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Pairs of Stockings: Materials, Craft Methods, and Usefulness in Pre-Modern Burial Legwear

Suomalainen 1600–1800-lukujen hauta-asu voidaan jakaa kahteen kategorian: (1) ihmisten elämänsä aikana käyttämiin esineisiin, jotka ovat saaneet uuden merkityksen hautavaatteina, ja (2) käytetyistä materiaaleista tehtyihin esineisiin, jotka on valmistettu erikseen hautaamista varten. Vaikka näillä on näennäisesti sama merkitys, uudelleen käytetyt asun osat ovat olleet käyttökelpoisia, kun taas uudelleen tehty asun osat ovat usein vähemmän käyttökelpoisista materiaaleista kiireessä vainajan yllä aseteltuja. Herää kysymys siitä, onko vainajalle tehdyillä vaatteilla käytännöllinen vai symbolinen merkitys. Jotkin asun osat, kuten hautapaidat, ovat usein uudelleen tehtyjä, kun taas toiset, kuten sukat, voivat olla joko hautausta varten tehtyjä tai uudelleen käytettyjä. Tässä artikkelissa keskitytään sukkiin.

Tutkimuksen kohteena ovat Hailuodon kirkon ja Oulun tuomiokirkon kaivauksilta löytyneet sekä Haukiputaan kirkon kirkkohautoissa yhä olevat sukat. Sukkamateriaalivalintojen pohdinnan jälkeen huomio kiinnittyy sukkien valmistusmenetelmiin sekä sukkien ominaisuuksiin. Näiden ominaisuuksien eroavaisuudet tuovat selkeästi esiin tekstiilien käytön, uudelleenkäytön ja uudelleen tekemisen moninaisuuden sekä vastauksia kysymyksiin siitä, mitä vainajan hautavaatteen tekeminen on tarkoittanut symbolisella ja käytännöllisellä tasolla.

Yleisesti sukat osoittavat, että vaatetuksen valinta hautausta varten oli symbolinen teko ennemmin kuin viite siitä, että vainajan haudassa viihtymisestä tai lämpimänä pysymisestä olisi oltu aidosti huolissaan. Sekä uudelleen tehty että uudelleen käytetyt esineet kertovat siitä, miten kuolleita surtiin ja miten heidät muistettiin. Siinä missä uudelleen käytettyihin esineisiin liittyy vainajaan liittyviä muistoja, uudelleen tehtyihin esineisiin liittyy muistoja itse suruprosessista sekä liittyen siihen, miten rakkaalle ihmiselle on tehty hautavaatteita.

Par av strumpor: material, hantverksmetoder och funktionalitet i fotbeklädnaderna i förmoderna svepningar

Finländska svepningar gjorda mellan 1600- och 1800-talen kan delas in i två kategorier: (1) återanvända ting använda i det dagliga livet och sedan som svepningar, och (2) omgjorda ting tillverkade av andrahandsmaterial specifikt för graven. Trots att de till synes uppfyller samma funktion, bibehåller återanvända ting sin funktionalitet, medan omgjorda ting ofta är hastigt sammansatta av mindre passande material, vilket väcker frågor kring omsorgen av den döda på praktiska kontra symboliska plan. Somliga ting såsom svepningskappor är konstant omgjorda medan andra kategorier såsom strumpor innehåller både omgjorda och återanvända ting. Fokuset här är på strumporna.

Artikeln tar upp strumpor identifierade genom grävningar på Hailuoto kyrka och Uleåborgs katedral samt inventarier på Haukipudas kyrka. Först behandlas de valda materialen, och sedan de tillämpade hantverksmetoderna och de resulterande egenskaperna rörande strumpornas funktionsduglighet. Skillnaderna understryker flexibiliteten i hur tyg användes, återanvändes och återskapades förr i tiden samt vad det innebär att försörja den döda på symboliska och praktiska plan.

På det stora hela indikerar dessa ting att valet av kläder för den döda representerade en symbolisk akt snarare än en verklig hänsyn för den dödes värme och bekvämlighet. Både återanvända och omgjorda ting vittnar om hur de levande sörjer och kommer ihåg den döda. Medan återanvända ting bär på minnen av den avlidna under dennes liv, bär omgjorda ting på minnen av förberedandet av en närstående för begravning och sorgeprocessen.

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Introduction

Finnish burial clothing from the 17th to 19th centuries can be divided into two categories: (1) repurposed items used in life then used as burial clothes, and (2) remade items crafted from second-hand materials specifically for burial. While repurposed items could ideally still take the wear-and-tear of daily use and can include features like ties, laces, hooks, or buttons (Grömer & Ullermann 2020), remade items are intended only for burial. This paper explores the impacts of industrialization and handcrafting professionalism on textile materials, while also considering the role of the cottage industry during this period, beginning with the materials selected, through the crafting methods, and the legwear's resulting performance characteristics. Additionally, this also speaks to the mourning process, and asks what these items may have meant for the family as they prepared a loved one for burial.

Textile analysis helps distinguish between these two categories (Strand et al. 2010: 159; Rast-Eicher 2016: 65), and different performance characteristics expected for an item during an individual's life (i.e., "stockings are warm and well-fitted"), versus items remade for burial from less suitable materials (Buchli 2007: 180; Sillar & Tite 2000; Trigger 2006: 451; Ruhl 2020; 2023). In addition to the legwear considered here, these burials also generally include "false" robes, crafted from recycled material to resemble fashionable clothing and pinned into the coffin lining (Kuokkanen & Lipkin 2011: 150). Many burials also include a cap, and a few include gloves too (Lipkin et al. 2021a). A two- to three-week gap

between death and burial for adults and week-long delay for children in conjunction with open coffins during funerals meant that much of the burial clothing was visible to the wider community (Hagberg 1937: 227; Åhrén Snickare 2002: 130; Lipkin 2020; Lipkin et al. 2021a).

The legwear considered originate from two sources: the churchyard burials of Oulu Cathedral, and the more-privileged below-church burials of Hailuoto and Haukipudas. Below-church burials were generally reserved for clergy, nobility, and eventually those who could afford the higher burial fee (Table 1, Alakärppä & Paavola 1997: 3; Sarkkinen & Kehusmaa 2002: 4; Niskala 2005: 140; Núñez et al. 2008: 123; 2011: 95–96; Lipkin et al. 2015: 209; Väre et al. 2015; Väre 2017: 31). As such, these materials generally represent the burial practices of upper-class individuals. Archaeologically, the collections also represent two extremes, with the material originating from Oulu Cathedral and Hailuoto excavated traditionally, while material from Haukipudas was inventoried in situ. This particularly impacts the preservation of textile materials, as plant fibres preserve poorly in acidic Finnish soil. As such, material from Oulu Cathedral and Hailuoto heavily favor animal-based fibers (e.g., wool and silk) while plant-based material (e.g., bast fibers – linen, nettle) generally exhibit poorer preservation; in contrast material from Haukipudas is often nearly complete, and a number of the burials in question are mummified (Janaway 1987; 2001: 381; Paavola 1988; 1991; 2009; Heckett 1991; Tarleton & Ordoñez 1995: 82; Alakärppä & Paavola 1997; Kehusmaa 1997; Sarkkinen & Kehusmaa 2002; Kallio 2005: 13; Harris 2010: 106; Kuokkanen & Lipkin 2011:

Table 1. Sites, active burial years, burial location, and data collection methods (After Paavola 1988; 2009; Alakärppä & Paavola 1997; Sarkkinen & Kehusmaa 2002; Núñez et al. 2008; 2011; Väre 2017).

Church Site	Active Burial Years	Burial Location	Data Collection
Hailuoto	1400s–1700s (predominately ca. 17th–18th centuries)	Below Church	Archaeological excavation: 1985–1987
Oulu Cathedral	Early 1600s–1780	Churchyard	Archaeological excavation: 1996, 2002
Haukipudas	1649–1765	Below Church	Inventoried: 1996, 2014–2017

149; Lipkin et al. 2015: 211; 2021a; 2021b; Rast-Eicher 2016: 87). As such, preservation bias has a much heavier impact on the materials from Oulu Cathedral and Hailuoto (Lipkin et al. 2021a).

Tradition stipulated that the deceased be buried warmly, or they would return to haunt the living (Krohn 1914: 67; Paulaharju 1914: 112–113; Hagberg 1937: 187–194; Harva 1945: 20–21; Pentikäinen 1968: 54–55; Koski 2011: 12–13, 187–192; Núñez 2015: 86; Lipkin 2016: 45; 2020). While burial contexts have long been viewed as symbolic, evoking sleep or peaceful rest (Wacklin 1844: 2,21; Lipkin et al. 2021b), this introduces a wider range of questions regarding the crafting decisions made by those in mourning, and what these materials meant to the surviving family. Choices in creating warm legwear are evident throughout the crafting process, and these features and material characteristics would have been well-known to those crafting the items. As such, the decision to craft items that do not meet the performance characteristics one expects in life represents a deliberate choice (Schiffer & Skibo 1987; Carr 1995; Sillar & Tite 2000; Ingold 2001; Caple 2006; Ruhl 2020; 2023). This addresses new questions about the mourning process, and the ways families both remembered and commemorated the dead.

On a basic level, whether items are warm starts with the question of fiber selection. Wool is the warmest available natural fiber and could be produced locally but can be itchy. Wool fibers can come in a wide variety of qualities, and spun into loose and fluffy woollen (using combed but not carded fibres) or more tightly-spun worsted (using carded and combed fibres), with the latter considered knitting yarn in the 19th century. In contrast, silk is soft and can be warm, and was an expensive imported good regulated by contemporary sumptuary laws. Filament silk (also known as reeled silk) is crafted with little or no twist in the yarn which results in a greater shine, while waste silk is often used to make spun silk threads (Iredale & Townhill 1973: 100; Rast-Eicher 2016: 55, 277, 283). Bast fibers such as linen and nettle were smooth and cool, but must be adapted via methods such as

layering or quilting to be considered warm (English 1969: 22–23; Rutt 1987: 233; Barber 1991: 20; Ryder 1995: 6; Ingold 2001; Janaway 2001: 383; Harris 2010: 105–107; Ravandi & Valizadeh 2011: 64–67; Babu 2015: 63).

The crafting methods selected also impact an item's performance characteristics: knitted materials are known for their elasticity, drape, and warm structure, while woven materials' stiffer structure tends to be thinner, and retain less heat (Henson [1831]1970: 13; Spencer 1989: 3; Cooke & Christiansen 2005: 72; Harris 2010: 109; Lipkin 2011: 50; Ravandi & Valizadeh 2011: 71–72). These analyses are further complicated by a relative lack of scholarly works on the history of knitting, and non-woven materials in general. Described as one of the “poor cousins of textile history” (Malcolm-Davies 2018: 3), knitted materials often defy terminology for more widely-documented woven materials (Turnau 1986: 167; Malcolm-Davies 2018; Odstrčilová, 2018: 51). The lack of unified nomenclature between historians, archaeologists, and handcrafters for describing these materials further complicates these issues and results in a disjointed approach to research. This often results in a lack of clarity regarding methods, techniques, and what is actually observed in material culture. Articles addressing knitted items or providing sound technical analyses of these materials remain relatively rare; even when they are addressed in academic literature, the descriptions are often incomplete or contradictory (Malcolm-Davies 2018; 2019; Malcolm-Davies et al. 2018).

Clothing History

During the 17th and 18th century stockings were generally knee-high and held under the knee by garters (Rapely 1975: 32; Kuokkanen & Lipkin 2011: 158; Lipkin 2011: 51), with knitted stockings greatly preferred to their woven-and-stitched medieval hose predecessors (Henson [1831]1970: 13; Spencer 1989: 7). The popularity of knee-breeches until the 19th century made stockings a necessity for men (Rapely 1975: 32;

Rutt 1987: 25; Kuokkanen & Lipkin 2011: 157). While histories of the knitting industry generally focus on English industry and wares (Rutt 1987: 71, 77; for example, see Rapely 1975; Styles 2013; Gerner 2015; Sugden 2017; Wallwork 1991; Wykes 1992), during this period linen and wool stocking production centers in southwestern Finland aimed to meet the increasing demand for knitted stockings, with the resulting materials seen as more valuable than home-knitted or locally produced options. In Naantali, once such center, stocking production jumped from around ten thousand pairs to several times that number, with 24 000–26 000 pairs for export alone (Pylkkänen 1982; Lipkin 2011: 50; Väre et al. 2021). In many cases, early knitted stockings incorporated popular features from older woven-and-stitched styles, including decorative ankle motifs and false calf seams. These holdovers persisted long after knitted stockings were common (Lipkin 2011: 51; O'Connell Edwards 2018: 44).

Estimates by Thirsk (1973) suggest that most individuals required two pairs of stockings per year, while Decaleur's (2001) work in the Netherlands indicate individuals there likely needed three or more pairs. Such stockings were considered a valuable commodity, well cared for and repaired as needed (Lipkin 2011: 50–55, 51; O'Connell Edwards 2018: 42). Silk and linen represented more luxurious options and could be layered for warmth depending on the time of year, or to protect expensive silk stockings. In contrast, plain worsted wool stockings were warm and more affordable (Henson [1831] 1970; Rapely 1975: 18, 20; Wykes 1992: 35; Ordoñez & Welters 1998: 83; Kuokkanen & Lipkin 2011: 157–158; Väre et al. 2021). While hand-knitted stockings were more valuable than comparable stockings made on a knitting frame, they were generally made of less valuable homespun wool or linen. (Lipkin 2011: 51–52).

Sumptuary laws also had an impact on how individuals dressed, both in life and in death (Kuokkanen & Lipkin 2011: 150; Salmi & Kuokkanen 2014: 183). While these regulations tried to limit the colors, materials, and types of cloth-

ing individuals could wear based on social class, they were difficult to enforce and frequently circumvented (Malvalehto & Reinikainen 1997: 25; Andersson 2014; Salmi & Kuokkanen 2014: 182–183, 197–198; Kuokkanen 2016: 64–66). Although specific regulations varied widely over time, for the purposes of this paper the limits on silk are particularly relevant. This was especially true of imported silks, with regulations in 1740 restricting silks to Swedish domestic products (Malvalehto & Reinikainen 1997: 48; Salmi & Kuokkanen 2014: 183; Lipkin et al. 2015: 213). These regulations were intended to stipulate not only how individuals dressed in life, but also in death (Kuokkanen & Lipkin 2011: 150; Salmi & Kuokkanen 2014: 183) again with limited success. For example, a 1644 Swedish law restricted silk, gold, silver, and lace in burial clothing regardless of class, and a 1686 law stipulated individuals dress in death according to their station in life (Rimpiläinen 1971: 189–191, 194, 198–200, 207–208). Despite these restrictions, silk, metallic embroidery, and lace are present in these collections (Ruhl 2020).

Crafting Methods

Spinning generally represents one of the first stages in crafting processes. While a highly experienced spinner using a drop spindle has the capacity to outperform a spinning wheel (Valinheimo 1956), for the average spinner the addition of the foot treadle to the spinning wheel in the 1530s increased the efficiency of the spinning process (English 1969: 4–5; Kroll 1981: 7; Lawrence 2010: 8). Probate inventories from Oulu in the 1700s indicate that spinning wheels were generally available, and a spindle whorl excavated from Oulu's city center town hall excavations in 2003 indicates that both wheel and drop spindle use persisted (Kroll 1981: 16, 26; Hyttinen & Rajala 2005: 109–110, 112; Kuokkanen 2014: 38; 2016: 61).

The process of spinning was further mechanized in the 18th century to keep up with increasing demand. Lombe's silk machine (Eng-

lish patent 1718) unwound, lightly spun, then re-wound filament silk onto a bobbin (English 1969: 22–26), while Paul's Spinning Machine (patented 1738) drafted fibers prior to spinning, removing the need for spinners' experienced hands (English 1969: 35–37). Hargreaves' well-known Spinning Jenny (invented ca. 1764, patented 1770; English 1969: 45, 49; Lawrence 2010: 9) used pre-drafted fibre and allowed a single worker to do the work of up to 25 spinners on hand wheels (Lawrence 2010: 9–10, 14–19).

Regardless of method, fibers can be s-spun (counterclockwise twist), z-spun (clockwise twist), or in some cases remain as a filament fiber (no twist – e.g., silk). Multiple strands are often then twisted together in the opposite direction to form a sturdier yarn, which is less likely to unravel (Malcolm-Davies 2019: 136 – e.g., s-spun threads will be Z-plied).

Knitting also saw a number of technological developments during the pre-modern era, although handknitting never fully disappeared (Rapely 1975; Rutt 1987: 85). Traditional handknitting holds loops (or stitches) on straight needles and pulls new yarn through each loop by shifting them from one needle to the other. Successive rows (or courses – Malcolm-Davies 2019: 135) lengthen the piece (Rutt 1987: 7–8; Spencer 1989: 7). Knitting patterns are often based on mathematical proportions to produce larger or smaller garments, making handknitting a versatile option for crafting a wide number of items (Rutt 1987: 16). Handknitting was also more responsive to changes in fashion than later mechanized options and could be done in the home as an additional source of income (Rutt 1987: 85; Tony 1999: 212). Although knitting was not limited to a particular social class, it took hold as a cottage industry in Sweden in the 18th century with items produced for sale in standard sizes (Lipkin 2011: 50; O'Connell Edwards 2018: 42).

Attempts to mechanize knitting encountered a number of difficulties. Although the first mechanized stocking frames were developed in 1589, they produced rather crude material (ca. 3 loops/cm; 1596/1597 ca. 7–8 loops/cm). As such, only small-scale production on

the knitting frame occurred up to 1620 (English 1969: 11, 13; Spencer 1989: 7–9; Cooke & Tavman-Yilmaz 1999: 199; Lipkin 2011: 50). Mechanized knitting frames required little skill to operate and could theoretically produce stockings faster than hand knitters (ca. 6–12 frame knitted pairs to 2 handknitted pairs, Lipkin 2011: 50), although the convenience of handknitting contrasted with the stationary nature of frame knitting may have mitigated some of these advantages (Rutt 1987: 85; Wykes 1992: 33; Tony 1999: 209; Lipkin 2011: 50). Nevertheless, additional developments from 1670 to 1850 increased both the speed and capabilities of mechanized knitting (Cooke & Tavman-Yilmaz 1999: 200). While stocking frames were eventually seen as a threat to the cottage knitting industry, their inability to produce complex or three-dimensional materials meant that demand for handknitted stockings – which also generally lasted longer – persisted (Henson [1831]1970: xix, xviii; English 1969: 16–18; Rapely 1975; Rutt 1987: 76, 85, 89–90; Spencer 2001: 8, 10; Lipkin 2011: 50). New developments were also slow to be implemented: the power-driven knitting frame and the rotary drive (which mechanized knitting in the round) were invented in 1769 but were not utilized for mass-production until the mid- to late-19th century (Spencer 1989: 10, 178, 236). Due to the delay between the development of the rotary drive (which also mechanized the knitting of stocking heels and toes) and its adoption into industrialized textile production in the 1870s, earlier material knitted on a stocking frame will be knitted flat and utilize seams and hand-finishing methods once the leg shaft was complete (Spencer 1989: 9–10, 178, 236; 2001: 259).

Woven materials are generally created as fabric before being cut and stitched into new shapes, while knitted items are shaped as they are made. In the case of stockings, this includes fitting the calf and instep gusset, shaping and/or reinforcing the heel, forming a gusset along the instep, and shaping the toe. There are several ways to approach each of these steps in handknitting, considering the wear and tear on different portions of the stocking, the overall fit,

and the aesthetic value of the completed item (McGregor 1984: 151–153; O’Connell Edwards 2018: 87). Stockings were generally knitted from the leg-cuff down towards the toe (Lipkin 2011: 51; O’Connell Edwards 2018: 44). Identifying these elements in archaeological contexts provides crucial information about how the stocking was produced, and also calls attention to the role of crafts-based knowledge in archaeological research (Bender Jørgensen 2007).

In addition to knit materials, there are four examples of nålbound materials present in these collections. Nålbinding was in use in Finland as early as the Iron Age and persisted well into the 20th century (Turnau 1986: 168; Vajanto 2014: 21–22; 2015). Utilizing a single large-eyed needle and the crafter’s thumb, this method works shorter (ca. 1–3 meters) lengths of yarn in a series of knot-like stitches and produces a material that does not unravel like knitting, even when snagged (Rutt 1987: 8–9; Hansen 1990: 21–23; Bender Jørgensen 2007; Claßen-Büttner 2015: 57). Unlike knitting, nålbinding was not mechanized, and as such samples seen here are likely the result of restricted local production (Hansen 1990: 23).

Overall, the history of textile developments is evident through the excavated and inventoried materials from Oulu Cathedral and the churches of Hailuoto and Haukipudas, and the impacts of industrialization and machine knitting (and the persistence of traditional production methods) are evident in several of the pieces.

Repurposed Stockings

Hailuoto

Overall, the stockings identified during the Hailuoto excavations represent repurposed materials and included a number of different functional elements which would have been useful during an individual’s life (Table 2). While the presence of repurposed stockings is consistent, they nevertheless can be further

broken down into two separate categories: woolen stockings, which appear to have been hand-produced, and silk stockings, which bear the hallmarks of mechanized production.

Wool Stockings

Eight stockings were identified at Hailuoto. Of these, six consisted of knitted wool (KM86088:526, 544, KM87131:114b, 311, 395l, 594c). As Table 2 shows, three of these were crafted from single-ply (or single-strand) yarn; two exhibited a s-twist (Fig. 3, also KM87131:395l), while one consisted of a z-twist (KM87131:594c). The remaining three stockings were crafted from two-ply (or two-strand) yarn; one exhibited a final Sz twist and ply (KM87131:114b), while two were crafted with a final Zs twist and ply (Figs. 1 and 2). Overall, the variety in yarn ply and spin suggests a lack of standardization, particularly as spinners generally spin and ply in the directions they were taught, only switching for functional reasons (Barber 1991: 178–180; Minar 2000: 89; cf. Grömer 2016: 171). As such, the yarn for these stockings was likely hand-produced

In addition to exploring the yarn spin and ply, several construction elements were identified in the six wool stockings. More complete pieces (e.g., Fig. 1) indicate that these stockings were knitted round. Several fragments also include minor decorative elements, including simple-knit (or “garter stitch”) stripes on several pieces (Fig. 2, also KM87131:114b). In some cases, this provides a place for increases or decreases along the pattern. While garter stitch knit ribs are a decorative way to mirror older seamed stockings, these features are also functional, as they increase elasticity for a better fit. Similar knit “ribs” are also often used along borders to hold material in place and prevent garments from rolling (Rutt 1987: 12). While it was possible to create faux ribs using a knitting frame by dropping and re-working stitch wales, these lack the elasticity of a true rib (Rapely 1975: 24–25). The heel turns in these materials are also well made, and include

Table 2. Hailuoto Burial Stockings.

Item number	Material	Thread Diameter	Single / plied	Yarn twist	Gauge (wales x courses / 10 cm)	Current colour	Features
KM86088:526	Wool	1.0 mm	2-ply	Z(2s)	35 x 45	Dark brown	Gar- ter stitch stripe Shaft de- creases
KM86088:544	Wool	1.0 mm	Single	s	80 x 40	Brown	Heel turn
KM87131:114b	Wool	1.2 mm	2-ply	S(2z)	50 x 40	Brown	Gar- ter stitch stripe
KM87131:311	Wool	2.0 mm	2-ply	Z(2s)	25 x 50	Light Reddish Brown	Knitted round Heel turn: Slip stitch
KM87131:395l	Wool	0.9 mm	Single	s	50 x 50	Brown	Extremely fragmen- tary
KM87131:594c	Wool	0.8 mm	Single	z	NA	Dark Brown	Extremely fragmen- tary
KM87131:419c	Silk	0.4 mm	Single	I (Fila- ment)	130 x 80	Light Golden Brown	Border edge Stitched seam
KM87131:442a	Silk	0.4 mm	Single	I (Fila- ment)	90 x 65	Light Golden Brown	Stitched seam

features which would have increased the comfort of these items; one stocking includes evidence for a “slip stitch” heel technique (Fig. 1), which would have increased the durability and cushion of the stocking heel. Another has clear decrease stitches required to turn the heel (Fig 3).

Overall, Hailuoto’s wool stocking fragments suggest warm, well-fitted garments: the heels are well crafted, there is clear evidence for increases and decreases to fit the items to the wearer’s body, and both fiber selection and crafting methods support the argument that these were warm and comfortable. The variability in spin, ply, and thread thickness in these materials suggest that they were hand-produced. Likewise, the variety in yarn twist and ply, the presence of circular knitting

techniques, increases/decreases to ensure fit, and rib and slip-stitch construction techniques strongly supports the continuance of the hand spinning and knitting industries. As all of these technologies were slow to be adapted into mechanized production (English 1969: 41–42; Spencer 1989: 10, 178, 236), these items were likely produced either in the home or at regional production centers.

Silk Stockings

While the wool stockings from Hailuoto originate from several different burials, the two silk stockings (Figs. 4–6,) are from the same burial; as such, these stockings likely constituted a pair. They are undoubtedly repurposed,



Figure 1. KM87131:311 Wool stocking with nearly complete shaft and heel construction. (Photo: E. Ruhl)



Figure 2. KM86088:526 Wool stocking with garter-stitch rib. (Photo: E. Ruhl & S. Tuovinen)



Figure 3. KM86088:544 Stocking with denser slip-stitched heel. (Photo: E. Ruhl)



Figure 4. KM87131:419b Silk Stocking with seam visible. (Photo: E. Ruhl)

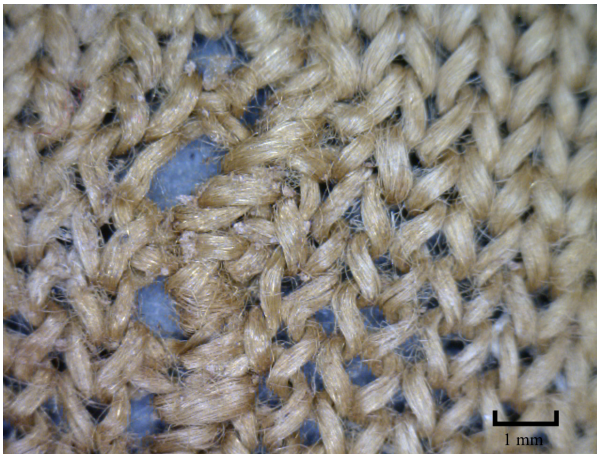


Figure 5. KM87131:442a Silk Stocking with seam visible. (Photo: E. Ruhl & S. Tuovinen)



Figure 6. KM87131:419b Silk Stocking with border edge. (Photo: E. Ruhl)

and were likely purchased as a luxury item. The pair is crafted from filament silk (ca. 0.4–0.5 mm thread thickness), which has little if any twist. Mechanized filament silk production occurs as early as 1718 (English 1969: 22–26) and indicates that this fiber was likely not produced by hand. While silk has the potential to be warm (Babu 2015: 63), these stockings are much thinner than even the single-ply wool stockings. The fiber alone indicates that these stockings would have constituted an imported luxury good, as silk was among the materials regulated by contemporary sumptuary laws (Andersson 2014). As repurposed items, these items likely reminded loved ones of the deceased wearing them in life. Due to their luxury status, these stockings represent a valuable investment in the burial. At the same time, the burial robes usually worn by the deceased would have covered this display of wealth within the burials. These stockings represent more than just a way to display wealth to those who came to view the body, and may represent a deeper personal meaning to the grieving family.

While the wool stockings were knitted round, this pair of silk stockings were knitted flat in a “plain” or stockinette stitch, then stitched along the calf to form a tube (Figs. 4 and 5). Additionally, the presence of flat-knit selvedge edges and the lack of evidence for fitting beyond the seam strongly suggest that these were created professionally on a knitting frame (Fig. 6). Unfortunately, as the feet are not present on this particular pair, it is not possible to see the necessary hand-finishing.

While the wool stockings were warm based on their fiber selection, these silk stockings may have been layered to achieve a similar level of warmth (Väre et al. 2021). Although direct evidence for this practice is not present in this archaeological context, this may be due to the unequal impacts of preservation bias on plant versus animal fibers. Overall, the fiber selected for these stockings seems to be tied to its’ role as a prestige good, rather than its warmth. This could be supported by the far larger number of wool stocking fragments identified, in contrast with the single pair found in this buri-

al. This provides a stark contrast to stipulations that the dead be buried warmly (Krohn 1914: 67; Paulaharju 1914; Hagberg 1937: 187–194; Harva 1945: 20–21; Pentikäinen 1968: 54–55; Koski 2011: 12–13, 187–192; Núñez 2015: 86; 112–113; Lipkin 2016: 45; 2020), and in this case prestige seems to take priority. Likewise, the limited information on fit available in this pair of stockings seems to support the idea that they are crafted from a fine material but required less effort and time in their construction. The edges lack a rib or other stabilizing stitch, which means they were likely to have “rolled” on the wearer, which could have been corrected by the use of ribbons or garters (Rutt 1987: 12; Kuokkanen & Lipkin 2011: 158; Lipkin 2011: 51; Lipkin and Kuokkanen 2014: 50; Lipkin et al. 2015: 216; Väre et al. 2021 e.g., Vicar Rungius). Overall, the only evidence for “fit” is in the presence of the seam. Again, this is consistent with machine knitted materials from early stocking frames (ca. 1600–1769; English 1969: 16–18; Spencer 1989: 10).

Oulu Cathedral

A total of fourteen stockings, legwarmers, slippers, or gaiters were identified from the 1996 and 2002 Oulu Cathedral excavations (Table 3, Sarkkinen & Kehusmaa 2002; Kuokkanen & Lipkin 2011: 158), eight of which consist of knitted wool (PPM12161:24, 36, 60, 75, 191, 213, KM2002067:303, 941). Overall, these pieces include efforts to shape the material, including increase or decrease loops (PPM12161:24, 191, 213; KM2002067:303, possibly 941), specialty stitches such as a heel flap (PPM12161:36, 191; KM2002067:941), or knit ribs (PPM12161:191, 244, 260; possibly KM2002067:303) (Lipkin 2011). As with the wool examples from Hailuoto, these include features which would be difficult to mechanize, and were likely produced in the home (Lipkin 2011: 50–51).

Two silk knitted stockings were identified in the Oulu Cathedral excavations (PPM12161:271; KM2002067:1040; Kuokkanen & Lipkin 2011; Lipkin 2011). While

Table 3. Oulu Cathedral Burial Stockings. *After Lipkin 2011.

Item number	Fibre	Thread diameter (plied / single)	Single / plied	Yarn twist	Gauge (wales x courses / 10 cm)	Current colour	Features
PPM12161:22	Wool*	4 mm* / 2 mm*	2-ply	Z(2s)	NR	Brown	Nålbound Finnish stitch*
PPM12161:24	Wool*	1.5 mm / 0.5* mm	2-ply	Z(2s)	60 x 50	Brown	Lightweight yarn Increase/decrease
PPM12161:25	Wool*	1 mm*	Single	s*	NR	Brown	Nålbound Finnish stitch*
PPM12161:36	Wool*	1–1.5 mm / 0.5 mm*	2-ply	Z(2s)	35 x 50	Brown	Heel turn
PPM12161:47	Wool*	1 mm*	Single	s*	NR	NR	Nålbound
PPM12161:60	Wool*	0.5 mm*	Likely single	s*	30 x 60	Brown	
PPM12161:75	Wool*	0.2 mm*	Likely single	s	40 x 50	Brown	Fragmentary stocking? *
PPM12161:75	Wool*	1 mm*	NR	s*	30 x 40	Dark brown	Fragmentary slipper? *
PPM12161:191	Wool*	1*–1.5 mm / 0.6 mm	2-ply	Z(2s)	35 x 50	Dark Gold-brown	Rib pattern Heel turn Increase/decrease
PPM12161:213	Wool*	1.5–3 mm / 0.8–0.9 mm*	2-ply	S(2z)	20 x 40	Dark Gold-Brown	Increase/decrease
PPM12161:271	Silk*	1*–2 mm / 0.5–1.5 mm	2-ply	S(2z)	35 x 50 25 x 30 (different fragments)	Brown	Decrease
PPM12161:244	Wool*	NR	NR	NR	NR	NR	Rib pattern
KM2002067:303	Wool*	NR	Single?	Z?	40 x 50	Dark Brown	Heel turn Increase/decrease Rib pattern?
KM2002067:941	Wool*	NR	NR	NR	NR	Dark Brown	Heel turn Decrease row?
KM2002067:1040	Silk*	0.2 mm*	Single	NR	NR	Gold-Brown	Fragmentary

one was more similar to those from Hailuoto (KM2002067:1040), the second represents an exception. This silk stocking (PPM12161:271) was knitted from a thicker, spun and plied (2-ply, S2z, ca. 1–2 mm plied thread thickness) silk than in the Hailuoto stockings. While fragmentary, this piece nevertheless included a line of decrease stitches, and as such was likely knit-

ted by hand. Among the materials considered here, this makes the piece unique: a stocking knitted with poor-quality luxury materials but utilizing the more valuable and time-consuming handknitting methods. As such, it is possible that this material represents spun waste silk (Iredale & Townhill 1973: 100–101).

In addition to the knitted materials, two burials (1996: 7, 10) also included *nålbound* wool materials. As Burial 7 also contained a lightweight 2-ply plain knitted fragment (PPM12161:24), this may indicate that the *nålbound* material represents a gaiter instead of a stocking (Kuokkanen & Lipkin 2011; Lipkin 2011), suggesting that footwear could be layered. Burial 10 represents an anomaly in the materials, as the body was buried not in a remade burial robe, but in everyday clothing. As such he represents an exception across all three sites considered here, and may represent a different burial tradition (Kuokkanen & Lipkin 2011; Lipkin & Kuokkanen 2014).

Overall, these repurposed knitted wool stockings align more closely with the material present at Hailuoto, which may suggest that preservation bias plays an important role in what is – or is not – present at the archaeological sites considered here. Likewise, the *nålbound* materials may also represent local production, as this handicraft method was not mechanized, and persisted in Finnish handicraft traditions until well into the 20th century (Vajanto 2014: 21–22, 31; 2015). In this case, the single knitted silk stocking continues to represent a conundrum – crafted from a valuable material but utilizing hand-production.

Remade Items

Thus far, the examples discussed are all repurposed items, worn in life then used as burial clothing. This generally seems consistent for stockings, with the nearby site of Haukipudas providing an interesting contrast with the repurposed materials of Hailuoto and Oulu Cathedral.

Haukipudas

Instead of utilizing pre-existing stockings for burial clothes, two burials at Haukipudas (Burials 1, 10) included burial hose crafted from woven materials (Lipkin et al. 2021a). While there is a long history of utilizing woven materials to

craft hose, knitted stockings were widely preferred by the 1600s (Henson [1831]1970: 13; Spencer 1989: 7; Ordoñez & Welters 1998: 83).

In the case of Burial 1, the remains of a female of approximately seven years who died during the 1760s wore textiles which remain in excellent condition (Alakärppä & Paavola 1997: 19; Lipkin et al. 2021a). The hose are concealed beneath the burial robe, and the skirt of the robe needed to be lifted to view them during the inventory. Crafted from plain-weave bast material, the hose were stitched tubes with seams running along the bottom of the foot, coming to a point at the toe. While the stitches themselves are not visible (indicating that a more-robust flat-felled seam is not used), the work is neatly done with ca. 4 stitches/cm, although the right hose pulls somewhat at the seam (Ruhl 2020). Overall, the stockings do a poor job of conforming to a comfortable shape for the foot, and the seam placement would have been uncomfortable if worn during life. The presence of a finely quilted repurposed cap in Burial 1 indicates that remade items were not used for the entire burial (Alakärppä & Paavola 1997: 19).

The second set of burial stockings at Haukipudas rest in Burial 10, an adult male aged 40–50 years. He has largely skeletonized, but the burial textiles remain in excellent condition (Alakärppä & Paavola 1997: 17). The hose in this burial are concealed under several folded and tucked centimeters of the remade burial robe and are very similar to those in Burial 1. Several pieces of plain-weave fabric are joined together to craft these burial hose, and a seam is evident along the top of the left hose. Additional pieces are joined together near the ankle. Again, while stitches are not visible, the seam itself is well-stitched, and it is possible that the seam across the top of the foot is flat-felled. Overall Burial 10 contains items that are both remade (including the burial robe, a scarf-like tie, and cap) and repurposed (including leather gloves).

While it is possible that additional legwear examples are present at Haukipudas,

these two represent the only samples accessible at the time of inventory. In both Burials 1 and 10, the hose are remade, and are tucked underneath the burial robe. As such, despite the tradition of open coffins during funerals (Hagberg 1937: 277; Lipkin 2020), the legwear would have remained unseen by all but those who dressed the dead (e.g., Lipkin 2016: 45). The woven bast material was neither warm nor fitted and would have lacked the elasticity common to knitted materials (Henson [1831]1970: 13; Spencer 1989: 3). In Burial 1 the hose included a seam which would have run along the bottom of the foot. The hose in Burial 10 seems somewhat better constructed, including a finer, more durable seam construction and possible gusset.

While these burials represent a minority of the available materials, it is important to note that preservation bias may be at play, as bast materials are less likely to survive in the acidic Finnish soils of sites such as Hailuoto (Janaway 1987; 2001: 381; Rast-Eicher 2016: 87; Lipkin et al. 2021a). These examples likely survived due to their placement below the church floor, and similar materials may be underrepresented among the Hailuoto and Oulu Cathedral materials.

Conclusions

These collections speak to the history of textile developments, and the impacts of industrialization and machine knitting (and the persistence of traditional production methods). The delay in adopting the rotary drive into industrialized textile production means that any material knitted on a stocking frame prior to the mid-18th century will be knitted flat – as was evident in the silk stockings from Hailuoto (KM87131:419c, 442a). Likewise, these materials suggest the hold that traditional styles have on modern developments, as is seen in the garter-seams in handknitted wool stockings (KM87131:114b, KM86088:526), and the nålbund material from Oulu Cathedral (PPM12161:22, 25, 47, 53).

While remade and repurposed items were ostensibly both crafted or selected to fulfil similar aesthetic ideas, their performance features and functionality differ widely. While repurposed items were still theoretically ready for day-to-day use, remade items show evidence of reworking, are often hastily stitched together, and would not have held up to daily wear. As such, remade items constitute a new artifact category, even though a casual observer could still recognize both remade and repurposed items in situ as a specific garment.

What does this mean both for the deceased, and for the crafters creating these items? For the deceased, this may represent an earlier life choice, in selecting luxury items such as silk stockings. In death, however, it is clear that some burial clothes do not follow particular rules: while items are supposed to be warm, several of the burial stockings here are not. While an individual may have invested in valuable silk stockings in life, it was left to their family to decide what they would wear in the afterlife. This indicates that providing for the dead was important at least partly on a symbolic level, rather than on the practical basis of warmth.

For a family preparing a burial, the difference between remade and repurposed items introduces a new series of memories and experiences, depending on the item. For the remade legwear of Haukipudas, the bast hose crafted intentionally for the burial may hold memories of grief and mourning. Likewise, the recycled materials used to craft these items may hold memories in themselves. These hoses were crafted specifically for death, a possible last service for a loved one.

In many ways, this further divides the memories associated with repurposed items. In the case of silk stockings, these items likely held memories of the individual using, wearing or valuing them; maybe they were purchased as a completed luxury product. This contrasts with the wool stockings, which were likely spun and knitted in the home, or at least locally; in addition to the memory of loved ones wearing these items, they would also hold memories

of those who crafted the items, or personal memories of crafting the items. In both cases, families' memories would center on the life of the individual, rather than their death. Additionally, since legwear was generally hidden beneath the burial robe and not visible to those viewing the body as part of funeral services, this represents a decision beyond a show of family wealth.

These differences highlight the malleability of textile use, reuse and remaking in the past, offering a window into the lifecycle of archaeological textiles. While these items were ostensibly used to fulfil the same role – that of “burial legwear” – their crafting methods and the memories grieving families would have associated with them represent two distinct categories, and different ways of providing for the dead. At the same time, the juxtaposition of home-crafted and mechanized production also illustrates the persistence of handcrafting methods while highlighting the role of luxury goods in a quickly changing world.

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