of Science
Institute of Archaeology and Ethnology
PL-90-364 Łódź, Tylna 1
Poland

El-Zerqa - A Military Post in the Eastern Desert of Egypt

El-Zerqa is one of the seven military posts situated along the old caravan route from the Nile to the Red Sea, from where it was possible to go by ship to Arabia and India (Fig 1). None of these stations have previously been examined and in January 1994 registration and excavation of the best preserved fortress, el-Zerqa commenced.

The project is organised by the Institut français d'archéologie orientale, Cairo (IFAO), and conducted by Hélène Cuvigny and Adam Bülow-Jacobsen.

The main part of the finds is located in the *sebkha* outside the entrance of the fort. It covers an area of roughly 200 m², of which approximately half was excavated this season. Unfortunately the 600 ostraca from the site have not provided any absolute dates, but based on the finds, especially the ceramics, the occupation may be dated to the 2nd century A.D. Nevertheless the texts have confirmed the name of the fort, Maximerianon, and it appears from the context that this is a station with all military duties.

As part of a stay in Egypt preliminary examination and registration of the textile material were conducted. No closer analysis was carried out. In this first season approximately 2400 pieces of textile were excavated from the *sebkha*. Most of the textiles are plain weaves, generally either very fine and dense qualities, or thin, light fabrics. Less common are tabbies with colour effect in different patterns. Ten percent of the weaves are twills and these include among others 2/2 plain twills and 1/2 twills, various herringbone and diamond twills with displacement, and several different qualities of *Rippenköper*. In addition to this there is a relatively large proportion of bands, *clavi* and *gammis*. Among the

more exceptional textiles are three pieces of Coptic knitting, probably the remains of a sock.

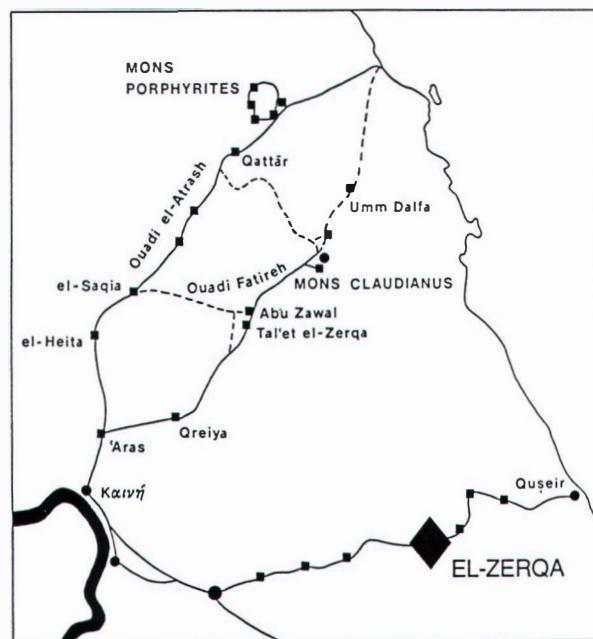


Figure 1 The location of el-Zerqa (♦).

Beside the above-mentioned weaves the el-Zerqa material contains a range of very coarse fabrics. In general these are plain or patterned weaves in natural colours, but also napped fabrics, felt and thick woollen weaves in either yellow, red or green occur.

A common feature for both groups of weaves is the prevalent use of natural colours, but dyeing in yellow, red, blue, green and purple is by no means unusual. Concurrently there is a dominance of woollen fabrics, and only a minor part of the textiles seems to be in plant fibre.

From this preliminary analysis it must be concluded that most of the textiles have been used for clothing. The combination of thick/warm and light/cool fabrics is ideal for the rough and fluctuating climate in the desert and they have a distinct standardised, military appearance. The group of different coarse weaves probably belong to the loosely defined collection of bedding and soft furnishing.

In the excavation season 1995 work on site will resume and hopefully the textile finds from el-Zerqa

will be able to put the life and use of a desert fortress into perspective, as was true for the finds from Mons Claudianus and 'Abu Sha'ar.

*Ulla Mannering
Vesterbrogade 127 A, 4^v
DK-1620 Copenhagen V
Denmark*

An Early European Textile Find from New Zealand

Dried Maori heads were macabre trophies of early European travellers, and in 1992 I was asked by the Liverpool Museum to report on wool in the head-band from one of these dated about 1820. Miss Tracey Seddon who sent yarn samples from the red-dyed cloth reported it to be woven with single-ply yarns in a plain weave. The finer, apparent warp yarns had a Z spinning twist and ran lengthwise along the band. There were 13 of these ends per cm length of the cloth and ten picks of the thicker apparent weft yarns, which had an S spinning twist.

Fibre diameter measurements showed that each yarn was made from the same Medium, fleece type. The fibres in the "warp" ranged from 18 to 64 microns with a mean of 36.7 microns, and those in the "weft" from 14 to 92 microns with a mean of 35.8 microns. Such wool is almost certainly from an English longwoolled breed. The coarseness and presence of medullated fibres - 3% in the warp and 18% in the weft - is in keeping with the longwools of about 1800. In the Kendal pattern book, dated ca.1770, nearly half of the 29 yarns I measured were of longwoolled type, their mean fibre diameters ranging from 30.7 to 36.9 microns (Satchell, et al., 1990). In contrast, of 18 wools excavated in a Maori cave and dated ca. 1825, only three were longwools (mean fibre diameters 36.8 to 38.7) (Ryder, 1972).

The slightly coarser wool in the warp is in keeping with the use of coarser wools in warps in the past, the ability to detect such a small difference by eye probably being assisted by the greater staple length of coarser wools (Ryder, 1987). Dr. G.W. Taylor identified brazilwood as the most likely source of the red dye. The similarity of the colour of the two yarns seen under the microscope indicates dyeing in the piece. That 90% of the fibres in the warp had faded compared with only 26% in the weft indicates a warp-faced cloth. This suggests that the cloth had been woven as a band, But Miss Seddon found no

trace of a selvedge and the warp facing could be due to the greater number of warp yarns per unit length.

Where Did the Cloth Come From?

Although there had been European contact with New Zealand for some time previously, there was virtually no introduction of sheep before 1840 (Ryder, 1983). It is therefore unlikely that the raw wool originated in New Zealand, and this accords with Miss Seddon's view that the cloth is unlikely to have been woven by Maoris and Dr. Taylor's view that dyeing of the cloth in New Zealand was unlikely. I suggest that it was spun, woven and dyed in Britain and obtained by Maoris as cloth.

The different spinning twist in the warp and weft follows a British tradition, 75% of medieval plain weaves having such a difference (Pritchard, 1991), One might even speculate that the cloth came from a Union Jack, the British national flag. Not only is the colour reminiscent of the red of this flag, but wool of longwoolled type was traditionally used to make bunting, which is a plain-weave fabric made from worsted-spun yarns. The band could have come from one of the piece-dyed red strips that are sewn together to make the flag, the St. Patrick's diagonal cross being lacking from the flag before 1801. This suggestion is opposed by Miss Seddon's observation that the yarns did not appear to be worsted spun, and the unlikelihood of making flag material with single-ply yarns.

The Maoris were hostile to European contact, as discovered by the British explorer Capt. Cook - could the cloth even date back to his 1769-70 circumnavigation of the islands? Cook is known to have put Union Jacks ashore on poles to claim the land. How Maoris might have obtained the cloth, part of a flag or not, could be the subject of further historical research.

References

Pritchard, F. (1991). Personal communication of data from which this calculation was made.

Ryder, M.L. (1972). Some foreign wool textiles excavated in New Zealand. *Journal of the Textile Institute* 63 (208-211).

Ryder, M.L. (1983). *Sheep and Man*. Duckworth, London.

Ryder, M.L. (1987). The measurement of wool fibres in yarns as an aid to defining carpet type. *Oriental Carpet and Textile Studies* III (134-152).

Satchell, J.E., Glover, J.M., Ryder, M.L., Taylor, G.W., and Garland, H.E. (1990). The Kendal Pattern Book. *Textile History* 21 (223-243).

M.L. Ryder
4 Osprey Close
Southampton SO1 8EX
UK

The Romano-Egyptian Site of Berenike

Ancient authors, such as Pliny, Strabo and Claudius Ptolemy have revealed the existence of an extensive trade between the Mediterranean and the Indian Ocean Basin, that is between Rome, the Arabic peninsula, Africa south of the Sahara, India, and Sri Lanka. In Egypt the goods, such as myrrh, frankincense and spices, were shipped from the Red Sea via the Nile Delta and the Mediterranean. To facilitate that transport a channel was made between the Nile Delta and the Red Sea. Ptolemy II Philadelphus finished the channel in the 3rd century BC, but he also founded a new Red Sea harbour, 1000 km south of the mouth of the channel, naming the town after his mother Berenike (I). The dangers of the Red Sea, with its pirates and prevailing North winds apparently were a smaller hazard than the routes from Berenike over land to Apollinopolis Magna (Edfu) or Koptos (Quft). Along these routes, which were 257 Roman miles long running across the Eastern Desert, a large number of way stations was built. These provided the travellers on their 12-day trip with water, a place to spend the night and protection against Blemmyes nomads who are reported to have regularly attacked the caravans.

Berenike was an isolated town with harsh living conditions and at the same time a harbour at a cultural crossroads. Its location in a sea-side desert and in an important military area has made systematic archaeological research at Berenike impossible, until last winter. In 1994 a Dutch-American expedition took place under the direction of Prof. Dr. S.E. Sidebotham, University of Delaware, USA and W.Z. Wendrich, Leiden University, The Netherlands. The project was financed by the National Geographic Society and the Stichting Historisch Onderzoek (Foundation for Historical Research), which have granted funding for the next four excavation seasons.

The survey in 1994 included mapping the site and excavating two test trenches. During the excava-

tions the preservation circumstances appeared to be favourable for organic materials. In one trench a trash dump of the 5th-6th century A.D. yielded botanical remains, papyrus, wood, basketry, cordage and textiles. The preliminary results of the textile analysis, performed by Marion van Waveren, a student of the Textile Research Centre in Leiden, indicate that the textiles show a wide variation, ranging from utilitarian fabrics to coloured decorated bands. The most important find was a small piece of block-printed cotton cloth, which is a very early import from India and an important indication of international trade. In the four excavation seasons planned for 1995-1998 the textiles will be analysed by John Peter Wild from Manchester University.

The Berenike basketry, analysed by Willemina Wendrich, showed interesting links with both the Nile valley and Nubia. This "Nubian" connection is also found in the pottery, which shows three major groups: imported Roman wares, Nubian wares and Blemmyes (local Bedouin) pottery. Close study of the textiles and basketry at Berenike may result in the first information on the lives of the early Bedouin people. The results of the textile and basketry analysis will be incorporated in the yearly *Berenike Reports*, which will be published by and can be ordered from the Centre of Non-Western Studies, Leiden University, Postbox 9515, NL-2300 RA Leiden, The Netherlands. Tel/fax: 31-(0)71-272210.

Willemina Wendrich
Nederlands Institute
1, Sharia Mahmoud 'Azmi
Zamalek, Cairo
Egypt

The Characterisation of Archaeological Textile Fibres Using Advanced Image Analysis Software

Introduction

Ryder pioneered the use of fibre diameter measurement¹ to characterise the fleece type of wools and developed the basis of an evolutionary scheme for the development of different fleece types in sheep which has proved of considerable worth in assessing archaeological textiles.² More recently he has extended the application of his measurement methodology to the study of plant fibres where he produced evidence of little if any selective change in flax fibre diameter between the Çatal Hüyük textiles and modern fibre.³ In *ATN 17* (November 1993) he has shown differences between the diameters of flax and hemp fibre in both modern and archaeological samples, but was unable to demonstrate a significant difference in diameters between nettle and flax, although more subjective physical attributes such as lumen size and shape were described as different.

Ryder's method involves the use of an optical projection microscope to form the image, and he describes the automation of the information capture by means of a bit pad linked to a suitable computer.⁴ Ryder's application of quantitative methods, in contrast to the substantially qualitative assessments of fibre type used by prior researchers such as Midgley⁵, represents considerable progress for textile archaeology, but problems of identification still exist, and the Manchester Archaeological Textile Unit (MATU) research team have recently started to combine SEM image capture with sophisticated image analysis software to tackle a number of the more difficult identification problems.

Sheep Breed Identification and Sheep/Goat Differentiation

The fibre diameter distributions recorded by Ryder enable the characterisation of wools into broad fleece types. Recently research in the textile industry has concentrated on the more subtle differentiation of sheep breeds, and the differentiation of speciality fibres like Cashmere, Cashgora, Angora, Alpaca, etc.

Researchers such as Robson at the Scottish College of Galashiels⁶ have demonstrated the potential for using parameters of scale frequency and scale shape/aspect ratio for separating fleeces from different breeds. Another team in Aachen⁷ has been successful in using scale height measurement to reliably *separate the sheep from the goats*. The

MATU team is now developing and applying these methods for use with archaeological textiles.

Plant Fibre Categorisation

Building on the work of Ryder we are also using image analysis techniques to establish algorithms which combine a set of fibre cross-section dimensions such as perimeter, cross-sectional area, shape factor, medulla area and medulla shape factor, to provide secure differentiation between fibres such as nettle and flax where the basic fibre ultimate diameter distributions overlap, and between flax and hemp where the fibre bundle dimensions overlap.

Equipment and Methodology

The ISI 100A SEM (1982) in the Department of Textiles at UMIST has been updated with the addition of a Pixi image capture system. This equipment converts the analogue SEM brightness signal into a digitised video image which can be stored in memory, or transferred directly into a suitable computer, for example an IBM 486DX, equipped with an appropriate video card (for example the Cortex-1 frame grabber) for image analysis. This transfer eliminates the need for film exposure, and the process of developing and printing conventional photographs.

The same procedure has been adopted with optical microscopes, and macro-lens systems, using a high resolution video camera to transfer the image directly to the computer. The image analysis software used is the VISILOG 4 version 4.1, produced by Noesis S.A.⁸ available to universities in the UK via CHEST (Combined Higher Education Software Team).

Sample preparation and examination methods are similar to normal techniques, but additional care is needed in the calibration of the screen image in the computer. In the case of SEM examination, etched micro-graticules providing 1 and 10 μ reference dimensions are mounted with the sample on the stub. In the case of optical systems stage micrometers are used to establish the screen calibration.

Visilog 4 which operates ideally within Windows 3.1⁹ offers a wide range of automatic and semi-automatic image filtering, enhancement, and measurement routines. For example the edge-detection routines make the measurement of scale features

much easier, eliminating the need to trace round the scale perimeter. For fibre cross-sections it is possible to measure diameter, cross-sectional area, medulla area, fibre cross-section perimeter, medulla perimeter, and shape factors, etc., very efficiently. The MATU team is now confident that combinations of the above measurements can be built into algorithms which will facilitate the reliable differentiation of plant species, and enable us to separate and identify different animal fibres with small samples, i.e. less than 30 fibres.

Conclusions

The recent developments in image analysis software, and the availability of powerful relatively cheap PC's have made the use of sophisticated image analysis techniques in the examination of archaeological textiles a natural extension to the measurement of fibre diameters and fibre cross-sections as a means of fibre identification.

The recent work at UMIST by the MATU team has demonstrated the potential of this technique to resolve the more difficult fibre identification problems. The current programme of work centres on the Vindolanda corpus of samples, and the techniques will be progressively extended to other periods and sites.

References

1. Ryder, M. (1983). *Sheep and Man*. Duckworth, London.
2. Ryder, M. (1983). A re-assessment of Bronze Age wool. *Journal of Archaeological Science* 10 (327-331). Ryder, M.L. (1984). Skin, hair and cloth remains from the ancient Kerma civilisation of Northern Sudan. *Journal of Archaeological Science* 11 (477-482). (To name but two of many examples.)
3. Ryder, M.L. and Gabra-Sanders, T. (1987). A microscopic study of remains of textiles made from plant fibres. *Oxford Journal of Archaeology* 6 (91-108).
4. Hutchings, N.J. and Ryder, M.L. (1985). The automation of the projection microscope. *Journal of the Textile Institute* 76 (295-299).
5. Midgley, T. (1928). The textiles and matting. *The Badarian Civilisation*; Brunton, G. and Caton-Thompson, G. (Eds.). B.S.A.E., London.
6. Robson, D. and Weedall, P.J. (1990). Fibre measurement from SEM images using image processing and analysis techniques. *Proceedings of the 2nd International Symposium on Speciality Animal Fibres*. Aachen.
7. Wortmann, F.J. and Wortmann, G. (1991). *Scanning Electron Microscopy as a Tool for the Analysis of Wool/Specialty Fibre Blends*. Aachen.
8. Noesis SA, Immeuble Nungesser, 13 Avenue Morane Saulnier, 78140 Vélizy, France.
9. Microsoft Corporation, One Microsoft Way, Redmond, WA 98052-6399, U.S.A.

W.D. Cooke, J.P. Wild, C.R. Cork and L. Fang-Lu
Department of Textiles
UMIST
PO Box 88
Manchester M60 1QD
UK

Experimental Archaeology

A Reconstruction of a Blanket from the Migration Period

The winters in the 1940s were very cold in Denmark and it was necessary to use a lot of peat to get some heat indoors. During peat cutting in a bog near Vejen, in south Jutland, a large piece of cloth was recovered from 1.5 m depth. The peat cutters brought the cloth to the local teacher, who turned it over to the doctor in the town and from him it finally came to the Museet på Koldinghus (Kolding, South Jutland). Unfortunately no more details are known. Margrethe Hald published the find in 1950 and 1986 and it has become known as the *Vejen Blanket*. It is dated to A.D. 400.

The blanket measures 2x1.5 m and is woven in a broken lozenge twill (Fig 1). All four selvages are tabletwoven and the corners have banded tassels. Each border has a four-thread tablet-weave with cording, the tablets in pairs thread right and left. The starting border is woven with ten tablets, the side borders with six and seven, and the closing border with 14 tablets. The blanket has 12 to 14 threads per centimeter in both warp and weft. The warp is Z-spun and the weft S-spun. The diameter of the thread used in the weaving is between 0.5

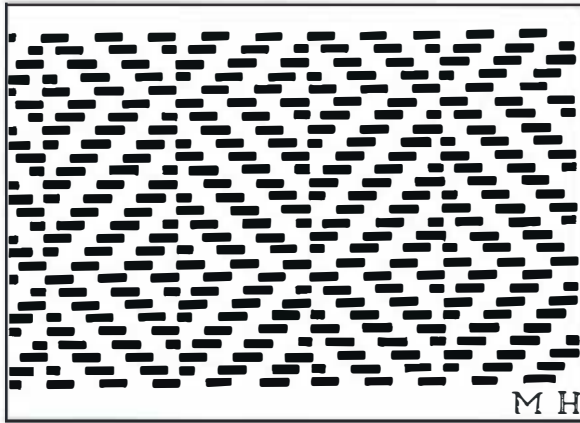


Figure 1a Diagram of the weave of the Vejen blanket. (Illustrated by Margrethe Hald).

and 1.0 mm. The degree of the angle at which the fibres in the thread lie is between 45 and 50°.

When Margrethe Hald examined the blanket it was on exhibition in the museum in Kolding in a room with light from four points of the sky. It had been exhibited in this manner for about 30 years. In connection with a modernization of the museum the blanket was removed from its exhibition case. It was thereby discovered that the blanket was about to fall to pieces where the light had the greatest effect. For the blanket to be preserved for posterity it would have to be kept in almost total darkness, making exhibition to the public very difficult.

It was therefore decided to make a copy of the blanket. At the same time we also wanted to carry out the work as experimental archaeology.

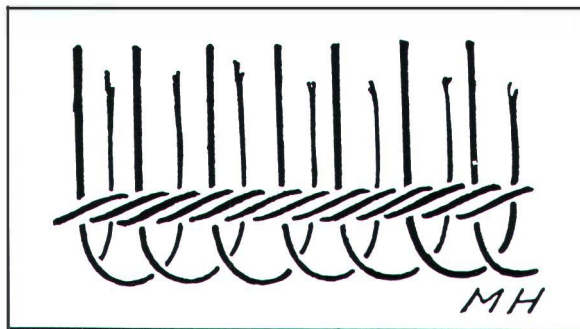


Figure 1b Diagram of the lower border of the Vejen blanket. (Illustrated by M. Hald).

Yarn from the blanket was sent to Penelope Walton Rogers in York to identify the dyes and fleece types.

The results were that the main body of the blanket, warp and weft, proved to be woven from a hairy medium fleece type, that is, one with a relatively fine underwool and a small number of coarser hairs (much like the modern Shetland wool). The warp of the tablet-woven border was

made from a shortwool kind of fleece (resembling the wool from modern Downs breeds) and the plied yarn round the tassel from a medium type (a little finer than the modern Romney).

Dye was detected only in the plied yarn round the tassel; the remaining yarns were either never dyed, or were coloured with a dye which has deteriorated beyond detection. The dye identified was from a madder-like dye. Dyers' madder, *Rubia tinctorum*, can usually be distinguished from the wild madders and the bedstraws, by the presence of alizarin. However, the Vejen dye was too weak to allow identification of the individual dye components by chromatography. (Extract from P. Walton Rogers's report.)

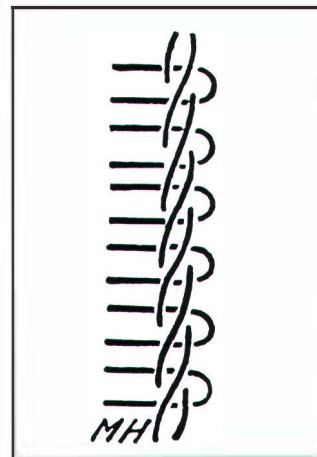


Figure 1c Diagram of the selvedge from the Vejen blanket. (Illustrated by M. Hald).

Wool according to the mentioned modern types was ordered and the spinning of the yarn was carried out on a spinning wheel because we did not have the money or the time for hand spinning on a suspended spindle. A Norwegian lady who had spun from her childhood did the spinning; she could spin 100 metres in one hour.

Total yarn spun: 340 m for the tablet-woven borders; 5665 m for the warp and 4227 m for the weft. The average weight was 10 g of wool per 75 metres yarn.

The warp was made as shown in the diagram in Figure 2. After the warp had been sewn onto the holes in the beam all the warpweights were hung so that each warp thread was weighted with 25 g.

The weaving of the blanket took 265 hours and when it was finished 2574 picks had been made. At the time when the weaving went on best you could make 12 picks in one hour, but it was impossible to make 60 picks in five hours. The last part of the blanket took three times as long as the first part.

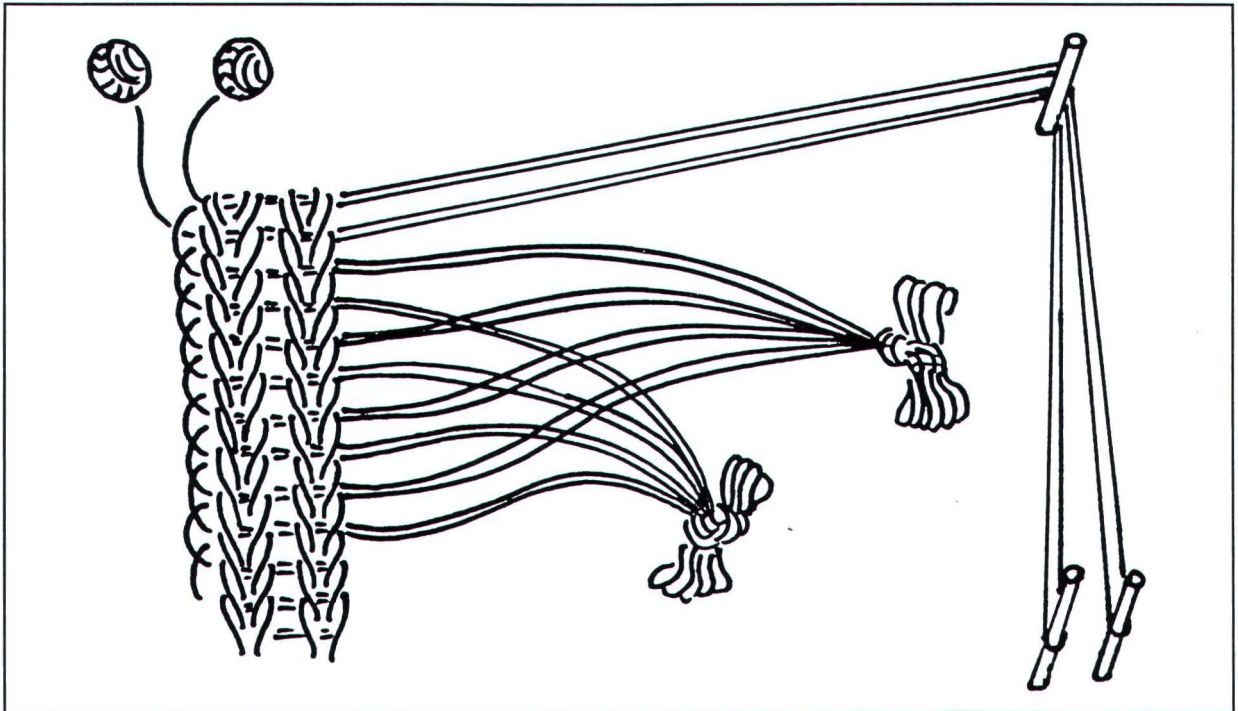


Figure 2 Diagram showing the warping method. The warp for the reconstruction was made with 1988 threads distributed over 151 cm plus the threads for the tablet-woven border. The warp was made to measure 285 cm, since the warp cannot be fully utilized. (Illustrated by A. Nørgaard).

When the blanket was taken off the loom the warp-ends left over were used as weft in the finishing tablet border and thereby were locked into the border.

All through the reconstruction the time consumed by individual processes was registered:

Spinning	100 hours
Making the warp	8 hours
Setting up the loom	14 hours
Weaving	265 hours
Finishing	15 hours
Total	402 hours

The restoration of the blanket from the Migration Period took place in the Department of Conservation at the National Museum in Brede. Neither of the blankets are yet on display at the Museet på Koldinghus.

An illustrated booklet about the reconstruction of the Vejen blanket is in preparation.

Anna Nørgaard
Nakskovvej 15^{ll.th}
DK-2500 Valby
Denmark

Else Østergaard
Dept. of Conservation
Nat. Mus. of Denmark
DK-2800 Lyngby
Denmark

Chevron Weave Patterns: An Experiment in Handspinning and Weaving

Introduction

In a lecture given recently by Mrs. Avigail Sheffer to a group of weavers in Israel she drew attention to a number of textiles from Masada (dating to the third quarter of the first century A.D.) which had a chevron effect although they were woven in plain tabby binding (e.g. Masada nos. 92/5 and 1035-29/1). She asked for the weavers' help and suggestions about the textiles' construction. The discussion led to the experiments described below.

Sample 1 Preparation as a Woollen

For the first experimental sample a Corriedale wool fleece (USA) with a staple length of 15 cm and a Bradford Count 50's to 60's was used. During the woollen preparation the fibres lay in all directions while carding, producing ultimately an elastic and bulky yarn (irrespective of its thickness) with a woolly surface.

Carding: A sufficient amount of wool was carded on a pair of hand-held Schacht curved carders to create thread for the sample weaving.

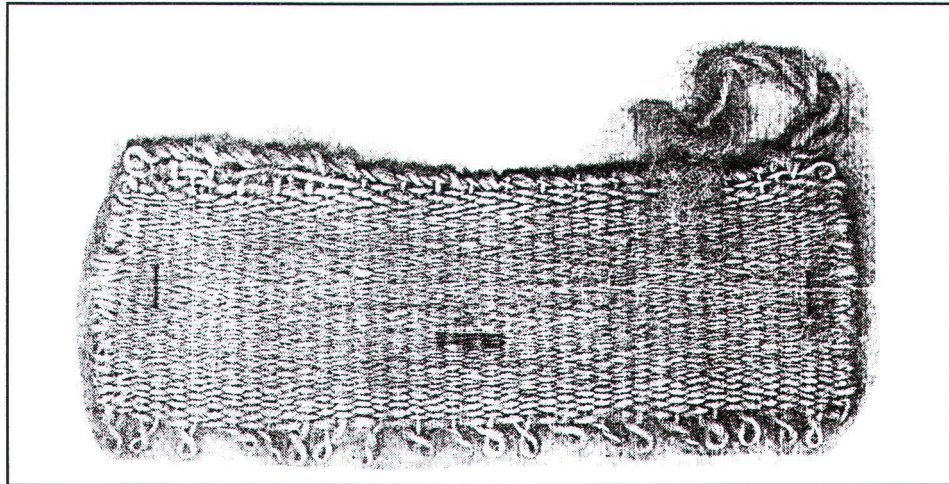


Figure 1 Sample 1 - Woollen preparation.

Spinning: The fibre mass was divided in half and the two halves spun on an Ashford traditional spinning wheel. One bobbin was Z-spun and a second bobbin S-spun at a twist angle of 33°, seven crimps per inch, the fibres being on average 28 microns in diameter. The S-spun single yarn weighed 28 g, the Z-spun 21 g, for a total of 49 g.

Yarn setting: To set the fibre twist the yarn was left on the spinning wheel bobbins for 24 hours. An additional setting was done by immersing the wound-off skeins in warm water to soak; they were then hung up to dry with moderate tension on the skeins. The tension also helps to set the yarn twist.

Weaving: Using a rigid-heddle loom warped at 6 tpi with a Z-spun warp, a small 650 by 205 mm cloth sample was woven in an alternating combination of S- and Z-spun yarns (a 2S/2Z and 3S/3Z repeat). Please note: I must indicate that my weaving is not as efficient as that of other weavers. Also, I'm afraid that carpet bugs ate a portion of the edging, as can be seen in the accompanying figures!

Remarks: This preliminary sample was not successful and not up to my expectations, for the following reasons:

1. The woollen-system preparation method produced a puffy yarn, thereby creating a thicker fabric, not of a smooth and even texture.
2. The woollen yarn produced a thick and hairy surface masking the chevron quality of its zigzag effect.

Sample 2 Preparation as a Worsted

The wool was prepared for worsted-system spinning from fibres rendered straight and parallel by hand combing. In the hand combing process shorter fibres are removed leaving only the long and parallel fibres. This preparation method makes for clarity of detail in the resulting textile as well as forming a sleek and smooth fabric.

Carding: Using English-style hand combs (from John Meck, USA) the fibres were prepared for the worsted system and finally drawn into a long, smooth, roving for spinning. All shorter fibres were removed in the combing process.

Spinning: Spinning and yarn setting were as for woollen spinning described above, but resulted in a



Figure 2 Sample 2 - Worsted preparation.

smoother and less hairy yarn. Both the S- and the Z-spun yarn (singles) weighed 14 g, totalling 28 g in the sample. They were spun at a twist of 45°, with 11 crimps per inch, with the fibres averaging 24 microns in diameter.

Weaving: The sample was woven on a rigid heddle at 6 tpi using Z-spun warp thread. In the weft repeats of 4S/4Z and 6S/6Z yarns were adopted; the 6S/6Z pattern had greater design clarity.

Remarks: Sample 2 was the more successful. The use of a worsted yarn definitely showed up the chevron zigzag pattern. The fabric was smooth and sleek and of even texture.

While attempting to carry out this project in the easiest and fastest manner possible (i.e. by the woollen system), one must not forget the techniques used thousands of years ago and the character of spinning at that time. If fibres were combed, the weaver could weave a finer and more durable fabric. A worsted yarn is more time-consuming in preparation, but immediately stands out in quality of craftsmanship and effect.

*T. Friedman
Moshave Nir Etzion
D.N. Hof Carmel
Israel*

(with introduction by John Peter Wild)

Worth Noting

Information Wanted

An 18th Century Stitch

Janice Brodie, Textile Conservation Technician at Parks Canada in Ottawa, Canada, has requested readers of *Textile Conservation Newsletter* to help confirm the identification of a knitting stitch in an 18th century sock found on the wreck of the *Machault* which sank in the mouth of the Restigouche River, Canada, in 1760.

The stocking is made of black or dark brown cotton yarn: the pattern is a "knit 2, purl 1" rib with a variation of this pattern at the top, which is the pattern in question. The gauge is eight stitches per cm and nine rows per cm.

The visual effect of the stitch variation is that of an additional thread that has been darned or woven through the already knitted ribbing. On the outside, a horizontal thread appears across the purl wale, disappearing into the knit wale. On the inside, the thread appears at the edge of the knit wale and seems to go up, on an angle, two rows (across the back of the knit wale) and over one thread; then it goes down two rows (at an angle) and disappears into the purl wale. This sequence is repeated along the round. This row is repeated six times, every four rows.

The thread is pulled distorting the existing stitches which gives an effect similar to a flat popcorn stitch. This circular *motif* appears on the outside of the knit wale.

Several attempts at reproducing this effect were less than satisfactory until the darning technique was tried. If anyone knows of a stitch similar to that described here, please contact Janice Brodie.

*Janice Brodie
Historic Resource Conservation
National Historic Sites Directorate
Parks Canada
1550 Liverpool Court
Ottawa, Ontario K1A 0M5
Canada*

(Request from *Textile Conservation Newsletter* 26.)

Asbestos Fibre

Clare Browne would appreciate information about any extant examples of textiles incorporating asbestos fibre, particularly from archaeological sites, but of any date before the nineteenth century; also references to such textiles.

*Clare Browne
Assistant Curator
Textiles and Dress Collection
Victoria and Albert Museum
Cromwell Road
London SW7 2RL
UK*

Scythian "Princess" Found in Altai Mountains, Russia, Near Chinese Border

The frozen body of a highborn woman aged about 25 years has been found mummified in a hollowed-out tree trunk below permafrost levels. The approximate dating is ca. 500 BC. The woman was wearing a long white dress with two red stripes, a matching blouse and a spectacular headdress. This last consisted of a carved wood hair grip which supported a tall narrow plume of black felt decorated with abstract patterns and animals. The woman wore gold ear ornaments and her arms and hands were tattooed with mythical monsters and a snow leopard. She lay on a pillow stuffed with grass.

There was a carpet on the floor of the tomb and six horses had been ritually killed and buried beneath the coffin. The body was laid on its side, with the head turned to the east, in the hollow, lidded trunk of a larch tree; this was decorated with carvings of geese and snow leopards. Carvings of the latter occurred again on wooden jars and as well there were carved figurines of winged snow leopards in the grave. There was also a silver mirror in a wooden frame. As part of the mummification process the body was stuffed with animal fur, grass, moss and peat. The director of the excavation is Natasha Polosmak.

This information came from an article in the London *Sunday Times* in late March 1994. The body was excavated last summer [1993]. Does anyone have further information on this exciting new find of textiles and other organic artefacts?

E. Wincott Heckett
Department of Archaeology
University College Cork
Cork, Ireland

Embroidery Terminology

Any thoughts on the terminology for the following categories of embroidery techniques?

1. Surface decoration of evenly woven or netted fabrics.
2. Surface decoration of other fabrics
 - a. by the addition of stitchery
 - b. by the addition of fabric, leather
 - c. by the addition of metal threads
 - d. by the addition of beads, sequins
3. Decoration added from the back of the fabric
4. Negative space techniques

- a. by pulling holes
 - b. by drawing either warp or weft threads
 - c. by cutting spaces
 - d. by building with cut spaces
5. Construction techniques
 - a. by pleating
 - b. by piecing
 - c. by using thread alone
 6. Miscellaneous

Anne Morrell
Dept. of Textiles and Fashion
The Manchester Metropolitan University
Oxford Road
Manchester, UK

Opening of the Sarcophagus of Frederick II in Palermo

In the Cathedral of Palermo study has been in progress around the sarcophagus of Frederick II (died in 1250 A.D.). The Istituto Centrale del Restauro (Central Institute for Restoration, ICR) was called by the Superintendent of Cultural Heritage of Palermo as a consultant. During a recent investigation with videoendoscopy we could see a good part of the textiles in the sarcophagus. It is planned that on February 25, 1995 a study day will be held in Palermo discussing the historical problems and proposals on the possibility of opening the tomb. The Textile Laboratory of ICR has to present a plan for the conservation and restoration of the textiles with special regard to: a sterile room with strict control of humidity built around the sarcophagus, microexcavation in the tomb and first-aid treatments, packing and transportation to a textile conservation laboratory, and treatment and exhibition.

Experts with experience with similar problems, such as microexcavation in a dry tomb, are kindly asked to contact Dr. Rosalina Varoli-Piazza for consultation and collaboration. Those interested are asked to send a description of their experiences including a list of their publications on the subject.

Dr. Rosalina Varoli-Piazza
Istituto Centrale del Restauro
Piazza S. Francesco di Paolo 9
I-00184 Roma
Italy

Tel: 39-6-48896262 Fax: 39-6-4815704

(Request from ICOM-CC Textile Working Group Newsletter 2 (1994))

More on Silk in Ancient Egypt

The discovery of silk in Egypt dated ca. 1000 BC, which I reported in *ATN 16*, was picked up by John Musty and reported in his Science Diary in *Current Archaeology 134* (1993). Later, in *CA 137* (1994), he quoted my remark that the z-twist suggested that the silk might have come from China. He also quoted a suggestion that India might be the source. This was made by correspondent Howard Kilbride-Jones, who also maintains that the silk described by Aristotle came from India. Aristotle's silk is much more likely to have come from the silk moth *Pachypasa otus* of the Aegean island of Cos, which belongs to the third main family of silk moths, the Lasiocampidae. This would also be the nearest possible source of the Egyptian silk.

Chinese silk comes from the domesticated, mulberry silkworm (*Bombyx mori*) belonging to the first main family, the Bombycidae. Indian silk is produced by larvae of moths belonging to the second main family, the Saturniidae. They produce coarser, wild silks such as Tussah. India is certainly a possible source of the Egyptian silk since Indian records of ca. 1000 BC refer to local silk production. This makes it surprising that silk production appears to owe so much to Chinese knowledge, which did not reach India along with the mulberry silkworm for another thousand years.

The point is that there might be a way of identifying the type of silk, if it was possible to section the

Egyptian find. As shown in Figure 1, Tussah silk from India is not only coarser than mulberry silk, but has a very different cross-section. The third type in the diagram, Anaphe silk, comes from Africa. This comes from the wild Anaphe moth of the equatorial region, in which groups of larvae spin communal nests on trees in place of individual cocoons and it is the empty nests that are collected to provide the silk. Not only does this provide a third centre of silk production independent of China (fourth if one includes the island of Cos), but it provides an intriguing possible fourth source of the Egyptian fibre. Egypt had considerable trade with the south through Nubia, so was silk one of the commodities imported? As a postscript one might add that although cotton is usually thought to have been the fibre described by classical writers as growing on trees, Anaphe silk provides another candidate for this misunderstanding.

Bibliography

Tazima, Y. (1984). Silkworm moths. *Evolution of Domesticated Animals*. Longman, London (416-424).

M.L. Ryder
4 Osprey Close
Southampton SO1 8EX
UK

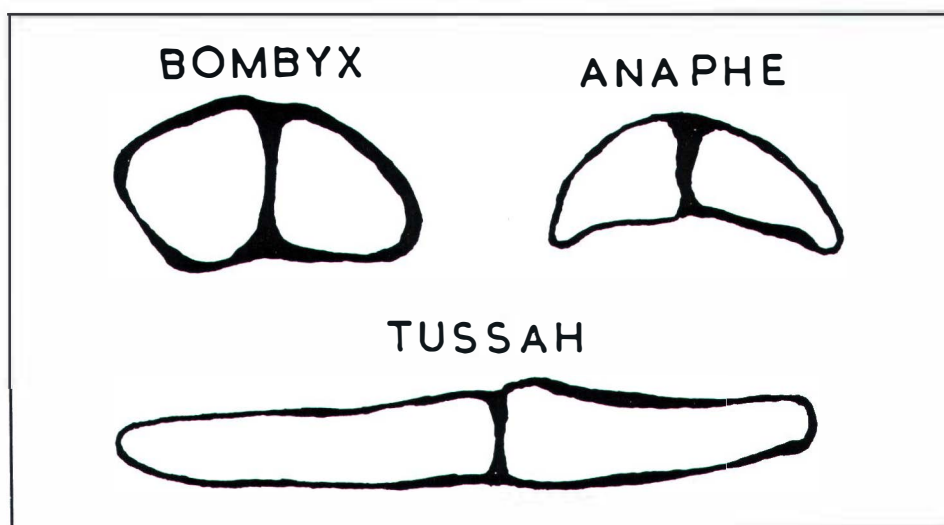


Figure 1 Comparisons of the cross-sections of cultivated silk (*Bombyx*) with two kinds of wild silk, *Anaphe* from Africa and Tussah from the Indian sub-continent. (From Ryder, M.L. (1963). *The gross structural features of protein fibres*. Fibre Structure; Hearle, J.W.S. and Peters, R.H. (Eds.). Butterworths, London (534-566).

Correction

In my paper on Danish Bronze Age wools (Ryder, 1988) I identified fine fibres from the underwool of goats. The identification was based on the surface scale pattern of the fibres as observed in scanning electron micrographs (SEMs) prepared by Mrs. T. Gabra-Sanders. I did not imply that the fibres were actually being used like modern cashmere, but rather these were goats with sheep. I have now made the same observation in wool of the Bronze Age hoard from St. Andrews, Scotland (Gabra-Sanders and Cowie, 1993; Ryder, 1993), but think that the fine fibres in question are from sheep.

All the fine fibres had the expected irregularly waved mosaic scale pattern (Ryder and Stephenson, 1968), but what was unexpected and unusual was the "distant" distance apart of the scale margins in fibres of about 15 microns in diameter. Distant scale margins are found in goat underwool (cashmere), which has a mean fibre diameter of about 15 microns, but not in modern fine wool, little of which has a mean fibre diameter of less than 20 microns. It now appears that distant scale margins are associated with fibre fineness rather than with species and it may also be a primitive feature. The identification of goat fibres in Danish Bronze Age wool can no longer be sustained. The main advantage of SEMs in the study of wool is the ease with which they show the surface scale patterns. In the past, casts of fibre surface had to be made in order to see the scale pattern clearly and so these have been little studied in archaeological material.

References

- Gabra-Sanders, T. and Cowie, T. (1993). The Late Bronze Age hoard from St. Andrews, Fife, Scotland. *Archaeological Textiles Newsletter* 16 (3-4).
- Ryder, M.L. (1988). Danish Bronze Age wools. *Danish Journal of Archaeology* 7 (136-143).
- Ryder, M.L. (1993). Probable hemp fibre in Bronze Age Scotland. *Archaeological Textiles Newsletter* 17 (10-13).
- Ryder, M.L. and Stephenson, S.K. (1968). *Wool Growth*. Academic Press, London (p 109).

M.L. Ryder
4 Osprey Close
Southampton SO1 8EX
UK

The Tutankhamun Textile and Clothing Project

In the last issue of the *ATN* we included a small item about the *Tutankhamun Textile and Clothing Project*, Leiden. It was noted that we were waiting to hear if we had permission from the authorities of the Egyptian Museum, Cairo, in order to see the Tutankhamun textiles now in the storerooms and to take photographs of them. We can now report that we were given permission and that Elise van Rooij and I were able to carry out work in February 1994. I should like to thank the Museum for both giving us permission and for showing us such kindness and help during our visit.

As a result of our work it is now possible to complete an initial catalogue of the textiles found in the tomb and to expand upon notes written by the excavator, Howard Carter. In addition, we were able to "borrow" the photographer from the Rijksmuseum van Oudheden, Leiden, in order to make colour photographs of many of the items.

Although the basic catalogue will soon be ready, it will be at least five years before a scholarly description of the clothing and its meaning will be presented to the textile world. However, I can assure readers of the *ATN* it will be worth the wait: we have already made some fascinating discoveries.

At present we are now ordering our finds, documentary information and the photographs. Eventually we hope to establish a Tutankhamun Textile and Clothing Archive here in Leiden. Nevertheless, it will take some time before we are in proper order. As part of the archival work we are looking for items, articles, books about Tutankhamun, especially a set of the three volumes written by Carter about the tomb and its contents. If anyone has a set of these books, or any others, and would be willing to give it to us, we would be very pleased to hear from them.

G.M. Vogelsang-Eastwood
Stichting Textile Research Centre
The National Museum of Ethnology
Postbox 212
NL-2300 AE Leiden
The Netherlands

Exhibitions

What is Embroidery?

From April 30, 1994

Whitworth Art Gallery, Manchester, UK

An exhibition is currently being held at the Whitworth Art Gallery, Manchester, UK, with the intriguing title *What is Embroidery?* The exhibition has been organised in conjunction with Prof. A. Morrell, a regular contributor to the *ATN*. The exhibition uses historical and contemporary work to explore the wide range of styles and techniques covered by the term *embroidery*. Is it a functional skill or an expressive medium now more closely related to the fine art practice?

A Stitch through Time: The Journey of an Islamic Embroidery Stitch through Europe and the New World

From May 27 through October 16, 1994

The Textile Museum, Washington, DC, USA

The exhibition traces the use and development of the double-running stitch from Mamluk, Egypt (A.D. 1250-1517) to the court of Henry VIII in England to 20th century Mexico. Thirty-eight textiles, many never before exhibited, have been selected from both the Textile Museum collection and private collections for the exhibition.

Clothing of the Pharaohs

From November 11, 1994

Rijksmuseum van Oudheden, Leiden, The Netherlands

The exhibition covers, amongst others, topics like how linen in ancient Egypt was made and decorated; the various uses to which cloth was put including household items and clothing; the clothing of Tutankhamun, and accessories such as cosmetics, wigs, jewellery and footwear.

After finishing in Leiden, the exhibition will travel to Copenhagen, Hannover and Vienna.

Conferences

The Textile Trade between Byzantium and the West: Economic and Artistic Exchanges

Medieval Dress and Textile Society Meeting

April 11, 1995

British Museum Lecture Theatre, London, UK

Ritual and Celebration in Ecclesiastical Dress in the Middle Ages

Medieval Dress and Textile Society AGM and Meeting

May 20, 1995

Courtauld Institute of Art

Somerset House, London, UK

Anyone interested in these meetings should contact Lisa Monnas at the address given below.

Lisa Monnas
16 Aubrey Walk
London W8 7SG
UK

Reviews

Conferences

Early Textiles Study Group

Binennial 2-day Conference
September 9-11, 1994, Manchester, UK

The conference took place in Manchester at Ashburne Hall on the topic *Early Items of Clothing*. A very interesting and full programme of fourteen speakers gave papers covering clothing from many parts of Europe, Africa and Asia, and ranging in time over two thousand years. Many aspects of dress were examined; discovery, analysis, conservation and presentation were discussed. It is somewhat invidious to pick out any particular speakers since the level of papers was universally high, but it was a particular pleasure to hear both Dr. Anna Jeroussalimskaja and Dr. Beata Biedronska-Slotowa who had respectively travelled from St. Petersburg and Krakow to attend the conference.

Dr. Jeroussalimskaja spoke on *The Clothing Found in 8-9th century Tombs in the Northern Caucasus*. Her paper was accompanied by excellent slides of the silk robes, hats and shoes worn by people who dominated a particular pass on the Silk Road in the Caucasus and so exacted a tribute in silk from traders passing through their territory. Dr. Biedronska-Slotowa spoke on the recent discovery in a presbytery of the diocese of Krakow of long-lost early 15th century episcopal vestments made from Byzantine and Mamluk silks.

A Chinese perspective was given by Madame Krishna Riboud and Dr. Verity Wilson. Madame Riboud discussed a recently discovered bronze statue of the late Shang dynasty (11-13th BC) which reveals details of dress of the period. Dr. Wilson spoke on the finds from the tombs of the Lady of Mashan (died ca. 300 BC) and the Lady from Mawang-Dui (died ca. 180 BC). The clothes from these tombs show that the cut of the garments is more complex than generally expected of Chinese clothing and that, for example, spirally wrapped garments were worn at the time. On the African front, headcoverings from Roman Egypt now in the Metropolitan Museum of Art were described by Ms. Nobuko Kajitani and Mr. Donald King spoke on aspects of dress in Roman and Byzantine Egypt.

The conference was very well attended with nearly 70 participants many of whom travelled from outside the UK. Vigorous discussions and conversations took place at mealtimes, coffeebreaks and

around the bar, and much informal information on textile topics was exchanged. An enjoyable visit was arranged to the Gallery of English Costume, Platt Hall, Manchester. The conference organisers, Karen Finch and Hero Granger-Taylor are to be congratulated on arranging so successfully a lively, stimulating and scholarly programme.

Elizabeth Wincott Heckett
Department of Archaeology
University College Cork
Cork, Ireland

Clothing the Pharaoh

Leiden 1994

To mark the opening of a ground-breaking exhibition in the National Museum of Antiquities, Leiden, on pharaonic clothing - and on the clothing of Tutankhamun in particular - the Research School CNWS hosted a two-day symposium (17-18 November 1994) on interregional contacts in the Near East in the mid second millennium BC. Textile trade and exchange were naturally the principal focus of discussion, but the topic was examined both in the light of the documentary evidence (by Stephanie Dalley and Renate Germer) and on the basis of the surviving fabrics (by Gillian Vogelsang-Eastwood and Bill Cooke), not least those furnishing the tomb of Tutankhamun. The representational sources were quarried by Diana de Wild and M.E. Wiland; the mechanisms of archaeological contact were explained by Professor J.H. Crouwel in terms of the transfer of chariot-making technology - an illuminating backdrop to the transfer of textile technology.

There was time, just, to view the fascinating exhibition itself, which will go on tour later to Copenhagen and other European centres. It must not be missed, nor must its catalogue, out in Dutch, and due to appear in Danish, German and probably English. It was all a feather in the caps of Gillian and Willem Vogelsang.

John Peter Wild
Department of Archaeology
University of Manchester
Manchester M13 9PL, UK

Publications

Recent Publications

- Anon (1973). Deities, saints and allegories: Late antique and Coptic textiles. *Hali* 72 (80-89).
- Bown, W. (1991). Cloth fragments reveal popular colours of the past. *New Scientist* 129 (34).
- Caldararo, N. and Kahle, T.B. (1989). An analysis of the present state of research into the authenticity of the Shroud of Turin. *Restauro* 95 (297-305).
- Dinegar, R.H. and Schwalbe, L.A. (1989). Isotope measurements and provenance studies of the Shroud of Turin. *Archaeological Chemistry IV, Advances in Chemistry Series 220*, Allen, R.O. (Ed.) American Chemical Society, Washington DC (409-417).
- Donnan, S.G. (1987). Field conservation of archaeological textiles: a case study from Pacatnamu, Peru. *In-Situ Archaeological Conservation*, H.W.M. Hodges (Ed.). Instituto Nacional de Antropología e Historia, Mexico City og J.Paul Getty Trust, Century City (72-77).
- Edwards, G. (1989). Guidelines for dealing with material from sites where organic remains have been preserved by metal corrosion products. *Evidence Preserved in Corrosion Products: New Fields in Artifact Studies*. Occasional Papers Number 8. UKIC, London (3-7).
- Egan, G. (1994). *Lead Cloth Seals and Related Items in the British Museum*, British Museum Occasional Paper 93.
- Enomoto-Sera, M. and Sato, M. (1994). Comparative studies on the secular degradation of silk fibres used in textiles fabricated in various eras. *Preventive Conservation: Practice, Theory and Research. Summaries of Posters*. IIC, London.
- Fentz, M. (1992). *Vikingskjorten fra Viborg*. Viborg Stiftsmuseum, Viborg. ISBN: 87-87272-46-6.
- Fujii, H., et.al. (1993). Textiles from At-Tar Caves. *Al-Rafidan* 14 (109-140).
- Gillard, R.D., Hardman, S.M. and Watkinson, D.E. (1993). Recent advances in textile studies using FT-IR microscopy. *Conservation Science in the U.K.*, Tennent, N.H. (Ed.). James & James Science, London (71-76). ISBN: 1-87-393622-2.
- Gillard, R.D., Hardman, S.M., Thomas, R.G. and Watkinson, D.E. (1994). The detection of dyes by FTIR microscopy. *Studies in Conservation* 39(3) (187-192).
- Gillard, R.D., Hardman, S.M., Thomas, R.G. and Watkinson, D.E. (1994). The mineralization of fibres in burial environments. *Studies in Conservation* 39(2) (132-140).
- Glover, J. (1992). The mummy bandages of Natsef-Amun. *SSCR Journal* 3(3) (18-19).
- Greaves, P.H. (1992). Fibre content testing. *Wool Science Review* 68 (1-24).
- Harbottle, G. and Heino, W. (1989). Carbon dating the Shroud of Turin: a test of recent improvements in the technique. *Archaeological Chemistry IV, Advances in Chemistry Series 220*, Allen, R.O. (Ed.) American Chemical Society, Washington DC (313-320).
- Hardman, S.M. (1992). The mineralization of fibers in burial environments. *Conservation News* 48 (41-42).
- Hatting, T. (1993). *Fåret i Oldtid & Nutid*. Historisk-Arkæologisk Førsøgscenter, Lejre. ISBN: 87-87567-48-2.
- Hendriks, U., Strelow, R. and Zalles-Flossbach, C. (1992). Materialanalytische Betrachtung altperuanischer Textilien aus der Sammlung des Völkerkundemuseums Berlin-Dahlem. *Berliner Beiträge zur Archäometrie* 11 (217-236).
- Højrup, O. (1991). *Landbokvinden: Rok og Kærne, Grovbrød og Vadmel*. National Museum of Denmark and Christian Ejler's Forlag, Copenhagen. ISBN: 87-7241-591-6.
- Imray, J. (1991). *The Mercers' Hall*. London.
- Jaacks, G. (1993). Kostumgeschichtliche Untersuchungen an den Geweben aus den Grabungen Hunderstraße, Schranggen un Königstraße in Lübeck. *Lübecker Schriften zur Archäol. und Kulturgeschichte* 23 (283-299).
- Jaacks, G. (1993). Die Kleidung des Lübecker Kaufmann. *Der Lübecker Kaufmann, Aspekte seines Lebens und Arbeit vom Mittelalter bis zum 19 Jh.* Lübeck.
- Jakes, K.A. and Angel, A. (1989). Determination of elemental distribution in ancient fibers. *Archaeological Chemistry IV, Advances in Chemistry Series 220*, Allen, R.O. (Ed.) American Chemical Society, Washington DC (451-464).

- Janaway, R.C. (1989). *Corrosion preserved textile evidence: mechanism, bias and interpretation. Evidence Preserved in Corrosion Products: New Fields in Artifact Studies*. Occasional Papers Number 8. UKIC, London (21-29).
- Kalyanaraman, A.R. (1991). X-ray method of dating archaeological fibrous artifacts. *Journal of the Textile Institute* 82(4) (508-511).
- Kohara, N., Kikuchi, M., Nakayama, E. and Toyoda, H. (1992). Natural ageing of ancient Egyptian linens. *Sen'i Gakkai shi* 48(5) (234-239).
- Koller, M. and Prandstetten, R. (Eds.) (1992). Textile Objekte. *Restauratorenblätter* 12.
- Krasusiki, I. and McKay, D. (1993). Conservation of an Egyptian painted mummy shroud. *Textile Conservation Newsletter Supplement*, Spring 1993.
- Lachaud, F. (1994). An aristocratic wardrobe of the late thirteenth century: The confiscation of the goods of Osbert de Spaldington in 1298. *Bulletin of the Institute of Historical Research* 67(162) (91-100).
- Mahall, K. (1990). *Qualitätsbeurteilung von Textilien*. Schiele & Schön, Berlin. ISBN: 3-7949-0514-8.
- Michel, R.H., Lazar, J. and McGovern, P.E. (1992). Indigoid dyes in Peruvian and Coptic textiles of the University Museum of Archaeology and Anthropology. *Archeomaterials* 6(1) (69-83).
- Motaged, S. (1990). Parcheh makshoofeh az taboot bronzy Kidin Hutran dar Arjan Behbahan / Cloth found in the bronze coffin of Kidin Hutran in Arjan, Behbahan. *Athar* 17 (64-147), English summary.
- Peacock, E.E. (1987). Anthropological textiles: a mounting solution. *ICOM Committee for Conservation, 8th Triennial Meeting, Sydney, Australia, 6-11 September, 1987*. Preprints, Vol.1, Grimstad, K. (Ed.). Getty Conservation Institute, Marina del Rey (413-416).
- Peacock, E.E. (1991). A case for artificial water-degraded archaeological textiles. *Proceedings of the 4th ICOM-Group on Wet Organic Archaeological Materials Conference*, Hoffmann, P. (Ed.). Deutsches Schiffahrtsmuseum, Bremerhaven (177-188).
- Peacock, E.E. (1992). Når et tekstil ikke bare er tekstil. *Spor* 7(1) (44-45).
- Peacock, E.E. (1992). The potential for thermoanalytical methods in the analysis of archaeological organics. *Organic Residues in Archaeology: Their Identification and Analysis*;
- White, R. and Page, H. (Eds.) UKIC Archeology Section, London, (39-51).
- Peacock, E.E. (1994). Når et arkeologisk tekstil ikke lenger er tekstilmateriale. *Spor* 9(1) (28-29).
- Petrascheck-Heim, I. (1990). Die Stoffe aus dem Reliquienkästchen in der Kirche Maria Himmelfahrt in Winzendorf. *Archaeologia Austriaca* 74 (220-227).
- Petrascheck-Heim, I. (1992). Probleme archäologischer Textilfunde, einige grundsätzliche Überlegungen. *Restauratorenblätter* 12 (24-32).
- Represa, C. and Borrego, P. (1992). Analysis and conservation of three Hispano-Moresque textiles dating from the first half of the twelfth century. *Conservation of Iberian and Latin American Cultural Heritage*; Hodges, H.W.M., Mills, J.S. and Smith, P. (Eds.). IIC, London (122-126).
- Sato, M., Yamaoka, R., Yamada, T., Kawanishi, H. and Tsujimura (1990). Conservation studies on woven fabrics excavated in Egypt. *Bulletin of the Apparel Science Center* 65(9) (58-61).
- Schindel, T. (1992). Conservation of grave garments from Spanish Colonial Sante Fe 1690-1710. *The Textile Specialty Group Preprints* 1. AIC, Washington DC (46-71).
- Schweger, B.F. and Kerr, N. (1987). Textiles collected during the temporary exhumation of a crew member from the Third Franklin Expedition: findings and analysis. *J.IIC-CG* 12 (9-19).
- Sibley, L.R., Jakes, K.A., Kuttruff, J.T., Wimberley, V.S., Malec, D. and Bajamonde, A. (1989). Photomicrography and statistical sampling of pseudomorphs after textiles. *Archaeological Chemistry IV, Advances in Chemistry Series* 220, Allen, R.O. (Ed.) American Chemical Society, Washington, DC (465-480).
- Staniland, K. (1994). In search of Medieval embroiderers. *Hali* 73 (82-89).
- Teerink, B.J. (1991). *Hair of West European Mammals*. Cambridge University Press, Cambridge. ISBN: 0-521-40264.
- Vogelsang-Eastwood, G.M. (1990). Crescent loomweights? *Oriens Antiquus* XXIX (97-13).
- Vuori, J., Segal, M. and Newton, C. (1989). Development of archaeological textile mounts at the Canadian Conservation Institute. *J.IIC-CG* 14 (3-11).
- Wade-Martins, P. (1994). *Black faces - A History of East-Anglian Sheep Breeds*. Norfolk Museum.
- Wilckens, L.von. (1991). *Die textilen Künste von der Spätantike bis um 1500*. C.H. Beck'sche Verlagsbuchhandlung, Munich.

Worch, M.T. (1989). Konservierung eines frühchristlichen Grabes in St. Maximin zu Trier. *Restauro* 95(4) (259-266).

* * *

Jaacks, G. and Tidow, K. (Eds.) (1994). *Textil-symposium Neumünster: Archäologische Textil-funde - Archaeological Textiles 4.-7.5.1993 (NESAT V)*. Textilmuseum Neumünster, Neumünster.

This volume can be ordered from:

Textilemuseum Neumünster
Parkstraße 17
D-2350 Neumünster
Germany

Hein, H. Eröffnung des Textilsymposiums 1993 (7-8).

Unterlehberg, H. Begrüßung (9).

Giner, C.A. Industrie oder Handwerk? (10-17).

Rast-Eicher, A. Gewebe im Neolithikum (18-26).

Müller, A. Geflechte und Gewebe aus Hornstaad/Hörnle I (27-33).

Gabra-Sanders, T. Textiles and fibres from the late bronze age hoard from St. Andrews, Fife, Scotland (34-42).

Banck, J. Die Textilfunde aus dem Hallstattzeitlichen Fürstengrab von Hochdorf, Gemeinde Eberdingen (Kreis Ludwigsburg) (43-52).

Ræder Knudsen, L. Analysis and reconstruction of two tabletwoven bands from the celtic burial Hochdorf (52-60).

Wild, J.-P. A hairmoss cap from Vindolanda (61-68).

Farke, H. Ein zweitausendjähriges Bekleidungsstück - Beobachtungen nach der Präsentation einer Ausstellung (69-81).

Hägg, I. Friesisches Tuch (82-94).

Fentz, M. Viking Age replicas in research and communication (95-108).

Bender Jørgensen, L. Ancient costumes reconstructed (109-113).

Krag, A.H. Reconstruction of a Viking Magnate dress (114-119).

Stolte, H. Das Ärmeltuch des Bischofs Ulrich von Augsburg - Mustermachbildung eines Brettchengewebes (120-128).

Zariņa, A. Neue Funde der Lettgallischen

Männertracht aus dem 11. Jahrhundert (129-136).

Goldmann, A. Das Manteltuch des Tempelritters, Textilfragmente aus einer Berliner Dorfkirche (137-147).

Heckett, E.W. Medieval textiles from Waterford City (148-156).

Pritchard, F. Weaving tablets from Roman London (157-161).

Arnegaard, J. and Østergaard, E. Notes on archaeological finds of textiles and textile equipment from the Norse western settlement in Greenland (162-177).

Gudjónsson, E.E. Warp-weighted looms in Iceland and Greenland (178-195).

Windler, R. Spätmittelalterliche Webkeller in der Altstadt von Winterthur (Kanton Zürich) (196-202).

Grenander-Nyberg, G. Prehistoric and early medieval features in the construction of the oldest north-European treadle looms (203-212).

Maik, J. Untersuchungen an mittelalterlichen und neuzeitlichen Textilfunden aus Ausgrabungen in Elblag (Elbing) (213-227).

Sorber, F. Textile finds from Antwerp Cathedral (228-235).

Nielsen, K.-H.S. The notorious Rønbjerg garment - once again (236-252).

Peacock, E. SEM-EDS analysis of metal threads from Trondheim (253-260).

* * *

Thesis, Dissertations, etc.

Peacock, E.E. (1993). *The Development and Drying of Simulated Water-Degraded Archaeological Textiles*. PhD thesis, Victoria University of Manchester, 653 pp.

University of Alberta, Canada

Schweger, B.F. (1983). *Documentation and Analysis of Clothing Worn by Non-native Men in the Canadian Arctic Prior to 1920, with Emphasis on Footwear*. Masters thesis.

Hammick, S.J. (1989). *Effect of Dichlorvos Resin Strips on Wool Fibers*. Masters thesis.

Marshall, J. (1992). *Analysis of Bast Fibres from Archaeological Sites*. Masters thesis.

All theses are available in microfiche format through Interlibrary Loan from the University of Alberta Library and the National Library in Ottawa.

The Textile Conservation Centre, Hampton Court, UK

- Barnett, J. (1983). *2,000 BC Egyptian Linen Dress*. Project report.
- Bilson, T. (1991). *Roman Egyptian Painted Shroud Fragment*. Project report.
- Gregoriou, M. (1990). *7th-8th C. AD, Boy's Coptic Tunic*. Project report.
- Howie, H. (1989). *A Coptic Tunic*. Project report.
- McClintock, (1986). *1588 Spanish Armada Waterlogged Textile*. Project report.
- Petschek, C. (1987). *Painted Egyptian Mummy Shroud*. Project report.
- Rubin, N. (1989). *Three Late Pre-Hispanic Textile Fragments from the Lima Valley, Peru*. Project report.
- Schindel, T. (1988). *C. 1690-1720, Grave Garments from a Spanish Colonial Burial in Sante Fe*. Project report.
- Seth-Smith, A. (1994). *Investigation in the Reconstruction of a 5th Dynasty Egyptian Bead Dress*. Project report.
- Smith, R. (1976). *Coptic Tunic with Hood*. Project report.

All student project reports are available for consultation in the Textile Conservation Centre Library.

Extended Bibliography

Dr. Dominique Cardon

Livres

- (1978). *Pratique de la Teinture Végétale*. Fleurus, Paris, 167 pp.
- (1990). *Guide des Teintures Naturelles - Couleurs de la Nature, Nature des couleurs*. Delachaux et Niestlé, Paris-Lausanne, 400 pp.
- (1990). *Les Vers du Rouge - Insectes tinctoriaux (Homoptera:Coccoidea) utilisés dans l'Ancien Monde au Moyen Age*. Cahiers d'Histoire et de Philosophie des Sciences, Vol. 28, Paris, 177 pp.
- (1993). *Fils Renoués - Trésors textiles du Moyen Age en Languedoc-Roussillon*. Catalogue de l'exposition, Musée des Beaux-Arts, Carcassonne, 166 pp.

Ouvrages Collectifs

- (1994). *Indiennes et Palampores à l'île Bourbon au XVIII^e siècle*. Maison Française du Meuble Créole, Saint-Louis, La Réunion, 1994. Coauteurs: Berinstan, V. et Tchakaloff, T.N.C.

Articles, Chapitres de Livres

- (1986). Les Plantes tinctoriales: Passé, présent...avenir? *Le courrier des médicinales en montagne* 8 (3-6).
- (1988). Sang pour Sang: Importance symbolique et usage médicinal des insectes tinctoriaux (kermès, cochenilles, laque). *Savoirs* 1 (134-148).
- (1989). Mediterranean kermes and kermes-dyeing. *Dyes in History and Archaeology* 7 (5-8).
- (1989). *Rouge, Bleu, Blanc: Teintures à Nîmes*, Catalogue de l'exposition, Musée du Vieux Nîmes. Introduction (6-8); chapitre 1 - Rouge, Bleu, Blanc: la Révolution des couleurs (9-14); chapitre 4 - Histoire scientifique des trois couleurs (55-78).
- (1989). Trésors tissés: Trésors dorés, Trésors cachés. *Trésors tissés, Trésors peints*, Catalogue de l'exposition, Centre d'Art Sacré, Hospice d'Ille-sur-Tet (11-12, 17).
- (1989). Per un albero genealogico del jeans: ritratti di antenati - Pour un arbre généalogique du jeans: portraits d'ancêtres. *Blu blue-jeans: il Blu popolare*, Catalogue de l'exposition. Electa, Milan (15-31).
- (1989). Les Échanges de Teintures rouges entre l'Orient et l'Occident depuis l'Antiquité jusqu'à la fin du Moyen Age. *Bulletin du CIETA* 67 (27-35).
- (1990). Els Tints en el segle XVIII: tradició i innovació. *Sintesi del Cicle de Conferències anual del Museu Textil i d'Indumentaria de Barcelona* (15-18).
- (1990). La cuve de Pastel au Moyen Age dans les pays méditerranéens. *La Teinture végétale: le bleu, résumés des interventions de la journée d'étude du 17 mai 1990*. A.E.D.T.A., Paris (5-15).
- (1990). Kermes: a dying dye. *Journal of the Society of Dyers and Colourists* 106 (191-192).
- (1990). Analysis of mediaeval red dyes by HPLC, with special emphasis on the insect dyes. *Dyes in History and Archaeology* 8 (22-31). Coauteurs: Colombibi, A. and Oger, B.
- (1991). Fragments de tissus médiévaux trouvés dans un puits-dépotoir à Montpellier - Analyses et correspondances avec la réglementation technique contemporaine. *Bulletin du CIETA* 68 (89-100).
- (1991). Various types of black dyes in mediterranean textile centres: an example of the

chemical relevance of mediaeval guild regulations. *Dyes in History and Archaeology* 9 (7-9).

(1991). Contribution à l'appareil critique. *Seta a Genoa - 1491-1991*, Catalogue de l'exposition. Colombo, Gênes (100-101, 159-160).

(1992). Échantillons de draps de laine des Archives Datini (fin XIV^e-début XV^e siècle) - Analyses techniques, importance historique. *Mélanges de l'École Française de Rome - Moyen Age*, 103(1) (359-372).

(1992). From the mediaeval woad vat to the modern indigo vats: a brief history of the long decline of woad seen through technical sources. *Beiträge zur Waidtagung* 4/5(1) (10-15).

(1992). New information on the mediaeval woad vat. *Dyes in History and Archaeology* 10 (22-30).

(1993). Textiles préhistoriques: Synthèse et Approches nouvelles. *Techniques et culture* 17-18 (273-297).

(1993). Raons tècniques de la Moda del Negre en el Vestit - Simbolisme dels colors, tècniques del tenyit: dues vies d'aproximació complementaries. *El Negre en el Vestit*, Fons del Museu Tèxtil i d'Indumentaria, Barcelone (5-15).

(1993). Fils renoués: Trésors textiles du Moyen Age en Languedoc-Roussillon. *Archeologia* 289 (48-57).

(1993). Textiles médiévaux conservés en Languedoc et en Roussillon. *Les Cahiers de Saint-Michel de Cuxa* XXIV (123-132).

(1993). La preuve par l'expérience dans les techniques médiévales de teinturerie. *Actes du Colloque de Lille "Les procédures de preuve, de validation et d'évaluation dans les Sciences et les Techniques: Une approche historique"*. Cahiers d'Historie et de Philosophie des Sciences 40 (303-310).

(1993). Un Sainte-Suaire en soie: le Saint Cabouin de Carcassonne. *Technique et Histoire - Études textiles en l'honneur de Gabriel Vial*, Bulletin du CIETA 70 (101-110).

(1994). Chimie empirique et savoir-faire traditionnel indien dans la teinture. *Indiennes et Palampores à l'Île Bourbon au XVIII^e siècle*, Catalogue de l'exposition, Maison Française du Meuble Créole, Saint-Louis, La Réunion (70-81 et Annexe 2).

(1994). Sensibilité aux couleurs des teinturiers d'autrefois. *La Couleur - Regards croisés sur la couleur du Moyen Age au XX^e siècle*. Du Léopard d'Or, Paris.

Dr. (Mrs.) Dominique Cardon
Chargée de Recherche au CNRS, UMR 9967
Le Vert
F-30460 Lasalle
France

Tel/Fax: 33-66-85-24-84

Audiovisual

Videos

Embroidery: Handstitching

This video is concerned with embroidery; specifically that aspect which involves stitching by hand, as opposed to many other techniques and processes which come under the umbrella of the word embroidery.

The video includes: three stitch movements, composite stitches and the use of stitches on particular fabrics. There is also a booklet accompanying the video with diagrams of the stitches shown on the video. A script of the video is available for those with hearing disabilities.

Price: £19.00 plus VAT

The Slide Librarian
Department of History of Art and Design
The Manchester Metropolitan University
Righton Building
Cavendish Street
Manchester M15 6BG
UK

Tel: 44-61-247-1930; Fax: 44-61-236-0820

Slide Sets

BT.2 African Embroidery: this set examines some of the rich variety of embroidery produced in the African continent. It covers many of the techniques used, and traces the cultural influences on the work produced. Text with introduction, map, commentary, bibliography and notes on sources. 13 pp, 30 slides. Price: £32.00

AT.1 Indian Embroidery: an introduction to the history and techniques of Indian embroidery. The text traces the evolution of embroidery through history, as it was subject to the changes brought about by imperialism and commerce. There are examples of four basic types of embroidery that are practised in India: *shisha* work, *phulkari*, appliqué and patchwork, and *kantha*.

The slides follow through the processes of creation from preliminary stitches to examples of the finished products - covers, bags, and garments; a step-by-step guide to the ways Indian embroidery is made. Text with introduction, map, commentary, bibliography and notes on sources. 99 pp, 55 slides. Price: £16.50

BT.3 Indian Embroidery 2: The second set in this series examines the history and techniques of Indian embroidery and features a stitch-by-stitch guide. Traditional and cultural influences on the rich variety of embroidery that is produced in India today are traced. Text with introduction, map, commentary, bibliography and notes on sources. 10 pp, 36 slides. Price: £35.00

The Slide Librarian
Department of History of Art and Design
The Manchester Metropolitan University
Righton Building
Cavendish Street
Manchester M15 6BG
UK

Tel: 44-61-247-1930; Fax: 44-61-236-0820

Subscriptions

ATN is now instituting a 2-year subscription term (4 issues). Subscription rate is Dfl 50.00 (or equivalent in pounds sterling) per term.

Subscription payments should be sent to:

G.M. Vogelsang-Eastwood
Stichting Textile Research Centre
The National Museum of Ethnology
Postbox 212
NL-2300 AE Leiden
The Netherlands

Payments are only accepted in pounds sterling or Dutch guilders. Payment should be in the form of bank cheques (for payments in pounds sterling only) or international postal orders, or money can be transferred to the following Dutch (post)Giro Account: G.M. Vogelsang-Eastwood, 2567328.

If all else fails, and it is necessary to use another currency, please add the equivalent of Dfl 12 to the subscription to cover bank charges.

Guidelines Authors

The *Archaeological Textiles Newsletter* aims to provide a source of information for those who are studying textiles primarily as archaeological objects. Contributions to the *Newsletter* are welcome, and should be in accordance with this concept.

1. Contributions can be in English, German or French. If necessary, items in Russian will be accepted, but these will be translated into English.

2. Contributions may include short references to recently published books, journals, articles and to forthcoming exhibitions, seminars, conferences, special courses, lectures, etc., information concerning work in progress (see note 3), and any queries concerning the study of archaeological textiles.

3. Work in Progress. This is a general category which includes, for example, work on archaeological textiles from recent excavations or in museums. Items in this section should contain information, if available, about the following: where the textiles were found; the relevant dates; who excavated the site and when; the range of textiles found; who is responsible for the cataloguing of the textiles and where they are to be published. These notes should not exceed a maximum of 750 words per item.

Maps showing the position of the relevant sites would be greatly appreciated.

4. Send submissions in typed form or produced in IBM compatible WordPerfect or Word format. Line drawings and photographs are accepted, but photographs must be of good quality.

5. The editors reserve the right to suggest alterations in the wording of items sent for publication.

6. The deadline for contributions is April 1st and October 1st, for the May and November issues respectively.

Submissions should be addressed to:

Elizabeth Peacock
Fak.ark.
Vitenskapsmuseet
N-7004 Trondheim
NORWAY

Fax: 47-73-592238
E-mail: elizabeth.peacock@vm.unit.no

Disclaimer

The views expressed by authors in articles printed in the *Archaeological Textiles Newsletter* are not necessarily those of the Editorial Board, and are the responsibility solely of the individual contributors.

The *Archaeological Textiles Newsletter*, Nos. 18 & 19, 1994 is published at Vitenskapsmuseet, University of Trondheim, Norway.

Editorial board: L. Bender Jørgensen, E. Heckett, K. Tidow, G.M. Vogelsang-Eastwood and J.P. Wild.

Editor: E.E. Peacock

Publication dates: twice-yearly, May and November.

ISSN: 0169-7331