

Cremation grave textiles

Examples from Vendel upper class in the Vendel and Viking Periods

Anita Malmius

Few are aware of the fact that organic material such as textiles and leather can survive in cremation graves. Even fewer are aware that charred textile fragments contain almost the same information as unburnt prehistoric textiles. This fact provides the opportunity for comparing textiles from different groups in society, for studying textile development, and for gaining access to a much greater textile material based on the numerous cremation graves. In this article the outfits of the men buried in the cremation graves in “Vendla’s Mound”, dated to the Vendel and Viking Periods, are compared with those buried in the contemporaneous boat-graves in Vendel.

Introduction

In an overview of Scandinavian textile- and leatherworking, Eva Andersson (1995: 16) observes that the textile craft tends to be mentioned only in passing in the archaeological literature and research discussions, and that dress is primarily seen as a complement to buckles and other ornaments. The reason for this would seem to be ‘the shortage of finds and other evidence’, but also, ‘poor knowledge of what has been found and lack of interest’.

This applies even to the results of the craft, namely the textiles themselves, but in the case of textiles from cremation graves it is more a matter of lack of knowledge than lack of finds. Few are aware of the fact that organic material such as textiles and leather can survive the cremation pyre. Many are on the other hand aware that textiles, feathers and leather in Scandinavia can be preserved in inhumation graves by contact with objects of bronze, silver and iron. Archaeological textile material is however in any event a rarity and it is therefore of utmost importance that all material that survives be taken care of.

The greatest problem in Nordic archaeological textile research is without doubt the perishability of textile material in the ground. Textiles survive only in special conditions (Geijer 1994: 297ff), which means that the finds cannot be considered representative of the original material. Previous archaeological generations have deliberately chosen to examine the usually very find-rich inhumation graves. The boat- and chamber graves of the Vendel and Viking Periods have been found especially interesting since they record

strong materialistic attitudes to death and life thereafter. The buried person has been provided with a full set of equipment for the after-life. Thanks to the custom of equipping the dead with rich grave-goods, we can today obtain insights into some aspects of the culture of buried persons. But only certain categories of objects have been laid down in the graves – already their contemporaries made choices as to what was at the time considered suitable and representative. Much of what has been deposited tends to be of perishable material: wood, textiles, leather, bone, food, etc., (Arbman 1938: 10). If we depend only on the material that has been preserved, we run serious risk of obtaining a biased picture of the range of objects in use in prehistoric times. This is even more the case with regard to material from cremation graves. It is further important to remember that only certain groups of people were entitled to be buried in style and to be equipped with grave-goods.

Textile finds are by tradition separated from other archaeological finds and perhaps this is why they have failed to be further analysed and documented (see below). Many of the rich graves were excavated during the National Romantic period when archaeological interest focused on decisively manifesting antiquity as a period of greatness. Textile finds were considered at that time to be of minor importance. To obtain a more balanced and clearer image of prehistoric society, I have in my research instead taken as my starting point all sorts of textiles, woven fabrics and other textile techniques using animal, vegetable and metallic raw materials, down, feather, leather, fur, etc., from different

Figure 1a. Map of Sweden showing locations of Vendel, Valsgärde, Old Uppsala and Birka. Drawing Kjell Persson.

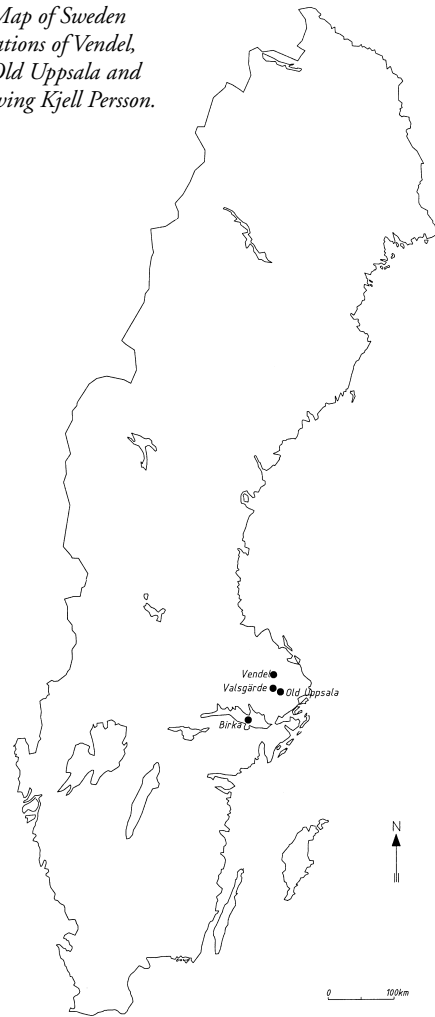
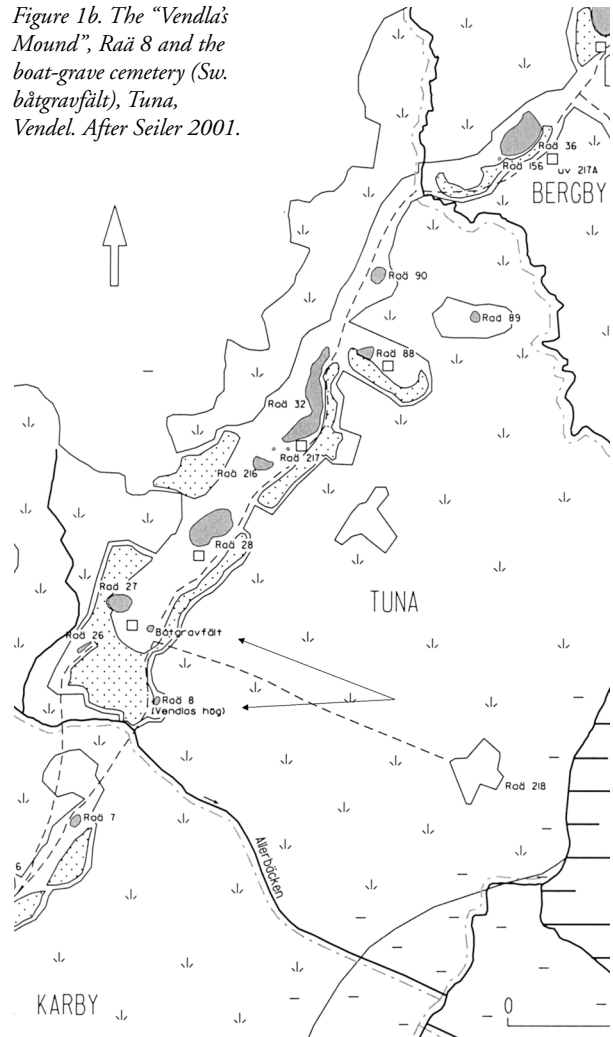


Figure 1b. The “Vendla’s Mound”, Raä 8 and the boat-grave cemetery (Sw. *båtgravfält*), Tuna, Vendel. After Seiler 2001.



types of graves and different environmental contexts. The textiles are placed in the centre of their immediate and general context. As a step in this direction, I here wish to draw attention to the textile material in cremation graves.

Background

In Uppland, rich boat-grave cemeteries, including those at Vendel and Valsgärde, were excavated at an early date and are partly published (Stolpe & Arne 1912; Arwidsson, 1942, 1954, 1977). The chronology of the Vendel boat-graves is based (1912: 59f) on Montelius 1892, Salin 1904 and Stjerna 1905. The five Vendel Period boat-graves in the Valsgärde cemetery have been dated by Arwidsson (1977: 126ff). Because of the large number of finds of high quality in the fourteen boat- and chamber-graves at Vendel – a place which has given its name to a whole epoch before the Viking Age – we know that these interments began c. AD 520/30 (Arrhenius 1983) and continued until the late Viking Period. The boats complete with their contents, which included textiles, leather, down, etc., were placed in the ground unburnt in a period when the dead usually were burned on pyres and buried in cremation graves. All persons

buried in the boat-graves have been interpreted as men on the basis of the find material.

Since 1991, the Archaeological Research Laboratory (AFL) at Stockholm University has conducted archaeological excavations in the proximity of Vendel church in northern Uppland. The original purpose was to localize and examine a settlement, which could be linked to the famous boat-graves, but the project has been expanded to include studies into various aspects of Iron Age society in eastern Svealand including an attempt to understand the power structures current in the Late Iron Age (Arrhenius & Herschend 1995). The model areas chosen for analysis, Vendel and Valsgärde, lie respectively 30 and a couple of kilometres north of Old (Gamla) Uppsala. Excavations so far at Vendel have resulted in settlement traces located south of Vendel church, only c. 50 m from the boat-grave cemetery. At least two buildings can be defined, a dwelling house and a farm building. Finds and radiocarbon datings indicate that the settlement was established in the end of the 5th century and continued on into the Viking Period (Isaksson et al. 2002: 41f). A settlement study of the surrounding area shows that the ‘Tuna territory’ in prehistoric times included a much greater region

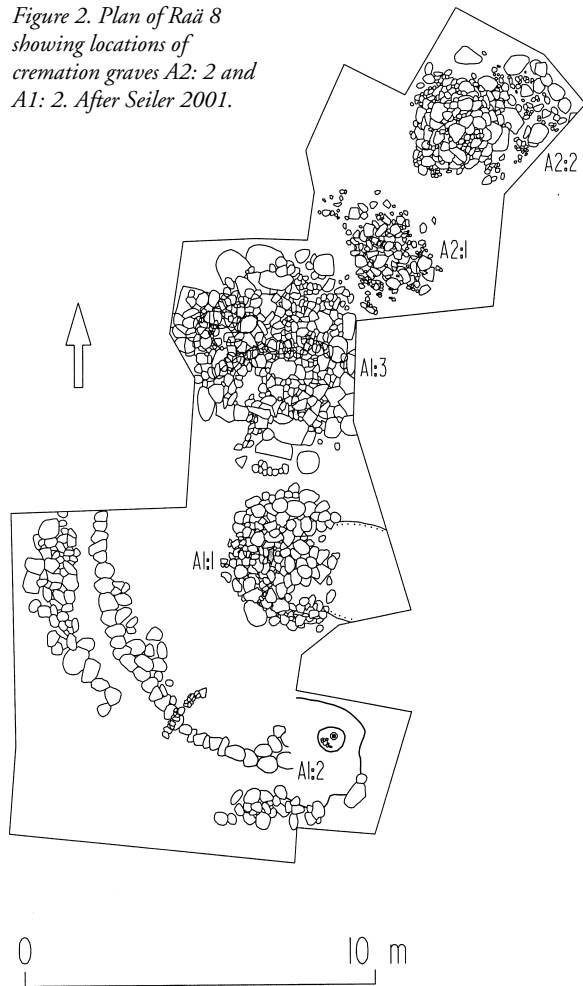
than the area around the boat-graves and their associated settlements (Seiler 2000) (fig. 1a, b). Within that extended area, there lie three large cemetery groups and several settlement-indicators, of which, three cemeteries and a settlement were excavated archaeologically during 1996 and 1997 (Seiler 1997). These settlements, boat-graves and cremation graves are situated on or in direct proximity to Vendel esker, i.e., an environment that does not facilitate the preservation of textiles. In the autumn of 2000 however, textiles were found in cremation grave A5, Vendel 1:8, dated to the later half of the 5th century and located in the cemetery close to the western churchyard wall (Raä 27). These fragments are however too charred to allow for analysis of binding system and thread count. Charred finds suitable for analysis were however found in the spring of 2000 in the cremation graves in Vendla's Mound, Raä 8, at Vendel, Vendel par., Uppland.

Raä 8 is situated on the crown of a hill about 280 m south-southeast of Vendel church. The monument consists of two burial mounds (A1 and A2) without any distinctive boundary between them. The southernmost and largest is known locally as *Fröken Wendelas hög* (Miss Wendela's Mound), *Drottning Vendlas kulle* (Queen Vendla's Hill) and the like. The hill and mounds measure c.35×30 m and at highest 6 m. The hill has a strategic location in terms of exposure, lying close to Allerbäcke, which forms the hypothetical prehistoric territory boundary. Seiler (2000) has argued that Vendla's Mound functioned as a boundary-marker within Tuna with regard to Karby to the south and that it was erected when the Tuna farm became established during the 5th century or beginning of the Vendel Period (Isaksson & Seiler 1997: 74; Arrhenius 2002). In all, three graves with cremation deposits were found within Vendla's Mound and of these graves, two, A2: 2 and A1: 2, contained charred textiles (fig. 2).

On the evidence of the composite comb L2 and gaming boards, Seiler (2001) dated grave A2: 2 to the second half of the 6th century, based on Lindqvist 1936: 166ff, 216ff; Sandberg 1976: 12ff; Petr  1984c: 70ff. A radiocarbon estimate from the grave provides a later date, possibly due to contamination during sampling. New samples have been submitted for radiocarbon dating. The grave contained three textile fragments and the burnt bone of animals and two humans: a child and a youth who, because of the so symbolically closely placed cremation urns, are considered to be possibly siblings. Additional grave finds consisted of rivets from a boat, two beads, horse fittings, two pottery vessels, etc.

Grave A1: 2 has been dated by Seiler (2001) to the 9th century on the basis of its composite combs, relying on Ambrosiani 1981: 25; Bergkvist 1993: 40. The grave contained in addition twelve textile fragments and the burnt bone of animals and of possibly two humans – a child and a youth, interpreted as a child in the company of a thrall or free servant for the journey to the otherside. There were also rivets from a boat, gaming boards, two pottery vessels, a penannular brooch, a shield mount, and frost-nails.

Figure 2. Plan of Raä 8 showing locations of cremation graves A2: 2 and A1: 2. After Seiler 2001.



The osteological material is too fragmentary for definitive sex-determination but the dimensions of these sites, the hunting birds, gaming pieces, etc. and total lack of female ornaments, provide strong indications that these are male graves (Seiler 2001: 56ff), (table 1).

The aim of the present investigation is to establish which types of textiles those buried in Vendla's Mound were fitted-out with, and to compare these to the textiles from the contemporaneous boat-graves in order to try to establish what function the textiles held, and to obtain information as to whether those buried in different types of graves were provided with fabrics/costumes of different kinds. More general, but very important, questions which my textile researches hope to illuminate are which types of textiles and leather can be expected to be found in cremation graves, how to recognise the remains of textiles from cremation graves, how to recover textile material during archaeological excavations, and what potential this material encompasses.

Previous finds of charred textiles

Cremation deposits beneath mounds and stone settings were the dominant burial rite in eastern Sweden right down

Table 1. Contents from Raä 8, graves A2: 2 and A1: 2. Fish-bones analysed by Lembi Lougas, other bones by Christian Lindqvist (Seiler 2001: 69).

Grave and grave content	Raä 8, grave A2: 2	Raä 8, grave A1: 2
Dating	late 6th cent	9th cent
Grave type	bone deposit under carefully constructed cairn	urn-cremation pit with surrounding cremation layer
Grave context	burial mound, small Late Iron Age cemetery	grave mound, small Late Iron Age cemetery
Burial rite	cremation	cremation
Genus/ total no. indiv	burnt bone: 1 child, 1 youth (siblings?); genus: prob. male	burnt bone: 1 child, 1 youth (thrall?); genus: prob. male
Animals	burnt bone: 1 horse, 3 dogs, sheep/goat, cattle, pig, cat, merlin, sparrow- and goshawk, crane, perch, pike, lavaret, carp, roach, eel, etc.	burnt bone: 1 horse, 2 dogs, sheep/goat, cattle, pig, cat?, grey-hen/hen, goose, goldeneye, salmon/trout, carp, etc.
Textiles/dress accessories on the deceased	no	no
Textiles/dress accessories, other	3 textile fragments 2 beads	12 textile fragments 1 penannular brooch
Personal equipment	1 composite comb 3 flint flakes 1 whetstone min. 57 whalebone gaming pieces	3 composite combs 2 flint flakes 2 whetstones of schist min. 13 whalebone gaming pieces 1 object of antler 1 knife handle?
Weapons	no	1 shield mount
Coffin/boat	min. 28 boat rivets; 16 nails; 1 staple	min. 41 boat rivets; 24 nails; 61 brads
Imported objects/ trade	no	no
Craftwork	no	no
Animal equipment	horse equipment (9 rivets)	3 frost-nails
Food and drink	2 pottery vessels plant and animal-remains	2 pottery vessels
Other	silicate-slag unidentif. iron objects	silicate-slag 1 iron mount; 1 bronze mount; 2 bronze nails; 1 bronze plate

to the end of the 10th century or around the year 1000 (Gräslund 2000: 34). In the Mälars area only a few finds of textile material and leather have been recovered (reported) so far from cremation graves; the finds reported here date to the Viking Period. In the cemetery at Lunda, Lovö, Lovö parish, Uppland, both textile and leather fragments were recovered in a charred state but these are still not analysed (Petré 1984: 66). In a burial mound c. 200 m southeast of Hallunda Farm in Botkyrka parish, Södermanland, charred fragments of a silk fabric were preserved and have been analysed (Malmius 2000: 1ff).

On the island of Björkö, containing the trading site Birka, in Adelsö parish, Uppland, an exceptionally large amount of textiles of various sorts were excavated at the end of the 19th century by Hjalmar Stolpe (Arbman 1940, 1943). That material, with/without metal thread, was separated from the other finds and ascribed its own find-category as textile material (Arbman 1943: IX). These textiles were first sorted and analysed by Geijer in connection with work on the pub-

lication of the third volume reporting these excavations, *Birka III* (Geijer 1938).

Despite the fact that 566 cremation graves were examined (Arwidsson 1984, table II) only one cremation grave, possibly two, contained any fragments of fabric. Charred fabric was noted from cremation grave Bj 88 (Arbman 1943: 39; Hägg 1986: 52). In Bj 71/91 silk fragments were found (Hägg 1986: 56), but it is not reported whether the silk belonged to the cremation grave or inhumation grave.

Of the 1110 graves which were investigated, 76 of the inhumation graves and 18 of the cremation graves contained work in/with gold- and silver thread belonging to plaited 'passementerie' of various shapes, as additional effects in woven braids and variously worked ornaments. The metal threads are of different sorts, mainly *drawn wire* (German *Draht*), *lamella* (German *Lahn*), *spun drawn wire* and *spun lamella* (Malmius & Lindblom c-ms; cf. definitions in Strömberg et al. 1979; Geijer 1980: 89ff; 1994: 23f). A thread of spun lamella is made from a flat thin strip of metal

Tables 2a–b (right). a) The thread-count sum, T , is calculated as the sum of the mean values [thread count in warp/cm] + [thread count in weft/cm]; the value obtained indicates the coarseness of the fabric: the higher the sum the finer the fabric. The values in the tables reflect fabrics of wool and linen; other values apply for silk.

b) The weave rib factor, R , is calculated as ([thread count in warp]/[thread count in weft] - 1; $R \geq 0$). The warp is here defined as having the highest thread count. The value obtained expresses the relationship between the thread count in warp and that in weft: the lower the value, the more balanced the fabric. In ribbed fabric the thread count of the warp is double or more than double that of the weft. Ribbous fabric can be divided into weakly ribbous $R=0.1-0.39$; medium ribbous $R=0.4-0.69$; strongly ribbous $R=0.7-0.99$ (Malmius 1996:81; 1998:80–81). The values in the tables reflect fabrics of wool and linen; other values apply for silk.

a)

Fabric coarseness	T
Very fine	> 30 threads/cm
Fine	20–29.75 threads/cm
Less fine	14–19.75 threads/cm
Coarse	< 13.75 threads/cm

b)

Relationship warp/weft	R
Balanced fabric	0.0–0.09
Ribbous fabric	0.1–0.9
Ribbed fabric	≥ 1.0

e.g. gold (the lamella), spun around a core of another material. A spun drawn wire thread is made from a solid round-sectioned wire of metal e.g. silver, spun or wound around a textile core. Inside such a spun drawn wire thread of silver from one of the cremation graves in the cemetery at Ormnös on Björkö, threads of silk are preserved (Arrhenius 1978; Malmius & Lindblom c-ms).

Charred textiles

Charred fragments of woven fabric exhibit different characteristics depending on the find circumstances, for example whether found in a cremation grave, inhumation grave or settlement, or from the manufacturing of so-called 'schmelzkugeln' (Malmius a-ms). Fabric fragments from cremation graves are black, glassy and slag-like on some surfaces, and in general hard. The fragments are often very small and confusingly like charcoal, and it is only when they are magnified that the material can be fully recognised, the woven fabric appearing in certain areas as if unburnt thus enabling binding system, spinning, thread count, hems, etc., to be studied. Prehistoric cremation techniques were highly efficient with a burning temperature of at times almost 1000 degrees, as can be seen from smelted glass, bronze, etc. Organic material therefore usually burns away especially if oxygen was in plentiful. But sometimes charred fragments remain of seeds, shells, grave bread, food remains (Hansson 1996: 61f), textiles and leather (Petré 1984: 66). The textile fragments that survive have probably lain in the periphery of the pyre, or been protected by some metal object. Textile work employing metal threads, especially those of gold, can often be detected in the black cremation layer already in the field. But, if fragments of charred textiles and leather are to be correctly preserved for future generations, it is necessary that we know how to recognize this material, carefully extract it during ex-

cavation, and carry out water sieving and flotation of the grave contents in the laboratory, etc.

Textile fragments from Vendla's Mound – material and method

Because of careful excavation in the field and careful examination of the cremation layer in the laboratory, charred textile fragments could be recovered from A2: 2 and A1: 2 (Seiler 2001: 62). The fragments are black and on some surfaces glossy and without any textile structure, while other surfaces show the clear characteristics of textiles. Charred textile fragments from cremation graves are generally hard like these and thus can take further laboratory treatment. The 15 textile fragments from cremation graves A2: 2 and A1: 2 were rinsed in deionized distilled water and air-dried. After this they were cleansed from surface dirt with the help of a tweezers and scalpel, or the soil and mineral particles were brushed away with a soft brush. Another method was to reverse the air-stream from a vacuum-tweezers since the delicate air-stream can remove fine soil carefully and effectively.

After this, the material was documented and examined using scientific methods in parallel with conventional technical textile research methods (Geijer 1994: 467). For technical textile definitions, see Strömberg et al. 1979; Burnham 1981; Geijer 1994: 21ff; Cyrus-Zetterström 1995. Thread-count sum, T , and rib-factor, R , have also been calculated. T indicates fabric coarseness and R how balanced the fabric is. $R=0-0.09$ shows that the fabric is balanced, $R=0.1-0.9$ is a ribbous cloth and $R \geq 1$ a ribbed cloth (table 2). During the Viking Period the thread system with the highest thread count is often the warp and the lowest is the weft, but which is warp and which is weft cannot be established with certainty unless the selvage or starting border survives (Malmius 1996, 1998, 2000).

In order to identify the fibre material/raw material, the fragments were analysed in a scanning electron microscope (SEM). Charring experiments were carried out with modern yarn and modern fabric of wool, linen and silk. FTIR-analysis (Fourier Transform Infrared Spectrometry) was afterwards conducted on samples of the modern material, which had been subjected to heat, and that not subjected to heat. The charred textile material from Raä 8 was then compared with the heat-subjected/non-heat subjected modern samples and with charred material from cremation grave Halunda 74:34, in Botkyrka parish, Södermanland. The aim was to identify the material from which the textiles in Raä 8

were woven to see if it contained proteins or carbohydrates, i.e. was of animal or vegetable origin (Malmius a-ms).

Results

Grave A2: 2

The three textile fragments are all black, small, partly glossy-black, 'blistered', and hard. One fragment, ID 3, was so charred that only a weak textile structure could be observed. On another fragment, ID 2, the binding system could be determined, which was twill. The third fragment, ID 1, being better preserved could be determined with regard to binding

Table 3. Cremation grave A2: 2. Fabric 1, woven in 2/2 twill. This carbonized fabric was examined with reference to BS (binding system), M (material), Max (maximum size in cm), Thr/cm (threads/cm in warp and weft), M Thr/cm (mean thread-count/cm in warp and weft), MP (number of measuring points), T (thread-count sum), R (rib factor), Sp (spinning), Yarn Ø (yarn diameter in mm), Sp-a (spinning angle), F-mm (fabric thickness in mm) and Colour.

Grave	ID	(n) frg	X	Y	BS	M	Max	Thr/cm	M thr/cm	MP	T	R	Sp	YarnØ	Sp-a	Fmm	Colour	Fabric	Fig
A2:2	1	1	1475	4829	2/2 ky	Wool	1,0x0,55	18,25-20x8,25-10	19,25x9	3x4	28,25	1,14	z/z	0,25-0,4x0,6-0,8	30-50x0-30	0,7	Black	1	3
A2:2	2	1	1475	4829	?ky	-	0,6x0,3	-	-	-	-	-	-	-	-	-	Black	-	-
A2:2	3	1	1475	4829	-	-	1,0x0,8	-	-	-	-	-	-	-	-	-	Black	-	-

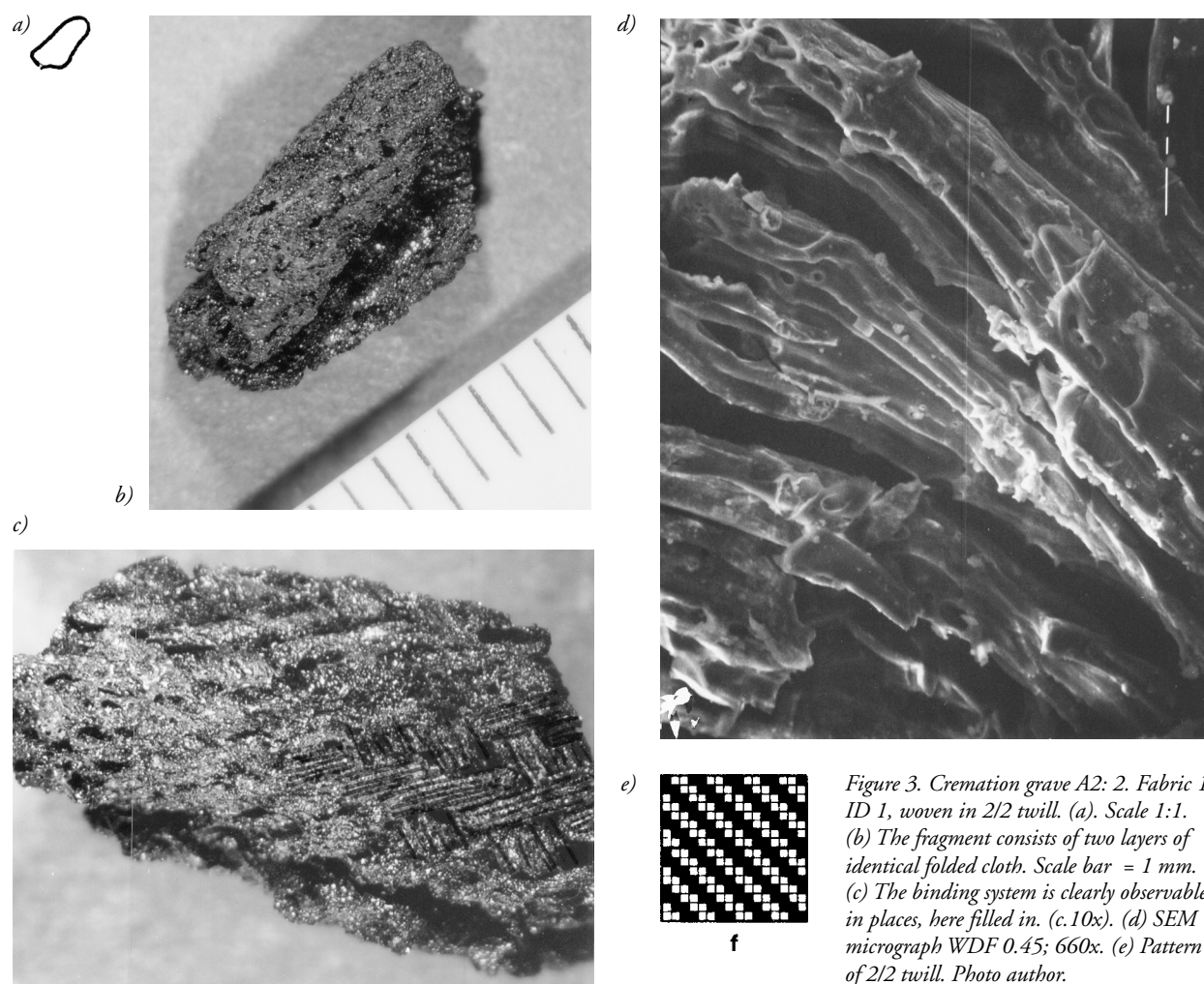


Figure 3. Cremation grave A2: 2. Fabric 1, ID 1, woven in 2/2 twill. (a). Scale 1:1. (b) The fragment consists of two layers of identical folded cloth. Scale bar = 1 mm. (c) The binding system is clearly observable in places, here filled in. (c. 10x). (d) SEM micrograph WDF 0.45; 660x. (e) Pattern of 2/2 twill. Photo author.

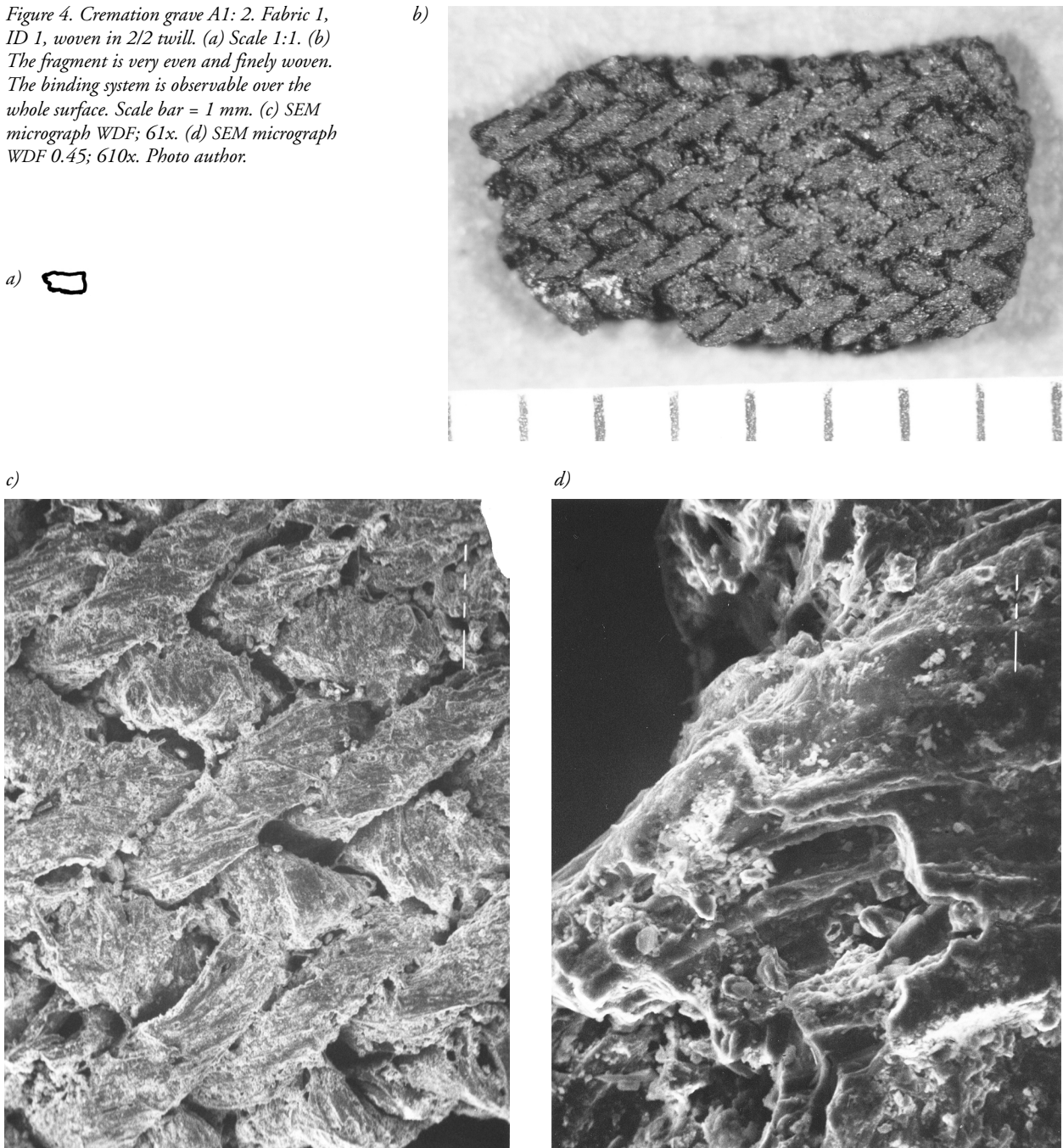
system, thread count, spinning, yarn diameter, spinning angle and fabric thickness. The fragment is woven in 2/2 twill and measures 1.0x0.55 cm (fig 3; table 3). It consists of two layers of fabric folded along the tighter thread system, which is more than twice as tight as the looser thread system (T=28.25; R=1.14). In both directions the yarn is single and z-spun. The structure and morphology of the fibre material could not be established by SEM, as the fibres were too deformed and partly smelted. The charring experiments showed however, that in an oxidized environment, such as a funeral pyre, vegetable fibres break down from the intense heat and at about 600°C turn into whitish ash. Animal fibres on the other

hand char and solidify into black lumps, provided they do not lie on the embers, in which case they disintegrate. FTIR-analysis showed that the material in ID 1, fabric 1, was of animal origin, almost certainly wool (Malmius a-ms).

Grave A1: 2

The fragments in grave A1: 2 are somewhat less charred than those in grave A2: 2, which means that on some fragments the individual fibres were observable with a magnifying glass. Colour varies from grey-black to black. In total there are 12 textile fragments, all small, somewhat glossy-black, 'blistered' and hard. Four of these, ID 9–12, could not be more closely

Figure 4. Cremation grave A1: 2. Fabric 1, ID 1, woven in 2/2 twill. (a) Scale 1:1. (b) The fragment is very even and finely woven. The binding system is observable over the whole surface. Scale bar = 1 mm. (c) SEM micrograph WDF; 61x. (d) SEM micrograph WDF 0.45; 610x. Photo author.



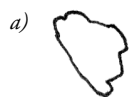
determined other than with regard to textile structure and four others, ID 5–8, could only be determined to be twill.

The remaining four are found in three adjoining excavation squares (one-metre squares). In the middle square, x1458; y4826, there was found a very well preserved fragment, ID 1, of a 2/2 twill which is very even and finely woven (fig. 4; table 4).

In square x1458; y4825 there were two fragments, ID 2 and 3, both woven in 2/2 twill. ID 2 is smooth and consists of a single layer of fabric, while ID 3 seems to be hemmed at one corner, where the edges are folded over. No hemming stitches are however visible. The binding system is not visible on the back of the fragment and the 'folded' edges are not fully intact, so other interpretations cannot be ruled out, for

example that it might be the remains of a fold (fig. 5; table 4). In square x1457; y4826, fragment ID 4 was found woven in 2/2 twill. Even this fragment has an upturned edge from a hem or fold, in this case along one side (fig. 6; table 4). Comparison with the charring experiments and FITR-analyses point towards the material being wool (Malmius *ams*). A compilation and comparison of all fragments however shows that these 2/2 twill fragments may have belonged to one, possibly two, different fabrics (fig. 7). ID 2 and ID 3, found in the same square, are of the same quality and come probably from the same fabric. ID 4 could also belong to that fabric since it is of similar quality and is in addition, as ID 2 and ID 3, provided with a turned-up edge, possibly from a hem. It cannot however be ruled out that ID 1, from

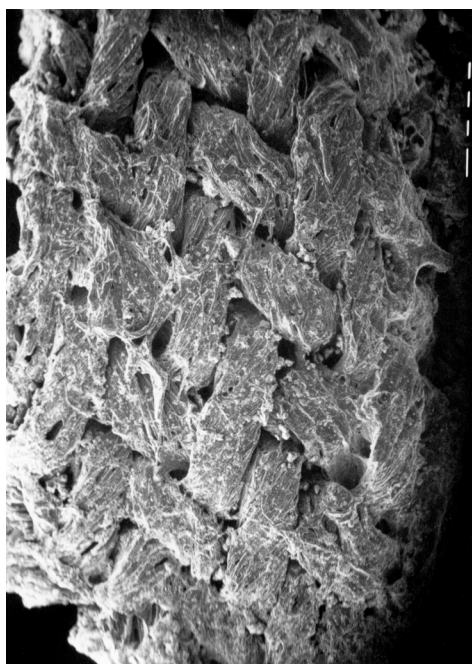
Figure 5. Cremation grave A1: 2. Fabric 2, ID 3, woven in 2/2 twill. (a) Scale 1:1. (b) The fragment is probably hemmed to form a corner point. Scale bar = 1 mm. (c) SEM micrograph WDF 0.45; 42x. (d) SEM micrograph WDF 0.46; 610x. Photo author.



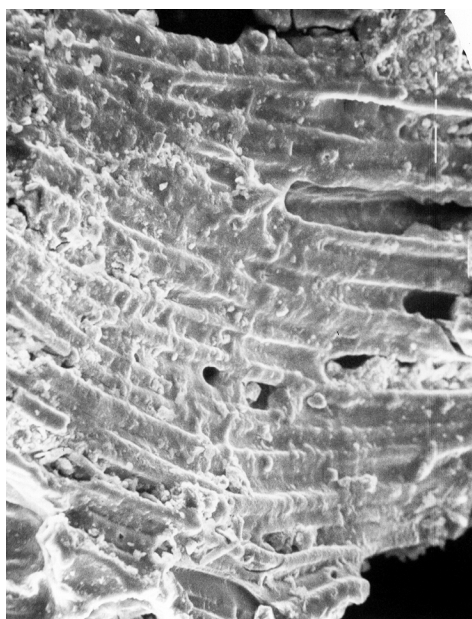
b)



c)



d)

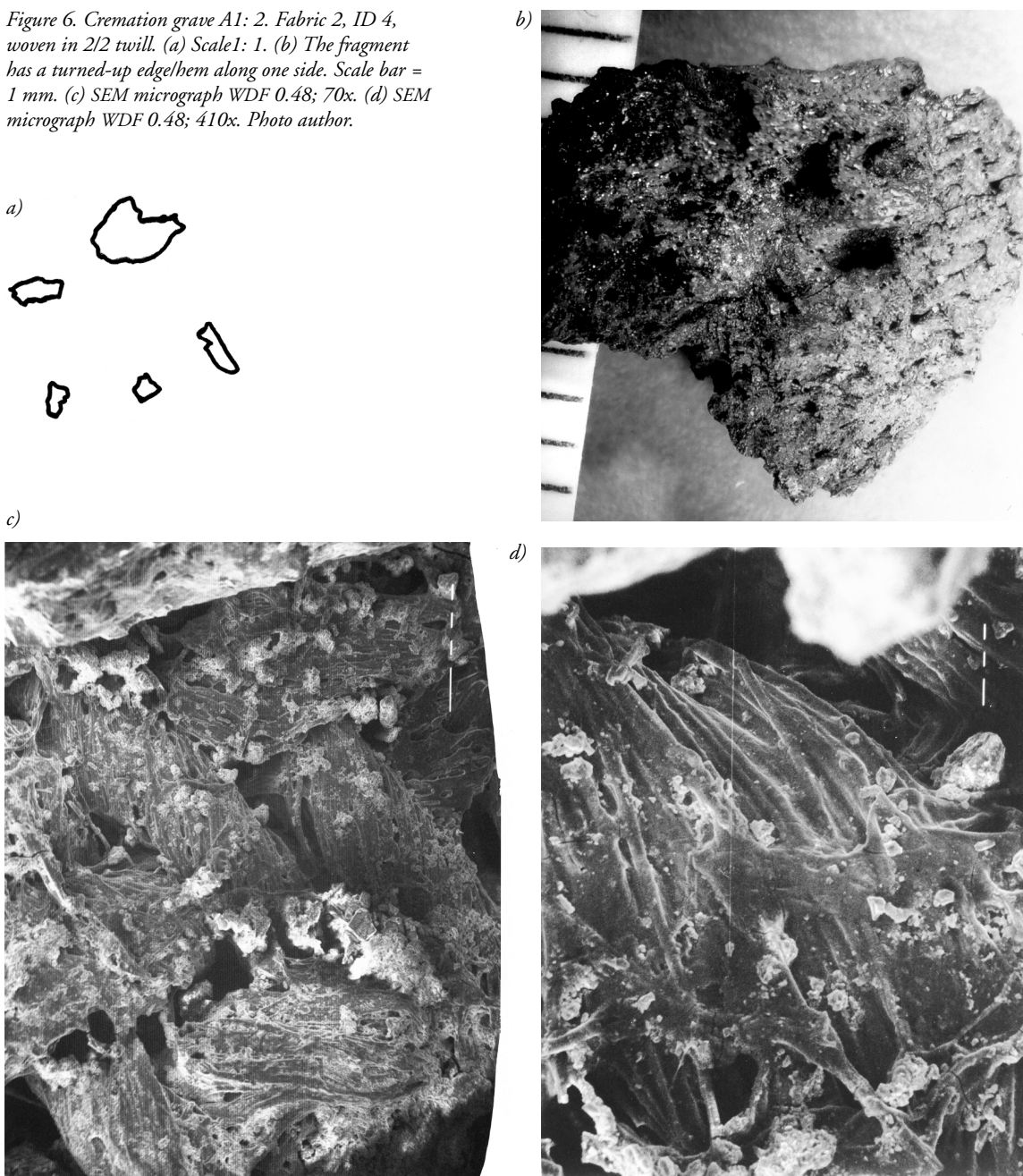


CREMATION GRAVE TEXTILES

Table 4. Cremation grave A1: 2. Fabric 1, woven in 2/2 twill, and fabric 2(?), woven in 2/2 twill. These carbonized fabrics were examined with regard to BS (binding system), M (material), Max (maximum size in cm), Thr/cm (threads/cm in warp and weft), M Thr/cm (mean thread-count/cm in warp and weft), MP (number of measuring points), T (thread-count sum), R (rib factor), Sp (spinning), Yarn Ø (yarn diameter in mm), Sp-a (spinning angle), F-mm (fabric thickness in mm) and Colour.

Grave	ID	(n)	frg	X	Y	BS	M	Max	Thr/cm	M thr/cm	MP	T	R	Sp	YarnØ	Sp-a	Fmm	Colour	Fabric	Fig
A1:2	1	1	1458	4826	2/2 ky	Wool	0,73x0,41	30,75-32x18,25-18,75	31,25x18,5	5x3	49,75	0,69	z/z	0,3-0,4x0,4-0,5	40-55x40-50	0,7	grey-bl	1	4	
A1:2	2	1	1458	4825	2/2 ky	Wool	0,75x0,55	19,5-21,75x14,25-16,25	20,75x15,5	3x3	36,25	0,34	z/z	0,3-0,5x0,4-0,7	20-40x40-50	0,7	grey-bl	2?	-	
A1:2	3	1	1458	4825	2/2 ky	Wool	1,5x1,2	21,26-16x16,75	22,0x16,25	3x3	38,25	0,35	z/z	0,4-0,5x0,4-0,5	20-40x20-40	0,5	grey-bl	2?	5	
A1:2	4	1	1457	4826	2/2 ky	Wool	1,5x1,1	17,75-19x15-16,75	18,25x15,5	4x3	33,75	0,18	z/z	0,3-0,4x0,4-0,5	20-40x20-50	0,7	grey-bl	2?	6	
A1:2	5-8	4	1457	4826	? Ky	-	0,8x0,4	-	-	-	-	-	-	-	-	-	grey-bl	-	-	
A1:2	9-12	4	1458	4825	-	-	0,7x0,5	-	-	-	-	-	-	-	-	-	grey-bl	-	-	

Figure 6. Cremation grave A1: 2. Fabric 2, ID 4, woven in 2/2 twill. (a) Scale 1: 1. (b) The fragment has a turned-up edge/hem along one side. Scale bar = 1 mm. (c) SEM micrograph WDF 0.48; 70x. (d) SEM micrograph WDF 0.48; 410x. Photo author.



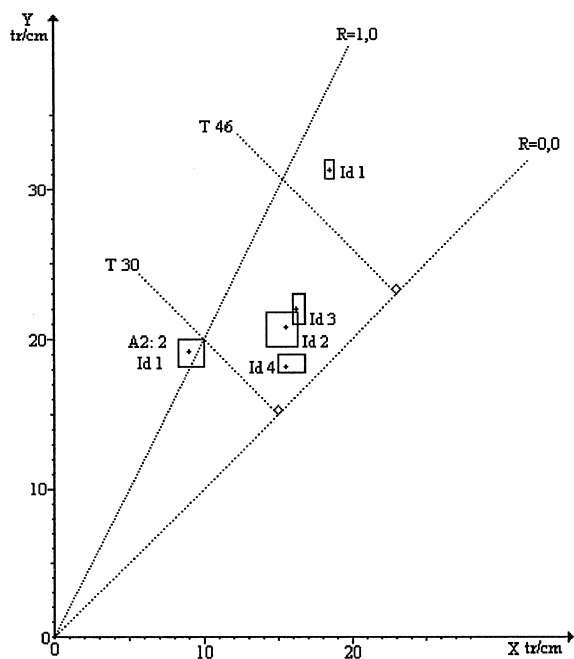


Figure 7. Rib factor diagram showing the four analysed fragments from grave A1: 2. Only fragments with the same binding system and material can have belonged to the same original fabric. The rib factor diagram is constructed with the highest thread count on the y-axis and the lowest on the x-axis. The diagonal lines indicate rib factor 0.0 (along this line the fabric has as many threads in warp as weft) and rib factor 1.0 (along this line the fabric has twice as many threads in the one thread system as the other). Perpendicular to the rib-factor line 0.0 lie the lines for thread count sum, $T=30$ and $T=46$. The thread count sum is the same along the whole line. The fabrics are depicted as rectangles or lines, within which the thread count varies. The plus sign (+) marks the mean thread count. In those areas where the rectangles overlap one another, the fabrics have the same thread count (Malmius 1996, 1998). If other data also show agreement, and the position in the grave allows it, then the fragments have probably/possibly belonged to the same original fabric. Fabric 1, ID 1, from grave A2: 2 is included to show the relationship between that fabric and the fabrics in A1: 2. The woollen fabrics are woven in 2/2 twill. Drawing author.

the central square, belonged to another fabric since the thread count in that fragment is considerably higher than in ID 2–4.

The charring experiments showed that thread density increases under the influence of heat. The amount of increase depends on the position of the fabric in the pyre, i.e. the temperature level and the surrounding context. The thread count in the analysed fragments is therefore probably higher than the original thread count; by how much however, is hard to establish without additional experimentation.

The higher thread count in ID 1 can therefore be caused by that fragment having lain closer to the pyre centre while the other fragments lay more peripherally; that is to say, all fragments could have belonged to the same original fabric. But the grave contains two persons and the textile fragments were found over a large area so it is not impossible that at least two different fabrics are present. A comparison of textiles by their appearances in the SEM-micrographs indicates that ID 1 is no more charred than the others. My interpretation is that these four 2/2 twill fragments belonged to two fabrics, that ID 1 comes from a fabric that in charred state is of very fine quality and medium-ribbous ($T=49.75$; $R=0.69$) (fabric 1), while ID 2–4 probably belong to a different fabric (fabric 2) which in charred state is also of very fine quality but weakly ribbous ($T=33.75$ – 38.25 ; $R=0.18$ – 0.35).

Textiles at Vendel during the Migration Period/Vendel Period

Our knowledge of the textiles used in clothing and grave furnishings at Vendel during the 6th century comes from examination of the remains of textiles from the boat-graves at Vendel church, that is graves XIV, XII and XI dating to between 520/30 and the end of the 6th century (Arrhenius

1983: 44) (table 5). One additional grave, boat-grave X, dated to the end of the 6th century, contains textile remains but these have not been analysed (Stolpe/Arne 1912: 38ff).

Weavings in 2/2 twill occurred in boat-graves XIV, XII and XI (table 6), where fabrics woven in tabby were also found. Even other binding systems appeared there including 2/2 broken twill/ broken lozenge twill, weft- or warp-floated tabby and soumak (Bender Jørgensen 1986: 236; Mattsson 2000: 29; Malmius b-ms).

A comparison with the fabric from cremation grave A2: 2 and the textiles woven in 2/2 twill from boat-graves XIV, XII and XI showed that the yarn in all cases is z-spun and that the raw material where it could be established, is animal, probably wool. Correlation of thread count and yarn diameter is harder to establish, partly because of the variety in thread counts within the boat-grave material ($T=24$ – 39.75) and partly because the heated-affected fabric 1, from cremation grave A2: 2, possibly has now a higher thread count ($T=28.25$) than it had originally, due to the heat – a phenomenon shown in the charring experiments. It is however clear that the cremation grave fabric compares best with the lesser fine fabrics from the boat-graves and that it cannot be excluded that fabric 1 is even coarser than the boat-grave fabrics.

The experiments also show that fabrics of animal material shrink almost as much along the warp as along the weft (Malmius a-ms). By this one can conclude that the fabric in the cremation grave originally had twice as many threads in the one direction as the other, or at least was strongly ribbous. Four of the fragments in the boat-graves are strongly ribbous, while the majority are weakly to medium ribbous.

Textiles at Vendel during the Viking Period

For the 9th/10th centuries, we have knowledge of clothing and grave furnishings at Vendel from the preserved textiles

CREMATION GRAVE TEXTILES

Table 5. Contents from the Vendel-period boat-graves XIV, XII and XI at Vendel, Vendel par., Uppland (Stolpe/Arne 1912; Bender Jørgensen 1986: 236; Mattsson 2000: 20f; Malmius b-ms).

Grave- and grave content	Grave XIV, Vendel	Grave XII, Vendel	Grave XI, Vendel
Dating	520/30 –560/70	late 6th cent	late 6th cent
Grave type	boat-grave	boat-grave	boat-grave
Grave context	boat-grave cemetery	boat-grave cemetery	boat-grave cemetery
Damaged/plundered	undamaged	badly damaged when grave was opened	centre plundered of its weapons
Burial rite	inhumation	inhumation	inhumation
Genus	man	man	man
Animals	1 bridled horse (in the stern), 2 dogs (in the prow)	2 pigs (centre of boat), 2 horses, 1 cattle, 2 dogs, 1 boar (outside the boat)	3 horses shod with frost-nails (outside the boat)
Textiles /dress accessories on the deceased	textile on/ inside helmet belt with bronze mounts	–	–
Textiles /dress accessories, other	textile, function not determined	textile fragments on sword, on outside of helmet, on strap-end, on iron mount	textile fragments on shield grip, inside helmet, on rivethead, on sword
Personal equipment	helmet on head knife hanging from belt gaming pieces comb	helmet chain mail gaming pieces dice	helmet chain mail
Weapons	1 double-edged sword, shield, spear	2 double and 1 single edged swords, 2 shields, 1 spearhead, arrowheads	fragment of 1 double-edged sword, 2 shields, 1 lance, spearheads
Coffin / boat	boat, c. 8 m long, just over 1 m wide	boat, prob. orig. just over 7 m long	boat, c. 9 m long
Imported objects /trade	(?)	1 glass beaker	(?)
Craftwork	wool shears, knife, knife-like blade tool	wool shears, knife, hammer	knife, hammer
Animal equipment	horse-bit, saddle mounts, stirrups, frost-nails	2 bridles (1 ornate, 1 simple), saddle, frost-nails	bridle, frost-nails, hook, leash(?)
Food and drink	food for the journey, iron cauldron	(no cauldron)	iron cauldron with chain, pot fork, cooking spit(?), drinking horn, mount (?)
Other	wooden vessel	flint, birch-bark	objects of birch-bark, sculptured wooden animal head

in chamber grave VIII. That grave is dated to c. 850 – early 10th century (Stolpe/Arne 1912: 59; Arbman 1938: 21) (table 7). The material from boat-graves IV and VI dating to 9th/10th centuries and from chamber grave VIII, preserved in the stores of the Museum of National Antiquities, Stockholm, have been searched through and found not to contain textile remains.

According to Stolpe/Arne (1912: 32), grave VIII contained ‘A small collection of fine gold thread, partly retaining its form of tiny spiral-shaped plaits. Has clearly been woven into fabric’. Analysis at AFL, discovered besides the spun gold lamella threads, also spun silver lamella threads and textiles woven in tabby and 2/2 broken lozenge twill. The spun lamella threads had presumably decorated one or several weavings (Salmi 2001, Malmius c-ms).

The woven 2/2 twill fabrics from cremation grave A1: 2,

in Vendla’s Mound, thus do not accord with the fabrics in chamber grave VIII. The fragments in the cremation grave are of very small dimensions: the largest measures 1.5×1.2 cm and fragment ID 3, has a very high thread count. This is the same with the other fragments found in the same grave. The limited size of these fragments means that it cannot be ruled out that some could have had a broken diagonal, and that the binding system really was 2/2 broken twill or 2/2 broken lozenge twill. The great difference between the graves is however the absence of gold and silver thread in A1: 2. Gold and silver threads occur in the 6th century in cremation graves in the East and West Mound at Old Uppsala (Lindquist 1936: 144, 178; Larsson 2000: 30ff; Malmius b-ms). Not before the 9th century, do gold and silver threads recur though they still are a rare find in graves before the 10th century when the overwhelming majority of

Table 6. Fabric fragments woven in 2/2 twill from the Vendel-period boat-graves XIV, XII and XI at Vendel. These fragments are not carbonised, they are attached to metal fragments where the metal salt has penetrated the fibres to a certain extent and placed itself as corrosion around the textile. Despite this, the fabrics can often be analysed in certain areas with regard to BS (binding system), M (material), Max (maximum size in cm), Thr/cm (threads/cm in warp and weft), M Thr/cm (mean thread-count/cm in warp and weft), MP (number of measuring points), T (thread-count sum), R (rib factor), Sp (spinning), Yarn Ø (yarn diameter in mm), Sp-a (spinning angle) and Colour.

Grave	(n) frg	Site	BS	M	Max	Thr/cm	M Thr/cm	MP	T	R	Sp	YarnØ	Sp-a	Tt mm	Colour	Fabric
Vendel XIV	1	–	2/2 twill	A?	0,75x0,65	14,5-20x11,5-16,5	17x13,5	4x4	30,5	0,26	z/z	0,46x0,42	–	–	br	–
Vendel XIV	1	fr helmet	2/2 twill	–	1,1x0,85	11-15x9-12	13,5x11	5x6	24,5	0,23	z/z	0,46x0,46	–	–	br	–
Vendel XIV	1	fr helmet	2/2 twill	–	0,91x0,62	17-21,5x12,15	19,75x13	6x6	32,75	0,52	z/z	0,44x0,4	–	–	br	–
Vendel XIV	1	fr helmet	2/2 twill	–	1,0x0,62	15-17x10-12,5	16,25x11,25	4x5	27,5	0,44	z/z	0,45x0,42	–	–	br	–
Vendel XIV	1	fr helmet	2/2 twill	–	0,5x0,4	13,5-16x10-12	14,5x11,25	4x4	25,75	0,29	z/z	0,5x0,5	–	–	br	–
Vendel XIV	1	fr helmet	2/2 twill	–	0,5x0,4	10-15x10-12,5	12,75x11,5	6x5	24,25	0,11	z/z	0,43x0,43	–	–	br	–
Vendel XIV	1	fr helmet	2/2 twill	–	0,7x0,65	16,5-21,5x9-13,5	19x11	2x2	30	0,73	z/z	0,46x0,5	–	–	br	–
Vendel XIV	1	fr helmet	2/2 twill	–	0,6x0,6	15,5-18,5x12-13,5	17,5x12,5	4x4	30	0,4	z/z	0,58x0,58	–	–	br	–
Vendel XIV	1	fr helmet	2/2 twill	–	0,55x0,55	20-21,5x11,5-13,5	20,75x12,5	3x4	33,25	0,66	z/z	0,45x0,45	–	–	br	–
Vendel XIV	1	–	2/2 twill	–	1,3x0,9	17-24,5x9-11	19x10	6x6	29	0,9	z/z	0,55x0,47	–	–	br	–
Vendel XIV	1	–	2/2 twill	–	0,85x0,85	13-20x10-12	15,25x10,75	4x5	26	0,42	z/z	0,43x0,56	–	–	br	–
Vendel XIV	1	–	2/2 twill	–	1,05x0,85	14,5-20x10-13,5	16,5x12	6x4	28,5	0,37	z/z	0,53x0,5	–	–	br	–
Vendel XIV	1	–	2/2 twill	–	1,9x1,3	16-19,5x12,5-13,5	18x13	3x3	31	0,38	z/z	0,47x0,47	–	–	br	–
Vendel XIV	1	–	2/2 twill	–	1,2x0,95	14-17,5x11-13,5	16x12	1x1	28	0,33	z/z	0,45x0,47	–	–	br	–
Vendel XIV	1	–	2/2 twill	–	1,15x0,95	15,5-17x11-15	16,25x12	5x6	28,25	0,35	z/z	0,42x0,44	–	–	br	–
Vendel XII	1	on Fe–frg	2/2 twill	A	0,9x0,75	23,5-27,5x14	25,75x14	3x1	39,75	0,84	z/z?	0,2-0,4x0,4-0,5	30-45x?	–	br	1
Vendel XII	1	on Fe–mount	2/2 twill	A	2,0x1,0	15-16,75x12,5	15,75x12,5	2x2	28,25	0,26	z/z	0,33x0,5-0,6	30-55x20-40	–	mbr	2
Vendel XII	2	on Fe–frg	2/2 twill	V?	1,4x1,3	10,75-13,75x9,75-12,5	12,5x11,5	5x4	24	0,09	z/z	0,5-1,3x0,5x0,8	10-40x10-30	–	mbr	3
Vendel XI	1	on sword	2/2 twill	–	–	–	22x12	–	34	0,83	z/z	–	–	–	–	–
Vendel XI	1	on sword	2/2 twill	–	–	–	22x15	–	37	0,47	z/z	–	–	–	–	–

occurrences appear. On Björkö, they occur in cremation graves, inhumation graves and chamber graves (Geijer 1938: 68ff; Arrhenius 1978: 52; Malmius & Lindblom g-ms).

The buried persons in chamber grave VIII and cremation grave A1: 2, which might be contemporaneous, have thus been provided with textiles of different binding systems and to some extent of different materials – whether this is the original situation or due to preservation conditions cannot be established.

Textile traditions and production

In the cremation graves A2: 2 and A1: 2, the fabrics are woven in 2/2 twill. When, where and how has this type of fabric been used? The textile finds most commonly found in Scandinavia during the late Roman Iron Age and Migration Period (c. AD 300–550) are weaves in 2/2 twill and tablet-woven bands (Geijer 1994: 272). In the Migration-Period chamber grave at Högom, Selånger parish, Medelpad, dated to c. 500 or slightly earlier, the dead man was dressed in a costume consisting of tunic, trousers and cloak. There was also an extra tunic and extra cloak. All items of clothing were made of wool and woven in 2/2 twill. The head garment was made of beaver fur (Nockert 1991: 9ff). The fabrics are mostly balanced to medium ribbous.

During the Vendel Period, the occurrence of these fabrics lessens in favour of unbalanced woollen fabrics woven in 2/2 twill and 2/2 broken lozenge twill. Even tabby-woven fabrics of linen begin now to appear in the grave material – a fact that is highly unusual during the Migration Period (Bender Jørgensen 1986: 164). Now that the clothing from boat-grave 5 at Valsgårde, Old Uppsala parish, has been in-

terpreted as a tunic/shirt and caftan, additional binding systems such as spin-patterned tabby and warp- or weft-float patterned tabby, can probably be ascribed to clothing fabric (Malmius 1998: 67ff).

The settlement excavations close to Vendel church indicate that the large hall's southern part was used for textile production and food-preparation. A concentration of fragments of numerous loom-weights lay around the house's southernmost row of posts (Isaksson et al. 2000: 19), while almost 2 m away in posthole A254, a seed of flax was found. A probable flax seed was found in cremation grave A1: 1 in Vendel's Mound (Hansson 2002: 6). Since flax contains 40% fat it is the first of all fossil seeds to be destroyed (Gustafsson 1989; Hansson 1999: 22, table 1). In one of the earlier houses, dated to c. AD 500, the only complete loom-weight find occurred in a gully (Isaksson et al. 2002: 19). Loom-weight fragments, numbering 205 in all, were also found in the settlement at the church-bell steeple-hut, Raä 28, in feature A14, which is dated to the Late Iron Age (Seiler 1999a). A spindle whorl was found in a grave at Bergby, Raä 38, A35, just north of Tuna. It is made from the joint-bone of an animal. A spindle whorl was found in a Viking Period grave at Skarbo, Raä 151, A7 and a stray find of a spindle whorl was found at Karby (Seiler 2001: 63, 69 [part 2], 47 [part 1]). Clear evidence thus exists for local textile production at Vendel. Which fabric or fabrics were woven there, cannot be stated with any certainty.

The function of the textiles

Were the discovered fabrics in the cremation graves used as clothing or grave furnishings? Ibn Fadlan, the Arabian ex-

Table 7. *The Viking-Period grave material in chamber grave VIII, Vendel, Vendels par., Uppland (Stolpe/Arne 1912; Salmi 2001; Malmius & Lindblom c-ms).*

Grave and grave content	Chamber grave VIII, Vendel
Dating	850's to early 10th cent
Grave type	chamber grave
Grave context	boat-grave cemetery
Damaged/ plundered	undamaged
Burial rite	inhumation
Genus	man
Animals	2 horses, 1 dog, 1 sheep (in chamber)
Textile /dress accessoried on the deceased	gold- and silver threads?
Textiles / dress accessoried, other	textile on chain mail
Personal equipment	chain mail, knife with handle wound in silver
Weapons	spearhead
Coffin /boat	no
Imported objects / trade	(?)
Craftwork	bone awl
Animal equipment	gilt strap-mounts richly decorated with interlace and animal ornament, bridle, horse chain
Food and drink	iron chain?

plorer, recorded in c. AD 920 how the Rus, i.e. Scandinavians, were dressed and how a rich chieftain was looked after when he died. He was dressed in a costume consisting of stockings, trousers, boots, a tunic and a caftan of gold brocade with buttons of gold, and a cap of brocade and sable fur. In the burial ship, a couch within a tent/pavillion was made ready with a mattress of Greek brocade. The chieftain was placed on the mattress and supported by means of the cushions. Next, he was provided with food, drink, weapons, dog, horse, cattle and other animals, and finally one of his female slaves. Then the ship together with the deceased and his grave goods was set alight. Ibn Fadlan even described the living Rus: 'I have seen the Rus as they came on their merchant journeys and encamped by the Volga. I have never seen more perfect physical specimens, tall as date palms, blonde and ruddy; they wear neither tunics nor caftans, but the men wear a garment which covers one side of the body and leaves a hand free' (Smyser 1965: 92ff) – the standard male apparel worn by the Rus in the 10th century seems thus to have been the cloak.

Whether the children and youths at Vendel were the recipients of a similar burial ritual as described by Ibn Fadlan, cannot of course be established, but there are several parallel features, such as the boat/ boat rivets, food, vessels for food, animals and textiles. It is thus not impossible that they were

equipped with both clothing and grave furnishings, though of simpler character, as described for this chieftain.

A comparison between the grave-goods in cremation grave A2: 2 where two young persons were laid to final rest and the grave-goods in the relatively contemporaneous boat-graves XIV, XII and XI (tables 1 and 5), where a single man was buried in each boat, shows that the cremation graves especially contain grave-goods consisting of 'personal' equipment (weapons are missing) and animals. Here can also be found rivets belonging to horse fittings and some pottery vessels (probably intended as containers for food). The numerous boat-rivets imply that a boat could have been included in the pyre (Müller-Wille 1970; Schönback 1994: 122). In the boat-graves however, the predominant find, besides the boat itself, is warrior equipment such as helmet, weapon and chain mail, together with rich equipment for horses and dogs. In boat-graves XIV and XI, the iron cauldron takes on a central role for food and feasting. The lack of an iron cauldron in grave XII can be explained by the boat there having been damaged in the 19th century when a new grave was laid out. The buried persons have also been provided with tools of various sorts. In both the cremation graves and the boat-graves, horses occur though in differing numbers. The inclusion of other kinds of animals varies from grave to grave.

If one likewise compares cremation grave A1: 2 from the 9th century with chamber grave VIII which is dated to the end of the 9th/ beginning of the 10th century, the same differences occur, though with some variation (tables 1 and 7). The grave-goods in the cremation grave still consist of 'personal' equipment – in this grave emphasized by a possible penannular brooch known in the Birka graves as an item particularly of men's dress (Thålin 1984: 19f). Weapons are decidedly absent, with one exception, a shield mount. Boat-rivets imply that a boat may have been included in that grave too. Helmets are no longer included in the Viking Period boat-grave and chamber-grave material, as was otherwise customary during the early Vendel Period in Vendel and Valsgårde (Stolpe & Arne 1912; Arwidsson 1942, 1954, 1977; Lundström 1983: 106). Warrior equipment is otherwise not as abundant as during the Vendel Period. Chamber grave VIII contained only chain mail and spearheads. In both cremation graves and chamber graves, horses and dogs occur, though in differing numbers. Other animals vary with regard to type and number.

Who then are these men who are buried one by one in the boats or burnt on the pyre, two children/ youths together(?) possibly in a boat?. It is quite clear that we here have two different groups – an older weapon-bearing one and non weapon-bearing children and youths. Ever since the boat-graves were discovered at the end of the 19th century, the men in the graves have been ascribed many professions – as kings, earls, chieftains, etc. (Norr & Sundkvist 1995: 408f). According to Anton Seiler (1999b: 73), who has studied the colonization of Vendel, the boat-graves should be interpreted as burial monuments erected over the major male personages of Tuna who in the first place were landowners but who prob-

ably belonged to a growing political and religious elite. Arrhenius (2000: 96) considers that it is the king's warriors who are buried in the boat-graves, belonging to cavalry, which during this period constituted the most advanced of warriors. The custom of boat burial (Müller-Wille 1970; Schönback 1980: 108ff), of which the rich boat-grave at Sutton Hoo from the 7th century is the most famous (Bruce-Mitford 1979), might be the result of close contacts with the Continent, where the warrior ideal was well established among aristocratic circles. On the Continent however, the dead were buried primarily in wooden chambers where the deceased and his/her grave goods were laid down in a manner comparable to the typical Scandinavian boat-graves (Gräslund 1980; Müller-Wille 1991: 186f). In such circles a person's status and social rank was displayed by dress – its material, colour and cut. This was valid both in the current life and that which was to come. Dress was therefore a very important ingredient of burial equipment. The young personages in the cremation graves, who were given horses, dogs, hunting birds, and other animals as grave-goods, were even provided with games. These bring to mind hunting, warring and competition and young aristocrats educated in the style of the day as future weapon-bearers and officials. Seiler (1999b: 74) considers that the cremation burials in Vendla's mound are probably monuments over the relatives of the major landowners. What then can the textiles add to this interpretation?

The textile examination shows that the young persons in cremation grave A2: 2 had received woollen fabric of traditional 2/2 twill, a type of fabric, which also the older men in the boat-graves received during the Vendel Period. The charred fabric in the cremation grave is today of fine quality (19.25×9 threads/cm; T=28.25) and is unbalanced (R=1.14) but probably originally was of a quality with fewer threads/cm. There is thus no fabric of directly comparable quality in the boat-graves, which are of fine to very fine quality and weakly to strongly ribbous. But it seems as if the new fashion with unbalanced woollen fabric eventually broke through or was on its way to a break-through at Vendel during the 6th century. The fabric in cremation grave A2: 2 is folded and consists of two layers of fabric of the same sort, which may indicate that it belongs to an item of clothing. Macrofossil analyses however indicate that the deceased lay on a bed of hay or else that the horse whose burnt bones were found in the grave had been provided with hay (Hansson 2002: 6). The fabric may also come from a bolster, cushion or something similar, which became folded in connection with the cremation act.

Even the Viking-Period cremation grave A1: 2 contained woollen fabric of 2/2 twill, possibly of two different qualities. The man/warrior in the Viking-Period chamber grave VIII had on the other hand received a completely different set of fabrics woven in tabby, 2/2 broken lozenge twill, and probably a woven fabric embroidered with gold and silver threads.

One of the charred fabrics (fabric 2) in A1: 2 is of very fine quality and the other fabric (fabric 1) is of even higher

quality. Both fabrics in that grave are weakly to medium ribbous.

It would appear from the fact that two of the fragments, ID 3 and 4, were hemmed, that fabric 2 must have belonged to an item of clothing. The pointed corner shape of fragment ID 3 brings to mind an open garment such as a jacket or caftan where the lower front edge has such a form. The traditional woollen fabrics in 2/2 twill, which are thicker and warmer than the e.g. tabby fabrics, were used for all sorts of garments and all sorts of uses. All the discussed woollen fabrics are of qualities which suit items of clothing such as cloaks, jackets/caftans or warm shirts. But without precise contexts, it is hazardous to differentiate between textiles for garments and textiles for grave furnishings and even where the context is known, it is not always possible to establish the primary function of very small textile fragments. Furthermore, a similar confusion or combination of functions is obvious from the written sources and their glosses, e.g.: Old Norse *feldr* or *möttull*, *skikkja* = cloak (Smyser 1965: 92ff), *fellur* (-ar, -ir) = skin rug, fur, fur coat (Leiström 1972: 67), *feldur* (-ar, -ir) = fur, fur cloak (Blöndal 1920-24:181), *feldur* = fur, coat (Sigurdsson 1970:171), *feldr* (-ar, -ir) = cloak (www.midhnottsol.org/zoega/text/h134.text).

Summary

It has been possible to establish that in the cremation graves in Vendla's mound, only woollen fabric in 2/2 twill occurred, a binding system found also in the Vendel Period boat-graves where it is associated with helmets and swords, i.e. these fabrics occur on/close to men. On the other hand, the fabrics in the new binding systems and materials, which occur in the contemporaneous boat-/chamber-graves do not occur. Whether this is the result of preservation conditions or that these fabrics were reserved for the higher social strata, cannot be established by this investigation alone, but requires further comparative work. It is my hypothesis however, after this pilot study, that the men in the Vendel Period boat-graves were provided with both traditional and new 'fashionable' fabrics, but the man in the Viking Period boat-grave only with 'à la mode' fabrics – fabrics that confirmed his rank and status. Some of these fabrics were probably imports or gifts.

In the cremation graves only traditional woollen fabrics were found, and these may have been made locally. It is possible that these fabrics belonged to a prospective warrior's hemmed blanket/cloak, which during the Viking Period was probably fastened with a penannular brooch (this supposition is based on the young men's warrior-like sporting or gaming pursuits and presumed position in society) – a garment that in the grave served as a shroud. However, as shown by the weavings in the Högom grave, woven fabrics of that sort could be used for all sorts of garments. Further examination can hopefully provide better information on how the fabrics in the cremation graves were used.

By this investigation of the textile fragments in Vendela's Mound, I have hoped to show that charred textile fragments contain almost all the information available from unburnt

prehistoric textiles. Investigations such as this provide the opportunity for comparing textiles belonging to different groups in society, for studying textile development and for gaining access to a larger textile material based on the numerous cremation graves of the Vendel and Viking Periods. My hope is that as a result, cremation graves in general will now be considered a valuable source for textile material.

English translation by Uaininn O'Meadhra.

References

Unpublished sources:

- Arrhenius, B. & Herschend, F. 1995. *SIV – Svealand in the vendel and viking periods. Settlement, society and power. An application for a research program*. The Archeological Research Laboratory, Stockholm University and Dept of Archaeology, University of Uppsala. Stockholm and Uppsala.
- Bergkvist, A. 1993. *65 kammar från Hemlanden på Björkö. En elementanalys på ett urval av gravmaterialen*. Masters paper (D-uppsats), Dept. of Archaeology. Stockholm University, Stockholm.
- Gustafsson, S. 1989. *Ett försök inom experimentell arkeologi med förkolning av frön*. Masters paper (D1-uppsats), Dept. of Archaeology. University of Umeå, Umeå.
- Hansson, A.-M. 1999. *Fossilt växtmaterial från SIV-projektets undersökningar i Vendel, vid Vendels kyrka*. Report from the Archeological Research Laboratory, Stockholm University. Stockholm.
- Hansson, A.-M. 2002. *Analys av fossilt växtmaterial från 3 brandgravar och ett undre lager i Vendlas hög, Vendel, Vendels sn, Uppland*. Report from the Archeological Research Laboratory, Stockholm University, Stockholm.
- Isaksson, S., Arrhenius, B. & Karlsson, Ö. 2002. *Långhus på liden. Arkeologiska boplatsundersökningar vid Vendel kyrka 1994–1998 och 2001–2001*. Report from the Archeological Research Laboratory, Stockholm University. Stockholm.
- Malmius, A. (a-ms). *Förkolnad textil. En metodstudie utifrån brandgravar i Uppland*.
- Malmius, A. (b-ms). *Dräkt och makt under 500-talet i centrala Svealand. En studie utifrån textilfragmenten i båtgrav XII i Vendel*.
- Malmius, A. & Lindblom, C. (c-ms). *Guld- och silver i vikingatidens dräkter*.
- Malmius, A. & Lindblom, C. (g-ms). *Birkas textila material i nytt ljus*.
- Sandberg, C.-A. 1976. *Spel och dobbel i Birka*. Undergraduate thesis (C-uppsats), Dept. Archaeology. Stockholm University, Stockholm.
- www.midhnottsol.org/zoega/text/h134.text. *A Concise Dictionary of Old Icelandic*.

Published sources:

- Ambrosiani, K. 1981. *Viking Age combs, comb making and comb makers in the light of finds from Birka and Ribe*. Stockholm Studies in Archaeology 2. Stockholm.
- Andersson, E. 1995. *Invisible Handicrafts: The General Picture of Textile and Skin Crafts in Scandinavian Surveys*. *Lund Archaeological Review* 1995, pp. 7–20. Lund.
- Arbman, H. 1938. *Vendelfyndet*. *Upplands fornminnesför. tidskrift* 46, pp. 1–28. Stockholm.
- Arbman, H. 1940–1943. *Birka I. Die Gräber*. Plates (1940). Text (1943). Stockholm.
- Arrhenius, B., Holmquist, L. & Wase, K. 1978. *Arkeologiska undersökningar vid Ormnös, Björkö, Adelsö sn, Up*. Rapport från Stockholms universitets arkeologiska forskningslaboratorium. (Report from the Archeological Research Laboratory, Stockholm University). No. 1. 1978. Stockholm.
- Arrhenius, B. 1983. *The Chronology of the Vendel graves*. In *Vendel period studies. Transactions of the Boat-grave symposium in Stockholm*,

- February 2–3, 1981*, pp. 39–70. Lamm, J.P. & Nordström, H.-Å. (eds.). The Museum of National Antiquities, Stockholm, Studies 2. Stockholm.
- Arrhenius, B. 2000. *Tuna och Husby i Vendel. I: En bok om Husbyar*, M. Olausson (ed). Avdelningen för arkeologiska undersökningar, skrifter nr 33. Riksantikvarieämbetet, pp. 93–100. Örebro.
- Arrhenius, B. 2002. *Die ländlichen Siedlungen im Umfeld von Birka*. In: *Haitabu und die frühe Stadtentwicklung im nördlichen Europa*. Schriften des archäologischen Landesmuseums, 8, pp. 349–357. Schleswig.
- Arwidsson, G. 1942. *Valsgärde 6. Die Gräberfunde von Valsgärde I*. Uppsala.
- Arwidsson, G. 1954. *Valsgärde 8. Die Gräberfunde von Valsgärde II*. Uppsala.
- Arwidsson, G. 1977. *Valsgärde 7. Die Gräberfunde von Valsgärde III*. Uppsala.
- Arwidsson, G. 1984. *Bemerkungen zur Quellenkritik*. In: *Birka II:1*.
- Bender Jørgensen, L. 1986. *Forhistoriske tekstiler i Skandinavien. Prehistoric Scandinavian Textiles*. Nordiske Fortidsminder, Ser. B. 9. Copenhagen.
- Blöndal, S. & Blöndal, B. T. 1980. 3. tr. (1920–1924). *Islandsk-dansk ordbog*. Reykjavik.
- Bruce-Mitford, R. 1979. *The Sutton Hoo ship burial: a handbook*. 3rd ed. London.
- Burnham, D. K. 1981. *A Textile Terminology: Warp and Weft*. London.
- Cyrus-Zetterström, U. 1995. *Textile terminology. Chinese-English – French-Swedish*. Stockholm.
- Geijer, A. 1938. *Birka III. Die Textilfunde aus den Gräbern*. Stockholm.
- Geijer, A. 1980. *The textile finds from Birka*. *Acta Archaeologica* vol. 50, 1979. Copenhagen.
- Geijer, A. 1994. *Ur textilkonstens historia*. Lund. (English ed. 1979. *A History of Textile Art*. London).
- Gräslund, A. 1980. *Birka IV. The Burial Customs. A study of the graves on Björkö*. KVHA. Uppsala.
- Gräslund, A.-S. 2000. *Järnålderns gravar i Sverige som arkeologiskt källmaterial*. Utbildningsmaterial (educational material), University of Uppsala. Uppsala.
- Hansson, A.-M. 1996. *Bread in Birka and on Björkö. Laborativ arkeologi*. *Journal of Nordic archaeological science*, 9, pp. 61–8. Stockholm.
- Hägg, I. 1986. *Die Tracht*. In: *Birka II:2*.
- Isaksson, S. & Seiler, A. 1997. *Landskap, bebyggelse och exponering. Några tankar kring en stormannagårds lokalisering*. In: *SIV Svealand i vendel- och vikingatid. Studier från delprojekten vid Stockholms universitet*. B. Arrhenius & G. Eriksson (eds.). Stockholm, (The Archeological Research Laboratory, Stockholm University), pp. 69–75. Stockholm.
- Isaksson, S. Wojnar-Johansson, M. & Hjulström, B. 2000. *The spatial organisation of subsistence at a Late Iron Age manor. An application of soil chemistry at a settlement in Vendel parish, Uppland, Sweden*. In: *Food and Rank in Early Medieval Time*. Thesis and Papers in Scientific Archaeology 3. (The Archeological Research Laboratory, Stockholm University). Stockholm.
- Larsson, A. 2000. *Posamentgravarnas retorik*. Undergraduate thesis (CD-uppsats). Dept of archaeology, University of Uppsala. Uppsala.
- Leijström, G., Magnússon, J. & Jansson, S. B. F. 1972. *Isländsk-svensk ordbok*. 3., extended edition. Stockholm.
- Lindquist, S. 1936. *Uppsala högar och Ottarshögen*. Stockholm.
- Lundström, A. 1983. *Vendel and the Vendel period*. In: *Vendel period studies. Transactions of the Boat-grave symposium in Stockholm, February 2–3, 1981*, pp. 105–108. Lamm, J.P. & Nordström, H.-Å. (eds.). The Museum of National Antiquities, Stockholm, Studies 2. Stockholm.
- Malmius, A. 1996. *Tortoise brooches, textile impressions and tex-*

- tiles. *Laborativ Arkeologi. Journal of Nordic archaeological science*, 9, pp. 79–88. Stockholm.
- Malmius, A. 1998. The textile fragments in boat-grave 5, Valsgärde, Old Uppsala parish, Uppland. *Laborativ arkeologi, Journal of Nordic archaeological science*, 10–11, pp. 65–80. Stockholm.
- Malmius, A. 2000. Analys av ett vikingatida textilfragment från en gravhög, Hallunda 75:34, Botkyrka sn, Södermanland. In: I.-M. Back Danielsson. *Härjad hög i Hallunda: arkeologisk undersökning av anläggning 34 från yngre järnålder på gravfält Raä 75, Hallunda, Botkyrka sn, Södermanland. Stockholm*. SAR Stockholm Archaeological Reports, Field Studies Nr 7, 2000. Stockholm.
- Mattsson, K. 2000. Spår av dräkten. Analys av textil och läder från den vendeltida båtgraven nr XIV i Vendel. In: *CD-uppsatser i laborativ arkeologi* 99/00. Part 2. The Archaeological Research Laboratory, Stockholm University, Stockholm.
- Montelius, O. 1892. Öfversikt öfver den nordiska forntidens perioder, intill kristendomens införande. *Svenska Fornminnesföreningens Tidskrift* 8:2, pp. 127–163.
- Müller-Wille, M. 1970. *Bestattung im Boot. Studien zu einer nord-europäischen Grabsitte*. Offa 25/26. Neumünster.
- Müller-Wille, M. 1991. Wikingerzeitliche Kammergräber. In *Mammen. Grav, kunst og samfund i vikingetid*, pp. 181–187. Iversen, M. (ed). Aarhus.
- Nockert, M. 1991. *The Högom find and other Migration period textiles and costumes in Scandinavia*. Archaeology and environment 9. Umeå.
- Norr, S. & Sundkvist, A. 1995. Valsgärde Revisited: Fieldwork Resumed after 40 Years. *Tor* 27, pp. 395–417.
- Petré, B. 1984. *Arkeologiska undersökningar på Lovö*. Part 2. Fornlämning Raä 27, Lunda. Stockholm.
- Salin, B. 1935 (1904). *Die altgermanische Thierornamentik: typologische Studie über germanische Metallgegenstände aus dem IV. bis IX. Jahrhundert, nebst einer Studie über irische Ornamentik*. Aus dem schwedischen Manuskript übers. von J. Mestorf. Stockholm.
- Salmi, K. 2001. Vikingatida dräkt detaljer från Vendel. In *CD-uppsatser i laborativ arkeologi* 00/01. The Archaeological Research Laboratory, Stockholm University. Stockholm
- Schönback, B. 1980. Båtgravskicket. In *Vendeltid*, pp. 108–122. Sandwall, A. (ed). Statens Historiska Museum. Stockholm.
- Schönback, B. 1994. Båtgravskicket. In *Tuna i Badelunda: guld, kvinnor, båtar*. Part 1, pp. 122–131. Västerås.
- Seiler, A. 1997. Ett litet brandgravfält i närheten av båtgravarna. Arkeologisk delundersökning, Raä 26, Vendel, Vendels sn, Uppland. In *SIV Svealand i vendel- och vikingatid: Rapport från utgrävningarna i Vendel*, pp. 56–92. B. Arrhenius & G. Eriksson (eds.). Arkeologiska forskningslaboratoriet, Stockholms universitet. The Archaeological Research Laboratory, Stockholm University. Stockholm.
- Seiler, A. 1999a. *Liv och död på klockstapelbacken. Arkeologisk delundersökning, raä 28, Vendel, Vendels sn, Uppland*. The Archaeological Research Laboratory, Stockholm University. Stockholm.
- Seiler, A. 1999b. Om rum, människor och aristokratiska miljöer. Järnålderns bebyggelse och samhälle belysta utifrån nya resultat från Tuna i Vendel. *Bebyggelsehistorisk tidskrift*, pp. 65–78. Stockholm.
- Seiler, A. 2000. *Vendlas hög. Arkeologisk undersökning. Raä 8, Vendel, Vendels sn, Uppland*. The Archaeological Research Laboratory, Stockholm University. Stockholm.
- Seiler, A. 2001. *I skuggan av båtgravarna. Landskap och samhälle i Vendels socken under yngre järnålder*. The Archaeological Research Laboratory, Stockholm University. Stockholm.
- Sigurðsson, A. 1970. *Íslensk-ensk orðabók*. Reykjavík.
- Smyser, H.M. 1965. Ibn Fadlan's Account of the Rus with Some Commentary and Some Allusions to Beowulf. In *Franciplegius: Medieval and Linguistic Studies in Honor of Francis Peabody Magoun*, pp. 92–119. Bessinger, J.B. Jr. & Creed, R.P. (eds.). New York: New York University Press.
- Stjerna, K. 1905. Bidrag till Bornholms befolkningshistoria under järnåldern. *Antikvarisk Tidskrift för Sverige* 18:1, pp. 1–296.
- Stolpe, H. & Arne, T. 1912. *Graffältet vid Vendel*. Stockholm.
- Strömberg, E., Geijer, A. & m.fl. 1979. *Nordisk textiltknisk terminologi*. Oslo.
- Thålin, H. 1984. Ringspännan. In: *Birka II:1*.