XII

NESAT

Nordeuropäisches Symposium für archäologische Textilien

North European Symposium for Archaeological Textiles

21st - 24th of May 2014

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NESAT Nordeuropäisches Symposium für archäologische Textilien
North European Symposium for Archaeological Textiles
Hallstatt 2014

21st – 24th May 2014
Hallstatt (Austria)

naturhistorisches museum wien

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Team guided tours

Excursion Block 1: Hallstatt High Valley (Salzbergtal): salt mine (Salzwelten Hallstatt) and cemetery
Hans Reschreiter, Anke Bacher, Daniel Brandner, Fiona Poppenwimmer, Hans Rudorfer

Excursion Block 2: Hallstatt town highlights (including ossuary)
Hallstatt Tourismusbüro
Luzia Gamsjäger, Austrian Guides
Museum Hallstatt: Seestraße 56, 4830 Hallstatt
Guide textile finds: Helga Rösel-Mautendorfer

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Tablet woven border from the salt mine Hallstatt (HallTex123), 800-400BC, © NHM Vienna

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North European Symposium for Archaeological Textiles
Nordeuropäisches Symposium für archäologische Textilien

founded by Lise Bender Jørgensen and Klaus Tidow

Since 1981, the North European Symposium for Archaeological Textiles (NESAT) has taken place every three years, and since then it has come to deal with finds from all parts of Europe. Among the participants are, among others, textile archaeologists, historians, art historians, natural scientists, conservators, craftspeople and self-taught persons. Thus, NESAT provides a unique forum for the discussion of textile archaeology from the perspective of various disciplines. This variety of topics and perspectives is also impressively documented by the published proceedings of previous NESAT symposia.

A Forum for an Interdisciplinary Exchange of Thoughts and Information

NESAT has always aimed at being a forum for the presentation of finds or topics that are currently being worked on and examined in the course of interdisciplinary research. Communication among textile researchers has become even more vivid since the launch of the **CTR** (Centre for Textile Research) at the University of Copenhagen and **DressID,** a European Union project researching how clothing and its wearers' identities relate to each other in the Roman Empire (coordination: Reiss-Engelhorn-Museen Mannheim). While the first NESAT symposia were still driven by a desire to intensify the exchange of thoughts and information between the small number of those interested in European textile archaeology, today's research and assessment of numerous finds and issues takes place across boundaries via frequent workshops and electronic media. Since particularly the aforementioned institutes and projects conduct in-depth international and interdisciplinary research, NESAT offers a tested and tried communication platform for those who work in smaller institutes or are not affiliated with any, i.e. those who by and large research and work on finds or topics in the textile archaeology field on their own.

Locations of Previous NESAT Symposia / *Bisherige Tagungsorte der NESAT-Symposien*

NESAT I	1981	Neumünster	Germany
NESAT II	1984	Copenhagen	Denmark
NESAT III	1987	York	Great Britain
NESAT IV	1990	Copenhagen	Denmark
NESAT V	1993	Neumünster	Germany
NESAT VI	1996	Göteburg-Borås	Sweden
NESAT VII	1999	Edinburgh	Great Britain
NESAT VIII	2002	Łodz	Poland
NESAT IX	2005	Braunwald	Switzerland
NESAT X	2008	Copenhagen	Great Britain
NESAT XI	2011	Esslingen	Germany

North European Symposium for Archaeological Textiles
Nordeuropäisches Symposium für archäologische Textilien

Das Nordeuropäische Symposium für archäologische Textilien (NESAT) findet seit 1981 alle drei Jahre statt und befasst sich mittlerweile mit Funden aus ganz Europa. Zu den Teilnehmern zählen u.a. Textilarchäologen, Historiker, Kunsthistoriker, Naturwissenschaftler, Textilrestauratoren, Handwerker und Autodidakten. So wird es möglich, textilarchäologische Themen von vielen Fachrichtungen aus zu beleuchten. Auch die publizierten Beiträge zu den bisherigen Tagungen dokumentieren eindrucksvoll dieses große Themenspektrum.

Forum für interdisziplinären Austausch

Das NESAT-Symposium hat sich stets als ein Forum verstanden, auf dem Funde oder Themen präsentiert wurden, die derzeit bearbeitet und interdisziplinär untersucht werden. Die Kommunikation unter den 'Textilern' hat seit dem Start des CTR (Centre for Textile Research) an der Universität in Kopenhagen und dem DressID , einem EU-Projekt zur Erforschung von Kleidung als Identitätsträgern im Römischen Reich (Koordination: Reiss-Engelhorn-Museen Mannheim) einen deutlichen Aufschwung genommen.

Stand hinter den ersten NESAT-Symposien noch der Wunsch, den Austausch der wenigen an Textilarchäologie in Europa Interessierten zu intensivieren, so erfolgt die Bearbeitung vieler Funde und Themen heute grenzübergreifend über regelmäßige Arbeitstreffen und elektronische Medien. Da besonders die eben genannten Einrichtungen eine intensive internationale und interdisziplinäre Forschung betreiben, bietet NESAT ein bewährtes Kommunikationsforum für diejenigen, die in kleineren Einrichtungen arbeiten oder keiner Institution verhaftet sind und weitgehend auf sich selbst gestellt textilarchäologische Funde oder Themen bearbeiten.

Venue Hallstatt / *Veranstaltungsort Hallstatt*

The NESAT XII symposium is organized by the Natural History Museum Vienna from 21st to 24th May 2014 in Hallstatt, Austria.
Since December of 1997 the region of **Hallstatt** has been honoured with a position on the UNESCO World Heritage list. This was primarily due to significant archaeological and speleological sites, and rare fauna and flora. The special significance of Hallstatt is based on its archaeological heritage: The salt mines of Hallstatt, exploited continuously for 3500 years and leading to cultural continuity dating back to the Middle Bronze Age, has resulted in the richness of the grave finds, after which an entire era has been named Hallstatt period. The glacier area of the Dachstein and the karst formations with the internationally known caves are of particular speleological interest. The lush flora and fauna are not typical and the unusual mountain landscape with the fjord-like lakes contribute very significantly to their importance. For visitors, of special interest are the **Hallstatt Museum** which was newly opened in 2002**,** the world famous ossuary of the catholic church and the salt mines.
In modern salt mines of Hallstatt (since 1311) traces of an older, prehistoric mining have been discovered repeatedly. There are three successive prehistoric mines, the Northern Group (1600-800 BC), the Eastern Group (800-300 BC) and the Western group (around the start of the Common Era). Of great importance are the finds from the salt mines, which were preserved in salt, particularly organic finds such as **textiles,** leather, fur, wood. Since these materials are few at other archaeological sites, especially the textile remains are of great importance.

Die 12. NESAT-Konferenz wird vom Naturhistorischen Museum Wien von 21.-24. Mai 2014 in Hallstatt, Österreich, abgehalten.
*Die Region **Hallstatt** wurde 1997 ins UNESCO Weltkultur- und -naturerbe aufgenommen. Ausschlaggebend dafür waren die bedeutenden archäologische und speläologischen Fundstätten, sowie die seltene Fauna und Flora. Die besondere Bedeutung Hallstatts beruht auf seinem archäologischen Erbe: Die Salzgewinnung in Hallstatt, deren dreieinhalbtausendjährige kulturelle Kontinuität bis in die mittlere Bronzezeit zurückreicht, hat den Reichtum der Grabfunde begründet, nach denen eine ganze Epoche den Namen Hallstattzeit erhalten hat. Die Gletscherregion des Dachsteins und die Karstformationen mit den international bekannten Höhlen sind von besonderem höhlenkundlichem Interesse. Die üppige Fauna und Flora sind untypisch für die bizarre Berglandschaft mit den fjordartigen Seen und tragen sehr wesentlich zu ihrer Bedeutung bei. Für Besucher ist vor allem das 2002 neu eröffnete **Hallstatt-Museum,** das weltberühmte Beinhaus der katholischen Pfarrkirche und das Schaubergwerk interessant.*
Im neuzeitlichen Salzbergwerk Hallstatt (seit 1311) hat man immer wieder Spuren eines älteren, prähistorischen Bergbaus entdeckt. Es handelt sich um drei aufeinander folgende prähistorische Bergwerke, die Nordgruppe (1600-800 v. Chr.), Ostgruppe (800-300 v. Chr.) und Westgruppe (um Christi Geburt).
*Eine herausragende Stellung haben die Funde aus dem Bergwerk, das sich hier durch die Konservierung im Salz auch organische Funde wie **Textilien,** Leder, Fell, Holz... erhalten haben. Da diese Materialien durch ihre Vergänglichkeit nur sehr selten an anderen archäologischen Fundplätzen entdeckt werden, haben vor allem auch die Textilreste für die Archäologie besondere Bedeutung.*

PROGRAM NESAT XII in Hallstatt

Wednesday 21. 05. 2014	**PAPERS, Culture- and Congress House Hallstatt**
08:30 - 09:00	Registration
09:00 - 09:30	Welcome by A. Scheutz, Mayor of Hallstatt and A. Kern, Director of Prehistoric Department Natural History Museum Vienna
09:30 - 11:00	**Session 1: Textile Research in Austria** Chair: John Peter Wild • K. Grömer: Textile Research in Austria • B. Nutz: Mining for Textiles - Textiles for Mining • J. Schramm, A. Fischer: Dressed with a Thousand Scales - The Find of a Roman *Lorica Squamata* in the Barbarian lands • I. Vanden Berghe, B. Nutz: Medieval Colors of Lengberg
11:00 - 11:20	Break – Coffee
11:20 - 12:40	**Session 2: Prehistory: Neolithic and Bronze Age Materials** Chair: Karina Grömer • L. Bender Jørgensen and A. Rast-Eicher: Hunting down the Earliest Wools in Europe • A. Grabundzija: Invisible Wool. Indirect Evidence from the 4th and 3rd Millennium South-eastern Europe • S. Harris: Folded, Layered Textiles from a Pit Pyre Excavated from Over Barrow, Cambrigdeshire
12:40 - 14:00	Break - Lunch • Presentation: Small Special Exhibition about Textile Finds from a Silver Mine in Carinthia
14:00 - 15:40	**Session 3: Prehistory: Bronze Age in Scandinavia** Chair: Lise Bender Jørgensen • U. Mannering: Costume and Textile Design in the Nordic Bronze Age • S. H. Fossøy: Seams and Embroidery on Bronze Age Costumes in Northern Europe • K. Wilson: Phenomenology of Prehistoric Clothing
15:40 - 16:00	Break – Coffee
16:00 - 17:30	**Session 4: Prehistory: Iron Age and Roman Iron Age** Chair: Margarita Gleba • A. Rast-Eicher, I. Vanden Berghe: Altrier - A New Look on the Textiles • J. Maik, A. Rybarczyk: Gewebe der Hallstattkultur aus Domasław in Niederschlesien • I. Demant: Textiles and Design in the Early Roman Iron Age of Western Denmark • U. L. Hansen: Textile Production in Late Roman Iron Age Denmark
17:30 - 19:00	Break
19:00	• Celebratory address: H. Reschreiter: Salt Mine Archaeology at Hallstatt

Thursday 22. 05. 2014	**Excursion**
	Excursion Block 1: Hallstatt High Valley (Salzbergtal): salt mine (Salzwelten Hallstatt) and cemetery
	Excursion Block 2: Hallstatt Town Highlights (including Ossuary), Hallstatt Museum
19:00	Buffet

PROGRAM NESAT XII in Hallstatt

Friday **23. 05. 2014**	**PAPERS, Culture- and Congress House Hallstatt**
09:00 - 10:50	**Session 5: Research History; Tools and Textile Production** Chair: Antoinette Rast-Eicher • M. Schwab: Schlabow gegen Stokar - ein früher Streit unter Forschern und dessen Hintergründe und Folgen • E. Harlizius-Klück: Against all Odds: Pure Science and Ancient Weaving • E. Andersson Strand: Textile Tools and Archaeology • T. Štolcová, J. Zajonc: Interdisciplinary Reconstruction of Weaving on the Warp-Weighted Loom in the Hallstatt Period
10:50 - 11:10	Break - Coffee • Poster Presentation
11:10 - 12:30	**Session 6: Tools and Textile Production** Chair: Elizabeth Barber • M. Gleba: Production and Consumption: Textile Economy and Urbanisation in Mediterranean Europe 1000-500 BCE • B. Klessig: Textile Tools from Viking Age Graves in Gothland, Sweden: a Preliminary Exploration • H. M. Sherman: Hedging on Archaeological Heckles: A Comparison of Tooth Blades from Novgorod with finds from York and Estonia • R. Rammo, A. Matsin: Textile Production in a Medieval Village in Siksälä (Estonia)
12:30 - 14:00	Break – Lunch
14:00 - 15:40	**Session 7: Early Medieval Grave Finds in Central Europe** Chair: Johanna Banck-Burgess • S. Desroiers: Chinese Silks in the Merovingian Graves of Saint-Denis Basilica? • I. Schneebauer-Meißner: Die Textilien und anderen organischen Reste der Männergräber des baiuvarischen Reihengräberfelds von Petting • Ch. Peek: Erste Ergebnisse textilarchäologischer Untersuchungen an organischen Materialien des Gräberfeldes von Lauchheim "Wasserfurche" • T. Niepold: Die Textilien des Herrn von Morken - Neubearbeitung eines alten Fundmaterials
15:40 - 16:10	Break - Coffee • Presentation by Britt Nowak-Böck, Helmut Voß: A standardised mapping system for organic remains on metal objects and in in–situ blocs
16:10 - 17:30	**Session 8: Early Medieval Garments from Bogs and Burials in Northern Europe** Chair: Marie Louise Nosch • S. Möller-Wiering: Runde Sache? Der Hunteburger Mantel A • G. M. Zink, A. Kwaspen: The Daetgen Trousers • H. Lukešová: Old Fragments of Women's Costumes from the Viking Age - New Methods for Identification • I. Žeiere: Surprising Discoveries in the National History Museum of Latvia
18:00	General Meeting of Friends of Archaeological Textiles Review

PROGRAM NESAT XII in Hallstatt

Saturday **24. 05. 2014**	**PAPERS, Culture- and Congress House Hallstatt**
09:00 - 10:50	**Session 9: Medieval and Early Modern Textiles from Mines and Settlements** Chair: Katrin Kania • C. Christiansen: Medieval Textiles and Fibres from a Lead Mine at Sillerholes, West Linton, Scotland • Alina Wilczyńska: Medieval Textiles from Wrocław Nowy Targ Square • T. Kaszab-Olschweski: "Fossile" Textilien
10:50 - 11:10	Break – Coffee
11:10 - 12:30	**Session 10: Medieval and Early Modern Funerary Dress and Headgear** Chair: Elizabeth Wincott Heckett • D. Grupa: Silk Liturgical Vestments excavated in the Parish Church of St. Nicolas in Gniew • S. Lipkin, K. Vajanto: Funerary Dress and Textiles in the 17th and 18th Century Burials in Oulu, Finland - Theoretical Considerations on Identity • C. L. Dahl, C. Rimstad: A Renaissance Woman´s Silk Cap from a Copenhagen Moat • J. Malcolm-Davies, H. Davidson, R. Frost: "He is of no account... if he have not a velvet or taffeta hat": A Survey of Excavated Sixteenth-Century Knitted Caps
12:30 - 14:00	Break – Lunch
14:00 - 15:40	**Session 11: Medieval and Early Modern Textiles with Gold, Silver and Silk** Chair: Frances Pritchard • E. Wincott Heckett: Gold and Silver Decorative Metal Laces in the 16th and 17th Centuries in Ireland and Europe • B. Nowak-Böck: A Hidden Treasure of Silver and Silk • G. M. Zink: The Reliquary of Starigrad, Oldenburg • M. Cybulska, E. Mianowska- Orlińska: Analysis, Reconstruction and Interpretation of two Early Medieval Silks from Kruszwica
15:40 - 16:00	Break – Coffee
16:00 - 17:40	**Session 12: Specific Analyses of Early Medieval-Medieval Textiles** Chair: Annette Paetz gen. Schieck • J. Galliker: Application of Computer Vision to Cross-Collection Characterisation of Historic Silk Textiles • D. Kohout, H. Březinová: An Assamblage of Medieval Archaeological Textiles from Prague: A Study of Current and Original Colours • I. von Holstein: Identifying Local and Non-local Textiles in Medieval Assemblages from around the Baltic and North Seas • M. van Strydonck, D. Bénazeth: Four Coptic Textiles from the Louvre Collection 14C re-dated after 55 yr
17:40	End Discussion and Farewell

Textile Research in Austria

Karina Grömer

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Research on textiles from archaeological excavations is carried out in Austria mainly by universities such as the University of Applied Arts Vienna and the University Innsbruck – as well as the Natural History Museum Vienna. The materials analyzed range in time span from the Bronze Age till the Early Modern times; they derive from graves, copper and salt mines, as well as from prehistoric settlements and medieval castles. Methods applied are textile analysis, fibre analysis with SEM, dyestuff analysis with HPLC and various others.

At the Natural History Museum Vienna textile research focuses on prehistoric, Roman and early medieval graves, but especially on the textiles from the salt mines in Hallstatt. This wide range of archaeological material leads to different research questions, which have been explored in various international research projects (DressID, CinBA, HallTexFWF) within the last ten years.

The most important research questions are:

- Development of textile techniques; innovations and traditions within the 2nd and 1st millennia BC: weaving and patterning techniques, dyeing, wool processing, sewing techniques
- Technological, social and economic background of textile innovations in Central European prehistory
- Creativity and design; appearance of textile surfaces and patterns
- Context and function of textiles in prehistory : clothing, soft furnishings, utilitarian textiles, grave goods, textiles as tools
- Ressource management, use – re-use – „recycling“
- Potentials and limitations of dress reconstruction – based on textile finds, dress fittings in graves and contemporaneous iconographic evidence
- Dress and identity: social value of clothing and textiles from the Bronze Age to the Medieval period, representation and appearance

Mining for Textiles – Textiles for Mining

Beatrix Nutz

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This paper will give an account on textiles from gold mining areas in Salzburg and Carinthia in the Austrian Alps found at altitudes ranging from 2000 m to 2800 m above sea level.

The textile and leather fragments that have been retrieved can be dated roughly to the 15th-17th centuries. The current dating is based on the onset of the so-called "Little Ice Age", a period of relatively cool climate beginning in the 15th century and lasting to the 19th.

During its peak in the middle of the 17th century and up to the mid-19th century, glacial advance made mining at great heights very difficult, if not impossible, thus putting a stop to mining activities at high altitudes. At the sites , which covered with glacial ice, organic materials such as textiles and leather have been preserved and now resurface due to global warming. Thus, these finds offer a very rare, if not unique, opportunity to investigate equipment and clothing of early modern time miners.

The woven, knitted and felted fabrics belong to fragments of clothing, such as a knitted cap dating to the early 16th century and the fragment of a pleated shirt, or are parts of hauling bags and other mining equipment. Some textiles are of yet undetermined use, for example an object consisting of three layers - two textile layers and a layer of several pieces of leather patched together - sewn together with narrow leather strips.

Based upon the information provided on the finds this paper hopes to encourage discussion about the everyday use of textiles in the Alpine mining areas.

Dressed with a Thousand Scales – The Find of a Roman *Lorica Squamata* in the Barbarian lands

Janet Schramm[a] – Andrea Fischer[b]

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The armour is a stray find from Baumgarten an der March in Lower Austria. The find spot is located close to the Roman legionary camp at Carnuntum. In Roman times Baumgarten lay north of the Roman Limes (the Danube), consequently in the barbarian countries free of Roman domination.

The fragmented object consists of about 1000 brass scales, partially complete, partially fragmented, single or associated with other scales. The find is remarkable because of its extensive size and its extraordinary textile preservation. The bast fibres were preserved due to the antibacterial properties of copper ions and are more or less present in organic form. Thus the construction of the fabric can be reconstructed. Using two opposing running stitches the scales were sewn with an S-twisted twine on to the ground fabric, made of flax or nettle. The attachment started with the bottom row. The base fabric is a coarse basket weave. Regrettably, the preserved leather does not have the same dimensions. It is evident that more leather was processed.

In general, assembled fragments of scale armour are very rare, especially with fabric backing. Only in Carpow, Scotland, and in Dura Europos, Syria, fragments of scales with base fabric were discovered. Depending on the position of the scales they can vary in size and shape. Beside the scales two breastplates were found. One plate is inscribed with an owner's name, which was read with the help of X-ray computed tomography.

The protective properties of the armour are due to several factors. Besides the composition of the metal, its thickness is significant for the stability of the armour. Surprisingly the cross-section of the metal scales is rather thin. Due to the imbricative order the thickness of the armour varies depending on the number of overlapping scale layers. Each scale is linked in both rows and columns and so is overlapped on all four sides. A pair of holes is located on both longitudinal sides of the scales. To connect the scales with each other, they are lined up side by side so that the holes overlap. A thin metal strip, which is bent on the back, connects the scales to each other. The imbricative arrangement spreads the force of an offensive strike over a wider area.

For the preservation of the armour fragments (especially the fragile fabric backing), an appropriate mounting is most essential. The textile was reinforced with threads of Stabiltex (a polyester fabric). Single threads were fixed with Paraloid B-72 to the metal surface and keep the textile in position. This approach causes no material changes and is almost invisible.

Fabric and scales were mounted on acrylic sheets with insect pins. Thus this extremely fragile find is supported, mechanically stabilised and can be handled and exhibited easily. Due to the mounting, other conservation treatments (such as treatment with consolidation media) were minimised. In the future, all investigation methods can be attempted and there are no limitations for further conservation treatments.

Medieval Colors of Lengberg

Ina Vanden Berghe [a] – Beatrix Nutz[b]

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In the course of an extensive reconstruction, starting in July 2008, at Lengberg Castle, East-Tyrol, archaeological investigations of several parts of the building were carried out under the direction of Harald Stadler (Institute for Archaeologies, University of Innsbruck). During the research a filled vault was detected below the floor boards of a room in the south wing of the castle on the second floor. The fill consisted of dry material in different layers, among them organic material such as twigs and straw, but also worked wood, leather (primarily shoes) and textiles. Based on the building history as well as investigations of construction techniques and the archaeological features, the finds have been dated to the 15th century. This date has now been confirmed by five radiocarbon-dates carried out at the ETH-Zürich.

Not counting single threads, cords and ropes, the textile finds include more than 2,700 fragments, among them a few almost completely preserved pieces. Of these, 1,048 fragments are coloured, primarily wool in various shades of blue, red and green, but also purple and black. Some fragments of silk textiles display the colour yellow but also blue, red, purple and green. Coloured linen fragments are rare and include primarily blue-coloured plied yarn used for seams.

Eighteen, mainly polychrome fragments were selected for dye analysis using liquid chromatography (HPLC-DAD) allowing the identification of two vegetal red dye sources, the roots of the madder plant and the heartwood from *Caesalpinia* trees, but also the precious red scale insect kermes. Blue shades were obtained by indigo or woad vat dyeing, while purple colours are the result of either the combination of madder with indigo or woad dyeing, or the use of lichen dyes such as rock tripe or cudbear. Green shades are produced by the blue indigo/woad and a yellow dye source, which could in one fragment be specified as the plant dyer's broom, though in other fragments one can only speak of a yellow luteolin-based dye plant, such as chamomile or similar species. Black threads were dyed with tannin on a blue indigo/woad ground.

The biological dye sources identified in the Lengberg textiles confirm the dating of the finds to the 15th century. Apart from redwood and eventually indigo, two sources that were frequently imported from the Far East at that time, all other biological dye sources could have been of European or even local origin.

Hunting down the Earliest Wools in Europe

Lise Bender Jørgensen[a] – Antoinette Rast-Eicher[b]

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What are the earliest wools in Europe, how can we identify and date them, and what do they tell us about the emergence of woolly sheep and wool as a raw material for textiles in prehistoric Europe? In connection with the CinBA project (Creativity in Craft Production in Middle and Late Bronze Age Europe), a database of European Bronze Age textiles has been created.

Establishing the dating of these textiles became a kind of steeplechase where assumptions, museum priorities and methods of conservation, methods of fiber identification as well as various dating methods were the obstacles. The quest for early wools has led to re-assessments of a number of claims for early wools. Some that have been considered Early Bronze Age wools since the 1930s have now been proven to be Middle Bronze Age or even later; others that have been disregarded as undated or less securely dated have moved into prominence by radiocarbon dating.

The paper explores and reassesses a series of claims for early wools from Europe in the context of the time when the find and the claim was made, by scholars such as Walter von Stokar, Karl Schlabow or Michael Ryder, and discusses how reassessments of their dating affect our knowledge about early wool and sheep husbandry in Europe.

Invisible Wool. Indirect Textile Evidence from the 4th and 3rd Millennium South-eastern Europe

Ana Grabundzija

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In the realm of an interdisciplinary TOPOI project "Textile Revolution" an independent research on introduction of wool bearing sheep in the Southeast Europe is conducted on the basis of indirect archaeological evidence that suggests early use of wool in textile production. Based on earlier research and published material, the study of unpublished textile tools and textile related archaeological finds is focused on providing arguments for appearance and spread of new raw material in areas where plant fiber was prevalent in textile production.

The large research area of Southeast Europe is being approached on a smaller-scale regional level, enabling the investigation and explanation of both spatio-temporal differences and similarities of this transition, and providing a more precise understanding of the innovation of wool production and processing.

Unpublished 4th and 3rd millennium textile related finds from relevant sites in Hungary, Slovenia, Croatia and Serbia are collected and documented by means of specially designed and programmed database, which enables corroboration of the results with zooarchaeological and archaeogeographical data. In order to elucidate time, space and distribution patterns of the wool production, chosen sites are used as representative for the northwestern regions of the studied area. The surveyed material, including tools for spinning and weaving, such as loom weights, spindle whorls and spools, bone and antler tools, needles, iconographic objects, and textile imprints, is studied as indicative of the shift towards animal fiber processing. Collected and processed data is being organized into representative diachronic spectra and used as a base for statistical analysis of changes in the frequency of finds and in the dimensions and weights of textile production tools.

Coherent cluster of processed sites in this study enables a more detailed archaeological context-related analysis providing a basis for raising further culture and identity related questions.

Folded, Layered Textiles from a Pit Pyre excavated from Over Barrow, Cambridgeshire

Susanna Harris

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The textiles from Over Barrow, Cambridgeshire, Britain date to the Middle Bronze Age and are radiocarbon dated to approximately 1700-1800 BC. The textiles come from the remains of a pit pyre used to cremate crouched bodies.

All the textiles are dark brown or black and have been preserved by charring. It is proposed by the excavator the bodies burned on the pit pyre and fell into the pit beneath together with the accompanying textiles. The textiles are distinctive as a number, they are preserved in multiple folded, layered clumps. Due to the pit pyre context, the analysis of layers and folds in the textiles has the potential to provide information as to whether they were used as clothing, shrouds or other purpose such as winding strips. Therefore, the scope of textile recording includes the standard documentation of weaving technique and fibre analysis as well as observations on the layers and folds in the charred clumps.

In total, there are eight folded, layered textile clumps and approximately sixtyfour loose textile fragments. A maximum of ten layers were recorded in one clump, most of the loose textile fragments are single layers but several have more than one layer. In this paper I will present the results of the textiles analysis in comparison to other British Bronze Age finds and discuss the interpretation of the folded, layered clumps in the cremation context.

Costume and Textile Design in the Nordic Bronze Age

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Denmark possesses a unique collection of textiles and costumes dated to the Bronze Age. This material is currently being investigated at the Danish National Research Foundation's Centre for Textile Research at the National Museum of Denmark in collaboration with several Danish local museums. All Danish Bronze Age textiles are re-studied and photographed in order to evaluate costume design and textile production. The analyses also include fiber analyses to explore the development and potential of raw materials for textile production, dye analysis to explore the development and use of a new technology to expand the visual appearance of Bronze Age costume, and strontium isotope analysis to explore trade and exchange of raw materials for textile production in the Nordic Bronze Age society.

In this paper the latest results from the ongoing analyses will be presented. Emphasis will be on the interpretation and wider implication of the results. Furthermore, the following questions will be addressed:

- how did the textile technology develop during the Bronze Age in the Nordic area in relation to other crafts and especially the skin craft?
- how did the Nordic costume develop in the 2nd and 1st millennia BC?

Seams and Embroidery on Bronze Age Costumes in Northern Europe

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Seven complete, woollen costumes survive from the Scandinavian Bronze Age that have been preserved thanks to a special mound-building tradition in Jutland (Denmark) and Schleswig (Germany). In addition to these a large quantity of fragmentary textiles has also been preserved in burials of Southern Scandinavia. These textile fragments have a very uniform appearance, which makes it almost impossible to identify their function as specific items of clothing.

This paper will discuss the possibilities for identifying items of clothing from the remains of different kinds of seams and embroidery present on the textile fragments. The remains of hems, stitches and embroidery on textile fragments from Northern Europe will be compared with the complete Danish garments. Is it possible to identify textiles with distinctive embroidery as the necklines on the blouses and stitches along the edges of some of the male wrap-around garments?

The same kind of uniform textiles are found in different Bronze Age cultures in Northern Europe with unique combinations of bronze objects and dress accessories. Do the textiles indicate standardized costumes and the same uniformity of textiles for the entire area or did the cloth also play a part in the expression of identity?

'In this, I am': A Phenomenology of Prehistoric Clothing

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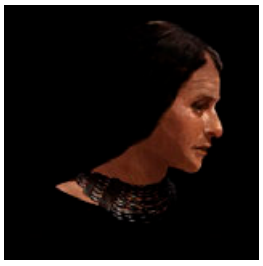
At last year's Chicago meeting of the Theoretical Archaeology Group conference I presented a paper on the finesse of perception in visualising archaeology. Put yourself in place of those who were there, it proposed, and some of the more ordinary, even mundane details of a setting are those that become necessary to know about. To understand the mechanisms at work in a Roman bathhouse, for example, one perhaps needs to steps out of the shoes of the architect and into the slippers of the bather; likewise, the work of engineers on the northern *limes* becomes much more impressive when one looks not at their (well preserved) technical solutions but rather at the problems which opposed them at the time, such as the (now long tamed) forces of nature such as snow and drift ice.

Christopher Tilley's theory of phenomenology (1994) has already proven useful in interpreting space. And it has been used, especially in the United States with its sparse archaeologica, to entangle the biography of single objects. It can also be applied to dress.

There is a tendency to reconstruct clothing as an expression of technical ability in a group; however, the way people wish to appear is, and has always been, culturally determined, and is therefore very much 'of that person, and of that moment'. Clothing is intrinsically of a very practical nature, too, yet the way a person might have best used his or her clothing is not often described; the anecdotal often being a mere sideline to researchers working on costume's broader geneaology.

When taking the phenomenological approach to the way people in the past chose to appear, clues appear to aspects of life (or actual dress items) hitherto undiscussed. An enigmatic find from southern Germany, some five and a half thousand years old, seems to throw light on a Neolithic costume silhouette with perhaps a ritual association. Sex sneaks into the clothing of northern Europe's Bronze Age, and possibly, a fear of the violence of men.



To illustrate my talk I shall show, for the first time, a series of reconstruction paintings made for "Tribal Europe", my proposed book on costume in prehistoric Europe. With an emphasis on plain appearance, their strong visual nature will illuminate patterns and details that might have before gone unnoticed.

Illustrations: left: 'Bronze Age jet necklace worn tight as a choker. Found in Inchmarnock, Scotland.'
right: 'Linked bronze cap decoration as worn by men of the Japodian tribes in the early Iron Age, and to this day mirrored in the tasseled 'Lika cap' worn in the same region in modern-day Croatia.'

Altrier - A New Look on the Textiles

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The cremation grave of a man was found in 1972 in Altrier (LUX) and is dated to the early La Tène period. A large Etruscan *stamnos* was placed as an urn in an oak coffin. Textiles were deposited in top of this ceramic vase and, inside of it, on the bones, and were interpreted in a first examination (Musée National d'Histoire et d'Art in Luxembourg and by H.J. Hundt in Mainz) as remains of garments.

The main textile is a 2/2 twill with plied warps and single wefts. This textile was published in 1972 as wool, but afterwards seen as one of the possible early silks in Europe - especially by English speaking writers - up to recent times. The discussion about the fibre has led to a more detailed investigation of the textiles including dye analyses, as they are still not published in detail.

While the majority of the textile fragments actually deteriorated into black coloured pieces, some fragments are still red or blue coloured or have polychrome patterns. Dye identification, based on HPLC-DAD analysis, will be discussed from both the coloured and deteriorated fibres.

Gewebe der Hallstattkultur aus Domasław in Niederschlesien

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Bei archäologischen Ausgrabungen, die das Institut für Archäologie und Ethnologie der Polnischen Akademie der Wissenschaften, Filiale Wrocław, vor dem Bau des Wrocław-Autobahnrings durchführte, wurde in Domasław bei Wrocław ein interessanter Komplex von Fundstellen (Siedlungen, ein Gräberfeld) der älteren Eisenzeit entdeckt. Schon die ersten Untersuchungen zeigten zahlreiche Einflüsse der Hallstattkultur, und heute sind die Forscher von Domasław der Meinung, die einzigen Funde auf dem Gebiet Polens und eine der am nördlichsten gelegenen Überreste der Besiedlung der Hallstattkultur entdeckt zu haben.

Unter den Funden gibt es auch einige Gewebefragmente, die meistens vollständig von Metalloxiden durchdrungen sind sowie Gewebeabdrücke in Ton. Die Textilien wurden in Leinwandbindung, Köperbindung 2/2 und vielleicht auch in Fischgratköperbindung 2/2 oder Spitzköperbindung 2/2 hergestellt. Da die Fundstücke in sehr schlechtem Zustand erhalten sind, bedarf es weiterer Untersuchungen, um eindeutig bestätigen zu können, dass sich unter ihnen auch Gewebe in Fischgratköper- oder Spitzköperbindung 2/2 befinden.

Die Bedeutung der Gewebe aus Domasław besteht nicht nur darin, dass sie als der erste Beleg von Textilien der Hallstattkultur in Polen gelten, sondern auch darin, dass es unter ihnen auch Gewebe in Köperbindung 2/2 gibt, die in späteren Epochen, besonders in der Römerzeit, äußerst populär waren.

Textiles and Design in the Early Roman Iron Age Western Denmark

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The aim of this paper is to see if a change in weaving technology affected the appearance of textiles in terms of form and design in western Denmark during the Roman Iron Age. The basis for the study is the re-analysis of the material from Lønne Hede, a 1st-2nd century AD cemetery where preserved textiles were found in nine graves. These textiles can be compared to other well preserved textiles finds such as "The Hammerum girl" found in the same region and dated to the late 2nd century AD (Mannering 2011). The date of these burials coincides with the introduction of a new loom type in Denmark, the warp-weighted loom. They are therefore important pieces for the understanding of the effect a change in technology may have had on the produced textiles.

The initial technical studies of the textile finds from Lønne Hede has earlier been presented at NESAT conferences (Demant 2007, Munksgård & Østergård 1988). In recent years new scientific and technical analyses have been carried out on the material as a cooperation between Museet for Varde by og Omegn and the Danish National Research Foundation's Centre for Textile Research, which revealed many interesting details. The new results will be presented and discussed in this paper in order to give a broader perspective on weaving, form and design of textiles in western Jutland during the first centuries AD.

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Textile Production in Late Roman Iron Age Denmark –
recent research based on analyses from Late Roman Iron Age grave fields belonging to the crucial Vorbasse village in Central Jutland

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Vorbasse is one of the largest Iron Age villages in Denmark (Jutland) existing from the Pre-Roman Iron Age to the Middle Age. Of current interest in relation to textile research is the Late Roman Iron Age part of the village. Vorbasse is the only site in Northern Europe, where until now small grave fields have been excavated, each belonging to one of the four contemporary farms from the Late Roman Iron Age.

The grave fields demonstrate clear differences in terms of social status, and each grave field has also its own characteristics in terms of grave equipment. The richest of the grave fields, which belongs to the largest and leading farm of the site, includes male, female and children's graves, including two high ranking warrior graves, richly equipped female graves and children's graves. Most of the extant textiles come from this grave field.

New analyses of the preserved textiles from the Late Roman Iron Age burials in Vorbasse clearly demonstrate that the textiles are of a very high quality and that several different textile techniques and raw materials have been used. The production of these textiles has included many steps, including fibre preparation, spinning, loom set up, weaving and finishing. By combining results from textile analyses of preserved textiles and analyses of textile tools and their suitability in production one can discuss which decisions people made at a certain place and at a given time. The question to be asked is, therefore, could these textiles have been produced in Vorbasse with the type of tools found at the site? And, furthermore, was this a production for everyday use and for all inhabitants in Vorbasse?

What also is of great interest is, that in comparison with recent new analyses of textiles from the previous period, Early Roman Iron Age, there seems to have been an interesting and clear change in textile technology (compared for example to the Danish Early Roman Iron Age Lønne Hede textiles – also from Jutland).

Schlabow gegen Stokar – ein früher Streit unter Forschern und dessen Hintergründe und Folgen

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1937 veröffentlicht Kurt Schlabow sein Werk über „Germanische Tuchmacher in der Bronzezeit“. Wie in solchen Fällen üblich, erscheinen Rezensionen zu der Veröffentlichung. Im „Mannus“ von 1938 wird daher eine Rezension von Dr. Walter Stokar von Neuforn, auch bekannt als Walter von Stokar, veröffentlicht, der selber zu dieser Zeit zum Thema „Spinnen und Weben bei den Germanen“ promoviert hat. In dieser Rezension kommt es jedoch nicht nur zu fachlicher Kritik und der Streit wird über mehrere Jahre noch über verschiedene Veröffentlichungen vor den Augen der deutschen Vorgeschichtsforschung ausgefochten.

Dr. Walter Stokar von Neuforn gehört zum Beginn dieser Auseinandersetzung noch zum Umfeld des „Reichsbund für Deutsche Vorgeschichte“ unter Prof. Dr. Hans Reinerth. Kurt Schlabows Position kann zunächst in den wechselnden Veröffentlichungen nicht nachvollzogen werden. Erst als Herbert Jankuhn, ein leitender Kopf der Vorgeschichtsforschung beim „SS – Ahnenerbe“ sich für Schlabow zu Wort meldet, zeigt sich, dass der Streit oberflächlich als ein Streit zwischen konkurrierenden Gruppen im Nationalsozialismus gewertet werden kann. Jedoch zeigt die Promotionsakte von Walter Stokar von Neuforn, dass auch finanzielle Gründe in Form der „Marktanteile“ eine Rolle spielten.

Schließlich zeigt ein bisher unveröffentlichter Schriftverkehr aus dem Jahr 1941, dass alle drei Forscher im Rahmen einer Mission des „SS – Ahnenerbes“ den Teppich von Bayeux untersuchen sollten. Diesem Vorhaben gegenüber sperrte sich jedoch Walter Stokar von Neuforn, welcher zunächst an dem Unternehmen teilnehmen wollte, jedoch nicht mit Kurt Schlabow. Mitunter ein Fehlverhalten, welches sich negativ auf Stokar von Neuforn nach 1945 auswirkte.

Against all Odds: Pure Science and Ancient Weaving

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The Ancient Greeks are famous for introducing rational arguments and establishing science. Especially in mathematics they stand out for the idea of deductive structure, logic and proofs.

Within the history of science and technology as well as the history of arts, new discussions are emerging, endeavouring to trace these achievements in crafts or other cultural influences. Textiles and textile production are rarely among them, although they take up a great deal of ancient culture in terms of time, effort and knowledge.

This paper investigates possible contributions of ancient textile technology to the advent of science in Greek antiquity and concentrates on the example of dyadic arithmetic - a specific number theory that, according to historians of mathematics, has no application in everyday life and is a pure invention of Greek philosophical genius. Plato calls dyadic arithmetic the best example of pure science.

But this number theory has perfect applications in weaving on a warp-weighted loom. And as this type of loom is much older than the arithmetic of the Greeks, the question arises whether weaving might have contributed to its invention. This paper will present some examples of patterning that are challenging and interesting from a mathematical point of view and investigate some Hallstatt diamond twills in the context of ancient mathematics and philosophy: the dyadic arithmetic of the Pythagoreans and mathematical considerations in the work of Plato.

Textile Tools and Archaeology

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Textile tools are the link between the textiles and their manufacture. Additionally, the implements are frequently the only evidence for manufacture since textiles are often fragmentary and poorly preserved. In order to identify the functional parameters of spindle whorls and loom weights, I have conducted several tests in collaboration with skilled crafts people (e.g. Andersson 1996, 2003; Mårtensson et al. 2009; Andersson Strand 2012).

In the early 1990s I recorded textile tools from Viking Age settlements. It was clear that, with few exceptions, spindle whorls found in the floor layer in the same house were of different sizes. In order to understand this difference I started to work with professional craftspeople who tested reconstructed tools with a selected raw material. The results were highly informative and as a result further tests have subsequently been conducted in order to get a better understanding of the tools' function. However, it is clear that there are not only possibilities but also limitations in what the experiments can tell us. It is also important to be aware that the tests give only one perspective. It is always essential to discuss the results from an archaeological point of view, in relation to specific finds and contexts, regions and time periods.

In this presentation I aim to present the methods that have been developed over the years and also to discuss how the results have been applied to different materials from various regions and time periods.

Interdisciplinary Reconstruction of Weaving on the Warp-Weighted Loom in the Hallstatt Period

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Lacking the actual finds of textiles from the Hallstatt period in Slovakia one has to look for another type of evidence for textile production. Fortunately, there are to be found many spindle whorls and loom weights at settlement contexts, which may be studied in more detail.

In 2002 and 2005 a lowland settlement was uncovered in the vicinity of a rich necropolis belonging to the Kalenderberg Group in Dunajská Lužná, part of Nové Košariská in Southwest Slovakia. In a partially destroyed house two groups of all together 170 pyramidal loom weights made of sun-dried clay were excavated. Both groups were found in lines next to the walls, one about 4 m long, another about 2 m long.

Based on this find, in 2010-2011, a reconstruction of the smaller warp-weighted loom with 79 loom weights was made. The type of weave and quality of threads were estimated based on the weight, shape and spatial distribution of the loom weights. At the same time, a matching piece of textile from Hallstatt salt mines was taken as a model type of fabric for reconstruction of weaving on this loom. The experiment was designed in cooperation with an archaeologist who excavated the loom weights, an ethnologist who is experienced in old textile techniques and a textile archaeologist. This interdisciplinary work resulted in new insights into the construction of the warp-weighted loom, the process of preparation for weaving as well as the weaving itself.

The aim of this paper is to answer the questions which arose during the reconstruction: What kind of evidence do the loom weights found in lines on a floor of a house provide? What kind of unit system of length and width can we think about in the Hallstatt period? In what way were threads distributed through the heddles to create a 2/2 twill? How do some of the construction elements of the loom influence the weaving process, e.g. how to attach weights on the warp or what is the slant of the supports of the heddle-rods? The results of this reconstruction will be presented in a broader context of textile production in the Hallstatt period in Central Europe.

Production and Consumption: Textile Economy and Urbanisation in Mediterranean Europe 1000-500 BCE

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The paper will present a new 5-year project, funded by the European Research Council starting grant, *Production and Consumption: Textile Economy and Urbanisation in Mediterranean Europe 1000-500 BCE* (*PROCON*). The project aims to test the hypothesis that textile production and consumption was a significant driving force of the economy and of the creation and perception of wealth in Mediterranean Europe during the period of urbanisation and early urbanism in 1000-500 BCE. The focus will be on the significance of the production and consumption of textiles for the development of city-states (as clothing, elite regalia, trade and exchange items) and the implications of this for other aspects of the economy, such as the use of farm land, labour resources and the development of urban lifestyle. This aim is achieved by addressing the following questions:

- How was this production and consumption organised: where did the various resources come from, what were the technologies used, what was the level of organisation?
- Who was involved in textile production and consumption?
- What was the quality and quantity of textiles produced and how they changed over time in response of urban consumer demands?

In exploring these questions the project follows not only a functional approach, but also considers the value ascribed to these goods and the customs that came with them. The geographical area selected for this study is eastern, central and western Mediterranean Europe, Greece, Italy and Spain. The chronological period chosen is the period between 1000 and 500 BCE, which roughly corresponds to the Early Iron Age in this area. The reason for choosing the area in question in the Early Iron Age period is that this was the first time in history when a more or less exclusive preference for urban settlement - prevalent in Europe to this day - achieved a truly pan-European scale. Urban life led to new consumption practices requiring new and different structures to sustain them. Consumption of textiles is defined by the quantity and quality of consumables produced, which in turn depends on the level of production organisation and the availability of material and human resources. Using established and novel approaches to textile research, the project results aim to change the landscape of urbanisation research by providing new data sets demonstrating textile production and consumption as major economic and social factors.

Textile Tools from Viking Age Graves in Gotland, Sweden: a Preliminary Exploration

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When analyzing archaeological textiles researchers must take into consideration the tools that were required to create textiles and how these tools influenced the quality and quantity of fiber needed to clothe a population. In past publications, researchers have focused on the analysis and interpretation of the remains of textiles found on the island of Gotland, but have not included the tools for the production of these textiles.

This paper is a presentation of my recently completed master's thesis and looks at the textile tools found in Viking age graves from Gotland, Sweden which are identified in Lena Thunmark-Nylen's *Die Wikingerzeit Gotlands*. These tools, found in the graves distributed throughout the ninety-two parishes of Gotland, include spindle whorls, weaving cards, needles and needle cases. Through the collection of data that includes weights, measurements and artifact material and spatial distribution analysis using ArcGIS (a Geographical Information Systems (GIS) tool) an interpretation is presented on the textiles produced on Gotland during the Viking period. This interpretation suggests that only small quantities of textiles were produced on Gotland with the majority traded in or acquired by alternative modes of commercial exploitation.

Hedging on Archaeological Heckles: A Comparison of Tooth Blades from Novgorod with finds from York and Estonia

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During the past 60 years of excavation, archaeologists at the medieval town site of Novgorod have identified more than 1,000 wooden knives (averaging 30 cm in length) as flax heckles, a tool that was used to separate and straighten flax and hemp fibers.

This attribution is significant for two reasons. First, it suggests that flax and hemp fibers were processed within the town itself, although scotching knives, another tool necessary for the processing of vegetal fiber, are relatively uncommon in the town. Second, Novgorod's typologies, including those for textile-processing tools, have helped archaeologists in other parts of the former Soviet Union identify the function of wooden artifacts at other sites with preserved wooden tools. As a result, Soviet-era archaeologists identified similar wooden tooth blades at other medieval sites as heckles.

Modern ethnographic hackles were made from sharpened iron nails embedded in a wooden platform. Iron nails believed to have been used in hackles have been unearthed at Coppergate in York, for example. This paper will present the results of archival research in Novgorod, which has determined that the objects in question were very probably not flax hackles. The hackle blades' teeth are quite shallow (average 5 mm depth), too shallow to properly catch and pull the fibers. My examination of the archaeological field books for the excavations of the medieval neighborhood of Troitsky (Novgorod) does suggest that the toothed blades were often found in contexts with other textile tools. Modern analogies for the Novgorod tooth blades are found in great number in ethnographic collections in Estonia, where they are identified as "*linakamm*", i.e., a tool used in combing flax fiber, but not a hackle properly speaking.

Textile Production in a Medieval Village in Siksälä (Estonia)

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Textiles are poorly preserved in the soil of Estonia, and finds which enable the reconstructions of clothing items or the study of the textile production are very rare. An exception is the rich textile material from Siksälä cemetery in South-Eastern Estonia with its 279 investigated graves. The majority of the textiles have been dated to the 13th–15th centuries (Middle Ages), but the earliest finds are from the 12th century (the end of prehistory according to the Estonian periodization). The community that used the cemetery was obviously a small (4–5 families) village in the border area between different medieval political entities in present day Russia and Estonia.

The focus of this paper is on the textile production process, as much as it is possible to detect it on the basis of funerary clothing preserved, in its social context. The making and the usage of fabrics in Siksälä appear to be uniform during these centuries. Presumably the textile culture which had become well established in the Late Iron Age continued with little change in the Middle Ages in spite of political, economic and social transformations marking the transition process from the Late Iron Age to the Medieval Period. Specifically, the making of textiles and clothing in a village at a given period was domestic handicraft carried out by women at homes in isolation from potential external impact.

To challenge this traditional view we attempt to concentrate on the changes and development. We study the process of textile handicraft as a whole and analyse, with the help of different methods, technical traits, tools, raw materials (e.g. dye stuffs, wool fibres), and standardisation of these textiles. A point of discussion will be the variability in the medieval rural textile handicraft. To what extent was it dependent on traded goods (e.g. imported dye stuffs, fabrics, or even clothing items) both at a regional or supra-regional level? Was making textiles an exclusively domestic activity or was there a kind of specialisation in existence? Can we detect the spread of technical innovations and communication of new ideas in the course of these centuries? Can a more detailed survey of these finds prove the continuity or does it break the pattern and illustrate the variability?

Chinese Silks in the Merovingian Graves of Saint-Denis Basilica ?

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A new examination of the textiles found in the Merovingian graves of Saint-Denis Basilica has revealed an interesting range of silks, plain and figured, which had not been identified by previous studies. Among them, two fragments show characteristics that can be related to Chinese productions. We shall describe the difficult path followed until the identification of the figured one, a type of silk seldom found in Western regions at this period. It gives a singular interest to the Saint-Denis finds by adding one more object with a precise Eastern provenience to the small group of early Chinese silks which found their way to Europe.

Die Textilien und anderen organischen Reste der Männergräber des baiuvarischen Reihengräberfelds von Petting

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Im Zuge der laufenden Promotionsarbeit an der Technischen Universität München in Kooperation mit der Archäologischen Staatssammlung München werden organische Reste aus einem baiuvarischen Reihengräberfeld untersucht und ausgewertet. Der Fokus liegt dabei auf den textilen und andern organischen Bekleidungs-, Ausrüstungs- und Grabausstattungsresten der Männergräber.

Das frühmittelalterliche Gräberfeld liegt in Petting (Lkr. Traunstein, Bayern) am südöstlichen Ende des Waginger Sees, nahe der heutigen österreichischen Grenze zu Salzburg. Hier befand sich im Frühmittelalter eine wichtige Siedlungskammer. Durch die Auswertung der organischen Reste sollen weitere Erkenntnisse über die frühmittelalterliche Blütezeit dieser Region erlangt werden.

Bei der Ausgrabung des Gräberfeldes vom Bayerischen Landesamt für Denkmalpflege in den Jahren 1991 bis 1993 wurden 721 Gräber geborgen. 2010 wurden die Funde von den Grundeigentümern der Archäologischen Staatssammlung München überlassen. Umfang der Promotion und somit Arbeitsgrundlage sind die in 99 Männergräbern erhaltenen Textilen und organischen Reste. Die Datierung der zu untersuchenden Gräber umfasst ungefähr ein Jahrhundert.

Aus den Gräbern liegen 270 Funde aus Metall mit auswertbaren textilen Anhaftungen vor, wobei die Anzahl der zu untersuchenden Objekte pro Grab zwischen einem und 32 variiert. Die erste Begutachtung ergab insgesamt über 650 auszuwertende textile Fragmente und stratigraphische Lagen. Dabei sind pro Grab zwischen ein und ca. 240 Textilbelege zu analysieren. Diese sind vorder- und rückseitig in Paketen an den Metallobjekten konserviert. Der Erhaltungszustand der Fragmente variiert stark, von vollkommen mineralisiert unter dicken Krusten, bis mit organischen Komponenten erhalten. Dies erfordert ein breites Spektrum von analytischen Mitteln. Als Standardanalyseverfahren stehen Rasterelektronen- und Polarisationsmikroskopie zur Verfügung. Weiterführende Analyseverfahren werden mit Kooperationspartnern durchgeführt. Der überwiegende Teil der Textilien ist konservatorisch unbehandelt, dies ermöglicht eine präzise Auswertung. Die zum Teil bei Altrestaurierungen vom Objekt separierten Fragmente, die mit Kunstharz getränkt wurden, stellen eine weitere Herausforderung dar.

Alle vorliegenden archäologischen Daten über das Gräberfeld, die Gräber und die Funde sowie alle neu gewonnenen Daten über die Textilien und organischen Reste werden mit dem gesamten Bildmaterial in einer elektronischen Datenbank zusammengeführt.

Neben dem Rahmen der Dissertation werden die Untersuchungen und ersten Ergebnisse des Grabes 62 mit umfangreichen organischen Resten vorgestellt. An 32 Metallobjekten haften teilweise über 40 textile Fragmente in einer Stratigraphie von bis zu 20 Lagen an, aus denen zahlreiche Informationen über die besondere Bekleidung, Grablegung und dabei verwendeten Rohstoffe gewonnen werden konnten.

Erste Ergebnisse textilarchäologischer Untersuchungen an organischen Materialien des Gräberfeldes von Lauchheim „Wasserfurche“ (Ostalbkreis)

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Das mit über 1300 Bestattungen beinahe vollständig erfasste frühmittelalterliche Gräberfeld von Lauchheim „Wasserfurche“ (Ostalbkreis) gehört zu den wichtigsten archäologischen Quellen Südwestdeutschlands. Im Rahmen eines von der DFG geförderten Forschungsvorhabens sollen sämtliche Befunde und Funde des Friedhofes erfasst und unter verschiedenen sozialgeschichtlichen Aspekten ausgewertet werden. Ziel der Aufarbeitung des Lauchheimer Fundmaterials ist auch die systematische Aufnahme aller Textil- und Lederfragmente sowie die Dokumentation einer möglichst hohen Anzahl der ebenfalls aus den Bestattungen geborgenen vegetativen Reste und sonstiger organischer Fundschichten. Neben Aussagen zu Vorkommen und Verbreitung der verschiedenen Materialien versprechen die Analysen an den organischen Artefakten eine zumindest partielle Rekonstruktion komplexer Befundzusammenhänge, welche u. a. weiterführende Erkenntnisse zur „Aufmachung“ der Bestatteten, so auch zum Nachweis einzelner Kleidungsstücke bzw. Gewandensembles, zugehöriger Accessoires und diverser Ausstattungselemente erwarten lässt.

Bereits während des Projektverlaufs zeichnet sich diesbezüglich ein unerwartet hoher Erkenntnisgewinn ab. Neben weitreichenden Aussagen zur quantitativen Verteilung einzelner Textiltypen eines Zeithorizontes und ersten Studien zum chronologischen Wandel der wohl gleichermaßen geschlechts- wie auch statusabhängigen „Stoffmoden“ erlauben die textilarchäologischen Untersuchungen inzwischen auch eine sichere funktionelle Zuordnung zahlreicher Gewebeschichten sowie vieler anderer organischer Artefakte. Die vielfältigen Grabbefunde des Friedhofes von Lauchheim „Wasserfurche“ schließen für den gesamten Belegungszeitraum den Gebrauch uniformer Kleidungen und identischer Ausstattungen aus. Nahezu regelhaft und überraschend deutlich zeichnen sich hingegen herstellungstechnisch bedingte Divergenzen zwischen den Kleiderstoffen und den Geweben der Grabausstattungen ab. Damit können die Ergebnisse der textilarchäologischen Beobachtungen maßgeblich zur Rekonstruktion überkommener Befundzusammenhänge beitragen. Die Möglichkeit einer zuverlässigen Unterscheidung zwischen den Textilien der Kleidung und den nicht unmittelbar zur Gewandung gehörigen organischen Fundschichten gewährt nicht nur neue Einblicke in frühmittelalterliche Bestattungsriten sondern setzt auch neue Impulse bei der Diskussion um die Verwendung einer bereits zu Lebzeiten genutzten „Gebrauchs- oder einer eigens für die Grablegung angefertigten Bestattungskleidung“. Zugleich werden auch neue Perspektiven bei der Neubewertung und Interpretation „textiler Altbestände“ zeitgleicher Bestattungsplätze eröffnet.

Im Rahmen des Vortrages sollen die Ergebnisse der textilarchäologischen Untersuchungen am Fundmaterial des Gräberfeldes von Lauchheim „Wasserfurche“ vorgestellt und diskutiert werden.

Die Textilien des Herrn von Morken – Neubearbeitung des alten Fundmaterials

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Auf dem Kirchberg der nordrhein-westfälischen Ortschaft Morken wurde in den 1950er Jahren inmitten eines kleinen fränkischen Friedhofs das hölzerne Kammergrab des so genannten Herrn von Morken gefunden. Die vom Bestattungsplatz der zugehörigen Ortsbevölkerung separierte Grablege sowie die wertvolle Beigabenausstattung ließen schon damals in dem um 600 n.Chr. Verstorbenen eine herausragende Persönlichkeit vermuten. Kurz nach der Bergung des Grabes erfolgte durch Karl Schlabow die Untersuchung des organischen Inhalts einer großen Bronzeschale, die seitlich des Bestatteten aufgestellt worden war. Dort hatten sich Fragmente verschiedener Gewebe erhalten, die auf Grund ihrer Vielzahl und des Nachweises von Seide in der Fachwelt besondere Aufmerksamkeit erregten.

Das gesamte Fundmaterial hat sich bis heute in den Magazinen des LVR Landesmuseums in Bonn erhalten und wurde in den letzten zwei Jahren im Rahmen einer Masterarbeit vollständig erfasst, erneut untersucht und dokumentiert. Mit Hilfe eines digitalen Videoauflichtmikroskops und Aminosäureanalysen konnten die Fragmente acht verschiedenen Gewebearten zugeordnet und die Fasermaterialien genau bestimmt werden. Mit diesen neuen Erkenntnissen mussten die Gewebeanalysen Schlabows korrigiert und der Seidennachweis widerlegt werden. Die farbig und aufwändig webgemusterten Textilien lassen sich keinen Bekleidungsbestandteilen zuordnen, sondern sind ausschließlich als besondere Statussymbole anzusprechen, die die Bedeutung des Bestatteten zusätzlich unterstreichen.

Unter den identifizierten Geweben weist mindestens eines auf eine weitaus höher entwickelte Webstuhltechnologie im germanisch geprägten Westeuropa bereits vor dem Jahre 1000 hin, wie auch schon an anderer Stelle in der textilarchäologischen Forschung durch verschiedene Einzelfunde vermutet wurde.

A standardised mapping system for organic remains on metal objects and in in–situ blocs – a manual by the Bayerisches Landesamt für Denkmalpflege (Bavarian State Department for the Protection of Historical Monuments and Sites)

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When dealing with organic remains on metal artefacts the question arises how to map the badly preserved and hardly identifiable relicts in an efficient and consistent system. This kind of documentation is an essential part of the conservation process and is the basis for later scientific research. The large amount of new objects discovered every year necessitates a standardised procedure. This is particularly the case when working with in-situ blocs and for the first aid conservation treatments of metal artefacts. The same applies for planning of special projects in which various persons are involved. Last but not least it is also a means for disseminating scientific results. Therefore the quality of the documentation must be ensured by a uniform approach.

On this basis a mapping system based on the software ADOBE PHOTOSHOP (version CS3 and above) was developed by the Bayerisches Landesamt für Denkmalpflege. It consists of a planar mapping with defined colour scheme, a stratigraphic depiction with coloured pictograms and a short description. The aim was to create an easily understandable and clear working tool that allows a quick optical comparison between different finds. It should be an instrument to be used by conservators and archaeologists for the documentation of organic remains on artefacts or in in-situ blocs. Additional information gained during the process can be added easily. This scheme was mainly developed for the documentation of mineralised textiles from Early Medieval graves, but it can also be used for objects from other periods and different states of preservation. An important aspect of this standardised mapping system is that it can be modified on an individual basis to fulfil different special requirements.

Runde Sache? Der Hunteburger Mantel A

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Aus den norddeutschen Mooren wurden im 19. und in der ersten Hälfte des 20. Jahrhunderts zahlreiche archäologische Textilien geborgen. Viele davon hat Karl Schlabow der Öffentlichkeit nahegebracht. In jüngerer Zeit hat sich gezeigt, dass eine Revision des Materials aus verschiedenen Gründen wünschenswert ist.

1949 wurden bei Hunteburg zwei nebeneinander liegende, männliche Moorleichen entdeckt. Jede war für sich in ein großes Wolltuch eingewickelt (Mäntel A und B). Weitere Kleidungsstücke fanden sich nicht. Eine ^{14}C-Datierung weist auf das Jahr 270 n.Chr. ± 50 Jahre (van der Sanden 1996:192). Die Gelegenheit zur erneuten Untersuchung des Mantels A aus Hunteburg, Kr. Wittlage (jetzt Lkr. Osnabrück) ergab sich, als sich der im Landesmuseum Hannover aufbewahrte Fund zu Restaurierungszwecken im Deutschen Textilmuseum in Krefeld befand.

Der Wollmantel wurde als 2/2-Köpergewebe in z/s mit ca. 12-13 x 6(-7) Fäden pro cm gewebt. Als rechteckiges, allseitig von Brettchenborten eingefasstes Textil wurde es seit Jahrzehnten als Produkt eines Gewichtswebstuhls aufgefasst. Allerdings weicht der innere Aufbau der Anfangskante von typischen auf dem Gewichtswebstuhl hergestellten Textilien ab. Ohne Zweifel ist der Einsatz dieses Webgerätes möglich, um exakt dieses Ergebnis zu bekommen. Doch gibt es einige Punkte, die dagegen sprechen könnten, wenn man berücksichtigt, dass die Weberinnen arbeitssparende Techniken kannten und nutzten, wie verschiedene Beispiele aus dieser Zeit belegen.

Als Alternative wird hier der Rundwebstuhl vorgeschlagen. Die vorgefundenen Details lassen sich gut mit den Merkmalen eines Produkts dieses Webgerätes vereinbaren. Die Brettchenborten wurden demnach nachträglich angewebt, an Kante A wohl in einer an Karl Schlabows Vorschlag angelehnten Weise, die letztlich auch Erika Arndt bei ihrer Rekonstruktion des ganz ähnlichen Mantels B aus Hunteburg angewendet hat – wenngleich beide von einer Entstehung der Brettchenborte während des Schärens der Grundgewebekette ausgegangen sind.

Der aus vorchristlichen Jahrhunderten in Dänemark wohl bekannte Rundwebstuhl rückt erst seit kurzem in das Blickfeld der Forschung zur Römischen Kaiserzeit. Nachdem am „Prachtmantel I“ aus Thorsberg – einem der berühmtesten Textilfunde aus jener Zeit – Merkmale nachgewiesen wurden, die eine Produktion auf dem Gewichtswebstuhl widerlegen und für die Herstellung auf dem Rundwebstuhl sprechen, und entsprechende Merkmale auch am Hunteburger Mantel A (sowie sehr wahrscheinlich auch an Mantel B) vorliegen, muss der quasi selbstverständliche Rückschluss von Brettchenborten auf den Gewichtswebstuhl aufgegeben werden.

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The Daetgen Trousers

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Only a small number of pairs of trousers of the first Millennium AD have been discovered. Besides linen finds from Central Asia, Syria and Egypt, just a few wool trousers have survived in Northern Europe. The Archäologisches Landesmuseum Schloss Gottorf possesses four pairs of those wool trousers: the two Thorsberg trousers (FS 3684 and FS 3685), the Damendorf trousers (KS 10924) and the Daetgen trousers (KS 11919b).

Trousers cover the underbody and the legs by two connected trouser-legs. Regarding the construction, all early trousers have certain features in common, but differences in pattern-cutting can be pointed out. It is remarkable that the three earlier dated trousers of Thorsberg and Damendorf show more advanced cut than the trousers of Daetgen. Yet, this small pair of trousers deserves more attention than it received in the last century.

The Daetgen trousers were lifted by accident in May 1906. They must have been in one piece as the first writings and sketches by Mestorf and Rothmann (Schleswig-Holsteinisches Museum vaterländischer Alterthümer Kiel) show and describe the trousers in the shape they are still in today. In former decades not so much effort was taken in documenting the conservation carried out on every textile. So first of all the history of treatment of the trousers had to be reconstructed. It became evident that some unexpected stitches, which give the trousers a strange deformed shape, were original, but also that loose fragments were wrongly fixed on the support fabric, without taking into account the grain of the weave. A detailed study of the pattern-cutting was undertaken. These results gave a new image of the construction in comparison with the publications of Schlabow (1976) and Hald (1980). Finally a replica was made to find out more about the fit of the trousers and the size of the wearer of this exceptional garment.

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Old Fragments of Women's Costumes from the Viking Age – New Methods for Identification

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Looking for the lost context of archaeological finds that were excavated in the past is often the only way to regain information that can lead to partial costume reconstruction. Ethical practices in archaeology and conservation have developed dramatically in the recent past, and finds discovered many years ago were not documented according to current standards. However, micro-stratigraphy of textile finds gives important clues as to their former use, and the position of textiles on metal objects in particular can be the key to partial costume reconstruction.

A project for rediscovering and re-evaluating old textile finds from the Viking Age was undertaken at the University Museum in Bergen. In the past, textiles and metals that were found together were often separated, unfortunately without any detailed documentation. The main focus of the project was to find the original position of the textiles on the metals, and to reconstruct the micro-stratigraphy if possible.

The first step in the working method involved a detailed study of the textile fragments. A computer programme for vector drawing was used to assist in the synthesis of complicated finds. The second step was to compare the stains and imprints on the textile fragments with the shape of the metal objects that possible to find a correlation between the textile and the metal. In the third step, a portable XRFspectrometer was used to check the elements present in the stains on the textiles. These were then compared to the element spectrums of the metals that were found close to the textiles. This working method made it possible to create distinct reconstructions of many of the finds, and to expand the knowledge of the details of women's costumes from the Viking Age in the western Norway region. It was possible to identify different types of garments, the evidence of which was substantiated by reconstructed micro-stratigraphy and other specific details of the textile fragments. Since only small fragments of garments were analysed, the majority of which come from the chest area, the features of complete women's costumes have been intentionally left open. Re-evaluating textile finds discovered in the past was a challenging project that has regained important information about particular grave finds that had been lost in the past.

Surprising Discoveries in the National History Museum of Latvia

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Ten years ago the National History Museum of Latvia obtained collections of artefacts, which previously belonged to the Institute of Latvian History. While working on the materials excavated from the Cunkani-Drengeri burial ground in 1982 several uncleaned blocks of soil were discovered among the ornaments belonging to a female burial from the 8th-9th century. These blocks possibly contained textile materials from the burial. The process of researching these collections is still underway.

During the preparation of the soil blocks, a fragment of a wool shawl with a tablet-woven band and bronze ornaments was discovered, as well as several fragments of leg bindings. The leg bindings intended for covering the shins were made using a weaving method so far unknown in the territory of Latvia and covered in diamond-shaped decorations. Even though most of the decorations have decomposed, it is possible to make a reconstruction of their original appearance and positioning. Also in other burials from the same burial ground several indications have been found about the costumes of the region and their decorations.

These new materials come from a region of Latvia where almost no previous discoveries of the costumes worn by its inhabitants have been made. Thus, they are unique for the country, revealing new ways of making clothing. The analysis of the new materials, as well as the repeated analysis of the existing materials from the same region, has led to determining certain patterns of garment-making characteristic of its inhabitants. These patterns differ from those encountered in other regions of Latvia.

Currently the research of the new materials is still ongoing, therefore more detailed information will be available in spring 2014.

Medieval Textiles and Fibres from a Lead Mine at Sillerholes, West Linton, Scotland

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In the mid-1990s a group of textiles and fibres were discovered in southern Scotland following the excavation of a boggy area for land improvement by a private developer. The findspot at Sillerholes is located in an area of long-standing mining activity south of Edinburgh. Indeed, the place-name refers to silver holes or mines, and this area has been a site of lead mining and silver extraction since at least the medieval period, and possibly as early as the Bronze Age. The textiles from Sillerholes are thought to date to the 13th and 14th centuries, although leather shoes from the same disturbed ground suggest a 12th to 13th century date.

The textile assemblage is the third largest in Scotland, but its importance lies in the fact that it originates at a medieval industrial site, in which miners lived near or on site. The woollen fragments include a range of qualities: tabby, 2/1 and 2/2 twills are represented, although the majority are in 2/1 twill. The patterned textiles show use of naturally coloured and dyed wools to form banded stripes or colour differentiation in warp and weft. Some finishing processes such as fulling and surface brushing are in evidence and may represent household textiles used by the miners and their families. The raw fibres have been identified as horse and cattle, possibly indicating the use of animals for some mining activities.

The textile finds were initially investigated by Thea Gabra Sanders, but sadly she was not able to complete the analysis and report before ill health forced her to abandon the research. The finds have received a fresh look, 20 years on, by the present author. This body of evidence contributes to the growing number of textiles recovered from early industrial areas, and in particular, to mining activities and the people who worked and lived at mining sites.

Medieval Textiles from Wrocław Nowy Targ Square

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From autumn 2010 till winter 2011 archaeological excavations were carried out in Wroclaw (Poland, Lower Silesia) at the Nowy Targ square. It was a unique opportunity to examine one of the oldest settlements in medieval Wrocław. Nowadays Nowy Targ square is located in the centre of the city, but in the thirteenth century it was a periphery of a just established town. In late Middle Ages it was transformed into a marketplace.

Archaeological research covered an area of almost 1000 m². During the excavation numerous remains of wooden buildings and parts of medieval streets have been found. Also large number of artefacts were excavated, such as jewellery, items of everyday use, tools etc.

Moreover, a large textile collection was discovered there, together with a set of tools used to produce them. Apart from local materials there were also remains of fabrics imported probably from all over Europe. All textiles date to the late medieval times. Most of the finds were very well preserved due to special soil conditions. The preliminary analysis showed that the fabrics were made of wool or silk. In certain cases during the conservation it was possible to restore original colour of the textiles.

„Fossile“ Textilien

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Zahlreiche spätmittelalterliche Pfeifentonfiguren (*Terrakotten*) aus rheinländischen Werkstätten zeigen an ihrer Oberfläche oder in ihrem Bruch Spuren von Textilien. Die Produzenten dieser Figuren, die sog. Bilderbäcker, ferner auch die Ausformer figural verzierter Ofenkacheln aus der gleichen Epoche, verwendeten Stoffstücke in diversen Phasen des Herstellungsprozesses und zwar als Hilfsmittel. Die Bilderbäcker platzierten sogar Gewebe im Inneren der Pfeifentonfiguren, damit diese dort bestimmte Aufgaben erfüllten.

Hierbei wurde offenbar auch billigend in Kauf genommen, dass die aus organischen Materialien bestehende Textilie den keramischen Brand mit Temperaturen um die 600-800 Grad Celsius nicht übersteht, sondern restlos verbrennt. Dennoch liefern die die Fäden umgebenden Tonpartikel ein mehr oder minder getreues Abbild des ehemaligen Gewebes.

Aus textilforscherischer Sicht erfuhr diese Fundgattung bisher wenig Beachtung, obwohl die erkennbaren Reste mehrere Aussagen über die Textilien erlauben: So beispielsweise über die Bindungsarten oder über die Fadendichte ferner auch über die Rohmaterialien. Des Weiteren können stellenweise die Spuren von Veredelung erkannt werden.

Allerdings muss wegen des „fossilen“ Charakters dieser Textilien die Bestimmung ihrer Ober- oder Unterseiten ebenso entfallen wie ihre Farbanalyse. Denn in der Regel kann nur eine Seite betrachtet werden und die Fragmente haben alle – bedingt durch die sie umgebenden Tonpartikel aus dem eisenarmen Ton der rheinischen Lagerstätten – eine weiße Farbe. Darüber hinaus ist auch die Unterscheidung zwischen den Faserverläufen wie S-, oder Z-gesponnenes Garn bzw. Zwirn oder zwischen den sich rechtwinklig kreuzenden Fäden (Kette und Schuss) nur selten bis gar nicht möglich.

Im Rahmen der Präsentation sollen nicht nur mehrere keramische Gegenstände mit Textilabdruck gezeigt, sondern auch die bereits gewonnenen Erkenntnisse aus dem laufenden Forschungsprojekt im Hinblick auf die Gewebe selbst vorgestellt werden. Dazu zählen auch die Erklärungsmodelle für diesen verschwenderischen Umgang mit den in jener Zeit auch noch in Handarbeit hergestellten Materialien und die möglichen Zusammenhänge zwischen zwei Handwerkszweigen auf lokaler Ebene. Des Weiteren soll auch die chronologische Eingrenzung dieses Phänomens erfolgen.

Silk Liturgical Vestments excavated in the Parish Church of St. Nicolas in Gniew

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During excavation works conducted inside the parish church of St. Nicolas in Gniew, many burials containing the relics of silk grave garments were revealed. They included two graves of priests with parts of liturgical vestments preserved. The priests were buried between the 16th and 18th centuries. In the course of examining the graves, two chasubles and stoles were identified. They had been made from silk fabrics and were preserved together with ornamental trimmings/passementerie, which marked particular parts of the vestments and the stoles. Smaller fragments of bands, which created a sign of a cross, regularly appeared on both ends of a stole. The textiles are of brown colour at present, which is connected with putrefaction processes during decomposition and degradation of natural pigments and dyes used on silk fabrics.

Burials of Catholic priests have always been connected with slight departures from the norms obligatory for traditional burial ceremonies. The priests' graves situated under the church floor are positioned in the opposite direction to the usual rule, thereby alluding to the role of the clergy as shepherds of the believers even after death. Sumptuary law did not apply to the clergy. Parishioners buried their confessors in their silk chasubles, which they had worn during their life. Sometimes the chasubles were stitched together for burial from old and worn out silk items and this was the case for the two priests buried in the parish church in Gniew.

Parts of the liturgical vestments were subjected to detailed technological analyses in a laboratory. Simultaneously, both priests' remains were analyzed anthropologically within interdisciplinary studies performed in cooperation with the Laboratory of Archaeological Heritage Conservation in The Institute of Archaeology and the Department of Anthropology in the Faculty of Biology and Earth Sciences of NCU in Toruń. Elaboration of the information is included in a Ph.D thesis currently being prepared, focusing on detailed analyses of the finds (liturgical vestments) from archaeological sites located inside historic parish churches in Poland.

Funerary Dress and Textiles in the 17th and 18th Century Burials in Oulu, Finland – Theoretical Considerations on Identity

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The aim of this paper is to present recent research into the 17th and 19th century burial textiles unearthed at the modern Oulu Cathedral in Northern Finland, as well as the clothes of mummified bodies still under the floors of northern Finnish churches along Bothnian Bay. Altogether 317 burials have been excavated in Oulu. Even though many burials contained only the remains of the coffin or human remains, in others a significant number of textile remnants have been preserved. The attire of the mummified bodies is occasionally in perfect condition. Mummification is caused by the frost and dry temperature of Finland's winter, and the season of the burial has affected the preservation of textiles as well. Inventories of the church burials continue, but so far more than 100 burials have been found. Consequently, the research into textiles from Oulu and the surrounding countryside churches is still at an early stage.

The fabrics and accessories used for the clothes of the deceased and the interior of the coffin may reveal the differing social status of townsmen of Oulu, as well as of people in the countryside, during the early modern era. The research methods are non- or microdestructive. CT-scanning and visual analysis of the textiles in the coffins provide important information on the funeral customs and their variations. Traditional visual analysis with the naked eye and aided with microscopic examination is the main method used to understand the textile structures and to determine the fibre materials. One aim is to find out the origin of the northern Swedish 17th to 19th century clothes (local or European) and their trade routes. HPLC-PDA analysis has been carried out on some wool textiles to detect dyestuffs and possible mordants. Local or imported dyestuffs may help to indicate the origin of the threads or textiles. Fibre analysis is applied to shed light on the origin of wool material and to determine wool types.

The research into the origins of local and imported textiles may reveal some important factors on the social organization within the cemeteries. The complexity of the matter is emphasized through the aspects of value, quality and dyes (colours). One aim of these above-mentioned analyses is also to reconstruct possible differences in the funeral clothes among certain social groups. In Oulu and its surroundings (then part of Sweden), clothing was regulated through sumptuary laws. The intention is to study how this is visible in the cemetery and church burials. What does the dress of the deceased tell us about a person's identity; gender, age and social status? How does the funeral dress reflect society's conception of these matters? The paper looks for theoretical starting points that textile research can adopt in answering the questions posed by social archaeologists.

A Renaissance Woman's Silk Cap from a Copenhagen Moat

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In 2011-12, as a result of expansion of the metro in Copenhagen, archaeologists have explored the history beneath the city. When the old 17th century moat was excavated, a small silk cap was unearthed. The cap is made of silk in two layers, an outer patterned layer and an inner tabby-woven layer. It is of a very fine quality. Between the layers, traces of cardboard were found and this was probably used to stiffen the cap. The cap appears brownish today, but the pattern originally consisted of more colours. Only one binding strap is preserved and on the front, a 4.5 cm wide piece of lace was attached. It is unfortunately missing today. The cap is a woman's cap and it is preliminarily dated to the 16th or early 17th century.

Depictions of Danish townswomen from this period show an otherwise uniform style of headwear consisting of layers of linen (a headcloth), very different from the cap excavated in Copenhagen. However, probate records of deceased townswomen from a number of Danish towns show a more nuanced use of headwear, in which local and international styles, traditional and fashionable styles were worn side by side. The internationally fashionable styles of headwear are thus usually associated with ladies of noble rank but could be obtained by women of the lower classes.

The silk cap is undoubtedly a fashionable cap, and unique as it is possibly the first common woman's cap dating to this period found in Denmark.

This paper presents the new analysis of the cap, which together with the use of historical documents to provide a context can offer suggestions to the possible use and wear of townswomen's dress in renaissance Copenhagen.

"He is of no account … if he have not a velvet or taffeta hat": A Survey of Excavated Sixteenth-Century Knitted Caps

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There are relatively few garments from the sixteenth century available for study and those that are have been well researched and reported (for example, Arnold, 1985, 1988 and 2008), and tend to belong to dress collections. This paper presents new insights into the largely overlooked and surprising number of extant examples of knitted caps from the Tudor era found and conserved in archaeological contexts.

A total of 104 knitted items of sixteenth century headwear were identified in European collections as far flung as Ireland and Croatia. Some were preserved in peat bogs, others shipwrecked, and many more unearthed during building work in cities. The caps and their linings show a surprising homogeneity, given that knitting patterns do not appear to have been circulated until much later eras and most cappers learned their trade by eye and experience (Buckland, 2009). The caps were surveyed between 2009 and 2013, using modern methods of collaborative investigation to draw the disparate data together. The investigators' aim was to draw new conclusions from objects which had not been systematically analysed, recorded or compared, despite being in museum collections for a long time (in some cases, for more than a hundred years).

The paper concentrates on the 53 examples at the Museum of London (now published online) all of which came from early urban archaeological digs in the City of London. They represent a very well-preserved but unglamorous specimen collection (sadly without detailed provenance) which reveal a range of production techniques, yarns, colours, finishing quality, and knitting tensions. Comparison with other extant examples provides guidance on different constructions with typical features and techniques from which clear classifications were deduced. The paper also explores how an archaeological approach to fragmentary remains (as is used for ancient textiles) may be applied to a large number of excavated early modern garments held in dress collections.

This paper demonstrates what can be learned from the re-discovery of these surviving specimens of lower-class sixteenth century dress and suggests what more could be discovered through applying current techniques of fibre and dye analysis.

Gold and Silver Decorative Metal Laces in the 16th and 17th centuries in Ireland and Europe

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The significant increase of the gold and silver pouring into Europe in the 16th and 17th centuries was due to the riches secured by the kings of Spain and Portugal who, in conquering South America, became enormously rich. This wealth spread through royal courts and aristocratic families, and some part of it was used for the decoration of expensive clothes. In addition, from the late Middle Ages the making of metal filaments and decorative laces became very profitable since the methods of production had been changed by the developing techniques of 'casting and drawing.' These two factors enabled wealthy people to demonstrate their power and importance through the decoration of their clothes. A wardrobe of high class dresses and suits made from expensive cloth and gold and silver decorations was just as useful currency as bags of coins.

Examples of such expensive metal laces have been excavated from some Irish castles and confirm the popularity of these decorative items of dress. Since it was the habit to send the worn laces back to the lace makers and gold and silver smiths to be melted down for further use, finds from domestic sites are rare. Two laces were found at Clogh Oughter Castle, Co, Roscommon; from Castledonovan, Co. Cork several pieces of a length of lace had each been folded and stitched originally to a garment but now have been cut off and are in small folded pieces. The piece from Dublin Castle is of a baser quality being mostly made of copper; with a small amount of silver added it could look something like gold.

The Scanning Electron Microscopy work undertaken on the Clogh Oughter Castle finds has demonstrated the fine details of the composition of the metal lace threads, and determined that there was also at the same time the death of the person who wore them. High definition photographs were taken of the 'gold' and silver threads at the same time.

Portraits of the Irish aristocracy included in this paper show how the use of metal laces and fringes is an important part of their identity of both nationality and status. Another development of change was the destruction of the Irish nation, largely due to the Reformation of churches in Ireland as well.

The Catholic religion was strongly linked with the indigenous ways of dress and culture. These changes can be seen in these Irish portraits; one such painting of Sir Neil O'Neil, (1680), known as "The Irish Chief", relates the complex story of his dress, status and history, by wearing and using specific items of clothing, arms and other accoutrements.

A Hidden Treasure of Silver and Silk

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During archeological excavations in the castle of Dollnstein, near Eichstätt in Bavaria a hidden treasure of silver was found within a residential building of the early 14th century. 4000 silver coins that ranged in date from before 1200 up to 1360/70, as well as several valuable artifacts were hidden in a ceramic pot: small gilded silver plates, a silver brooch, beads of coral, decorations made of silver threads and a silver ring. In addition, precious textiles of silk and linen were deposited.

A detailed investigation of the extremely fragile fragments uncovered important information about the production and use of the fabrics and the silver ornaments. This was possible by using the technique of non-destructive examination of 3D computer tomography. In the course of this work, an object in the shape of an eagle was identified as a brooch by finding the corroded pin on the reverse, covered with different textile structures. Further it was possible to reconstruct/make out a 1.6 cm wide silk band decorated with 14 silver fittings alternating with beads of coral. The band had been carefully folded before it was placed in the pot. The reason for concealing the treasure and its historical background are up to now uncertain.

The paper will point out the possibilities and the limits of the analysis of the poorly preserved textiles and provide an insight into the practical handling of the findings at the Bayerisches Landesamt für Denkmalpflege.

The Reliquary of Starigard / Oldenburg

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The modern town of Oldenburg in Holstein situated east of Kiel close to the Baltic Sea derives from a Slavonic settlement from the beginning of the 8th century. Starigard, as the place was called in the historic sources, soon prospered and became a wealthy sea-trading place and the westernmost capital of the Slavonic world. It became the main castle of the Wagrian Slaves, a tribe of the Obotrites Slaves. From the mid 10th century until 1160 it was also the place of a missionary bishopric. But it had already lost its importance by 1149 when the Danish conquered the castle and destroyed it.

The excavation in the 1980s revealed a graveyard dating to the 10th century with rich grave goods. In grave no. 74 (955-983 AD) a find-complex consisting of textile and gold objects was lifted as an in-situ block. The first insights based on X-ray analyses were published in “Europas Mitte um 1000” edited by Alfred Wieczorek in 2000. The objects were interpreted as a precious reliquary (*Reliquienbeutel*) and kept frozen at -20°C for 30 years. In 2013 a laboratory examination based on X-rays and computed tomography (CT) was started. The first results with textiles, gold threads, gold sheets and a complex microstratigraphy give hope for much more.

The paper seeks to summarize the research history of the object, the opening of the in-situ block in 2013, its results and the presentation of the object in the museum.

Analysis, Reconstruction and Interpretation of two Early Medieval Silks from Kruszwica

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Among the oldest historical textile objects deposited in the Collection of Textiles of the National Museum in Warsaw are two silks found in 1961 during archaeological excavations in St. Peter and Paul collegiate church in Kruszwica, in a grave dating from the turn of the 12th century. They have not yet been analysed, except for some approaches to interpretation of ornaments made in the 1960s.

They represent fragments of silk fabrics woven in weft-faced compound weaves and embroidered with silk and metal thread. One of the fabrics is a band with Latin inscriptions, the second is a stole ornamented with the figures of bishops.

The paper presents the results of structural and physico-chemical analysis of fragments and an approach to computer reconstruction of their original appearance. Comprehensive analysis of similar objects from the same period, as well as the re-interpreted inscriptions lead to some hypotheses concerning the origin of the textiles. The high quality of the finds demonstrate the important position in the church hierarchy held by the man buried in the grave. They form archaeological evidence confirming the historical investigations which indicate that Kruszwica was a seat of the Wloclawek bishop in that time.

Application of Computer Vision to Cross-Collection Characterisation of Historic Silk Textiles

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This paper presents the results of my PhD dissertation research which applies computer-based imaging technologies to examine historic silk production evidence more intensively than was formerly possible. My programme combines high-resolution images with a computer vision software application to measure quality and workshop characteristics of weft-faced compound weave figured silks attributed to Mediterranean and Near East workshops between c. AD 600-1200. Surviving complex figured silks are significant in both historical and technological terms. At the time, developments in complex pattern weaving had a profound effect on the organisation of work and the spread of weaving methods. In particular, drawlooms represented one of the first instances of mechanically sequenced and memorised work in history.

For a variety of reasons, research progress for this category of textiles has slowed in recent years with few scholars now active in the field. While essential to protect fragile textiles from damage, the practical consequence of strict museum conservation standards has been reduced collections access for textile scholars. Resource constraints and structural changes in museum practices mean that many institutions now focus on exhibitions rather than research. At some institutions, large textile collections built up on the heels of the antiquarian era now languish. Even at well-resourced institutions, there is little opportunity for incomplete or antiquated collections documentation to be updated. In the face of these challenges, dramatic advances in digital imaging provide opportunities for the development of new methods for investigation and documentation.

My research protocol combines a research grade digital microscope with a custom-built stand to perform precise digital 'sampling' for measurement of textile attributes including yarn characteristics, textile structure, density and pattern unit features. The computer vision application aids in error detection, providing a basic form of industrial inspection for ancient textiles. The outcome is a set of objective and reproducible measurements enabling specific comparison of attributes across different collections. By using my portable equipment setup, I was able to record 127 silk fragments in ten different collections in North America and Europe. Analysis demonstrates patterns of work practices and imitative pattern reproduction among workshops. Results also help to re-unify textiles divided in antiquity or after excavation. In the future, this methodology could provide the basis for a shared database of images available to a broader community of researchers.

An Assemblage of Medieval Archaeological Textiles from Prague: a Study of Current and Original Colours

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The paper presents research into medieval textile and dyeing technologies by means of a detailed study and archeometric analyses of a unique assemblage of 1,300 textile fragments obtained from archaeologically investigated medieval waste layers. The set of textile fragments was obtained during rescue archaeological excavations of the entrance shafts of collectors in the New Town in Prague conducted, between 2004 and 2007. The vast majority of textile finds are wool fulled cloth, while unfulled cloth, silk textiles, laces, strings and felt are also represented. The potential of the preserved assemblage lies in the quantity and variability of textile types and the colours of the individual fragments, which are suitable for comparisons with the results of European textile finds that have already been processed.

The first phase of our work was a comprehensive textile-technological investigation, with an emphasis on the study of the density ratio of warp and weft threads. The second phase of the work involved the documentation of the current colour of the fragments by taking measurements with a spectrophotometer in the visible part of light spectrum, with a definition of colour using CIELAB coordinates. The third phase involved the establishment of the original colour by determining the remnants of organic dyes and evidence of the presence of inorganic mordant metals. Organic dyes such as red anthraquinones, yellow flavonoids, blue indigo and black tannins were analysed following their extraction from fibres using liquid chromotography with mass spectrometry detection. Inorganic mordants or weighting metals such as aluminium, iron and copper were analysed using an X-ray spectrometer. A synthesis of the resulting analytical data of organic dyes and inorganic metals provides a suitable comparison with theoretical information from preserved medieval written sources in which dye sources and methods are recorded. The final phase was a comparison of the current colour with the determined original colour. Thanks to the identical find contexts and soil conditions at the excavation site, it was possible to establish the colour changes during the course of the archaeologisation of the textile fragments in connection with the type of fibres used.

Identifying Local and Non-local Textiles in Medieval Assemblages from around the Baltic and North Seas

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A chemical method of examining the origin of a sample of wool offers the possibility of distinguishing between

(i) locally-made objects in local styles,
(ii) local copies of non-local styles, and
(iii) imported material in non-local styles.

This is important because it allows discrimination between the movement of textiles and the movement of ideas about how textiles are made. However the definition of 'local' at a given site may not be simple, depending on site type (rural/urban) and the specific methods used to analyse the textiles, whether these be zones of manufacturing practice (structural and dye analyses), breed groups (fleece type analysis), or sheep grazing environment (light stable isotopic analysis).

This presentation will discuss the results of light stable isotopic analysis of wool textile finds from two strongly contrasting medieval assemblages: high status urban graves at Birka, Sweden (C9-10th) and low status rural settlement at Hessens, Stadt Wilhelmshaven, Germany (C7-8th) in the light of established archaeological, scientific and documentary criteria. Some of the difficulties in linking multiple criteria for identifying non-local textiles will be explored. The application of this method to further sites from the Baltic and North Sea regions, focusing on both Frisian and Hanseatic trade links, will be discussed.

Four Coptic Textiles from the Louvre Collection ^{14}C re-dated after 55 yr

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In 1957/8 the curator and art historian P. du Bourguet had 4 Coptic textiles ^{14}C dated by the Saclay laboratory. The results were rejected, not because of the large standard deviation (>100yr) but because they didn't fit in his chronological framework based on typological comparison.

Furthermore textiles that should have comparable ages were dated several centuries apart. As a result of this investigation for many decades art historians rejected radiocarbon as a dating tool for Coptic textiles.

Re-examination of the old data and new ^{14}C dates revealed that mistakes were made in the reporting as well as in the interpretation of the data and that the textiles were much older than expected.

Posterpresentation

Newly elaborated textiles from the royal crypt in the St. Vitus Cathedral at Prague Castle – The ribbon made on tablets and the children tunic
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Ein vorinkazeitliches Textil aus der Ur- und Frühgeschichtlichen Sammlung der FAU Erlangen-Nürnberg
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A Late Medieval hood from Vučedol in Eastern Croatia
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Possibilities of cooperation with Faculty of Textile Engineering
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Investigations about the Dissemination of Dyeing in Prehistoric Europe
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Silk in artificial flowers and grave wreaths in Poland (16th – 18th c)
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Icelandic Archaeological Textiles: their role and place in the North Atlantic
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Finnish Late Iron Age Patterned Tablet-Woven Band (Präsentation – tablet weaving)
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The decorative bands of a medieval textile reliquary from the Cathedral of Turku, Finland
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Protogeometric Funerary Textiles from Stamna, Aitolia, Greece
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The fabric of a South Italian Archaic Society - Textiles from Ripacandida, Basilicata
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Pollen study of medieval textiles
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Kontush sashes from the crypt of The Holy Virgin Mary's Name church
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Textile remains in hallstatt graves in Alsace (France)
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Brocaded in Gold. Two Tablet-Woven Baldrics at the Germanisches Nationalmuseum, Nürnberg
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Textile analysis from Wisloujscie Fortress
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Archaeobiological evidences of textile production in the Early Neolithic site of La Draga
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Selected headwear of archaeological research in Poland on
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A Protogeometric Urn Cloth from Stamna, Aitolia, Greece
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Totenkleid, Leichentuch und Federstreuung
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Die Spur der Fäden. Perlenensembles und ihre Aussagemöglichkeiten
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Pre-European Maori textiles from South Island New Zealand
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Preliminary report on textile finds from the chieftain´s grave in Poprad- Matejovce
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