BETWEEN SKINS

ANIMAL SKINS IN THE IRON AGE AND HISTORICAL BURIALS IN EASTERN FENNOSCANDIA

Tuija Kirkinen

ACADEMIC DISSERTATION

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Cover: Cervidae hairs. Photo by T. Kirkinen.
ABSTRACT

This thesis investigates the skin and fur finds which have been excavated from Iron Age (500 BC – AD 1200/1300) and historical (1200/1300–1700) burials in eastern Fennoscandia during the past 130 years. The research material is unique in Europe, as fur remains usually decompose in archaeological contexts. For eastern Fennoscandian Iron Age research, this study brings new information on the roles that animal skins and wild animals held in societies, which produced furs both for domestic use and for the international fur trade.

The main questions of this thesis are

1) How can archaeological fur remains be studied? What information do they provide?
2) What kinds of furs have been discovered in the graves?
3) Why were the furs placed in the graves?
4) What are the recommendations for future research?

The research material consists of skin remains from 121 inhumation burials (animal skins and hairs) and 22 cremation burial sites (remains of claws). Animal hairs were found especially in contact with metals. Hairs were also found from the Late Neolithic soil samples in Perttulanmäki Corded Ware burial in Kauhava, which evidences the huge potential of microarchaeological analysis in fibre research. In cremation cemeteries, the predator 3rd phalanges provide evidence for the cremation of brown bear (Ursus arctos) and lynx (Lynx lynx) skins.

Animal skins were identified by species by the morphology of the hairs. The method was applied to the identification of species, fur preparation traditions like pulling, and the qualities of origin animals, such as the colour of the coat. In this thesis, morphological identification of hairs proved its usefulness as a cost-effective method for identifying archaeological samples. First, it can be applied in cases that lie outside the scope of scientific methods. These constraints are met when the sample size is very small, when the material is mineralized or when DNA has degenerated in acidic soils. However, most archaeological samples had undergone several taphonomic processes, caused especially by bacterial and fungal activity. This has altered the morphology and other qualities of hairs like the preservation of DNA.

As shown in this thesis, animal skin products formed an integral part in burials as grave goods, garments and burial inner structures. For future research on animal fibres, recommendations are made for the handling of finds and samples.
ACKNOWLEDGEMENTS

The stages of my academic journey have been many. Finally, I found the current subject in 2014 in consequence of my passion for animals and nature. In this work, I am deeply grateful to several people for their support and help.

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Equally, I want to thank my colleagues in archaeology and especially my second supervisor, Docent Georg Haggrén, University of Helsinki, Docent Kristiina Mannermaa, PhD Krista Vajanto, and Professor Mika Lavento, who read my texts and helped me enormously. In addition, I have the pleasure to thank my co-authors Marja Ahola, Aki Arponen, Janne Ruokolainen and Ina Vanden Berghe for their collaboration and inspiration.

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Finally, I want to thank my mother Sirkka-Liisa, my brother Vesa and sister-in-law Anni, sister Kirsi-Marja and brother-in-law Jaska. Most importantly, I thank my most precious ones, Teo and Tuuli, for sharing, caring and loving. I look forward to the time and new adventures which await us now.

Helsinki, 2nd March, 2019

Tuija Kirkinen
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Appendix I. List of Iron Age and medieval / historical sites studied in this thesis

Original publications I-IV
LIST OF ORIGINAL PUBLICATIONS

This thesis is based on the following publications:


The publications are referred to in the text by their Roman numerals.

The author’s contribution to publications III and IV:

III: TK designed the study, collected and analysed the animal hair material and wrote the manuscript together with AA. The textile material was analyzed by AA and the dye analysis was provided and interpreted by IVB. The revision of the final draft was done by TK and AA.

IV: MA initiated and TK, MA and KV designed the study together. TK analyzed the animal hair material together with KV. MA wrote the paper with contributions from TK, KV and JR. The revision of the final draft was done by all writers.
**ABBREVIATIONS**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>AD</td>
<td>Anno Domini</td>
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<tr>
<td>aDNA</td>
<td>ancient DNA</td>
</tr>
<tr>
<td>ANT</td>
<td>Actor-Network Theory</td>
</tr>
<tr>
<td>BC</td>
<td>Before Christ</td>
</tr>
<tr>
<td>CC BY 4.0</td>
<td>Creative Commons 4.0 licence</td>
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<tr>
<td>FHA</td>
<td>the Finnish Heritage Agency</td>
</tr>
<tr>
<td>FU</td>
<td>Fenno-Ugric collection, National Museum of Finland</td>
</tr>
<tr>
<td>MS</td>
<td>Mass Spectrometry</td>
</tr>
<tr>
<td>NISP</td>
<td>Number of Identified Specimen</td>
</tr>
<tr>
<td>NM</td>
<td>National Museum of Finland</td>
</tr>
<tr>
<td>NMC</td>
<td>Nanomicroscopy Center, Aalto University</td>
</tr>
<tr>
<td>SEM</td>
<td>Scanning Electron Microscopy</td>
</tr>
<tr>
<td>SKVR</td>
<td>Suomen Kansan Vanhat Runot, En. The Ancient Poems of the Finnish People (also a database)</td>
</tr>
<tr>
<td>TEM</td>
<td>Transmission Electron Microscopy</td>
</tr>
<tr>
<td>C14</td>
<td>Carbon 14 (radioactive carbon isotope for dating)</td>
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</tbody>
</table>
1 INTRODUCTION

1.1 FOCUSING ON ARCHAEOLOGICAL FUR FINDS

Animal skins and fur belong to one of the first materials that humans have exploited from the Palaeolithic Era onwards. Thus far, the oldest bone needles, which were evidently used for preparing skins, have been found in Sibudu Cave, South Africa (Backwell et al. 2008) almost about 80,000 years ago, and later in Siberia, Denisova Cave, from about 40,000 years ago (Kuzmin 2007; see later in China, Song et al. 2016). Furthermore, the DNA of clothing lice evidences the wearing of clothes in Africa already 170,000 years ago (Toups et al. 2011). However, animal skins themselves belong to soft animal-originated materials, which decompose easily in archaeological contexts. They thus represent the ‘missing majority’ which is by and large absent in archaeological find material, but which we can assume to once have been of great importance (e.g. Grömer et al. 2017; Hurcombe 2014, 68; Kite 2006).

Also in Finnish archaeology, animal skins and furs were long expected to have decayed in our acidic soils. This diehard belief is actually false, as furs and animal hairs have been found from the prehistoric and historic inhumation burials and listed in the find catalogues and publications from the beginning of the discipline (Appelgren-Kivalo 1907, 11–12, 36–37, 43, 60; Korvenkontio 1927; Pälsi 1925; Schwindt 1893; Tallgren 1931, 168–170; Äyräpää 1931). All this testifies to the fact that, in Finland, we do have animal fur remains in our archaeological record, but lacked any systematic research on them until now.

In this thesis, a pioneering study of east Fennoscandian (Finland and the Karelian Isthmus) fur finds, dated to the Iron Age and historical time, is presented. The research material is unique in the European context, as archaeological fur remains, especially of wild animals, are rare indeed (Brandt et al. 2014, 1; Carver & Klápště [eds.] 2011, 156, 393; for an overview of European find material, see Rast-Eicher 2016). For future research, the identifying of animal hairs and fibres in contact with metal items and in soil samples underlines the importance of microarchaeology and microscopy for the study of small-scale organic cultural heritage at archaeological sites and collections.

For east Fennoscandian Iron Age research, this study brings new information about the roles that animal skins and wild animals held in societies which presumably produced furs for international trade networks. Compared to previous research, the work evidences the legacies of hunting traditions in populations which have been seen foremost as agrarian. Most importantly, the study of animal-originated material culture reveals something very crucial about the human mind.
1.2 RESEARCH QUESTIONS AND OBJECTIVES

The present study investigates animal skins in the Iron Age and historical burials in eastern Fennoscandia. The results were obtained by searching for answers to the following research questions and objectives:

1) How can archaeological fur remains be studied? What information do they provide?
   - to study the possibilities and source-critical problems of morphological identification of hairs and fibres from archaeological contexts

2) What kinds of furs have been discovered in the graves?
   - to present and identify the unique fur material which has been excavated from the Iron Age and historical period burials in Finland and in the Karelian Isthmus, Russia.

3) Why were the furs placed in the graves?
   - to interpret the roles of furs as material culture and as indicators of human-animal relationships in the Finno-Ugrian culture sphere

4) What are the recommendations for future research?
   - to advance the surveying of even microscopic organic cultural heritage in excavations and collections
   - to advance the study of fibres

These questions are answered in four Papers (I-IV) listed on page 9 and in the synthesis. The fur and skin finds are presented in Papers I, III (inhumation burials in Finland and the Karelian Isthmus) and II (cremation burials in Finland). Paper IV is a case study, in which advanced methodologies for the survey and identification of hairs is presented.

The interconnectedness of the individual Papers is illustrated in Table 1.

Table 1. The four Papers (I–IV) plotted according to the research questions (RQ) they aim to answer.

<table>
<thead>
<tr>
<th>Research question</th>
<th>Paper I</th>
<th>Paper II</th>
<th>Paper III</th>
<th>Paper IV</th>
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<tr>
<td>RQ 1</td>
<td>xxx</td>
<td>x</td>
<td>xx</td>
<td>xxx</td>
</tr>
<tr>
<td>RQ 2</td>
<td>xxx</td>
<td>xxx</td>
<td>xxx</td>
<td>(x)</td>
</tr>
<tr>
<td>RQ 3</td>
<td>xxx</td>
<td>xxx</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>RQ 4</td>
<td>x</td>
<td></td>
<td></td>
<td>xx</td>
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</table>

RQ 1: The morphological identification of animal fibres and skins is a central issue in this thesis. The identification was based both on optical microscopy
(Papers I and III) and scanning electron microscopy [SEM] (Paper IV) of hair and fur samples, and of fibres collected from soil samples, respectively. Additionally, aDNA analysis was tested for Finnish material but it gave no results.

The morphological identification of bones in Paper II is based on osteological reports and literature. The source-critical questions concerning sampling, identification and taphonomy were discussed in Papers I, III and IV (hairs) and in Paper II (bones).

RQ 2: The identifications of Iron Age and historical furs and skins were presented in Papers I and III (inhumation burials) and II (cremation burials).

RQ 3: The meanings embedded in furs were interpreted in terms of the fuzziness of human identity in relation to animals and even animal-originated products (Papers I and II). Evidence for this theory was searched from anthropological and ethnographical analogies (Paper I) and from folkloric (Paper II) sources.

RQ 4: This thesis emphasizes the research potential of animal fibres from archaeological contexts. In Papers I and IV, advice for the surveying of animal-hair remains in burials and even in soil samples were presented, respectively.

In the synthesis, Chapter 1 forms the basis for the dissertation by validating the importance of this research, describing the research questions, showing the logic as to how the research questions are interconnected, and by clarifying the most central issues of the study material, ethical questions, and the terminology used.

Chapter 2 locates the eastern Fennoscandian fur finds in a broader geographical and research historical context. Chapters 2.1 and 2.2 give an overview of the preservation of finds and the identification methods applied on archaeological skin finds in general. This introduction is needed for understanding the state of research.

Chapters 2.3 and 2.4 present the general research environment by focusing on what is known about the uses of furs in Fennoscandia during the Iron Age and the early historical period. This information is needed for comparisons between Scandinavian and eastern Fennoscandian skin finds.

In Chapter 3, the special roles that furs had in material culture and in commemoration rituals are discussed in theory. This information is needed for understanding the worldview behind the burying and cremating of skins.

In Chapter 4, the taphonomy of the find material and the used research methods are summarized. This information is needed for understanding the source-critical problems of this thesis. (Research questions 1 and 4).
Introduction

In **Chapter 5**, the results and discussion of this thesis is presented. The Chapter is divided in two parts so that the first section (5.1) presents an overview about the Iron Age and historical fur finds in eastern Fennoscandia (**Research question 2**). The next Chapter (5.2) discusses the different meanings of furs in commemoration rituals (**Research question 3**).

Finally, **Chapter 6** presents the conclusions of this thesis.

### 1.3 RESEARCH MATERIAL: A SHORT INTRODUCTION

The archaeological research material of this thesis consists of organic finds which can be interpreted as remains of mammalian fur (see terminology in Chapter 1.5). This find group consists of entire hides and fur garments or artefacts, loose hairs, and 3rd phalanges (nail bones) which were hypothetically left on the skins.

I have excluded leather items, i.e. skins from which the hairs have been removed on purpose. The reasons behind this choice are many. First, I claim that leather-type materials were used mostly for different purposes than that of fur. Leather can be seen to have played a primary role in durability requiring objects, such as shoes, belts, straps, containers, and saddles, while fur was used for items which need to be warm or aesthetically impressive. Second, I argue that leather was given different status and meanings from that of fur. Finally, the preservation and identification methods of leather items differ from those of fur.

Geographically, I have outlined the research area to cover the Finnish mainland and the Karelian Isthmus (Russia, a former Finnish province before World War II). The area forms the westernmost edge of the north Eurasian fur producing area (Delort 1978; Martin 1986), the ecological basis of which, especially, follows closely the Boreal and Central Russian vegetational zones with the coexisting Siberian and Continental animal species and the high quality of mammalian winter pelts. The studied sites have been plotted on the map in Fig. 1. For vegetational zones, see Fig. 7.

Chronologically, the focus of this thesis is on the Iron Age (in Finland 500 BC – AD 1200/1300), the medieval period (in southern Finland 1200/1300–1520, Lapland around 1600) and the beginning of the early Modern Age (1520–1700) (see Haggrén et al. 2015; Kulonen et al. [eds.] 2005, 217). This time span covers the bulk of the presently known archaeological fur finds, i.e. the predator claws found from cremation burials, and the material collected from the Late Iron Age and medieval inhumation burials. At the end of the period, the placing of furs and grave goods in burials ended gradually by the influence of the Church. The selected time span also coexists with the intensification of the international fur trade, which has also been a central issue in Finnish archaeology (e.g. Raninen & Wessman 2015). For the sites, see Appendix 1.
Additionally, a case study of a Corded Ware (2800/2700–2300 BC) burial of Perttulanmäki from western Finland is included for its methodology as it evidences the preservation of fibres in soils for millennia. It also speaks for the longevity of some fur using traditions even from the Stone Age onwards. For the timeline of each Paper, see Table 2.
Table 2. The timeline of this thesis by each Paper. Papers I, III and IV handle inhumation burials and Paper II cremation burials. Periods according to Haggrén et al. 2015 and Kulonen et al. [eds]. 2005, 217. EIA = Early Iron Age (500 BC – AD 400), MIA = Middle Iron Age (AD 400–800), LIA = Late Iron Age (AD 800–1200/1300). Horizontal ruling = material mentioned in the compilation part, diagonal ruling = uncertain dating, black = certain dating.

<table>
<thead>
<tr>
<th>Paper I</th>
<th>Paper II</th>
<th>Paper III</th>
<th>Paper IV</th>
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<tbody>
<tr>
<td>2800/2300</td>
<td>...</td>
<td>600</td>
<td>400</td>
</tr>
<tr>
<td>BC AD</td>
<td>200</td>
<td>400</td>
<td>600</td>
</tr>
<tr>
<td>0</td>
<td>800</td>
<td>1000</td>
<td>1200</td>
</tr>
<tr>
<td>1400</td>
<td>1600</td>
<td>1800</td>
<td></td>
</tr>
<tr>
<td>Late Neolithic</td>
<td>EIA</td>
<td>MIA</td>
<td>LIA</td>
</tr>
<tr>
<td>historical time</td>
<td></td>
<td></td>
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</table>

The research material was collected both from cremation and inhumation burials. The mentions of skin and hair finds were searched from literature and find catalogues at the Finnish Heritage Agency (FHA). The osteological find material was collected from published and unpublished osteological reports at FHA archives and databases.

Thus, the source material of this thesis is a sample of the fur remains which have been excavated during the decades and archived at the National Museum of Finland (NM). I regard that the material in its entity offers a good basis for the research of furs in burials. Its representativeness has been evaluated especially in Chapters 4.3–4.3.2.

1.4 ETHICAL ISSUES

Ethical issues which are relevant in my dissertation consist of a various group of unrelated themes, the most important one of which is the handling of human remains and especially of ethnically sensitive Sámi sites. I also raise the question of destructive sampling of museum collections and finally, I note the disconnectedness of this study with the modern fur farming industry.

This thesis is based on animal hairs and skin remains which have been collected from burials. In practice, human remains, i.e. human scalp hairs, probably also hairs from other body parts, were a byproduct which were not easy to avoid completely. As a result, scalp hairs were identified from some southern Finnish inhumation burials (Paper I). Also, scalp hairs were found in yarns which were used to bind bronze spirals to textiles.

Today, the paralleling of human scalp hairs with other human remains is not a straightforward issue in archaeology nor in the museums. Most often the discussion of human remains is concentrated on bones and on soft tissues, such as mummifications (in Finland see Ranta 2011; Salo & Kivikero 2010. See
also Kalmistopiiri, a professional web site which deals with burial archaeology, human remains and osteology).

Internationally, ethical problems related to human scalp hairs have been recognized. Especially the purchase of hairs from indigenous communities for museum collections and their future use for DNA research (Callaway 2011; Peers 2003) has been debated. Nowadays, many museum collections are returning hairs, nails and bones to indigenous communities. But, for instance, the British Museum in London generally excludes hair and nails from its repatriation policy (Callaway 2011). Outside the academic world, the collecting of hair for the human hair industry and the concepts of fair trade have been discussed widely (e.g. Prendergast 2015). This all emphasizes that human scalp hairs should be treated with the same respect as other human remains, found from archaeological contexts.

The major part of my study material has its origins from cemeteries which are not ethnically sensitive. A clear exception to this rule are the sites categorized as Sámi cultural heritage. In this thesis, Mukkala, a 17th-century Sámi cemetery in eastern Lapland (Paper III), belongs in this category. At the time of my study (2015), the finds from the cemetery were archived in the Finno-Ugrian collection (FU) at the National Museum of Finland. In April 2017, the National Museum of Finland concluded an agreement with the Sámi Museum Siida for the repatriation of the Sámi collection to Siida. Whether and to what extent this concerns also the Mukkala find material at this stage is unclear. In August 2017, the Finnish Sami Parliament pressed on in a direction which gives instructions on how to apply for consent when the research has or might have effects on Sámi cultural heritage and traditional knowledge (see Finnish Sami Parliament 2017). This will have an impact on future studies.

The collecting of animal hair samples for identification requires destructive sampling which always diminishes the amount of material for future research. This issue has been discussed by the International Council for Archaeozoology (2009), which has given instructions for the ethical sampling of archaeofaunal materials (see also Pálsdóttir 2017). However, the sample sizes needed for morphological identification are relatively small, only from 2–3 millimeters to 2–4 hairs per sample. As such, they are smaller than required, e.g. for aDNA analysis. I also underline the importance of archiving the studied fibres in museum collections to avoid multiple sampling of finds.

In this research, the sampling was conducted by the National Museum conservators in order to guarantee the minimum disturbance of the material. The samples will be archived in the National Museum of Finland for future research.

Finally, in the eyes of the public the study of furs might be seen as politically difficult, because it can be seen to be related to modern fur farming and animal rights. This contradiction has been highlighted e.g. in museums which have exhibited the cultural history of furs. For example, in the National
Museum of Copenhagen, the exhibition of Fur: an issue of life and death (2014–2015. See Melchior 2015) contradicted ethics and aesthetics. In this thesis I confirm that my thesis cannot be used in support of the modern fur industry. The hunting of wild animals for meat and skins centuries and even millennia ago represented a totally different way of living compared to ours.

1.5 TERMINOLOGY AND DEFINITIONS

Animal skin is the outer covering of a vertebrate which is consisting mostly of collagen (skin [tissue]) and keratin (hair, feathers). Its value as a raw material is closely bound to its physical characteristics as soft, flexible and waterproof material, which makes it optimal for containers and covers, especially for clothes (Grömer et al. 2017; Harris 2014a; Hurcombe 2014, 79–88). In archaeological research these organic soft tissues represent “the missing majority” as they have mostly decayed from the archaeological record with only a few traces left.

A skin is a living organ and it begins to decay soon after the slaughtering and skinning of an animal. This process is prevented by removing extra fat and flesh from the skin mechanically (scrapping), and by tanning the end-product chemically (Angus 2002; Darke 2006; Grömer et al. 2017; Harris 2011; Thomson 2006, 2011). See Fig. 2. The term tanning is used here for a variety of treatments, the purpose of which is to stabilize and preserve the hide (e.g. Hurcombe 2014, 80–87). Thus, the term covers also the terms pseudo-tanning and curing, used in the research literature for some of the methods practiced during prehistoric times (e.g. Harris 2011; Thomson 2011).

Fig. 2. The scraping of flesh side of a skin. © Miika Vanhapiha.
Most mammals have a hairy coat or pelage, although there are some exceptions like a naked mole-ratt (Heterocephalus glaber) or Canadian breed of hairless cat (Sphynx, Felis catus). Mammals which are hunted or farmed for their high quality coats are called fur-bearing animals or shortly fur animals (e.g. red squirrel [Sciurus vulgaris]).

The terms used for skin-products are many. An entire skin is generally known as a pelt, hide or skin. Trade usage confines the term skin to that of smaller animals such as goat, sheep or calf, and applies the term hide to the skin of large animals such as horse, elk and cattle. The hairy coat of fur animals and such mammals as European beaver, brown bear and red fox is called pelt (peltry), when the skin has been dried, and fur when the skin has been preserved by a mild form of tanning. For fur animal skins, a wide variety of terms and trade names have been applied to make a distinction between different colours, seasons, qualities and potential uses of the skins (see e.g. Delort 1978; Martin 1986, 64–65; Rast-Eicher 2016, 129). In general, when the hairs are retained, the product can be called a dressing or a (dressed) furskin, or in short just a skin. The term leather is used for a skin from which the hairs have been removed and which has been made incorruptible by tanning. For terminology, see Grömer et al. (2017), Rahme (1998) and Salaman (1986).

According to this terminology, I deal in my research with dressed (fur)skins, pelts and furs as I have excluded the products from which the hair has been removed on purpose. For the sake of convenience, I use the short term skin, and in the case of fur animals I use also the term fur. Accordingly, I have called the skin-organ (dermis and epidermis) as skin tissue in order to make a distinction in my usual use of the term skin (see Fig. 3). For a processed skin from which the hairs have been removed, I use the term leather-type skin.

![Fig. 3. The structure of skin. © Miika Vanhapiha.](image-url)
The pelage of a mammal is composed basically of coarse (guard, over) hairs and fine (under) hairs, which are each divided into subgroups according to their size and structure (e.g. Teerink 2003, 5–6). For some animals which are used for hair production, a more nuanced terminology has been developed. The term wool is used for sheep (fine) hair, term mohair for the hair collected from angora goats and cashmere for the hair collected from cashmere goats. The guard hairs of a sheep are called kemp. Additionally, the hairs collected from different parts of the sheep have their special names (e.g. Vaarna 1965, 199–202). Besides these, animals do have a special type of hairs like whiskers, mane and tail hairs. Human hairs from the head are called human scalp hairs.

Each hair consists of a root section, basal part (extreme base) and a tip, and the length of the hair is divided into shaft (proximal part) and shield (distal part). Morphologically, a hair is composed of three main layers, namely the outermost cuticle (incl. cuticular scales), an inner cortex and a central core or medulla (see Fig. 4). For a detailed description of the structure of a hair, see Wilson (2008, 126–128) and Teerink (2003, 2–12).

Fig. 4. The structure of hair. Figure: Teo Kirkinen.

Throughout millennia, skins have been used in the same ways as textiles, baskets and birch bark. Susanna Harris (2008) has emphasized that the differentiation between textiles and skins is based on the production techniques and materials used instead of their wearing e.g. as garments. As a result, Harris has proposed a new incorporative term, cloth-type materials, to be used in works in which the shared characteristics of these materials are studied.

I understand the point and importance of Harris’s proposal very well as I have struggled with similar kinds of problems. For example, I have studied the use of skins for the wrapping of corpses, but I have left the birch bark and textiles used for the same purposes out of the scope of my study. The reason for concentrating solely on skins is based on the fact that, although the named materials are related, they are still different (see Harris 2008, 231). As a result,
my study plays with this difference and aims to understand the manifold meanings embedded in skins.
2 RESEARCH ENVIRONMENT IN BRIEF

2.1 SURVEY OF ANIMAL SKINS AND HAIRS FROM ARCHAEOLOGICAL DEPOSITIONS

Mammal skin (tissue) is a layered (dermis, epidermis) organ, composed mostly of collagen fibres and keratinocytes (Cronyn 1990, 263–269). Without parchment or tanning it decomposes easily in archaeological contexts. Mammal hairs are comprised mostly of keratin, i.e. a protein which can be found also in claws, nails, horns and hooves (e.g. Wilson 2008, 126–128). As organic soft tissues, hairs are prone to several pre- and post-depositional taphonomic processes (Cameron et al. 2006; Cronyn 1990, 263–75; Kite 2006, 159–160; Tridico et al. 2014b). Thanks to its unique physicochemical structure, which limits any significant post-biogenic change, hair can survive in soils for millennia, or, in unfavourable conditions, it can decompose in weeks (Tridico et al. 2014b; Wilson 2008; Wilson & Tobin 2010). The decomposing rate of hairs and fibres in burial contexts is dependent on microenvironmental factors such as microbiological load, pH, moisture and changes in redox status (Janaway 2008; Wilson 2008; see also Wilson et al. 2007). In general, skins can be found in favorable conditions in anaerobic, wet, salty, arid, or cold environments where bacterial and fungal activity is at its minimum (e.g. Cameron et al. 2006; Rast-Eicher 2016, 15–31; Wilson 2008).

In Scandinavia, these constraints are met especially in Danish bogs where well-preserved skin garments have been found (Brandt et al. 2014; Mannering et al. 2010, 2012). During the recent years, skins have been found also in glacial ice-sheets in Norway, which are melting as a result of global warming (Callanan 2014). Due to the advances taken in (micro)archaeology, microscopy, forensic sciences, conservation and underwater archaeology, fibres have been identified in soil samples (Beatty & Bonnichsen 1994; Metcalfe 2018; Morell 1994; Wilson 2008, 124. See Paper IV), Middle Pleistocene coprolite samples (Taru & Backwell 2013), and from shipwrecks (Ryder 1998; Vajanto 2014).

Most important for this thesis, skin remains have been found from inhumation burials, where fibres have been preserved especially in contact with metal artefacts (Paper I; e.g. Arwidsson 1938; Ågren 1993, 1995; see Cameron 1991). See Fig. 5. In these cases the preserved material might consist of single fibres or small fur pieces. For example, Ulla Mannering (2017, 151–152) has reported that the remains of animal skins and furs are numerous in the Late Iron Age graves in Scandinavia, but because of their poor preservation it has been impossible to define their original functions.
Fig. 5. Animal hair finds from grave 32, Humikkala in Masku, southwestern Finland. Left: the finds on a tray. Right above: cervidae skin under a penannular brooch, possibly from a fur coat (NM 8656: grave 32:5a). Right below: Cervidae hairs, preserved in contact with bronze spiral ornaments (NM 8656: grave 32:4), Photos: Mikko Rautala & Stina Björklund / FHA.

Besides animal hairs and skin fragments, also osteological find material can indicate the presence of skins. This is based on the fact that the limb, tail, and head bones were sometimes left inside raw hides, the hooves in horse skins, and horns or antlers in the skins of artiodactyls. The occurrence of different anatomical parts of butchered animals in the osteological record has been discussed e.g. by Serjeantson (1989), Wigh (1998, 2001, 120–129), MacGregor (1998), Strid (2010, 2012b), Fairnell (2003, 10–13 and cited literature; 2008; 2011) and in Thomson & Mould ([eds.] 2011). Internationally, the occurrence of a high number of limb extremities, tail vertebrae, and skulls, horn-cores, and hooves has been interpreted as evidence

In Finland, the cremating of skins in which the bones were still attached have resulted in a large number of predator 3rd phalanges (nail bones) from the Middle and Late Iron Age funerary rites (see Paper II). Additionally, in Majakangas in Konnevesi, central Finland, the osteological find material indicates the cremating of a raw hide at the site (Mannermaa et al. 2014; Ukkonen 2003; Vanhatalo 2003, 2005. Paper I).

The accumulation and preservation of skins in eastern Fennoscandia, analysed in this thesis, have been presented in detail in Chapters 4.1 and 4.3 as well as in Papers I-IV.

### 2.2 IDENTIFICATION OF ANIMAL FIBRES

#### 2.2.1 MORPHOLOGICAL IDENTIFICATION

The origins of the morphological study of animal hairs have been defined in literature to the end of the 19th century (Rast-Eicher 2016, 130). Much of our understanding of hair morphology is based on the study of wool and in archaeology, correspondingly, on textile research (e.g. Janaway 2002; Kirjavainen & Riikonen 2005). Nowadays, morphological identification of animal hairs is practiced in the fields of forensic sciences (e.g. Robertson [ed.] 1999; Tridico 2005; Tridico et al. 2014a; Wheeler & Wilson 2008), conservation biology and zoology (e.g. Gharu & Trevedi 2016; Rana et al. 2017; Sahajpal et al. 2009), archaeology (Rast-Eicher 2016 with references), conservation and textile research (e.g. Batcheller 2005; Vineis et al. 2008).

In Finnish archaeology, I have found the first references to animal hair identification in Schwindt’s (1893, Foreword, 192) publication *Tietoja Karjalan rautakaudesta* (En. Information about the Karelian Iron Age), in which zoologist J.A. Palmen identified a rich animal hair material found from Kekomäki in Kaukola, Karelian Isthmus. In 1927, zoologist V.A. Korvenkontio microscoped some hair samples from Vanhakartano Cemetery C in Köyliö. In the 1930s, animal hair fragments were analysed from a Late Neolithic burial from Perttulanmäki in Kauhava, western Finland by Korvenkontio and textile specialist Tyyni Vahter (Äyräpää 1931; see Paper IV).

After these pioneering studies, the morphological identification became gradually more common; first, by conservators (e.g. Tomanterä 1978) and, then, by textile archaeologists (e.g. Asplund & Riikonen 2007; Riikonen 1990). See more references in Paper I.

Lately, the development of microscopy and especially the use of scanning electron microscopy (SEM) has increased the importance of morphological...
research of fibres (Rast-Eicher 2016, 70–71, 130). Additionally, the use of statistics and computer-aided applications have been developed to handle measurement data obtained by SEM (e.g. Foster et al. 2011; Sato et al. 2006).

Besides identification, microscopy can also provide valuable information on the use of fibres, the preparing of furs and on the qualities of original animals, e.g. the insulation properties of their pelage or the variation in domestic animal hair and wool (De Marinis & Asprea 2006a, 2006b; Lanier et al. 2001; Rast-Eicher & Jørgensen 2013; Timisjärvi et al. 1984; Vineis et al. 2008, 2011; Ågren 1993, 1995).

The problems of morphological identification of hairs have been recovered during the recent years especially in cases in which scientific methods (aDNA, mass spectrometry) have contradicted earlier morphology-based results (Brandt et al. 2014; Sinding et al. 2015). The problems derive e.g. from the fact that the morphology of hairs can diverge within the same species according to age, sex, seasonality, nutrition, health and environment (e.g. Brandt et al. 2014, 2; De Marinis & Asprea 2006a; Tridico 2005; Vineis et al. 2008).

Moreover, the hairs from different parts of the body of an animal look different. For example in sheep, the coat has been divided into 5–7 parts according to the quality of the wool (e.g. Vaarna 1965, 205–207).

Especially the identifying of ancient domestic species by comparing them with modern animals is problematic. The main reason for this is that modern animals have undergone hundreds of years of selective breeding that has altered the morphology of their hair (Brandt et al. 2014, 2; Leroy et al. 2015; Meyer et al. 1997, 2000). In Finland, the effects of domestication on sheep wool and the finding of primitive characteristics in native indigenous species have been investigated by Krista Vajanto (2013, 2014), Heini Kirjavainen (2005) and Jaana Riikonen (Kirjavainen & Riikonen 2005).

2.2.2 SCIENTIFIC IDENTIFICATION METHODS

As an alternative for morphological identification, hairs have been a source of scientific identification methods, most importantly of DNA analysis and mass spectrometry (MS). DNA analysis has been applied on hairs from the 1990s onwards especially in forensic sciences (e.g. Allen et al. 1998; DiZinno et al. 1999; Wilson et al. 1994). Today, DNA can be extracted both from hair root bulbs and from the shafts (e.g. Guan et al. 2013; Wilson 2008, 123–124). In archaeology, aDNA was analysed from hair samples for the first time in 2001 by Bonnichsen et al. (2001), who managed to identify an almost 10,000-year-old hair sample as a desert bighorn sheep (Övis canadensis nelsoni). Since then, aDNA analysis has been applied successfully on archaeological hair samples (e.g. Gilbert et al. 2007a, 2007b; Rizzi et al. 2012; Sinding et al. 2015) and even on woolen textiles (Brandt 2015; Brandt et al. 2011). In Bengtsson et al. (2012), the findings indicate that “the quality of DNA vary considerably by species and even by individual, and within individual between hair types”. In
archaeology, the main problem in DNA analysis lies on its incapacity for acidic environments, which are common in bog environments and in podzol soils e.g. in Finland.

**MS-based identification methods** have been applied on hair and down e.g. by Hollemeyer et al. (2002, 2008, 2012), Solazzo et al. (2011, 2013, 2014), and Kim et al. (2013). These methods are based on the identification of species specific protein compositions, specialized on hair keratins or skin collagens. For the identifications needed in archaeology, MS-based methods can be applied also on materials which are out of the scope of DNA-analysis, e.g. on finds which have been found from acidic environments like bogs (e.g. Brandt et al. 2014). Today, relatively few laboratories are specialized in keratin proteins, and also reference libraries needed for the identification are still in progress.

Also, the **amino-acid composition** of the fibres have been used to study animal hairs and silks (Rast-Eicher 2016, 72, with references).

The identification of fibres and bones for this thesis has been described in Chapter 4.2. and in Papers I-IV. The results of the identifications have been discussed in each Paper and in Chapter 5.1.1.

### 2.3 ARCHAEOLOGICAL SKIN FINDS IN FENNOSCANDIA

#### 2.3.1 NORTHERN EUROPEAN SKIN CLOTHING TRADITIONS

Throughout the millennia, animal skins have been used foremost as clothes. Although weaving as a new technique made use of sheep hairs for textiles from the Bronze Age onwards, skins and furs retained their central role long after the beginning of textile production (see Mannering et al. 2012). In northern Europe, the use of skins and furs is an issue which we don’t know enough about. This can be seen as a natural result of the fact that skins decompose easily in archaeological depositions. The poor preservation of skins does not, however, explain the current state of research. This question has been discussed lately by Susanna Harris (2008), who has drawn attention to the fact that, of the total amount of organic materials which have been found in burials, textiles have generally gained much more interest than fur remains. Harris has explained the reason for these phenomena by the hierarchy of interest in research which values weaving as a developing technology and sees animal skins as insignificant and unchanging.
Also in Finland, the research on Iron Age and medieval clothing culture has concentrated on textiles. For example, fur garments have not been taken into account when making (re)constructions of Iron Age dresses¹ (see Lehtosalo-Hilander 1984; Luoma [ed.] 2003).

A general view of Iron Age and medieval skin garments in northern Europe has been built mainly on the well-preserved material found from Danish bogs. The picture has been complemented by the finds e.g. from Greenland (Østergård 2009, 119–122; see Sinding et al. 2015) and Birka (Ågren 1993, 1995), and by identifying the iconographic representations of skin garments in metal artifacts and tapestries (Mannering 2017). Skin clothes have been referenced also in sagas and written regulations (Østergård 2009, 119).

Ulla Mannering has concluded that at the beginning of the Iron Age, the ratio between textiles and skin/fur garments has been estimated as 3:2 on the basis of the garments that have been discovered in Danish bogs (Mannering 2017, 151–152, 165; Mannering et al. 2012, 105–110). The Early Iron Age bog finds evidence the use of skins especially for cloaks. Most of the identified skins originated from domestic animals, i.e. from sheep, goat, and cattle, and only a few items were made of deer, otter and wolf. (Brandt et al. 2014; Mannering et al. 2012, 105.)

Later on, skin garments were no longer prominent in the southern Scandinavian Late Iron Age bog finds, although furs were used to line cloaks and jackets (Hägg 1984; Mannering 2017, 152, 157, 159, 177; Ågren 1993, 1995). The use of fur linings and the idea of furs as luxury were presumably adopted together with jackets, kaftans, and silk from the Far East (Mannering 2017, 156–161, 177; see also Delort 1978, 322–325; Martin 1986, 52).

The Scandinavian find materials can be expected to be useful also for this study, as from textile research we know that southern Finland shared similarities with Scandinavian and eastern Baltic dress fashions (Lehtosalo-Hilander 1984; Vajanto 2015, 26–27). However, it can be hypothesized that the traditional ways of wearing animal skin clothes continued in the Finno-Ugrian culture sphere still during the Iron Age. For example, historical sources evidence the use of reindeer skins for fur shoes, gaiters, mittens, headgear, and Lapp coats (peski, see Fig. 6) still at the beginning of the 20th century in the Sámi settlement area. For shoes and gaiters, also European elk, cattle, and seal skins were used, and coats were sometimes made of sheep skins. For neck covering, a traditional boa or a kind of a short cape (sieppuri) was made of brown bear or wolverine fur, sometimes also of red squirrel tails. (Itkonen 1948a, 310–340; see also The National Museum of Denmark [read 03/2018]; Schmidt & Pedersen [eds.] 2010.)

¹ So-called ancient Finnish costumes (Fi. muinaispuku), the term of which refers to dresses which have been created on the basis of the Late Iron Age and medieval period inhumation burials and which represent the dressing cultures in different parts of Finland (Lehtosalo-Hilander 1984).
During the 17th century, Lapp coats were in use even in the southernmost parts of Finland. Also, shoes made of reindeer and seal skins as well as mittens made of reindeer, brown bear, wolf and red fox skins, were commonly used (Pylkkänen 1970, 310–311, 367–368, 390).

Finally, animal skins and body parts, e.g. bird wings and reindeer antlers, are known to have been used in specific ritual garb among the northern Eurasian populations. Most often attention has been paid to Siberian shaman garments, which can be found in ethnographic collections both in Finland and especially in Russia (e.g. Gorbacheva & Solovyeva [eds.] 2006; Pentikäinen et al. [eds.] 1998). Almost a hundred years ago, Uno Holmberg (1922) published his article *The shaman costume and its significance*. He concluded that Siberian shaman costumes always expressed a certain animal, most often a bird, or a reindeer or a bear. These outfits were sewn e.g. of reindeer skin, in which the collar and sleeves were edged with brown bear fur (a bear costume), or the head gear with feathers (a bird costume) and the whole dress was equipped with leather stripes which imitated feathers or hairs. Thus, by
wearing e.g. a bird costume and by imitating the animal, the shaman supernaturally acquired the powers of a bird, which mediated the joint metamorphosis of a human being and a bird. In this case, the costume was an element assisting the shaman in mediating the transfer of his/her supernatural powers or soul.

In Finland, Anna-Leena Siikala (1992, 19–20) has specified that in the Finnish cultural sphere, the question did not concern classical shamanism (see definition in Tolley 2009, 66–72; see also Frog 2017, 61) but, rather, a noaidi (En. witch) institution which had shamanistic features. The remains of this tradition can be found in the tietäjä (En. seer) institution which Siikala dates to the Iron Age. Also tietäjä equipped him/herself by a specific shirt, belt and cap, in which e.g. a squirrel’s fur stripes were sewn (Siikala 1992, 239–246; 2014, 195).

The uses of skins for garments are discussed in this thesis in Chapter 5.1.4 and in Papers I and III.

### 2.3.2 OTHER USES OF FURS AND SKINS

Besides garments, furs and skins have been used for various purposes in buildings and boats, for riding gear and vessels, for bags and coverings, to name but a few of such uses (see Grömer et al. 2017; Hurcombe 2014, 87–88). Next, I present the use of furs and skins for wrapping the deceased, and for magic and offerings as they provide possible counterparts for the finds studied in this thesis.

The wrapping of the deceased in skins or in textiles is an age-old tradition which is still practiced in some cultures. The practice has a wide chronological distribution as there is evidence of skin wrappings already from Mesolithic burials (Brinch Petersen et al. 1993; see also Nilsson Stutz 2003, 295–304; 2006, 218–219; Nilsson Stutz & Larsson 2016). Accordingly, reindeer and brown bear skins were used for wrapping in northern Eurasian cultures as late as during the 19th century (Itkonen 1948b, 353–354; Ruohonen 2012, 65–66). The end of the tradition was connected to the spread of the Christian religion in the North. As the Church disapproved of the use of skins in burials, the corpses were more commonly wrapped in linen and other textiles and even in rugs which, according to Riitta Pylkän (1974, 27–31), aimed to imitate fur. See Chapter 5.1.3 and Papers I-IV.

The using of furs and skins as offerings or gifts to spirits is documented widely in northern Eurasia by early explorers, travellers, and ethnographers (Harva 1933, 201–202, 264–265; Krohn 1894/2008, 16, 19, 23, 27, 42, 46, 50, 52, 54, 63, 72, 142–144, 186; see also Willerslev 2007, 143). These rituals were common among the Finno-Ugric tribes in the Volga region, and among the peoples in the subarctic culture area in general. Most often, skins were hung on trees in a sacred grove (see Krohn 1894/2008; Waronen
1898/2009, 84), or stored in a special depository (Krohn 1894/2008, 48–51; Lehtinen 1998, 88) and in some cases burnt (Krohn 1894/2008, 20) or buried (Krohn 1894/2008, 144). In particular, the hides of large mammals, horses in the Volga region and reindeer near the Arctic zone, still had their skulls, antlers, and the lower parts of limbs and/or hooves attached (Krohn 1894/2008, 27, 42, 46, 142, 151). Also, different small animal furs have been documented to have been used by shamans in order to come into contact with animal-helping spirits (Holmberg 1922, 28).

Finally, in ethnographic sources the use of skins and animal hairs e.g. for healing or as offerings have been recorded. Hairs were usually kept in fur, textile or birch bark pouches together with other powerful items such as teeth, snake skins and bear claws (Krohn 1894/2008, 35; Krohn 1915/2008, 91; Lehikoinen 2009, 39–41). According to Anna-Leena Siikala (1992, 239–246), the tietäjä (En. seer), equipped himself with charm items in the same way as a shaman. These kinds of pouches have also been found in Finland from Iron Age contexts. For example, Theodor Schwindt (1893, 146–147) interpreted some of the items found in pouches — human scalp hairs, yarns, iron, bones, skin and cloth fragments, stripes — in the Kekomäki Crusade period burials, Karelian Isthmus, as the remains of magic pouches. Also from burial 43 of Kirkkomäki in Kaarina, the horse hair finds have been interpreted as a charm (Asplund & Riikonen 2007, 30).

The use of skins for wrapping is discussed in this thesis in Chapters 5.1.3 and 5.2.1 and in all Papers. The use of furs for artefacts is discussed in Papers I and III.

2.4 THE FUR TRADE

In Finnish archaeology, furs have been discussed almost entirely from the points of view of trade. Especially in the Iron Age research, fur trade has had a strong explanatory power in interpreting the colonization of Finland, social differentiation and material culture (e.g. Aspelin 1885, 46, 80–81, 84–86; Edgren 1993, 177, 192–193, 261; Huurre 1979, 56–57, 107–108, 115; Kivikoski 1961, 122–123, 159–160, 210, 275, 277–278; Nordman 1924, 188–189; Taavitsainen 1990, 2004; Taavitsainen et al. 1998, 2007; Tällgren 1931, 146, 192; Äyräpää 1927, 1939, 49). In the most recent book on Finnish prehistory Muinaisuutemme jäljet, Sami Raninen and Anna Wessman (2015) have presented the fur trade paradigm and its present stage in depth.

In this context, there is no need to go into detail, as this thesis does not deal with the fur trade. Instead, I challenge the previous research, which has seen animal skins merely as sources of material wealth. More precisely, I focus on the roles that animal skins held in populations which have been classified as producers of furs.
For the discussion of the fur trade, both the use of the term and the archaeological basis of the phenomenon need to be clarified. Here I use the term *fur trade* for the organized trading network, not for the exchange of goods nor for local trade which evidently took place much earlier. The beginning of fur trade has been dated in Finnish archaeology to the Migration period (400–600 AD) or to the Roman Iron Age (Raninen & Wessman 2015, 247, 259, 261–262, with references). Its intensification took place in the 8th and 9th centuries AD as a part of a network which delivered exotic status items to Continental Europe and the Islamic world (Graham-Campbell & Valor [eds.] 2007, 303, 306; Howard-Johnston 1998; Kovalev 2001, 2003; Martin 1986). According to literary sources, commercial interest in furs was focused on a very heterogeneous group of products ranging from fur animals such as pine marten (*Martes martes*), sable (*Martes zibellina*), stoat (*Mustela erminea*), red fox, European beaver (*Castor fiber*), and red squirrel to seal, reindeer, and brown bear (Delort 1978; Howard-Johnston 1998, 67–68; Martin 1986; Petré 1980; Pluskowski 2006, 119; Ylimaunu 2000, 98).

The fur trade paradigm is based very convincingly on Finland’s geographical location in the northern Eurasian fur production area and near the known trading centers (Birka, Sweden and Staraja Ladoga [Aldeigjuborg], Russia), see Fig. 7. Accordingly, the historically known fur trade and fur taxation system in Sweden–Finland have been hypothesized to indicate the prehistoric roots of this activity (e.g. Dreijer 1979, 5; Kaukiainen 1982, 29–33, 51–52; Voionmaa 1947, 29–30; see Wuorisalo 2005, 10–13).

Archaeologically, the most important finds which have been interpreted as evidence of commercial fur trade are silver coins (e.g. Howard-Johnston 1998; Kovalev 2001), and fur animal bones (e.g. Kovalev 2003, 137; Maltby 2017, 240–242). In Finland, the amounts of coins are only a fraction of those that are found in the neighbouring areas of Scandinavia and Russia. In any case, silver coins and hoards together with weight and scale finds have been interpreted as evidence of trade activities. According to Tuukka Talvio (2014, 135),

*A possible explanation for the almost total absence of Viking Age hoards in Satakunta [southwestern Finland] seemed to be that the trading there was based more on barter (goods exchanged for goods) than a ‘silver economy’. According to this interpretation, the silver that was available was usually converted into other goods rather than hoarded. This would mean that there were in Finland in the later Viking Age two systems of trading. Both employed money (silver), but in differing degrees. The ‘wholesale dealers’, who sold furs and other goods to overseas merchants, acquired considerable sums of money and used it to obtain their merchandise from inland areas. Local dealers also used money, but much of their trading was based on bartering – for silver was, after all, just another expensive import product, and its value tended to fluctuate* (Talvio 2002: 122–123).
Fig. 7. The medieval fur-producing area in Europe as defined by Robert Delort (1978; horizontal ruling) in relation to vegetational zones (turquoise lines). The near-by Late Iron Age /medieval fur trade centers 1 = Birka (Sweden), 2 = Staraja Ladoga (Russia), 3 = Novgorod (Russia), 4 = Visby (Sweden) are marked with grey rectangles. Background: Google Earth. Figure: T. Kirkinen.

Moreover, the numbers of fur animal bones are low in Finland. We lack, for example, tanning sites with their characteristic waste material like limb extremities (Strid 2012a, 2012b; Wigh 2001, 120–128, 1998). Most importantly, we lack sites in which the high proportions of fur animal bones would indicate the intensive hunting of wild mammals, comparable with western Russian Iron Age sites in Meryas and Mordvas in the Volga region (fur animals 12 % of NISP), Veps and Karelians (38–59 %), or Komis and Udmurts (64–69 %) (Kovalev 2003, 137; Maltby 2017, 240–242; see also Hamilton-Dyer et al. 2017). However, the identification of a site as a fur-processing site on the basis of the quantity of bones has proved to be problematic (e.g. Ervynck 2011, 106; Hamilton-Dyer et al. 2017; Stevens 2011). Explanations concerning
the quantity of bones also suffer from many source-critical problems (see Strid 2012b).

With this, all I wish to say is that the special characteristics of the Finnish fur trade need to be studied in detail in the future. In this thesis, the ritual uses of furs speaks for a special human-animal relationship in which these large mammals were seen very close to humans, even as relatives or parts of selves. It follows that animal skins cannot be seen solely as trade items, as they had high ritual value, too.
3 THEORETICAL FRAMEWORK

This thesis investigates animal skins which once served in commemoration rituals as (death) clothes, wrappings, coverings and grave goods. They might have been items that the deceased used in his/her lifetime, or they might have been produced for the funerals only. The skins were accumulated in the archaeological record in several phases, such as: the furnishing of the grave, clothing of the dead, the placing of grave goods, possible feasting and sacrificing, and the closing of the grave. On the whole, the selection of items and clothes to be buried or cremated with the corpse was a series of ritual acts that were executed by individuals, framed by the structures of the society and culture (e.g. Nilsson Stutz 2003).

In this part of the thesis, my aim is to theorize the special roles which furs held in material culture and especially in rituals of death. This section forms the basis for Chapter 5.2, in which the significance of skins and skin products in the Iron Age and medieval burials in eastern Fennoscandia is hypothesized (Research question 3).

The term ritual as such is problematic as it covers a wide variety of acts which are intertwined in almost every aspect of life (e.g. Bradley 2005; Collins 2005; Fogelin 2007, 60; Verhoeven 2011). At a general level, the term refers to traditions which were repeated e.g. in rites of passage and transformation, healing and affliction, feasting, exchange and communion, and worship, and which reflect the group’s or commune’s beliefs about the world (Tieteen termipankki 16.11.2017).

In archaeology, the implications of ritual theory (Bell 1992, 1997) on archaeological theory building has been discussed widely (e.g. Fogelin 2007; Insoll 2004; Kyriakidis [ed.] 2007; Nilsson Stutz 2003; Swenson 2015). The main issue in this field is that because of the nature and limitations of archaeological source material, our research focuses on the materiality of rituals or ritual acts (e.g. Insoll 2009; Nilsson Stutz 2003, 51; see Fogelin 2007). This phenomenon has been conceptualized especially under the umbrella of practice theory (Malafouris 2013, 119–120; e.g. Nilsson Stutz 2003; Pollard 2009; see Moore & Sanders 2006, 13).

Liv Nilsson Stutz (2003, 37–54) stresses that although we in archaeology focus on individual actions, e.g. on a single burial or just on a single act in a burial, like clothing the dead, we need to scale these actions up to the bigger picture by contextualizing them with other archaeological cases and categories. In this thesis the contextualizing of single burials or ritual acts, i.e. the getting of a “bigger picture” is based on several categories or criteria. First, the quality (Chapters 5.1.1, 5.1.4) and chronology of skins (Chapters 5.1.2, 5.1.3) were analysed in order to study the skin using traditions as a whole in respect to other find categories and changes in burial customs.
Second, in the contexts of other cloth-type materials or animal-originated products, skins seem to have had a special role by bearing a reference to their origin animals. This can be read such that, in rituals, animal skins have helped mediate a relationship between humans and animals, to acquire their powers or, even their bodies. Basically, I claim that animal skins shared qualities that have promoted some degree of universality in the ways that humans experience and interact with animal skins and skin artefacts. The basis of this phenomenon is hypothesized in Chapter 3.1.1, in which the concepts of skin-self and second-skin are presented. This theory is complemented by the concept of agency in Chapter 3.1.2.

Third, the meanings embedded in animal skins must be viewed by contextualizing them as elements in burial rituals. As such, the core of these rituals was to control the emotions around death and loss, and to facilitate one’s transformation from the realm of the living to the realm of the dead and ancestry (e.g. Nilsson Stutz 2003, 351–352; Pearson 1999; Williams et al. [eds.] 2005). It can be hypothesized that in this process the wrapping or clothing of the deceased in a second skin had a special meaning. The roles of skins in identity changes are discussed in Chapter 3.1.3.

Finally, these ritual acts were, in turn, dependent on society’s cultural constructions of afterlife, myths or religion. In this thesis, I have studied the roles which animal skins had in Finno-Ugrian and north Eurasian traditions by mining ethnographic and folkloric sources. Most interestingly, these sources provide evidence that animal skins have facilitated the identity transformation, especially at the liminal stages of life of both humans and animals (hunting, war, death). The use of ethnographic analogies have been discussed in Chapter 3.2.

The results of these comparisons have been presented in Papers I and II and in Chapter 5.2.

### 3.1 SKINS IN MATERIAL CULTURE

#### 3.1.1 ANIMAL SKIN AS THE SECOND SKIN

When we look at an animal, or our own hands, the thing we see is the outside layer of a body, that is, skin or pelage. Accordingly, skin and pelage are important for the identity of self and for the identification of another. In the following, the concepts of skin-self and the second skin are used to interpret the essence of skins universally.

The concept of skin-self (Fr. Moi-Peau; Warnier 2006, 187–188; 2007, 56–60) was created by a French psychoanalyst Didier Anzieu in 1985. Anzieu uses the term skin-self for human skin as the most archaic experience of the subject, constructed already in one’s childhood. Additionally, he interprets that skin’s original function is to serve as a container of human bodies and as an outside layer of a body. So, human skin can be understood as an arch-container in
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which the neuro-psychological and anatomical functions form the experience of the self. In Jean-Pierre Warnier (2007, 56),

... the individual self is constructed as a fantasy of a psychic skin, an envelope containing affects, drives, representations and fantasies. It divides the space between an inside and an outside, and processes of projection, introjection, and identification.

Most importantly, the concept of skin-self can be hypothetically projected onto animals, too. According to Warnier (2006, 194), skin-self can be applied to animals especially when they “provide hides, pelts or fur as surfaces suited to all kind of purposes”.

For people who worked with carcasses and skinned the animals in the past, the idea that animal’s skin represented its self might have been a very concret thought. By this I mean that from a freshly killed carcass the skin can be taken off easily, like animals “clothing”. This is concretized e.g. in Finnish folklore in which the skinning of a bear is described as taking off its coat (Fi. takki, clothe; Tarkka 2005, 264; see also Willerslev 2007, 130). See Fig. 8.

The skinning of an animal revealed its muscles and flesh, and as “naked” both humans and animals can look very much alike. So, if animal’s identity

Fig. 8. Skinning of a fox. Photo: T. Kirkinen.
was located in its skin, it was the outer fur-skin which distinguished e.g. bears from humans. As an example of this, Tim Ingold (2000, 114, 122–124) has documented an Inuit legend according to which animals, e.g. bears, could reveal their human faces by taking their furry hood off.

Animal skin can also serve as a second skin for human identity when it is used as clothing. The wearing of animal skin can in its extreme lead to a change of identities between animal and human. For example, in Fennic bear killing ritual the act of skinning facilitated humans and bears to change their “coats” and thus, identities (Tarkka 2005, 264; see also Itkonen 1948b, 364–366; Krohn 1915/2008, 157; Willerslev 2007, 1–2, 97–98, 102, 164–165).

In Pedersen & Willerslev (2012, 484), the shamanic costumes were interpreted as magical skins which momentarily enabled one to see things “upside down”. This could also be applied to hunters, who were wearing animal skins. According to Howard Williams (2004), also the inner structures of the grave can be seen to represent the second skin of the deceased. For example, by covering the body with birch bark or skins or by putting his/her cremated bones in an urn, a second skin is provided to aid the transformation from the living to the realm of the dead.

In my thesis, the concepts of skin-self and the second skin have been used to interpret the special roles that animal skins had in material culture first, as the original base for animal’s self and second, as a second skin for human identity. Also, the theory of a second skin can be seen as related to theories which deal with the body-object interactions. (See Martin & Weetch 2017, 6–7; also Sontag & Schlater 1982; Warnier 2006.) This issue is dealt in the next Chapter.

### 3.1.2 ANIMAL SKIN AND AGENCY

In this Chapter, I focus on theories which argue that the human mind is not limited by its biological boundaries but acts in an endless interaction with the outside world. I approach the issue by the concept of agency, which refers in social sciences to the capacity of individuals to act independently and to make their own free choices (for the term, see Barker 2003, 231–243).

In research branches which aim to analyse the engagement of humans and things, the capacity to act has been given equally to non-human agents, too. This is in line with ethnographic sources, which carry innumeral realizations of material agency (for the term, see e.g. Knappett & Malafouris 2008; Malafouris 2013, 119–149; McGraw & Krátký 2017). This is evident when animals or things are embedded with person-like qualities (powers, spirits) which in turn act as a stimulus or intervention for people (e.g. Groleau 2009; Hurcombe 2014, 9–10).

One of the most influential conceptualizations of human–non-human interaction has been formulated by the French philosopher Bruno Latour. In his actor-network theory (ANT), Latour approaches humans and non-humans, objects, ideas and environment as actants in a complex network
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(Latour 2005; Law 1999, 2008). By this he means that non-human actors “do things”, i.e. they have agency (in archaeology see e.g. Alberti & Bray 2009; Malafouris 2013, 122–129; Martin 2013. For the criticism, see e.g. Hodder 2012, 91–94, 215–216; Strathern 2006; Watts 2013, 12 with references).

In actor-network theory, the relationships between actors have been constructed by narratives. This juxtaposes generalisations or over-simplifications in which e.g. certain artefacts have static roles or qualities, or that ethnographic analogies, social theories or grand narratives can be applied over vast areas to interpret context-related acts and phenomenon.

In archaeology, the construction of agency merely on the basis of archaeological find material is, however, challenging without the possibility of interviewing human actors or observing networks in action. Regardless of this, agency has become a central component of archaeological interpretation during the past decades (see discussion e.g. in Dobres & Robb [eds.] 2000; Hodder 2012, 213–216; Malafouris 2013, 119–149).

Next, I discuss the concept of agency embedded in animal skins. This task as such is controversial, as e.g. Lambros Malafouris (2013, 147–148) has stated that agency is not a fixed phenomenon, an external quality or essence but “the relational and emergent product of material engagement”. Regardless of this, I claim that the agency of skins originates partly in their former essence as living animals. Skins thus belong to the category of animal-originated materials together with e.g. antlers, claws and paws, which have been commonly seen to carry legacies of the living beings they once were (Hurcombe 2014, 10; Mills & Ferguson 2008). This can be read in ethnographic and anthropologic sources, in which animal parts were often treated as if they still had the qualities or even supernatural powers of the animal or the whole species (e.g. Holmberg 1922; Jordan 2003, 106; Losey 2010; Russell 2012, 52–54; Wachowich 2014).

I presume that animal skins worked as a stimuli for the human mind, partly due to their physical qualities (see Hodder 2012, 34–39). By this I mean that after the death of an animal, and even after the processing of the skin, it still has a strong sense of the living animal, or its life-force. This means that a skin bears the characteristics of an animal, and it provides an animal’s warmth and the sense of weight when used for clothing. The wearing of this kind of fur clothing mixes the qualities of a skin and a human, and the person looks like the animal and animal’s smell becomes a part of the human smell (Hurcombe 2014, 11; Pedersen & Willerslev 2012, 473–474).

I also agree with the above presented statement that agency is a relational product of material engagement. I hypothesize that e.g. skins of wild animals had specific agency only in areas where the lives of humans and wild animals were closely engaged. This engagement was based on the need of meat and furs, and the relationship was built on a series of acts which covered hunting, handling of carcasses, preparing of food and skins, and on the using of these products. For people who didn’t live with these animals, the products
hypothetically represented otherness and were rare and exotic, even status items (e.g. Pluskowski 2007).

As the hunter-game engagement was a long-lasting element in north Eurasian cultures, also the meanings embedded in skins can be expected to have been relatively stable. However, I do not claim that this relationship was unchangeable. Instead, both the gradual adaption of textiles and domestic animals, as well as the beginning of commercial fur hunting were changes which can be expected to have had an influence on the roles of wild animal skins in eastern Fennoscandia, too.

Finally, I refer to Malafouris (2013, 147–148) according to whom the main question is when is an agent more than what is an agent. By this Malafouris means that agency is something that is present in certain contexts or acts. Rituals are typically the kinds of acts when e.g. everyday objects like furs can contain agency (see also Bradley 2005; McGraw & Krátký 2017, 241).

For example, Sonja Hukantaival (2016, 123–143) has studied building concealment traditions in Finland in 1200–1950 AD, and she presents that the concealed items were everyday objects like coins, knives, and animal remains, the specific agency of which was activated in rituals. According to Hukantaival, these products shared common properties like hardness, sharpness, silveriness, redness, or fieriness, which manifested their potential powers.

Similarly, I argue that animal skins were “more key than many others” (see Hodder 2012, 59), and that their potential powers were manifested in their hairiness or in claws left in predator skins. Finally, their powers were manifested in rituals, the descriptions of which can be found in ethnographic sources (see Chapter 3.2 and Papers I and II).

3.1.3 FUZZY IDENTITIES AND SKINS

3.1.3.1 Being-in-the-world

In this Chapter, I study the interaction between the material world and the human mind more closely. I focus on theories which emphasize that the boundaries between the human self and the outer world are porous or blurred in a way which renders the human–non-human interaction.

Here, I use the term fuzzy, which opposes the idea of fixed classifications and sharp boundaries. This phenomenon has been discussed and theorized in a number of studies and termed, for example, as non-fixed, relational, transforming, interspecies, and hybrid. The fluid transformation from one class into another can be expressed e.g. by partiality, dividuality, and metamorphosis (E.g. Hedeager 2011; Herva 2009; Hodder 2012; Ingold 2000; Jennbert 2011, 130-138, 187–195; Watts [ed.] 2013). As a whole, these concepts aim to express different ontologies about being-in-the-world (for the term, see references to Heidegger in Willerslev 2007, 20–21, 186–187; Watts 2013, 4).
The fuzziness of human identity has been examined especially by researchers with a common basis in a postmodern agenda. However, Morten Pedersen and Rane Willerslev (2012) have stressed that the fuzziness of human identity cannot be labelled solely as a postmodern theory, as it has been worked on in anthropologic research from the beginning of the formulation of animistic theory at the end of the 19th century (Pedersen & Willerslev 2012; Willerslev 2007, 1, 15–19; e.g. Alberti & Bray 2009; Borić 2013; Harvey 2005, 99–114).

In the archaeological record, the evidence of transforming identities has been hypothesized in artefacts which depict the metamorphosis of humans and animals. Also, it has been theorized in burials in which human and animal body parts have been mixed. (e.g. Back Danielsson 2007, 245–246, 252–253; Conneller 2004; Groleau 2009; Jennbert 2011, 123–138; Losey et al. 2013; Mannermaa 2016a, 2016b; McNiven 2013.)

The importance of animal skins in transformation rituals has been evidenced in ethnographic and anthropologic studies. Already in Chapter 3.1.1, Animal skin as the second skin, I referred to Lotte Tarkka (2005, 264) and the example of the Finnic bear-killing ritual in which the human-animal transformation was facilitated by “changing the coats”. The wearing of animal skins has been discussed especially by Eduardo Viveiros de Castro (1998, 482) and Rane Willerslev (2007, 1, 97–98, 102, 125, 164–165; Pedersen & Willerslev 2012), who have interpreted the use of skins in hunting rituals by the concepts of perspectivism. According to Viveiros de Castro (1998, 482),

*We are dealing with [Amerindian] societies which inscribe efficacious meanings onto the skin, [...] endowed with the power metaphysically to transform the identities of those who wear them, if used in the appropriate ritual context. To put on mask-clothing is not so much to conceal a human essence beneath an animal appearance, but rather to activate the powers of a different body. The animal clothes that shamans use to travel the cosmos are not fantasies but instruments: they are akin to diving equipment, or space suits, and not to carnival masks. ... In the same way, the ‘clothing’ which, amongst animals, covers an internal ‘essence’ of a human type, is not a mere disguise but their distinctive equipment, endowed with the affects and capacities which define each animal...*

Accordingly, Morten Pedersen and Willerslev (2012) have documented Siberian Yukaghir elk hunters and their way of using elk-hide coats for identity changes. According to Pedersen and Willerslev, elk skins were used especially for the mimetic sameness which helped the hunter to reach the position in which he was both a man and an elk. At the same, also the elk was seen as an elk and a woman. So, in a hunting act both humans and animals “can move in and out of different species’ perspectives by temporarily taking on each other’s bodies” (Willerslev 2007, 2; see also Harvey 2005, 99–114; Ingold
2000, 111–131; Losey 2010; McNiven 2013). These kinds of hunting rituals have been documented also in Finnish Lapland (Itkonen 1948b, 18–19, 527).

In this thesis, I hypothesize that animal skins held a central role in human–non-human transformations. I have analysed this issue in Papers I and II, and in Chapters 5.2 and 5.2.1.

### 3.1.3.2 North European shamanism

Next, I turn to recent Scandinavian Iron Age research, especially to Ing-Marie Back Danielsson (2007), Lotte Hedeager (2011), Kristina Jennbert (2011) and Neil Price (2002), who have studied human-animal transformations both in archaeological source material, as in Old Norse religion and literature. As a result, they have interpreted the observed transformative elements by shamanistic tradition (Back Danielsson 2007, 94–98) or elements (Hedeager 2011, 75), originating hypothetically from Sámi influences or creolization (Jennbert 2011, 200; Price 2002, 233–278; see also Tolley 2009, 66–85; Zachrisson et al. 1997 [eds]).

The term *shamanism* in its classic form refers to communities who had spiritual practitioners, shamans (the term is adopted from Ewenki tribe from Siberia) in the circumpolar region (e.g. Tolley 2009, 66). In northern Europe, the contacts between Norse and Sámi hypothetically led to the adaption of shamanistic features in Norse mythology (Tolley 2009). In Finland, Anna-Leena Siikala (1992, 19–20) has specified that, in the Finnish cultural sphere, the question was not about classical shamanism, but rather concerned a *noaidi* (witch) institution which had shamanistic features.

In this context, I refer briefly to the role of skins in the act of human-animal shape shifting in Norse mythology. Especially Lotte Hedeager (2011, 82–84), Ing-Marie Back Danielsson (2007, 252–253) and Kristina Jennbert (2011, 187–195) have referred in their research to the concepts of *fylgja* (or *fylgjur*) and *hamingja* (or *hamr*), which can both be translated as ‘skin’ or ‘animal clothing’ in Old Norse texts. *Fylgja* is the “soul” of a person, which appears in the shape of an animal or a woman. *Hamingja*, in part, refers also to shape changing. The shape shifting can happen when the physical body of a human falls asleep or is dead. As a result, the human soul transforms into an animal, and the person becomes this animal.

It is possible to hypothesize that the concepts of *fylgja* and *hamingja* have their roots on the use of animal skins in transformation rituals. The importance of animal skins in shamanistic human-animal metamorphosis was discussed already a hundred of years ago by the Finnish historian of religion Uno Holmberg (later Harva), who noted that animal skins and body parts were used to facilitate the metamorphosis in shamanic rituals (Holmber 1920; see Chapter 2.3.1). Also in Pedersen & Willerslev (2012, 484), the shamanic costumes are interpreted as magical skins which momentarily enable one to see things “upside down” (See also shaman costumes in Chapter 2.3.1).
Possible Norse influences in east Fennoscandian bear-fur cremating traditions have been discussed in detail in Paper II and in Chapter 5.2.1.2.

3.2 THE USE OF ETHNOGRAPHIC ANALOGIES

In previous Chapters 3.1.1–3.1.3, I have concluded that

1. Human skin has a special role in the building of human cognition about the self. The concept of skin-self can be hypothetically projected onto animal skins, too. This, in part, interprets the seeing of skins as representatives of the animals.

2. Animal skin can serve as a second skin for human identity when it is used as clothing.

3. Human and non-human worlds are entangled with each other. In this interaction, things and animals are seen to have agency. Additionally, I hypothesize that skins belonged to everyday objects which had potential for specific agency to be activated in rituals.

4. Human–non-human entanglements allow transformations from one identity to another. These transformations were facilitated and controlled by animal skins.

In this thesis, the above listed statements form the theoretical basis for interpreting the role of skins and skin garments in the Iron Age and early historical commemoration rituals in eastern Fennoscandia. Next, possible manifestations of human-animal entanglements and the role of skins in these acts particularly in the Finno-Ugrian cultural sphere were studied by following references to skins in the Finnish ethnographic and folkloric sources and studies (Papers I and II and Chapter 5.2.1). Here, I follow the idea that traditional epic poetry can reflect Iron Age and medieval period cosmology and ritual life (see e.g. Frog 2014; Frog & Lukin 2015, 15; Jonuks 2011; Korpela 2014; Siikala 1992; 2012, 422–472. For the research history, see Raninen 2009a).

During the past twenty years, religion-historical, ethnographic and folkloric sources have proved their fruitfulness in interpreting the formation processes of the zooarchaeological record, especially for seeing other than strictly economic interpretations for the data. In Finland, especially the works written by Kristiina Mannermaa (2008a, 2008b, 2016b), Sonja Hukantaival (2016) and Vesa-Pekka Herva (2009; Herva & Ylimaunu 2009) are good examples of this. In Scandinavia, e.g. Lotte Hedeager (2011) and Kristina Jennbert (2006, 2011) have made use of Old Norse literature in interpreting osteological record from ritual contexts.

I validate the application of analogical reasoning by the relatively short time period between the datings of archaeological finds and the recording of ethnographic material. At its minimum, the latest archaeological finds are from the 14th to 17th centuries, and the earliest documentations date from the
17th century. However, it is evident that Iron Age cultures are not synonymous with (pre)modern societies.

Even so, analogical reasoning is by no means unproblematic. The main problem with it is oversimplification. This means that generalized analogies can be so amorphous that they can be used to interpret almost everything (Martin 2013, 2–4, 41, with references; see also Groleau 2009). In order to handle this problem, the reference material for analogies need to be selected with care by the closeness of geographical region and culture, environmental circumstances and means of livelihoods. However, this is not a simple demand, because the territory of Finland was already multicultural during the Iron Age. This means that there might have been different fur and skin using cultures and traditions simultaneously, too (see especially Paper II).
4 MATERIALS AND METHODS

4.1 ZOOARCHAEOLOGICAL SOURCE MATERIAL OF THIS THESIS

This thesis studies zooarchaeological (i.e. animal originated. For the term, see Albarella 2017, 3–6; Russell 2012, 5–10) remains of animal skins which consist of furs and skins, loose animal hairs, imprints of hairs, and animal bones, found in association with Iron Age and historical burials. Leather items were not included for this research (see Chapter 1.3). The skin material is presented in Papers I, III (and IV), and osteological finds in Paper II. The basic information of the sites is presented in Appendix I. The distribution of the sites is presented in Fig. 9.

Fig. 9. Distribution of sites. Yellow circles = inhumation cemeteries, red stars = cremation cemeteries, white triangles, 1 = Pertultanmäki in Kauhava, Corded Ware burial, 2 = Mukkala in Savukoski, inhumation cemetery. Drawing: T. Kirkinen.
The osteological source material of this thesis consists of predator 3rd phalanges, i.e. nail bones which indicate the presence of impressive claws at archaeological sites. To sum up, 161 brown bear phalanges were found from 22 cremation cemeteries, and single lynx (Lynx lynx) and seal 3rd phalanges included in the material. These predator phalanges were deposited in cremation burials and pyre sites presumably as remains of cremated skins. This hypothesis is based on the tradition of leaving impressive claws attached to skins (e.g. Andersson & Paulsson 1993, 58–59, 72–73, 78–81, 92–94; Lahtinen 1964). See Fig. 10.

![Fig. 10. Left: Photo from Khanty bear ritual. Note the impressive claws of the skin. Photo: FHA (SUK324:31), CC BY 4.0. Right: a cremated bear 3rd phalange from a cremation burial under level ground in Kaavontönikkä in Vaasa, western Finland (NM 9520:37). Photo: T. Kirkinen.](image_url)

For several reasons, the 3rd phalanges were often left connected to predator and fur animal skins, hooves in horse hides, horns and antlers in the hides of artiodactyls, and head, tail and limb bones e.g. in fur animal and even in large mammal skins. In most cases, these bones were cut off during the processing of skins, and the osteological material deposited e.g. at tanning sites (e.g. Erwynck 2011; Fairnell 2003, 2008, 2011; Stevens 2011; Strid 2010, 28–32, 2012a, 2012b; Wigh 1998, 86–88, 2001, 120–129).

Additionally, a unique find from a Migration Period cremation burial in Majakangas in Konnevesi (Central Finland) included a burnt head (cranium, mandibula), limbs (ulna, tibia, entocuneiforme), and the tail bones of a pine marten (Martes martes). This find has been interpreted to indicate the cremating of a rawhide together with the body (Mannermaa et al. 2014; Ukkonen 2003; Vanhatalo 2003; 2005; see Paper I).

The research material was collected on the basis of osteological reports from burial sites. Because the osteological analysis has been made only selectively,
the material must be seen as a sample of the total number of 3rd phalanges archived at the National Museum of Finland.

The find places examined in this study are all located in the southern part of mainland Finland, and they cover the time span from the Roman Iron Age to the end of the Viking Age. Thus, they overlap both chronologically and geographically with the southern Finnish inhumation cemetery tradition. Most of the cremation burials were so-called cremation cemeteries under level ground, in which both collective and individual burials were made (for the definition, see Wessman 2010, 19–24, 34). See Fig. 11.

**Fig. 11.** Latokallio in Mikkeli, eastern Finland. The burials of this cremation cemetery under level ground are situated on the slopes and in the holes of the cliff. From this site, two burnt bear 3rd phalanges (Ukkonen 1993) were excavated in 1939 by Esko Sarasmo. Photo: E. Sarasmo 1939 / FHA (AKF14007), CC BY 4.0.

**The hair and skin material** consists of 232 hair samples originating from a total of 121 Iron Age and historical inhumation burials in southern mainland Finland and the Karelian Isthmus (Papers I and III).

The Middle and Late Iron Age inhumation burial tradition occurred first in southwestern Finland in the Eura-Köyliö area at the beginning of the Merovingian Period ([AD 550/600–800/825], e.g. Raninen & Wessman 2015, 281–282). The furnishing of graves with dresses, jewelry, weapons and everyday items ended gradually in western Finland about 1200 AD. In Eastern Finland and the Karelian Isthmus, the most recent furnished graves have been C14 and coin dated in Tuukkala in Mikkeli (Mikkola 2009, 184; 2012),
Kurkijoki Kalmistomäki and Kauskilanmäki in Lappeenranta (Laakso 2014, 130) to the 14th to 16th centuries (Paper I). The material from Sámi area consists of four graves in the 17th century Mukkala burial ground in eastern Lapland (Paper III).

The research material was collected on the basis of find catalogues (see more in Chapter 4.3.1). The finds are archived at the National Museum of Finland.

Soil samples. As animal hairs and feathers might have been preserved as very small fragments, investigating both the finds and the soil samples with the aid of a microscope, as well as using different floating methods, can produce interesting material for the research (e.g. Beatty & Bonnichsen 1994; Kirkinen 2018; Mannermaa et al. [in press]; Metcalfe 2018; Morell 1994; Wilson 2008, 124). In this thesis, the soil samples from a Corded Ware burial site in Pertulanmäki in Kauhava, western Finland were examined using a microscope (21 samples, Paper IV), which revealed goat hairs and bird barbules from the burial structures. The methodology for floating the soil samples for fibres needs further study in the future.

4.2 IDENTIFICATION

4.2.1 MORPHOLOGICAL IDENTIFICATION OF HAIRS

In this thesis, the identification of skins was based on the morphological characteristics of hairs. As such, it follows the basic idea of any morphological identification of objects of nature (e.g. bones, macrofossils, pollen). The hairs were analysed by optical microscopy (Papers I and III) and SEM (scanning electronic microscope, Paper IV) at the Department of Archaeology, University of Helsinki, and at the Nanomicroscopy Center, Aalto University (NMC). The optical microscopy (100 x – 500 x ) was vital for the study of the inner structures of the hairs (medulla, cortex, pigments, measurements), and it was also used to study cross-sections (after Greaves & Saville 1995, 39 –40) and cuticular scales by preparing longitudinal negative casts from the hairs after Kirk et al. (1949). SEM, in part, was important for the high-resolution documentation and measurements of cuticular scales. For the equipment used, collaboration and preparation of samples, see each Paper.

For the identification, the identification keys on Appleyard (1978), Teerink (2003), Rast-Eicher (2016) and Furskin Co (2011) were applied. Most importantly, I sampled a reference collection from Fennoscandian species at the Natural History Museum, University of Helsinki (see Paper I). For the identification of domestic animals, I collected reference material from farms, university and city farmsteads, and from museum collections as well as from private dog- and cat-owners in Finland, Sweden, Iceland, Norway and Denmark. See Fig. 12.
The key features for the identification were the length and diameter of guard and under hairs, the shape of the root, tip and cross-section, the structure of the medulla and cuticular scales, the pigment distribution and density in the cortex, and the presence of ovoid bodies (e.g. Chernova 2002; Goodway 1987; Hausman 1920; Tridico 2005). The classifications followed Teerink (2003) and Furskin Co (2011) (animal hairs), and Ogle & Fox (1998) (human hairs). The slides (optical microscopy) and aluminium stubs (SEM) will be archived in the National Museum of Finland (Papers I, III and IV).

For the morphological identification of bones, see the osteological reports.

4.2.2 SCIENTIFIC IDENTIFICATION METHODS

aDNA analyses was tested at the University of Oulu, Finland, for the identification of cervidae hairs collected from Iron Age burials. Unfortunately, the hairs were too degenerated for the analysis. The hypothetical reason for
the result was the acidic soils in Finland. This case confirms that the preservation of DNA is not the same as with morphological features, as even seemingly well preserved hair samples can have lost their macromolecular structures (e.g. Brandt et al. 2014, 2; Wilson 2008, 138).

4.3 TAPHONOMICAL ISSUES

4.3.1 TAPHONOMY OF HAIRS AND SKINS

4.3.1.1 Excavations and sampling from archaeological collections

In this Chapter, the source-critical problems which are related to the preservation of skins are discussed in detail. In general, skins are organic soft materials which are prone to several taphonomic processes in archaeological contexts. The information about the preservation of studied hairs is useful also for field archaeologists, conservators, and for those who curate the finds.

At archaeological excavations, the recovering of decayed hair fragments is a task which needs both an advanced examination methodology and knowledge of the contexts in which the decayed organic remains were found. The best way of handling burials with skin remains is to excavate the material in a laboratory (e.g. Patteri 2011, 2012; Riikonen 2011). However, the research material of this thesis was accumulated over a one-hundred-year-long period, 1886–2009, and of the studied burials the excavation and documentation methods have varied through the years.

First of all, good sampling and documentation was done also in the very early years. Especially at excavations in which textiles were collected and documented properly, also skins and hairs were treated with care. For example, Hj. Appelgren-Kivalo’s (1907) documentation in his Suomalaisia pukuja myöhemmältä rautakaudelta (En. Finnish dresses from the Late Iron Age) is breathtaking in its accuracy.

In some cases, the careful and systematic sampling has produced valuable material for future research. Especially in Luistari, Pirkko-Liisa Lehtosalo-Hilander has saved a huge amount of organic materials, which were preserved usually in contact with metal artefacts. An even more spectacular case was the collecting of soil samples from the Corded Ware burial in Pertultanmäki in Kauhava, western Finland in the early 1930s by Aarne Äyräpää (1931). From these samples, mineralized goat hair fragments were identified with modern equipment (Paper IV).

At its worst, there is evidence that in some cases the skin remains and hairs were not sampled, although they were recognized during the excavation (e.g. in Mukkala, eastern Lapland, see Paper III). In Vilusenharju in Tampere, the burials were already destroyed when archaeologists studied the site and rescued furs by sieving through masses of land. Also, in some cases the hairs
were listed in find catalogues, but currently, no hair material exists anymore. At least in some cases the organic material was removed from metal finds during the conservation (see Paper I).

The research material for this thesis was collected on the basis of find catalogues, i.e. only those finds, in which hairs or skins were mentioned, were studied (see also Chapter 1.3). The source-critical problems of the collecting process are as follows. First, sometimes the hairs formed only a part of clumps of textiles, bone, earth, wood, and bark, and in these cases the hairs were just listed as organic material (e.g. in Luistari). In some cases, the finds were not identified as hairs but were erroneously catalogued e.g. as grass (e.g. in Tuukkala in Mikkeli and Kekomäki in Kaukola). What this indicates is that a systematic study of complete burials will produce new research materials in the future.

The total amounts of animal hairs and fur remains, excavated through the decades and stored in the archives, is difficult to estimate. However, I studied the richest female burial of Luistari in Eura, known as *Euran emäntä* (Lady of Eura, grave 56), as a whole (except the finds which are in the exhibition at the National Museum of Finland) by microscope. This test revealed over 40 really small fragments of fibres, possibly of animal hairs, which haven’t been listed in any catalogues. In conclusion, this thesis must be understood as a sample of the information which is hidden in our archaeological collections and at archaeological sites.

### 4.3.1.2 The preservation of hairs

In the Finnish find material, skin tissues were often decomposed totally and only the remains of hairs were present for the study (c.f. Østergård 2009, 119–122). The main deal, about 75% of the fur and hair finds were preserved in association with metal artefacts. Most often the hairs were preserved in contact with bronze items, when the toxic copper alloys were absorbed into the fibres. Proximity to iron artefacts preserved animal hairs in corrosion crusts by forming a corrosion cast over the hair. (Especially Paper I).

In some cases the hairs were mineralized, i.e. the organic material of the hair was replaced by inorganic material, either partially or completely (a pseudomorph) (Gillard et al. 1994). In the most extreme cases, the whole hair was decomposed with only a cast left in a metal item (see Papers I and III).

According to Wilson et al. (2001, 215), microbial- and chemical-induced breakdown can create an anoxic state in the grave and, with the persistance of these conditions, increase the possibility of the preservation of hairs. Soil qualities, as well as grave structures, e.g. coffin-wood, are part of this process (Wilson 2008; Wilson et al. 2001, 2007). As an estimation, in about 30% of the studied burials, part of the hairs were preserved due to favourable microenvironments. (See also Paper IV).
When speaking about the preservation of hairs, it is important to specify what is meant by the term. In archaeological contexts, usually at least some features or qualities of the hairs had degenerated or decayed over time.

For morphological identification, especially the degeneration of the morphology of hairs can cause difficulties as it changes the outlook of the hairs, when compared to modern samples. For example, the vacuolated cells in the medulla, which are normally filled with air (Tridico et al. 2014a; Wilson 2008, 128) and have a dark appearance, are in many archaeological samples transparent (i.e. empty) and have usually more or less lost their shape (see Fig. 13).

![Fig. 13. Modern (on the left) and archaeological (on the right) Cervidae hairs, photos by optical microscope. Photo: T. Kirkinen.](image)

In the research material, different stages and forms of degeneration were recorded. First, the hairs were seen to have been prone to micro-organisms which decompose and digest keratin. The most influential of these are the so-called filamentous fungi which reside primarily in soils by recycling mammalian proteins. Besides fungal activity, also bacteria and insects were seen to have decomposed the hairs. These biological agents damaged also the morphological structures needed for identification e.g. by loosening the cuticular scales or by hollowing out the medulla (see e.g. Kanbe & Tanaka 1982; Rast-Eicher 2016, 31–40; Tridico et al. 2014b; Wilson et al. 2001). See Fig. 14a and 14b.

These destructive effects of biological agents are not limited to archaeological depositions; on the contrary, they might have caused damage to the hairs already while the animal was still alive, when the skin was in use as a garment and, after excavation, in poor packaging and storage conditions. These processes are met also in curated museum collections, where especially insects might destroy the fibres (Tridico et al. 2014b; Wilson et al. 2001).

It is also important to notice that the good morphological shape of the hairs does not necessarily guarantee the preservation of other elements, e.g. DNA (see Chapter 4.2.2).
Fig. 14a. Degeneration of animal fibres caused by filamentous fungi and biological agents which have invaded the hair by causing lateral lines, bore type holes, surface damage, and hollowing out the medulla. Photo: T. Kirkinen.

Fig. 14b. Loosening of cuticular scales and needle type damage. Photo: T. Kirkinen and K. Vajanto.
4.3.2 TAPHONOMY OF BONES
Bones are composed mostly of collagen (Cronyn 1990, 275–281) and they decompose in Finland’s acidic soils through time. From Iron Age and medieval sites it is possible to find unburnt bone material but, in general, the burning or cremating of bones increases their preservation significantly.

The source-critical problems deal with the dating and context of the bones as well as the importance of sieving for finding the small fragments of bones, e.g. phalanges (e.g. Zohar & Belmaker 2005). The source-critical issues have been dealt with in detail in Paper II. For taphonomical issues in Finland, see Auli Tourunen’s (2011) paper Burnt, fragmented and mixed: Identification and interpretation of domestic animal bones in Finnish burnt bone assemblages.
5 RESULTS AND DISCUSSION

5.1 ANIMAL SKINS IN BURIALS

5.1.1 SPECIMENS

5.1.1.1 Results of identifications

In this thesis, 253 animal hair samples from 122 inhumation burials in 25 cemeteries (Papers I, III, IV) and 161 brown bear 3rd phalanges from 22 cremation burial sites (Paper II) were investigated.

The religion-cultural division between cremation and inhumation burials divides the research material into two categories. First, in the Iron Age cremation burials, the organic material was cremated and only the bones which were attached to skins can be found. This find material consists almost entirely of bear 3rd phalanges, i.e. remains of claws. Additionally, single lynx and seal 3rd phalanges have been reported in osteological analysis (Paper II).

As an exception, a unique find from a Migration Period cremation burial in Majakangas in Konnevesi (Central Finland) included a burnt head (cranium, mandibula), limbs (ulna, tibia, entocuneiforme), and the tail bones of a pine marten (Martes martes). This find has been interpreted to indicate the cremating of a rawhide together with the body (Mannermaa et al. 2014; Ukkonen 2003; Vanhatalo 2003, 2005).

In the inhumation burials studied here, the identified hair and skin remains consisted of a wide variety of mammals from domestic species to fur animals, predators and big game. In comparison to cremation burials, brown bear, lynx (Lynx lynx) and wolf skins (Canis lupus) were rare.

The most notable phenomenon in this material is the share of wild animals. In total, wild animal skins were observed in about 80% of the graves in which the hairs were identified/sampled. This is in strong contrast with contemporary osteological find materials in which the domesticated species dominate (e.g. Blomqvist & Fortelius 1982; Bläuer 2015; Kivikero 2011, 2015; Tupala 1999; Ukkonen & Mannermaa 2017, 167–172; Vuorinen 2009, 170–176; for Sweden see Jennbert 2011, 58–61, 79–80, 92, 98–99, 119).

The majority of the skins were Cervidae (Alces alces and Rangifer tarandus), which were identified in every second/third of the graves. Other specimens which were hunted primarily for their meat, such as seals (Phocidae

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2 The Perttulanmäki (Kauhava, western Finland) Corded Ware burial is excluded in these comparisons.
in general and *Pusa hispida*), and mountain hare (*Lepus timidus*), were identified in a few graves.

The specimens hunted primarily for their fur were identified in only 12 burials (16% of the graves with identifications). This group of animals consists of weasel family (*Mustelidae*), red squirrel (*Sciurus vulgaris*), red fox (*Vulpes vulpes*), and European beaver (*Castor fiber*). In comparison with Cervidae skins, which were found in practice in every cemetery, fur animal skins were identified only in Luistari in Eura, Rikala in Halikko, Kirkkomäki in Kaarina, Kekomäki in Kaukola and Mukkala in Savukoski. However, this result can be seen only as suggestive, as the fine haired and small fur animal skins are supposedly underrepresented in the research material. See Fig. 15.

**Fig. 15.** The numbers of inhumation graves in which the hairs of a) meat intensive wild mammals (*Cervidae*, *Phocidae*, *Lepus timidus*), b) fur animals, c) predators (*Ursus arctos*, *Lynx lynx*, *Canis lupus*) and d) domestic animals have been identified in Finland and in the Karelian Isthmus. Figure: T. Kirkinen.

The above presented classification of meat intensive animals, fur animals and predators is, of course, partly overlapping. For example, lynx was not only a predator but also a valuable fur animal, too. Moreover, European beaver was used as well for its meat, fur, as *Castoreum*. Also, the using of Cervidae skins for garments and artefacts indicates that big game was valued not only for its meat but also for its skins.

The rest of the identified specimen originated from domestic species, mainly cattle, goat, sheep, and pig. Domestic animal skin remains were found in ca. 15 burials (appr. 20% of the graves with identifications). The number must be understood as an estimation as the difference between wool (textile) and sheep skin was difficult to verify. However, although dog and horse bones
have been identified from the studied cremation and inhumation burials, their skins seem not to have been placed in the graves.

### 5.1.1.2 Discussion: the predominance of big game

The results of this theses underline the role of wild mammals, especially that of big game, in death rituals. In cremation burials, the numbers of brown bear phalanges indicate that the species was hunted, although its bones are mostly absent from the Iron Age settlement sites. The ceremonial hunting of bear has been studied widely in Finnish ethnology and folklore (see Paper II with references), but we should not forget that it was also valuable for its meat, which was shared ritually in the community. As bear was usually slaughtered in its winter nest early in the spring, it offered meat when other sources of food were limited. Even today, bear meat is valued for its taste and it is on the menus of a specific few restaurants in Finland.

In the examined inhumation burials, the number of European elk and (wild forest) reindeer identifications need to be discussed in detail. The result is in strong contrast with the low numbers of Cervidae bones found from the Late Iron Age settlement sites. From inhumation burials, no cervidae bones have been identified (Kivikero 2011, 2015; Lehtosalo-Hilander 1982c, 68; Tupala 2000; Ukkonen & Mannermaa 2017, 163–164, 178–182). Also in this case, ethnographical sources indicate that Cervidae bones were often handled ritually and they were not left at the settlement sites as debris (Holmberg 1922, 22–24; Itkonen 1948b, 368; Jordan 2003, 113, 115, 125, 129–132, 201–204). However, it cannot be excluded that the numbers of elk and wild forest reindeer were low in the southernmost parts of Finland at the end of the Iron Age, so skins can also be traded from the neighbouring areas. For example, Veli-Matti Kangas et al. (2015) have simulated the prehistoric population sizes from the genetic composition of modern elks and concluded that the populations were relatively small during the Iron Age. Also, the species is known to have suffered population depletions, partly due to hunting pressure, as early as during the Neolithic Stone Age (Larsson et al. 2012; Oinonen et al. 2014; Ukkonen 1996, 69–70) and repeatedly during the 16th-20th centuries (Koivisto 1972, 357; Nygren 2009, 18–19; Pirinen 1982, 394; Seppälä 2009, 161; Siivonen 1972, 27–28).

The two possible reindeer sub-species, i.e. wild forest reindeer (*Rangifer tarandus fennicus*) and mountain reindeer (*Rangifer tarandus tarandus*) later also semi-domesticated reindeer, had different ecological habitats so that mountain reindeer and the herded animals lived foremost in and near the Arctic zone. The skins of these animals might well have been traded to southern Finland and to the Karelian Isthmus.

Wild forest reindeer is, instead, a southernmost species. In Finland, its fate was to be hunted to local extinction by the end of the 19th century. (Siivonen 1972, 27; Siivonen & Mäki 1972, 383–387.) Thus, the “natural” distribution of wild forest reindeer has been reconstructed merely on the basis of historical
sources (e.g. Montonen 1974, 21, 48–53; Pirinen 1982, 395) and archaeo-
osteo logical finds (Ukkonen & Mannermaa 2017, 133–134; 224–225). Most
importantly, reindeer bones have not been found from the Iron Age sites at the
southernmost areas of Finland, i.e. in areas where the reindeer (and European
elk) skins have been found from graves. See Fig. 16.

![Fig. 16. The map shows the hypothesized historical territory of R. tarandus in Finland (light green hatching, after Rankama & Ukkonen 2001, 135; Ukkonen 2001, 16), compared to the inhumation cemeteries from which cervidae (both reindeer and European elk) hairs have been identified (marked with yellow dots). Red stars mark those Late Iron Age and medieval sites from which R. tarandus bones have been identified: from left to right, Tursiannotko settlement site in Pirkkala, Ihannaniemi in Sysmä and Valkola settlement site and Kyyhkylä cair cemetery in Mikkeli (Bläuer 2017; Rankama & Ukkonen 2001; Ukkonen 1996, 80; 2001, 16; Ukkonen & Mannermaa 2017, 224–225). Drawing: T. Kirkinen.]

To conclude, the numbers of Cervidae identifications in graves is in this thesis interpreted to reflect their value as game animals. This is in accordance with the long term utilization of European elk and wild reindeer in Fennoscandia throughout the millennia (Lehikoinen 2008, 64–67; Rankama & Ukkonen 2001; Ukkonen 2001, 16; Ukkonen & Mannermaa 2017, 222–225).
The use of Cervidae skins in burials has been discussed in Papers I and III and in Chapters 5.1.2 and 5.2.1.1.

5.1.2 CHRONOLOGICAL ASPECTS
The way of equipping the dead with furs is evidenced in east Fennoscandian burials from the Neolithic Stone Age (Paper IV) to the 17th century AD (Paper III). In this thesis, the focus is on the Iron Age and medieval period fur finds. A detailed chronological outline is, however, suggestive as most of the studied burials are dated on the basis of artefact typology only. The importance of C14-datings can be read in cases when the scientific datings have challenged the ones based on artifact typology (e.g. Koivisto et al. 2016; Mäntylä-Asplund & Storå 2010).

The earliest marks of furs in Iron Age burials have been detected in the Early Roman Iron Age (AD 0/50–150/200\(^3\)) tarand\(^4\) and stone-cist cemetery at Korvala in Sauvo, southwestern Finland. The evidence consists of pseudomorphs of hairs which were observed and photographed on the surfaces of an axe and a spearhead during the conservation process (NM 31522:15, 16; pers. comm. Pia Klaavu; see Fig. 17).

From the Roman Iron Age onwards, most of the dead were cremated. This means that the majority of possible skins have been burnt, too. In cremations, the only finds which can be connected to the use of skins with some certainty are the predator 3rd phalanges, i.e. the remains of impressive claws which were left on the skins. In Finland, the earliest evidence of cremated bear skins is from Kärsämäki in Maaria (Turku) (Kivikoski 1965), which lies about 30 km away from the above mentioned Sauvo cemetery. The site has been dated to the Roman Iron Age, although it might have been in use also during the later periods (Moisio 2016, 158). So, we don’t know the exact dating of those bear phalanges without C14-dating.

\(^3\) Periods are dated according to Haggrén et al. 2015, cover pages.
\(^4\) According to Anna Wessman (2009, 74), a tarand-grave (Fi. tarhakalmisto) burial or cemetery is consisted of stone enclosures which are often linked together. These sites have been found from eastern Sweden, southern Finnish coastal area and from the Baltic region. Besides inhumations, these burials might contain also cremation burials.
Fig. 17. A spear head (NM 31522:16) from Korvala in Sauvo, southwestern Finland. The pseudomorphs of hairs were preserved on the surface. Photo: FHA.

Kärsämäki is an important site and it has given its name to Kärsämäki-type cemeteries. According to Anna Wessman and Sami Raninen, Kärsämäki-type individual weapon burials share some common features with a later

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5 Kärsämäki-type cemeteries are individual pit burials, hypothetically elite burials accompanied with weaponry (see e.g. Wessman 2010, 66-67, with references).
cemetery type, called the cremation cemetery under level ground (Wessman 2010, 66–67; Wickholm & Raninen 2006, 154; Raninen 2005b). Most interestingly, as predator phalanges have commonly been found in this new cemetery type, it is tempting to see a continuum in bear skin burials from the Kärsämäki-type cemeteries to cremation cemeteries under level ground. However, according to Jussi Moisio (2016, 165–166), animal bones haven’t been found in other Kärsämäki-type cemeteries this far. Also, the dating of the Kärsämäki phalanges has yet to be verified.

The earliest cremation cemeteries under level ground date in Finland to the Migration period (AD 375/400–550/600), with most of them being dated to 600–1000 AD (Wessman 2010, 34). The phalange finds cover this time span as a whole, appearing in a wave from western Finland to the east (see Paper II).

In cremation cairn cemeteries, thus far the only phalanges have been excavated from Päivääniemi in Lempäälä, southern Finland (Katiskoski 1987), and Mujanvainio in Laihia, western Finland (Koivisto et al. 2016). This is highly interesting as (earth-mixed) cairns, too, were common in Finland during ca. 300–1000 AD (Wessman 2010, 33–34). As argued by Anna Wessman (2010, 32),

…it seems that the belief in an afterlife was perhaps different amongst the people who buried their dead in these [cremation cemeteries under level ground] places, as compared to those who buried their dead in inhumation burials or in earth-mixed cairns.

So, bear skins were not an integral part in all cremation burials.

The first inhumation burials can be dated to the Merovingian Period (AD 550/600–800/825). Thus, these inhumations were contemporary with the cremation cemeteries, and they were sometimes both located in the same cemeteries. The new tradition was adopted first in the southwestern parts of Finland in Luistari and Pappilanmäki in Eura, and Vanhakartano in Köyliö (Lehtosalo-Hilander 1982b, 173–190; 2000, 227; Wessman 2010, 33). In this thesis, only the grave 21 in Luistari belongs to this early phase with its Bovidae skin remains (NM 18000:1240, 1242).

During the Viking Age (AD 800/825–1025/1100), the number of known inhumation burials is much higher than before, and so is the number of

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6 Cremation cemetery under level ground (Fi. tasaisen maan polttokalmisto) is a complex cemetery type in which both individual and collective burials have been made. Later on, also inhumation burials were made in these cemeteries. This burial type is inherently Finnish as only some southern and eastern sites are known outside the present borders. See more in Wessman (2010, 19–26, 34.)

7 Earth-mixed cairns is a heterogeneous group of burials which cover usually one or several cremations, sometimes also inhumations. They can be structured or unstructured, from a couple of cairns to large fields with hundreds of cairns. (Wessman 2010, 33.)
preserved skin remains. The material originates from the southwestern Finnish cemeteries in Luistari, Osmanmäki and Pappilanmäki in Eura, Kirkkomäki in Kaarina, Anivehmanmäki in Yläne and Vanhakartano Cemetery C in Köylö. Disappointingly, many Viking Age hairs were badly preserved and therefore couldn’t be identified. Regardless of this, the results testify to a versatile use of cattle, cervid, predator and fur animal skins.

Most (62%) of the studied inhumation burials have been dated to the Crusade period (AD 1025/1100–1200/1300), and these sites — Luistari in Eura (see Fig. 18), Kirkkomäki in Kaarina, Rikala in Halikko, Humikkala in Masku, Yliskylä in Perniö, Topolanmäki in Valkeakoski, Kirkkailanmäki in Hollola, Mikkola in Ylöjärvi, Vilusenharju in Tampere, Kappelinmäki in Lappeenranta, Tuukkala and Visulahti in Mikkeli, Kekomäki in Kaukola, Tontinmäki in Räisälä, and Patja in Sakkola — dot the map from southwestern Finland to the Karelian Isthmus. The identified specimens testify to the use of skins of domestic species, cervids, fur animals, seals, predators, and mountain hare. The chronology of these burials is, however, problematic, as there are not many precisely dated burials. The few coin and radiocarbon datings show that some of the graves date, in fact, to the medieval period (e.g. Laakso 2014, 129–131; Mikkola 2009, 184). The problems in dating are closely bound with the question of the Christianization process and its chronology (e.g. Laakso 2014, 129–134; Luoto & Pälkkö 2005; Purhonen 1998, 135–142, 149–152; Salonen 2014; Taavitsainen 2005).

The latest skin finds have been excavated from northern Finland (see Papers I and III; Kuokkanen & Lipkin 2011, 150). In Mukkala in Savukoski, a Forest Sámi burial ground in eastern Lapland, the analysed animal hairs testify to the use of reindeer and brown bear skins for wrapping, elk leg-skins for Sámi fur shoes, and fur for a pouch as late as during the 17th century (Paper III; Leppäaho 1937). This is in line with other archaeological excavations at Sámi sites (Itkonen 1948b, 353–354; Manker 1961, 149–155, 190–192).

The end of the putting animal skins in graves was supposedly controlled by the Church. Teppo Korhonen (1982a, 62) has studied the issue in detail and according to him, the protestant orthodoxy finally denied the use of skins at the end of the 18th century as an expression of paganism or Catholic faith. Before that, the Catholic Church accepted fur animal skins commonly as donations and offerings from parishioners (Korhonen 1982a, 1982b; also Krohn 1894/2008, 144, 162, 173). Most interestingly, the Church tended to Christianize bear skins by collecting and using them in front of the altar as carpets from the 15th century onwards (Korhonen 1982a, 1982b; also in other peripheric areas like Greenland, see Østergård 2009, 120–121). Later on, animal skins were replaced by textiles, in burials especially by rugs (pall-clothes), the tuft of which probably imitated fur (Pylkkänen 1974, 27–31).
In conclusion, chronological changes in the uses of skins in burials can be divided into the following phases:

- skins were placed in graves already by a Late Neolithic burial in Perttulanmäki, western Finland
- the evidence of furs has been found in an Early Iron Age inhumation burial in Korvala in Sauvo, southwestern Finland
- bear skins were cremated in Kärsämäki cemetery in Kaarina, southwestern Finland, possibly during the Early Iron Age
- the cremating of bear and predator skins was common in the cremation cemeteries under level ground from the Merovingian period onwards. Bear phalanges have been found in other cremation burial types only twice.
- a versatile use of skins for wrapping, garments and artefacts is evidenced in inhumation burials from the Merovingian period to the medieval period, in Northern Finland even up to the 17th century
- Christianization ended the tradition of placing furs and skins in graves gradually first in the southwestern Finland and finally in northern Finland

5.1.3 WRAPPING AND COVERING AS A LONG-TERM NORTHERN PHENOMENON
A major part of the identified hair samples originated from skins on which the deceased was laid to rest or by which the body was covered or wrapped. In this
thesis, these different forms are not easy to separate from each other. The reasons for this are many. First, the documentation of animal hairs was in many cases inadequate for further analysis. Second, the loose hair remains, scattered in a grave, are difficult to interpret: they might be remains of wrappings, but they might also originate from garments; or they might even be clumps of loose hairs removed from pelts and placed in the grave for their softness (cf. Karjalainen 1918, 79). Finally, in some cases the distribution of human bones does not support the hypothesis of tight wrapping (effet de parois, pers. comm. Ulla Moilanen 1/2018; see Nilsson Stutz 2003, 295–304), but as in most cases the bones were decayed, this element could not be studied systematically. As a result, I have relied on interpretations made in the field, and used the term soft container (c.f. Nilsson Stutz 2003, 300–303) for all kinds of wrappings and coverings, and termed the act itself as wrapping or covering. The term covers both cloth-type materials (skin, textile) and birch bark, but here the focus is on skin materials, only.

On the basis of the research material, covering was evidently practiced both in cremation and inhumation burials. As discussed in Paper II, predator and especially brown bear phalanges have been hypothesized as the remains of soft containers. An important evidence for this theory can be found in Swedish and Norwegian inhumation graves, in which the distribution of bear phalanges indicates the placing of a skin under the deceased (Petré 1980). Some brown bear phalanges have been found at the sites with boat rivets (e.g. Pappilanmäki in Raisio and Yliskylä in Perniö), which might indicate that skins were cremated in boat burials.

In the examined Iron Age and medieval inhumation burials, soft containers were used in about 20–35 burials, i.e. in every second – every fourth of the graves with identifications. Reindeer and bear skins were used for wrapping and fur shoes also in the Mukkala Forest Sámi cemetery, where six of the eight excavated burials included remains of wrappings and coverings (Leppäaho 1937; Paper III).

For practical reasons, the skins used for covering were those of large mammals, most often reindeer and European elk skins but also brown bear and cattle skins (see Fig. 19). It is not excluded that some seal skins might have been used for wrapping, too. Additionally, in two small children’s graves in Luistari in Eura (graves 118, 139), the identified Canidae and Felidae hairs might have originated from lynx and wolf skins which were used for wrappings.

Originally, soft containers seemed to have been a part of different kinds of grave structures and burials. For example in Luistari grave 288, Pirkko-Liisa Lehtosalo-Hilander (1982a, 33) has interpreted the dark structure in the grave to be the remains of a bier, either made of textile or of skin (cf. Perttulanmäki in Kauhava, Paper IV). Also in Mukkala, in two of the graves (IV and VI) the body was wrapped in a skin with no signs of other structures (Leppäaho 1937). In some burials the deceased was wrapped or covered by a skin and laid in a coffin (e.g. Kirkkomäki in Kaarina, grave 30), a chamber-like structure
(Kekomäki in Kaukola, grave 3), or a hollowed-out tree coffin (Rikala in Halikko, grave 7). The grave might also have been filled with grass (Vanhakartano Cemetery C in Köyliö grave 28), and moss (Rikala in Halikko, grave 7), and covered with birch bark (Vanhakartano Cemetery C in Köyliö, grave 28).

![Cervidae skin and loose hairs from the bottom of the grave, preserved in contact with apron’s spiral ornaments (NM 27196:31064d) in burial 31 in Kirkkomäki inhumation cemetery in Kaarina, southwestern Finland. Photo: T. Kirkinen.](image)

The practice of wrapping the deceased has been interpreted in the ethnographic sources with the idea of preventing the deceased’s soul from escaping, or just by care-taking of the dead by offering him/her a soft place to rest (Harva 1933, 208; Karjalainen 1918, 67–68; Manker 1961, 190; see Nilsson Stutz 2003, 354; Storå 1971, 235). For softness, sometimes only reindeer hairs were put in the grave (Karjalainen 1918, 79). This is a possible explanation also in some burials studied in this thesis, although it is difficult to verify.

This provides evidence that skins had a functional explanation, too, and that they belonged to the grave’s inner structures, together with other soft materials. In the grave, they formed a part of the multiple layers of clothes, fabrics, birch bark, grass, moss, coffin and stone settings with which the body was covered. In this way, the body was separated from the immediate contact with the sediment (Nilsson Stutz 2003, 354).
In the research literature, the wrapping of bodies in reindeer and brown bear skins or in birch bark has been connected closely to Sámi ethnicity, as these materials have been found in the excavated Sámi burial grounds and reported in historical and ethnographical sources (DuBois 1999, 71; Itkonen 1948b, 350; Manker 1961, 190–192; Nilsson Stutz 2006, 231–232; Storå 1971, 87, 92, 95–96, 106; Svestad 2007, 45, 47, 49, 56–59; 2011, 46–48; Waronen 1898/2009, 64–65; Zachrisson 1997, 79; see also Frog 2017, 60; Paper III).

However, the wrapping of bodies in skins is a phenomenon with wide geographical and chronological continuum in north Eurasian commemoration rituals. For example, it has been documented in Mesolithic burials in Gøngehusvej, Denmark (bear skin, possibly also roe deer; Brinch Petersen et al. 1993). The use of skins in Mesolithic burials has been hypothesized also by Albrethsen and Brinch Petersen (1975), Albrethsen et al. (1976), Larsson (1988a, 1988b), and Kannegaard Nielsen & Brinch Petersen (1993). Additionally, some Mesolithic human figurines have been interpreted as representations of wrapped corpses (Jonuks 2016, 121–122, 124; also Nilsson Stutz 2006, 231–232; Núñez 1987).

During the Neolithic Stone Age, a goat skin was identified in a Corded Ware burial in Finland (Paper IV). In the Danish Bronze Age oak-coffin burials, cattle and goat skins were used for wrapping the deceased (Frei et al. 2015; Harris 2014b, 122–124; Jennbert 2011, 101). Also, wild animal skins have been documented in the Iron Age, medieval, and Early Modern Period graves e.g. in Siberia and Altai (Harva 1933, 206, 209; Karjalainen 1918, 64, 66; Liesowska 2015; Waronen 1898/2009, 65), Finland (Papers I and III) and in northern America (Osgood 1936/1970, 145; Pritzker 2000).

Hence, the use of reindeer and brown bear skins for wrapping the dead cannot be identified solely as a Sámi habit. Instead, it was a widespread and long-lasting northern tradition, the practicing of which continued among hunting and herding cultures into the early 19th century. Indeed, the number of wild animal skins in Fennoscandian burials is an interesting phenomenon. Ideologies behind this phenomenon will be discussed in Chapter 5.2.1.

5.1.4 FURS AS CLOTHES

5.1.4.1 A summary of the finds

The skin fragments and loose hairs which were studied in this thesis rarely rendered their interpretation as clothes (Paper I). The complete skin garments have been found only from Mukkala, eastern Lapland, where the deceased in grave I was equipped with fur shoes which were tied up with woollen ribbons (Paper III). In most cases, it was difficult to recover whether the fur remains origined from garments, from wrappings or from artefacts like pouches or bags. Some indicators for the identification of garments can, however, be used:

- Presence of stitches (Mannering 2017, 152)
• Shape and context
• Fur animal skins

In this study, stitches were rarely observed. The reason for the rareness is that in many cases the skin tissue was decomposed and only the hairs were preserved. This hinders especially the identification of clothes which were made of reindeer skins. Only in Tuukkala in Mikkeli (male grave 39), eastern Finland, a stitched piece of a cervidae skin was found near the deceased's right brachium. It can be hypothesized that it originated from an outerwear, most probably from an anorak or a so-called peski, a Lapp coat.

The most interesting documenting of stitched pieces was made already in 1890s by Theodor Schwindt, who excavated the Kekomäki inhumation cemetery in Kaukola, Karelian Isthmus. From graves 1 and 3, a versatile collection of fur remains were found. Fortunately, Schwindt was interested in textiles and thus, he documented them relatively well. However, the stitched pieces were hard to interpret, whether they were remains of fur pouches or pieces of a fur coat or a fur-lined cape (Schwindt 1893, 145, 164, 182).

Most often, the interpretations of garments have been based on the shape and context of furs. For example, Theodor Schwindt (1893, 137) hypothesized the use of trousers / gaiters made of seal skin in Kekomäki burial 3. Also in Vilusenharju cemetery in Tampere, the remains of seal skins from graves 42 and 44 origined from clothes (Nallinmaa-Luoto 1978, 236; Tomanterä 1978, 22). Fur clothes were hypothesised also in Kirkkomäki inhumation cemetery in Kaarina, in male burials 16 and 30 (see Asplund & Riikonen 2007, 25).

Especially, the shape and context of furs was applicable for identifying mittens. At its best, furs were preserved on both sides of hand bones in contact with finger-rings. Mittens were made of Cervidae (Luistari in Eura, grave 90; see Lehtosalo-Hilander 2000, 197) and mountain hare (Vilusenharju in Tampere, possibly also in Kekomäki in Kaukola, grave 3), possibly also of sheep (Luistari, grave 21), undefined fur animal fur (Luistari, grave 10) or red fox (Luistari, grave 283). See Fig. 20.

In some cases, the information that brooches were originally found on the top of fur, or that animal hairs were attached on the bottom surface of a fibula, might indicate the presence of fur-lined capes or entire skin garments which were fastened by brooches. In Birka, Sweden, beaver hairs which were found especially in contact with brooches were interpreted as borders of woollen tunics (Hägg 1984) or capes (Ågren 1993; 1995; see Chapter 2.3.1).

In Finnish material, the hairs attached on the bottom surface of a convex round brooch (NM 10201:4B; see conservation report, NM) from Kiiliää inhumation burial in Sääksmäki, is one of the examples which might indicate fur clothing. Also in Humikkala in Masku, the pieces of cervidae skins which were found under a penannular brooch (NM 8656, grave 32:5a) might indicate the use of a reindeer skin garment. See Fig. 5. The skins might also be remains
of a reindeer hide which was placed on the bottom of the grave, as has been the case in Kirkkomäki in Kaarina (NM 27025).

Fig. 20. Luistari inhumation cemetery, southwestern Finland. Burial 283 from NW. A small piece of red fox fur (NM 18000:3219) was found near the bronze finger-ring. Photos: a) P.-L. Lehtosalo-Hilander / FHA (FI45895:333) and b) T. Kirkinen.

Also, the information concerning exploited species can be used for further interpretation. Small and middle-sized fur animals can be expected to have been used either for clothing or for small artefacts such as pouches, belts, bags, sheaths and scabbards (see Papers I and III). Hypothetically, fur animal hairs provide evidence for the use of fur clothes in Luistari in Eura, Kirkkomäki in Kaarina, Humikkala in Masku and Kekomäki in Kaukola.

In the male burial in Kekomäki grave 3, the remains of a small fur animal (red squirrel/Mustelidae) most probably originated from a cape or cape linings and/or from a tunic. In that burial there were also remains of black beaver hairs, which Schwindt (1893, 182) interpreted as the remains of a collar. Thus, it can be a small cape, a traditional sieppuri (neck wrapping) which was usually made of European beaver or brown bear skin (Itkonen 1948a, 339). Besides Kekomäki, similar kind of finds have been made this far only from Luistari grave 35.

In Kekomäki and also in Luistari grave 283, beaver hairs were treated in the same way as in Birka, i.e. the guard hairs were pulled off (see Ågren 1995; see also Finnish fur manufacturing in Järvinen 1950, 232; Lahtinen 1964, 54). In Kekomäki, the pulled beaver fur was black, which is known to have been
one of the most valuable variants in the past (Pylkkänen 1955, 90; Seppälä 2009, 164).

However, it cannot be excluded that sometimes fur animal skins might have been offered as grave-gifts (see Harva 1933, 207). Possible indicators of this tradition can be found in a Migration period cremation burial in Majakangas in Konnevesi, central Finland. In this burial, a head (cranium, mandibula), limbs (ulna, tibia, entocuneiforme), and tail bones of a pine marten were found and interpreted as the remains of a raw hide (Mannermaa et al. 2014; Ukkonen 2003; Vanhatalo 2003; 2005). Also in an inhumation burial in Vanhakartano Cemetery B in Köyliö, southwestern Finland, a skull of a mustelid was found near the deceased’s feet (grave 4, Cleve 1938). Also in Kekomäki grave 1, the red fox, beaver and undefined fur animal remains which were found in a pile of textiles near the deceased’s feet, can be hypothesized as grave-goods. Alternatively, they might be remains of linings in textiles which were piled at the end of the grave.

Domestic animal skins, such as sheep, goat and cattle skins might have been used for the burial of inner structures or for wrapping, too. However, they might also indicate the use of capes similar to the ones which have been found from Scandinavian bogs (see Chapter 2.3.1).

5.1.4.2 Discussion

The above presented results indicate a rather versatile use of skin and fur garments during the Late Iron Age and early historical times. At least fur animals, cervidae, seals, mountain hare, sheep and possibly also other domestic animals were skinned in order to manufacture trousers, coats, mittens and fur shoes. Some of the finds indicate that people in the Finnish mainland and in the Karelian Isthmus followed Scandinavian fashion by wearing capes or tunics which were lined with fur (see Chapter 2.3.1). Also the pulling of beaver guard hair and the valuing of black variants of game reveal evidence of the same.

By contrast, the use of seal and reindeer or European elk skins for garments haven’t been recorded from Scandinavian finds. Instead, especially the finds which have been found from Danish bogs were almost entirely made of domestic animal skins. I suggest that reindeer and seal skin garments give evidence of local or, more convincingly, north-Eurasian and circumpolar ways of using skins for clothing. This doesn’t mean that they were clothed in seal skins from tip to toe. Instead, there is evidence that some traditional skin garments were favoured even after the adapting of new influences from neighbouring populations. For example, anthropologist Peter Jordan (2003, 65, 204) has studied Siberian Khanty who lived on hunting, foraging and (commercial) fur hunting still at the turn of the 21th century. According to Jordan, the adoption of influences from the non-indigenous Russian people was uneven in different social groups so that some persons or groups were more traditional than others. Also, some items were seen as better than the
new products, and Khanty, for example, preferred traditional winter clothing to imported textiles.

Also in the Mukkala Forest Sámi cemetery (Paper III), a careful study of textiles (by Aki Arponen) and skins shows evidence that the find material was a compilation of items acquired by trade (fabrics, metal artefacts), produced by Finnish settlers (knitted socks) and by Sámi (ribbons and their colourants, fur shoes, a fur pouch and wrappings). Also in this case, fur items indicate a long-lasting element in the material culture.

To conclude, I argue that eastern Fennoscandia was situated in between at least two different fur clothing traditions: the Germanic (Scandinavian), which favoured domestic animal skins and fur animal linings, and north-Eurasian, which valued reindeer and seal skin garments, too. For the study of fur garments, a more detailed research of whole burials is needed.

5.2 ANIMAL SKINS AND IDENTITY

In this thesis, the studied animal skin remains indicate that skins were everyday products which were commonly exploited in commemoration rituals. In this Chapter, the world-view behind the burying or cremating animal skins is searched in the interaction between human mind and animal-originated materials. The theoretical basis is presented in Chapter 3.

5.2.1 ANIMAL SKINS FACILITATE TRANSFORMING

5.2.1.1 Wrapping in the Late Iron Age inhumation burials

In this thesis, one of the most important results is the dominance of big game, the skins of which were used especially for wrapping. These results differ from those obtained by osteological analysis, in which European elk and reindeer bones are rare or absent (Kivikero 2011; 2015; Mannermaa & Ukkonen 2017, 163–164, 222–225; Tupala 1999; Vuorinen 2009, 170–176).

In previous research, both the dominance of domestic animal bones (Bläuer 2015; Mannermaa & Ukkonen 2017, 158–170) and the results of palaeoecological investigations (e.g. Alenius 2007; Alenius et al. 2017; Mikkola et al. 2015; Vuorela 1999; Vuorela & Hicks 1996) have stressed the farming way of living (e.g. Lehtosalo-Hilander 1982c, 67–68; Raninen & Wessman 2015, 299, 302–307, 348–349; Uino 1997, 143–164). However, it is generally known that the change from hunting economies to animal husbandry and agriculture was by no means abrupt. The transition in the southern half of Finland took thousands of years, and even longer in the eastern and northern parts of Finland (e.g. Bläuer & Kantanen 2013; Itkonen 1948b, 5–68; Layton 2003, xii in Jordan 2003; Lehikoinen 2008; Taavitsainen 1990; Talve 1980,
Results and discussion 68–71; Voionmaa 1947). The results of this thesis indicate that the change might have been even slower than expected. In the following, I state that in burial rituals the wrapping practices presumably indicated the longevity of a hunting mentality long after having adapted to farming.

I base this argument first, on the origins of wrapping in hunting cultures. The first examples in Northern Eurasia are from the Mesolithic Stone Age, after which animal skins were repeatedly used for wrapping the deceased (see Chapter 5.1.3). It is difficult to confirm the conservativeness of Iron Age death rituals and the continuing of practices which were formed already in hunting-nomad cultures. This would mean that Iron Age rituals would employ even more archaic elements or ideas. However, rituals themselves work as a means of remembering and maintaining traditions (e.g. Fogelin 2007, 58).

Second, I hypothesize that the act of wrapping had its origins in hunting rituals, in which the wearing of a skin helped the hunter to become an animal. Rane Willerslev (2007, 75–76, 109) has interpreted that this ritual was practiced especially in big-game hunting, which demanded close contact with the game animal (also Itkonen 1948b, 18–19; see Chapter 3.1.3.1). In burials, the act of wrapping controlled the liminal stage of death and facilitated the transformation from a human being to an animal-ancestor. This is in line with the worldview in which animals such as bear and reindeer were ex-humans, fore-fathers or relatives (Borić 2013, 52–53; Harvey 2005, 115–116; Holmberg 1922; Itkonen 1948b, 364–366; Jennbert 2011, 198; Losey 2010, 19; Martin 2013, 57; Sarmela 2009, 92–94).

In ethnographic and folkloric sources, humans and animals were seen to have been able to move in and out in each other’s bodies by dressing in each other’s skins (Harvey 2005, 114; Itkonen 1948b, 527; Tarkka 2005, 264; Willerslev 2007, 2). Also, stories about transformations between humans and elks and reindeers are numerous. For example, a famous Kalevalaic poem, known as the Hunting of Elk, tells a story about a hunter, who was pursuing a mythical elk from the underworld, which then transformed into a woman (Siikala 2012, 393). Among the Skolt Sámi, Míentuš, a male god, wanders around as a wild reindeer which sometimes turned into a human being by taking off its furry skin (Montonen 1974, 54; see Paper I). The theoretical basis of this phenomenon, especially the idea of animal skin as a second skin and the fuzziness of identities has been discussed in Chapter 3.

Alternatively, it can be hypothesized that the wrapping of bodies in wild animal skins indicate the presence of a hunter-gatherer people. As stated by Robert Layton (2003, xi-xiv, with references) about the Siberian Khanty, hunter-gatherers did not necessarily die out or change their mode of subsistence when they come into contact with farmers […]. Instead, many developed a symbiotic relationship. Accordingly, the ethnicity and livelihoods of southern Finnish hunting populations have been discussed in Finnish archaeology from the beginning of the discipline, although their material culture has not been identified this far. One possible indicator might be found in Cervidae skins and
birch bark constructions in graves. This kind of interaction has been studied in Sweden and Norway from the 1980s onwards e.g. by Inger Zachrisson et al. (eds. 1997). I presume that this kind of discussion will be dealt in the near future also in Finnish archaeology, as the Sámi traits e.g. in place names (Aikio 2012) and aDNA studies (Lamnidis et al. 2018) have recently paralleled the earlier history research (e.g. Pirinen 1982, 329–330, 1988, 273, 275–281; Taavitsainen 2014, 1074–1075; also Siikala 1992).

5.2.1.2 Cremated bear furs in cemeteries

In Iron Age cremation burials, also the organic material was burnt and this means that soft materials like skins and hairs have been lost almost completely. Thus far, only the 3rd phalanges, i.e. the remains of brown bear and other predator claws, which were attached to skins during cremating, have been preserved for research. The cremating of bear skins links southern Finland with Scandinavian and Continental burials, in which the use of bear skins has been explained as a manifestation of a warrior cult linked to the deity of Odin, and death (Gräslund 2006, 125; Hedeager 2011, 91–95; Pentikäinen 2007, 24; Pluskowski 2006; Price 2002, 366–374).

In Paper II, I have interpreted the cremating of bear skins as a western influence in Finland. First, this hypothesis is supported by the distribution of the phalange sites, which occurred first in the south-westernmost Finland and spread eastwards through time. Second, bear-phalanges have been found from sites which typically evidence contacts or influences from Scandinavian and Central European culture spheres (for contacts see e.g. Raninen & Wessman 2015, 236–238, 253, 268).

Most interestingly, the so-called Fiery Fur verses (Fi. Tulinen turkki) in Kalevala-metric poetry can be connected to the cremating of bear skins. In Fiery Fur verses, a magical garment, a burning skin, was asked from the narrator’s dead parents for protection in war, and before a dangerous journey (Haavio 1967, 332; Siikala 1992, 245–249). Parallel to a fiery fur, also a fiery sword, an iron shirt, or an iron headgear were asked to invoke supra-normal powers (Haavio 1967, 331–333; Siikala 1992, 294–296, 2012, 309). Equally, also Fiery Fur verses have been interpreted as having a Germanic influence on Finnish epic poems (see references in Paper II; also Frog 2013; Siikala 1992, 285–288, 293–296, 2012, 436–437; cf. fylgja e.g. in Hedeager 2011, 82–84).

The Early and Middle Iron Age warrior cult and martial elite identity have been discussed in Finnish archaeology especially by Sirkku Pihlman (1990), Sami Raninen (2005a, 2005b, 2009b; see also Raninen & Wessman 2015), Anna Wessman (2010, 64–66, 111) and Marianne Schauman-Lönnqvist (1996, 1999). In this cultural sphere, the use of predator skins can be interpreted to indicate a zoomorphic transformation, the warrior as a predator. This ideology is familiar to us from the Norse legend of berserkers (etymologically ber, bear and serker, skin or clothe. Cf. wolfserkers), i.e. legendary soldiers who were dressed in bear skins. Although skin-wearing soldiers have been illustrated
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e.g. in helmet-plates in Sweden, this doesn’t mean literally that the soldiers were dressed in skins. Instead, possible interpretations are that the men were fearless and strong as bears, or even that they might have gone berserk, i.e. mad or furious (berserkergang). Most importantly, these men were able to control shapeshifting, the most powerful magic of all (Back Danielsson 2007, 42–43; Gräslund 2006, 125; Hedeager 2011, 93–95; Pentikäinen 2007, 24–25; Price 2002, 364, 366–378; Tolley 2009, 563–569).

In Finland, the cremating of bear skins was a very different tradition compared to the well-known Finno-Ugrian bear tradition, which had its roots on circumpolar bear ceremonialism (e.g. Honko 1993, 120–126; Krohn 1915/2008, 146–164; Pentikäinen 2007, 63–93; Sarmela 2009, 87–88; Siikala 2012, 380–389). The core of the tradition was the idea of the bears' divine origin and its relationship to humans. Consequently, as the bear was reverenced as a divine forefather, its respectful treatment and killing needed to be controlled by a ceremony (e.g. Haavio 1967, 16–41; Itkonen 1948b, 364–366; Krohn 1915/2008, 146–164; Pentikäinen 2007, 65; Sarmela 2009, 79–94; Siikala 2012, 368–370; Tarkka 2005, 272–274; Russell 2012, 52–58, 168–170. For the most recent research, see Piludu 2019).

The slaying ceremony was a ritual drama which began with the killing of the bear in its winter den, and culminated in the ritual wedding of the bear and a maiden, ending by the returning of the bear bones back to the circle of life. This was done by hanging the skull up on a tree, and burying the bones, sometimes in anatomical order, at the foot of the sacred pine (Haavio 1967, 33–35; Holmberg 1915, 49–50; Korhonen 1982b, 96–97; Krohn 1915/2008, 146–164; Pentikäinen 2007, 63–64; Siikala 2008, 140–143; 2012, 368–369, 380–389). Bear graves connected to this tradition have been excavated in Swedish and Norwegian Sámi areas (Jennbert 2003, 142–143 and cited literature; 2011, 111–112; Zachrisson & Iregren 1974), but not in Finland (Äikäs et al. 2009, 118).

However, in eastern and northern Finland the practicing of bear rituals and the burying of bear bones continued until the 17th–19th centuries (Krohn 1915/2008, 146; Krohn 1894/2008, 36–37; Sarmela 2009, 87–88; see also Haavio 1967, 15–16; Holmberg 1915, 43–52; Honko 1993, 132–134; Itkonen 1948b, 364–366; Pentikäinen 2007, 43–92; Siikala 2012, 380–389). Furthermore, the lack of slaughter debris at the settlement sites can be hypothetically explained by the ceremonial bear-slaying.

To conclude, the cremating of predator skins can be interpreted either by a new settlement or a strong influence from the west. It can be hypothesized that the burning of bear skins must have been a powerful act from the point of view of non-Germanic spectators. So, the Finnish territory located at the junction of two bear cults, so-called circumpolar bear ceremonialism and that of a north European bear-warrior cult.
5.2.2 SKINS REPRESENT STATUS AND WEALTH

In Finnish archaeology, the role of east Fennoscandian populations as suppliers of furs for Scandinavian, Central European and Asian consumers is generally accepted (see Chapter 2.4). In this network, furs were valued foremost as exotic and rare products which reflected the high status of the carrier.

In eastern Fennoscandia, furs were not rare nor exotic. Instead, animal skins had use-value as warm garments. They also had trade-in value as they could be exchanged for metals, metal artefacts, and glass beads, maybe also for horses, valuable dogs, fabrics, and food.

In Finnish find material, the evidence of furs as status items is relatively scarce. I base this argument on the low numbers of fur animal (European beaver, lynx, red squirrel, and mustelids) skins in graves. However, this is partly due to taphonomical reasons (see Chapter 4.3.1) and the issue needs to be studied more carefully by examining the find material microscopically as a whole.

However, in the burials listed in Chapter 5.1.4.1, the presence of the rare black variants of furs and the preparing of furs, e.g. by pulling off the coarse hairs, provides evidence of sharing the concepts of beauty with the people, e.g. in Birka, Sweden (Ågren 1993, 1995).

Also, the correlation between fur finds and the estimated wealth of the graves can indicate the high status of fur items. This hypothesis was tentatively tested by comparing the estimated value of graves in Luistari inhumation cemetery in Eura, calculated by Pirkko-Liisa Lehtosalo-Hilander (1982c, 37–46), to the fur finds in burials. As a result, the graves which were accompanied with skin or fur items, clothes or wrappings, seemed to be wealthier than the graves on average. These comparisons are, however, not unproblematic. Most evidently, as the preserving of animal skins and hairs correlates with the presence of metal items, it means that furs can be expected to have been preserved especially in the wealthiest graves.

Finally, the use of skins to cover silver coins and other valuable items can be hypothesized to indicate their value. In this research, pouches and bags which contained silver coins have been excavated from Kappelinmäki in Lappee (grave 17; Laakso 1999), and Luistari in Eura (grave 348; Lehtosalo-Hilander 1982a, 237–240). In Vanhakartano Cemetery C in Köyliö in so-called Trader’s burial (grave XV), a silver coin fragment, weights, and hazelnuts were kept in a birch bark box in a pouch made of reindeer skin (Cleve 1978, 30–31). See Fig. 21. Fur pouches were also used to carry balances and/or weights in Luistari (grave 348), and in Kirkkomäki in Kaarina (graves 19 and 38; Asplund & Riikonen 2007, 29).
To conclude, I claim that fur animal skins represented status only to a minority of the Late Iron Age population. These people were tentatively part of Scandinavian upper class themselves or were in social interaction with them. Also, the use of big game animal skins in the Iron Age death rituals cannot be seen as a uniform phenomenon, instead, there were different fur-using cultures. In this thesis, two traditions were discussed in detail, the Scandinavian warrior-as-a-predator tradition (Paper II), and the Finno-Ugric hunter-ancestor tradition (Paper I).
6 CONCLUSIONS

The study of animal skins and hairs is a specialized field in zooarchaeology. Although the previous research has assumed the decaying of soft skin and fur products in Finnish acidic soils, we have a huge potential left to study. I hope that this thesis will advance the sampling and documenting of tiny hair fragments at the excavations and will advance their preservation and safeguarding in archaeological collections. This will offer new insights for archaeology and raise the value of human and animal hairs as a source of new information about the past.

Based on the foregoing, the following conclusions and recommendations can be made:

**Research question 1**
**How can archaeological fur remains be studied? What information do they provide?**

In this thesis, a pioneering study of Iron Age and historical fur finds from eastern Fennoscandian burial contexts was conducted. The research produced new information about the past human-animal relationships, livelihoods, material culture, rituals, and worldview.

Animal skins are soft organic products the preservation of which is dependent on favourable conditions. This research shows that eastern Fennoscandian inhumation burials can offer favourable conditions for the preservation of animal and human hair keratins. In the Iron Age and historical inhumation burials studied here, favourable conditions were met especially in contact with metals. Particularly the ones which were preserved in contact with bronze and silver were often still identifiable by their morphology. Hairs were also preserved due to specific micro-environmental conditions and could be identified even from the Late Neolithic soil samples.

In cremation cemeteries, the predator 3rd phalanges provide evidence for the cremation of brown bear skins in which the impressive claws were left attached.

In this research, the focus was on the morphological analysis of archaeological hair samples. Morphological identification complements scientific identification methods as a cost-effective and material saving method. The method was applied to the identification of species, fur preparation traditions like pulling, and the qualities of origin animals, such as the colour of the coat.
and the variation in domestic animal hairs. It was also useful on fibres which could not be identified by scientific methods, in this thesis because of their small size, because of the degeneration of DNA or because of the mineralization of hairs. Also, morphological research offered information about the qualities of hairs and fur which cannot be analysed by DNA or by using a mass spectrometer.

However, most archaeological samples had undergone several taphonomic processes, caused especially by bacterial and fungal activity. This has altered the morphology and other qualities of hairs like the preservation of DNA.

**Research question 2**
*What kinds of furs have been discovered in the graves?*

As shown in this thesis, animal skin products formed an integral part in burials as grave goods, garments and burial inner structures. In the Iron Age and medieval period inhumation burials (ca. AD 600–1400), skins were used for wrapping, clothes and artefacts like pouches and bags, sheaths and scabbards. Animal skins were placed in inhumation burials already during the Early Iron Age and as late as during the 17th century AD.

In cremation burials, the 3rd phalanges (claws) provide evidence that brown bear and other predator skins were cremated along with the deceased ca. AD 300–1000. In one case, the cremating of a raw skin has been hypothesized.

In inhumation burials, skins of wild animals, especially those of European elk and (wild forest) reindeer, dominated. This is in contrast with the results obtained by osteological analysis of settlement sites and burials, in which the cervidae bones are rare or absent. Moreover, single lynx, wolf and brown bear skins, most probably from wrappings, were identified. Additionally, seals and mountain hare skins were also used. A minor number of fur animal skins like mustelidae, European beaver, red squirrel and red fox were identified. These skins were interpreted as the remains of clothes, linings, and pouches.

Eastern Fennoscandia was situated in between at least two different fur clothing traditions: Scandinavian and north-Eurasian. In the Scandinavian tradition, fur animal skins were used for linings. In some examples, European beaver furs were treated in the same way as in Birka, by pulling. There is also evidence that the rare black-coloured skins were valued. In the north-Eurasian tradition, reindeer and seal skins were used for garments. This is in contrast with the Scandinavian tradition in which domestic animal skins were preferred.

Christianization ended the tradition of putting animal skins in graves.
**Research question 3**

*Why were the furs placed in the graves?*

This research showed that animal skins were an important element in death rituals throughout the Iron Age and early medieval period.

Skins were used for clothes against the cold. In burials, they hypothetically reflect garments which the deceased used during his/her lifetime.

Skins were also used for their aesthetic value and status. Especially accessories and clothes made of fur animal skins were valued in Iron Age Europe. In eastern Fennoscandian burials, fur animal garments were relatively rare and they were probably used by those in social interaction with the Scandinavian ruling elite. Also the pulling of European beaver furs and the selecting of black-furred animals raised the aesthetic/status value of furs.

In burials, the ritual of wrapping the deceased in wild-animal skins hypothetically facilitated his/her transformation from the living to the realm of the dead and the ancestors. This tradition was interpreted to indicate the importance of hunting and the unbroken continuity of a hunting mentality among Iron Age and historic-period populations. This is in contrast with previous research which has emphasized the farming way of life. Hypothetically, it can also indicate e.g. intermarriages between agrarian and mixed economy populations.

In cremation burials, the cremating of brown bear or other predator skins was interpreted to reflect the warrior-identity of the deceased. This tradition was most evidently of Scandinavian origin.

**Research question 4**

*What are the recommendations for future research?*

In the field, all metal finds should be handled with ultimate care as they might have microscopic fibres bound to their surfaces. This is important for metal detector finds, too.

In many cases, skin tissues decay in our acidid soils and only clumps of hairs are preserved. This phenomenon makes difficult the identification and interpretation, as such a clump may be a mixture of hairs from several species. Most importantly, it causes problems at the excavations when single hairs are difficult to recognize, collect, and document properly. For this reason, it is important to study inhumation burials in a laboratory. If the burial cannot be studied in a laboratory, a careful sampling of all organic materials is crucial.
The collecting of soil samples for microarchaeological analysis from contexts where skins might have existed, is recommended.

In conservation, a careful sampling of hairs and other organic materials from metal artifacts and corrosion crusts is recommended to be completed before conservation. Also, a careful documenting of negative casts of hairs and other organic materials during the conservation is recommended.

The morphological identification needs to be done by using reference samples from local animal species. For the identification of domestic breeds, the reference samples collected from local (indigenous) specimens is recommended.

Human scalp hairs should be treated with the same respect as other human remains.

The analysed sample slides need to be archived in museum collections to avoid multiple sampling.

For the sampling, documentation, identification and archiving of animal and human hairs and skins, instructions and best practices for researchers have been formulated in wildlife forensics (see Scientific Working Group for Wildlife Forensics (SWGWILD) 2012), forensic sciences (Wilson et al. 2001; see also Tridico et al. 2014a), and conservation and taxidermy collections (Conservation Centre 2014; ICOM Working Group undated a; undated b). In archaeology, most of these instructions can be applied on archaeological materials, too.

Final summary

As shown in this thesis, animal-skin products formed an integral part in burials as grave goods, garments and burial inner structures. Skins were used for wrapping, clothes and artefacts like pouches and bags, sheaths and scabbards. In inhumation burials, skins of wild animals, especially those of European elk (Alces alces) and (wild forest) reindeer (Rangifer tarandus), dominated. Moreover, single lynx, wolf (Canis lupus) and brown bear skins, seals (Phocidae) and mountain hare (Lepus timidus) skins, were identified. A minor number of fur animal skins like mustelidae, European beaver (Castor fiber), red squirrel (Sciurus vulgaris) and red fox (Vulpes vulpes) were also used. The skins of domestic animals were in the minority.

In burials, the ritual of wrapping the deceased in wild animal skins hypothetically facilitated his/her transformation from the living to the realm of the dead and the ancestors. This tradition was interpreted to indicate the importance of hunting and the unbroken continuity of a hunting mentality.
among Iron Age and historic period populations. In cremation burials, the cremating of brown bear or other predator skins was interpreted as reflecting the warrior-identity of the deceased. This tradition was most evidently of Scandinavian origin.

Naturally, skins were used for clothes against the cold. In burials, fur garments hypothetically reflect garments which the deceased used during his/her lifetime. Skins were also used for their aesthetic value and status. Especially accessories and clothes made of fur animal skins were valued in Iron Age Europe.

For future research on animal fibres, recommendations were made for the handling of finds and samples. In the field, all metal finds should be handled with ultimate care as they might have microscopic fibres bound to their surfaces. This is important for metal detector finds, too. Also, if the burial cannot be studied in a laboratory, a careful sampling of all organic materials is crucial. The collecting of soil samples for microarchaeological analysis from contexts where skins might have existed, is recommended.
7 REFERENCES

7.1 UNPUBLISHED SOURCES


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Tieteen termipankki Folkloristiikka: rituaali.


7.2 LITERATURE


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References


Iron Age and medieval / historical burial sites on the Finnish mainland and Karelian Isthmus studied in this thesis. The numbers at the end of each description refer to the distribution map. Sources: Kulttuuriperinnön palveluikkuna (En. Cultural Heritage Database), the Finnish Heritage Agency. Ancient Karelia. Archaeological studies by Pirjo Uino (1997) was used for sites which are from the Karelian Isthmus, Russia. The datings are based in most cases on artefact typology and should be considered as suggestive, only.

<table>
<thead>
<tr>
<th>site</th>
<th>cemetery type</th>
<th>dating (AD)</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anivehmaanmäki in Yläne</td>
<td>inhumation cemetery</td>
<td>9–11th centuries</td>
<td>In the 1950s, 83 graves were studied at this Viking Age site. The female grave XLI was covered with birch bark and probably with Cervidae skin (Hirvluoto 1956). The studied material included only pseudomorphs in a corrosion crust (no sample).  Map = site 21.</td>
</tr>
<tr>
<td>Cemetery A (Luodonpää), Vanhakartano in Köyliö</td>
<td>inhumation cemetery</td>
<td>6–8th centuries</td>
<td>At this Migration period site, 21 inhumation burials, one cremation burial and one cremation pit burial have been excavated. Thus far, fur remains have been detected in contact with a sword scabbard (NM 8723;1190).  Map = site 18.</td>
</tr>
<tr>
<td>Cemetery C (Lailin kalmisto), Vanhakartano in Köyliö</td>
<td>inhumation cemetery</td>
<td>10–11/12th centuries</td>
<td>At this site, 60–70 graves have been destroyed (NM 8602, 8613) or excavated (NM 8602A, 8723). Many of the burials were richly furnished and covered with birch bark, hay, and leaves. Fur remains were catalogued in 16 finds from ten burials. The deceased were reported to have been wrapped in Cervidae skins (Cleve 1978, 82), and in the analysis report by V.A. Korvenkontio (1927) the samples taken from grave 17 were identified as Cervidae. Some of the slides were archived at FHA and in these badly preserved samples only a possible identification of cattle could be made. In general, the hair material from Cemetery C was badly preserved, and some of the hair finds were corroded or removed. As a result, in total 16 samples were analysed, of which 7 samples were identified as being Cervidae (from two graves) and one as possibly being Bovidae (old sample slides).  Map = site 19.</td>
</tr>
<tr>
<td>Hiidenmäki in Jämsä</td>
<td>cremation cemetery under level ground</td>
<td>9–11th centuries</td>
<td>The burials have been made on the small terraces and holes of a cliff. Also the pyre site was discovered at the site. The find material included e.g. horse gear, and the osteological analysis, made by Niklas Söderholm in 2002, resulted in 14 brown-bear 3rd phalange identifications. Additionally, human and dog bones were identified.  Map = site 28.</td>
</tr>
<tr>
<td>Humikkala in Masku</td>
<td>inhumation cemetery</td>
<td>11–13/14th centuries</td>
<td>The Crusade period site is famous for its richly furnished graves. The total number of burials is ca. 56. Next to the site, a cremation cemetery under level ground has been detected. Animal skin remains were found from 8 graves, and they consist of Cervidae and sheep skins and brushes made of pig bristles.  Map = site 11.</td>
</tr>
<tr>
<td>Illinsaari 2 in Ii</td>
<td>inhumation and cremation cemetery</td>
<td>12–13th centuries</td>
<td>Illinsaari was discovered in 2011, when an oval tortoise brooch with animal hairs (NM 38884:1), identified later as seal hairs, was found on the river bank. During the preceding excavations, a piece of animal fur was found from the soil samples taken from a cremation burial (Kuusela 2013, 19).  Map = site 39.</td>
</tr>
<tr>
<td>Isoriihenmäki in Salo</td>
<td>cremation cemetery under level ground</td>
<td>7/9–11th centuries</td>
<td>The site is situated on the top of a bank facing towards the river depression. The first finds were made in the 1930s. Mikael Fortelius (1980) has analysed the material excavated in 1972, and identified four brown-bear 3rd phalange together with human and dog bones.  Map = site 12.</td>
</tr>
<tr>
<td>Kaavontönkkä in Vaasa</td>
<td>cremation cemetery under level ground and two cairns</td>
<td>5–11th centuries</td>
<td>At the site, also remains of a boat burial have been identified. The Skogens Kulturarv i Kvarkenregionen project investigated the site and made analyses from the find material. One bone was radiocarbon dated to the Viking Age. The osteological analysis was made in 2013 by Katarina Ourinen, who identified six brown-bear 3rd phalange fragments together with human and Phocidae bones. Most of the bear bones were discovered from a sieve, so their exact contexts are not known.  Map = site 36.</td>
</tr>
<tr>
<td>Kalmumäki in Uusikaupunki</td>
<td>cremation cemetery under level ground</td>
<td>7–12th centuries</td>
<td>Besides cremation burials, two inhumation burials and a boat burial are also known from the site. The site has been excavated in several phases. Osteologist Pirjo Lahtiperä (1975) has analyzed material from Kalmumäki and she has identified brown-bear 3rd phalanges from it. There is no further information about the number, context or quality of the bones.  Map = site 1.</td>
</tr>
<tr>
<td>Kalomäki 2 in Hämeenlinna</td>
<td>cremation cemetery under level ground (and inhumation burials)</td>
<td>7–11th centuries</td>
<td>Besides cremation burials, inhumation burials and a settlement site are also known from the site. Osteologist Pirjo Lahtiperä (1975) has analyzed material from Kalomäki 2 and she has identified brown-bear 3rd phalanges from it. There is no further information about the number, context or quality of the bones.  Map = site 26.</td>
</tr>
<tr>
<td>Site Name</td>
<td>Cemetery Type</td>
<td>Period</td>
<td>Notes</td>
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<tr>
<td>Kappelinmäki in Lappeenranta</td>
<td>Inhumation</td>
<td>12–16th centuries</td>
<td>In Kappelinmäki, over 300 graves have been detected, both furnished and more recent, unfurnished ones. The site is of importance as it clarifies the Christianization process in eastern Finland. From this site, three pouch remains, which were made of fur, were analyzed. Map = site 35.</td>
</tr>
<tr>
<td>Kirk(ka)ilanmäki in Hollola</td>
<td>Inhumation</td>
<td>12–15th centuries</td>
<td>Most of the site's over 130 graves were unfurnished. On the top of inhumations, even tens of cremation burials were made. From this site, Cervidae hairs were detected from grave 14, a part of which was excavated at a laboratory. The hairs were found in contact with a 14th-century belt. Map = site 29.</td>
</tr>
<tr>
<td>Kirkkomäki in Kaarina (Turku)</td>
<td>Inhumation</td>
<td>11–12th centuries</td>
<td>In Kirkkomäki, 43 burials have been investigated thus far. Part of the burials were excavated in a laboratory, resulting in excellent information about textiles and fur remains. From this site, fur remains were found from 17 graves. Many of the burials were furnished by Cervidae skins, and remains of red squirrel, undefined fur animal, badger, Phocidae, Carnivora, sheep, and cattle skins were found. Fur was used for knife sheaths, pouches, and clothes. Map = site 10.</td>
</tr>
<tr>
<td>Kirkkonylä in Konginkangas</td>
<td>Inhumation</td>
<td>12/14th centuries?</td>
<td>A few items were excavated in 1914 in Konginkangas. One of them was a piece of Cervidae skin (NM 6709:16), the precise context of which is unknown. Map = site 38.</td>
</tr>
<tr>
<td>Kekomäki in Kaukola</td>
<td>Inhumation</td>
<td>12–13th centuries</td>
<td>Kekomäki is located on the Karelian Isthmus, today in Russia. Theodor Schwindt excavated six richly furnished graves at the site in 1886 and 1888. Textiles as well as fur fragments were relatively well preserved. From graves 1 and 3 (multiple burials), remains of cervidae, red fox, brown bear, Phocidae, European beaver, undefined fur animal, mountain hare, and red squirrel were identified. Map = site 40.</td>
</tr>
<tr>
<td>Korvala in Sauvo</td>
<td>Inhumation</td>
<td>1–3rd centuries</td>
<td>Korvala is famous for its tarand and stone-cist graves, interpreted as Baltic influence in southern Finland. This richly furnished site has been excavated in 1997–1999 and 2001. From burial 22, pseudomorphs of hairs have been observed on the surfaces of an axe and a spearhead (NM 31522:15, 16). Map = site 43.</td>
</tr>
<tr>
<td>Kylämäki in Laitila</td>
<td>Cremation</td>
<td>7–11th centuries</td>
<td>Five brown-bear 3rd phalanges were excavated in the 1960s by Pirkko-Lisa Lehtosalo-Hilander (1964). She interpreted that the claws were found in the same context with a sword blade and a scramasax. The find has also been mentioned by Ella Kivikoski (1965). Map = site 4.</td>
</tr>
<tr>
<td>Kärsämäki in Maaria (Turku)</td>
<td>Cremation (pit and urn burial) cemetery</td>
<td>1–4/7th centuries</td>
<td>Kärsämäki is an important site as it has given its name to Kärsämäki–type cemeteries. From this site, in total 75 burial structures have been investigated, both inhumation and different kinds of cremation burials. According to Ella Kivikoski (1965, 27), five brown-bear 3rd phalanges have been found from the site. Pirjo Lahtiperä has analysed the bone material from the site in her MA thesis in 1973. She has identified &quot;several&quot; brown-bear 3rd phalanges from three burials which date, according to the artefact typology, to the Early and Late Iron Ages (ca 0–300/350 AD). Map = site 6.</td>
</tr>
<tr>
<td>Käräjämäki in Kokemäki</td>
<td>Cremation</td>
<td>5–7th centuries</td>
<td>The Migration period burials have been mixed with the underlying Stone Age settlement site layers. Moreover, a court stone ring has been recorded at the site (the name of the site is literally &quot;Court Hill&quot;). Kristiina Mannermaa has analysed part of the bone material from the site in 2001, and she has identified 7 brown-bear 3rd phalanges from the material. Also a Phocidae 3rd phalange was identified, which might indicate the cremating of seal skin along with the deceased. Additionally, human, bird, fish, sheep, cattle and pig bones were identified. However, some of the bones might be from the Stone Age contexts. Map = site 20.</td>
</tr>
<tr>
<td>Latokallio in Mikkeli</td>
<td>Cremation</td>
<td>11th century</td>
<td>The burials are situated on the slopes and in the holes of a cliff. Unfortunately, many of the finds were unearthed unprofessionally by local workmen. Pirkko Ukkonen has identified two brown-bear 3rd phalanges from the material in 1993. Map = site 32.</td>
</tr>
<tr>
<td>Site Name</td>
<td>Cemetery Type</td>
<td>Period</td>
<td>Notes</td>
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<tr>
<td>Luistari in Eura</td>
<td>Inhumation cemetery</td>
<td>6–14th centuries</td>
<td>With its over 1300 excavated burials, Luistari is the best studied inhumation cemetery in Finland (Lehtosalo-Hilander 1982a-c; 2000). Animal hairs and feathers were detected from 23 burials (13% of the furnished graves) of the material which was excavated in 1969–1979. From that material, hairs from Cervidae, sheep, cattle, European beaver, brown bear, lynx, wolf, red fox, and badger as well as bird feathers were identified. A systematic study of all organic materials and corrosion crusts, as well as the study of the burials excavated after 1979, would offer new information for the study of animal fibres. Map = site 17.</td>
</tr>
<tr>
<td>Merola in Lieto</td>
<td>Cremation cemetery under level ground</td>
<td>5–11th centuries</td>
<td>The site has been excavated in 1930–1931, 1935 and 1980. Osteologist Pirjo Lahtiperä (1975) has analysed material from Merola and she has identified brown-bear 3rd phalanges from it. There is no further information about the number, context or quality of the bones. Map = site 9.</td>
</tr>
<tr>
<td>Mikkola in Ylöjärvi</td>
<td>Inhumation (and cremation) cemetery</td>
<td>11–14th centuries</td>
<td>The Crusade period inhumation burials were made on the top of the preceding cremation cemetery under level ground. The site was excavated first in the 1890s and later in 1959–1987. Fur remains were catalogued in two of the ca. 17 graves. In grave 2/1972, the distribution of finds was unusual. Map = site 22.</td>
</tr>
<tr>
<td>Mujanvainio in Laihia</td>
<td>Cremation cairn cemetery</td>
<td>Iron Age</td>
<td>In Mujanvainio, several cairns were excavated already in the 1930s. In the 2010s, the Skogens Kulturarv i Kvarkenregionen project investigated the site and made analyses from the find material. C14-dated graves 1 and 3a gave the results to the Early Iron Age and Merovingian Period (Koivistö et al. 2016). Out of the 8 cairns, two of them included brown-bear phalange fragments possibly in total from two claws. The osteological analysis was made by Katriina Nurminen in 2013. Map = site 37.</td>
</tr>
<tr>
<td>Mukkala in Savukoski</td>
<td>Inhumation cemetery</td>
<td>17th century</td>
<td>The Mukkala Forest Sámi burial ground consists of eight excavated inhumation burials and 1–2 near-by shaman burials which date to the beginning and middle of the 17th century. The site was excavated by Jorma Leppäaho in the 1930s. Since its discovery, Mukkala is of importance as one of the few excavated Sámi burial grounds. According to Leppäaho, animal skins were used for wrapping or as shrouds in five burials and remains of fur shoes were recorded in all graves. However, Leppäaho sampled wrappings from three graves, in which reindeer and brown bear were identified. Additionally, the fur-shoes were identified as elk leg/head skin, and a pouch as fur animal skin. Map = site 44.</td>
</tr>
<tr>
<td>Osmanmäki in Eura</td>
<td>Inhumation (and cremation) cemetery</td>
<td>6–13th centuries</td>
<td>Osmanmäki is part of the Käräjämäki-Osmanmäki complex which is valued for its cremation pit burials, burial mounds, inhumation burials, and a court stone ring. The rich textile and fur remains were catalogued already over a hundred years ago. Fur remains were catalogued from 13 contexts. Unfortunately, most of them had disappeared. From the remaining hairs, sheep was identified. Map = site 15.</td>
</tr>
<tr>
<td>Pappilanmäki in Eura</td>
<td>Inhumation cemetery</td>
<td>7–13/14th centuries</td>
<td>The site is famous for its luxurious Merovingian ring-sword. Cervidae hairs were found in a female grave XIV, which was covered with birch bark. Besides this, pig bristles from brushes were found from two graves. Some samples could not be identified by their morphology. Map = site 16.</td>
</tr>
<tr>
<td>Pappilanmäki in Raisio</td>
<td>Cremation cemetery under level ground</td>
<td>9–11th centuries</td>
<td>The cultural layer covers the hill and for example, two boat burials have been excavated at the site. Osteologist Pirjo Lahtiperä (1975) has analysed material from Pappilanmäki and she has identified brown-bear 3rd phalanges from it. There is no further information about the number, context or quality of the bones. Map = site 8.</td>
</tr>
<tr>
<td>Patja in Sakkola</td>
<td>Inhumation cemetery</td>
<td>12–14th centuries</td>
<td>Patja is located on the Karelian Isthmus, today in Russia. At this site, approximately 70 burials, most of them destroyed by treasure hunting, have been detected. Fur remains were catalogued from two burials and a stray find, one of them identified as Cervidae. Map = site 42.</td>
</tr>
<tr>
<td>Pukkisaari in Jaala</td>
<td>Cremation cemetery under level ground</td>
<td>8–11th centuries</td>
<td>Pukkisaari is a multiperiodal and multifunctional site, in the same island also as Late Neolithic and Early Metal Period settlement sites have been investigated. The cremation cemetery represents a variation which has no stone structures. Kati Salo has analysed the bone material in 2005, and she has identified 13 brown-bear 3rd phalanges, which originated from a concentration of human (possible male) bones, metal finds and soot. Map = site 31.</td>
</tr>
<tr>
<td>Site</td>
<td>Type</td>
<td>Period</td>
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<tr>
<td>Päiväniemi in Lempäälä</td>
<td>cremation cairn cemetery</td>
<td>7–9th centuries</td>
<td>The site was excavated for the first time in the 1860s and since then it has been the subject of several investigations. Thus far, almost 20 cairns out of the 130 structures have been excavated. The site has been in use for several centuries, although most of the material has been dated to the Merovingian period. Tarja Formisto has analysed the bone material which was excavated in 1987. She identified four brown-bear 3rd phalanges together with human bones. Map = site 24.</td>
</tr>
<tr>
<td>Riihimäki in Hämeenlinna</td>
<td>cremation cemetery under level ground</td>
<td>9–11th centuries</td>
<td>The site is multiperiodic and multifunctional with an adjacent settlement site. Niklas Söderholm (1998) has investigated part of the bone material of the site and he has reported two brown-bear 3rd phalange fragments at the site. Besides human bones, also bones of a dog and a cat were identified. Map = site 27.</td>
</tr>
<tr>
<td>Rikala in Halikko</td>
<td>inhumation cemetery</td>
<td>11–14th centuries</td>
<td>This multiperiodic and multifunctional site has been excavated in several phases. In the area, a multiperiodic settlement site, cup stones, and cemeteries have been detected. From the Crusade period inhumation cemetery, ca. 50 burials have been excavated. Additionally, several graves have been destroyed by construction activities. At this site, the rich metal finds have preserved textiles and fur remains. Fur finds were catalogued from three burials (Cervidae, red fox/Mustelidae). Map = site 13.</td>
</tr>
<tr>
<td>Rukoushuone - Kansakoulunjärvi in Laitila</td>
<td>cremation cemetery under level ground</td>
<td>5–7th centuries</td>
<td>From this site, 20 brown-bear 3rd phalanges have been identified. Sari Mäntylä-Asplund and Jan Storå (2010) radiocarbon dated one of the bones, which resulted in a Migration/Merovingian period dating, of 430–620 cal. AD (UA-36963). Map = site 13.</td>
</tr>
<tr>
<td>Ristikari in Turku</td>
<td>cremation cemetery under level ground</td>
<td>7–11th centuries</td>
<td>Ristikari I–II is a complex with two cremation cemeteries under level ground I and IIIB), inhumation cemetery (IIC) and remains of buildings (IIA). Also, remains of a boat burial have been recorded. Osteologist Pirjo Lahtiperä (1975) has identified brown-bear 3rd phalanges in material that she has analysed from Ristikari. There is no further information about the number, context or quality of the bones. Map = site 7.</td>
</tr>
<tr>
<td>Rukoushuone - Kansakoulunjärvi in Laitila</td>
<td>cremation cemetery under level ground</td>
<td>5–11th centuries</td>
<td>The area has been under intensive use from the 2nd century AD onwards. The cremation burial ground has covered over 2000 square meters, and the place is well known also for its Untamala-type burial mounds. Osteologist Pirjo Lahtiperä (1975) has identified brown-bear 3rd phalanges in material that she has analysed from Kalomäki 2. There is no further information about the number, context or quality of the bones. Map = site 5.</td>
</tr>
<tr>
<td>Skinnari in Nastola</td>
<td>cremation cemetery under level ground, possibly also a cairn</td>
<td>9–11th centuries</td>
<td>The finds and bones were excavated from the holes of a small cliff. The corpses were evidently pyred at the site. Tarja Formisto has identified human bones and two brown-bear 3rd phalanges from the material in 2002. Map = site 30.</td>
</tr>
<tr>
<td>Tontinnäki in Reisäla</td>
<td>inhumation cemetery (one cremation burial)</td>
<td>12–14th centuries</td>
<td>Tontinnäki is located on the Karelian Isthmus, today in Russia. The site is famous for its smithy workshop remains. At the cemetery, ca. 26 burials have been detected. Fur remains were catalogued from two female burials, neither of which were preserved for study. In grave 3/1886, the find was interpreted as the remains of shoes (NM 2491:52), possibly of fur shoes. Map = site 41.</td>
</tr>
<tr>
<td>Toppolamäki in Valkeakoski</td>
<td>inhumation cemetery</td>
<td>12–14th centuries</td>
<td>In Toppolamäki, ca. 10 burials have been destroyed by the hauling of sand, of which two finds containing hairs were reported. NM 10461:5 was identified as human hairs. The find NM 10461:1 was a pennannular brooch, on the surface of which pseudomorphs of animal hairs were preserved. Map = site 25.</td>
</tr>
<tr>
<td>Tuukkala in Mikkeli</td>
<td>inhumation cemetery (and cremation burials)</td>
<td>13–15th centuries</td>
<td>Tuukkala is famous for its richly furnished burials and textile remains. The total number of graves is difficult to estimate, as many burials were destroyed by construction works at the end of the 19th century. The number of excavated burials is over 50. Two of the burials were excavated partly at a laboratory. From Tuukkala, fur remains were catalogued from six burials. As a result, Phocidae, Cervidae and sheep/goat were identified. Reindeer skin was also used for clothing. Map = site 33.</td>
</tr>
<tr>
<td>Site Name</td>
<td>Type of Cemetery</td>
<td>Date Period</td>
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<tr>
<td>Vainionmäki A in Laitila</td>
<td>cremation cemetery under level ground</td>
<td>7–9th centuries</td>
<td>The site is located in Vainionmäki, where also other burial sites and a settlement site are known (sites B-D). The Merovingian period cemetery has been excavated in 1986–1994. In this cemetery, at least 25 individuals have been buried. Tarja Formisto (1996, 84) has analyzed the bone material of the site and she has identified 11 brown bear phalanges. Map = site 2.</td>
</tr>
<tr>
<td>Vainionmäki B in Laitila</td>
<td>cremation cemetery under level ground</td>
<td>9–11th centuries</td>
<td>The site is located in Vainionmäki, where other burial sites and a settlement site are also known (sites A, C-D). B-site has been excavated many times during the 21st century. Kati Salo has analysed the bone material from one excavation in 2005, and she has identified one brown-bear 3rd phalange fragment together with human and dog bones. Map = site 3.</td>
</tr>
<tr>
<td>Vilusenharju in Tampere</td>
<td>inhumation cemetery</td>
<td>11–13th centuries</td>
<td>The site was discovered by the hauling of sand, which had destroyed the site's inhumation and cremation burials almost completely. The finds were discovered by sieving the sand masses and by buying the finds from local collectors. Additionally, almost 50 burials were excavated, some of which were partly destroyed. All considered, the site's textile and fur finds are remarkable. Fur finds were catalogued from 7 burials and from two disturbed contexts. The material consists of Cervidae, mountain hare, Phocidae, and sheep skins. Map = site 23.</td>
</tr>
<tr>
<td>Vilusenharju in Tampere</td>
<td>cremation cemetery under level ground</td>
<td>10–11th centuries</td>
<td>Cremated bones and artefacts were collected from disturbed land masses and from the filling of inhumation burials. The bone material was analysed by Pirjo Lahtiperä (1978, 10, table 1), who identified in total 53 brown-bear 3rd phalanges from the site. Map = site 23.</td>
</tr>
<tr>
<td>Visulahti in Mikkeli</td>
<td>inhumation cemetery (and cremation burials)</td>
<td>12–14th centuries</td>
<td>At this site, 28 inhumation graves, five cremation burials and two unburned bone concentrations were excavated. Animal hairs were reported from one burial, which was not sampled. Map = site 34.</td>
</tr>
<tr>
<td>Yliskylä in Perniö</td>
<td>inhumation cemetery (and a cremation burial)</td>
<td>12–14th centuries</td>
<td>At this site, 11 inhumation burials and a cremation burial under a low mound (an Early Iron Age boat burial) was excavated already at the end of the 19th century. Animal hairs were catalogued in five finds. Some of these hairs have disappeared, probably along with conservation. From the remaining fibres, Phocidae and possible lynx hairs were identified. Appelgren-Kivalo (1907) has interpreted the hairs as remains of a skin on which the deceased were laid to rest. Map = site 14.</td>
</tr>
</tbody>
</table>

1) Kalmumäki in Uusikaupunki
2) Vainionmäki A in Laitila
3) Vainionmäki B in Laitila
4) Kylämäki in Laitila
5) Rukoushuone - Kansakoulumäki in Laitila
6) Kärsämäki in Maaria (Turku)
7) Ristimäki in Turku
8) Pappilanmäki in Raisio
9) Merola in Lieto
10) Kirkkomäki in Kaarina (Turku)
11) Humikkala in Masku
12) Isorihenniä in Salo
13) Rikala in Halikko
14) Viskylä in Perniö
15) Osmanmäki in Eura
16) Pappilanmäki in Eura
17) Luistari in Eura
18) Cemetery A, Vanhakartano in Köyliö
19) Cemetery C (Lallin kalmisto), Vanhakartano in
20) Käräjämäki in Kokemäki
21) Anivehmaanmäki in Yiäne
22) Mikkola in Ylöjärvi
23) Vilunenharju in Tampere
24) Päivääniemi in Lempäälä
25) Toppolanmäki in Valkeakoski
26) Kalomäki 2 in Hämeenlinna
27) Riirimäki in Hämeenlinna
28) Hiidenmäki in Jämsä
29) Kirk(k)jallanmäki in Holloba
30) Skinari in Nastola
31) Pukkisaari in Jaala
32) Latokallio in Mikkeli
33) Tuukkala in Mikkeli
34) Visulahti in Mikkeli
35) Kappelinmäki in Lappeenranta
36) Kaavontönkkä in Vaasa
37) Mujanvainio in Lahti
38) Kirkonkylä in Konginkangas
39) Ilinsiäri 2 in Ii
40) Kekomäki in Kaukola
41) Tontinmäki in Raisalä
42) Patja in Sakkola
43) Korvala in Sauvo
44) Mukkala in Savukoski
45) Mukkala in Savukoski