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Spindle whorls from 14th - 18th century Turku, Finland

Introduction

In Finnish archaeology, spindle whorls have been a very little researched find group. In this paper, I will discuss the spindle whorls found in Turku, Finland. The first certain finds of spindle whorls in Finland come from the early Iron Age. Throughout the prehistoric times and the Middle Ages, all spinning was done with a spindle. The spinning wheel was introduced in Finland in the 16th century, when it is first mentioned in documents from Turku. The spinning wheel did not replace the spindle right away, but both tools were used simultaneously for some time. In south-west Finland, where Turku is located, the spinning wheel became more common in the 17th century. In the 18th century, it probably replaced the spindle altogether. In eastern and northern parts of Finland however, the spindle continued to be used until World War II (Vallinheimo 1956, 214, 240).

In Turku, 79 spindle whorls have been found. Fifty-nine of them are complete, 18 are fragmentary and 2 are unfinished. Of all the whorls found in Turku, 37 come from the so-called Åbo Akademi excavation in 1998. The other 42 whorls come from 14 different sites. Of the 79 whorls found in Turku, 54 can be dated to 14th - 18th centuries. However, most of the datable whorls are medieval: 40 whorls

come from the 14th and 15th centuries. Ten whorls can be dated to the end of the 15th century or to the 16th century, and four to the 17th or 18th century. The whorls are made of different materials: bone, antler, stone, wood and clay (Fig. 1).

Bone and antler whorls

Of the 79 spindle whorls found in Turku, 44 (57 %) are made of bone or antler. Thirty-one of the bone whorls were cut from the head or epiphysis of animal femur or humerus. All but one of these whorls has been made of cattle bone (Figs. 2a). One small example has been made from a pig femur head.

Whorls made of epiphysis are hemispherical in shape. The spindle holes in these whorls have various shapes. Double cone shape is the most common, with 17 examples. Seven whorls have a conical hole and four have a cylindrical hole. All the whorls made of femur or humerus head are undecorated.

The diameter of the whorls made of cattle femur or humerus head varies between 34 and 55 mm. Their height varies from 12 to 29 mm. The diameters of the spindle holes are 9-14 mm. They weigh between 6.4 and 41.6 g. The whorl made of pig femur head has a 26 mm diameter and 12 mm height. It weighs 3.5 g. Ten spindle whorls have been made of other bones. Eight of them are complete and two are fragmentary. One example has been cut from a long bone. Six whorls have been lathe-turned. Many different shapes can be found in bone whorls. The most common shape is hemispherical with 5 examples. Of the other whorls, 2 are cylindrical, one is flat and one is flattened hemispherical. Three whorls have a spindle hole with double cone shape, three have a conical hole and 3 have a cylindrical hole. Six bone whorls are decorated. The only form of decoration found on bone whorls is concentric rings.

There is much variation in size of the bone whorls, partly because of many different shapes. Bone whorls are 18-50 mm in diameter and 6-29 mm in height. Hole diameter varies from 6 to 14 mm. There is much

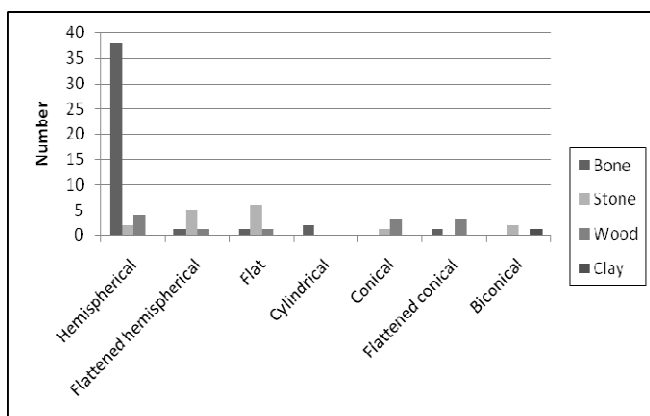


Figure 1. The forms and materials of the Turku spindle whorls.

variation in weight, too: the lightest whorl weighs only 3 g, whilst the heaviest is 33 g.

Three whorls have been made of antler. Two of them are hemispherical. The third example has flattened conical shape and is possibly lathe-turned. It is decorated with concentric rings (Fig. 2b), as is one of the hemispherical ones, too. Two of the antler whorls have a conical spindle hole and one has an double cone shaped hole.

Compared to many of the bone whorls, the antler whorls have a large diameter. Their diameters are 42, 51 and 51 mm respectively. Their height is 16-17 mm. Diameter of the spindle holes varies from 11 to 13 mm. Whorls made of antler are quite heavy, too: they weigh 24, 35 and 40 g.

Stone whorls

Sixteen (21 %) of the Turku spindle whorls are made of stone. Ten of them are complete and 6 are fragments. Many different stone types were used for spindle whorls. Five examples are made of slate. Other stone types include sandstone, limestone and diabase. Most of the stone whorls are quite flat in shape: there are 6 flat and 5 flattened hemispherical whorls. Two whorls are hemispherical and two are conical. Eleven whorls have a spindle hole with double cone shape, while 3 have a conical hole. Three of the stone whorls have some kind of decoration. One example is decorated with concentric circles (Figure 2c). Two whorls have ring-and-dot decoration in combination with rings or radial lines.

The diameter of the stone whorls ranges from 27 to 52 mm. There is much variation because the whorls represent so many different shapes. The flat and flattened hemispherical whorls, which make out two thirds of the stone whorls, are 40-52 mm in diameter. The height of all the stone whorls varies between 5 and 21 mm. The hole diameter is 8-13 mm. There is also much variation in the weight of the stone whorls: they weigh between 9.6 g and 57 g.

Two unfinished stone whorls have been found in Turku. Both of them are fragmentary. These unfinished whorls show that stone whorls were made in Turku.

Wooden whorls

Thirteen (17 %) of the spindle whorls found in Turku are made of wood. Of the 13 wooden whorls, 6 are complete and 7 are fragmentary. However, wooden whorls may have been more common. Only a part of wooden whorls would have survived since wood de-

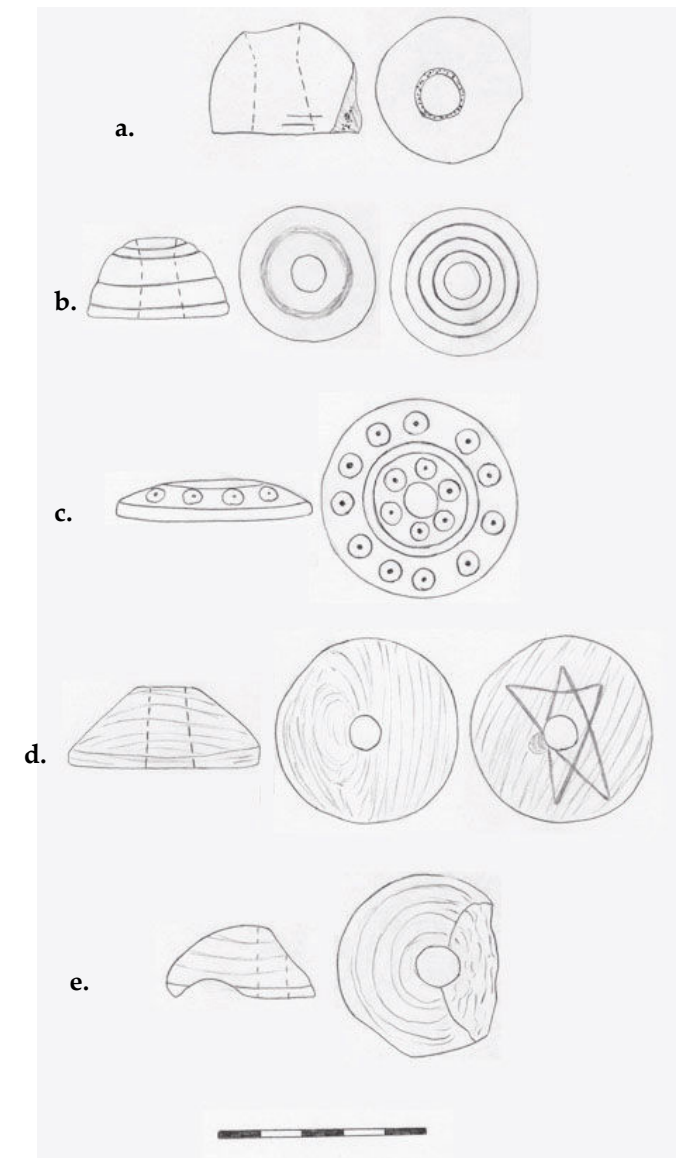


Fig. 2. Spindle whorls

a. A spindle whorl made of cattle femur-head, late 14th or early 15th century. **b.** A lathe-turned bone whorl, decorated with concentric circles, late 14th or early 15th century. **c.** A decorated stone spindle whorl, probably medieval. **d.** A wooden spindle whorl with an incised pentagram, early 14th century. **e.** A fragmentary ceramic spindle whorl of German type, 14th century (Drawings by the author)

cays easily in the soil.

Four of the wooden whorls are lathe-turned, the rest are carved with a knife. Hemispherical is the most common shape for wooden whorls with 4 examples. Of the remaining whorls, 3 are conical, 3 flattened conical, 1 flattened hemispherical and 1 is discoid.

Five whorls have a double cone shaped hole, 4 have a conical hole and three have a cylindrical hole. Six wooden whorls have some kind of decoration. Three of them are decorated with concentric circles. Two whorls have more complicated decoration consisting of dots, circles and radial lines. One whorl has an owner's mark carved on it. Another example has an incised pentagram on its base (Figure 2d). The pentagram has been a very common protective magical mark in Finland.

The diameter of the wooden whorls varies between 42 and 59 mm. One fragmentary whorl has been much bigger, c. 80 mm in diameter. The height of the wooden whorls is 7-19 mm. The hole diameter varies from 8 to 14 mm. Wooden whorls weigh between 5 and 26 g. Their original weight has probably been a bit higher, since wooden artefacts may have lost some of their weight through decay.

Ceramic whorls

Four ceramic spindle whorls have been found in Turku (Figure 2e). Only one of them is complete, the other 3 are fragmentary. The only complete ceramic whorl is biconical in shape and it clearly represents the type very common in the German area until the 17th century (e.g. Moorhouse and Hurst 1981; Pühl 1986). Two of the fragments probably come from whorls of this type, too. The complete whorl is 39 mm in diameter and 25 mm in height. Both the complete whorl and one of the fragments have a cylindrical spindle hole, 10 mm in diameter. The complete whorl weighs 30 g, and one of the fragments was probably about the same weight. One small fragment of a ceramic spindle whorl is very different from the German-type whorls. It is quite roughly made. The fragment is so small that the original shape and size of the whorl remain uncertain.

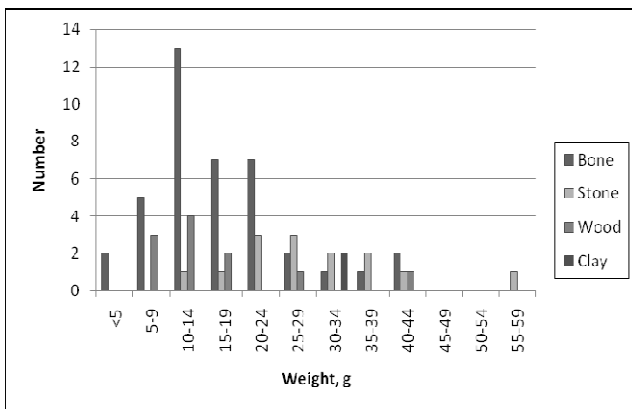


Fig. 3. The weight and the material of the whorls.

Spinning in Turku

The spindle whorls found in Turku can give some information of the types of thread that were produced. The factors affecting the quality of the thread are the weight and the diameter of the spindle whorl (Figs. 3 and 4). Other factors include the size and weight of the spindle, the quality of the raw fibres, spinning technique, tradition and the skill of the spinner (Walton Rogers 1997, 1743-1745; Andersson 1999, 24-25).

Threads of different thickness can be spun using spindles of different weight. A light spindle gives fine thread and a heavy one gives thick thread. A spindle whorl does not tell exactly the thickness of thread spun with it, but it still can give interesting information of the types of thread that were produced.

I will consider the weight distribution of Turku spindle whorls in comparison with the spinning experiments by Eva Andersson and Anne Batzer in 1999. In these experiments spindle whorls of 5, 10, 20 and 30 g were used. With the 5 g whorl a short spindle of 2.5 g was used. The heavier whorls were used with longer spindles weighing 5 to 6 g. For the yarn spun with each whorl, Andersson and Batzer give a thread count for which it would be suitable in a woven fabric (Andersson 1999, 24). This makes the experiment very useful as the given density can be compared with archaeological textile finds.

Thread spun with the lightest whorl of 5 g was suitable for a fabric with thread count 25-37.5 threads/cm. The density of the thread spun with the 10 g whorl was 10-30 threads/cm, with the 20 g whorl 5-22.5 threads/cm and with the 30 g whorl 2.5-15 threads/cm (Andersson 1999, 24). Heini Kirjavainen (2004, 25) has classified the textile finds from Turku by thread count in three groups. Thread count of a coarse fabric is 1-10 threads/cm, a medium fine 11-17 threads/cm and fine fabric more than 18 threads/cm. In general, it can be

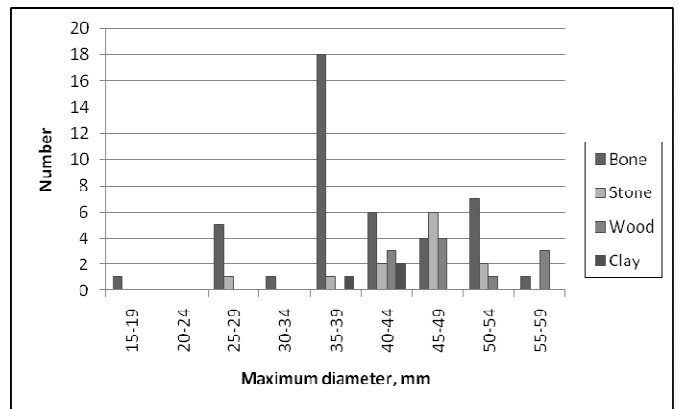


Fig. 4. The maximum diameter and the material of the whorls.



said that a 30 g whorl produces thread for coarse fabrics, a 20 g whorl for medium fine fabrics and 5 g and 10 g whorls for fine fabrics.

For closer inspection, I chose the spindle whorls from Åbo Akademi excavation. From this excavation was found a great amount of objects made of organic materials, among them textiles and textile tools. Thirty-seven of all 79 whorls found in Turku come from this site. Twenty-nine of them can be dated to the 14th and 15th centuries. Seven whorls are dated to the end of the 15th century or to the 16th century. Only one example is dated to the 17th or 18th century. Heini Kirjavainen has researched and published some of the Åbo Akademi textile finds. Hence, the information derived from the spindle whorls can be compared with the data from textile finds. Naturally, not all the textiles found at the site were produced there. However, in the Åbo Akademi excavations, lots of textile tools were found, as well as raw wool (Kirjavainen 2004, 10-12). This suggests that at least some of the textiles were produced at the site.

The weight of the Åbo Akademi spindle whorls varies from 5 to 42 g. Most of them weigh between 10 and 24 g. The whorls appear to be quite light. When compared with the information from the spinning experiments by Andersson and Batzer, the whorls seem to be suitable for spinning fine threads, which would also indicate production of fine fabrics. Could the textile production in Turku have been concentrated on such fine fabrics?

Spindle rods used in Turku may explain why the whorls are so light. Naturally, the quality of the thread is affected by the weight of the whole spindle, not only the whorl. The spindles used in the spinning experiments by Andersson and Batzer were quite light, the heaviest of them weighing only 6 g (Andersson 1999, 24). The two spindle rods found from Åbo Akademi excavation are heavier. They are also thicker than the spindles used in the experiment, which explains the difference in weight. A fragmentary wooden spindle from the Åbo Akademi site weighs 17 g, is 195 mm long and 8-16 mm thick. It has originally been longer and heavier since it is fragmentary on both ends. From the same excavation, a smaller, also fragmentary bone spindle was found. It now weighs 9 g and is 110 mm in length and 6-10 mm in thickness. The spindles used by Andersson and Batzer weighed 5 g and 6 g, and their maximum thickness was 8-9 mm (Andersson and Batzer 1999, 13).

Although not many spindle rods have been found in Turku, the spindle holes in whorls clearly show that

spindles have mostly been quite thick and heavy. The minimum diameter of the spindle hole for the wooden and bone whorls is mostly 10-13 mm. These whorls would have required a thick spindle, perhaps similar to the wooden one found at Åbo Akademi. The minimum hole diameter in stone whorls is 8-9 mm. For these whorls, the Åbo Akademi wooden spindle would be too thick and the bone spindle too thin. These heavy spindle rods could have been used with lighter whorls. The heaviest spindle used in the experiment by Andersson and Batzer was 36 g, with both rod and whorl included. If the original weight of the wooden spindle rod from Åbo Akademi site was about 20 g, a whorl weighing only 16 g would have been needed for the same result.

When the weight of the whorls from Åbo Akademi site is considered with these heavier spindles in mind, it shows that mostly thick threads and coarse fabrics were produced. Most of the whorls from the Åbo Akademi site would weigh 25-35 g if used with a 10 g or 20 g spindle rod. The threads spun with these spindles would be best suited for coarse and medium-fine fabrics with a density of 2.5-22.5 threads/cm.

The heaviest whorls that weigh over 40 g have been used for spinning very thick threads or plying yarns. In the Middle Ages plied threads were rarely used in woven fabrics, but they could have been used for other purposes. Shoemakers needed strong plied thread for sewing leather (Kirjavainen 2005, 100). There is evidence of leather working activity from the Åbo Akademi site (Harjula 2005, 69). The heaviest whorls may have been used to spin threads needed by a shoemaker. Information from the textile tools found at the Åbo Akademi site can be compared with the information from textile finds at the same site. Best suited for this comparison are the 2/2 twills since the thread count given by Andersson and Batzer is for this weave (Andersson 1999, 24-25). It is also very common among the textiles from the Åbo Akademi site (Kirjavainen 2004, 21).

Most of the 2/2 twills from the Åbo Akademi site are made of Finnish wool (Kirjavainen 2004, 65-67, 78, 80-81). It is possible that they were produced on site. The 2/2 twill fabrics from the Åbo Akademi site are mostly coarse with density 6x5-10x10 threads/cm. Medium fine twills were also found, their thread count is 11/6 – 16/8 threads/cm (Kirjavainen 2004, 28). This compares favourably with the evidence from the whorls indicating that mostly thick threads and coarse fabrics were produced.

Based on the finds of spindle whorls and textiles it

can be stated that, at the Åbo Akademi site, spinners mainly produced quite thick threads for coarse fabrics. The same can be said of the whole town of Turku. The weight distribution of the spindle whorls from other sites is very similar to that of the Åbo Akademi finds: most of the whorls are 10-24 g in weight. However, a couple of small and light whorls show that also fine threads were produced.

Household spinning or professional production?

In the Middle Ages spinning was done by women at home (Bohnsack 1985, 102). Spinning for household needs must have taken place in practically every household. Women could also spin for the needs of professional cloth production. They worked for a weaver or a clothier who provided the wool and received back the yarn (Woodland 1990, 216). Professional spinning was done at home as was the household spinning, but it exceeded the spinners' own needs and women were paid for doing it. However, spinning never became a professional craft during the Middle Ages in the same way as many other processes included in cloth production. This is indicated by the fact that spinning remained a female craft, whereas, for example, professional weavers were mostly men (Bohnsack 1985, 102).

The amount of spindle whorls found in Turku is relatively small. However, this does not mean that spinning for household needs or even professional spinning was not practiced. One explanation for the small number of whorls could be the use of organic materials to make them. Especially wood, but also bone and antler, are materials that decay easily in the soil. Also spindles without a whorl may have been used. In Turku, two spindles have been found which probably were used without a whorl. Based on the finds it is not possible to say how common spindles of this type were, only that they existed and were used. Yet another explanation could be that the spinning wheel was taken into use very early. However, that seems unlikely.

The largest collection of spindle whorls in Turku was found at the Åbo Akademi excavation, where thirty-seven whorls were found from the c. 1300 m² area. Compared to some other European towns, this is a very small amount. From the excavations of Søndre Felt and Mindes Tomt in Oslo, Norway, over 240 whorls were found in an area of c. 1000 m². From the excavations of Bryggen in Bergen, also in Norway, 410 whorls were found, although the excavated area was much bigger there, c. 7500 m² (Øye 1988, 17, 38;

Molaug 1991, 81-82).

According to Linda Mårtensson (2007, 157), the professional textile production would have required many spindle whorls of the same kind, since several spinners were needed to produce the yarn. No groups of uniform spindle whorls exist among the Åbo Akademi finds and the whorls seem to be unique. However, the whorls made of cattle femur or humerus head could be a group of tools for professional spinning, even if they are not uniform in appearance, since they were easy to make. I believe that these simple undecorated tools belonged to professional textile production, whereas the carefully made and beautifully decorated whorls were more personalised by their owners. In any case, professional spinning would have taken place at home, and probably every spinner used the kind of equipment she happened to own. The Åbo Akademi site has produced a large amount of spindle whorls when compared to other excavations in Turku. This probably indicates professional spinning. There is other evidence of professional textile production at the site, too. Based on the textile finds and finds of horizontal loom parts, Heini Kirjavainen (2003, 275-276; 2004, 89-90, 96; 2007, 94-95) suggested that there was some kind of organised textile production at the site. If professional weaving was practiced on the site, professional spinning must have taken place, too. Probably spinning was organised the same way as elsewhere in Europe: a weaver or a clothier provided the spinner with wool and received back the yarn (Bohnsack 1985, 106-107; Woodland 1990, 216).

Therefore, I assume that some kind of professional spinning as a part of textile production took place at the Åbo Akademi site. Possibly, there were professional spinners elsewhere in Turku as well. However, the finds of spindle whorls give no clear indication of that. The small quantity of whorls found at other sites in Turku may simply indicate spinning for household needs.

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Kirill Mikhailov

New finds of Viking Age textiles in Ukraine and Russia

In recent years, in the territory of Eastern Europe, active investigations of Old Russian cemeteries dated to the Viking Age are continuing. During the salvage excavations of sites for new building developments in historical centres of Russian and Ukrainian cities, archaeologists have discovered a new series of chamber graves of the 10th c. AD with numerous important finds. Among the burial goods of these chamber graves were fragments of textiles, tablet-woven bands of silk and silver thread, passanterie and silver thread embroidery from female and male articles of

clothing. At present, these finds have not yet been conserved and are not available to investigators. Thanks to the kind permission of the excavators, however, I was able to see the organic and other objects from these graves. Among them were fragments of various funerary garments. One of the finds will soon be published in *NESAT X* (Zubkova, Orfinskaya and Mikhailov forthcoming). As far as the others are concerned, until the conservation is completed, it is only possible to make preliminary observations.