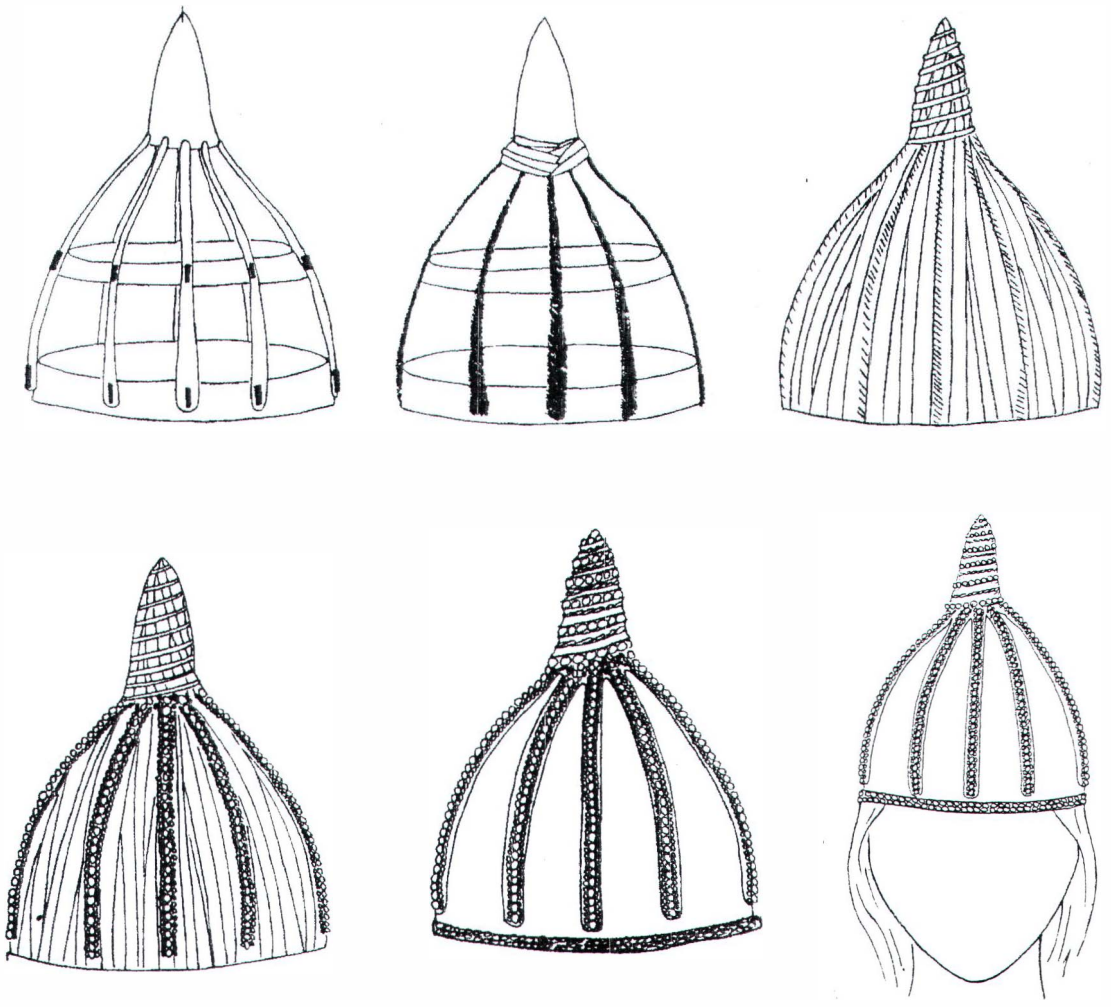
ARCHAEOLOGICAL TEXTILES NEWSLETTER



NUMBER 40 SPRING 2005

Editorial

News about the Centre for Textile Research in the University of Copenhagen was just breaking when *ATN* 39 went to press. Ulla Mannering has now written for us a brief account of it and outlined its aims and objectives (p.28-30). When it opens later in the summer, it will have an immediate impact on the archaeological textile world.

The Centre has agreed to post in due course on its website (<www.hum.ku.dk/ctr>) the contents of the first twenty numbers of the *ATN*, starting with *ATN* 1 (1985). Since it remains a subscription-only journal, few extra copies are printed and few backnumbers are available; making early numbers accessible on the CTR website should be of considerable benefit.

Radiocarbon dating has been routinely applied to archaeological material from prehistory; but there are black holes in historic times, too, in which close dating is not possible. A symposium held recently in Antwerp (p.22-3) highlighted the value of establishing 14C dates for early medieval textiles, the dating of which has often been controversial. Professor De Moor's bibliographical survey of published 14C dates printed below (p.25-6) will be supplemented from time to time in future numbers of *ATN*. The CTR has also agreed to act as a clearing house for new 14C dates, to be made available on its website. But the scheme can only operate efficiently if it is informed about new dates - over to you!

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Cover: Reconstruction of headdress from the Shakhaevskaya burial ground, kurgan 4, grave 32 (N. Shishlina)

Features

Textiles from Antinoë in the Museum of New Zealand Te Papa Tongarewa (Te Papa)

'When sorted and cleaned may prove of great interest' reads the note in the margin next to 'No.15. Textiles unsorted and unwashed' on the list of items received from the Egypt Exploration Fund in 1914 by Te Papa (then the Dominion Museum) (MU2, Box 64, Item 4; O'Rourke 1998).

These textiles, plus numbers 16 and 17 on the list, a piece of knotted netting and a *sprang* hairnet, comprise Te Papa's collection of 17 textiles from Roman and Byzantine Egypt. They originate from Antinoë (Antinoöpolis), a city in Middle Egypt founded by the Roman Emperor Hadrian in AD130.

During the winter of 1913-1914 John de Monins Johnson of the Graeco-Roman branch of the Egypt Exploration Fund (EEF) excavated rubbish mounds in Antinoë. The purpose of his excavation was to find papyri, but in the process he unearthed a large quantity of items associated with daily life (Johnson 1914, 168, 180; EEF 1914, 4). According to the Fund's 1914-1915 annual report, these items had proved a valuable addition to the antiquities that it had been able to distribute that year (EEF 1915, 12). In return for an annual subscription of three guineas, Te Papa received a share of this distribution; Emily Paterson, the Secretary of the Egypt Exploration Fund, advised the museum's director of this in a letter dated 1st August 1914 (MU2, Box 64, Item 4). Attached to the letter was the list of the items Te Papa received: these included 4 leather shoes, 3 small bone carvings, 6 ceramic jars, 3 lamps and a few other implements, 3 pieces of jewellery, and the textiles. The collection appears to be a small but fairly representative sample of the items excavated (Johnson 1914, 180; EEF 1914, 6-8).

The textiles have not been cleaned, but were sorted and examined by visiting English textile specialist, Clive Rogers, in 1981. Rogers provided a brief description of each and dated the collection to between the 3rd and 7th centuries AD.

The writer has recently re-examined the textiles. A few appear to be discrete items, but most are small fragments, the largest measuring 160mm x 97mm. In addition to the *sprang* and knotted netting, the collection includes two tiny pieces of tapestry, a small square of *nålebinding*, and a variety of tabby weaves, twill weaves and compound weaves. A few fragments include both S-spun and Z-spun threads, but most of the threads used in making the textiles are S-spun, the traditional direction of spinning in Egypt (Wild 2003, 108). In the few instances where plied threads have been used, these are S-spun threads Z-plied together. Some of the textiles are wholly or partially dyed, mostly in shades of blue or red, or a purplish-brown. They were probably dyed with cultivated woad (blue) and madder (red), with the purplish-brown colour resulting from woad overdyed with madder (Wild 2003, 116)

Four of the textiles have been studied in detail; they were examined under magnification and their fibres analysed microscopically using polarised light. The largest of these (figs.1a and 1b) is similar to the two-faced textiles described in Crowfoot and Griffiths (1939). According to Crowfoot and Griffiths (1939, 40-41) these compound weft-faced textiles were produced by using two wefts of different colours in alternate picks, one passing in front of 3 warps, the other passing in front of one. The wefts were then beaten down forming a two-faced fabric in which the dominant colour in any part of the pattern on the obverse was the opposite of that on the reverse. The Te Papa textile was made using this technique. It is made from undyed and dyed wool (blue and red), S-spun, with 10 warp threads per cm and 16 weft threads per cm. The fragment measures 160mm x 97mm. Rogers (1981) identified this fragment as being part of a domestic textile in use before the 6th century AD. Crowfoot and Griffiths (1939, 46-47) mention that Albert Gayet found similar textiles used as cushions under the heads of portrait mummies dating from the second and third centuries AD during his excavations in Antinoë in the late 19th/early 20th centuries.

The second textile (figs.2a and 2b) has an undyed linen warp and the weft comprises both undyed linen and dyed wool (purplish-brown). The threads are all S-spun, with linen warp threads 36 per cm, linen weft

Fig.1a and 1b FE001731/13 Textile fragment from Egypt. Wool. Collection of the Museum of New Zealand Te Papa Tongarewa (Photo: Norman Heke)

Fig.2a and 2b FE1731/5 Textile fragment from Egypt. Wool and Linen. Collection of the Museum of New Zealand Te Papa Tongarewa (Photo: Norman Heke)

threads 32 per cm, and wool weft threads 40 per cm. The white stripes are (nearly) balanced tabby, and the purplish-brown stripes are weft-faced tabby. The method used to create the stripes appears to be similar to that described by Pritchard and Verhecken-Lammens (2001, 23-24). When the weaving changes from balanced to weft-faced tabby some warp threads are grouped together and woven as one, while others float at the back, thus reducing the number of warps allowing the weft to be beaten down (fig.2b). In this textile the warp threads seem to be grouped in a 4:1 ratio, and the linen weft row to one side of each purplish-brown stripe floats over the groups of 4 warp threads, but under the floating warps, on the back. Although the fragment is small (32mm x 120mm), and has no ground fabric remaining, its construction suggests that it is probably either a fragment of furnishing fabric, or part of a striped *clavus* on an undyed linen tunic, from the 3rd and 4th centuries AD (Pritchard, Verhecken-Lammens 2001, 20-23).

The third textile (figs.3a and 3b) comprises a double layer of fabric joined on all sides. It is made from a rectangular piece of red and blue striped fabric folded in half and the other 3 sides stitched together with yellow wool thread (in overhand stitch). A few stitches of yellow thread are present elsewhere on the textile; some pass through both layers of fabric, others only through one. Along the folded edge is a row of small holes. These and a few other similar holes in the textile may be former stitch or pin holes. Rogers (1981) dated this textile to the 3rd to 6th centuries AD, which seems likely since it is woven in half basket weave, one of the more common ground weaves used in the eastern Roman Empire (Wild

Fig.3a and 3b FE1731/12 Textile fragment from Egypt. Wool. Collection of the Museum of New Zealand Te Papa Tongarewa (Photo: Norman Heke)

Fig.4a and 4b FE1731/15 Textile fragment from Egypt. Linen, cotton and silk. Collection of the Museum of New Zealand Te Papa Tongarewa (Photo: Norman Heke)

2003, 110). The textile measures 100mm x 132mm. It appears to be a weft-faced tabby (based on the assumption that the more tightly spun paired threads form the warp) with 7 paired warp threads per cm, and 11 weft threads per cm. All the threads used in the textile's construction are S-spun dyed wool. The likely function of the textile has not yet been identified.

Nor has the function of the fourth textile (figs.4a and 4b) been identified. It is a semi-circle, measuring 165mm x 96mm, consisting of three pieces of light brown linen fabric (S-spun threads, balanced tabby weave with 16 weft and 16 warp threads per cm). The pieces are joined together with running stitches (using S-spun, Z-plied linen thread). Parallel to the joins is a row of stitching (S-spun linen thread) with no apparent function, suggesting that the textile may originally have been joined to something else.

The outer edges of the textile are bound with narrow strips of two different fabrics. The fabric binding on the curved edge is woven from S-spun linen thread and is of similar density and colour to the main fabric. The fabric binding the straight edge is also a similar colour. However, the warp and weft have been spun in different directions, and when examined under a microscope the fabric appears to be cotton. This is possible since cotton is known to have been grown in Egypt from the early Roman period, and used for making inexpensive garments (Wild 2003, 108).

On what appears to be the reverse of the textile (fig.4b) is a central panel made up of 3 pieces of pink and white patterned fabric, with the raw outer edges of the panel bound with strips of cotton fabric similar to that

binding the straight edge of the textile. One of these is cut on the bias (the other bindings on the textile are cut on the straight/cross grain).

The pink and white fabric is a compound weft-faced 2/1 twill (20 warp threads and 30 weft threads per cm). The warp is Z-spun pink thread and the weft comprises unspun pink and white threads. The fibres could not be identified with certainty under a microscope. However, the fabric has a lustre that suggests it is silk (Carson 2004, pers. comm.). This identification is supported by its construction: Z-spun warp, unspun wefts and compound twill weave, techniques characteristic of early Byzantine silk manufacture (Wild 2003, 142-143). Thus the fourth textile may date from the 5th or later centuries AD.

The study of this collection is still in progress, and to date this has mainly consisted of analysing the structure of the textiles. Unfortunately no detailed description of Johnson's excavation was published so little information is known about any of the items, including textiles, he found. However, earlier excavations at Antinoë by Albert Gayet yielded a large number of textiles, many of which are now held in French museums (Kendrick 1920, 7). So it may be possible to better identify and date the Te Papa textiles at a future date.

A few other collections of Egyptian textiles are held in New Zealand museums. The largest collection is in Otago Museum in Dunedin, and was gifted by Phocion Tano, a Cairo antiques merchant, in 1946. It comprises 70 textiles from between AD 500 and AD 1800. This collection has been studied by Honorary Curator, Margery Blackman, and includes tabby weave, tapestry weave, patterned weave, and embroidered and printed textiles. Although all the textiles were found in Egypt, the printed textiles were made in India and others may have originated in other parts of the Middle East (Blackman 2003, 3-4).

Although the Otago Museum collection is the more important collection, the Te Papa textiles date from an earlier period and thus the collections complement each other. Despite its limitations the Te Papa collection has been useful for research, particularly for students studying the history of textile design. It includes a variety of fibres, dyes and weaves and, especially for the writer, has proved to be of great interest.

Acknowledgements

I wish to thank the Te Papa staff who provided access to the collections, documentation and other resources. My grateful thanks also to the people who read and commented on my drafts. Special thanks to Jill Camilleri, visiting Conservation Intern, for instruction on the microscopic analysis of fibres using polarised light.

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Headdress from the Catacomb Culture Grave of the Shakhaevskaya Burial Ground in the Rostov Region

Introduction

The Catacomb culture is one of the most outstanding pastoral cultures of the Eurasian Steppe Bronze Age. When a new economic model under this culture (cal.2500-2000 BC) was introduced, people living in the Eurasian steppes started using a new fibrous material, i.e. wool. Headdress items from the Catacomb culture graves help us get an insight into ancient textile craft development. One of the most interesting finds is a headdress uncovered in grave 32, kurgan 4, of the Shakhaevskaya burial ground (figs.5, 19). The site is located on the right bank of the Manych River in the Rostov region in Southern Russia.

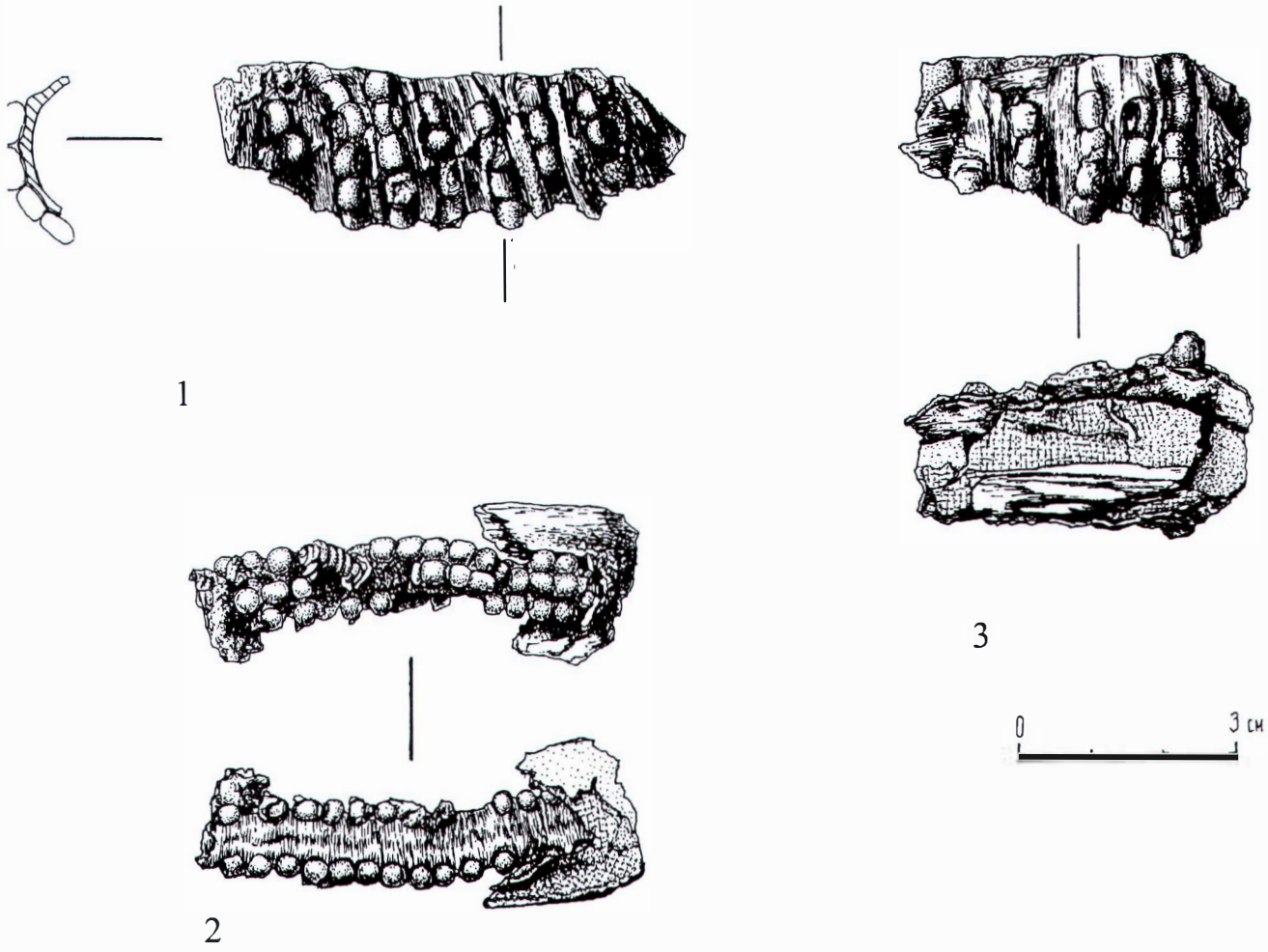

Fig.5 Shakhaevskaya burial ground, kurgan 4, grave 32: fragments of the composite cap: a wooden cone-shaped top piece, a woven tape with three rows of bronze, glass and pearl beads sewn onto it.

Analyses

Analyses of this headdress helped us identify different types of materials, which were used to make it: a wool tape and wool threads; non-textile materials, i.e. wood, leather, sinews. Bronze, mother-of-pearl and faience beads were also used as decorative elements (fig.6).

The base 'cloth' of the headdress was made of pieces of tape sewn together. The tape itself was woven from non-plied Z-twist wool threads dyed in light orange-yellow colour. The level of twist is 1.2-1.5 mm. The thickness of light-coloured threads is 0.45-0.5mm. The density of threads is 10 threads/cm. The cloth had a diagonal plain weave.

Z-twist wool threads with the level of twist of 2-2.3 mm and the thickness of 0.75-1.1 mm were used to wrap and sew together separate details, some of which contained small fragments of leather identified by special morphological fibrous constructions, i.e. 'collagen bars'. In addition to wool threads, sinews were also used for sewing purposes. Sinews were identified on their morphology (they have elongated round string-like 'elements'), on double refractions, and on the absence of amorphous collagen.

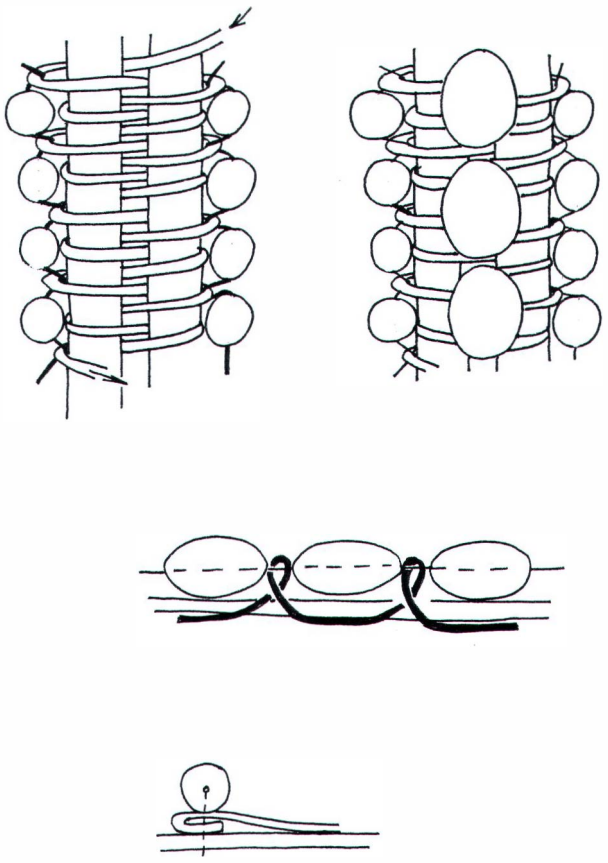

Fig.6 Shakhaevskaya burial ground, kurgan 4, grave 32: reconstruction of the bead tape

Decorative beads are present in three types, i.e. barrel-like bronze beads, oval faience beads and drilled mother-of-pearls.

Reconstruction of headdress manufacture

We have reconstructed five consecutive manufacturing stages using results of analyses of nine fragments of the headdress (fig.7).

Stage I: Thin twigs used to make the framework of the headdress were attached to the bottom of a wooden cone-shaped top piece. These twigs were fixed on to horizontal slats with the help of copper (?) rivets to ensure rigidity. The number of twigs is unknown.

Stage II: Intersections as well as the twigs themselves were wrapped with threads. The cone-shaped top piece was attached to the wooden framework with a leather cord.

Stage III: The wood framework was covered with a vertically arranged wool tape. The tape was fixed to the framework by wool threads. The tape was attached to the cone-shaped top piece with fine leather straps placed in the upward-going spiral. Tape pieces sewn together formed the base 'cloth' of the headdress.

Stage IV: The base cloth that was formed by the woven tape had three rows of bronze, glass and pearl beads sewn on to it. The number of such rows is unknown.

Stage V: A thick piece of leather with holes for beads was attached to the surface, while separate bronze beads forming an upward-going spiral pattern were sewn on the cone-shaped top piece. This piece of leather covering the whole body of the headdress reinforced the framework and served as a decoration as well. A thin leather strap with a sinew cord was placed between bead rows. The lower part of the headdress was decorated with several rows of faience and

pearl beads. We do not know if there were decorations on the leather. The edge of the headdress appears to have been decorated with one or more rows of faience beads, which were sewn on to the tape.

The description of the location of the headdress parts on the skull found in the grave was used for this reconstruction (Fedorova-Davydova, Gorbenko 1974, 101).

In summary, the headdress found in the Shakhaevskaya grave was a multi-coloured composite cap consisting of a framework and a top piece richly decorated with beads.

Conclusion

The composite cap from the Shakhaevskya grave is unique. We may say it was made approximately in 2300-2200 calBC (14C date of the *Lithospermum officinale* seeds found in the same grave is Ua-21407: 3745±45, 2270-2250, 2110-2120, 2100-2030 calBC). We may also add that the Bronze Age population of the Eurasian steppe used different type of headdresses at that time, such as hair-cords, head-bands as well as caps (Shishlina 2004). But this type of headdress was found for the first time. Many different materials were used to make it, i.e. wood, leather, sinews, orange-yellow wool tape, and faience, bronze and mother-of-pearl beads. It indicates that the headdress was made by a very skilled craftsman who knew how to weave, to embroider, to dye textiles, and even had skills of a turner to work with wood. He used a complicated design for his masterpiece.

It is very difficult to identify if this headdress was made locally or imported. It is necessary to find stylistically similar items, probably pictures of similar caps, in the cultures which were contemporary with the Catacomb culture population at the end of 3000 calBC and with whom this population could have had regular cultural contacts.

We know now that the Catacomb culture groups had a well developed production of bronze and faience beads (Shortland *et al.* in press). We think that decorative beads were made locally. Wool tape could also be made by local weavers. Previously we concluded that wool fibres had not been used in the Eurasian steppe until the Catacomb culture (Orfinskaya *et al.* 1999). Seeds of common gromwell (*Lithospermum officinale* L.) were found in the same grave. Such seeds cut from both sides were used by many local Catacomb culture groups for embroidery and as beads (Mandjikiny burial ground in Kalmykia, Peschany-V in the Rostov region). These data indicate that the headdresses under discussion might have been produced locally. The analyses conducted have increased our knowledge of the headdresses typical for the ancient population.

Acknowledgement

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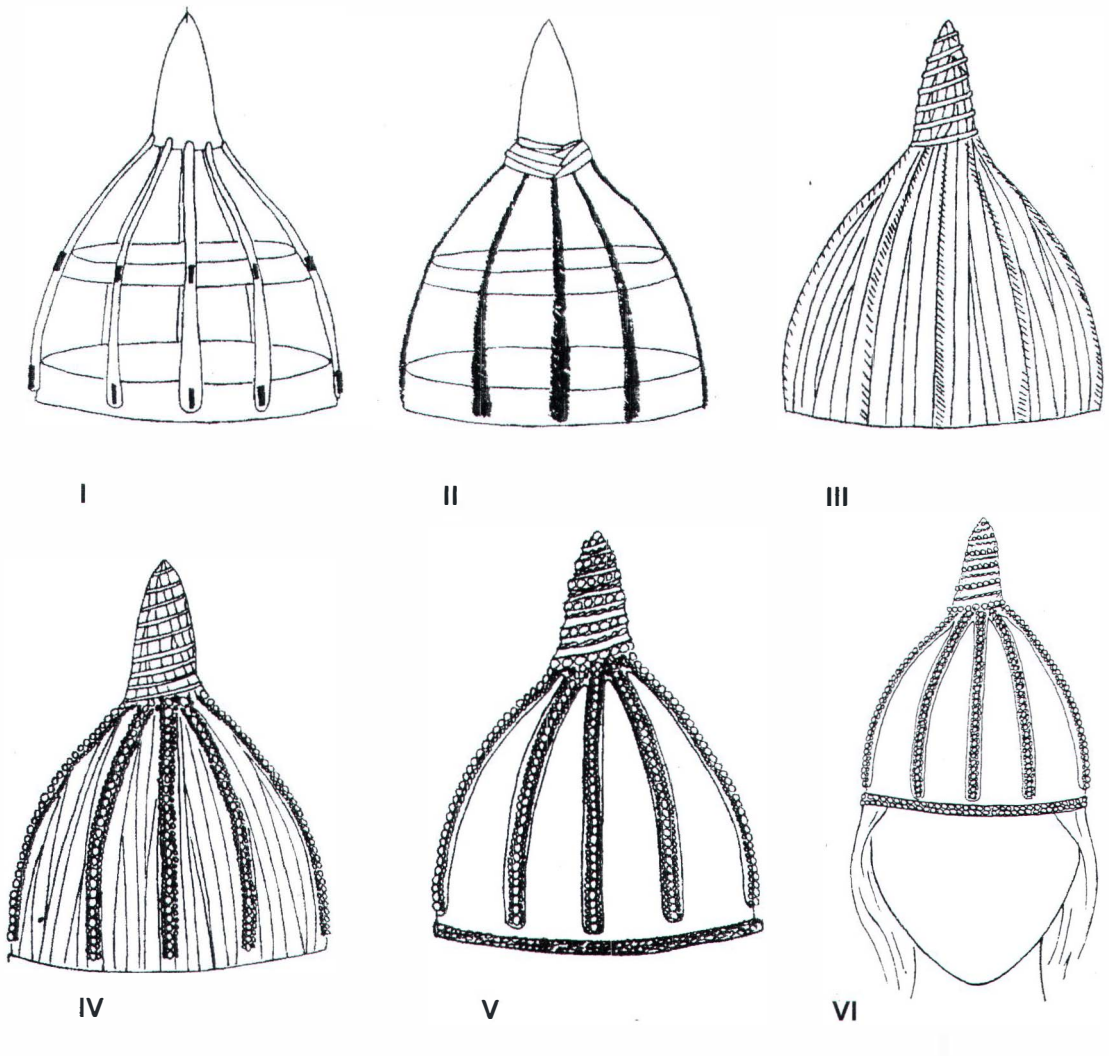

Fig.7 Shakhaevskaya burial ground, kurgan 4, grave 32: reconstruction of the headdress manufacturing stages (I-V) and general appearance (VI)

Did the Golden Fleece really exist?

The legend of the Golden Fleece, which goes back to about 500 BC and was the subject of debate among the authors of antiquity, continues to receive attention. It concerns the quest by the Greek, Jason, and his Argonauts for a golden fleece (in fact a woolled sheepskin and not a shorn fleece) which was suspended in a sacred grove in Colchis at the eastern end of the Black Sea. There are several main hypotheses to explain the basis of the legend. One is that the 'gold' referred to the fineness and therefore the high value of the wool. Another is that the fleece was used to collect gold particles from running water and therefore appeared like gold. A third view is that the wool was literally golden-yellow in colour. Readers may be familiar with my discussion of these hypotheses and whether indeed they are mutually exclusive (Ryder 1991; Ryder 1992). I have recently published a 'last word' (Ryder 2004), which I summarise here, showing in a unified theory that all three hypotheses could be correct.

The ritual suspension of sheepskins

It has been thought that the suspension of skins in this way might date back to the Timber Grave culture, which flourished in the area of the Lower Dnieper river from about 2500 to 2000 BC. The literature of the Hittite civilisation of Anatolia in about 1500 BC had a reference to a sheepskin hung on an evergreen tree. There was therefore a history in the area of a custom involving the ritual suspension of a sheepskin long before the legend of the Golden Fleece began.

Did 'the Golden Fleece' indicate fine wool?

The Roman agricultural writer Varro, wrote in 37 BC: 'flocks, which on account of their value were said to have golden fleeces - - - like that ram which Aeetes sacrificed at Colchis, whose fleece was the quest of those princes known as the Argonauts'. The

association of the term 'golden fleece' with high quality wool therefore goes back to antiquity. There are ample historical suggestions of fine-woolled sheep in the area to support the view that the legend refers to a search for a fine-woolled breed of sheep. Fleeced sheep, as opposed to those with a brown, hair coat structured like that of deer, first appeared in Mesopotamia around 3000 BC. By 1000 BC there were sheep that had been bred not only with white fleeces, but also with finer wool. During the next millenium, references in classical literature record that places on the coasts of Asia Minor had a reputation for fine wool. Youatt wrote in his book on sheep (1837) that 'golden' referred to the 'intrinsic excellence' of the wool and interpreted the legend as a real event in which Greek invaders carried off fine-woolled sheep to improve their own flocks. More recently, Prof. J. T. Killen of Cambridge University thinks that the story of Jason's voyage may be an echo of efforts of mainland Greece to find new sources of wool after the fall of Crete in about 1400 BC. I gained support for the fine wool theory in 1973 when I identified fine wool in some remains of cloth dated about 500 BC from the Greek city of Nymphaeum on the northern shore of the Black Sea.

Did 'the Golden Fleece' indicate the collection of gold dust?

There is considerable evidence for the use of woolled sheepskins to collect gold particles from running water by suspending them in a stream. The skins were then hung between trees to allow them to dry. This took place not just in the Black Sea area but in other parts of the world. Again this explanation was first put forward in antiquity. Strabo, who died in AD 19, wrote that gold collection was implied by the statement in the legend that when Jason snatched the golden fleece 'from the shimmering of the locks of wool there settled on his fair cheeks and brow a red flush like a flame' (i.e. gold dust).

Are the fine wool and gold theories both correct?

My own view is that the fine wool and the gold theories are not mutually exclusive. A fine-woolled fleece would be more efficient at collecting gold particles than a coarse one. Not only are fine fleeces denser, but they tend to contain more grease. Gold particles, being not easily wetted, would stick readily to the grease. Sand particles on the other hand are wetted and would not stick to the greasy fine fleece.

Could the wool have been coloured?

There are two kinds of coloured wool. In one the colour is an extraneous discoloration constituting a fault which reduces the value of the wool and so is unlikely to have been given the epithet 'golden' indicating a desirable property. The other kind is natural and hereditary and again is considered a fault in modern good quality wool. The people of Sardinia are convinced that the local 'wild' Mouflon sheep with its 'golden' coat is the basis of the legend. We now know that this sheep is a non-fleeced, feral descendant of the first (Neolithic) domestic type, and in terms of coat-colour genetics its colour is described as light brown (compare my latest suggestion below). Although Varro supported the fine wool theory, elsewhere in his writings he embraced the colour theory by referring to 'sheep that resemble gold because of the redness of their wool'. I interpret this 'red' wool as like the tan red of red deer. Pliny in his *Natural History* referred to yellow wool, which today would be regarded as a discoloration. It is possible, however, that inaccuracies of translation have arisen here and that 'red' and 'yellow' should be equated with the hereditary sheep colour 'tan'. But any hereditary 'brown/red/tan' colour of all the fibres in an ancient fleece would have reduced rather than enhanced its value since whiteness was associated with fineness as a desirable feature.

'Yellow' wool is recorded in Mesopotamia as early as about 2000 BC when the coloration reduced fleece value. I discovered from a chance meeting at a historical conference that the Mesopotamian 'yellow' was not a wool discoloration and could mean the hereditary colour 'tan'. Since a modern breed of goat with this colour is named the 'Golden Guernsey', the possibility that the Colchis wool was genetically 'golden' should perhaps not be dismissed too readily. Unlike black and brown which are both eumelanin pigment, tan is phaeomelanin pigment (as in human red hair) and is found in otherwise genetically white sheep.

All three theories are probably correct.

The revelation that the Mesopotamian 'yellow' was not a discoloration and could mean 'tan' imparts a new dimension to the discussion since such colour is usually restricted to the coarser, outer-coat fibres of a fleece, as in the 'red' kemp hairs of Welsh Mountain sheep. The (white) fine wool from the Crimea mentioned above has since been re-assessed as the underwool from a primitive fleece. One can therefore now speculate that the 'golden' fleece had tan outer hairs from which fine, white underwool was harvested for textile use by combing. This does not exclude gold collection, but it does mean that selective breeding for whiter and/or less-hairy fleeces would have the same end result - a fleece of true Fine type, composed entirely of fine fibres with no hairs, the forerunner of the Merino breed.

Conclusion

The Golden Fleece legend could have been based on real events. The fleece was very likely to have been used to collect gold from running water and it equally likely had naturally tan outer hairs with a fine, white underwool. This is the typical fleece structure of the early Bronze Age, when, before the invention of shears in the Iron Age, the underwool was harvested for textile use by combing the sheep.

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Erste Ergebnisse zum Einsatz der 3D-Computertomographie bei der Untersuchung archäologischer Textilien

Die 3D-Röntgen-Computertomographie

Seit ca. 30 Jahren wird die Röntgen-Computertomographie in der medizinischen Diagnostik eingesetzt. Um die Vorteile der Computerthomographie auch für Fragen in der Archäologie und Restaurierung nutzen zu können, war der Einsatz von industriellen Anlagen (wie beispielsweise an der Fachhochschule Aalen / Arge Metallguss / Baden-Württemberg) mit wesentlich höherer Auflösung im Vergleich zu den medizinischen CT-Anlagen bahnbrechend. CT-Untersuchungen an verschiedensten archäologischen und kunsthistorischen Objekten haben gezeigt, dass dieses Verfahren im Vergleich zu konventionellen Prüfverfahren (beispielsweise Röntgen-durchleuchtung) völlig neue Möglichkeiten zur Analyse, Bearbeitung, Dokumentation und Archivierung von Glas-, Holz-, Knochen- oder Metallfunden eröffnet.

Zur Anlagetechnik

Die industrielle CT-Anlage an der Hochschule Aalen ist mit einer Röntgen-Mikrofokusröhre (10 - 225 kV, 0,1 - 3 mA, Brennfleck 2 µm - 230 µm bei 300 W) und einem Flächendetektor (400mm x 400mm, mit 1024 x 1024 Pixel) ausgestattet. Die Ortsauflösung bzw. Detailerkennbarkeit liegt zwischen 0,005mm - 0,3mm und wird durch die Objektgröße bzw. Fragestellung bestimmt.

Zum Funktionsprinzip

Bei der 3D-CT-Messung wird das Prüfobjekt innerhalb des konusförmigen Röntgenstrahls einmal um 360° gedreht. Die Röntgenquelle und der Detektor bleiben dabei in fester Position. Mittels Flächendetektor wird in zirka tausend Winkelpositionen ein Röntgen-durchleuchtungsbild (Projektion) des Prüfobjekts aufgenommen. Unter Verwendung eines mathematischen Rekonstruktionsalgorithmus wird aus den gemessenen Projektionen die dreidimensionale Verteilung des Schwächungskoeffizienten im Objektvolumen rekonstruiert (Abb.8).

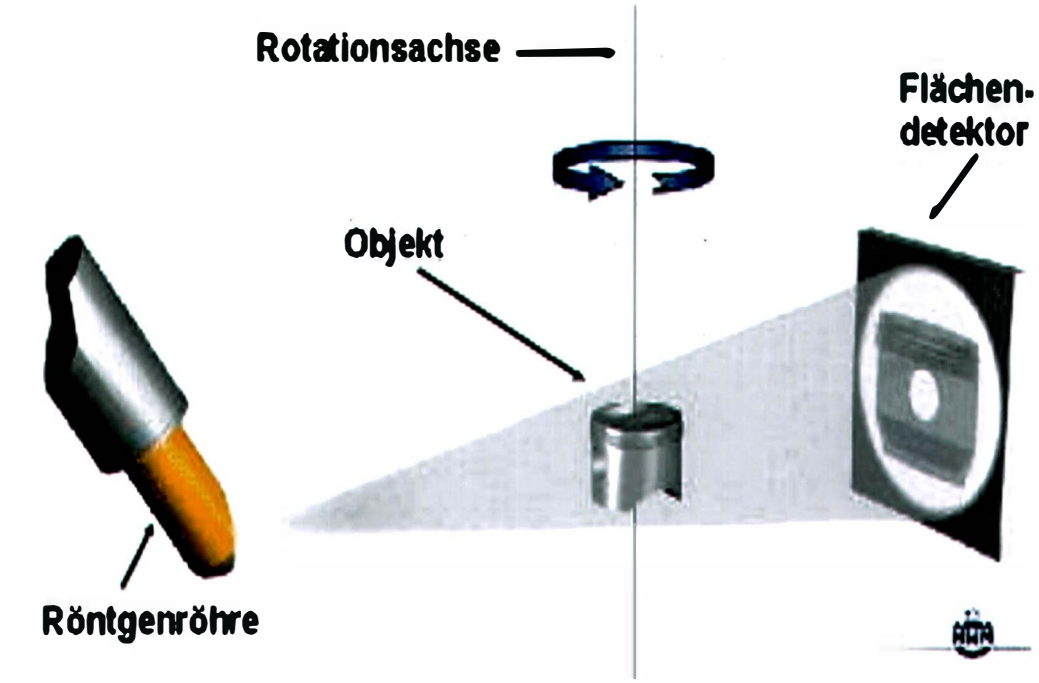

Abb.8 Funktionsprinzip der 3D-Computertomographie (/D-Kegelstrahl-Computertomographie)

Die Visualisierung

Das dreidimensionale Tomogramm beinhaltet sowohl die Geometriedaten der Außenkontur eines Objekts als auch die Geometrie interner, dreidimensionaler Strukturen. Weiterhin sind Informationen über verschiedene Materialien innerhalb des Objekts vorhanden. Aus den gemessen CT-Daten können auch stl-Daten erzeugt werden. Mit der Visualisierungssoftware können sowohl virtuelle Schnittbilder in den drei senkrecht zu einander stehenden Raumrichtungen (axial, frontal, sagittal) als auch das Untersuchungsobjekt drei-dimensional dargestellt betrachtet werden. Die Größe von inneren und äußeren Strukturen kann vermessen werden. Materialien unterschiedlicher Dichte heben sich durch verschiedene Grauwerte im Tomogramm ab.

Zur Untersuchung archäologischer Textilien

Mit einer Versuchsreihe zur Visualisierung überlieferter organischer Reste aus archäologischen Befundzusammenhängen mittels 3D-Computertomographie an der Fachhochschule Aalen / Arge Metallguss sollte ein möglicher Einsatz digitaler Untersuchungs- und Dokumentations-methoden für die archäologische Textil-restaurierung bzw. archäologische Textilforschung getestet werden.

Fragestellungen und Auswahl der Objekte

Für die computertomographischen Untersuchungen wurden einige Objekte aus frühmittelalterlichen Fundkomplexen nach zuvor festgelegten Fragestellungen ausgewählt. Es stellte sich beispielsweise die Frage, ob im CT verschiedene Materialarten wie Textil-, Leder- oder Bastreste detailliert erfasst werden können. Ferner war zu überprüfen, ob der Erhaltungszustand organischer Fragmente (gemeint ist hier rezentes oder gänzlich mineralisiertes Fundmaterial aus feuchtem bzw. trockenem Bodenmilieu) die Ergebnisse einer computertomographischen Messung qualitativ beeinflussen.

Besonders wichtig erschien in diesem Zusammenhang auch die Frage, ob bei einer Untersuchung mittels Computertomographie nur zuvor freipräparierte Funde bzw. Befunde oder auch gänzlich unbearbeitete Objekte, vielleicht sogar in kleineren Blöcken geborgene Organica vollständig erfasst werden können. Ein weiteres Ziel war es zu klären, ob im CT auch mehrlagig an Metallfunden erhaltene organische Schichten sichtbar sind, sich also Anzahl bzw. Abfolge und Verlauf einzelner Lagen genau erkennen lassen. Ferner sollte ermittelt werden, ob bei einer computertomographischen Messung auch Aufschlüsse über Gewebebindungen, Fadendrehungen und Fadenstärken zu gewinnen sind.

Es erschien sinnvoll, in der Versuchsreihe zunächst die Funde und Befunde zu bevorzugen, bei denen man mit den eingangs herkömmlichen Untersuchungsmethoden keine zuverlässigen Ergebnisse erzielen konnte. Dies betraf vor allem Organica, bei denen aufgrund überlagernder Metallkorrosion keine Aufschlüsse zur Schichtanzahl bzw. -abfolge oder eine exakte Bestimmung der Bindung mehr möglich gewesen war. (Alle CT-Messungen wurden von Frau Dr. I. Pfeifer-Schäller an der FH Aalen mit dem dortigen dreidimensionalen Röntgen- Computertomographen (3D-CT-Anlage RayScan 200) durchgeführt.)

In der Tabelle 1 sind die Messparameter und die Voxelgröße der im folgenden vorzustellenden CT-Messungen aufgelistet.

Zur Untersuchung eines mineralisierten Textilfragmentes

Zur Untersuchung stand ein mineralisiertes Gewebefragment, welches auf der Rückseite eines Eisenschlüssels aus dem frühmittelalterlichen Frauengrab 11 von Aschheim (Ldkr. München/Bayern) erhalten war. Da sich die einzelnen Fäden aufgrund auflagernder Korrosion nicht eindeutig verfolgen ließen, blieb bei der mikroskopischen Voruntersuchung unklar, um welche Gewebebindung es sich bei dem 0,5cm x 1cm großen, inzwischen vom Metallträger abgelösten Fragment handelte. Das Textilfragment war für die 60-minütige Aufnahme im rechten Winkel auf dem Drehteller der Anlage zu positionieren. Nur bei einer genauen Ausrichtung konnten anschließend CT-Schnitte exakt entlang der

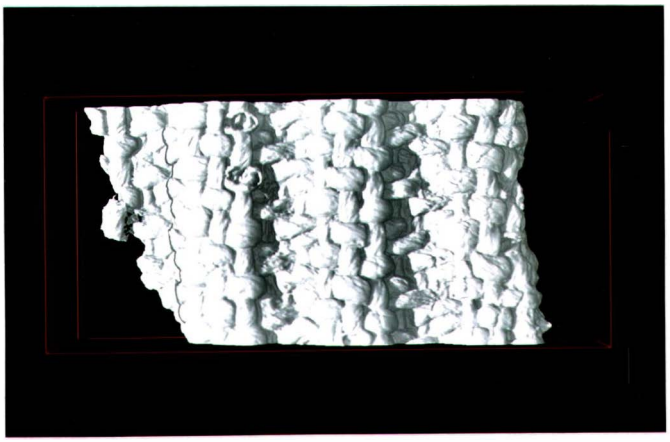

Abb. 9 3D-Aufnahme des Gewebefragmentes aus Grab 11 von Aschheim (Ldkr. München / Bayern)

Fadensysteme angelegt werden.

Wie erhofft, konnte das Gewebefragment mittels computertomographischer Messung detailliert erfasst werden. Durch das Ausblenden der auflagernden Verschmutzungen und anhaftenden Korrosionsprodukte ließ sich die Oberfläche des Textils ohne Mühe 'virtuell freigelegen'. Mit zusätzlichen Licht- und Schatteneinstellungen trat eine 'rippige' Gewebestruktur deutlich hervor (Abb. 9).

Der gemessene Ausschnitt konnte nun in den drei Raumrichtungen digital geschnitten werden. Durch frontales Anschneiden des Fragmentes ließen sich die Fadenstärke und Garndrehung in Kette und Schuss sowie die Gewebedichte exakt ablesen, messen und dokumentieren. Virtuell angelegte Schnitte entlang der beiden Fadensysteme erbrachten Aufschluss über die Gewebebindung. Die präzisen Aufnahmen mit hoher Ortsauflösung zeigten die angeschnittenen

Name der Messung	Verwendete Filter	Röhren-Spannung (kV)	Röhrenstrom (µA)	Intergrationszeit (ms)	resultierende Voxelgröße (mm)
Aschheim Grab 11	keine	150	70	2280	0,010
Herrenberg Grab 398	keine	200	160	2280	0,019
Bruckmühl Grab 34	Pb + Fe	200	290	1140	0,063

Tabelle 1 Die Messparameter und die Voxelgröße der vorgestellten CT-Messungen

Abb.10a Sagittaler Schnitt durch das Gewebefragment aus Grab 11 von Aschheim (Ldkr. München / Bayern)

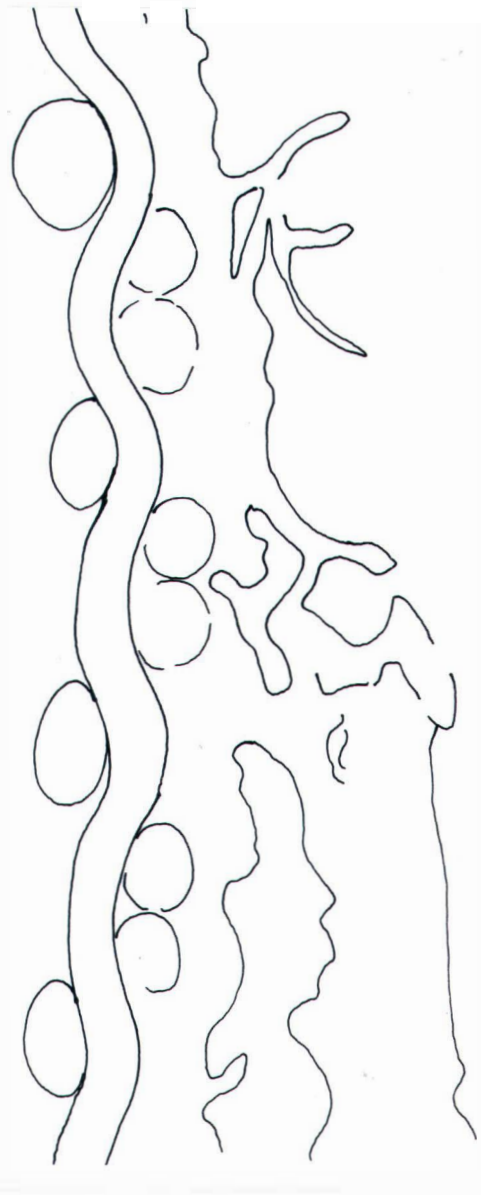

Abb.10b Umzeichnung des Sagittalschnittes durch das Gewebefragment aus Grab 11 von Aschheim (Ldkr. München / Bayern)

Fäden als Punkte, um die das zweite Fadensystem führte. Beim 'Durchfliegen' der Schnitte konnte der Verlauf der einzelnen Fäden verfolgt und ein sogenannter 'Rippenköper' bestimmt werden (Abb.10a-10b).

Zur Untersuchung unpräparierter organischer Reste eines Bronzeobjektes

In einem weiteren Arbeitsschritt sollte überprüft werden, ob bei einer Befund-untersuchung mittels 3D-Computer-tomographie auch unpräparierte organische Überreste detailliert erfasst und vollständig ausgewertet werden können. Für diesen Versuch wurde eine versilberte Bronzefibel aus dem Frauengrab 389 des frühmittelalterlichen Bestattungsplatzes von Herrenberg (Kr. Böblingen/Baden-Württemberg) herangezogen. Um eine möglichst hohe Auflösung zu erzielen, wurde für die computertomographische Untersuchung ein nur kleines Messfeld im Bereich des Fibelbügels gewählt. Leider sollten die insgesamt 70-minütigen Messungen ohne Erfolg bleiben. In den erstellten Aufnahmen war sowohl in axialer und frontaler wie auch in sagittaler Schnittrichtung lediglich der entsprechende Abschnitt des bronzenen Bügels zu erkennen. Die vollständig erhaltene eiserne Fibelnadel sowie die anhaftenden Organica wurden dagegen vollständig überstrahlt (Abb.11).

Da eine Visualisierung der organischen Reste mittels CT nicht möglich war, musste die Bügelfibel anschließend - herkömmlichen Vorgehensweisen folgend - vorsichtig freipräpariert und dokumentiert werden. Bei den mit Hilfe des Stereomikroskops durchgeführten Untersuchungen ließen sich an der Schauseite leinwandbindige

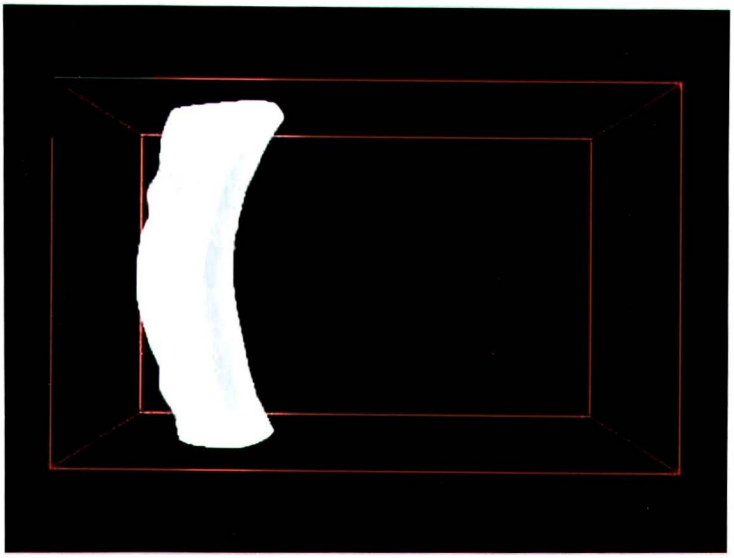

Abb.11 CT-Aufnahme der Bügelfibel aus Grab 389 von Herrenberg (Kr. Böblingen / Baden-Württemberg)

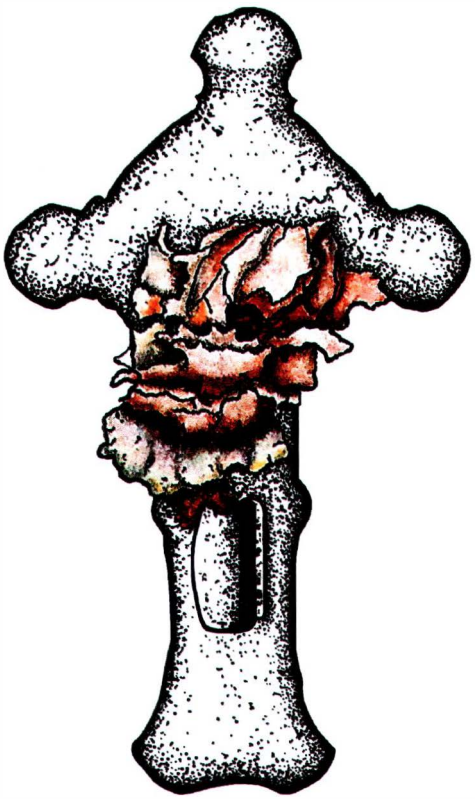

Abb.12 Unterseite der Bügelfibel aus Grab 389 von Herrenberg (Kr. Böblingen / Baden-Württemberg)

Textilreste, an der Rückseite zwei parallel verlaufende Stofffalten, an welchen die Eisennadel festgesteckt worden war, beobachten (Abb.12).

Zur Untersuchung mehrschichtiger organischer Reste eines Eisenobjektes

Zur Untersuchung standen des Weiteren 18 tauschierte Eisenbeschläge und Riemenzungen einer Gürtelgarnitur aus Grab 34 des frühmittelalterlichen Friedhofes von Bruckmühl, Ldkr. Rosenheim. Zu den bereits bei der konservatorischen Erstversorgung sichtbaren organischen Resten an Schau- und Unterseite zählten nicht nur vollständig mineralisierte Leder- und Textilschichten sondern auch Federn, Zwirne und feine Holzfragmente. So konnte beispielsweise ein leinwandbindiges Gewebe mit Spinnmusterung als Rest eines einst gegürteten Gewandes identifiziert werden; bei den vielen kleinen Vogelfederfragmenten, welche ausschließlich als äußerste Schicht auf den Beschlägen der Gürtelrückenpartie anhafteten, handelte es sich mit großer Wahrscheinlichkeit um Relikte einer Bettung bzw. Unterlage des Toten. Mehrere erhaltene Lederfragmente waren dem Leibgurt zu zuordnen. Die Beobachtungen erbrachten den Nachweis, dass die tauschierten Beschläge jeweils mit zwei rückseitig angelöteten Eisenösen am Gürtel aufgesteckt waren. Sehr gut erhaltene Holzstäbchen in den Metallösen dienten dem verdeckten Arretieren der Beschläge an der Gürtelrückseite. Hier waren wohl auch die Nebenriemen, welche - zusätzlich verziert mit tauschierten Riemenzungen - vom Leibgurt abwärts hingen, befestigt.

Um zusätzliche Informationen über optisch nicht sichtbare, tiefer liegende Schichten der organischen Reste zu erhalten, wurde ein Ösenbeschlag mit anhaftenden Lederresten für eine computertomographische Untersuchung ausgewählt (Abb.13). Durch exakte Einstellungen gelang es neben den herstellungstechnischen Details der Metalle auch die mineralisierten, organischen Materialien zu visualisieren. Virtuelle Schnitte durch die erhaltenen Lederreste lieferten einen detaillierten Einblick in die Herstellungstechnik des Gürtels: Deutlich zu erkennen war das doppelt gelegte Gürtelleder und sechs darin eingebettete, parallel in Längsrichtung verlaufende Zwirne. Mehrere feine Nahtlochreihen

Abb.13 3D-Aufnahme des Ösenbeschlages aus Grab 34 von Bruckmühl (Ldkr. Rosenheim / Bayern)

zeigten an, dass die Zwirne ursprünglich in das Leder eingenäht waren (Abb.14-15). Durch aufwändige Gestaltung bei der Herstellung erhielt der mit Metallbeschlägen gezierte Leibgurt somit einen längsrippigen Charakter und zusätzliche Stabilität (Abb.16).

Zusammenfassung und Ausblick

Die hier vorgestellten Beispiele verdeutlichen, dass sich die Computertomographie für Beobachtungen und Untersuchungen an organischen Resten aus archäologischen Befundzusammenhängen bei einem gezielten Einsatz eignet. Die hochauflösende 3D-Computertomographie kann somit als Ergänzung gängiger bzw. üblicher Untersuchungsmethoden und Analyseverfahren eingesetzt werden. Die Ergebnisse einer computertomographischen Messung sind offenbar abhängig vom Erhaltungszustand der zu untersuchenden Organica und deren Metallträgern. So wurden beispielsweise die besten Resultate bei den Untersuchungen an mineralisierten Resten stark korrodierter Eisenfunde erzielt. Eine Visualisierung organischer Reste an deutlich dichteren Bronzeobjekten gelang dagegen bislang nicht. Erstaunliche Detailinformationen erbrachten vor allem die mit hoher Ortsauflösung erstellten Aufnahmen von kleinen, bereits vom Metallobjekt gelösten Gewebefragmenten. Diese waren durch die Möglichkeiten der 'virtuallen Freilegung' leicht zu dokumentieren.

Das Beispiel aus Bruckmühl verdeutlicht, dass auch verdeckte Schichten zerstörungsfrei erfasst und ausgewertet werden konnten. Bei den mehrschichtig an Metallobjekten erhaltenen Organica waren mikroskopische Voruntersuchungen jedoch unbedingt notwendig. Nur so waren vorab konkrete Fragen zu formulieren und die CT-Bilder richtig zu interpretieren. Die hochaufgelösten 3D-Darstellungen und die in zahlreichen Ebenen und variablen Ausrichtungen anzulegenden CT-Schnitte können die herkömmliche (schriftliche so wie zeichnerische) Dokumentation organischer Funde und Befunde ergänzen. Bei der CT-Messung wurden jedoch nicht nur die Organica sondern auch die Metallträger selbst genau erfasst. So gaben die Aufnahmen in der Regel detaillierte Aufschlüsse über Größe, Materialart und Herstellungstechniken.

In Zukunft ist zu überprüfen, ob sich mittels Computertomographie auch organische Gewebefragmente, welche nicht mit Metallsalzen durchtränkt sind (Nassfunde aus Feuchtböden oder Fundmaterial aus trockenem Bodenmilieu) detailliert darstellen lassen. Im Rahmen einer weiteren Versuchsreihe soll beispielsweise getestet werden, ob sich auch sehr komplexe Gewebebilder, die rein optisch aufgrund des starken Abbaugrades kaum zu identifizieren sind, mit virtuellen Schnitten bestimmen lassen.

Bei der CT-Untersuchung an archäologischen Textilien muss allerdings stets der Kosten - Nutzen - Faktor bedacht werden. Bei herausragenden Funden, deren detaillierte Untersuchung neue Aufschlüsse hinsichtlich seit langem diskutierter Fragestellungen verspricht, sollte der finanzielle Aufwand jedoch außer Diskussion stehen.

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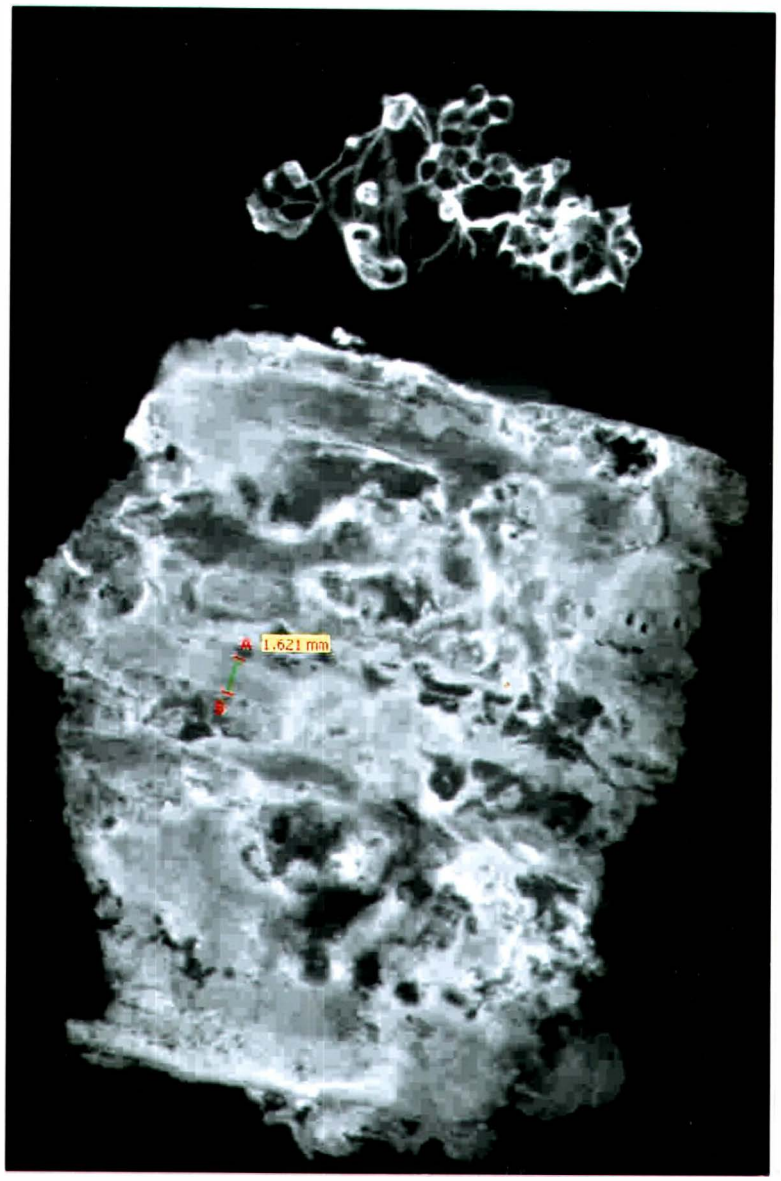

Abb. 14 CT-Aufnahme der rückseitig am Ösenbeschag erhaltenen organischen Schichten (Bruckmühl, Ldkr. Rosenheim / Bayern)

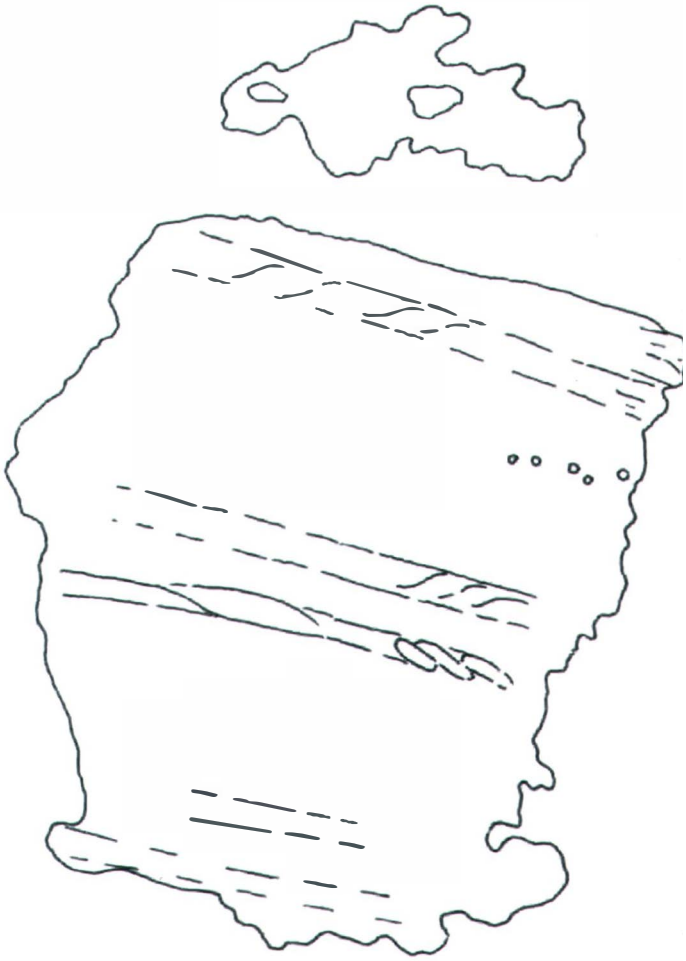

Abb. 15 Umzeichnung der rückseitig am Ösenbeschlag erhaltenen organischen Schichten (Bruckmühl, Ldkr. Rosenheim / Bayern)

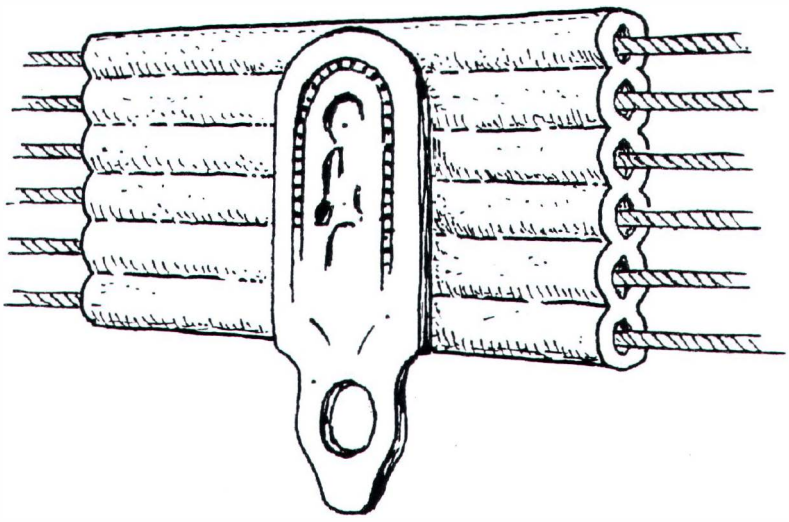

Abb. 16 Rekonstruktion des Leibgurtes mit aufgestecktem Ösenbeschlag aus Grab 34 von Bruckmühl (Ldkr. Rosenheim / Bayern)

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Decisions Taken in Planning a Replica Artefact

The flowchart in fig.17 was developed for a paper given at the 2004 ETSG conference (see p.21). The only change I have made is to add 'tools' to 'technique' in the final group of questions. It would be possible to add a whole sequence for 'tools', but the use of replica tools is more a consideration when studying the technique than the finished product. The smiley faces indicate *yes*, the frowns *no*, the crosses *stop* and the big tick at bottom right *go ahead*.

The reason for undertaking the work is the first consideration. The categories are not mutually exclusive; however, if the answer to all three questions is *no*, then whatever is made it will not be a 'replica' of anything.

There are two questions about the source, followed by detailed questions as to what can be established from the source material. Without adequate information, one may make a guess, but not a replica. Time and money impose limits, and in some cases it is impossible to establish the detail of the original or to obtain suitable materials. The 'end product' may not be the stuff made, but the demonstration of the process: the wrong yarn can demonstrate the use of the loom, though it will not make the right cloth. Equally the right yarn can be woven on an anachronistic loom, or even worked by a completely different process producing an identical structure to the original. What is important is that the compromises and limitations should be clear in the mind of the maker and in any documentation.

I list below the articles cited as examples of making replicas for various purposes.

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.

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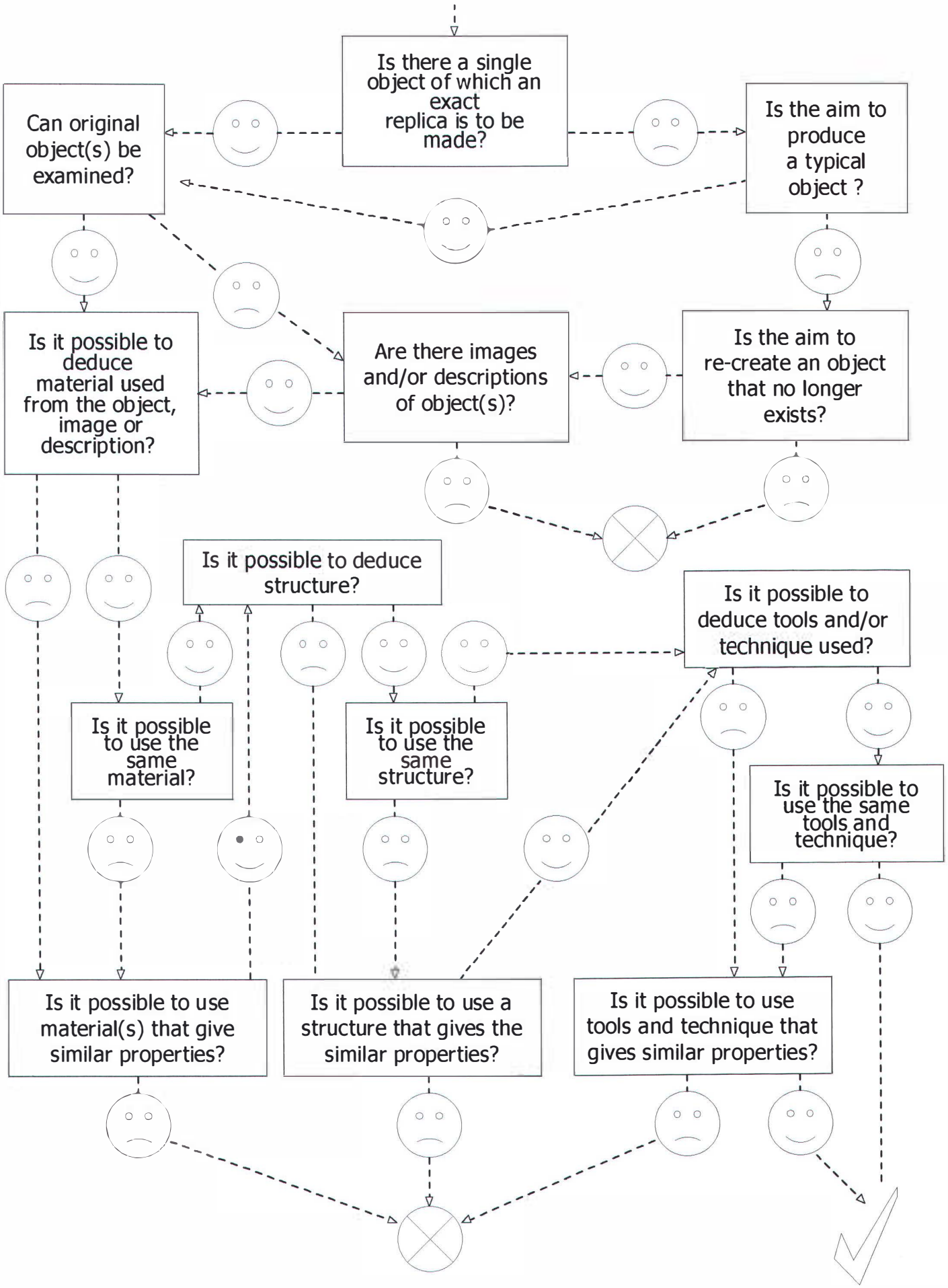

Fig.17 Decisions taken in planning a replica artefact

Report

Textile Remains on Metal from Bareqet, Israel

A copper-alloy dagger bearing textile remains was uncovered at Bareqet. The textile is preserved in one layer on both faces of the dagger due to the metal's corrosion products.

A number of different mechanisms can preserve textile characteristics when they are buried in close proximity to metal objects. Janaway (1983, 48) suggested four basic categories:
a) Textiles preserved by metal ions. The metal ions act as biocidal agents, limiting biological decay. Hydrolysis of the fibre is presumed to continue. This category is found most commonly in association with copper alloys.
b) Textiles preserved by metal corrosion products forming a negative cast. In this instance the corrosion products cover the fibres, eventually forming a cylindrical mould. The interstices become filled with soil to form a solid matrix. If the mould is cracked open a fine negative cast replica of the fibre may be examined. This type of preservation is most common in association with iron.
c) Textile fibres replaced by metal corrosion products. In this case a positive replica of the fibre is formed by corrosion products. The textile may or may not be preserved, but its morphological features remain.
d) A combined negative cast and metal replaced fibres.

The textile is made of linen, undyed cream. The threads are medium S-spun, sometimes plied in a final S twist for better cohesion. A plain weave technique was employed with a high density of weaving. The warp threads are thinner than the weft threads, 15 threads per cm in the warp, 8 threads per cm in the weft.

Discussion

The textile remnants from Bareqet are of exceptional value, in the light of the rarity of such remains in this part of the country.

Linen is known in Israel from the Neolithic period (*c.*6500 BCE) at Nahal Hemar. It was used in techniques such as looping and knotted netting (Schick 1988), but not in weaving. Linen textiles from the Chalcolithic Period were discovered in the Judean Desert caves: The Cave of the Treasure (Bar-Adon 1971), Caves in the Northern Judean Desert (Schick 2002); and Lower Wadi el-Makkukh (Schick 1998; Shamir and Schick, forthcoming). Until now no textiles from the Early Bronze Age have been found apart from linen threads adhering to metal from Hurvat Gilan excavated by Y. Cohen and Gesher excavated by S. Cohen (pers. obs.).

All the fabrics in Israel from the Neolithic to Early Bronze periods were made of linen (Bar-Adon 1971; Schick 1988; 1998). Wool textiles were found for the first time at Jericho dating from the Middle Bronze Age (Shamir, pers. obs., University College London). Threads that are sometimes plied are characteristic of the Chalcolithic Period and are not known before or afterwards.

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Reviews

Early Textiles Study Group, Manchester, 10–12.9.2004

The ETSG met once more in Ashburne Hall, University of Manchester, for its twelfth biennial conference. Most of the recent conferences have been built around a specific theme, with invited speakers, often from abroad; but for this year it was decided to revert to the original formula, inviting members of ETSG and their colleagues to present aspects of their own current research. The risk in that approach was that the programme might become an unsatisfactory ragbag (literally !); but in the event the formula was a great success.

Maria Hayward broke the ice on the first evening with her account of English pre-Reformation liturgical textiles, illustrated with some striking images. The programme of the first full day is best reviewed in chronological order of content. Angela Thomas discussed recent research on Ancient Egyptian Predynastic textiles, while Roberta Cortopassi drew our attention to some animal-hair woven mats, part of an important corpus of late Roman/early mediaeval archaeological textiles from Elephantine in Egypt. Some roughly contemporary Egyptian cloaks and shawls in the Whitworth Gallery were presented by Frances Pritchard and Ann French. Glynis Edwards then reviewed the implications for Anglo-Saxon costume of some metal-replaced textile finds from Mucking, Essex. Hard on the heels of her recent book on the topic, Margareta Nockert surveyed the (often surprising) results of the radiocarbon dating of a series of well known Scandinavian textile finds. In a contrasting world, the Ottoman influences on Tunisian and Moroccan textiles were explained by Jennifer Scarce.

During the afternoon, conference members had the opportunity of seeing more of the textile collection of the Whitworth Gallery, at the kind invitation of Frances Pritchard. After dinner Ruth Gilbert expressed her thoughts (and reservations) on the production of replicas as a research tool.

On Sunday there was time for four lectures before the lunchtime close. Kay Lacey characterised the mediaeval worsted industry; Helen Persson and Tamar Maor described the splendid collection of early leather shoes in the Victoria and Albert Museum; Ruth Singer looked at some late mediaeval purses; Orit Shamir gave an account of the clothing found in some 8th-9th century leper burials at Kasr al-Yahud, Israel.

Naomi Tarrant, Frances Pritchard and Glynis Edwards compiled and managed the programme, took care of the on-the-spot arrangements and handled the finances. Conference members, well aware of how vital such tasks are, expressed warmest appreciation. As usual, there are no plans to publish the collected papers from the meeting as such; but most of them deserve to, and certainly will, see their way into print.

John Peter Wild

Unraveling the Boundary: Perishable Technologies across and between the Prehistoric Great Basin and Southwest. A symposium at the 70th Annual Meeting of the Society for American Archaeology, Salt Lake City, 30.3–3.4.05.

Organised by Edward Jolie and Maxine McBrinn, the SAA Fiber Perishable Interest Group sponsored a session on basketry, cordage and textiles at the SAA's annual meeting. The theme was Southwest USA and the Great Basin, comprising the following presentations:
Perishables Research across the prehistoric Great Basin and Southwest (Maxine McBrinn and Ed Jolie); Early Fiber Technologies in the Western Great Basin (Eugene Hattori and Catherine Fowler); The Spread of Coiled Basketry in the Prehistoric Great Basin (Ed Jolie and Eugene Hattori); Netted Structures in the Prehistoric Great Basin (Ruth Burgett Jolie); Promontory Cave Moccasin Research and Conservation Project (Kathy Kankainen); Crossing the Western Boundary: Prehistoric Textiles in California (Judith Polanich); Two Rod and Bundle Coiling: Defining Basketmaker Culture in Southern Nevada (Diane Winslow); The Castle Park Region (Northwestern Colorado) Revisited: A Reanalysis of Perishable Materials from Archaeological Cave Sites (Danielle Benden and Sheila Goff); A New Twist on Cordage: The Social Implications of Variability in

Archaic-Basketmaker Cordage on the Colorado Plateau (Randy Haas); Weaving Identity: Visualizing Cultural Difference through an Analysis of Sinaguan Textiles (Anne Raney and Laurie Webster); Tracks in the Sands: Sandals as Indicators of Changing Social-Economic Spheres along the Colorado River (Phil Geib); The Mexican Connection: Another Look at 'Perishable' Relationships between Mexico and Points North (J.M. Adovasio). Joel Janetski (discussant) summarised the session.

The session was a splendid example of the potential of research into perishable artefacts, firmly establishing them as an alternative to 'durables', traditional objects of archaeological endeavour such as pottery, stone, metals etc. Each case was beautifully presented, illustrated and argued. Most of them were firmly within the American tradition of viewing Archaeology as Science rather than as part of the Humanities, although some of the speakers investigated social implications and discussed cultural identities. To a European observer, the total lack of references to research done in Europe was conspicuous and somewhat surprising. Still, it was fascinating to see how closely the development of fibre technologies in the Americas resembled that of the Old World, particularly the rich Neolithic finds from the Alpine region of Europe. It could be very interesting to investigate global relationships between developments of fibre technologies, pottery and the domestication of plants and animals - perhaps a theme for a future, cross-atlantic symposium.

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Textiles and Methods of Dating (Egypt, 1st Millennium AD): Workshop of the Study Group 'Textiles from the Nile Valley', Katoen Natie, Antwerp, 16-17.4.05

The workshop of the study group 'Textiles from the Nile Valley', entitled 'Textiles and Methods of Dating (Egypt, 1st Millennium AD)' was held at Katoen Natie's impressive HeadquARTers in Antwerp over the weekend 16-17.4.05. The workshop was organised by Prof. Dr. Antoine de Moor and Dr. Cäcilia Fluck and attended by about 45 participants from countries throughout Europe.

On the previous evening, Mr and Mrs Huts kindly provided a reception for participants at which they could view Katoen Natie's outstanding gallery of Egyptian tunics and other textiles (see *ATN* 39, 34), beautifully displayed and many of them radiocarbon dated, together with a small exhibition of other dated textiles from their own collection and elsewhere, which admirably set the scene for the weekend's business.

After a brief introduction to the conventional methods of dating textiles (J.P. Wild), A. de Moor explained the carbon 14 method and the dating programme currently being carried out at Katoen Natie, in conjunction with the Louvre, the Abegg-Stiftung and the Royal Museums of Art and History, Brussels. A number of papers followed on the 14C dating of specific textiles from various collections: silks from Antinoë (D. Bénazeth), piled linen tunics from the Louvre and Katoen Natie (R. Cortopassi), wool tunics given by Flinders Petrie to the Whitworth Museum, Manchester (F. Pritchard), textiles in the National Fine Arts Museum, Madrid (A. Cabrera and L. Rodrigues) and in the Museum für Byzantinische Kunst, Berlin (K. Mälck and C. Fluck).

Discussion then broadened to include other dating methods and textiles from other areas. L. Bender Jørgensen discussed the textiles from Mons Claudianus and Abu Sha'ar dated by archaeological context, arguing that differences in the textile assemblage may be due primarily to differences in population (soldiers, civilians, monks) and to climate. A. Stauffer discussed gold and purple textiles from Syria and Egypt dated art-historically. Papers followed on textiles from Nabatean sites in the Negev, Israel (R. Rosenthal-Heginbottom) and Amorium, Turkey (P. Linscheid), dated historically and archaeologically. To round off the day's proceedings, F. Sorber gave a fascinating description of methods of weaving capes to shape in present-day Morocco.

The Sunday session started with two other types of evidence that can shed important

light on the dating of textiles: dated papyri, with their references to clothing and textiles (H. Froschauer) and the Greek and Coptic 'inscriptions' that occur on textiles from Egypt (M. Durand). S. Schrenk then gave a paper applying the results of 14C analysis to textiles dated stylistically, demonstrating contemporary diversity of style rather than linear chronological development. The final session was devoted to techniques and dyes: mediaeval taquetés and samites in the Cluny Museum, Paris (N. Schluck), technical aspects of taquetés in the Katoen Natie collection (C. Verhecken-Lammens), dyestuffs in textiles from Egypt and their correlation to dating (A. Verhecken) and dye analysis of two textile fragments in the Museum für Angewandte Kunst, Vienna (R. Hofmann-de Keijzer).

The 14C analysis of textiles is still in its infancy, but is already opening up some fascinating areas for further exploration. To take but one example: it was clear from a number of the papers that textiles of a generally similar type, but with significant differences in artistic style and/or weaving technique, dyestuffs, etc. were being produced at the same date. It is clearly too simplistic to presuppose a single line of development in style or technique as a criterion for dating. The reasons and implications of this diversity, however, remain a matter for speculation. Are we looking at the products of different regions, different workshops, perhaps the whims of the individual weaver? Only time, and a lot more 14C dated textiles (for which the cry was raised throughout the workshop) can help us to tell.

The papers from the workshop are to be published. Meanwhile, Prof. de Moor has supplied *ATN* with a bibliography of carbon-dated textiles (see p.25-6 below). It is hoped that this will be kept up to date as further results are forthcoming.

Credit is due to him and to Cäcilia Fluck for arranging a smooth-running and, in many respects, ground-breaking programme, and thanks to Mr and Mrs Huts and their staff at Katoen Natie for providing a truly wonderful setting in which to hold it. Their kind offer to return there for the next workshop has been gratefully accepted.

Felicity Wild

Resources

Lehrangebote zur Konservierung von Textilfunden

Die Auswahl an Studiengängen für die Restaurierung und Konservierung von Kunst- und Kulturgut in Deutschland ist in den letzten Jahren immer zahlreicher und vielfältiger geworden. Gelehrt wird die Konservierung von Gemälden, Wandmalerei, Schriftgut, Photographie, Möbeln, technischem Kulturgut, Textilien oder archäologischen Objekten. Welcher Studiengang beschäftigt sich nun im Besonderen mit der 'Konservierung von archäologischen Textilfunden'?

Studienrichtung Textil

Die Suche nach einem Studiengang mit dieser Spezialisierung führt zunächst einmal an die Fachhochschule nach Köln: hier bietet das Institut für Restaurierungs- und Konservierungswissenschaften die Studienrichtung 'Textilien und Objekte aus Leder' an. Neben den diversen objektspezifischen Disziplinen der Textilrestaurierung wie Kostüme, Paramentik oder textiler Raumausstattung beinhaltet der Lehrplan auch Vorlesungen und Seminare zu archäologischen Textilfunden. Diese werden begleitet durch werkstoffkundlichen Unterricht in Textilchemie, Methoden der Textilprüfung, Fasermikroskopie und Techniken der Textilherstellung, -verarbeitung und -verzierung. Die Ergebnisse verschiedener Projekte von Studierenden sind in Publikationen, Seminar- und Diplomarbeiten (siehe Anhang) zu finden.

Studienrichtung archäologische Objekte

Eine enge Verknüpfung mit der Fachrichtung der Konservierung von archäologischen Objekten ergibt sich durch die Fundsituation von Textilien auf den Ausgrabungen: Sie werden häufig gemeinsam mit Metallfunden geborgen. Textilfragmente, durch die Metallkorrosionsprodukte konserviert, haften an den Metallbeigaben in Körpergräbern. Die Komponenten Metall und Textil können bei der Restaurierung nicht ohne den Verlust von Informationen getrennt werden. Die wissenschaftliche und konservatorische Methodik bei der Konservierung ist dementsprechend

fachübergreifend.

Konservierungsverfahren für Textilien, die aufgrund ihrer wassergesättigten Lagerungsbedingungen im Boden erhalten blieben, sind eng verwandt mit den Verfahren zur Konservierung von archäologischem (Nass-) Holz. So ist es naheliegend, dass bei Studiengängen mit dem Schwerpunkt 'Konservierung von archäologischen Objekten' die Textilfunde einen Platz im Lehrplan haben. Diplomarbeiten im Bereich Textilien der entsprechenden Studiengänge an der Staatlichen Akademie der Bildenden Künste Stuttgart und der Fachhochschule für Technik und Wissenschaft Berlin stehen als Ergebnis (siehe Anhang). Vorlesungen an der Akademie in Stuttgart erörtern den Aufbau von Protein- und Zellulosefasern und die komplexen Abbauvorgänge von organischen Materialien im Boden; Herstellungs-, Verarbeitungs- und Ziertechniken sowie Konservierungs-verfahren von Textilien werden behandelt. Da der Rohstoff Textil aber tatsächlich nur einen Teil des sehr breiten Materialspektrums dieser Studienrichtung darstellt, können nur Grundlagen vermittelt werden.

Praxisangebot in Stuttgart

Praxisbezogene Studienprojekte haben einen wichtigen Stellenwert im Lehrplan der Restaurierungsstudiengänge in Stuttgart. Studierende im Grundstudium (6 Semester) untersuchen, dokumentieren und konservieren an 4 bzw. 3 Tagen in der Woche originale Objekte bzw. Funde, wie es die diesjährigen Studienreform vorsieht. Zeitlich und räumlich sehr flexibel können Projekte im Hauptstudium (4 Semester) gestaltet werden, denn theoretische Inhalte werden dann von der Hochschule als Block in Modulen angeboten.

Didaktischer Anspruch

In wieweit eignen sich Textilfunde, um grundlegende Fähigkeiten des Restaurierens archäologischer Objekte zu vermitteln? Die fragilen Textilien werden häufig zusammen mit den Metallbeigaben als Block geborgen. Die Bergung der Funde im Atelier - eine Ausgrabung *en miniature* - spiegelt die Komplexität des archäologischen Restaurierens wieder. Die anspruchsvolle Aufgabe eignet sich didaktisch hervorragend, wesentliche Kriterien des systematisch - wissenschaftlichen Restaurierens unter Berücksichtigung moderner berufsethischer Gesichtspunkte zu vermitteln. Die Voraussetzung, um alle Informationen eines Befundes zu bewahren, sind durch eine stratigraphische Freilegung, eine zeichnerische und photographische Dokumentation und entsprechende Analysen gegeben. Gemeinsam mit Archäologen und Naturwissenschaftlern können Studierende so zum Fortschritt der archäologischen Forschung beitragen.

Planung Wintersemester 2004/05

Für die Umsetzung praxisbezogener Projekte kooperiert die Staatliche Akademie der Bildenden Künste mit dem Landesamt für Denkmalpflege Baden-Württemberg. Heidemarie Farke und Antja Bartels begleiteten in den letzten Jahren Blockseminare und Projekte als Lehrbeauftragte der Akademie und förderten als erfahrene Restauratorinnen viele Studierende mit großem Engagement, auch in ihren Werkstätten in Schleswig bzw. Bamberg. Für das Wintersemester 2004/05 ist für eine Gruppe von 9 Studierenden die Bearbeitung von Blockbergungen des Landesamt für Denkmalpflege Baden-Württemberg geplant. Ein Lehrauftrag wurde an Christina Peek vergeben, die als Archäologin im Rahmen eines DFG Projektes zur archäologischen Textilforschung dort tätig ist.

Wassergesättigte Funde

Die Bearbeitung von Fundkomplexen wassergesättigter Gewebe und Geflechte eignet sich hingegen nur bedingt für den Lehralltag. Dies bestätigt die Erfahrung der letzten 10 Jahre an der Akademie in Stuttgart. Es ist schwierig, ein Projekt für eine Studentengruppe zu konzipieren, da sich Fundkomplexe im Vorfeld nur begrenzt einschätzen lassen. Die Konservierungs-behandlungen sind zudem meist langwierig und die Konservierungsbäder müssen täglich kontrolliert werden; ein mikrobieller Befall schädigt die Funde irreversibel. Derartige Projekte bleiben aufgrund ihrer Komplexität einzelnen Studierenden im Hauptstudium vorbehalten.

Ausblick

Die Lehre an Hochschulen kann einen wichtigen Beitrag zur Fortentwicklung der archäologischen Textilforschung leisten, indem sie wissenschaftliche und konservatorische Methoden zur Bearbeitung von archäologischen Textilfunden vermittelt und optimale Rahmenbedingungen für Praxisprojekte schafft. Die Lehrveranstaltungen in den letzten Jahren an der Staatlichen Akademie der Bildenden Künste in Stuttgart begeisterten zahlreiche Studierende für diese Disziplin: durch kritisches und kreatives Denken konnten spannende Ergebnisse erzielt werden. Um eine umfassende Fachkompetenz zu entwickeln, bedarf es einer gewissen Liebe und Leidenschaft zum organischen Material, das oft nur in Spuren erhalten ist. Auch dieses zu vermitteln ist Aufgabe der Lehre.

Anhang

Im Folgenden findet sich eine Zusammenstellung von Diplomarbeiten mit dem Schwerpunkt 'Konservierung von archäologischen Textilfunden', die in den letzten 10 Jahren an deutschen Hochschulen und Fachhochschulen entstanden sind:

Andrea Fischer, *Reste von organischen Materialien an Bodenfunden aus Metall: Identifizierung und Erhaltung für die archäologische Forschung*, Diplomarbeit Staatliche Akademie der Bildenden Künste Stuttgart 1994; Publikation: Institut für Museumskunde an der Staatlichen Akademie der Bildenden Künste 1997

Beate Kränzle, *Möglichkeiten und Grenzen der Entfernung synthetischer Festigungsmittel am Beispiel eines Wollgewebes aus der Eisenzeit*, Diplomarbeit Fachhochschule Köln 1995

Sylvia Mitschke, *Zur Erfassung und Auswertung archäologischer Textilien an korrodiertem Metall*, Diplomarbeit Fachhochschule Köln 2000; Publikation: Kleinen Schriften des vorgeschichtlichen Seminars der Philipps-Universität Marburg 51, Marburg 2001

Britt Nowak, *Zur Bearbeitung von Blockbergungen mit organischen Resten aus archäologischen Ausgrabungen: Bergung, Konservierung und Auswertung von Zierscheibenbefunden aus dem frühmittelalterlichen Gräberfeld von Lauchheim (Ostalbkreis/Baden-Württemberg)*, Diplomarbeit Staatliche Akademie der Bildenden Künste Stuttgart 2002

Katrin Odvod, *Mooszöpfe - Vergleichende Untersuchungen zur Funktion und Konservierung von mittelalterlichen Mooszöpfen*, Diplomarbeit Fachhochschule für Technik und Wirtschaft Berlin 2000

Ulrike Rothenhäusler, *Ein römisches Korbgeflecht aus Garzweiler, Kr. Neuss - Freilegung, Konservierung und Herstellungstechnik*, Diplomarbeit Staatliche Akademie der Bildenden Künste Stuttgart 2002

Ute Schönbach, *Flecken auf textilen Grabfunden aus der Mamlukenzeit (1250 - 1517)*, Diplomarbeit Fachhochschule Köln 1999

Isabella Waltriný, *Ein bemaltes, zerknülltes Textilfragment aus dem Ägyptischen Museum Berlin: Sicherung - Identifizierung - Erhaltung*, Diplomarbeit Fachhochschule für Technik und Wirtschaft, Berlin 2002

Andrea Fischer, Diplom-Restauratorin
Studiengang Restaurierung von archäologischen, ethnologischen und kunsthandwerklichen Objekten
Staatliche Akademie der Bildenden Künste Stuttgart Germany

Radiocarbon Dates for Textiles from Egypt and Central Asia

Radiocarbon dates have been obtained by Katoen Natie, Antwerp (see *ATN* 39, 34) for about 115 Pharaonic, Late Antique and early mediaeval textiles and six shoes and sandals. Several of the radiocarbon-dated textiles from Katoen Natie have been published in: A. De Moor (ed), *Coptic Textiles from Flemish Private Collections* (Zottegem 1993). Twelve woollen tunics of a particular type are dated in: M. Immerzeel, J. van der Vliet (edd), *Coptic Studies on the Threshold of a New Millennium* (Leuven 2004), 1425-1442. For 10 woollen caps in sprang technique: A. De Moor, C. Verhecken-Lammens, M. van Strydonck, 'Radiocarbon dating of Coptic woollen caps

in sprang technique', *Bulletin du CIETA* 79, 2002, 26-32.

Several textiles from the Louvre and Katoen Natie feature in: M. van Strydonck, A. De Moor, D. Bénazeth, '14C dating compared to art historical dating of Roman and Coptic textiles from Egypt', *Radiocarbon* 46, 2004, 231-244. Two Sasanian coats from the Museum für Byzantinische Kunst, Berlin, and three post-Sasanian tapestries from Katoen Natie: A. De Moor, M. van Strydonck, C. Verhecken-Lammens, 'Radiocarbon dating of two Sasanian coats and three post-Sasanian tapestries' in C. Fluck, G.M. Vogelsang-Eastwood (edd), *Riding Costume in Egypt* (Leiden 2004), 181-187. For silk samites from Central Asia: A. De Moor, B. Overlaet, C. Verhecken-Lammens, 'Radiocarbon-dated silk road samites in the collection of Katoen Natie, Antwerp', *Iranica Antiqua* forthcoming. Fatimid stockings and one large complete Fayum shawl with Coptic inscriptions from the Psalms in: C. Fluck, G. Helmecke (edd), *Textile Messages: Inscribed Fabrics from Roman to Abbasid Egypt* (Leiden, forthcoming).

The Abegg-Stiftung, Riggisberg, has radiocarbon-dated 34 late antique textiles (S. Schrenk, *Textilien des Mittelmeerraumes aus spätantiker bis frühislamischer Zeit* (Bern 2004)) and about 15 Central Asian textiles. The Louvre has dated 80 late antique textiles; the Museum für Byzantinische Kunst, Berlin, 14 textiles; Sankt Severin, Köln, 5 late antique and early mediaeval Persian/Central Asian textiles; the Whitworth Art Gallery, Manchester, has dated 6 woollen tunics.

Katoen Natie, the Abegg-Stiftung, the Louvre and the Musées Royaux d'Art et d'Histoire in Brussels are combining forces to radiocarbon-date groups of at least ten textiles of the same type. This will enable us to narrow the date range and to establish the principal period of the production of these textiles.

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Warp Crossing and Warp Elimination in Tapestry Bands

Catherine Depierraz, Scientific Secretary of the Abegg-Stiftung, has kindly conveyed to *ATN* the Stiftung's permission to reproduce here (fig.18) the typology of warp crossing (*croisage*) and warp elimination developed and drawn by Regina Knaller and published in Sabine Schrenk's recent *Textilien des Mittelmeerraumes aus spätantiker bis frühislamischer Zeit* (2004), 491. As a point of reference for those seeking to identify a particular type in the field the scheme will be invaluable.

It should be noted that the useful introductory chapters in Schrenk 2004 have been translated into English and are printed in that volume as an appendix (p.250-275).

John Peter Wild

Recent Publications

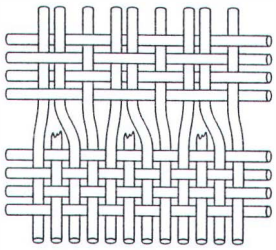
Badinou, P., *La Laine et le Parfum. Épinetra et Alabastres,* Monographs on Antiquity II, Leuven, 2003

Brune, K-H., *Die koptischen Textilien im* museum kunst palast *Düsseldorf I: Wirkereien mit figürlichen Motiven,* Wiesbaden, 2004

Fluck, C., 'Textilien spätantiker, christlicher und islamischer Zeit aus Ägypten' in: M.von Falck, C.Fluck (edd), *Die Ägyptische Sammlung des Gustav-Lübcke-Museums Hamm,* Bönen, 2004, 208-261

Fluck, C., 'Ägyptische Puppen aus römischer bis frühislamischer Zeit. Ein Streifzug durch die Sammlungen des Ägyptischen Museums in Berlin, des Museums für Angewandte Kunst in Wien und des Benaki-Museums in Athen' in: H.Harrauer, R.Pintaudi (edd), *Gedenkschrift für Ulrike Horak (P.Horak),* Papyrologica Florentina 34 (2), Florence, 2004, 383-400

Gleba, M., 'Textile production in protohistoric Italy: the use of implements in reconstructing a "missing" craft' in: E.C.De Sena, H.Dessales (edd), *Archaeological Methods and Approaches: Industry and Commerce in Ancient Italy,* British



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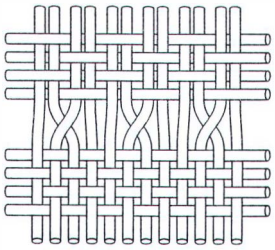

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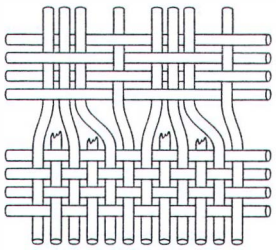

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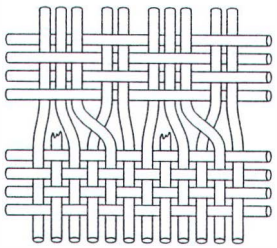

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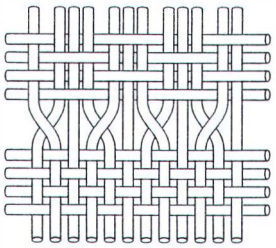

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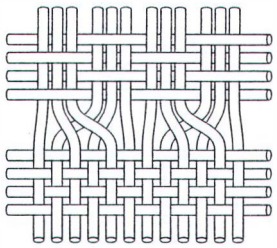

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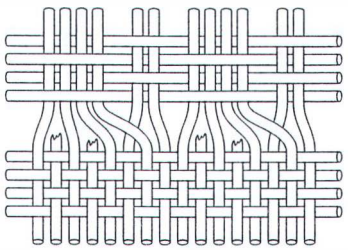

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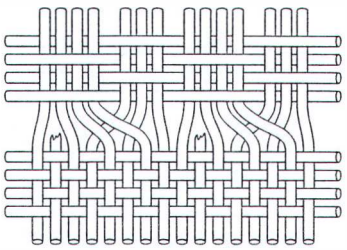

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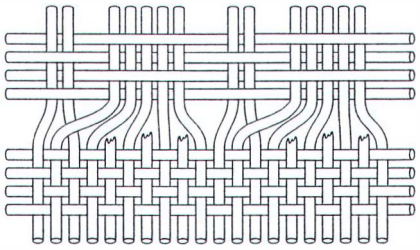

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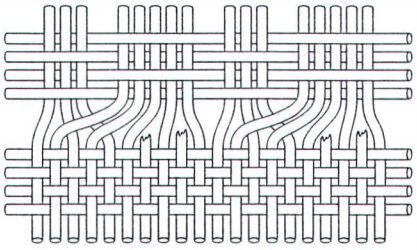

Typ X

Fig.18 Warp crossing and warp elimination in tapestry bands: a typology by Regina Knaller in Schrenk 2004, 491. (By courtesy of the Abegg-Stiftung, Riggisberg)

Archaeological Reports S1262, Oxford, 2004, 1-11

Kocińska, M.K., J.Maik, *Średniowieczne i nowożytne: Plomby tekstylne z wykopalisk w Gdańsku,* Acta Archaeologica Lodziensia 50/2, Łódź, 2004

Kötzsche, L., *Der bemalte Behang in der Abegg-Stiftung: Eine alttestamentliche Bildfolge des 4.Jahrhunderts,* Riggisberger Berichte 11, Bern, 2005

Maik, J., 'Średniowieczne jedwabie z wykopalisk w Elblągu' ('Mediaeval silk textiles from excavations in Elbing (Elbląg)'), *Archaeologia et Historia Urbana,* Elbląg, 2004, 509-516

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Conference Acta

Alfaro, C., J.P.Wild, B.Costa (edd), Purpureae vestes: *Actas del 1.Symposium Internacional sobre Textiles y Tintes de Mediterráneo en Época Romana, Ibiza, 8 al 10 noviembre, 2002,* Valèncìa, 2004
Papers on problems in the Roman textile industry, linen production in pre-Roman and Roman Italy, wools of the Wielbark culture, wool working at Pompeii, sails, sacking and packing at Berenike, the Mons Claudianus textile project, use of gold thread in Rome and Italy, textiles from Petit Cruzot and Chartres, purple dyeing in Roman documents and on Roman textiles from military sites in Egypt, textile production and dyeing in Roman North Africa, excavations on purple-dyeing sites on Ibiza and in mainland Spain and Mauretania, tannin-based dyes in modern Mexico and purple in Costa Rica (see *ATN* 36, 25).

Bischler, P., K.Grömer, R.Hofmann-de Keijzer, A.Kern, H.Reschreiter (edd), *Hallstatt Textiles: Technical Analysis, Scientific Investigation and Experiment on Iron Age Textiles,* British Archaeological Reports S1351, Oxford, 2005
Seventeen papers (in English and German) from the Textile Symposium of June 2004 in Hallstatt: introduction to the site of Hallstatt; the Hallstatt saltmines and textiles; review of the textile corpus; evidence for sewing; dye analysis on the textiles; the present condition and conservation of the textiles; experiments in tablet-weaving, dyeing, the set-up of warp-weighted looms and spinning; the development of the earliest European textiles; Iron Age textiles from Central Europe; textiles from Riesenferner (Vedretta di Ries, Bolzano); textiles from the saltmines on the Dürrnberg; research on Iron Age textiles in Slovakia and Moravia (see *ATN* 39, 28-39).

Caillet, J.P., J.M.Carrié (edd), 'Tissus et vêtements dans l'antiquité tardive', *Antiquité Tardive* 12, 2004, 13-252 (see *ATN* 36, 26-27)

Cleland, L., M.Harlow, L.Llewellyn-Jones (edd), *The Clothed Body in the Ancient World,* Oxbow, Oxford, 2005 (see *ATN* 34, 25-26)

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The emphasis of these papers from the NESAT VIII symposium is on textiles of the

Migration Period, the Middle Ages and early modern times, but individual studies of sheeps' fleece, dyestuffs, the warp-weighted loom and experiments in textile reconstruction are included (see *ATN* 35, 18-20).

Pritchard, F., J.P.Wild (edd), *Northern Archaeological Textiles: NESAT VII: Textile Symposium in Edinburgh, 5th-7th May 1999,* Oxbow Books, Oxford, 2005
Twenty-four papers from NESAT VII covering Roman textiles in silk and gold thread, wool fabrics of the early Middle Ages, cloth for sails and transport, aristocratic costumes of the later Middle Ages, wool fleece types, forms of loomweight and spinning wheel and the character of the Anglo-Saxon and Viking textile industries (see *ATN* 28, 24-26).

Owen-Crocker, G.R., *Dress in Anglo-Saxon England*, 2nd edition, Boydell & Brewer, Woodbridge 2004 [ISBN 1-84383-081-7]
This is a revised edition of a comprehensive study of English dress and textiles from the fifth to the eleventh century, first published in 1986. It draws on evidence from archaeology, text and art.
[offer price: £22.50, US$45.00, see below]

Medieval Clothing and Textiles I, 2005, is a new periodical [ISSN 1744-5787] edited by R. Netherton and G. R. Owen-Crocker.
Interdisciplinary in approach, topics in this first volume include Anglo-Saxon embroidery, textiles and textile imagery in the *Exeter Book*, the tippet, the regulation of clerical dress and evidence for dress and textiles in late medieval English wills.
[offer price: £18.75, US$37.46, see below]

Hodges, L.F., *Chaucer and Clothing: Clerical and Academic Costume in the Prologue to the Canterbury Tales,* Boydell & Brewer, Woodbridge, 2005 [ISSN 0261-9822]
This is a detailed discussion of the meaning of the terms used to describe the clothing of Chaucer's religious and academic pilgrims.
[offer price: £37.50, US$67.50, see below]

The publishers of the above three volumes, Boydell & Brewer Ltd (PO Box 9, Woodbridge, Suffolk IP12 3DF (tel 01394 610 600; fax 01394 610 316; e-mail: trading@boydell.co.uk)) offer to readers of *ATN* the purchase prices listed above (equivalent to 25% discount). Please add £2.00 postage UK, £4.00 rest of the world, US$4.00 N.America; this is a flat rate, no matter how many books you order. Payment may be made by Visa, MasterCard, Switch and cheque. To ensure you receive the full discount please quote reference **05066**. For N.America only: Boydell & Brewer, 668 Mount Hope Ave, Rochester NY 14620-2731.

News in Brief

Centre for Textile Research, CTR, in Copenhagen, Denmark 2005-2010.

In August 2005 a new textile research centre opens in Copenhagen, Denmark, the Centre for Textile Research. CTR is funded by the Danish National Research Foundation and will in 2005-2010 focus on textile history from prehistory to present times. The initiators are Marie-Louise Nosch and Ulla Mannering from the Saxo-Institute, University of Copenhagen. The scientific mission of CTR is to promote, expand and consolidate textile research in the academic world. CTR aims to:

1. establish a visible and explicit research profile with national and international reference setting new standards for future textile research.

2. explore and coordinate international textile knowledge.

3. achieve new results by conducting scientific programs in new research fields and by inspiring young scholars to include textiles in their research.

These objectives will be pursued in a substantial research program involving several Danish and European universities and museums, as well as design schools and the modern Danish textile industry. A variety of activities involving textile history will take place at the Centre, including research training of young scholars, courses in textile history on all academic levels, international seminars and conferences.

In the CTR research program, the origins and early development of textile technology will be investigated in collaboration with

leading international scholars. Textile production is to be investigated initially in two areas. The first will be the unique Bronze and early Iron Age costumes and textiles in Danish collections. This work will include new analyses and republication of the books of Margrethe Hald. The second investigation will focus on the rich archaeological, epigraphic and iconographical textile sources from the 2nd millennium B.C. Mediterranean. The combination is new and original and justified by the common textile technology in these areas and periods.

In addition, CTR will train six Ph.D. students from various fields of the Humanities. The Ph.D. grants will be awarded in open international competition. The application procedure starts in autumn 2005 and the first grants will start in January 2006. Visiting scholars from various countries will be able to spend their research time in CTR. Post doc. grants and scholarships will be awarded in open international competition to textile specialists or other scholars working on various aspects of textiles and costume. For application procedures and further information, see www.hum.ku.dk/ctr (the homepage opens in May 2005).

Since textile research is a neglected area, CTR will invest in activities which establish and consolidate an infrastructure for the research area. This includes manuals, a web based newsletter, republication and new analyses of important groups of archaeological textiles and a systematic study of tools based on empirical evidence and on experimental archaeology. This will facilitate communication and exchange with other parts of the Humanities and provide a position for textile studies in cultural history. The aim is to establish a strong and visible research orientation and to set a new standard of research in this area for the next generation.

CTR will be located at the University of Copenhagen, in close collaboration with the Saxo-Institute and the Danish National Museum. Further collaborators are the Danish University of Education, the Lejre Experimental Centre, the universities in Lund, Borås, Trondheim, Manchester and Lyon. The leader of CTR is Dr. Marie-Louise Nosch, and scientific project managers are the archaeologists Ulla Mannering and Dr. Eva Andersson.

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European Association of Archaeologists Conference, The Archaeology of Textiles and Clothing II: Cork, 5.-11.9.2005

Since the use of cloth, clothing and self-decoration is behaviour exclusive to the human species, it is an essential component of archaeological studies. Following the wide-ranging papers presented at Lyon in 2004, the plan for the session in Cork is to develop and deepen the discussion; the aim is to deliver papers that will inform a more general audience of the scope and breadth of textile research. Papers therefore should provide a wider perspective, correlating different aspects of the area of study (an overview might, for example, relate cloth finds of a particular type to other pieces in a more general contaxt that may be technical, social, geographic or time-related). Topics such as textile handicraft and technology, aspects of organisation and economics and gender issues can also be examined in this manner. An editing team will want to present a publication of such papers that will be useful to archaeologists and others interested in briefing themselves on the present state of textile studies.

Papers will be of 20 minutes' duration; posters are welcome. The deadline for offers of papers was 22nd March; but enquiries can still be directed to Elizabeth Wincott Heckett (heckette@indigo.ie), Carmen Alfaro Giner (Carmen.Alfaro@uv.es) or Eva Andersson (eva.andersson@ark.lu.se). For further information on EAA Cork visit <http://eaacork.ucc.ie>

North American Textile Conservation 5th Biennial Conference, Recovering the Past: The Conservation of Archaeological and Ethnographic Textiles: Mexico City, 9.-11.11.2005

The conference will focus on the conservation, research, diffusion and exhibition of archaeological and ethnographic

Fig. 19 Shakhaevskaya burial ground, kurgan 4, grave 32: fragments of the composite cap

textiles of every country. The conference is dedicated to Irmgard W.Johnson, who worked for over 50 years to research, rescue and preserve the textile designs of several ethnic groups of Mexico.

The Conference will be preceded by a series of optional workshops (8.-9.11.05) and optional cultural tours (8, 9 and 12.11.05)

For registration information visit <www.natcc.inah.gob.mx> or e-mail <natcc@inah.gob.mx> Cost: US$275.00

2nd International Symposium on Textiles and Dyes in the Mediterranean Ancient World: Athens, 24.-26.11.2005

The second international symposium on Textiles and Dyes in the Mediterranean Ancient World will take place in Athens, Greece from 24.-26.11.2005, a joint scientific project of the University of Valencia and the University of Athens. Papers are invited, in English or French, of 20 minutes duration. Abstracts (250 words) should be sent by e-mail to Carmen.Alfaro@uv.es by 1st September 2005.

Further information and registration forms can be obtained from Prof. Alfaro:
<Carmen.Alfaro@uv.es>

Correction

Human Body Lice indicate Historical Age of Clothing - Correction

In my note with the above title that appeared in *ATN* 37, 15-16 (Autumn 2003) I made an error in reading the report. I should have stated that it was calculated that it took 72,000 years for the human body louse *to become a species different from the head louse.* The researchers I quoted used this time taken for the divergence to take place to claim that the figure of 72,000 years accords with the figure of 100,000 years since the last major human migration from Africa, before which clothes are unlikely to have been worn.

My error in fact does not alter much the arguments I made, which can be clarified as follows. The first major advance in the development of clothing was the use of animal skins which began after the last major human migration from Africa 100,000 years ago. The second major advance was the 'invention' of spinning and weaving to make cloth which occurred as recently as 12,000 years ago. Two factors probably contribute to the 28,000 year gap between 100,000 years and the figure of 72,000 obtained. Firstly, it would be some time after 100,000 BP when clothing began to be worn. Secondly, when skins started to be worn, head lice would move from the scalp to the fur of the skins and since the fur provided a similar environment to the scalp, there is unlikely to have been much selection pressure to evolve. The third point is that modern body lice live in the seams of woven clothing which provide a different environment from scalp hair or fur. A stronger evolutionary stimulus would therefore have arisen once cloth garments replaced skins, probably not before about 12,000 years ago. It follows that one would expect the major evolutionary changes to have taken place during the last 12,000 years as the lice adapted to a life in cloth as opposed to hair.

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Guidelines for Authors

The *Archaeological Textiles Newsletter* aims to provide a source of information relating to all aspects of archaeological textiles. Archaeological textiles from both prehistoric and historic periods and from all parts of the world are covered in the *ATN*'s range of interests.

1. Contributions can be in English, German or French.

2. Contributions may include announcements and reviews of exhibitions, seminars, conferences, special courses and lectures, information relating to current projects and any queries concerning the study of archaeological textiles. Bibliographical information on new books and articles is particularly welcome.

3. Accounts of work in progress. This general category includes research/activities related to archaeological textiles from recent excavations or in museums/galleries. Projects may encompass technology and analysis, experimental archaeology, documentation, exhibition, conservation and storage. These contributions can be in the form of notes or longer feature articles.

4. Please send submissions in hard-copy, typed, form (lines not justified). (An accompanying disk in Word would be welcomed.) References should be in the Harvard system (eg Smith 1990), with bibliography at the end.

5. Line drawings and photographs are welcomed, but must be originals of good contrast for reproduction.. Artwork should not be mounted or incorporated into text. Captions, please !

6. The Editorial Board reserves the right to suggest alterations in the wording of manuscripts sent for publication.

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