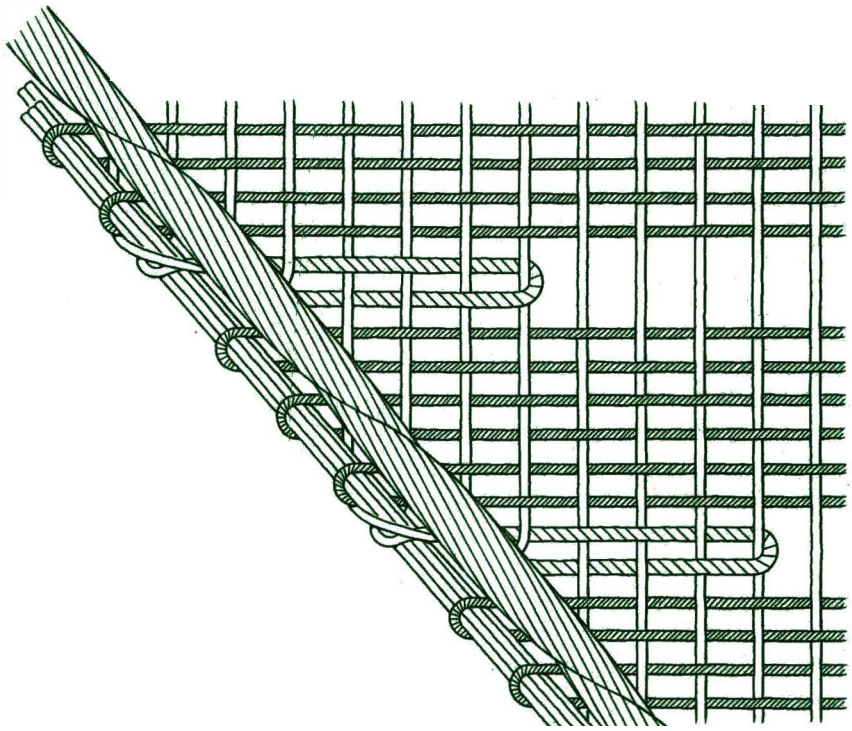
ARCHAEOLOGICAL TEXTILES NEWSLETTER



NUMBER 45 AUTUMN 2007

Editorial

Our ancient word-processor, and faithful provider of camera-ready text, discovered that this was to be our last issue of *ATN* - and died, after serving *ATN* for 19 numbers over 9½ years, but not before allowing itself to be coaxed into printing out the pages that follow.

ATN was the inspiration of Gillian Vogelsang-Eastwood in Leiden in 1985; it moved to Trondheim in 1994, and to Manchester in 1998. A new team at CTR in Copenhagen University will now take it fully into the digital world - and we hope that they will enjoy the challenge of its publication as much as we have done! Full practical details of the new arrangements will be found in the colophon inside the back cover; they come into effect on 1st January 2008.

Our curation of *ATN* ends in a flurry of purple and gold - and questions of textile preservation and conservation in Spain and Germany. Tribute is paid to a pair of our local pioneering textile scholars, the Midgleys of Bolton, and the author of an influential paper on weaving garments to shape on the loom revisits the topic 25 years later.

As we have said so often here, sometimes with an urgency verging on panic - only calmed by the active intervention of our Editorial Board! - *ATN* depends on its contributors, themselves often subscribers, to maintain the flow of manuscripts for publication. They have done us proud in the past ten years, and we hope that the new team will have the benefit of that same support!

Valete

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Features

A Study of the Textile Remains from the Necropolis in Angorilla, Alcalá del Río, Seville, Spain

Textile remains from antiquity are made up of cultural items that are generally insignificant in quantitative terms, but nevertheless offer us a great deal of qualitative information about the technology, the economy and sometimes the trade of the populations that used them. On the other hand, certain periods and cultures are especially scarce in textile materials that might speak to us of their material culture, their techniques and their customs in regard to clothing. The Phoenician-Orientalising period in the Mediterranean is one of them.

In the Iberian Peninsula we have several small, yet extremely interesting, remains of fabrics which might be more or less directly linked to the Phoenician and Punic presence on the south and east coasts. So far we have seen and studied the carbonised remains from Mairena del Alcor (in the province of Seville), which are kept in the Archaeological Museum of Seville, the Bonsor Collection (Alfaro 1984) and the Hispanic Society of New York (Alfaro, Tébar 2007); others from a slightly later period which were found inside a female anthropomorphic Phoenician sarcophagus that was discovered some years ago, now in Cadiz (Alfaro 1983-84); and some other almost undiscernible fabric (?) remains attached to a stone found on the Phoenician coastal site of La Fonteta, in the province of Alicante, which were given to us by our good friend Alfredo González Prats (an analysis of which could not be published due to the extremely small size of the sample that had been preserved).

That is why the barely two square centimetres of fine cloth stuck to a belt buckle from the Orientalising necropolis found in a place called Angorilla, in Alcalá del Río (near Carmona), and which we are studying now, are of such great interest. The remains of the cloth, which must once have covered the whole of the rear of the buckle (most probably as part of the dead person's clothing), are now patchily present only on some parts of it, including the hooks bent over both sides. The buckle is a beautiful bronze piece, extremely rich in copper, as indicated by the colouring of the place from which the sample was taken for analysis. This detail is important, since the salts in copper have a big influence on the mineralisation of fabrics. The study of the buckle is being published now, together with that of the other materials from the necropolis. (The remains were found in a rescue excavation by A. Fernández and Araceli Rodríguez in a necropolis at a place known as Angorilla. They can be dated to the 7th-6th century BC. The full study of this necropolis has been published by José Luis Escacena Carrasco.)

Fortunately, the time has passed when textile remains on metal items were ruthlessly eliminated by restorers who were simply interested in cleaning up the pieces of greatest artistic merit. At the present time, the mineralisation of textiles through contact with metal objects is one of the ways in which organic remains of this type, which provide us with the most information, are preserved. This natural process is complex and does not always occur in the same way. The mineral salts in metal objects (especially copper and iron) act on the cloth fibres under given conditions. In the case of copper salts, the mineralisation process allows these fibres to preserve their original appearance (except for their colouring). That is why they can be seen simply as mineral elements that have adopted the exact form of the organic matter they once were and which they gradually replaced. This is what we call 'positive mineralisation' (see Moulherat 2001).

The original organic matter (linen, hemp or other cellulose fibres) is gradually replaced by inorganic matter from the metal salts in the copper, or copper alloy, object supporting the fabric (fig.1).

This transfer of metal salts that gradually occupy the space of the organic fibres is influenced by various factors depending on the nature of the fibres and the metal support to which they are attached, but also on the burial system employed. Inhumation allows the metal to corrode, which is the essential condition for positive mineralisation of the fibres to occur. The pH of the atmosphere in the tomb, the temperature and the water in the ground act on the corrosion of the metal to produce metal ions that impregnate the adjacent

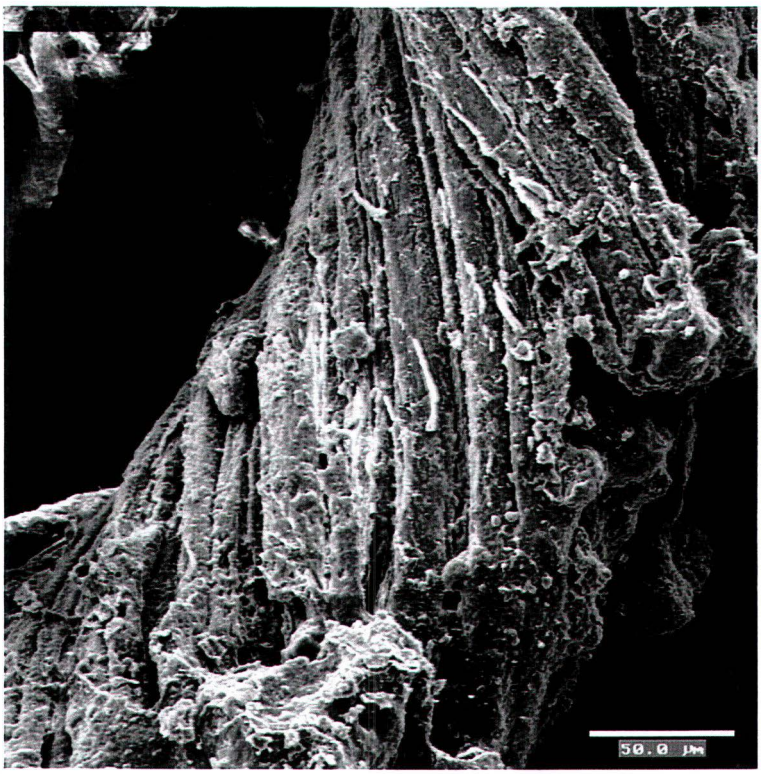

Fig.1 SEM image of a thread composed of S-twisted flax fibres from the Angorilla necropolis, Scale bar: 50µ

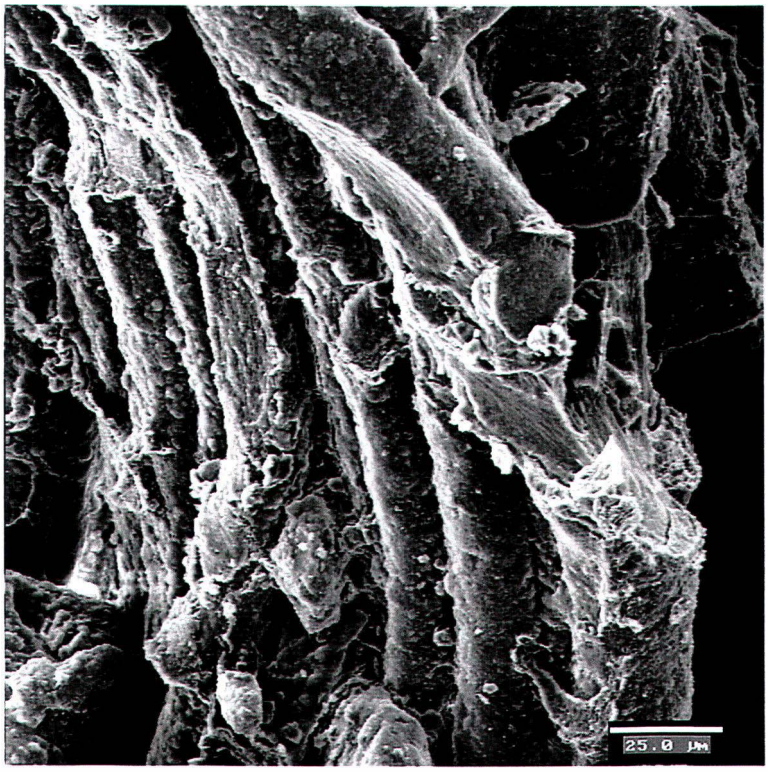

Fig.2 Positive mineralisation of fibres in the fabric found in Alcalá del Río. Scale Bar: 25µ

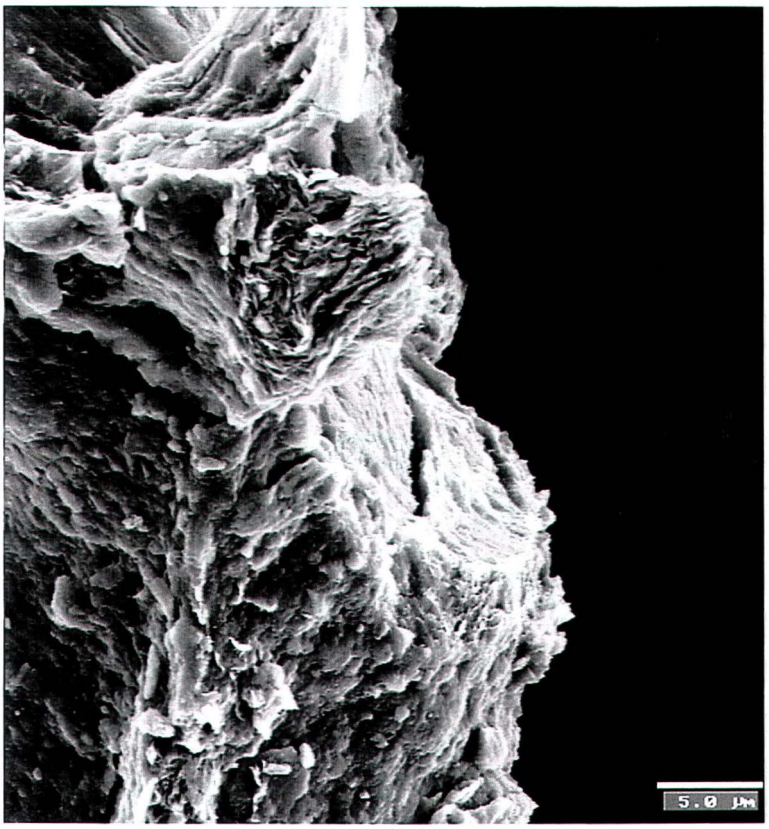

Fig.3 Cut showing 'positive mineralisation' of a fibre and a detail of the elongated central lumen typical of flax. Scale bar: 5µ

Fig.4 Mineralised flax fibre. Scale bar: 10µ

organic matter in a process that is further stimulated by the emission of putrefaction gas and liquids from the decomposition of the body. Moreover, the absence of oxygen inhibits the action of the micro-organisms to a large extent and slows down the disappearance of the fibres, thereby favouring their mineralisation (Moulherat 2001, 44).

Examination of the fibres in our tiny piece of fabric using a scanning electron microscope (SEM) has enabled us to verify that they are completely covered in mineral matter (pseudomorphs, in technical language). In other words, these are not hollow fibres under an external protective mineral layer built up on the surface, nor have they been only partly preserved or mineralised, as sometimes happens. In such cases, there are hollow areas inside the external mineral crust alternating with remains of organic matter or matter that has also been mineralised (what we call 'partially mineralised fibres'). That is why, in this case, we speak of positive mineralisation. Figs.2 and 3 clearly show various cuts made with an extremely fine *cuttex* when we were attempting to take the sample. These cuts reveal the recently opened-up inside of some fibres completely full of mineral matter that has taken the place of the fibres. It is difficult to determine the raw material used to make the threads due to the strong mineralisation of the fabric. However, some of the photographs obtained with the SEM (figs.3 and 4) seem to suggest that the material is linen or hemp. (It is extremely difficult to distinguish these two fibres in mineralised condition.) In the image can be seen the typical knots with an edge that separate the fibre into sections. The condition of the mineralised fibre is relatively good.

So far as the characteristics of the preserved fabric are concerned (figs.5 and 6), we should say that it is a piece of openwork tabby (1/1) composed of threads that are quite well balanced as regards their thicknesses: 0.2-0.3mm in one direction, which might be the weft (as stronger, but finer, threads are usually used in it) and 0.3 -0.4mm in the other, which might be the warp (in which the use of thicker threads makes it possible to get on with the work). However, the difference in the thicknesses is so small as to make it difficult to be sure whether it is not due simply to the wear and tear resulting from use.

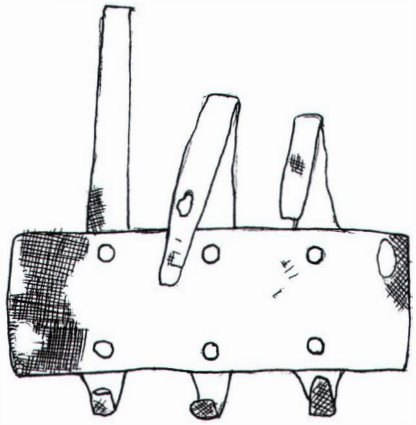

Fig.5 Reverse of the belt buckle with the lighter fabric remains.

As can be seen in the photograph (fig.7), the twist in the threads is quite strong and in S-direction (at an angle of 40°) in weft and warp. There are 14 threads per centimetre square (the measure of how closely or loosely woven a fabric is) in weft and warp. Since some threads are thicker than others at the edge of the metal piece, this apparent unevenness may be due to wear of the fabric.

The magnification provided by the microscope makes it possible to see the 'plastifying' action of some type of preserving agent applied to the fabric. There are some modern cotton threads stuck to this preserving agent contaminating a fabric that there was absolutely no need to protect with any chemical substance whatsoever.

Acknowledgement

This work has been carried out as part of the R+D Research Project (HUM 2004/01984-HIST) of the Spanish Ministry of Education and Science. I would like to thank my colleague E. Ferrer for providing me with this material for study and Maria Luisa de Labandera, lecturer at Seville University, for having brought it to Valencia for examination.

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Fig. 6 Detail of the best preserved area of fabric on the buckle

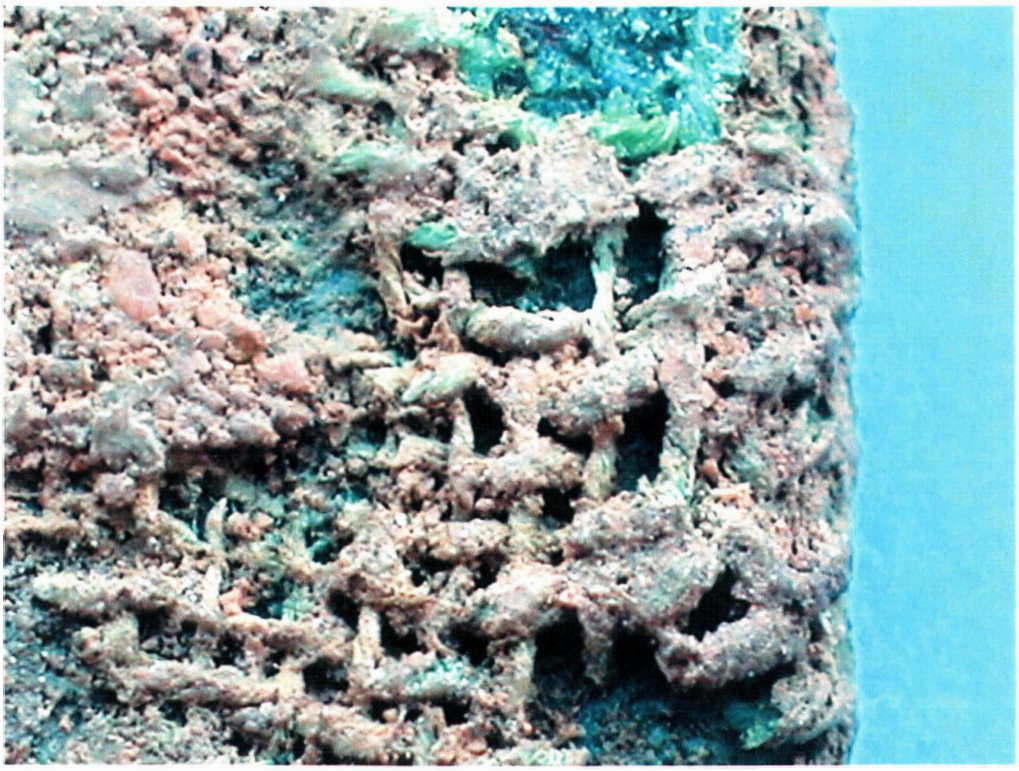

Fig. 7 Detail of the fabric. Note the green tones in the area where the sample was obtained; the broken threads allow the mineralisation inside the fibres to be seen.

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Goldgewebe aus spätrömischen Bestattungen bei Köln

In der Nähe von Köln wurden in den vergangenen Jahren mehrere reichausgestattete Sarkophage geborgen. In zwei Fällen konnten auch Reste von Goldfäden bzw. Goldgeweben sowie ein kostbares Haarnetz sichergestellt werden. Sie belegen zum einen den Reichtum einzelner Familien, zum andern aber den Handel mit Luxusgütern aus dem Bereich des Mittelmeerraumes bis in die Gebiete des Mittel- und Niederrheins. Nachfolgend werden die beiden Befunde aus Klein-Vernich und Rommerskirchen vorgestellt. Dem Haarnetz ist ein eigener Beitrag gewidmet (s.u.).

Die Gewebereste von Klein-Vernich

2004 wurden in Klein-Vernich südwestlich von Köln zwei Sarkophage und ein Brunnenbecken mit Bestattungsresten aus dem 3. Jahrhundert gefunden. Beide Sarkophage und das Brunnenbecken wurden in Zweitverwendung genutzt. Bei der Bestattung im Brunnenbecken handelt es sich um eine Aschebestattung, bei denjenigen in den Sarkophagen um Körperbestattungen. (Zum Fund und den einzelnen Sarkophagen zusammenfassend Andrikopoulou, Wagner 2005; Stauffer 2005.)

Im Sediment von Sarkophag 2 waren bereits mit bloßem Auge eine Menge feinster Goldfäden zu erkennen, die sich offensichtlich über die ganze Länge des Sarkophages verteilten und mit dem lehmigen Sediment fest verbacken waren (Abb.8). Zusammenhängende Gewebefragmente oder Faserreste waren nicht festzustellen. Das ganze Sediment wurde deshalb zunächst geröntgt, da sich auf diese Weise nicht an der Oberfläche sichtbare Strukturen und Muster von Metallfäden und allfällige Bekleidungsbestandteile wie Schließen, Fibeln und Nadeln nachweisen lassen. Die Röntgenaufnahme des Sediments bestätigte lediglich, dass die Goldfäden sich über den ganzen Sarkophaginhalt gleichmäßig verteilen, Spuren von zusammenhängendem Goldgewebe waren auch damit nicht erkennbar.

Die anschließenden Untersuchungen zeigten jedoch, dass hier ein außergewöhnlich prachtvolles und seltenes Gewebe zur Bestattung verwendet wurde. Unter dem Auflichtmikroskop war an mehreren Stellen zu sehen, dass die Goldfäden in Wirktechnik verarbeitet waren. Weiter konnten sowohl einzelne Faserreste, als auch viele schwarzblaue Verfärbungen von abgebauter Fasern im Sediment gefunden werden. Die weiterführenden Faseruntersuchungen mit Durchlicht- und Rasterelektronenmikroskop ergaben den Befund, dass für das Gewebe dunkel- bis schwarzblaue Kaschmirwolle und blauviolett gefärbte Wildseide verarbeitet worden sind, Rohstoffe, die aus Zentral- und Südostasien ins Römische Reich gelangt sind. In die gleiche Richtung weisen die Farbuntersuchungen, die an den schwarzblauen Wollfasern vorgenommen wurden. Hier konnte als hauptsächliche Farbkomponente Chrysophanol identifiziert werden (Analysen: Vanden Berghe KIK/IRPA Bruxelles). Dieser Farbstoff kommt in unterschiedlichen Pflanzen vor. Dazu gehören u.a. der chinesische Rhabarber, der europäische Ampfer und die Rinde des Faulbaumes (Scheppe 1993, 224-227). Es ist jedoch kaum anzunehmen, dass das kostbare Kaschmirgarn mit Ampfer eingefärbt wurde. Wahrscheinlicher ist auch hier, dass die Farbkomponente wie der Rohstoff auf eine asiatische Herkunft des Garnes verweist. Der Qualität der textilen Fasern entspricht auch der Goldfaden. Der Seelfaden ist vollständig vergangen, so dass die Goldfäden heute als hohle 'Röhrchen' vorliegen. Unter dem Rasterelektronenmikroskop war zu

sehen, dass die Streifen von lediglich 0.1mm Breite und 3.3µm Dicke aus einer Goldfolie von hoher Reinheit geschnitten und zu äußerst feinen Goldfäden verarbeitet worden sind.

Obwohl keine zusammenhängenden Gewebereste gefunden wurden, liefern die Resultate ein klares Bild vom Textil aus Sarkophag 2 von Klein-Vernich. Es handelt sich wohl um ein blaues Tuch mit eingewirktem goldenem Dekor, das den Leichnam vollständig bedeckt hat. Kaschmirwolle und Wildseide deuten auf ein wertvolles Importprodukt von der Art, wie sie in Naintré, Viminacium, Alsohéteny, und an anderen Orten gefunden wurden (Bédat *et al.*. 2005; Bedini *et al.*. 2004; Desrosiers 1999; zusammenfassend Stauffer 2007a; Stauffer 2007b).

Die Gewebereste von Rommerskirchen

Erstaunlicherweise wurden nur ein Jahr später Fragmente eines ähnlichen Gewebes in einem Gräberfeld bei Rommerskirchen, nördlich von Köln gefunden. Ein Steinsarg aus dem 2. Viertel des 3. Jahrhunderts enthielt Asche und Reste von Gebeinen einer Frau. Die kostbaren Grabbeigaben umfassten nebst Gläsern, Objekten aus Bein, einer silbernen Spindel und einem reich mit verschiedenartigen Perlen verzierten textilen Haarschmuck (Schrade 2006 und s.u.) wiederum Reste von Goldfäden und Goldfolie (Abb.9). Anders als beim Sarkophag aus Klein-Vernich war im Zuge der Bergungsarbeiten der größte Teil der Goldfäden bereits aus dem Sediment ausgeschwemmt worden. Die Goldfäden bestehen aus Lahnen von 0.4-0.5mm Breite, welche aus einer sehr reinen Goldfolie von nur 0.7µm Dicke geschnitten und um einen textilen Kern gewickelt wurden. (Es konnte nicht mit letzter Sicherheit geklärt werden, ob sogar zwei Arten von Goldfäden vorliegen. In einigen Fällen scheinen die Streifen breiter und weniger dicht um den textilen Kern gewickelt zu sein. Da die dünnen und extrem weichen Fäden durch das Ausschwemmen mechanisch beansprucht wurden, ist keine definitive Aussage mehr möglich.) An ihrer Innenseite fanden sich Reste von rotem Bolus. Die Seelfäden sind nahezu vollständig vergangen. An einigen Stellen sind winzige Reste der blauschwarzen(?) Seele erhalten, deren rasterelektronisches Bild trotz stark abgebautem Zustand auf Wolle hindeutet. Ein größeres zusammenhängendes Konglomerat zeigt, dass die Goldfäden zumindest teilweise in Wirktechnik verarbeitet waren (Abb.10). Ebenfalls in Wirktechnik gearbeitet ist ein winziges Fragment aus blauschwarzer Wolle. Im Weiteren konnten zwischen den Goldfäden und im Sediment konnten zahlreiche weitere blaue Fasern entdeckt werden, bei denen es sich um Baumwolle (Abb.11), Wolle und Wildseide handelt. Dazu kommen naturfarbene und rotbraune Wollfasern. Das breite Spektrum unterschiedlicher Faserarten verweist auf verschiedene Gewebe von überwiegend dunkelblauer Färbung. Mindestens eines davon war mit Goldwirkerei verziert.

Obwohl viel schlechter erhalten, muss es sich auch bei den Funden aus Rommerskirchen um Reste von Tücher bzw. Bekleidung handeln, die aus ausgesuchten Materialien bestanden bzw. einen Dekor in Gold auf blauem Grund aufwiesen. Derartige Dekorationen sind u.a. in den Sarkophagen aus St. Maximin in Trier überliefert, von denen bis lang nur einer publiziert worden ist.

Die kostbaren Gewebe aus Rommerskirchen gehören wie der Kopfschmuck mit Perlenbesatz, die Gläser, die silberne Spindel und andere ausgesuchte Beigaben zu den Luxusgegenständen, die den herausgehobenen sozialen Status der Bestatteten eindrucksvoll zum Ausdruck bringen.

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Abb.8 Weilerswist - Klein-Vernich: Fragmente von Goldwirkerei aus dem Sediment des Sarkophags, 3. Jh. n. Chr. © Annemarie Stauffer, Köln

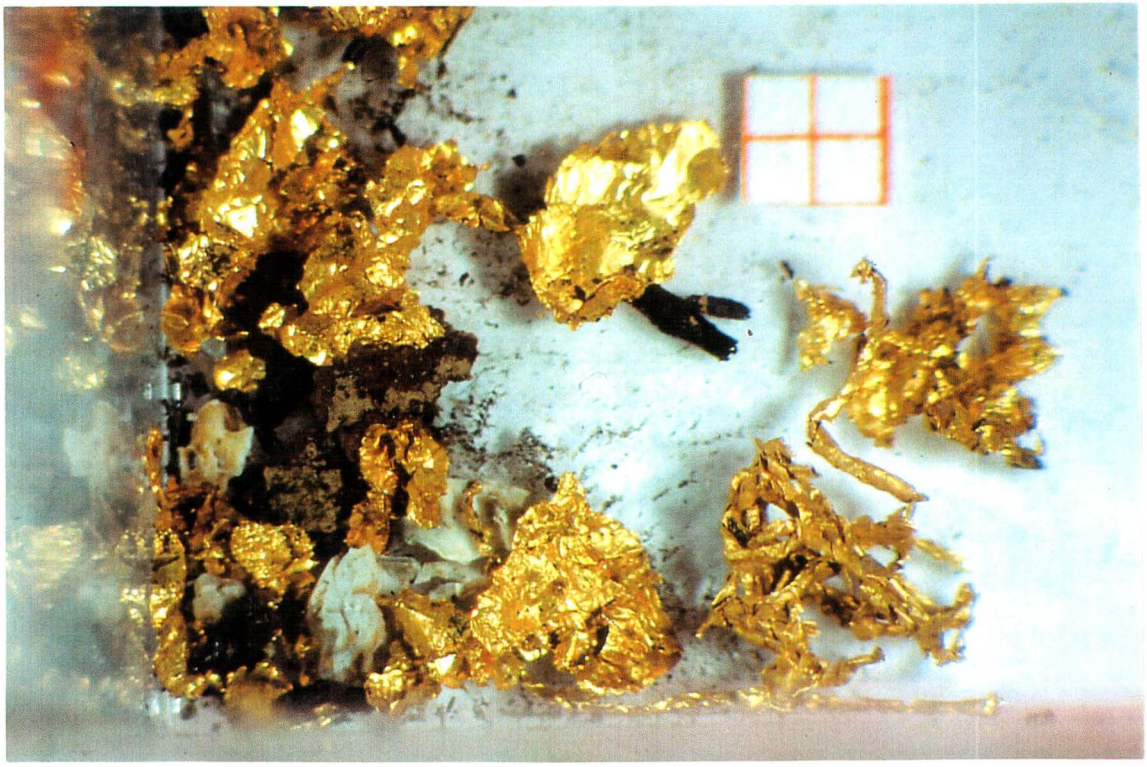

Abb.9 Rommerskirchen: Goldfäden und Reste von Goldfolie aus dem Sediment des Sarges, © Annemarie Stauffer, Köln

Abb.10. Rommerskirchen: Fragment einers gewirkten(?) Dekors. © Annemarie Stauffer, Köln

Abb.11 Rommerskirchen: Blaugefärbte Baumwollfaser. © Annemarie Stauffer, Köln

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Haarnetz und Stirnband aus einem Frauengrab bei Köln (2.Viertel 3.Jahrhundert)

Nachdem bereits 2004 in einem Sarkophag aus Weilerswist - Klein-Vernich (2. Hälfte 3. Jahrhundert) die Überreste eines kostbaren Goldgewebes identifiziert werden konnten, wurde ein ähnlich bedeutender Fund ein Jahr später im Sarg einer Frau in Rommerskirchen nördlich von Köln gemacht (vergleiche Beitrag Annemarie Stauffer). Zum Einen wurden wiederum Reste eines golddurchwirkten Gewebes sichergestellt, zum Andern konnte ein mehrteiliger Haarschmuck der Verstorbenen im Kontext erhalten und sein ursprüngliches Aussehen rekonstruiert werden.

Kopfschmuck

In dem Steinsarg aus dem 2. Viertel des 3. Jhs. waren auf einer Seite die Schmuckgegenstände der Verstorbenen deponiert worden, unter anderem auch die Überreste eines Frauenkopfschmuckes, bestehend aus Glas-, Metall-, Bein und Textilbestandteilen (Abb.12). Da archäologische Textilien aufgrund ihrer Vergänglichkeit oft nur wenig Beachtung finden, werden sie in der Regel aus dem Gesamtkontext herausgenommen und separat untersucht. Dies führt zu Informationen, die nicht im direkten Zusammenhang mit der archäologischen Gesamtsituation stehen und nur schwer eine Interpretation zulassen. In diesem Fall wurde der Frauenkopfschmuck in der Werkstatt des Rheinischen Landesmuseums im Block geborgen und konnte durch eine systematische Bestandsaufnahme und mit Hilfe von radiographischen Untersuchungsmethoden an der Fachhochschule Köln zerstörungsfrei untersucht werden. Es war sogar möglich, aufgrund der Lage der einzelnen Bestandteile Rückschlüsse auf das Gesamtobjekt zu ziehen und dadurch eine hohes Maß an Vergleichbarkeit mit ähnlichen Funden zu erzielen.

Zunächst wurden die einzelnen Bestandteile des Befundes auf der Oberfläche in ihrer Lage und ihrer Anordnung zueinander erfasst und anschließend mit Hilfe geeigneter Analysemethoden anhand ihrer speziellen Merkmale unterschieden. Dabei konnten zweierlei Arten von ehemals vergoldeten Metallplättchen identifiziert werden. Zum Einen dreieckige Plättchen mit halbkugelförmigen Erhebungen, zum Anderen runde Metallplättchen mit glatter Oberfläche. Weitere Metallbestandteile stellen kleine zierliche Metallröllchen dar, die ebenfalls Reste einer Vergoldung an ihrer Oberfläche aufweisen. In unmittelbarerer Nähe zu den Metallplättchen sind weiße und dunkelblaue Glasperlen angeordnet (Abb.13). Außerdem konnten noch blaugrüne

Stabperlen identifiziert werden. Die textilen Bestandteile des Befundes stellen Wollfasern in Form von Faserverbünden oder Fäden dar. Diese sind hauptsächlich an den Metallplättchen oder in den Durchlochungen der Perlen zu finden (Abb.14). Abschließend bleiben noch die runden Haarnadeln aus Bein zu erwähnen, die zum großen Teil auf der Befundoberfläche aufliegen.

Die Anordnung dieser Bestandteile ergab nun folgendes Bild (Abb.15). Bei dem Gesamtobjekt handelte es sich um einen Frauenkopfschmuck, bestehend aus Stirn- oder Scheitelband und Haarnetz. Die Metallplättchen stellten die Kettenglieder dar, die aneinandergereiht die Hauptkette des Schmuckbandes bildeten. In der Mitte des Schmuckbandes war ein von dunkelblauen runden Perlen umrahmtes rundes Goldplättchen angeordnet, das vermutlich in der Mitte der Stirn zwischen den Augen auflag. Nach beiden Seiten folgten dreieckige Kettenglieder so, dass sie mit den Spitzen Richtung Schläfen zeigten. Diese wurden jeweils von weißen runden Perlen umrahmt. Auf Höhe der Schläfen waren erneut jeweils noch mal ein rundes, von dunkelblauen runden Perlen umsäumtes Metallglied angeordnet. Die letzten Kettenglieder bildeten dann wieder die dreieckigen Metallplättchen. Zwischen den weißen Perlen waren in regelmäßigen Abständen vereinzelt dunkelblaue Perlen angeordnet, um den Übergang von einem zum nächsten Kettenglied zu betonen. Es ist davon auszugehen, dass das Schmuckband etwa über den Ohren endete und dort das Haarnetz aus Wolle, vermutlich in einer Sprangtechnik hergestellt, ansetzte. Dieses hatte die Funktion, am Hinterkopf oder im Nacken einen Haarknoten zu halten. Die Haarnadeln dienten ebenfalls zum Halten des Knotens und nahmen gleichzeitig zum Teil noch eine schmückende Funktion ein. Die Metallröllchen und die Stabperlen sind nicht entlang des Schmuckbandes angeordnet und scheinen eher zur Ausschmückung des Haarnetzes herangezogen worden sein.

Im Anschluss an die Bestandsaufnahme erfolgten weitere Untersuchungen mit Hilfe radiographischer Methoden, die sowohl den Inhalt der Blockbergung sichtbar machten, als auch erweiterte Erkenntnisse hinsichtlich der Lage und Anordnung verschiedener Bestandteile brachten. Die Röntgenuntersuchung machte deutlich, dass

Abb. 15 Rekonstruktion des Kopfschmuckes (Fotografische Grundlage: Oehler 1980, Tafel 14). ©FH-Köln G. Schrade

die Metallröllchen nahezu regelmäßig und systematisch angeordnet sind. Dies festigte die Theorie, dass die Metallröllchen die einzelnen Waben des Haarnetzes schmückten, um die eher triste Materialsichtigkeit der Wolle aufzuwerten. Außerdem brachte das Röntgenbild eine zusätzliche Nadel zum Vorschein, die aufgrund ihrer Helligkeit im Bild als Metallnadel identifiziert werden konnte. Ihre genaue Lage direkt unter der Befundoberfläche wurde dann durch eine Untersuchung mittels Computertomographie ersichtlich. Der Entschluss, eine solche Maßnahme durchzuführen basierte auf einer Versuchsreihe zur Visualisierung überlieferter Gewebe, die im Auftrag des Landesdenkmalamtes Baden-Württemberg und des Bayerischen Landesamtes für Denkmalpflege durchgeführt wurde (Nowak-Böck *et al.* 2005). Die Auswertungen der Computertomographie führten letztendlich auch zu dem Entschluss, eine partielle Freilegung vorzunehmen, um die Nadel zugänglich zu machen. Das Ergebnis dieser

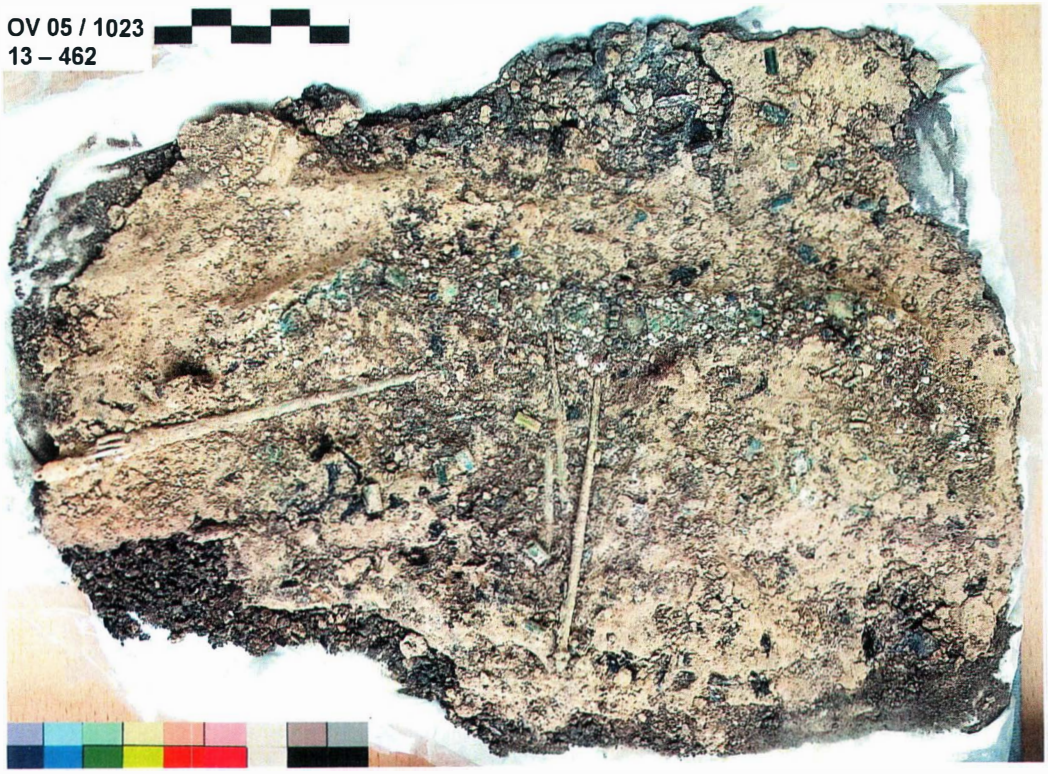

Abb. 12 Rommerskirchen. Gesamtaufnahme des Befundblockes. © FH-Köln, U. Borowiak

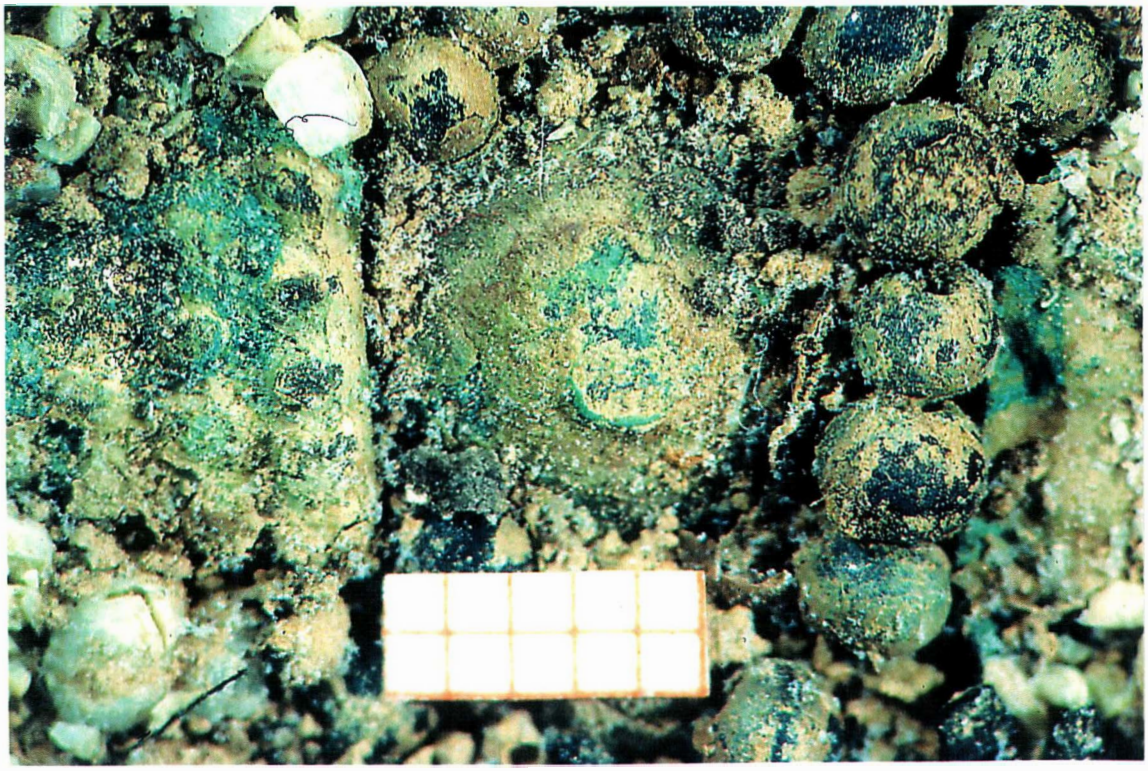

Abb. 13 Rommerskirchen. Detail des Stirnbandes mit Metallplättchen und Glasperlen ©FH-Köln, G. Schrade

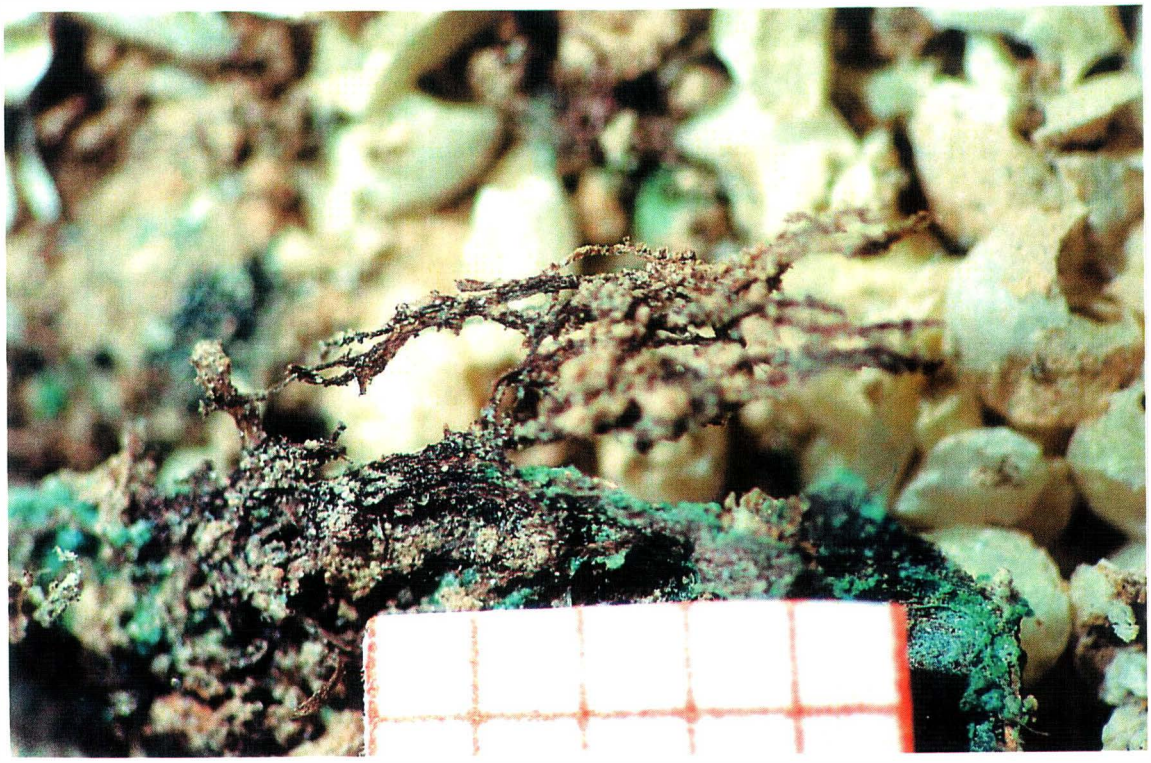

Abb.14 Rommerskirchen. Textilfragment. ©FH-Köln, G. Schrade

Abb.16 Rommerskirchen. 'Feststellnadel' zum Fixieren des Haarnetzes. ©FH-Köln, G. Schrade

Schaft gewickelten textilen Überresten (Abb.16). Diese Nadel könnte eine Art 'Feststellnadel' dargestellt haben, die das Haarnetz beim Tragen verschiedener Frisuren in seiner Weite fixierte.

Aufgrund aller Untersuchungsergebnisse fand abschließend der Versuch statt, den Kopfschmuck in seiner Art und seiner Erscheinungsform zu rekonstruieren (Abb.15). Ein großer Teil dieser Rekonstruktion basiert auf erarbeiten Fakten und nur wenig Fragestellungen bleiben dabei offen und müssen durch Interpretationsansätze ergänzt werden.

Die Suche nach Vergleichsbeispielen gestaltete sich etwas schwierig. Es gibt nur wenige vergleichbare, aus Gräbern geborgene Objekte, meistens handelt es sich hierbei um Überreste von goldenen Fäden oder um goldene Metallröllchen und Perlen. Textiles Material konnte nur selten geborgen werden. Der aufgrund seines Aufbaus ähnlichste Kopfschmuck wurde 1991 auf dem Gelände der Università Cattolica in Mailand in einem versiegelten Sarkophag gefunden (Rossignani *et al.* 2005). Dabei handelte es sich um die Körperbestattung einer Frau, um deren Kopf eine große Anzahl von Goldelementen, bestehend aus Goldröllchen und Goldkügelchen, sowie Bernsteinblättchen geborgen wurden. Bei diesem Fund konnte ebenfalls die Kombination Stirnband und Haarnetz aus der Befundanalyse nachgewiesen werden. Die Datierung dieses Kopfschmuckes erfolgte aus dem Fundkontext auf die 1. Hälfte des 3. Jahrhunderts n. Chr., das heißt, in eine ähnliche Zeit, wie sie auch für die Särge aus Rommerskirchen erschlossen werden kann.

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Late Antique Sarcophagus Burials from St Maximin in Trier: Current Examination

Seemingly insignificant finds from long past excavations are still in a state of slumber in many museum repositories, although their rediscovery could be just as exciting as the excavation of new finds. This is particularly true when such an old find involves a group of late antique stone sarcophagi in which, astonishingly enough, highly sensitive organic materials, notably textile furnishings, are preserved more than 20 years after the opening of the said sarcophagi.

The sarcophagi were recovered from the site of the former abbey church of St. Maximin in Trier at the beginning of the 1980s. They originate from a monumental basilica that was exclusively used for burials (Neyses 2001; Weber 2006) and was located *extra muros* - outside the city walls of the late Roman metropolis of Trier. The mortuary building gradually developed from a smaller preceding building and older burial vaults which were incorporated into the construction. The interment of bishop Maximinus (AD 330-347) is suspected to have been the motive for the final expansion. Even today, innumerable stone sarcophagi positioned in close alignment above each other and side by side can be seen inside this mortuary building. This reflects the desire of the ancient believers to

be buried *ad sanctos* – as closely as possible to the saints. More than 100 epitaphs discovered unequivocally prove that the people buried there belonged to a relatively high social stratum (senatorial nobility) who were Christians (Merten 1990).

At the end of the archaeological work the excavation area was made partially accessible to the public. When constructing the paths through the burial ground numerous sarcophagi had to be removed. In the course of this, 30 sarcophagi with well preserved contents were stored at the museum for later examination. Immediately after the recovery some graves were presented in the context of a special exhibition ('Kaiserresidenz'), but no scientific analysis was carried out and finally all the sarcophagi disappeared into the repository in an untouched condition. It was not until about ten years later, in 1994, that the textile content of one of the sarcophagi was finally examined (Dreyspring 2002).

Two years ago all of the sarcophagi had to be removed from storage due to reorganizational measures in the course of the special exhibition 'Constantine the Great' taking place in 2007. The sudden change in circumstances facilitated deliberations about the future of the sarcophagi. The necessity of a scientific study was beyond question, but how was this analysis to be carried out? Is one allowed to intrude upon the original condition of the find? Or does everything have to remain unscathed? One of the main questions of the archaeologists was what kind of insights could be expected after such a long storage period. The conservator's focus was on the possibilities of preserving the finds and on methods of determining the actual state of preservation of the organic materials.

In order to find answers to these questions two sarcophagi were initially examined in the course of a pilot project (Reifarth 2006a). The objective of the examination was the documentation and technological analyses of all materials contained in the sarcophagi, including their horizontal and stratigraphical distribution, their state of preservation, and their significance in a burial context. The basic methodology focused on the avoidance of any intrusive measures as well as on the interdisciplinarity of the analyses. Specialists in the areas of anthropology, archaeology, textile technology, conservation, archaeobotany, forensic entomology, microbiology and chemistry were involved in the examination. Important aspects during the scientific study were the simultaneous recording of results by the different disciplines as well as the continuous intellectual exchange among the experts.

The methods developed during the pilot project are now being applied to all sarcophagi. The examination is mainly based on a purely visual assessment of the material *in situ* or on the basis of high-resolution photographs; micro-samples are only taken for the special analyses of materials.

The documentation of the graves is carried out by various means:

3D scans. This technique allows a three-dimensional documentation of the sarcophagus and its contents (the burial) as an entity. With the help of special image editing programs exact measurements can be secured from the smallest details. This is particularly helpful for the anthropological evaluation of the burials since by means of this technique the bones can be three-dimensionally measured in a non-invasive manner.

High-resolution digital imagery. The contents of the sarcophagi were documented by means of high-resolution digital photographs. These pictures served as the basis for the mapping of the collected results and extracted samples. They can be printed in high quality or displayed on the computer at an approximate scale of 1:1. The latter is particularly advantageous during interdisciplinary work because one can discuss details regarding the graves with other specialists even if they are not on site and can only see the image and not the sarcophagus itself.

Video microscopy. The graves are examined and documented in digital form by means of a video microscope. With this system, examinations with up to 200-fold magnification, measurements using the live image, and high-resolution pictures are possible. Due to the flexible construction even very narrow areas and larger cavities can be inspected. The inspection on the separate screen offers several additional

Fig.17 Silk fabric in damask weave used for wrapping the deceased, grave 174, St. Maximin, Trier

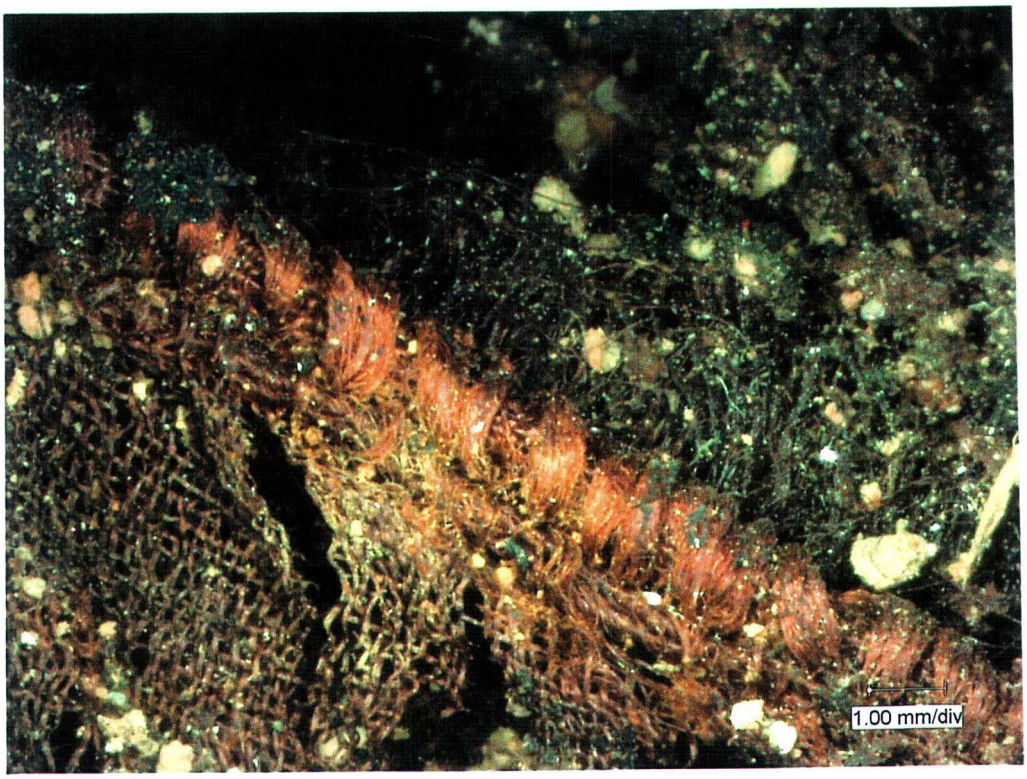

Fig.18 Detail of the neckline of a silk tunic in plain tabby weave and a wool garment beneath, grave 4, St. Maximin, Trier

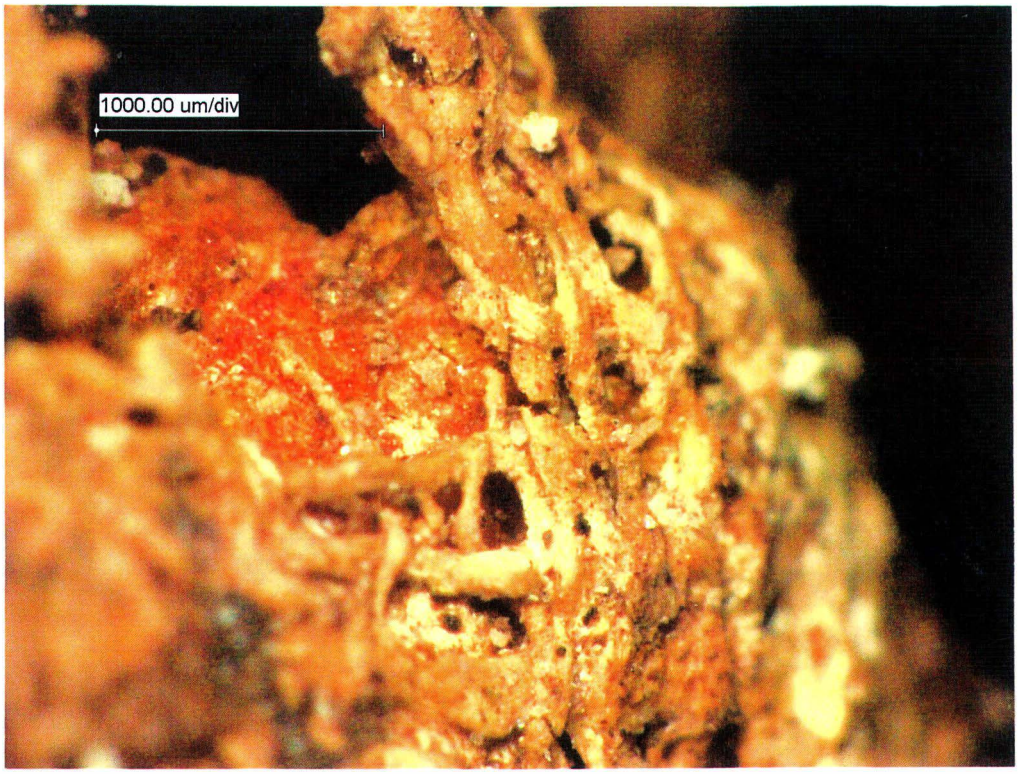

Fig.19 Burial shroud in plain tabby weave with a (reddish) compact layer of resin behind it, grave 571, St. Maximin, Trier

advantages: 1. When working in a team, all participants can simultaneously see the results. 2. Detailed technical drawings (eg of textiles) can be executed directly on the screen by means of transparent paper. 3. During the examination there is a considerable distance between the researchers and the burial material in the sarcophagus. This, on the one hand, serves to protect the researchers' health in case of microbially infested tombs. On the other hand, the graves are not contaminated by the investigators themselves, which is, for example, of importance in the case of planned DNA analyses or C14 dating.

By using all of these techniques in combination, two aims which are often mutually exclusive when handling archaeological finds can be connected: the scientific analyses and the simultaneous preservation of the sarcophagus and burial.

The scientific gain, questioned at the beginning of the pilot project, was confirmed by numerous novel results which affect not only our knowledge of late Roman textile history, but also give insights into the burial culture of the early Christians in Trier, and inform us about aspects pertaining to trade history, economic history and social history (Reifarth 2006 b). It became clear, for example, that the deceased were buried in extremely valuable garments – for instance, tunics incorporating purple coloured wool, interwoven with gold threads, and silk fabric in damask weave – of which an astonishing amount has been preserved (figs.17–18). But not only these relatively well preserved fabrics, made from precious materials, are of historical importance; inconspicuous grey fragments which partly cover the precious garments of the dead prove to be highly degraded remains of burial shrouds. It was also surprising to discover resins between these cloths (fig.19), for which two different types of treatment can clearly be distinguished. In some tombs the topmost fabric layers are completely soaked with resinous substances in certain areas, with the intensity decreasing in the deeper layers. It is obvious that in these cases a liquid, oily substance was poured over the body. In other tombs, however, solid bits of resin are found between the shrouds. In these cases resins were applied in a paste or solid form. Also interesting are the different

combinations of clothing and wrapping of the deceased.

How is one to deal with this unique evidence in the future? Should the valuable textiles be removed from the sarcophagi for conservation purposes? In the context of burials, textiles should not be treated as an isolated collection of objects. In places, the fabrics found in the sarcophagi in Trier for example are in direct contact with human remains, insect remains, microorganisms and plant matter. This complex combination of different organic materials contains extremely valuable information, especially considering the preserved original position of the burials in the sarcophagi which would be lost if the textiles were extracted. The organic materials – bones, textiles, hair, plant remains, and insects – can still be identified relatively clearly, but for the most part they are extremely fragile and so degraded that they would immediately accrue damage when being touched. However, thanks to their position in the sarcophagi the burials were to a great extent protected from mechanical exposure during the excavations in such a way that a kind of microcosm full of important information was preserved *in situ*.

In some of the graves, for instance, patches of discoloration on the bottom of the sarcophagus or on bone splinters are the only evidence that still points to the original existence of purple-coloured fabrics. One cannot usually preserve such traces in a traditional sense but at best document them. But we can only document what we see. And how much do we possibly miss in our examination? Which questions can never be asked because we do not yet have the technical capabilities to answer them?

If one considers the technical possibilities that were available for analysis immediately after the recovery of the sarcophagi, it can be considered a stroke of luck that the contents were not examined back then. With possible future technological innovations in mind, the sarcophagi should remain as unchanged as possible in their current state, so as to be available to the next generation for further research.

But still the problem remains as to HOW the sarcophagi can be stored in the time to come. And closely associated with this is the question whether historical graves may solely be perceived in regard to their scientific significance. Are human remains merely organic materials of the same relevance as any other material in archaeological finds? If one were to answer these questions in the affirmative, one could unhesitatingly present the sarcophagi in every exhibition or store them in the repository.

In German legislation it is definitively established that human remains may be examined or rather researched given their scientific value, but no regulation exists for the treatment after completion of the examination (Sommer 2004). If one enquires at the cultural heritage institutions concerned with archaeological monuments in the individual federal states as to what happens with human remains stemming from excavations, one receives very diverse answers. The answers range from systematic storing to reburial of all remains, notwithstanding their age. Between these two poles, according to the most frequent statements, skeletons from a Christian context are reburied if possible, while prehistoric remains are archived as research objects. But should the pious treatment of human remains be solely restricted to those for whom it is known (or suspected) that during their lifetime they practiced the Christian faith? Should the sarcophagi from St. Maximin therefore also be reburied? The best solution would certainly be repatriation to the still existing burial site of St. Maximin. This, however, is impossible for logistical reasons. An installation in a museum context is, in my opinion, extremely precarious, both for conservational and for ethical reasons and would require a high degree of planning with regard to its thematic integration (Hager 2002). Moreover, it also does not seem insignificant to me that one sarcophagus, covered by a sheet of glass, is already exhibited at the below-ground accessible burial site of St. Maximin in its original position and may thus stand as an exemplar for all the graves examined. By accident, that sarcophagus was badly damaged during construction work towards the end of the archaeological excavation in 1989. In this case, for the first time, a conservator was immediately consulted and the burial was preserved *in situ* (Worch 1989). In my opinion, the specific

environment is decisive for one's perspective. Hence, a different significance is attached to tombs in a museum, compared to those in a sacred or funeral context, simply on the basis of the resting place alone. Since increasing spatial capacity exists in the diocese of Trier as a result of the reduced size of congregations, storage in sacred premises is presently being considered for the sarcophagi from St. Maximin.

Irrespective of scientific significance and temporal classification (and the religious association that can be derived therefrom), respect for human remains should be a factor when dealing with archaeological graves. In my opinion this does not necessarily have to lead to a reburial after completion of the examination, but should rather result in the storage of the finds with the understanding that one is not dealing with arbitrary archaeological finds but with human remains (McGowan 1996, 119).

Acknowledgements

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The Midgleys of Bolton and their Contribution to the Scientific Examination of Ancient Textiles

In the early 20th century some people became known for their expertise in early textile research, for example Henry Ling Roth (1855-1925), who was curator at the Bankfield Museum in Halifax and particularly interested in weaving, and Grace Crowfoot (1878-1957), who made important studies of hand spinning. Known to both of them were William and Thomas Midgley, father and son, who were the first two curators of the Chadwick Museum, Bolton, and who pioneered the scientific examination of early Egyptian textiles. The Chadwick Museum was built as the result of a bequest from Dr. Samuel Taylor Chadwick, thus being named after its benefactor, and the first curator, William Waller Midgley (1843-1925), was appointed in July 1883 so that the museum could be prepared and opened in June 1884.

William Midgley (fig.20) was born in Normanton, Yorkshire, and had come to Bolton as a young man in 1867. It seems likely that he had some experience in the textile industry, but at the time of the Census in 1881 he was working as a commercial traveller in tea. His wife was also from Yorkshire, but their five children, three daughters and two sons, had all been born in Bolton. William's interests were varied and he had taken a considerable drop in salary in accepting the museum post. At this time British excavations under the Egypt Exploration Fund were starting in Egypt and either the museum or a supportive individual made a subscription and thus the museum received its first Egyptian items in November 1884. Appropriately these were textiles from Flinders Petrie's excavations at Tanis, but they were late in date. In addition to the museum's own support for work in Egypt, subscriptions for the museum's benefit were collected principally before 1914 by Annie Elizabeth Finney Barlow (1863-1941), the daughter of a local cotton spinner and manufacturer (Thomas 1985). By 1890 the museum service was increasing and an assistant curator was appointed. This was the museum assistant, William's elder son Thomas, born in Bolton in 1874, who had come to work at the museum on leaving school, who was now promoted at the age of 15 or 16 and who was to spend his whole career in the Bolton museum service.

William took his later chosen work as a museum curator seriously and despite his involvement in so many different museum collections, he was committed to research. Between 1886 and 1901 he achieved seven publications, the majority of which were concerned with cotton and therefore probably related to some of his earlier expertise (Midgley 1886a, 1886b, 1889, 1893, 1894, 1900, 1901). Exactly when he began to think of pioneering work in terms of textile archaeology in the examination of Egyptian fabrics is not really known, although this may have occurred in the 1890's. He may have begun some preparatory or comparative work, but his opportunity to study Dynastic and earlier material would come a bit later and mostly in his retirement.

William retired in 1906 and was succeeded as curator in Bolton by his son Thomas. Before long William began to make his mark in Egyptian textile research. Flinders Petrie sent to Bolton some cloth from body wrappings excavated in 1909-1910 in a cemetery at Meydum, asking William for a report upon them. The date of the fabrics was late Dynasty III or early Dynasty IV and William was well aware that little work had been done on material of this date. His report was his first publication on Egyptian textiles and shows his methods of examination (Midgley 1911). His methods were based on how a more modern textile might be investigated and therefore he looked at the number of ends or warp threads and the number of picks or weft threads to the linear inch, the approximate yarn count or number of hanks in a pound, the diameter of the fibres, the structure of the weave, whether the yarns were single or doubled, twist of the yarns and whether there were any selvedges. He made comparisons with modern yarns, prepared microscope slides and adopted an entirely scientific approach whilst recognising that what he was looking at might be brittle, matted, stained, impregnated and not in very good condition. He identified the fabrics as linen and established an examination standard which he would follow and impart to his son.

The next material which he received was

from a Predynastic cemetery at Gerzeh, which in terms of its early date and being from burials was not perhaps very well preserved and not easy to identify. Nevertheless he counted the warps and wefts and looked at the yarns and gave his opinion that the fibre was not flax as it seemed rather coarse but that it was ramie (Petrie *et al.* 1912). Ramie is a member of the nettle family and there is certainly doubt as to whether Midgley was right in making this identification, which has been in print for over ninety years and which would be worthy of reinvestigation. He then carried out some work for Henry Ling Roth, which resulted in two publications (Midgley 1912, 1913a).

William's final published work was for Flinders Petrie and was concerned with textiles excavated from mastabas of the First Dynasty from Tarkhan and from various graves of Dynasties IV-V at Kafr Ammar (Midgley 1915). All of the material was assessed as linen and in a simple tabby weave and although William now had some more information on selvedges, he recognised that he had not seen enough examples to be able to draw any clear conclusions about the finished edges on Egyptian textiles. He gave detailed figures about warps and wefts and about the diameter of fibres and he published superb photographs of microscope slides of fibres and of black and white micro-photographs of fabrics, which are as valid and useful to look at now as they were then. He probably realised that he might not work on this for much longer and in 1913 he wrote to his son Thomas sending him forty-five micro-slides of cloth from Tarkhan, a slide of finest Irish linen fibre for comparison, the copy of his report which had been accepted for publication and then saying 'These, together with my previous contributions will make your collections of detailed descriptions of Archaic fabrics a unique one' (Midgley 1913b). This was undoubtedly true and it meant that Thomas could continue the work. In 1915 when William Midgley saw his last publication in print, he was 72 years old but he would continue to be a source of advice and help until his death in 1925.

Thomas would in fact undertake more extensive work on Egyptian textiles, but his greatest challenges in this field were to come close to and mainly after his father's death. Through his own contact with Henry Ling Roth, Thomas went to Halifax to study their three inscribed stone items, and he published descriptions and comments on these pieces in a booklet in 1907 (Midgley 1907). Thomas's next publication was concerned with research on cotton (Midgley 1921), but he must have spent quite a long time working on the life of Samuel Crompton, inventor of the spinning mule, as 1927 was the centenary of Crompton's death. As a result of his publications in that year, Thomas Midgley would be recognised as an authority on the life and work of Samuel Crompton (Midgley 1927a, 1927b, 1927c).

At the same time Thomas was very much involved in the Egyptian collection and also in contact with a new generation of excavators. One of these was Guy Brunton for whom he would undertake a considerable amount of work on textiles and many letters would pass between them. His work for Brunton on later specimens from Qau and Badari, including linen and matting of the Protodynastic, Dynasty VI and Pan-Grave, only concerned short reports (Midgley 1927d, 1930). His main work on the textiles and matting from Qau and Badari was on the Predynastic and Badarian material, the latter being the earliest textiles from Egypt so far studied. This material was decomposed and friable but he was able to obtain samples by using water or dilute alcohol to flake off a layer from the matted mass in each case and fix some of them on paper with a weak solution of celluloid; but he used untreated fragments for microscopic examination. Photographs were taken and he counted the warps and the wefts, assessed the structure of the weave and looked at the diameter of the fibres. What William had not done was to look at the direction of twist of the yarns and Thomas did not do this either. Thus neither of them realised that where there were doubled yarns as Thomas noted in all Badarian fabrics and as they both saw in some Predynastic fabrics, this was because they were z-spun or twisted yarns and that during the Predynastic period there was a technological change to s-spun yarns, which thereafter, joined by splicing, became the norm in Dynastic and later textiles. Despite this, Thomas's work on the Badarian and Predynastic pieces from Qau and Badari cannot be criticised too much as he was

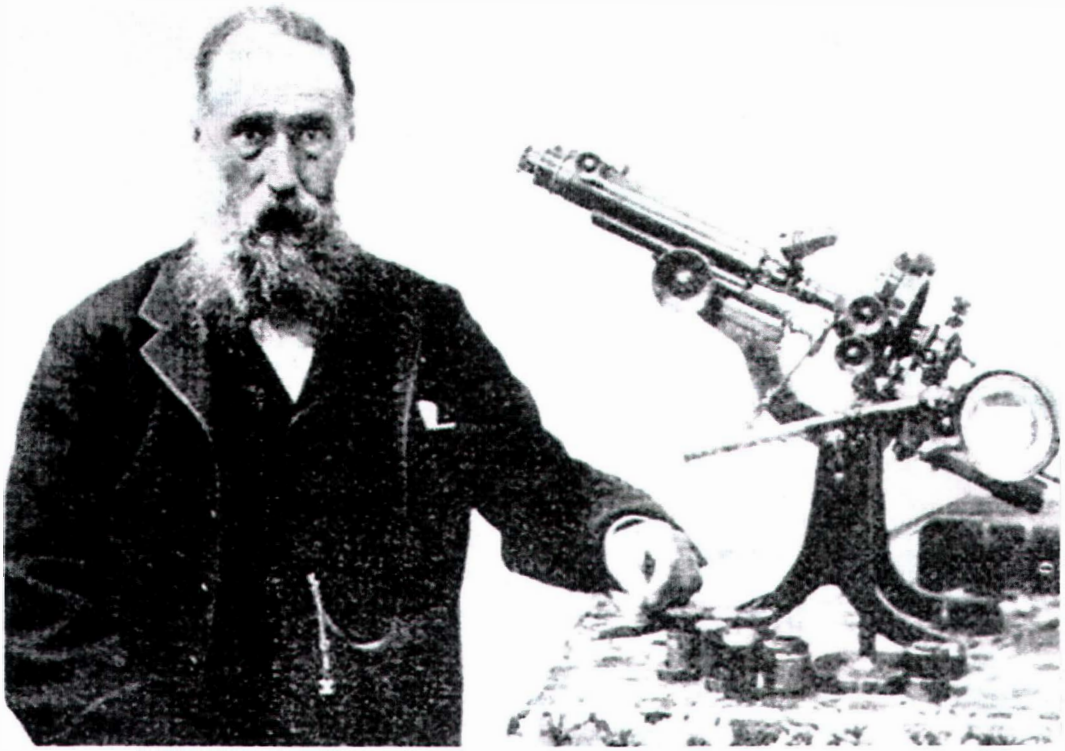

Fig.20 William W. Midgley, published in Lancashire Review *1897*

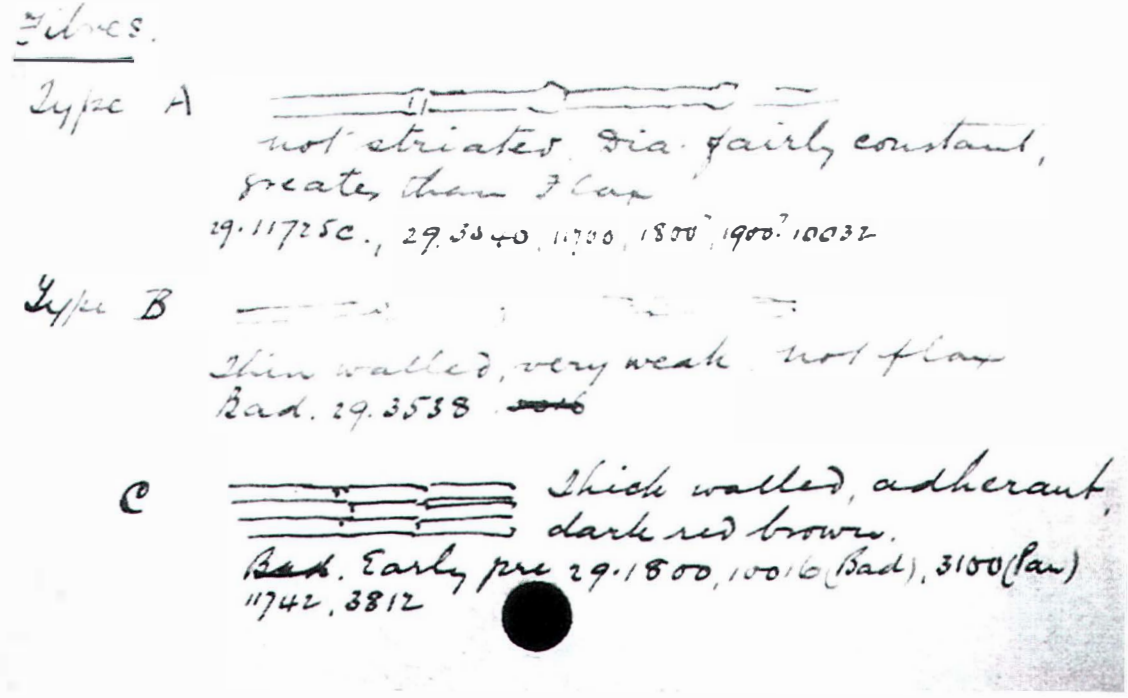

Fig.21 Card with Thomas Midgley's drawings of his three fibre types, A, B and C

breaking new ground.

His initial thoughts were that the textiles were all linen, but by the time that the excavation report was going to press, he had added a note that some of them might not be flax and that he would need to examine more early material before he could say something more definite (Midgley 1928). He had no doubts about the Fayum Neolithic piece of cloth which Gertrude Caton Thompson sent to him in 1926, which was quite clearly linen, but this had been found in a granary and its fibre structure was superbly preserved in comparison to the Badarian specimens from burial contexts.

The late 1920s and early 1930s were an exceptionally busy time for Thomas in textile research. In 1928 Thomas received from James Starkey, who had been in contact with him, all of the textiles which had been discovered during Starkey's work in 1924 and 1925 for the University of Michigan expedition at the Graeco-Roman town site of Karanis. This amounted to over 4,000 textiles which Thomas was asked to examine and he had to obtain the agreement of the museum's committee to do this work. It was a big task and he completed an inventory of which one copy went to Ann Arbor in Michigan and the other was kept in Bolton. He took or had done micro-photographs and he was allowed to keep for the Chadwick Museum a selection from the textiles. He chose about three hundred, and these undoubtedly included examples of all the representative and key pieces and he managed to catalogue these into the collection in 1930.

However, Guy Brunton under the auspices of British Museum Expeditions to Middle Egypt had been excavating at Mostagedda and Matmar, had discovered textiles of more or less all dates but also Badarian and Predynastic and naturally was anxious for Thomas to provide reports on them. The material from Badari had revealed evidence of selvedges and thus important details about early weaving and Thomas had hoped that more examples would become available for study. There was certainly, in terms of samples, far more to look at from Mostagedda, but the work was slow and took him rather longer than he expected. The earlier and indeed some later textiles and their fibres and the matting were not in good condition, he had difficulty in preparing slides and in the end was rather puzzled about the fibres. He determined three types of fibre, which he called Types A, B and C (fig.21) and found these in the Badarian cloth, the Predynastic, most of the material dated to Dynasties IV - X and generally from the Pan-graves (Midgley 1937a). There was very little Predynastic and Protodynastic material from Matmar but Midgley categorised this into his fibre types (Midgley 1948).

Brunton had hoped for something more concrete about the fibres in the Mostagedda volume and Thomas had hoped to provide this but perhaps he felt reluctant to commit himself in print when more work might be helpful. Time ran out for the Mostagedda publication, although it did not actually appear until 1937. Finally through Oliver Myers he was asked to look at material from cemeteries at Armant and the Bucheum, which he catalogued into the collection in 1932. His reports include his usual details on weave and yarns, but they show his frustration at being faced yet again with material that he consistently described as fragmentary or decomposed and which was not going to assist conclusively in fibre identification (Midgley 1934, 1937b). It is clear that he thought that Fibre type A was hemp, but he gave few clues about types B and C. Mostagedda fabrics are being reinvestigated and are still difficult to examine and identify. It is thought that type C is probably flax, which Thomas might have thought of as being coarser than he would expect.

The work of the Midgleys was a long time ago, but it was admirable and set a high standard in procedures. However, it came to an end when Thomas retired in 1934, receiving considerable accolades in a local press report, although no photograph was published as personally he appears to have been unassuming and certainly camera-shy. He went to live in Ludlow in Shropshire, where he became involved in local affairs, published nothing further on Egyptian textiles and died in Ludlow in 1953.

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'Weaving Clothes to Shape in the Ancient World' 25 years on: Corrections and Further Details with Particular Reference to the Cloaks from Lahun.

Introduction

My article, 'Weaving Clothes to Shape in the Ancient World: The Tunic and Toga of the Arringatore', was published in *Textile History* in 1982 (Granger-Taylor 1982). In this I took as my starting point a late Etruscan bronze sculpture known by the Italian name, Arringatore. I explained the construction of his garments - a toga and a sleeveless tunic - in terms of the techniques found on excavated textiles.

Since 1982, many more textiles have been discovered, in particular several important groups dating from around the late 1st century CE found in the Eastern Desert of Egypt (at Mons Claudianus, Maximianon and Krokodilo, Myos Hormos/Quseir al-Qadim, Didymoi and Berenike (Cardon 2003; Cardon, Granger-Taylor forthcoming; Handley 2004; Mannering 2006; Wild 2006). Meanwhile other textiles already above ground in 1982 have been studied or reinvestigated (Schmidt-Colinet, Stauffer, Al-As'ad 2000; Sheffer, Granger-Taylor 1994). Though the number of complete objects dating from before the Christian period remains small (most of the new finds are fragments from rubbish heaps), the new evidence amply confirms the existence in Classical Antiquity of the convention of 'weaving to shape'. In addition to textiles with shaped outlines (the majority from cloaks and sleeved tunics), we now have textiles dividing into two layers (identified by me as from cloaks, loincloths and leg-wrappers) and even one item woven in the round like a basket (this last, from Didymoi in Egypt, is a kind of hat - the weft pile, inside and out, suggests that it was used as a helmet liner (Cardon 2002, 42, fig 2)).

Time has also proved the usefulness of comparing archaeological finds with depictions of clothing and other textiles in art. Bronze portrait sculpture, of which the Arringatore is a particularly fine example, can now be recognised as a special case, since it has been shown that actual textiles were used when making moulds for the bronze casting (Christman 1987; Granger-Taylor 1987). We could therefore see the Arringatore's clothing not merely as a representation but what might be called a 'recording', preserving the surface morphology of clothes very similar to those he would have owned (because they had to be coated with wax, old and worn examples are likely to have been used in this process, rather than the well-maintained wool garments the Arringatore would doubtless normally have worn).

Correction a): the outline of cloaks from Lahun, now in Philadelphia

Togas were woven to shape as an elongated semi-circle. No published textile can be identified with certainty as from a toga, but the basic principles of the toga's construction are shared with the Roman semi-circular cloak and later variations of this. The cloaks from Lahun discussed here in fact have some cutting in their construction, around the area of the neck. But as the diagrams show, they were first woven to shape in the traditional manner. (A toga is a draped garment, worn without fastenings. A cloak is here defined as an enveloping outer garment either held by a brooch or sewn together with a short or long seam.)

A wonderfully-complete garment discussed in my 1982 article is a hooded cloak now in University Museum, Philadelphia. This is of wool, dyed brownish yellow, in a heavy weft-faced 1:2 twill weave. It has a long seam up the front and is an example of the variation of the Roman semi-circular cloak which had become common around the 4th century CE and which came to be known in Latin as *casula*, or 'little house' (Wilson 1938). The diagram (fig.22) shows that here the semi-circle has a two-tier rectilinear extension forming the upper shoulder area and hood.

The cloak in Philadelphia is part of a group of textiles given to the University Museum by Mrs John Harrison in 1895. Mrs Harrison was a sponsor of the British archaeologist William Flinders Petrie. Petrie, in a letter to the University Museum, states that he had bought the textiles at Lahun, in the Fayum district of Egypt, during the winter of 1884-5 and that they date to around 600 CE (letter to Sarah Yorke Stevenson, 12/10/1895, University Museum Archives, Egyptian Curatorial File 1/5,

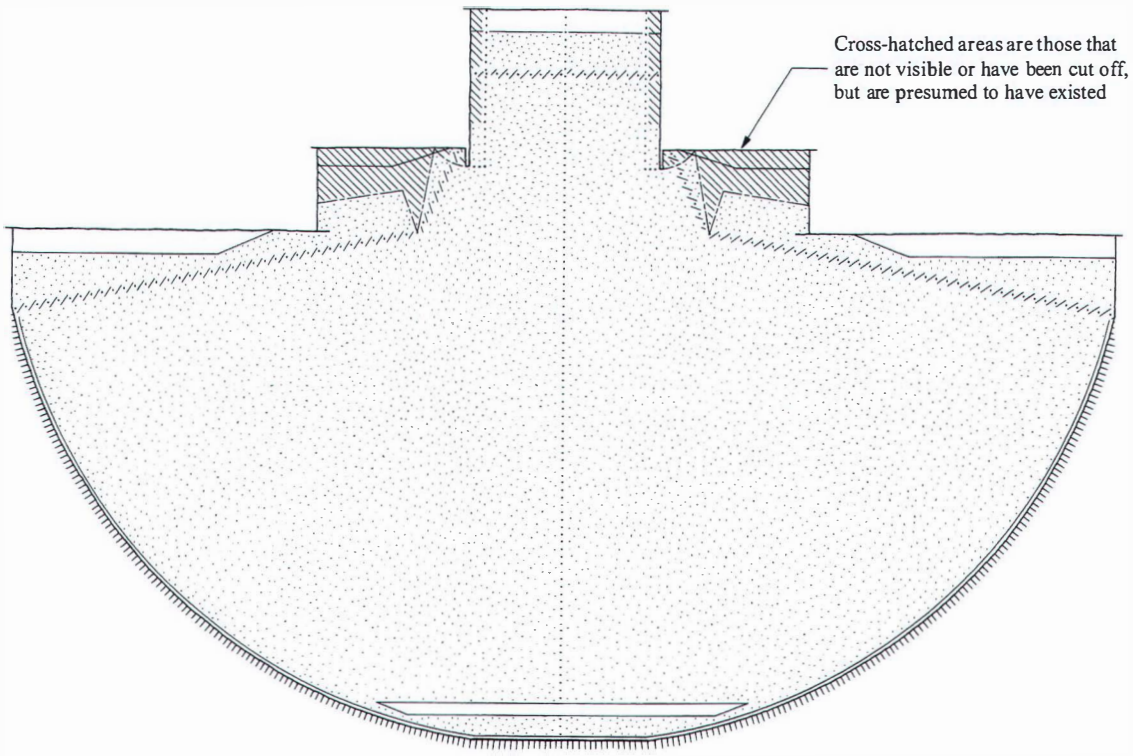

Fig.22 Hooded cloak from Lahun, Egypt. The University Museum, University of Pennsylvania, Philadelphia, E.16803. Outline as woven, length c.198cm, width c.300cm. (Drawing: James M Farrant after Hero Granger-Taylor)

quoted in an unpublished research paper by Michael F Bazinet (Bazinet 1987, 1)). Petrie himself had excavated at Lahun in 1889-90; he chose to use the names 'Kahun' for the Middle Kingdom town and the full Arabic name 'Illahun' for the later settlement (Petrie 1891). As Rosalind Hall (now Janssen) has written, one of the few facts recorded by Petrie about the Christian cemetery at Lahun is that he found there a coin of the Byzantine emperor Heraclius (610-641 CE) (Hall 1982, 42; cf Pritchard 2006, 2-8).

I had been able to study the cloak in Philadelphia in 1980, but did not have a photograph of the whole object. The first correction to be made to my 1982 article is the outline plan of this cloak, which is here shown in a new diagram (fig.22). The photograph eventually obtained (fig.23) shows that the outline of the body of the cloak is more rounded and deeper than drawn in 1982. The diagram has been adjusted accordingly, increasing the distance between the bottom of the hood and the hem from *c.*140cm to *c.*155cm.

I returned to University Museum, Philadelphia in 1989 and on this second visit the cloak which I had originally studied, E.16803, was on display and so inaccessible. But I was able to examine a smaller cloak from Lahun, E.16840 (fig.24). This example is only half-complete (it has been torn from top to bottom to one side of the hood) but because most of the stitching has been removed, the woven outline is easier to record than on the intact large example. In particular, it is possible to see on E.16840 that there is a short woven slit at the upper 're-entrant' angle (figs.25, 26). Although on the larger cloak both upper re-entrant angles are hidden under a lining, by analogy it became clear that there must have been slits here, too, as on the smaller cloak. I have therefore inserted slits of 5cm into the new plan of the larger cloak, fig.22; making this change required the whole hood area of the cloak area to move downwards also by 5cm, an adjustment which I am sure corresponds to reality.

The lower re-entrant angles on the cloaks do not have a slit and in this area the plan in fig.22 remains as originally drawn. These lower angles are in fact visible on the inside of this larger cloak, on either side of the main seam (on the smaller cloak in figs.25

Fig.23 Hooded cloak E.16803. The cloak as it survives, viewed from the side. (Photo: The University Museum, University of Pennsylvania, negative S8-31697).

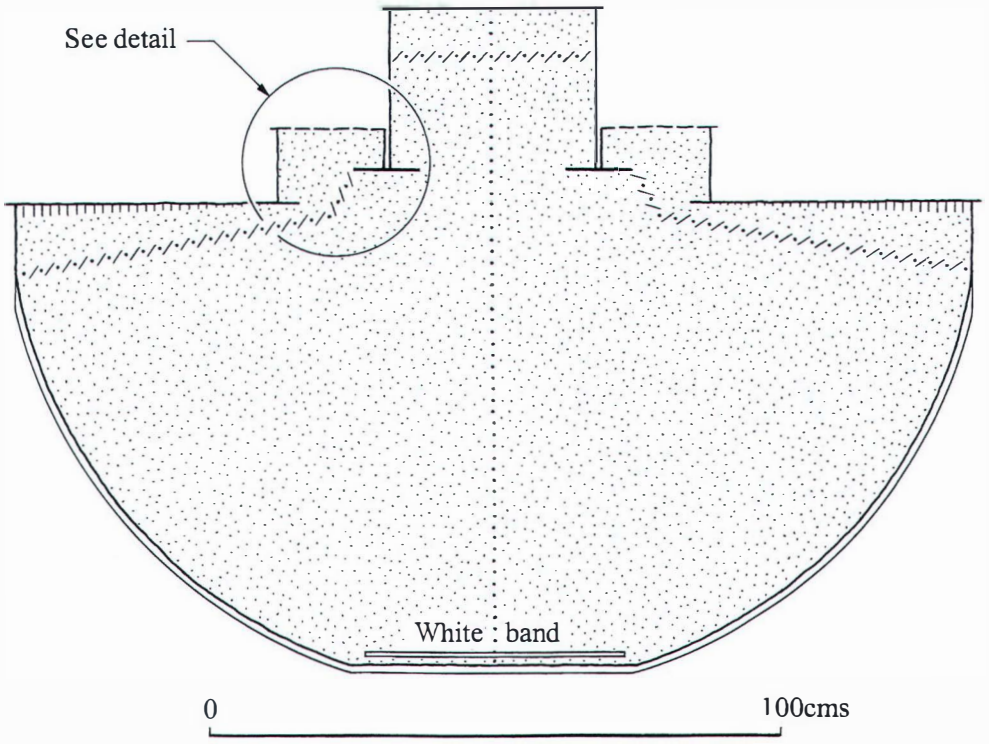

Fig.24 Child's hooded cloak from Lahun, Egypt. The University Museum, University of Pennsylvania, Philadelphia, E.16840. Outline as woven, length c.116cm, width c.167cm. (Drawing: James M Farrant after Hero Granger-Taylor)

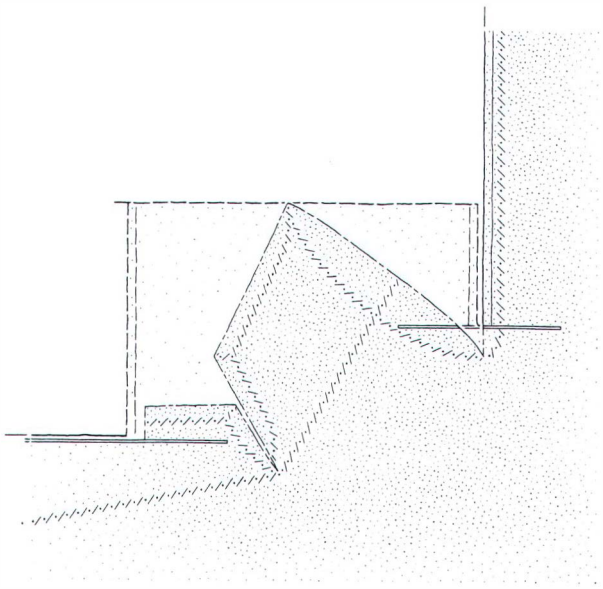

Fig.25 Child's hooded cloak E.16840, detail of the upper re-entrant angle, to the left of hood. (Drawing: James M. Farrant after Hero Granger-Taylor)

and 26 the selvedge at this angle has been cut away). The structure of these angles is in principle very similar to underarm angles with starting borders occurring on sleeved wool tunics from Egypt. In the catalogue of Frances Pritchard's recent exhibition at the Whitworth Art Gallery, Manchester (Pritchard 2006), fig.5.2 is a close-up of the same angle on another Lahun cloak fragment in 1:2 twill; we see here clearly how the threads forming the starting border are carried on into the web as twining (in this example also the selvedge has been cut away). This detail can be directly compared to fig. 4.36.c in the same catalogue, an excellent close-up photograph of an underarm angle with starting border on a sleeved tunic from Lahun. In Antoine De Moor's 1993 catalogue of Coptic textiles, invaluable diagrams based on analysis by Daniël De Jonghe and Chris Verhecken-Lammens show in detail how these angles were woven on wool tunics (De Moor 1993, figs.9 and 10: it should be noted that the

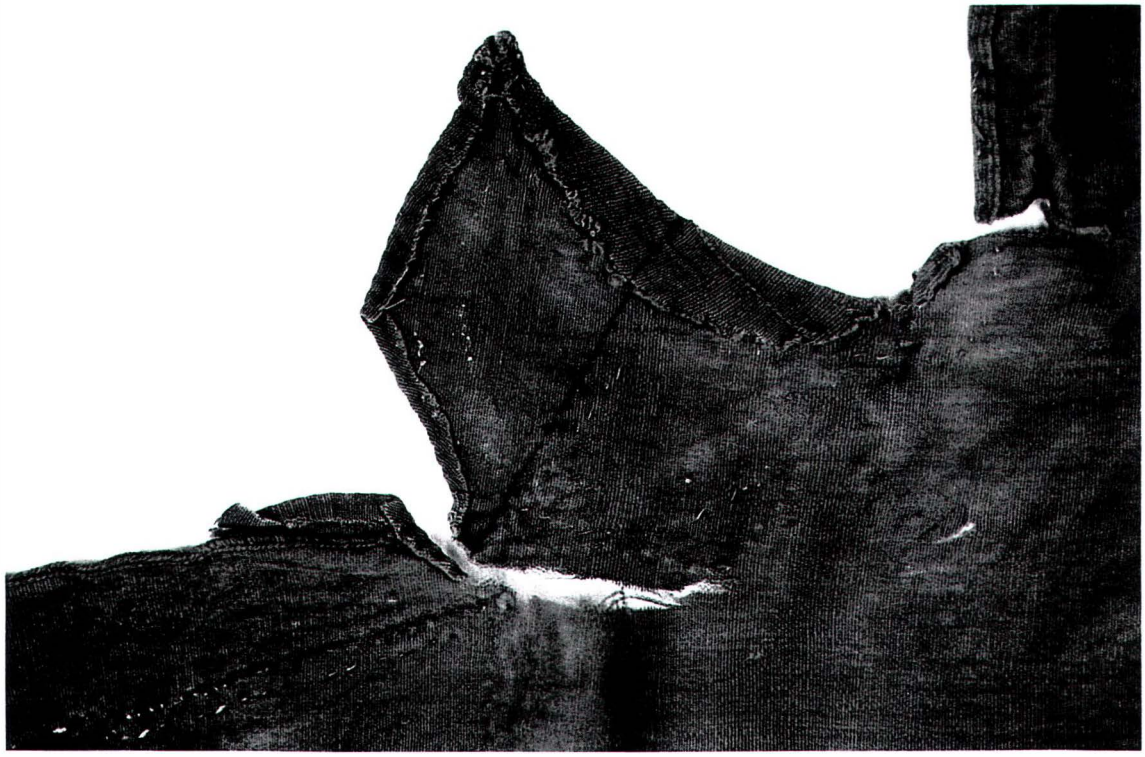

Fig.26 The same area of E.16840 as in Fig. 25. (Photo: Hero Granger-Taylor.)

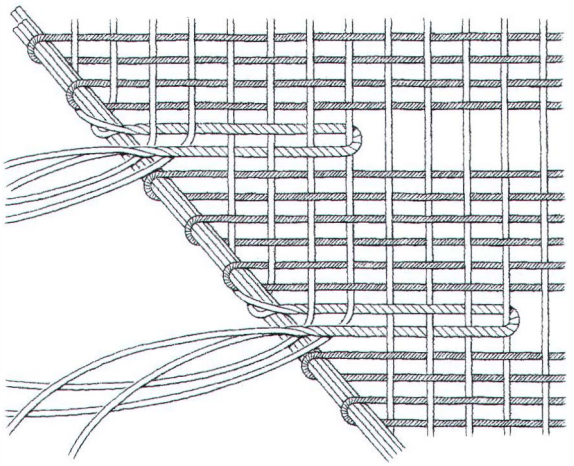

Fig.27 Fragment of cloak, British Museum EA 68977. Diagram of the curved selvedge, viewed from the inside of the cloak, before the formation of the closing cord. (Drawing: James M. Farrant after Hero Granger-Taylor)

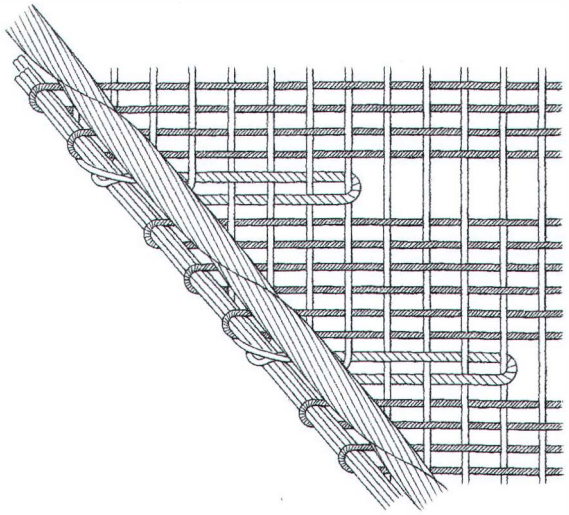

Fig.28 As fig.27, with the closing cord in place.

Philadelphia at this point, the warp threads, instead of re-entering the web, are formed into a horizontal plait and then into a closing cord (Pritchard 2006, 120, fig.5.4).)

Another fragment of cloak from Lahun, of a very different texture, also has a curved selvedge but with the warp threads here finishing in a fringe rather than a closing cord (fig.29). This is a large piece still in the collection of the Petrie Museum of Egyptian Archaeology, University College London, UC 7495, published by Rosalind Hall (Hall 1982, 40-42; Hall 1980). The unusual appearance of this textile is due to the materials, which are not wool, but linen in the warp and a fine goat-hair (mohair) in the weft. The details of the formal identification of these fibres are given by Hall. The red dye on the linen warp was analysed in 1990 by Dr.Vincent Daniels, then of the British Museum, with the result as follows: 'Purpurin was the main component with lesser amounts of alizarin. Madder (*Rubia tinctoria*) could have been used'. (Unpublished report no.1990/33, British Museum Department of Conservation.) The linen yarn is S-spun. The mohair is very yellow in appearance and was perhaps also dyed. It is loosely Z-spun.

The open structure of this textile makes the technique relatively easy to read. As with the British Museum fragment, warp threads are cast off at intervals in groups as the weaving of the curve progresses. In the part of the curve studied by me, the number of warp threads cast off at one time is 12. These twelve threads are divided into two and the six from the back of the shed cross over the other six and are carried into the web for a short distance before turning back in the same shed and exiting at the selvedge. Given the open nature of the ground weave in this case, these warp-cum-weft threads form a clearly visible feature, a kind of truncated self-band, 5.5 to 6.5cm long.

As the six threads re-emerge at the selvedge, they are firstly Z-twisted on themselves and then S-twisted together with another six threads which have also first been Z-twisted on themselves. The narrow cord formed in this way is knotted at the end and left to hang loose, becoming part of a well-spaced fringe, *c.*10cm long where intact.

As can be seen in the photograph in fig.29, the two groups of six threads coming together to form one cord or fringe element are not the original group of 12 dropped threads. Rather, six threads are those re-emerging from the web while the other six are threads that have been left hanging loose, but at one level up. Thus when these two groups are each Z-twisted on themselves, they are about 1cm apart. They therefore float a short distance through

Fig.29 Detail of cloak fragment of linen and mohair from Lahun. Petrie Museum of Egyptian Archaeology, University College London, UC 7495. (Photo: Hero Granger-Taylor)

space before coming together to form the final S-twisted cord.

This procedure repeats around the curve of the Petrie fragment, the number of warp threads being dropped at one time being adjusted to the angle of the curve (towards the bottom, the number becomes 16 to 18 rather than 12).

While discussing the Lahun finds, it is worth just considering whether or not the fragment at the British Museum, apparently without provenance, might not also be from Lahun. It is associated with a small group of wool textiles in the Department of Egyptian Antiquities at the British Museum, unnumbered when first seen by me in 1979. These are comparatively plain and solidly woven, characteristics we have come to recognise in finds from the Fayum. It is possible that, although unregistered, these were part of a group of material from Lahun given to the Department of Greek and Roman Antiquities at the British Museum in 1890 (that is, immediately after Petrie's excavation there in the winter of 1889-90). The donor of this material was Jesse Haworth, another sponsor of Petrie and a Manchester merchant. Haworth was the original donor of some of the Whitworth Art Gallery's Lahun textiles (Pritchard 2006, 4). The next step will be to see whether fragments in the British Museum group can be matched with textiles known to have come from Lahun.

The British Museum cloak fragment, with its high standard of production and its very carefully woven curved selvedge, appears to be earlier than the cloaks and cloak fragments in Philadelphia and Manchester, perhaps 4th-6th century CE. But once again, a difference in date may be explained if it had been found in a different part of the Lahun cemetery, where the burials had taken place earlier.

Other corrections to the article

Figure 7 in my 1982 article shows the whole of the wool tunic from Dura as it survives, not just the bottom corner as stated on p.7. On pp. 8-9, fig.9 is on the left of page and fig.10 is above the two captions. On p.14 some text has been repeated and other text left out. On p.14, the first paragraph should read as follows: 'On the togas of the Ara Pacis (fig.16) loops are clear on both front and back corners and indications of loops or knots are seen on togas in much later stone sculpture. Fig.17, a detail of an Etruscan stone cinerary urn of the late 3rd to early 2nd century BC shows a starting border, also apparently of the same method as that on the Philadephia cloak and which, like the cloak, ends in two simple knots.[40] And again the ends of starting borders are visible on the corners of some of the figures from Lavinium.[41]'

On p.15, the photographs are reversed, as described above. On p.18, fig.23, like fig.20, is based on a false principle: the extra warp threads forming the internal selvedges would have been carried on some distance into the web and then themselves finished off (or started) as twining; any additional twined reinforcement across the end of the opening would have been worked as finger-looping, with both rows of twining formed simultaneously.

Fig.26, the diagram of the Moroccan *selham*, is correctly drawn but the material is in fact black wool, not goat-hair (Rabate, Sorber 2007. In 2004, Frieda Sorber was able to commission and record the weaving of such a cloak at Tazenakht. We look forward to the publication of her study.).

Fig.24, the diagram of the Arringatore's toga, I believe to be still correct in principle. Only one detail should perhaps be adjusted, the line of twining towards the bottom of the curve. On the statue, this is shown as a discontinuous double row of twining. In reality, I now believe, the twining would have reached as far as the outer edge of the toga, but would have been double in the central section only. A comparison with the British Museum fragment and the Moroccan *selham* suggests that the twining was formed by the bundle of threads used to form the selvedge which in the case of the Arringatore's toga was not carried on to the very bottom of the garment, but was discontinued *c.*10cm above this level; I believe these threads were then brought into the centre of the web as twining.

Earlier examples of curved selvedges

Curved selvedges are still rare among surviving textiles and at present I know of only three besides those on the Lahun cloaks, the British Museum fragment and those I presume to be on the cloak from Antinoë. These three are all from the site of Didymoi, a fort in the Eastern Desert of Egypt to the south-east of Coptos, and all date to the late 1st century - early 2nd century CE. These finds will be published soon by Dominique Cardon and myself (Cardon, Granger-Taylor, forthcoming). In each case the selvedge occurs on an off-cut from a cloak. The most complete is a solid but relatively fine weft-faced tabby in undyed wool, D.1999.3329.8. The structure here is simpler than on the examples just discussed: there is no reinforcing bundle of warp threads and the cast-off warp ends are not carried into the web as weft. Instead, the cast-off threads are simply twisted into a closing cord. Because the angle of the curve is relatively upright on D.1999.3329.8, the distance between points where warp ends are cast-off are correspondingly well spaced, and between these points the cord originally floated parallel to the selvedge but not attached to it. This is an obvious structural weakness, and most of the cord has broken away or now hangs loose.

On the second example, D.2000.1562.1, the closing cord has been lost altogether. This fragment is light orange in colour and again in tabby weave. In this case the weave is not particularly dense and without the presence of the curved selvedge we would not have known for certain that the source was a

cloak.

The third example, D.1999.3327.1A, is a fragment of fine dark blue ribbed twill, the ribs running in the weft direction. Here, the dropped warp threads form a twisted fringe rather than a closing cord.

In these last two examples, where there is no closing cord, the selvedge was at first missed by us. We now look carefully at all cloak off-cuts hoping to find more curved selvedges and we urge colleagues working on similar material to do likewise. In this way the mysteries of ancient 'weaving to shape' will gradually become better understood.

Acknowledgments

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Review

Textiles and Architecture (Egypt, 1st Millennium AD): Workshop of the Study Group 'Textiles from the Nile Valley', Katoen Natie, Antwerp, 6-7.10.07

The fifth weekend workshop of the study group 'Textiles from the Nile Valley' took place on 6-7.10.07, once again at the HeadquARTers of Katoen Natie, by kind invitation of Mr F. and Mrs K. Huts and organised by Prof. Dr. Antoine De Moor and Dr Cäcilia Fluck. Participants, about 45 in number, came from America and New Zealand, as well as from Europe, from Scandinavia to Spain. In addition to the wonderful gallery of Egyptian tunics viewed on the last occasion, a new gallery has now been opened of Islamic and Sassanian textiles, which participants inspected with great interest.

The highlight of the opening reception on Friday evening was the presentation, hot from the press, of the volume of papers from the fourth workshop, *Methods of dating ancient textiles of the 1st millennium AD from Egypt and neighbouring countries*, an impressive work, fully illustrated in colour throughout (see p.37 for details). Both the editors and publishers were congratulated in person on the speed and quality of its appearance.

The fifth workshop took as its theme 'Textiles and architecture'. After a brief general introduction on Saturday morning, a paper was read for P. Grossman on the late antique architecture of Egypt, particularly the development of church architecture, with reference to the opportunities it provided for furnishing textiles. There followed two papers on the written sources. Prof. W. Clarysse discussed the papyrological sources for furnishing textiles, noting the problems of Greek and Roman vocabulary, where the terms tend not just to be vague, but to change in meaning over time; G. Helmecke illustrated the information obtained from Islamic sources and miniatures. The focus then turned to the textiles themselves. C. Verhecken-Lammens discussed the technical aspects of linen fabrics with pile, with a splendid collection of examples of the different types from the Katoen Natie collection laid out to view. Subsequent papers covered furnishing fabrics (including cotton) recently excavated at Kellis in the Dakleh Oasis (R. Livingstone), textiles in the collection of the Coptic Museum in Cairo (C. Nauerth) and in Spanish collections (A. Cabrera, L. Turell), a discussion of decorated cushions and how they might be recognised (A. Paetz gen. Schieck), and of the nature of wall-hangings, which, unlike other furnishing textiles, survive more frequently than the artistic representations of them (S. Schrenk). Finally, R. Rosenthal-Heginbottom discussed the curtains depicted in artistic representations of synagogues and their fittings, questioning whether they were authentic or merely symbolic.

After a paper on Coptic textiles in the Museum of Culture in Basel, in particular on a tunic showing decoration depicting figures in an arcade, the focus on the Sunday turned to current research: textile evidence from excavations of monastic buildings and cemeteries at Sharuna (B. Huber), a query

Fig.30 Mr and Mrs Huts (left and right) welcome participants in the fifth workshop to Katoen Natie and congratulate the editors and publishers of the volume arising from the previous meeting. (Photo: Bruno Vetters)

on the origin of two Mediaeval silks, possibly Egyptian (M. Erikson), and two papers devoted to on-going scientific research which raised important questions. J. Wouters' analyses of the composition of red, blue and purple dyes in Roman and Coptic Egyptian textiles suggested regular use of multiple biological sources, not least in the production of red and purple dyes, while A. Verhecken's classification of spindle whorls, by their 'moment of inertia' rather than simply by weight or dimensions, suggested a functional difference between Pharaonic whorls and not just later Egyptian whorls, but also contemporary whorls from neighbouring regions.

Great credit is due to the organisers, Prof. De Moor and Dr. Fluck, for the smooth running of this highly successful conference. It is planned to publish the papers in similar format to the last. Warm thanks are due, once again, to Mr and Mrs Huts for their hospitality and support for publication. Their kind invitation to return to Katoen Natie for a third workshop was received with acclaim.

Felicity Wild

Resources

Recent Publications

Boersma, F., *Unravelling Textiles*, Archetype, London 2007

Larsson Lovén, L., *The Imagery of Textile Making: Gender and Status in the Funerary Iconography of Textile Manufacture in Roman Italy and Gaul,* University of Göteborg 2002

Müller, M., 'Baumwollfaser und Malventuch in Abgrenzung zu anderen Rohstoffen', *Archäologisches Korrespondenzblatt* 37, 2007, 247-256

Peek, C., A.Siegmüller, 'Kostbarkeiten aus dem Norden? Neue Überlegungen zur Identifizierung Friesischer Tuche', *Archäologisches Korrespondenzblatt* 37, 2007, 283-296

Reifarth, N., W-R.Teegen, N.Boehnke, J.Wiethold, 'Das spätantike Grab 279 aus St Maximin in Trier. Textiltechnologische, anthropologische und archäobotanische

Untersuchungen', *Funde und Ausgrabungen im Bezirk Trier* 38, 2006, 58-70

von Rummel, P., *Habitus barbarus: Kleidung und Repräsentation spätantiker Eliten im 4. und 5. Jahrhundert,* Berlin, 2007

Shamir, O., 'Textiles and garments from Qumran - Chalcolithic and Roman periods' in: J.Gunneweg, C.Greenblatt, A.Adriens (edd), *Bio- and Material Cultures at Qumran,* Stuttgart 2006, 285-296

Shamir, O., 'Loomweights from En-Gedi' in: E.Stern (ed), *En-Gedi Excavations I: Final Report (1961-1965),* Israel Exploration Society, Jerusalem 2007, 381-390

Shamir, O., 'Organic materials' in: D.T.Ariel *et al.* (edd), *The Dead Sea Scrolls,* Jerusalem 2007, 116-134

Shamir, O., 'Textiles, cordage and threads from En-Gedi' in: Y.Hischfeld, *En-Gedi Excavations II: Final Reports (1996-2002),* Israel Exploration Society, Jerusalem 2007, 587-594

Shamir, O., A.Baginski, 'Golden threads in antiquity' in: *Shimmering Gold: The Splendor of Gold Embroideries,* Eretz Israel Museum, Tel Aviv 2007, 43

Stauffer, A., *Antike Musterblätter: Wirkkartons aus dem spätantiken und frühbyzantinischen Ägypten,* Reichert, Wiesbaden 2007

Scherping, R., J-P.Schmidt, 'Seide im Norden - die Textilreste am älter-bronzezeitlichen Halskragen von Thürkow, Lkr. Güstrow (Mecklenburg-Vorpommern)', *Archäologisches Korrespondenzblatt* 37, 2007, 207-220

Vandenabeele, P., H.G.M.Edwards, O.Shamir, J.Gunneweg, L.Moens, 'Raman spectroscopic study of archaeological textile samples from the "Cave of Letters"' in: J.Gunneweg, C.Greenblatt, A.Adriens (edd), *Bio- and Material Cultures at Qumran,* Stuttgart 2006, 131-138

Walton Rogers, P., *Cloth and Clothing in Early Anglo-Saxon England AD 450-700,* CBA Research Report 145, York 2007

Wild, J.P., F.C.Wild, 'Textiles' in: S.E.Sidebotham, W.Z.Wendrich (edd), *Berenike 1999/2000: Report on the Excavations at Berenike, including Excavations in Wadi Kalalat and Siket, and the Survey of the Mons Smaragdus Region,* Cotsen Institure UCLA, Los Angeles 2007, 225-227

Conference Proceedings

Gilles, C., M-L.B.Nosch (edd), *Ancient Textiles: Production, Craft and Society: Proceedings of the First International Conference on Ancient Textiles held at Lund, Sweden, and Copenhagen, Denmark, on March 19-23, 2003,* Oxbow, Oxford 2007

De Moor, A., C.Fluck (edd), *Methods of Dating Ancient Textiles of the 1st Millennium AD from Egypt and Neighbouring Countries: Proceedings of the 4th Meeting of the Study Group 'Textiles from the Nile Valley', Antwerp 16-17 April 2005,* Iannoo, Tielt 2007
[ISBN 978 90-209-70982]

Rast-Eicher, A., R.Windler (edd), *NESAT IX: Archäologische Textilfunde - Archaeological Textiles: Braunwald 18.-21.Mai 2005,* Ennenda 2007 (to order see below)

(The above volumes contain a vast number of papers on archaeological textiles, too many to enumerate separately here.)

Dissertations

Camilla Louise Dahl has received a master's degree at the Department of History, The Saxo Institute, University of Copenhagen with the work: *'Strigle, glissing, skaut': Terminologiske undersøgelser af genstandsfeltet 'hovedbeklædning' samt typologiske angivelser deraf i skriftlige kilder fra ca. 1200-1600, med særligt henblik på komparative studier af dragtforskningens terminologiprojekter og termanvendelsen i samtidige kilder.*

Ulla Viklund has received a master's degree at the Department of Archaeology and Religious Studies, Norwegian University of Science and Technology, Trondheim, with

the work: *Towards a Cosmology of Colours - Roman Textiles from Mons Claudianus. A Methodology of Approaching Meaning of Colours in Ancient Textiles.*

Hanna Zimmerman has been awarded a doctorate at the University of Groningen for her work: *Textiel in context: Een Analyse van archeologische Textielvondsten uit 16e-eeuws Groningen.* (The volume was published in Groningen in November 2007: ISBN 978 90-77957-08-0)

NESAT IX: advertisement

Copies of the proceedings of the Ninth Symposium of the North European Symposium for Archaeological Textiles (Braunwald 2005) (edd. Rast-Eicher, Windler) [ISBN 978 3-033-01267-7] can be ordered direct from Dr.A.Rast-Eicher (*archeotex@bluewin.ch*) at a cost of 48.00 Swiss francs (plus postage of SFr.5 for CH, SFr.11 for Europe, SFr.16 for USA). Prepayment for the order should be made to: Raiffeisenbank Glarnerland, CH-8752 Näfels, account no. 25485.12 (Antoinette Rast-Eicher, NESAT) (BC 81031; IBAN CH69 8103 1000 0025 4851 2; SWIFT RAIFCH22). All bank charges must be prepaid by the customer. No cheques can be accepted. Alternatively, orders may be directed to the online bookshop: www.lesestoff.ch/fulldisplay?ISBN=9783033012677.

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From spring 2008 the Centre for Textile Research in Copenhagen University (CTR) is taking over the publication of the *ATN*. In order to secure the future academic and legal continuation of the *ATN* CTR has set up the society "Friends of Archaeological Textiles Newsletter", which starting in 2008 will be the platform for the publication of the *ATN* and dissemination of the current research and information on archaeological textiles. All old and new private subscribers to the *ATN* will automatically become members of the Society and thereby receive the newsletter. Institutions may subscribe to the ATN, without membership in the Society, at a special price.

In order to make the transition from paper-based to electronic and computerised administration of the *ATN* easier, we kindly ask the present subscribers to send an e-mail to the new Corresponding Editor, Margarita Gleba, at <margarita@atnfriends.com> stating that they are a subscriber to the *ATN*. We need the e-mail address to facilitate future communication and renewal notices.

From 2008 subscription-paying and most communication will only be possible electronically. It is necessary to raise the membership fee for 2008, but the fee level will subsequently be adjusted to the cost of production. In the future, we plan to offer *ATN* in an electronic format.

The new membership fee to the Society "Friends of Archaeological Textiles Newsletter" for *private individuals* is €20 per year and the new subscription fee for *Institutional Members* is €30 per year. All previous payments will be honoured. The membership fee is for one year, but it is possible to pay for several years in advance. Please note: we can no longer accept cheques or cash – all payments are to be made via the secure website. To become a member of the Friends of Archaeological Textiles Newsletter and/or to receive the *ATN*, please visit:
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4. References should follow the Harvard System (e.g. Smith 2007, 56), with bibliography at the end.
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