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# 15 Local Cloth Production in Medieval Turku, Finland

by Heini Kirjavainen

*The Åbo Akademi textile and textile tool finds complete the picture of Finnish medieval cloth production in an urban context. The textiles and tools of production date from the 14th and 15th centuries. The cloth bindings used 2/2 twill, plain weave and 2/1 twill. Some of the textiles were fulled, napped and sheared as well. Textile tool finds for almost every phase of cloth production, from spinning to cloth finishing, were excavated. Horizontal loom parts and tools were discovered, but tools associated with upright looms could also be found. Along with these artifacts were found many kilos of raw wool and some bunches of hemp fibers. Linen cloth and some linen weft yarns were found on textiles. Nettle and hemp fibers in sewing threads of various leather artifacts were present, too.<sup>1</sup> A comparative fiber analysis was conducted between the cloth types (fulled woolen cloth, fulled coarse woolen cloth, 2/2 twill cloth, plain weave cloth and 2/1 twill cloth) and present-day wool fibers from primitive Åland sheep and Finnish landrace, and some raw wool finds. Coarser cloths were made of local hairy or a hairy medium type of wool but fulled woolen cloths and some fine 2/2 twill cloths were finer, with fibers of a medium and generalized medium type. Cloth production was arranged in the specialized areas at the Åbo Akademi site, some of them overlapping with the processing of wool or vegetable fibers and spinning. Two concentration areas could be connected with weaving.*

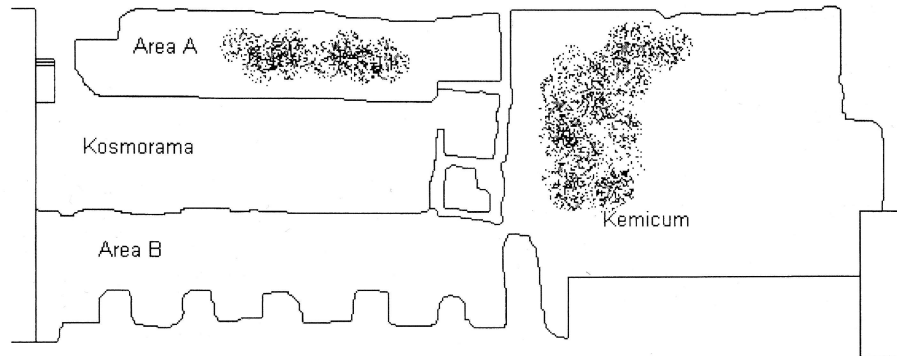
## **Introduction**

The archaeological excavations were made in Turku, Finland, by the Turku Provincial Museum in the year 1998. The so-called Åbo Akademi site was situated in the central area of medieval Turku, near the Dome and the marketplace called Suurtori. It belonged to the Mätäjärvi quarter, and as a dwelling site, it had many connections to different artisanal activities, mainly of leather working and shoe making,<sup>2</sup> but also cloth weaving.<sup>3</sup> The textile and additional tool finds of other urban excavations in Turku are very sporadic and minor compared with that of the Åbo Akademi artifacts.

The unique find of 800 pieces of textile was excavated. This is the largest collection of medieval archaeological textiles in Finland.

Along with many kilos of raw wool found in the excavation site, 135 tools or tool parts could also be related to these textile finds. They could support the assumption of the development of urban crafts. These tools or tool parts could be related to almost every phase of textile production, from sheep-shearing to a finished cloth product. It seems that the most intensive cloth production occurred between the years 1350–1500, in the same areas where the most of the textile fragments and raw wool were found.<sup>4</sup> Textile fragments were composed of 98% wool, 1% goat hair and 1% other fibers, including that of animal hair and vegetable fibers such as flax, hemp and nettle. Evidence of wear and use were found on the fabric pieces, such as cut seams and hems, stitches

Fig. 15.1: Plan of the excavation area. Textile and textile tool concentrations on marked areas.



and stitch-holes, button holes and cut edges.<sup>5</sup> Thick cultural layers contained dung and other remains of human activities.<sup>6</sup> Textiles and textile tools were preserved primarily in the lowest layers and spread over two areas at both ends of the excavation site (Fig. 15.1).

### ***Domestic or Professionally Produced Cloths?***

The most common binding is 2/2 twill at 55%, then plain weave 39% with 2/1 twills at only 6%. One explanation for the emergence of four-shafted twills could be that the weavers specialized in manufacturing one type of cloth, for example 2/2 twills, which were also available fulled and dyed with imported colorants:<sup>7</sup> these two kinds of cloth types are most striking in the Åbo Akademi textile materials. When it comes to the binding itself, medieval 2/2 twills have a long tradition in Finnish pre-historical weaving, using warp-weighted<sup>8</sup> or other types of upright looms. Loom-weights have not been found in the Åbo Akademi site, but some weaving implements that were used with upright looms have survived.<sup>9</sup> As early as pre-historic times, woolen twill cloths were used as outer garments and those woven in plain weave as undergarments.<sup>10</sup> During the Iron Age, woolen plain-weave cloths were rare, and the majority were made of vegetable fibers, such as flax, hemp and nettle, but unfortunately, they have been inadequately preserved.<sup>11</sup> In the Åbo Akademi textile material, woolen plain-weave cloths are fine and light, and they may have been woven for undergarments. Fabrics woven in 2/2 twills or 2/1 twills are much heavier and thicker, and better suited as outer garments for the northern climate. Because of

the similar appearance of plain-weave fabrics in Northern Europe at the turn of the 14th century, horizontal looms may have been more common there.<sup>12</sup> This suggestion may be acceptable because plain weaves are in greater number than the twill weaves.

Furthermore, parts of horizontal looms and weaving equipment have been found in the site.<sup>13</sup> The low number of 2/1 twills gives no indication as to whether they were woven with upright or horizontal looms. If they were woven at the Åbo Akademi site, either method would be possible. They may have been more numerous before the 14th century, but there are no indications of changing production technology at the turn of the 14th century regarding them.

It seems more likely that 2/2 twill weaving continued with upright and horizontal looms during the Middle Ages at the Åbo Akademi site. Moreover, each loom type may have served a specific function for particular cloths. Coarse woolen cloth called *sarka* in Finnish is mentioned in medieval documents,<sup>14</sup> but these sources do not discuss the type of looms used. However, a few simple selvages and a starting border have been preserved, which may indicate the use of a horizontal loom. As several textile researchers have already stated, horizontal looms have been associated with the rise of commercial textile production.<sup>15</sup> The Åbo Akademi horizontal loom parts and various weaving tools do not help us in this respect. But when did the first horizontal looms arrive? They could have come with foreign weavers from Hanseatic (c. 14th to 16th centuries) towns or migrated from east to west. We can tell that the Åbo Akademi horizontal loom finds are the oldest by far in Finland, dating back to the 15th century.<sup>16</sup>

We would like to assume that there was some kind of organized production at the site, especially when considering the uniformity of the cloth and the abundance of raw wool. Simple weaves and similar thread counts appear in warp and weft because they were quick to create and weave. Once cloths had been woven, specialized after-treatments may have been used.<sup>17</sup> These standardized qualities of textiles have been calculated with variation, which are expressed with a standardization co-efficient. It is low in professionally woven fabrics and higher in domestic woven cloths (Fig. 15.2).<sup>18</sup>

### Imported or Locally Produced Textiles?

This question was approached through fiber analysis (Fig. 15.3). It was conducted by measuring 100 wool-fiber diameters within each sample. This gives a hair-diameter distribution, which indicates the sheep-fleece type.<sup>19</sup> The percentage of medullation and dyed fibers was also recorded. Most fiber samples were taken from the textile pieces and sent to York for dye tests.<sup>20</sup> There, fibers were compared with each other and to known primitive northern short-tailed, double-coated breeds of sheep: Åland sheep and Finnish landrace. The fiber samples were also compared with different raw wool finds from the excavation site. Coarser cloths (fulled coarse woollen cloth, most of the 2/2 twills, plain weaves and 2/1 twills) were made of local hairy or a hairy medium type of wool, with a wide range (>100  $\mu\text{m}$ ) of fiber in a skewed and/or continuous distribution. Fulfilled woollen cloths and some fine 2/2 twill cloths had a finer fiber type of medium and generalized medium wool. They had a narrower range (<50–60  $\mu\text{m}$ ) of fiber, in a skewed or symmetrical distribution. These two latter cloth types had atypical fiber distribution for the local sheep race, and were more characteristic of finer woolled sheep. Thus, I believe those cloth types had to have been imported. Raw wool fibers matched with coarser cloth types and are surely locally produced – some of them woven at the Åbo Akademi site, but in nearby areas, as well. The dye test results of TLC chromatography<sup>21</sup> also support this conclusion, for imported dyers' madder was found in textiles woven of local wool.

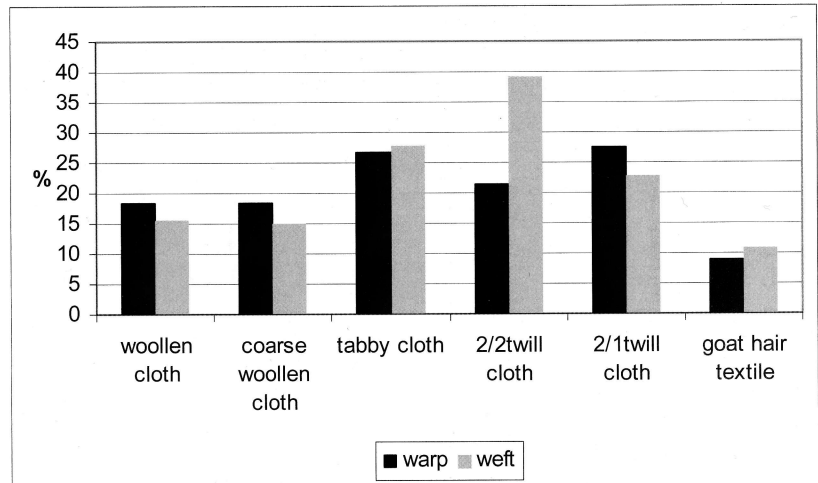
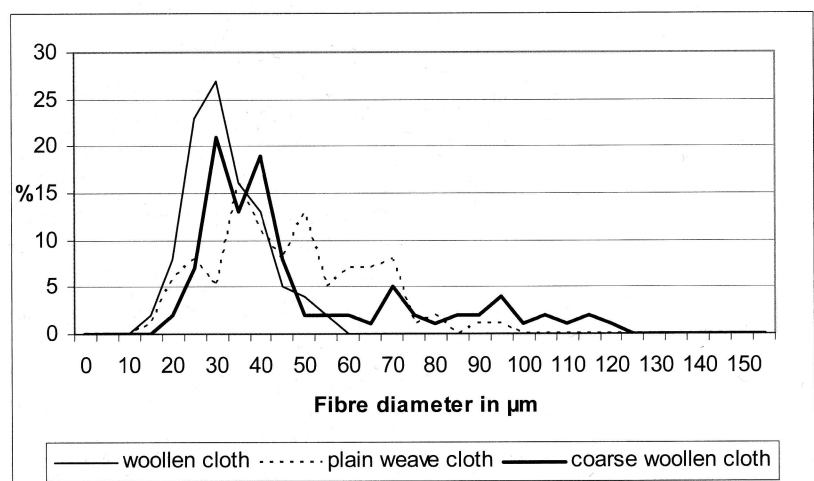


Fig. 15.2: Variation in cloth types.

Finnish historical sources<sup>22</sup> mention cloth importation from Flanders, England and Germany.<sup>23</sup> The textile trade did not follow a straightforward path from the place of origin to Turku, but occurred via Hanseatic towns like Lübeck, Danzig and Reval.<sup>24</sup> Furthermore, smaller-scale cloth trade called 'peasant sailing' was carried on along the Finnish coastline via Vyborg, Stockholm and Reval.<sup>25</sup> The first mention of local cloth manufacture is from a 16th-century account book.<sup>26</sup> It has been supposed that local cloth production was regulated through different statutes, although no written sources have survived which attest to this.<sup>27</sup>

The weaving of everyday textiles may have been for local consumption, but an increase of economic wealth and foreign contacts may have created pressure for commercial textile production.<sup>28</sup> The organized cloth production and trading environment in Turku may have

Fig. 15.3: Fiber diameters in some cloth types.



existed at the very site of Åbo Akademi during the 14th and 15th centuries. There, finished cloth product was the focus. But in order to manufacture it, institutional statutes and regulations were there to control and restrict the production and trading.

### Notes

This textile research is a part of a larger archaeological research project called 'From village to town. Changing ways of life in Southwest Finland from the 10th to the 16th centuries'. The project is carried out with the University of Turku and the Turku Provincial Museum. The project leader is Professor Jussi-Pekka Taavitsainen from the University of Turku.

- 1 Kirjavainen 2003d, unpublished report.
- 2 Harjula 2002, 127.
- 3 Kirjavainen 2002, 346–351; 2003a, 4–18; 2003b, 12–19.
- 4 Kirjavainen 2003c.
- 5 Kirjavainen 2003a, 6.
- 6 Seppänen 2002, 357.
- 7 Kirjavainen 2002, 348; 2003a, 6; 2003b, 13.
- 8 In Finland the oldest probable loom-weights date from the 7th to the 8th centuries, see Erä-Esko et al. 1995, 87. The oldest clay weights with holes date from the 1st – 3rd centuries. They have been found in various contexts (cremation and inhumation burials, ancient hill forts and habitation sites) up to the 13th century, which is the turning point from pre-history to the Middle Ages in Finland, see Antell 1999.
- 9 A connection with the warp-weighted loom is a sword beater, which is similar to the Bryggen finds in Bergen, Norway: see Øye 1988, 82. Needle-like tools (3 pieces), which have a hole at the butt end, and three weft bobbins, which bulge at one end, can be also connected with an upright loom: see Kirjavainen 2003c.
- 10 Erä-Esko et al. 1995, 87.
- 11 Lehtosalo-Hilander 2001, 15. Pre-historical textile fragments have been preserved mainly in inhumation burials, Lehtosalo-Hilander 2001, 7–8.
- 12 Maik 1998, 217.
- 13 Loom parts found: two wooden pulleys, a pulley support, a heddle horse, four heddle rods. Each of them is fragmentary. Weaving tools, which could be combined with a horizontal loom, include a boat shuttle and a possible reed hook, which is fragmentary: see Kirjavainen 2003c.
- 14 For example, see *Finlands Medeltidsurkunder*, Hausen (ed.) 1910–1935, Vol. IV, letter 3001, in which there are many mentions of using coarse woolen cloth as payment for taxes, land sale and barter transactions.
- 15 For example Hoffmann 1974, 258, 261; Maik 1998, 217.
- 16 Kirjavainen 2003c.
- 17 Hoffmann 1974, 284; Gjøøl Hagen 1988, 115. After-treatments like dyeing, fulling, napping and shearing could be used separately or all at once.
- 18 Gjøøl Hagen 1988, 128; Kirjavainen 2002, 348; 2003b, 15–16.
- 19 For example, Ryder 2000, 4.
- 20 The tests were conducted by Penelope Walton-Rogers at the York Textile Research in Archaeology. The colorants used were dyers' madder (*Rubia tinctorum L.*), bedstraw (*Galium verum L.* or *Galium odoratum L.*), woad (*Isatis tinctoria L.*) and alder bark (*Alnus glutinosa L.*). Also an unidentified yellow substance called 'yellow X' was found, which has been found in other Scandinavian textiles as well, see Walton Rogers 2001.
- 21 Walton Rogers 2001, unpublished report.
- 22 The main source for this is *Finlands Medeltidsurkunder*, Hausen (ed.) 1910–1935, vols. I–VIII.
- 23 Taavitsainen 1982, 24.
- 24 Kerkkonen 1981, 468.
- 25 Kerkkonen 1959, 31. Imported cloths were meant for the gentry, clerks or wealthy burghers, not for peasants, Kerkkonen 1959, 133.
- 26 Melander 1914, 2.
- 27 Kuujo 1981, 165.
- 28 Henry 1998, 164.



# ANCIENT TEXTILES

## Production, Craft and Society

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edited by

*Carole Gillis and Marie-Louise B. Nosch*



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