Ancient Finnish Bells and Soundscapes

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In the history of Finnish music, the 12th and 13th centuries have always been an outstanding turning point. During these centuries, the Finns were converted to Christianity and adopted Christian sacred music, which left a lot of manuscripts and other textual evidence for future musicologists. On the other hand, possible sounds and musical activities of the preceding prehistoric centuries or millenniums were forgotten: according to music historians there was no evidence within their reach.

The aim of my doctoral thesis is to show that it is possible to study ancient Finnish soundscapes and ideas of music making through the remains that have been preserved in the ground. My research data consists of 481 archaeological


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finds – 308 pellet bells, 14 bells and 159 bell pendants – which have been discovered in excavations throughout the country and are dated to the 5th–13th centuries A.D., i.e. to the periods of middle and late Iron Age. In spite of their fairly large total number, these are likely the most important silver artefacts known at present.

...metrical value of these metal artefacts is irreplaceable. In other north and northeast European countries pieces of prehistoric bone flutes, whistles, whizzers, wooden other stringed instruments have been preserved and studied by musicologists (Lund 1981: 246–265; Povetkin 1992: 206–224). Articles on metal have been published by Malm & Fehner (1967), Gräslund (1984), N. (1994) and Stassiková-Stukovská (1994).

During the last years, I have catalogued and studied the Finnish pellet bells, bells and bell pendants at the National Museum of Finland and at several provincial museums. My purpose is to classify the artefacts according to shape, size, ornaments, material and methods of making. Other questions being asked are: How did these instruments sound? How were they used? What did their sound mean to the Iron Age people?

Classifying the Data

On the grounds of sound production mechanism, the artefacts can be divided into three groups. First, the pellet bells are made up of an enclosed, more or less spherical waist and free little pebbles or metal pellets that dash against the inside walls (pl. 1, 2a–b). In the second group, the bells are made up of an open, conical or cylindrical waist and a bar or clapper that is pivoted in the bottom and swings to and fro (pl. 2c–d). Often the clapper has become rusty and come off. Thirdly, the bell pendants are similar to the other bells, but smaller, only 1 or 2 cm in diameter (pl. 3). Since they usually appear in clusters, they are able to produce a sound by jingling against each other, even if they do not have a clapper. Actually, only few bell pendants bear traces of a clapper. In addition to these artefacts, which show signs of intentional sound production, there is a large number of jingling chain arrangements, necklaces, neckrings, needles and whips among the middle and late Iron Age finds. Their sound, however, might also have been unintentional or secondary to the more practical function, and for this reason they have been excluded from the actual data.

To obtain finer separations within the aforementioned three groups, I have used statistical multivariate methods: coded the information on various attributes of the artefacts (size, shape, ornaments etc.) into a matrix and then computerized it.

Using the SPSS Two-Step Cluster Analysis procedure, I was able to separate the pellet bells further into six categories or clusters (pl. 1, 2a–b), and bell pendants into four categories or clusters (pl. 3). Each of these categories seemed to have a slightly different dating and a different distribution. The greater part of the material, however, could be dated to the 11th–13th centuries. A comparison with distribution maps of other northeast European bells indicates that some artefacts were probably brought to Finland from Baltic, Novgorodian, Volga-Finnish or Permian regions (Apals et al. 1974: 161, 225, 266, t. 42, t. 53, t. 56, t. 61: Bljujiene 1992: 118; Gräslund 1984: 119–124; Jaanits et al. 1982: 318, 350, 365: Malinowski 1994: 183–199; Мальм & Фехнер 1967: 133–141; Povetkin 1992: 210–212; Спицын 1901: t. 6, 19, 21, 24–26; Спицын 1902: t. 3, 10–14, 32; Stankus 1995: 92; Stassiková-Stukovská 1994: 443–446 etc.), while others were made locally in Finland. (Table 1.) In certain cases it was even possible to attri-
bute sets of distinctive, identical bells to some particular masters, who, in the 10th or 11th century, operated in their own workshops somewhere in the southwestern, southeastern or interior parts of Finland.

**Analysing Structures, Alloys and Sound**

Casting seams, protruding pegs and other marks suggest that the Iron Age masters employed different kinds of metal techniques for constructing these instruments. Methods of manufacture include forging, riveting, soldering, overlaying, bending.

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from a plate, casting in two-part or triplicate moulds, in one, two or several parts, or à cire perdue, press-sheet metal technique, wax filigree technique etc. (cf. Lithberg 1914: 2–5; Oldeberg 1966: 82–92, 101–102, 163; Tomanderä 1991: 35–49). This multitude of techniques refers to a large number of makers and overlapping traditions. Using analogues with European bell founder tradition from more recent times, it is possible to see that the Iron Age masters were striving for good sound quality (Coleman 1971: 41; Nyman 2002: 76–77, 92; Westcott 1970). For example, they equipped iron bells with copper cover and bronze bells with iron clappers and staples of clappers – according to vernacular masters, these are old tricks to improve the sound.

Various alloys of bell bronze, especially the proportion of tin and lead to copper, can have an influence on the sound as well; while tin makes the sound more sonorous, lead damps it down (Schad & Warlimont 1984: 275–279; Westcott 1970). The elemental analysis of sixteen Iron Age bells, made by röntgen-fluorescence spectrometer by mineralogist Seppo Hornitzky, yielded varying results. The bells representing Baltic or Novgorodian regions or traditions had large proportions of both tin and lead. The bells made in Finland had no tin at all. The bells representing Volga-Finnish or Permian traditions, however, had large

![Spectrogram plot depicting the sound of the pellet bell NM 24868:2](image)

**Figure 1.** Spectrogram plot depicting the sound of the pellet bell NM 24868:2
proportions of tin and no lead at all (Tomander 1991: 46–48), which is an ideal alloy for sound production. In this respect, the masters following the easternmost traditions seem to have been the most skillful.

Although in the majority of cases the instruments were badly damaged, in 70 instances a more or less degenerated sound was still audible. I was given permission to record these original sounds into digital audiotape and analysed them at the Music Research Laboratory in Helsinki. Spectrogram plots, made by Spectutils spectrum analysis tools, reveal that a thousand-year-old bell sound is composed of 10–20 partials. The frequencies of these partials are high, from 2 to 16 kHz (fig. 1). In contrast with contemporary tuned hand bells and church bells (Hibbert 2003; Rossing 1984: 398–405), the spectrum is inharmonic: it is full of close pairs of frequencies, doublets and clusters, which means that the sound can not be perceived as one single pitch. Instead, to modern ears it sounds a bit harsh and vague. Owing to the corroded metal, it also dampens more rapidly. Sound pressure levels (L_A), measured by a sound level meter, range from 40 to 65 dB.

Archaeological contexts

Archaeological contexts are critical to understanding the possible meaning of these ancient sounds. Although a large proportion of the instruments was found in indistinguishable contexts, 10 items were found in hoards, 31 items in cairns and barrows and 196 items in a total of 80 inhumation graves, which make up the most valuable source of information. Typical late Iron Age inhumation graves contain abundantly furnishings: besides remains of bodies, brooches, bracelets, rings, weapons, tools, vessels and pieces of bronze spiral-decorated dresses, which all were deposited with the dead. It seems evident that the bells were fastened to dresses and hung from chains, chain sets, necklaces, belts, headgears and horse harnesses (Cleve 1978: 33–34, 35–36, 30–62; Lehtosalo-Hilander 1982a: 67–69, 89–94, 122–124, 285; Lehtosalo-Hilander 2000: 31, 47–48, 60–61, 98–99; Nallinmaa-Luoto 1978: 10–11, 26–28; Schvindt 1893: 18, 178). They were also put into pouches or sewn onto garments, where they served as buttons (fig. 2) (Lehtosalo-Hilander 1982a: 234–235; Pälsi 1928: 75, 77). Sometimes they were even fourteen or fifteen in number (Cleve 1978: 43–44, 55–56, 60–62; Lehtosalo-Hilander 1982a: 67–69, 89–94, 122–124, 285; Lehtosalo-Hilander 2000: 31, 47–48, 60–61, 98–99; Nallinmaa-Luoto 1978: 10–11, 26–28; Schvindt 1893: 18, 178). These bells were not buried deep in the ground, but were instead placed close to the head. It is probable that the dead wore these bells during their lifetime.

Figure 2. Eleven pellet bells in a line on a dead person's chest; grave 21 in the cemetery of Humikkala (1030–1150 A.D.) (Pälsi 1928: 75, 77).
Figure 3. Calculation of the value of grave furnishings in the cemetery of Köylönsaari C (975–1150 A.D.). Black bars denote graves with bells.

47–49; Paloniemi 1960: 26–27). Therefore, when people wearing dresses like this were on the move, the instruments started to ring and produce jingling acoustic spaces. Men, women, children – representatives of both genders as well as age groups could have this jingle around them. In comparison with women, who were wearing delicately vibrating eard bells, the acoustic image of men and horses was different: their bells were made of cut sheet metal and generated a more clattering or rattling sound.

The archaeological contexts of the bells also suggest that the instruments were reserved for socially distinguishable people, those who got the most elaborate funerals. These prominent members of society have the largest amounts of glass beads, silver coins, silk, scales, silver-ornamented swords, spearheads and axes in their graves – in other words, rare and expensive articles, which had to be imported from Central Europe, Russia, Byzantium, Arabia and Persia (Lehtosalo-Hilander 1984: 292–295, 323, 348, 361). Lehtosalo-Hilander’s (1982c: 37–47) method of calculation of the value of grave furnishing, applied to the cemeteries of Köylönsaari C, Luistari II–IV, Vilusenharju and Rikala (Halinen 1988: app.7; Lehtosalo-Hilander 1982b: 41–43; Koivisto 1996: app.3), confirms this impression: in all cemeteries the graves containing bells were counted among the most prestigious ones (fig. 3). There are only few exceptions. Statistical tests also show significant correlations between bells, precious metals, imported articles and the overall number of artefacts and artefact categories per grave.
The cultural context can be presented as follows: In the Finnish Iron Age the bells were to a certain extent associated with wealth and prosperity. Together with jingling amounts of chains, coins, beads and other ornaments, they belonged to the people who benefited from trade contacts with faraway countries or, at least, were stressing these contacts in their way of dressing and burial rites. In exchange for furs or possibly slaves, it was customary to bring bronze, silver, fabrics and weapons to Finland (Huurre 1995: 195–196). Bells, especially the very first ones, were imported too. It is possible to imagine that the dresses full of bells and other metal pendants made a reference to a certain cultural meaning. The metallic sound could, for example, mark the personal territories of the users, support their identities and make their appearances more impressive by conveying messages concerning wealth and power. At least in later Finnish folk poems and spells, the guardian spirits of fur animals were considered to be so rich that they "were tottering all around" in their jingling and heavy gold and silver garments (SKVR 1933: nr. 3305, 3307, 3308, 3318, 3320, 3336).

**Ethnographical parallels**

Another possible level of meaning is suggested in Finnish folk tradition, where bells were often regarded as amulets full of prophylactic properties. Cow bells, sheep bells and horse bells were taken into use and carried by common people in calendar rituals and rites of passage, whenever somebody crossed the limits of cultural bounds and needed protection. Together with sharp-edged, sharp-toothed and sharp-pointed metal weapons, the bells made up a magical barrier, a sound-wall, against evil spirits. (Kemppinen 1967: 40; Rantasalo 1955: 56–59, 58–60, 78, 88–89; Salminen 1916: 10, 52, 82, 83, 130, 137.)

A belief like this is of course difficult to be traced in an archaeological context, but it is still possible to try to read abstract codes that lie behind the surface. For example, the late Iron Age chest ornaments in Northern and Northeastern Europe repeatedly contain the following composite or variant pendants: bells, crosses, cowry shells, Thor's hammers, axe pendants, bear's tooth pendants, webbed foot pendants and bird-shaped pendants. All these can, according to tradition, be regarded as prophylactic amulets (Cleve 1978: 119, 189; Kivikoski 1965: 22–26, 32–35; Siikala 1992: 198–200, 239–242; Vuorela 1979: 141, 215, 454). Furthermore, the late Iron Age pouches and boxes contain bells, nuts, claws, burls, hair, animal bones and pieces of sulphur, which again are well-known amulets or magical items (Cleve 1978: 87; Schvindt 1893: 147, 190–191; Sirelius 1899, 554–561, 567–568; Siikala 1992: 240–242). Membership in this kind of paradigmatic set helps to determine the identity of the individual artefacts: in this case, it gives rather adequate grounds for interpreting the Iron Age bells as magical tools.
<table>
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<tr>
<th>ARTEFACTS</th>
<th>NUMBER</th>
<th>DIAMETER*</th>
<th>DATING</th>
<th>DISTRIBUTION</th>
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<tr>
<td>Pellet bells</td>
<td></td>
<td></td>
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<tr>
<td>Cluster 1</td>
<td>48</td>
<td>30 mm</td>
<td>950–1050</td>
<td>Åland, Finland Proper, Satakunta</td>
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<td>950–1050</td>
<td>Tavastia</td>
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<td>1000–1100</td>
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<td>Cluster 4</td>
<td>6</td>
<td>17 mm</td>
<td>1050–1150</td>
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<td>1000–1150</td>
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<td>77</td>
<td>13 mm</td>
<td>1050–1200</td>
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<td>-</td>
<td>750–</td>
<td>-</td>
</tr>
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<td>Bells</td>
<td>14</td>
<td>51 mm</td>
<td>400–</td>
<td>Åland, Finland Proper, Satakunta, Tavastia, Karelia, Russia, the Baltic countries, Scandinavia, Central Europe, the British Isles</td>
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<td>Bell pendants</td>
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<td>16 mm</td>
<td>550–1150</td>
<td>Åland, Nylandia, Finland Proper, Satakunta, Tavastia, Russia, the Baltic countries</td>
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<td>Cluster B</td>
<td>35</td>
<td>6 mm</td>
<td>1050–1300</td>
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<td>Cluster C</td>
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<td>13 mm</td>
<td>1050–1300</td>
<td>Karelia, Savonia, Tavastia, Ostrobothnia, Kainuu, Russia</td>
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<td>9 mm</td>
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<td>24</td>
<td>-</td>
<td>400–1150</td>
<td>-</td>
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<tr>
<td>Total</td>
<td>481</td>
<td>-</td>
<td>400–</td>
<td>-</td>
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* Maximum width of the body on average

**Table 1.** Facts and figures about the clusters.

**Conclusions**

On examination it was found that the Iron Age bells, pellet bells and bell pendants number at least 481 in Finnish finds. They have been found in all parts of inhabited Finland and especially in all the centers of habitation dating from the 10th–13th centuries A.D. This points to the conclusion that the artefacts were in regular and established use, embellishing or manipulating the soundscape when needed or suited. The pebbles, pellets and clappers, for their part, prove that the artefacts were indisputably instruments intended for sound production. As such, they are the oldest ones left in Finland.

The bells were no toys, but supported the identities of women, children and men, who used to be distinguished from the others, at least in lavishly performed burial rites. People often acquired their bells from a distance and considered them
to be dignified enough to be taken along into the afterlife. In addition to wealth and prosperity, the bells seem to have associated with the sphere of magic.

Apart from the audible past, the bells tell of prehistoric craftsmanship, communications, trade contacts, clothing, beliefs and burial customs. They can also shed light on the ways in which the soundworld was involved in constructing social hierarchies and expressing cultural norms and ideals.

TIIVISTELMÄ

Suomen rautakautiset kulkuset, kellot ja kellenmuotoiset riipukset – äänimaiseman arkeologiaa

Väitöskirjatyöhön perustuvan artikkelin aiheena ovat Suomen keski- ja myöhäisrautakauden aikaiset kulkuset, kellot ja kellenmuotoiset riipukset, aiemmin tutkimaton, soiva metalliesineiden ryhma 400–1200-luvuilta jKr. Mustikkarkeologian alaa kuluiuvan tutkimuksen tarkoituksena on avata kuulokulma rautakauteen ja selvittää: a) kuinka tukiin tai kameratuon 481 esiintää luokitellaan ja kuinka ne ovat soinnet; b) kerka näitä Suomen vanhimpia sailyneita soittimia ovat käytännössä ja missä yhteydessä: sekä c) mikä merkitys soittimilla ja niiden soinnilla on ollut rautakautisessa kulttuurissa ja äänimaisemassa.

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