The Competition of Fibres

Workshop
March 8–10, 2017

Excellence Cluster Topoi
(A-4) Textile Revolution

EXCELLENCE CLUSTER TOPOI

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Venue
Topoi Building Dahlem
Hittorfstraße 18
14195 Berlin

Early textile production…

…was linked to raw material procurement strategies. Fibre treatment and processing greatly depend on both, the nature and the quality of the resources that are used, as well as on the desired end products. Fortunately, the different modes of exploitation and use leave recognizable traces in the archaeological record. Especially the studies of textile production processes provide different strains of evidence for the investigation of technological adaptations.

This workshop will deal with plant and animal raw materials that are represented in the early phases of fibre production. The aim of the meeting is to stimulate discussions on the relationship between different fibre resources and modes of their exploitation. Special attention will be given to the textile production process. The development of fibre material advantages will be reviewed in a broader context of environmental, cultural, economic and social causality.

Content

Program

Wednesday, 08.03.2017

15:00
Welcome and opening

15:15
Catherine Breniquet
Early Wool of Mesopotamia, ca. 7000-3000 BC. Between Prestige and Economy

15:45
Orit Shamir
Linen Textiles Production – Continuity and Discontinuity from the Neolithic Period to the Chalcolithic Period in the Southern Levant

16:15
Coffee break

16:45
Thaddeus Nelson
Fibers, Fabrics, and Looms: A link between animal fibers and warp weighted looms in the Iron Age Levant

17:15
Janet Levy
Archaic, male exclusive, loom from Oman

Keynote lecture

19:15
Ofer Bar Yosef
The Neolithic Revolution in the Fertile Crescent and the origins of fiber technology

Reception

Thursday, 09.03.2017

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Wolfram Schier
The Topoi Research Group ‚Textile Revolution' – archaeological background and multi-proxy approach

09:30
Ana Grabundzija, Chiara Schoch
Fibres to Fibres, Thread to Thread. Comparing Diachronic Changes in Large Spindle-whorl Samples

10:00
Norbert Benecke, Cornelia Becker, Christian Küchelmann
Finding the woolly sheep: meta-analyses of archaeozoological data from SE-Europe and the Near East

10:30
Martin Park
Proxy evidence for early pastoral subsistence following an environmental approach

11:00
Coffee break

11:30
Kalliope Sarri
Taming the fibers. Tradition and innovations in the textile cultures of Neolithic Greece

12:00
Sophia Vakirtzi
Ex Oriente Ars ? Anatolianizing spindle-whorls in the Early Bronze Age Aegean and their implications for fiber crafts

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13:30
Małgorzata Siennicka-Rahmstorf
Flax, wool or both? Evidence for different types of fibres in Early Bronze Age Greece (3rd Millennium BC)

14:00
Agatha Ulanowska
Different skills for different fibres? The use of flax and wool in textile technology of Bronze Age Greece in light of archaeological experiments

14:30
Coffee break

15:00
Margarita Gleba, Susanna Harris
Fibres for Splicing - Technology and Technique in the Ancient Mediterranean

15:30
Vanya Petrova
The Travelling Spinners of the 4th Millennium BC in the Balkans

16:00
Virginia Rimkute
Plants and plant fibres of the Eastern Baltic Littoral in the Neolithic – Bronze Age: experiments on processing and textile production

Soiree at „Holzlaube"

Fabeckstrasse 23–25,
Lecture room -1.1009

18:00
Helmut Kroll
Über die Archäobiologie im 20. Jahrhundert

Reception and buffet

Friday, 10.03.2017

09:00
Sabine Karg
Know-how about flax production of Neolithic farmers in the circum-alpine region

09:30
Johanna Banck-Burgess
„Verkannte Revolution", Bedeutung von Gehölzbast im Kontext neolithischer und frühbronzezeitlicher Textilien aus Feuchtbodensiedlungen

10:00
Anne Reichert
Wettbewerb der Fasern – Textile Materialien der Steinzeit und ihre Verarbeitung

10:30
Coffee break

11:00
Karina Grömer
Hallstatt Textiles - Raw materials, Textile Technologies, Innovations and Cultural Response in Central Europe in the 2nd and 1st mill. BC

11:30
Ulrich Schmölcke, Elena Nikulina
Microscopic and archaeogenetic studies of hair

12:00
Linda Hurcombe
Competing fibres: the plurality of clothing solutions

12:30
Final discussion

14:00
Departure

Abstracts

Catherine Breniquet

Early Wool of Mesopotamia, ca. 7000–3000 BCE. Between prestige and economy

As seen from the Old Babylonian period, Mesopotamia is the "Land of Wool". Sheep are herded for their meat and wool. Since the end of the 3rd millennium BC and the Ur III period, huge manufactures produce cheap standardized fabrics and clothing on an unknown scale. Women and their children are employed in these large workshops. This situation is often interpreted as a specific adaptation to the arid environment since prehistoric times, as a consequence of an unchanged situation. An evolutionary perspective provides the theoretical frame. Written sources shed light on the matter and allow to evaluate the economic role of nomads, palace and temple, as well as those of the private owners since the urban revolution. However all this reconstruction, if not false, needs to be improved, especially in the light of data concerning the prehistory of the alluvium, in a wider perspective.

Now, we understand better the natural evolution of the alluvium from the beginning of the Holocene period. Neolithic villages and first cities grow up in a marshy landscape where sheep are very rare. A complex balance between geomorphological evolution with the rise of the sea level, the progress of the alluvium and the appearance of a steppic landscape on the margins allowed the development of sheep breeding practices and appearance of specific breeds such as the fat-tailed sheep adapted to arid pastures. In this landscape, it is difficult to believe that wool production was an absolute necessity for textile. The first textiles are made of vegetal fibres, especially linen which is well documented from archaeological records, and well adapted to the natural environment. Iconography provides additional information about the costume or clothing habits of early Mesopotamia. Without surprise, figurines from Late Neolithic contexts show numerous naked or in state of adorned nudity's individuals (jewelry, labrets, belts, straps, scarification or tattoos, etc.). Clothing appears during the Uruk period on iconography, always linked with official contexts involving élite and gods, suggesting that cloth was invented for prestige and not for moral or utilitary purpose. Meanwhile, wool appears as a subsistence ration distributed to male and female workers.

In this respect, the key parameter is the socio-economic development of the Ubaidian communities which settled in the alluvium since at least 7000 BC, and developed from villages to chiefdoms, giving birth to the first urban societies around 4000 BC. Sheep became the animal of prestige and their wool, used both for itself and for clothing, symbol of power and currency in a primitive market economy. While linen remains in use during the 3rd millennium BC for religious uses and requires only water, sheep breeding needs space and plays probably an active role in the delimitation of the first Sumerian cities' borders, and as a consequence, in their conflicts too.

Dressing the power, paying the workers: the invention of clothing in ancient Mesopotamia

"Mesopotamian archaeology is a difficult field for the study of ancient textiles. The majority of textiles are only fragmentarily preserved, if at all, as is the case for tools such as looms made from organic materials. From textual sources, Mesopotamia is known to be the 'land of wool': large workshops with female workers transforming this raw material into fabric are recorded from at least the third millennium BC. But from archaeological evidence, wool is not the first textile fibre to be used and its use emerges under specific environmental conditions in connection with human choices. By using different sources, this paper will propose a new hypothesis on the development of clothing in archaic Mesopotamia (7000-3000 BC) in which political economy plays a major role."

Banea:

Ancient textile production involved a wide range of complex technologies, from collecting and processing fibres, threads and weaving, to all manner of finishing such as bleaching, dyeing and applied techniques. Understanding the technological aspect of textiles requires detailed and specific studies, forwhich considerable advances have been made in textile research in recent decades. Equally significant is our understanding of textiles' consumption,i.e., their wider role and value in the social lives of ancient communities. The rich potential of textile technology and the ANE texts, many of which provide clues on modes of circulation of textiles, prompts fresh examination of topics such as: the role of the aesthetic of textiles in creating social identities, their value in perpetuating, personifying or transforming power networks, and their visual transmission across technologies.

Thaddeus Nelson

Fibers, Fabrics, and Looms: A link between animal fibers and warp weighted looms in the Iron Age Levant

This paper presents a comparative study of textile tools and textile remains from the Iron Age II (c. 1000 – 500 BCE) Levant as a means to investigate production and procurement of textiles made from distinct fibers in international economies. Loom weights are a nearly ubiquitous component of Iron Age II material culture that record widespread use of warp-weighted looms. Yet there is no consensus on the physical characteristics of the textiles weavers used these looms to produce. Thus, it has not been possible to investigate the relationship between Iron Age II textile production and activities such as herding, farming, trade, tribute, or cult. This study reconstructs the fabrics made with Iron Age II warp-weighted looms from measurements of loom weights from twelve sites. These reconstructions are compared to textile remains and textile impressions in order to describe the variation in fabrics that could have been woven with warp-weighted looms. This method shows that Levantine warp-weighted looms were best suited for weaving multiple types of animal fiber (i.e. wool and goat hair) textiles rather than fine bast fiber (i.e. linen and hemp) fabrics.

Janet Levy

Archaic, male exclusive, loom from Oman

Women are bad news and even more so menstruating women; the concept prevails in at least a broad geographic swathe from Agadir to Peshawar. They should not be permitted to touch camels or buffaloes or go near beehives lest their baleful influence affects productivity or provokes death of livestock.

The use of this primeval loom type and equally archaic mode of yarn production was apparently adopted from an older existing prototype from or generated by this worldview. This loom type, task specific, used only by men was still in use in the 1980's although women of the same tribes practiced drop spinning and wove on horizontal ground looms.

Very narrow, short textiles woven on this loom type were used specifically for the manufacture of udder bags worn by she camels for weaning purposes. The yarn was finger spun between the index fingers and thumbs of both hands.

The loom type has no name. It is not known to research. There are no photographs. It was documented in a few brief lines by Gigi Crocker-Jones 19xx, in a publication half in Arabic and half in English. The raw material used whether sheep's wool or camel's hair is not stated. I think sheep wool would have served the purpose better; the smell would have been repellent to a young camel familiar with its mother's odours.

The loom consists of a short ad hoc stick wedged under the soles of the feet and a second stick placed just above the knees and tied to each thigh. The weaver is seated on the ground with knees raised. The warping can only be conducted in sandy conditions since the warp thread has to be fed under the bottom stick (warp beam) by pushing aside the sand. The web is extended at about 700 degrees.

I have conducted replication studies on a beach, using local Bedouin, hand-held spindle single ply, woolen yarn. It was backbreaking.

The significance of this revelation is not only its 'novelty' aspect a cultural adaptation/accommodation, a prophylactic-technological measure to keep the evil eye at bay but also it is evidence of one of the invisible links, lost to archaeology, which trace the trajectory between body tensioned looms and looms in which all components are external to the human body.

Ofer Bar-Yosef

The Neolithic Revolution in the Fertile Crescent and the origins of fiber technology

Since the publication of the 19th century seminal volume by Alphonse de Candolle on the "The origins of cultivated plants" it was obvious, although not well understood by Paleolithic archaeologists, that the Neolithic Revolution is foremost about plants not the animals. It was a biogeographic accident that the four domesticated animals- goat, sheep, cattle and pig were mostly available in the Levant. Other centers such as northern and southern China had only millet, rice and pigs. In the Americas, except for camelids the domestication of the maize and the tubers in South America became the base for farming communities.

Annual cultivation emerged among mobile and semi-sedentary hamlets of hunter-gatherers when anticipated mobility within given territories was not feasible or very limited due to social rules. In the course of this important social and economic process the kinds of habitations changed. Houses shifted plans from round to rectangular buildings. Materials employed for construction involved wattle and daub, dried mud bricks and stone but always on stone foundations. Domestic and public storage facilities appeared as well as central ceremonial places such as Göbekli Tepe. Changes in food preparation techniques, burials practices, presence of mobile artisans, and more are the markers of this revolution. Cultivation of cereals in the Levant was initiated in the Levant around 23,000 years ago probably as a temporary reaction to limitations on seasonal mobility due to the increase of the local population. Systematic cultivation began in earnest, as far as we know today, during the time of the Natufian culture (ca. 14.5-11.7 Ka cal BP) and lasted through the PPNA period. However, only during the Early PPNB (10,800/500-10,000 cal BP) the domestication of the various cereals and legumes occurred, a process that lasted until ca. 8,200 cal BP.

A critical difference is that the domestication of flax preceded the domestication of edible plants. Strings or ropes were needed in daily life during the Paleolithic. The proposal that our ancestors employed stripes cut from animal hides, tendons or ligaments, is probably correct. Strings made of plants were an additional option. But finding the remains of wild flax in excavations is a very

rare occurrence. A better way for demonstrating the presence of wild flax fibers is through the analysis of Non-Pollen Palynomorphs (NPP). Microscopic fossil wild flax fibers were first discovered in Late Paleolithic sites in the Caucasus and China. However, strings from domesticated flax were uncovered in the Judean Desert by 11,500 cal BP, thus at the onset of the Neolithic Revolution. It would not be presumptuous to assume that the process of flax cultivation began by the Natufian culture or even earlier. Growing flax probably continued through the PPNA but it is certain that the domesticated plants were available for making strings and thread by PPNB time. Twenty five radiocarbon dates of various organic objects retrieved from Nahal Hemar cave in 1983 include eight linen samples. They all fall within the early to early middle PPNB (ca. 10.1-9.7 Ka cal BP). The various knotted netting is a technique employed for manufacturing different linen objects represents one of the inventions of the PPPNB period.

Orit Shamir

Linen Textiles Production – Continuity and Discontinuity from the Neolithic Period to the Chalcolithic Period in the Southern Levant

The domestication of flax was an essential prerequisite for textiles in the Southern Levant. Experimental fiber extraction of wild flax in Israel proved that these plants had surfaces which were too heavily textured to allow the creation of threads suitable for textiles. Linen fabrics from the Pre-Pottery Neolithic period, seventh Millennium BCE, were preserved only at the cave deposits of Nahal Hemar. They were not woven, but made in other techniques such as looping and knotted netting; that is, without the use of a loom. These techniques disappear in the Southern Levant by the Chalcolithic period. The first loom in the southern Levant appeared in the Chalcolithic period and was a horizontal ground loom.

By the Chalcolithic period, flax fiber processing was based on thousands of years of experience of using bast fibers, and thus the quality of textiles from the Chalcolithic period is quite good, also characterized by splicing. Wool was not yet a favoured fiber and wool textiles are found for the first time at Jericho in the Middle Bronze Age. The Chalcolithic period was a brief moment when the Southern Levant was at the forefront of human technological and artistic development. This moment is important for innovations in metallurgy, textiles, horticulture and animal husbandry. The people of the Chalcolithic did not just play a role in human development, they marked their contribution in style. We will examine if the textiles follow these changes and inventions.

Late Chalcolithic occurrences in the Judean Desert in Israel were identified in 400 natural caves, spread in the deep canyons and along the high escarpment west of the Dead Sea and the Jordan Valley. It became evident that excluding a shrine, clear Late Chalcolithic presence was found in the caves only.

Because of the exquisite preservation, these textiles allow all facets of weaving to be examined, so that we can pinpoint precisely where the Chalcolithic period falls in the history of textile technology. Without the excavations and surveys in Judean Desert caves, our understanding of the use of linen textiles in the region would begin some four thousand years later – in the Roman period.

The most important Chalcolithic sites in the Southern Levant that have yielded textiles are the Cave of the Treasure, the Cave of the Warrior and Nahal Ze'elim. The lecture will also represent the new discovery of textiles from recent excavations at "Yoram Cave", near Masada, yielded a stratum of nesting materials of raptors, as well as a stratum representing human activity in the Chalcolithic period with several hundred textile fragments, enabling us to shed additional light on Chalcolithic customs, technologies and traditions.

Wolfram Schier

The Topoi Research Group „Textile Revolution" – archaeological background and multi-proxy approach

At first, an introduction into the structure, objectives and methodology of the Topoi Research Group will be presented. The paper then reviews some hypotheses about the origin and spread of wool production, among which Andrew Sherratts "Secondary Products Revolution" (SPR) is the most widespread. While the SPR hypothesis as a whole has received considerable and (partly) justified critique, some of its main assumptions and observations concerning the role of textile production have remain unrefuted.

With reference to SE and Central Europe the new hypothesis of a "Pastoral Turn" is presented, describing an economic shift from a mixed farming economy involving small scale animal husbandry towards more specialized forms of animal husbandry and pastoralism, evolving in ecozones less favorable for an agriculture-focussed mode of production. It is suggested, that this process of economic and ecological diversification can be indirectly observed, based on various proxies, between the later 5th and later 4th millennium calBC from the western Pontic region to (at least) Northern central Europe. While this "Pastoral Turn" appears to foster large scale cattle herding first, it may well have favoured the development of specialized ovicaprid pastoralism, thus setting the scene for the adoption of the wooly sheep and intensified wool production.

This diversification process, however, also favoured specialization and intensification in crop procurement and might have encouraged improvements in the production of plant fibres, rather than reducing or even replacing them. Diversification in productive strategies not only helps to complement the ecological properties of different habitats and environments, but it also necessitates larger scale exchange of different commodities. It is suggested that the textile (r)evolution represents only one important component in a large scale socioeconomic transformation process characterizing the Eneolithic (Eastern Europe) or Late Neolithic (Western Europe) respectively.

Ana Grabundzjia, Chiara Schoch

Fibres to Fibres, Thread to Thread. Comparing Diachronic Changes in Large Spindle-whorl Samples

As a part of the Excellence Cluster Topoi "Textile Revolution" research group, the here presented doctoral projects investigate indirect archaeological evidence of textile production in two large geographical areas: South East and Central Europe and Western Asia.

Set to explore the introduction of fleece bearing sheep husbandry and the early use of wool, both dissertations have focused on examining major changes in textile technologies that could be associated with the use of a new textile fibre material. Even though the chronological frame of the two dissertations is somewhat longer, for this paper we focus on the period from 5th to 3rd Millennium BCE.

Unlike perishable direct evidence, textile tools are well represented in the prehistoric contexts along the investigated geographical transect from South Central Europe to Western Asia. The morphological and functional analysis of these tools, especially spindle whorls, allows us to investigate changes in textile production traditions.

The results of the textile tool analysis offer a summarized overview of the large spindle-whorl samples compiled from the two separate, regionally based site clusters. All together more than two thousand spindle-whorls from 47 different localities were recorded, including a substantial number of unpublished examples, which presents a significant addition to the current state of research. Although this approach prevented raising specific questions about localized textile productions it enabled outlining main regional changes and trends. In the textile "chaine operatoire" the spindle-whorls are placed between processed fibres and produced threads. This position in the production process is -in archaeological terms- as close to fibre raw material as we can get. Even though a direct connection between fibre raw material and spindle-whorl properties cannot be established, we assume that by having a certain available spectrum of fibres and aiming for a certain spectrum of textiles "communities of practice" would have established a set of well-functioning tools that would fit both the raw material constraints and the final product demands.

Conclusive comparative analysis of the investigated tools between the two study areas enabled recognizing and describing different technological trends and developments of the fibre production and processing. Better understanding of technological flexibility, observed through tools' adaptability in different socio-cultural circumstances and environmental conditions, is in the main focus of this paper.

Both areas displayed a varying degree of intensity in the appearance and standardisation of the whorls during the investigated millennia. What is missing is a clear-cut division in the distribution of spindle-whorl properties that would indicate an exclusive use of two specific raw materials i.e. wool and flax. The data actually shows characteristics of gradually different universal tools that might be associated with a much wider range of different fibres than to date expected.

Cornelia Becker, Norbert Benecke, Christian Küchelmann

Finding the woolly sheep: meta-analyses of archaeozoological data from SE-Europe and the Near East

In the Near East, sheep husbandry originally focussed on meat and milk and it is still questionable when this shifted to wool exploitation or rather when woolly sheep made their appearance for the first time. Quantitative analyses of the published record of major bone assemblages from 401 sites in SE-Europe and the Near East are used to identify regional and chronological variation in sheep exploitation patterns and explore where and when wool exploitation was initiated and at what time and to which dimension it spread westwards and reached Europe. The sites included here cover a sequence from 7000-1500 BC and consider data from more than 1.8 mill animal bones of which 67.000 can be allocated to sheep. From this vast amount of information, it should be possible to prove if different historical trajectories in the use of domestic sheep did exist and if regions with significantly different patterns of domestic sheep uptake and usage can be detected. Relevant factors are a general increase in numbers of sheep, higher amounts of animals slaughtered at an old stage, an equal sex ratio and modifications in size and robustness of the animals. Preliminary results and trends on these questions shall be presented.

Martin Park

Proxy evidence for early pastoral subsistence following an environmental approach

Early farming communities increasingly relied on herding domesticats instead of hunting game. The diversified use of (secondary) animal products, such as sheep wool, milk, manure, traction, was going along with intensified animal herding. Herds of livestock trampling the landscape cause soil compaction which fosters certain plant species and grazing itself has direct effects on the vegetation composition and density.

Furthermore, humans may increase open grazing areas by clearing forests. These environmental interventions lead to increasingly sensitive landscapes and ultimately may enhance landscape degradation.

Vegetation composition is represented by pollen assemblages that can be extracted from semi-terrestrial archives. Phases of intensified sedimentation and thus soil erosion can be identified using geochemical proxies such as trace elements and organic content. Climate variation can be reconstructed using speleothem d18O and d13C records.

We compiled geochemical and pollen data from 27 sites within the Carpathian region to investigate spatio-temporal patterns of herding-related landscape changes between 7000–3000 cal BP. A standardized evaluation procedure was applied to pollen of secondary indicator species to estimate the impact of animal herding on the vegetation.

Independent climate proxies were used to include climate effects on the vegetation development. Results show increased herding indication in the southern Carpathian region during the Early Chalcolithic (6500–6000 cal BP). This is contemporary with increase of domesticats represented in bone assemblages from the region, however, climate deterioration seems to have played a role in vegetation disturbance, as well. The results for northern Hungary show increased herding indication during the Chalcolithic-Bronze Age transition (5000–4500 cal BP) which is in agreement with bone data; furthermore, the analysis of spindle whorls indicates establishment of wool economy for the same time period.

Kalliope Sarri

Taming the fibers: tradition and innovations in the textile cultures Neolithic Greece

Our knowledge of the textile manufacture of the Aegean Neolithic Aegean is based only on indirect information, while the knowledge on raw materials used for the early textiles is much lesser known. The archaeozoological data from other regions suggest that the earliest populations of early domesticated sheep, which could give a small amount of spinnable wool, was of limited use and value for textile crafts.

Nevertheless, there is evidence from Central Anatolia that the widespread use of wool for the manufacture of clothing was introduced during the final stages of the Aegean Later Neolithic. But we do not know exactly when this occurred in every single place and how systematic this first use was. Due to the lack of ample archaeozoological and - botanical data from the Aegean, the only viable approach remains the study of the technological data, in particular the indirect examination of different weaving technologies, the types and the usage of tools in the consideration of the potential types of fibres.

This paper attempts from different approaches to answer the following questions:

- When did the textile toolbox occurs and how did it develop during the Aegean Neolithic?
- What does the particular development of textile tools mean. Is it associated with the use of new types of fibers or with new types of textile products?
- Is the evolution of textile implements and the variability of archaeo-zoological data contemporaneous and if: is it of significance or is it a coincidence?
- To which conclusions do the experimental tests with Neolithic tool copies lead?
- How do modern crafts people qualify the technical characteristics and the potentiality of Neolithic tools?
- What do we learn from diachronic comparisons of these tool types?
- What can we conclude from ethnological record from societies in a similar natural environment and a similar economy?

Apart from the data analysis on the early Aegean textiles and their association with various fibres, the paper deals with the interaction with other technological fields with the scope to investigate whether the early Aegean textile production has influenced the development of other crafts (such as pottery production) and what was the impact on succeeding cultural developments.

Sophia Vakirtzi

"Ex Oriente Ars"? "Anatolianizing" spindle whorls on the Early Bronze Age Aegean Islands and their implications for fiber crafts

This paper will discuss the implications from the appearance (usage) of a new form of spindle whorl on the practice and/or social perception of fiber crafts, in the Aegean insular region during the Early Bronze Age (i.e. the 3rd millennium B.C.).

The type of tool in question is characterized by two morphological (and functional?) elements which occur either separately or in combination: one element is a cavity around the central hole, only on one of the whorl's two distal ends, and the other element is a particular style of decoration, characterized by technique (incision sometimes combined with impression), motifs (rectilinear or curvilinear motifs, in a few, rare cases combined with schematic figurative ones) and syntax (symmetrical and / or radial arrangement along the circumference around the central hole of the whorl). This type of tool is also referred to as "scodelletta" or "hollow whorl" in the archaeological literature.

Carington Smith and Barber have long observed and pointed out the apparent similarity between this type of whorl present in some Aegean assemblages, with spindle whorls from several Neolithic, Chalcolithic, Early and Middle Bronze Age sites, expanding from central Asia to western Anatolia. Barber highlighted the gradual appearance of this type of tool in a vast area including the Eastern Mediterranean, the Balkans and extending to central Europe in a "westward" direction, as the Bronze Age progressed. With regard to the Aegean region, the Middle Bronze Age was suggested as a "terminus post quem" for the appearance of this type of "Anatolianizing" spindle whorl on the Greek mainland.

Although scanty evidence was available for the association of this type of whorl with Aegean insular Early Bronze Age contexts at a very early stage of Aegean archaeology, recent research on a large sample of spindle whorls from the region confirms the occurence of the type on the Aegean islands in the Early Bronze Age. However, if fine scales of geographical and chronological frames are used in the analysis of the data, a more complicated picture emerges, with regard to the earliest appearance and the representation of the type in the distinct Aegean insular assemblages and micro-regions.

After presenting the recently updated distribution of "Anatolianizing" spindle whorls on the Early Bronze Age Aegean islands, this paper will examine the implications of their appearance for contemporary Aegean fiber crafts, by addressing the following questions:

- What was the technology used for fiber crafts on the Aegean islands prior to the appearance of "Anatolianizing" whorls and what were the textile fibers exploited according to our current state of knowledge?
- Does the new type of tool indicate any significant differences in fiber technology? Do the distinctive features of the "Anatolianizing" whorls embody any functional differentiation compared to whorls lacking these features?
- What does the archaeological context of these tools reveal about their use(rs)?
- What does the timing of their appearance in the Early Bronze period signify, given the profound cultural changes that are observed in the Aegean insular region in the 3rd millennium B.C.?

Malgorzata Siennicka

Flax or wool? Or both? Traditions and innovations in textile production in Early Bronze Age southern Greece (the 3rd Millennium BC)

Textile production must have been a crucial craft for the inhabitants of Early Bronze Age (the 3rd millennium BC) southern Greece as numerous textile implements demonstrate, particularly spindle whorls and loom weights which are frequently discovered at many sites. Yet, the finds of actual textiles dating to this period are virtually absent from the archaeological evidence. Moreover, the archaeozoological and archaeobotanical data seems to be ambiguous and does not explain with certainty which raw materials were available and used. Therefore, it is not known what types of fibres – plant or animal, or both – were applied and what kinds of yarn and fabrics were produced in that time. Additionally, if we consider that until now only in a few cases (e.g. Tsoungiza in Corinthia, or Tiryns and Lerna in the Argolid) can we examine a combination of data consisting of archaeological finds, and remains of plants and animals, the situation becomes even more problematical.

Recently, one of the most interesting debated issues regarding textile production has been the moment of introduction of woolly wool, its spread throughout Asia and Europe, and an increasing production of wool fabrics. Wool textiles, according to some scholars, have many advantages over linen and other plant textiles because they are more flexible, softer, have better insulating properties, are water repellent, and can be more easily dyed. Also, flax production requires more time and labour investment than wool. Various kinds of evidence point to the period between the 6th and 5th millennia BC for the first use of woolly wool in the Near East and around 3rd millennium BC in Greece. Some scholars have suggested that in the Near and in the Aegean wool might have already been used during the Neolithic period (ca. 7–4th millennia BC respectively). However, in this case it was rather hairy wool, which may have been used for various purposes, and even spun without spinning tools or with only simple devices like (unpreserved) wooden.

Archaeozoological evidence from Greece points rather to the later period for the first appearance of woolly wool, which would be around the end of the 4th millennium in Thessaly, and the 3rd millennium BC in southern Greece. Nevertheless, it is probable that animal fibres (the hair of sheep or goats) were used before, but their importance considerably increased with the introduction and spread of woolly wool which revolutionised textile production forever and became one of the most important industries in the prehistoric societies. As far as use of flax is concerned, the archaeobotanical evidence demonstrates that flax was exploited for oil and fibres already in the 8th millennium BC, and from Greece we are provided with data for the cultivation of flax by the time of the Early and Middle Neolithic period.

The aim of this paper is to review the available archaeozoological and archaeobotanical evidence, in particular archaeological evidence from chosen Early Bronze Age sites in the Peloponnese in order to outline traditions and innovations of textile production. The main focus will be on the fibres possibly used at that time, and on the potential introduction of woolly wool in the 3rd millennium BC. Textile implements, especially spindle whorls, will be examined in detail because their dimensions (masses and diameters) may tell us more about fibres which were spun. Moreover, introduction of the new tools during the 3rd millennium, like biconical incised spindle whorls of the Anatolian type, or crescent-shaped loom weights, may suggest influences or direct imports from the Near East not only of the textile implements, but also of the innovative textile techniques and possibly even a novel raw material, in this case, woolly wool.

Agata Ulanowska

Different skills for different fibres? The use of flax and wool in textile technology of Bronze Age Greece in light of archaeological experiments

Flax and wool were two basic raw materials in textile production in Bronze Age Greece. Although the use of other fibres, i.e. nettle and goat hair is confirmed by archaeological evidence, and the use of wild silk and sea-silk is debated, wool and flax must have played a major role in textile economy. The complementing properties of both fibres, such as strength (increasing when wet), good heat conductivity, cool, crisp and smooth feeling to the touch of flax (and linen), and the elasticity, high absorption of moisture and insulating properties of wool provide, inter alia, an excellent choice for complex textile production in response to different consumers' needs. However, the history of flax and wool exploitation in Bronze Age Greece, the intensity with which these raw materials were used and possible innovations in processing both fibres are not easy to recognise or reconstruct.

In this paper, I address the question of how different properties of both fibres and different skills required for processing them may have been reflected in different types of evidence from different phases of the Bronze Age in Greece, e.g.:

the evidence of archaeological textiles comprises mostly linen fabrics which were often wrapped around metal objects or mouths of clay jars deposited in tombs. It reflects the preservation conditions in the first place, but it may also be seen as a choice of a specific fibre for a specific use.

certain forms of spindle whorls and the dynamics of their distribution have been debated with relation to the introduction of wool at the beginning of the Bronze Age but at the later periods the forms of spindle whorls seem to become more homogenous. Yet no relation has been observed between fibres and the forms of loom weights, and use-wear marks on them.

Linear B archives demonstrate that wool was the predominant raw material in the Mycenaean era, however, there may have been textile production centres, e.g. Pylos in Messenia, which specialised in flax production. A group of female textile workers designated in Pylian archives as ri-ne-ja (lineiai) suggests that specialisation or labour division according to the fibre processed may have existed as well.

since wool is easier to dye, it may be assumed that most of the patterned textiles rendered in art referred to woolly fabrics. But the transparency, specific colour and form of some depictions were debated as references to other fibres, i.e. flax, wild silk and sea-silk.

Since the cultivation, husbandry and processing of wool and flax required different types of knowledge, organisational strategies and skills, I also refer to studies (including archaeological experiments) which aim to investigate these processes and, especially, technological changes in fibre processing (e.g. retting, combing, splicing, plying, spinning – flax; finesse, sorting, combing, spinning, plying – wool).

With regards to textile technology in Bronze Age Greece, archaeological experimenting with wool seems to prevail over the research on flax and I intend to examine possible reasons for this inequality. I also refer to my own experience and the experience of students of archaeology with spinning and weaving flax and wool, and I discuss certain challenges of working with fibres with different properties. In this discussion, the questions of how the predominant use of one type of fibre and its availability on market may influence the transfer of textile skills, and of whether different skills are indeed necessary for textile work with flax an wool today are also addressed.

Margarita Gleba, Susanna Harris

Fibres for Splicing – Technology and Technique in the Ancient Mediterranean

Plant fibre products have a complex and time consuming chaîne opératoire which involves the interrelated tasks of gathering / cultivating and harvesting plants, processing to extract the fibres, then twisting them into threads before they can be worked into the more familiar stages of weaving, interlacing and looping. Recent research into Neolithic fibre technology points to a long tradition of working plant fibres into threads by splicing, rather than draft spinning. Spicing was the original plant fibre technology in Europe and the Mediterranean going back at least to the use of tree bast in the Mesolithic. Previously this technique was only recognised in ancient Egypt, Israel and the Far East. This paper presents new results that identify splicing of plant fibres in Iron Age Mediterranean Europe. These results demonstrate that techniques of splicing plant fibres into yarn extend from the Neolithic to the Iron Age, and continued alongside the adoption of draft spinning, a technology related to wool. During the Bronze Age, wool became the preferred fibre for textiles, being a more efficient fibre to be utilized in large scale textile production. The impact of the technology of draft spinning wool seems to have provided the catalyst for the technology of draft spinning plant fibres. The paper will propose some possible reasons for the late adoption of draft spinning for plant fibres.

Vanya Petrova

The Travelling Spinners of the 4th Millennium BC in the Balkans

The time-span between 4250/4200 cal. BC (the end of the 'classic' Chalcolithic/ Late Neolithic cultures in the Eastern Balkans and the Aegean) and 3400/3300 cal. BC (the first manifestation of EBA phenomena of Cernavoda III type) is marked by major changes affecting almost all aspects of the cultural development of the Balkans, including settlement pattern, socio-economic structure and organization, and spiritual life. The explanations proposed vary strongly from 'hostile invasions' and 'large-scale migrations to and from' through 'deterioration in climate and environmental catastrophes' to 'gradual cultural and social transformations'. However, our comprehension is seriously limited by the mere scarcity of data and the 'low archaeological visibility' of the period in question.

Recent excavations at sites located in the mountainous region on the Greek/ Bulgarian border (the Rhodopes) provide us invaluable information and evidence of an intensive human occupation of previously unsettled landscapes, indicating a shift in the settlement pattern and evidently in the agricultural tradition and the exploitation of natural resources. Material culture, with few exceptions, shows clear genetic connections with the preceding period. One prominent exception, however, is the appearance of a new set of textile tools, encountered in many of the excavated sites, dated from the beginning of the 4th millennium BC onwards. The set comprises low conical spindle whorls and rounded clay cylinders, for which the interpretation as loom weights seems plausible. Neither of them is known from the preceding period, at least from the area south of the Danube.

Another observation is even more important. While loom-weights of different shapes appear in the record already in the beginning of the 6th mill BC and show a smooth development with a prominent peak in the second half of the 5th mill BC, the evidence of spindle whorls for the same period is both inconclusive and inconsistent. On the contrary, the Rhodope sites produced none of the conventional loom weight types. The spindle whorls from different sites share two important common traits: they are uniform in size and shape, and great in number, suggesting a well-established spinning technology.

Thus, it is the first case when we have an indication for a split from the earlier technological traditions. Strikingly similar artefacts appear either separately or in a set, in contemporary and later complexes over a vast territory. The paper aims to present in detail the evidence of spinning/weaving from the 4th mill BC in the Rhodope and the adjacent regions, considering their functional characteristics, context, origin, spatial and temporal diffusion, as well as their possible implications for changes in the fibre resources.

Virginija Rimkuté

Plants and plant fibres of the Eastern Baltic Littoral in the Neolithic – Bronze Age: experiments on processing and textile production

In this paper there are analysed finds of plant fibre production from sites 1A, 1B, 2B, and 23 of the Šventoji complex and Nida, dated back to Middle–Late Neolithic (~4000–2700 BC), Lithuania, which are located on the Eastern coast of the Baltic Sea. Also there are presented some finds from the sites of the lake settlement by the lake Luokesos, located in Eastern Lithuania and dated back to the Bronze Age. There were found various yarns, strings and cordage pieces, fishing nets and other fishing gear, fabric fragments, mats/cloths, a basket/bag, and a sling. They were made of lime bast, nettle, and hemp. Some of the finds rely both to textile and basketry production, as they are non-woven and made by using plant parts, not only fibres. Thus, some pieces, made of birch bark and other materials, will also be described, for they are intertwined with other plant fibre products. Unfortunately, not all the finds are extant today, so the only source of those was their descriptions made by the researcher, and photographs. As an extra source for analysing the mats there were used the (re)creations of bindings, found as impressions on the pot shards from the Nida site.

Another useful source for the probably used plants was analysis of the pollens. While this does not declare that the identified plants were used for textile/basketry production, a common range of the aerial flora could be defined. The extant finds and their materials were compared with the use-wear data of flint tools, dated back to the analysed and earlier periods (experiments by G. Slah and T. Rimkus from the Klaipėda University, Klaipėda, Lithuania). The analysed finds were also compared with finds from other European sites, as most actual finds recur to “the basic kit” – i.e., generally, the used fibres, bindings, and produced objects are very similar across the Europe.

For researching the processing and production, there were used pilot experimentations and experiential tests, as well as structured experiments, both short- and long-term ones. In this paper, several sets of experiments will be presented in detail, as follows:

- Production and usage of twined clothing, held in 2008–2012. The research was based on finding from the site Šventoji 2B. There were (re)created three cloths and they were tested as pieces of clothing.
- Production and usage of twined and twill matting (2005–2015). The experiments were based on finds from Šventoji sites and Nida. Various plants were tested.
- Production of various types of cordage (2005–2016). It was a set of experimentations and experiments, based on finds from Šventoji sites and lake settlement of Luokesos. Diverse ways (both without and with tools) of cordage production were experienced.
- Processing of various plant fibres (2005–2016), based on data from sites of Šventoji, Nida, and Luokesos. There were experienced various periods and ways of harvesting plants and plant fibres. This set of actualistic experiments was important for better understanding of plant fibre production in Late Neolithic – Bronze Age communities of the Eastern Baltic Littoral.

Sabine Karg

Know-how about flax production of Neolithic farmers in the circum-alpine region

Flax (Linum usitatissimum L.) is the only textile and oil plant of the Neolithic founder crop package. Flax seeds contain omega-3 fatty acids and are still today used for nutritional purposes, the extracted oil is quick-drying and processed into varnish, binding agent for paint and putty (´Kitt` in German). Flax fibres are long, strong and tear resistant, and can be spun into fine threads.

In Europe archaeological records of flax seeds and capsules are known from features dating to the Linear Pottery culture (6th millennium BC). Still it is not known for which purposes flax was cultivated at that time. Insignificantly few flax finds are recorded from the Middle Neolithic period. However, there are not many archaeobotanical studies available from that time.

New and surprising results from intensively studied, very well preserved pile dwellings from Southern Germany indicate that members of the Late Neolithic Goldberg and Horgen cultures (3500-2800 BC) had already been specialised on the cultivation and production of flax. Metric studies on flax seeds from some of these settlements show that a small seeded flax variety was cultivated from 3400 BC onwards, probably a breed that was specifically developed for the yield of long and strong fibres. In order to confirm this hypothesis, we are currently analysing flax finds from more than 60 wetland sites that are situated in the circum-alpine region (France, Switzerland, Italy, Slovenia, Austria and Germany).

In addition to the botanical finds, we also investigate the textile tools and products from selected sites. The first results indicate that flax threads were often used for manufacturing fishing nets. Yet is not proven if these threads were made by using spindle whorls or by applying a technique that is called “splicing”. In order to approach the ancient processes of fibre extraction and thread making, we plan to perform experiments with modern material. We have therefore cultivated in 2016, together with colleagues from the Canadian Genebank and the University of Hohenheim, more than 30 old landraces of different flax varieties. The bountiful harvest is currently under examination.

By studying botanical finds, textile tools and fabrics from 60 pile dwelling sites, and by performing experiments with old landraces of flax, we expect to gain a new and holistic view on the know-how and the scale of flax cultivation, processing and fabric production during the 4th and 3rd millennium BC in Central Europe.

This research project is financed by the German Research Council (DFG) and associated with the Institute for Pre- and Protohistoric Archaeology of the Free University Berlin in collaboration with the University of Hohenheim, the University of Potsdam, the Agency of Cultural Heritage in Baden-Württemberg, the Niedersächsisches Institut für historische Küstenforschung, the Canadian Genebank, the University of Basel, the University of Zürich, the Agency of Cultural Heritage in the Canton Zürich, the University of Milano, the University of Franche-Comte, the University of Ljubljana and the University of Vienna.

Johanna Banck-Burgess

Die verkannte Revolution

Im Umfeld der Alpen präsentieren neolithische und frühbronzezeitliche Textilen in Feuchtbodensiedlungen einen breit gefächerten Einsatzbereich im alltäglichen Leben, der von seilereiprodukten, über Behältnisse, Fischerutensilien bis zu hin zu Kleidungsstücke reicht. Entsprechend ihrer Funktion wurden Rohstoffe und Herstellungstechniken darauf abgestimmt. Zum einen verwundert es, mit welchem Qualität und breiten Funktionspalette sich bereits die Textilbestände in jungneolithikum Siedlungen, wie zum Beispiel in Hornstaad-Hörnle am deutschen Bodenseeufer präsentieren. Die meisten Textilien bestehen aus Gehölzbast und setzen umfassendes Wissen in Auswahl, Aufbereitung und Verarbeitung vorraus. Über die Experimentelle Archäologie wissen wir inzwischen, dass dieses Wissen weitgehend verloren ist. Dieses Wissen setzt eine lange Tradierung voraus, die sicher in den Jäger- und Sammlerkulturen zu suchen ist. Zum Anderen verwundert es, warum das Textilhandwerk und seine Erzeugnisse in seinen wesentlichen Zügen von Neolithikum bis mindestens zur frühen Bronzezeit eine große Kontinuität besitzt. Deckten die Textilien aus Gehölzbast; einschließlich angenommenen Lederobjekte, den Bedarf an Funktionstextilien im alltäglichen Leben so gut ab, dass die zwingenden Notwendigkeit nach andere Rohstoffen, wie Flachs oder Wolle nicht bestand? Dieser Beitrag soll Fragen aufwerfen und mögliche Forschungsfelder aufzeigen, die mögliche Antworten liefern können.

Anne Reichert

Wettbewerb der Fasern – Textile Materialien der Steinzeit und ihre Verarbeitung

Wenn wir heute von Textilien sprechen, verstehen wir darunter vor allem Stoffe aus Wolle, Seide, Leinen, Baumwolle, Chemiefasern und aus den verschiedenen Gemischen dieser Materialien.

Chemiefasern sind ein neuzeitliches Produkt, Seide und Baumwolle sind in unseren Breiten nicht heimisch. Aus archäologischen Funden kennen wir für die Stoffherstellung Leinen, Hanf und Wolle: Leinen seit dem Anbau von Flachs im Neolithikum, Hanf und Wolle erst seit der Eisenzeit, Wolle vor allem von Funden aus Mooren und Salzlagerstätten.

Das muss allerdings nicht heißen, dass Wolle in der Jungsteinzeit nicht verarbeitet wurde. Schafe wurden gezüchtet, was durch Knochenfunde belegt ist. Stark spiralige Fadenreste aus Flachs, die am Zürichsee gefunden wurden, könnten ursprünglich mit Wolle verzwirnt gewesen sein. Da tierische Materialien wie Wolle, Fell und Leder im Boden (mit Ausnahme bestimmter Moore oder eingefroren im Eis) spurlos vergehen, zeugen nur die Werkzeuge (geschliffene Nadeln und Ahlen aus Knochen und Elfenbein) davon, dass bereits im Paläolithikum Kleidung genäht wurde; andernfalls hätten die Menschen in diesem Klima gar nicht überleben können.

Im Neolithikum tauchen neue Formen von Werkzeugen auf: Spinnwirtel und Webgewichte. Komplette Spindeln, zum Teil noch mit aufgewickeltem Faden, sind allerdings äußerst selten. Webgewichte lassen auf einen stehenden Webstuhl schließen, auch wenn die genaue Form nicht bekannt ist. Gurtwebgeräte wären ebenfalls möglich.

Neben den in Seeufersiedlungen gefundenen Resten von Leinengeweben gibt es aber noch andere Arten von Textilien, die ohne jedes Werkzeug und direkt aus den Rohmaterialien hergestellt wurden und die zum Teil bereits im Mesolithikum nachgewiesen sind: Zwirnschnüre unterschiedlicher Stärke und Geflechte in verschiedenen Techniken.

Zum Zwirnen und Flechten eignet sich neben Gräsern, Seggen, Binsen, Brennnesseln u. a. auch Bast, die Schicht zwischen der Rinde und dem Holz von Bäumen. Verschiedene Bastarten und ihre Aufbereitung werden vorgestellt. Sehr häufig verwendet wurde Lindenbast, woraus viele Geflechte bestehen, die im circumalpinen Raum gefunden wurden. Wie Hüte und Sandalen aus Lindenbast gearbeitet wurden, wird an Beispielen gezeigt.

Karina Grömer

Raw materials, Textile Technologies, Innovations and Cultural Response in Central Europe in the 2nd and 1st mill. BC

Although the focus of the workshop is on textile production in Western Asia and Europe between 5000 – 2000 BC, the following paper will present some prospects to the 2nd and 1st millennium BC in Central Europe. As textile technology in Central Europe before 2000 BC is mainly based on plant fibres, the introduction of wool textiles about 2600 BC and its dominance from the mid of 2nd millennium BC changes the way textiles were made and decorated.

Among others, the textiles from the salt mines Hallstatt and the copper mine Mitterberg in Austria, covering organic preserved textiles from a time-span between c. 1500 to 400 BC, are ideal case studies to discuss different steps of the textile production process, innovations and cultural responses.

In the 2nd millennium BC, sheep wool seems to replace plant fibres as the most important raw material, other animal fibres detected are scarce evidence for goat and horse hair. Recently, from various Central European sites like Hallstatt and Mitterberg, wool measurements were carried out to trace back both the development of sheep fleece types as well as technological adaptions – what is the focus here. The developments in sheep breeding go hand in hand with advanced technologies in fleece preparation, spinning and weaving techniques. Especially among the wool textiles of the mid-2nd millennium BC "innovative" technologies like twill, tablet weaving, spin pattern and dyeing are linked to a more developed fleece type with a reduction (or absence) of kemp hair.

In the second part of the paper, invention – innovation – adaption of certain textile techniques have to be discussed. Such, inventions and innovations have an impact on changing competiveness of different fibres. That is most obvious in the use of white wool which allows specific decorative techniques such as dyeing; also the refinement of textile qualities is bound to developments in sheep breeding and in advanced fibre processing methods (e.g. combed yarn allows the production of very thin and even threads). Although early examples of patterning techniques like colour stripes, patterned tablet weaving and the use of gold threads are known from the 2nd millennium BC in Central Europe – it has to be addressed that the main corps of textile finds of that era are simple tabbies of coarser qualities without pattern. In the 1st millennium BC an adaptive period follows, where those techniques on wool textiles were fully incorporated into the textile techniques widely used in the Hallstatt Culture (especially twill weaving, tablet weaving, fine qualities, dyeing, colour pattern and spin pattern). They seem to play an important role in the social dynamics and contemporary representative culture.

Elena Nikulina, Ulrich Schmölcke

Microscopic and archaeogenetic studies of hair

The preservation of animal hairs needs optimal sediment conditions, in particular they must have been hermetically sealed since the time of their embedding. Consequently, as other organic materials rarely found at archaeological excavations, animal fibres are rarely the focus of archaeogenetic research. Together with the department of Functional Morphology and Biomechanics at the Zoological Institute of Kiel University (Germany), the ZBSA conducted an experimental study combining the microscopic and archaeogenetic identification of archaeological animal hairs. The joint study had three main aims: to test the extraction method, to test the aDNA preservation, and at the end to identify the species. One conclusion from this study is that hairs from archaeological excavations can be a useful source of aDNA, but the verification by additional methods such as microscopy seems to be suitable.

A second study was recently conducted in cooperation with colleagues from the Lower Saxony Institute for Historical Coastal Research in Wilhelmshaven. On the basis of four aDNA fragments of the mitochondrial control region we compared the haplotypes obtained from wool samples with haplotypes from sheep bones from the same excavation site. All hair haplotypes were obtained also from bones, but for interpretation several difficulties have to be taken in mind.

Linda Hurcombe

Competing fibres: the plurality of clothing solutions

There are archaeological and ethnographic finds from Europe and beyond that show a wide range of materials and processes for textile production. Moss, Juncus, bulrush, nettles and tree bast fibres, and many more materials, can all be processed in various ways to make them soft and flexible or tough and durable. Some variations are better at heat retention, whilst others have good water shedding properties. One plant, processed in different ways, can give multiple quality possibilities in much the same way as one animal skin, treated in a variety of ways, can impart different qualities to the finished material. The main sources of variation can be grouped into three categories.

First, the specific plant or animal species used as the raw material, its growing conditions, for animals might include sex, age and body part used, and for plants might include age and season of harvest and the plant part used.

Second, the processing and applied treatments of the raw material which can include for plants, the physical removal or manipulation of some elements, and the thermal, chemical and biological treatments such as boiling with wood ash, or retting as well as for animal products a range of physical, and chemical treatments to remove unwanted aspects, and build in the desired qualities by means of further physical treatment and the application of fats, oils, smoke, and other substances.

Third, the technologies used to make up the finished textiles can vary greatly with cordage technologies such as twining and looping each offering a range of qualities just as much as ‘woven’ textiles. One element of the discussion will be the animals and plants in the local environment and those within the region, and the second element will be how subsistence strategies might link with the material culture of fibres. The third discussion strand will be the ways in which processes and technologies might crossover between different materials.

This paper will explore the competition of fibres drawing on both personal experiences and those of other craftspeople to consider the breadth of plant and animal materials exploited and the range of textile qualities they can produce under differing circumstances.

Experimental work has especially focussed on nettles, tree bast fibres, cattle and horse hair and a variety of skin processing techniques all of which have explored some longstanding archaeological finds from prehistoric Europe and the recent discoveries from Whitehorse Hill, UK. Textiles serve many different purposes and even one clothing system or textile-making community may involve several kinds of plant and animal raw materials and many kinds of processes.

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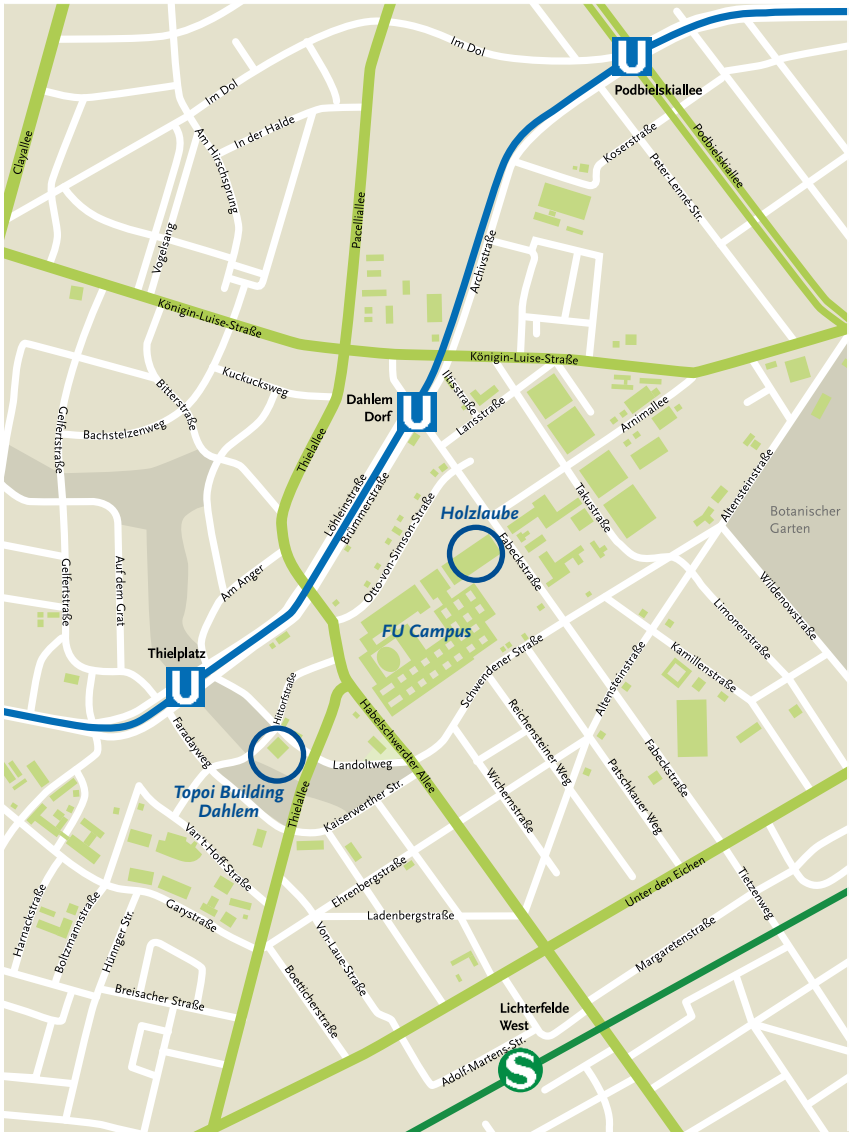
Location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