STUDIA INSTRUMENTORUM MUSICAE POPULARIS XVI
Tarptautinės tradicinės muzikos tarybos Liaudies muzikos instrumentų tyrimų grupės XVI tarptautinės konferencijos straipsniai /
ICTM Study Group on Folk Musical Instruments
Proceedings from the 16th International Meeting

ISSN 1392–2831 Tautosakos darbai XXXII 2006

JINGLE BELLS, BELLS AND BELL PENDANTS – LISTENING TO THE IRON AGE FINLAND

RIITTA RAINIO
Department of Musicology, *University of Helsinki*

Subject: Metal rattles found in Finland dating back to the middle and late Iron Age.
Purpose of study: To document and classify the rattles and test them as sound-producing devices. To shed light on the Iron Age soundscape and ideas of music making.
Methods: Multivariable analysis, elementary analysis, sound analysis, contextual archaeological methods.
Keywords: Archaeology, iron age, barter, burial, adornment, ethnomusicology, soundscape, musical instrument, bell, rites of passage, amulets, casting, alloy.

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 in turn left 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 to be used.

The aim of my piece of research 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 data consists of 467 archaeological finds – 292 jingle bells, 15 bells and 160 bell pendants – which have been discovered in excavations throughout the country and are dated to the 5th–13th centuries, i.e. to the periods of middle and late Iron Age. In spite of their fairly large total number, these jingling bronze, iron and silver objects have not awakened even archaeologists' interest: they have not been fully documented, described or regarded and tested as sound-producing devices. Yet in Finland, where soil is acidic and possible musical instruments of wood, bone or leather have decomposed, the organological value of these metal objects is irreplaceable.

In other north and northeast European countries, pieces of prehistoric bone flutes, whistles, whizzers, wooden lyres and other stringed instruments have been preserved

and studied by music archaeologists (Lund 1981: 246–265; Povetkin 1992: 206–224). Malm, Fehner (1967), Gräslund (1984), Malinowski (1994) and Stassiková-Stukovská (1994) have written articles on metal bells also found in Russia, Sweden, Poland and Slovakia.

During the last few years, I have explored the original Finnish jingle bells, bells and bell pendants at the National Museum of Finland and at certain provincial museums. My purpose is to classify them according to size, shape, 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? Selecting the appropriate methods for a study on music archaeology is a challenging task. A number of interdisciplinary methods and viewpoints will be needed.

Classifying the Data

On the grounds of sound production mechanism, the objects can be divided into three groups. First, the jingle bells are made up of an enclosed, spherical waist and free little stones or metal pellets that dash against the inside walls (Fig. 1). In the second group, the bells are made up of an open, conical waist and an iron bar or striker that is pivoted in the bottom and swings to and fro (Fig. 2). Often the striker 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 (Fig. 2). Since they usually appear in clusters, they are able to produce a sound by jingling against each other,

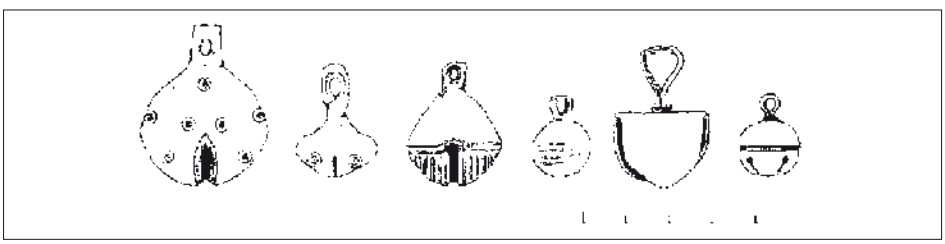

Fig. 1. Jingle bells representing clusters 1–6.
(KM 8602:31, 9102:20, 32717:2, 32291:675,18000:2884, 8656:H21:9)

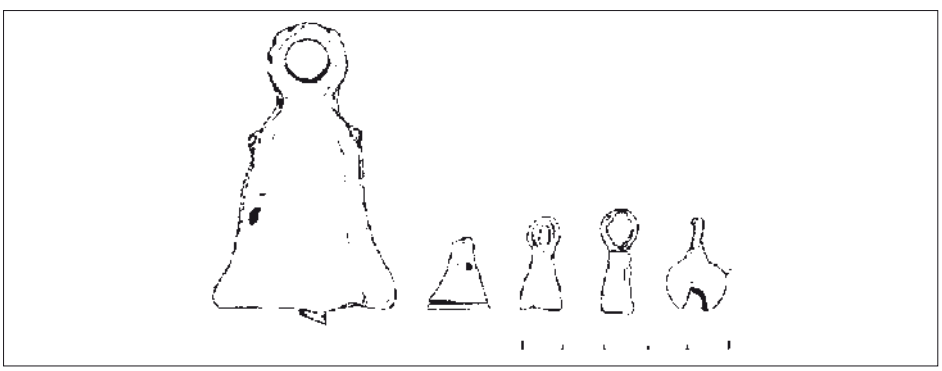

Fig. 2. A bell (KM 30445:2) and bell pendants representing clusters A–D.
(KM 3574:158, 2494:17, 6709:5, 2481:73)

even if they do not have a striker. Actually, only few bell pendants bear traces of a striker. In addition to these objects, 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 and coded the information on various attributes of the objects (size, shape, ornaments) into a matrix and then computerized it. Using the SPSS Two Step Cluster Analysis procedure, I was able to separate the jingle bells further into six categories or clusters (Fig. 1), and bell pendants into four categories or clusters (Fig. 2). Each of these categories seemed to have a slightly different dating and a different distribution. A comparison with distribution maps of other northeast European bells indicates that some objects were clearly brought to Finland from Slavic, Baltic, Permian or Volga-Finnish regions (clusters 3, 4, C, D) (Apals et al. 1974: 161, 225, 266, t. 42, t. 53, t. 56, t. 61; Bliujienė 1992: 118; Gräslund 1984: 119–124; Jaanits et al. 1982: 318, 350, 365; Malinowski 1994: 183–199; Malm, Fehner 1967: 133–141; Povetkin 1992: 210–212; Spicyn 1901: t. 6, 19, 21, 24–26; Spicyn 1902: t. 3, 10–14, 32; Stankus 1995: 92; Stassiková-Stukovská 1994: 443–446 etc.), while others were made locally in Finland (clusters 1, 2). In certain cases it was even possible to attribute 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

Cast-sutures, pegs and other marks suggest that the Iron Age masters employed different kinds of metal techniques for constructing these instruments. Methods include smithing, riveting, soldering, overlaying, casting in two-part or tripartite 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; Tomanterä 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 (Coleman 1971: 41; Nyman 2002: 76–77, 92; Westcott *Bells and…*), it is possible to see that the Iron Age masters too were striving for good sound quality. For example, they equipped iron bells with copper cover and bronze bells with iron strikers and staples of strikers – 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 *Bells and*...). The elementary analysis of sixteen Iron Age bells, made by röntgenfluorescense spectrometer by mineralogist Seppo Hornytzkyj, yielded varying results. The bells

brought from Slavic or Baltic regions had large proportions of both tin and lead; the bells made in Finland had no tin at all; and the bells originating from Permian or Volga-Finnish regions had large proportions of tin and no lead at all (Tomanterä 1991: 46–48), which is an ideal alloy for sound production. In this respect, the masters in Permian or Volga-Finnish regions 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. 3). In contrast with contemporary tuned hand bells and church bells (Hibbert *The Sound*...; Rossing 1984: 398–405), the spectrum is very 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, measured by a TES sound level meter, range from 40 to 65 dB(A).

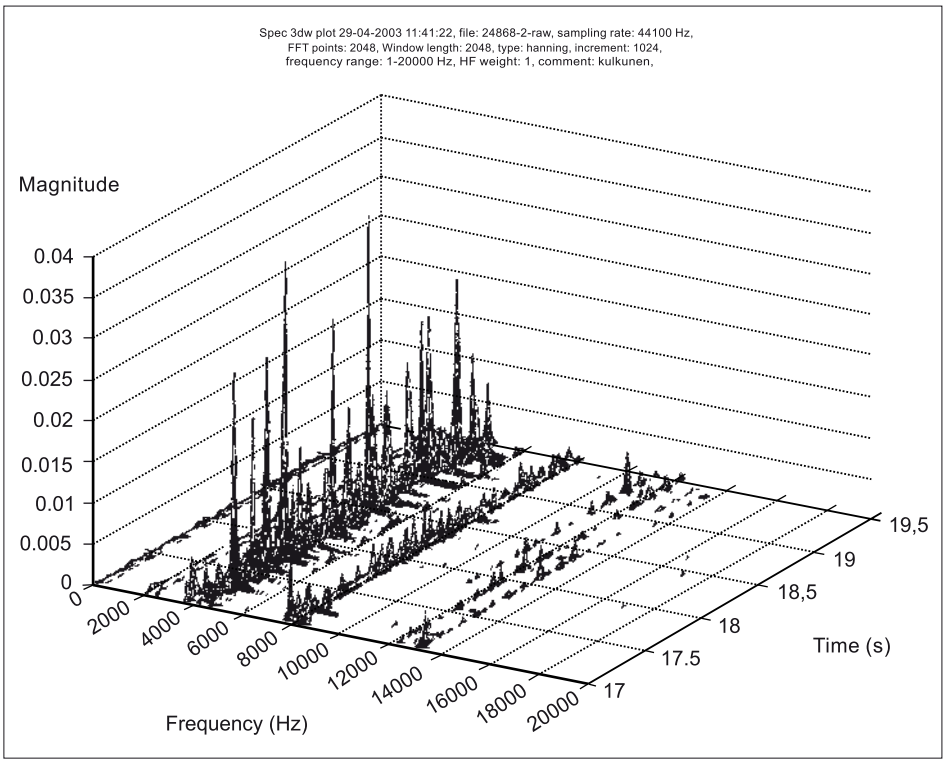

Fig. 3. Spectrogram plot depicting the sound of the jingle bell KM 24868:2.

Archaeological and Cultural 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, 32 items in cairns and barrows and 190 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 peaces of bronze spiral-decorated dresses, which all were deposited with the dead. It seems fairly evident that the bells were fastened to dresses and hung from chains, chain sets, necklaces, belts, headgears and horse harnesses (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; Schwindt 1893: 18, 178). They were also sewn onto garments and pouches, where they served as buttons (Lehtosalo-Hilander 1982a: 234–235; Pälsi 1928: 75, 77). Sometimes they were even fourteen in number (Cleve 1978: 47–49). 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 cast 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 contexts in which the bells were found also suggest that they were reserved for socially distinguished people, those who received the most elaborate funerals. These prominent members of society possess the most furnishings and also have glass beads, silk, scales, silver coins and 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). To obtain an overview of the differences in the status of graves, I have used the method developed by Finnish archaeologist Lehtosalo-Hilander (1982b: 37–47). Her method of calculation of the value of furnishing is based on Early Medieval Danish, Frankish, Slavic, Byzantine and Arabian sources which enable one to estimate the comparative prices of different articles in graves. In all analysed Finnish cemeteries – Köyliö, Luistari, Taskula and Vilusenharju (Halinen 1988: appendix 7; Koivisto 1996: appendix 3; Lehtosalo-Hilander 1982b: 41–43) – the graves containing bells were counted among the most prestigious ones (Fig. 4). Statistical tests also showed significant correlations between bells, precious metals, luxury items and the overall number of items per grave.

The uncovered 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 most from trade contacts with faraway countries, and were willing to show it in their way of dressing. Possibly this group of people even

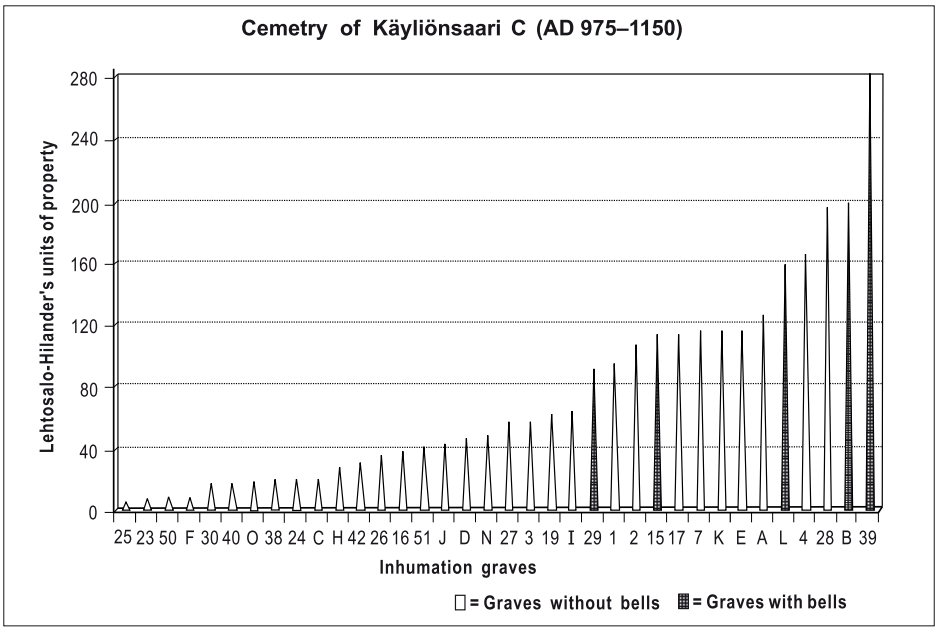

Fig. 4. Calculation of the value of grave furnishings in Köyliö.

ran the local branches of the long-distance exchange, which at that time was lively. In exchange for furs (or slaves), they brought 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, chains, coins and other metal pendants made a reference to some kind of cultural meaning. They could, for example, support the identities of the users acoustically, and make their appearances more impressive by conveying messages concerning wealth, status 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: 3305, 3307, 3308, 3318, 3320, 3336).

Ethnographical Parallels

Another possible level of meaning is suggested in Finnish folk tradition, where bells were always 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, or 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 against evil spirits. (Kemppinen 1967: 40; Rantasalo 1955: 36–39, 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 repeatedly contain the following composite or

variant pendants: bells, crosses, cowry shells (*Cypraea moneta*), 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 1994: 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; Schwindt 1893: 147, 190–191; Sirelius 554–561, 567–568; Siikala 1994: 240–242). Membership in this kind of paradigmatic set helps to determine the identity of the individual artefacts; in this case, it gives adequate grounds for interpreting the Iron Age bells as magical items.

Conclusions

The examination of over 400 jingle bells, bells and bell pendants proves that these Iron Age objects were indisputably instruments intended for sound production. These humble musical instruments play an important role in the history of Finnish music: they are the oldest surviving, concrete remnants of Finnish musical customs. Judging from their frequency, their metallic, monotonous jingle enchanted the Iron Age people and was on certain occasions used to embellish or manipulate the soundscape. The bells were no toys, but belonged to the dresses of wealthy matrons and sword-bearing men, who often acquired their bells from far away and considered them to be dignified enough to be taken along into the afterlife. Apart from the audible past, the bells tell of prehistoric craftsmanship, communications, burial customs and beliefs. They can also shed light on the ways in which the soundworld was involved in constructing social hierarchies and expressing cultural norms, values and ideals.

SOURCES AND REFERENCES

Museum collections:

Häme Castle, Hämeenlinna. Archaeological collections.

The Museum Centre Vapriikki, Tampere. Archaeological collections.

The National Board of Antiquities, Department of Archaeology, Helsinki. Archaeological collections.

The National Museum of Finland, Helsinki. Archaeological collections.

The Regional Museum of South Karelia, Lappeenranta. Archaeological collections.

Savonlinna Provincial Museum, Savonlinna. Archaeological collections.

Turku Provincial Museum, Turku. Archaeological collections.

University of Turku, Department of Archaeology, Turku. Archaeological collections.

Vanhalinna Museum, Lieto. Archaeological collections.

Åland museum, Mariehamn. Archaeological collections.

Literature:

Apals, J., et al. (1974). *Latvijas PSR arheoloģija*. Rīga.

Bliujienė, Audronė (1992). Alinkos (Raistinės) pilkapiai. *Lietuvos archeologija, t. 8*, pp. 105–126.

Cleve, Nils (1978). *Skelettgravfälten på Kjuloholm i Kjulo*. Helsinki.

Coleman, Satis N. (1971). *Bells,Their History,Llegends, Making and Uses*. Westport, Connecticut.

Gräslund, Anne-Sofie (1984). Schellen. In Greta Arwidsson (Ed.), *Birka, No 2(1): Systematische Analysen der Gräberfunde* (pp. 119–124). Stockholm.

Halinen, Petri (1988). *Köyliön Vanhankartanon c-kalmistoa ja Euran Luistarin kalmistoa käyttäneiden yhteisöjen sosiaalinen ja taloudellinen rakenne*. Helsinki.

Hibbert, Bill (*The Sound*). The Sound of Bells. – *http://www.hibberts.co.uk/* [Viewed July 1, 2003].

Huurre, Matti (1995). *9000 vuotta Suomen esihistoriaa*. Helsinki.

Jaanits, L., et al. (1982). *Eesti esiajalugu.* Tallinn.

Kemppinen, Iivar (1967). *Haudantakainen elämä karjalaisen muinaisuskon ja vertailevan uskontotieteen valossa.* Helsinki.

Kivikoski, Ella (1965). Magisches Fundgut aus finnischer Eisenzeit. *Suomen Museo*, *Vol. 72*, pp. 22–35.

Koivisto, Satu (1996). *Tampereen Vilusenharjun ruumishaudat rautakautisen yhteisön heijastajana.* Helsinki.

Lehtosalo-Hilander, Pirkko-Liisa (1982a). *Luistari, No 1: The Graves*. Helsinki.

— (1982b). *Luistari, No 3: A Burial-Ground Reflecting the Finnish Viking Age Society*. Helsinki.

— (1984). Keski- ja myöhäisrautakausi. In Yrjö Blomstedt, Veikko Anttila, Jukka Nevakivi, Kauko Pirinen, Tuomo Polvinen, Reino Riikonen, Unto Salo, Hannu Soikkanen, Pentti Virrankoski, Jukka Tarkka (Ed.), *Suomen historia* (No 1, pp. 250–405). Espoo.

— (2000). *Luistari, No 4: A History of Weapons and Ornaments*. Helsinki.

Lithberg, Nils (1914). Koskällan. *Fataburen, Vol. 1914*, pp. 1–18.

Lund, Cajsa (1981). Archaeomusicology of Scandinavia. *World Archaeology, Vol. 12, No 3*, pp. 246–265.

Malinowski, Tadeusz (1994). Quelques idiophones en metal (grelots et clochettes) du haut moyen age polonais. In Marcel Otte (Ed.), *Sons Originels. Préhistoire de la musique* (pp. 183–199). Liège.

Malm, V. A., Fehner, M. V. (1967). Привески-бубенчики. *Труды Государственного исторического музея, № 43*, pp. 133–148.

Nallinmaa-Luoto, Terhi (1978). *Tampere-Vilusenharju. Nuoremman rautakauden kalmisto Pirkanmaalla.* Turku.

Nyman, Harri (2002). *Umpikulkusista kirkonkelloihin: vaskenvalu Kaavin Juutilassa.* Kuopio.

Oldeberg, Andreas (1966). *Metallteknik under vikingatid och medeltid*. Stockholm.

Povetkin, V. I. (1992). Musical Finds from Novgorod. In Mark A. Brisbane (Ed.), *The Archaeology of Novgorod, Russia* (pp. 206–224). Lincoln.

Pälsi, Sakari (1928). Puvustoaineksia Maskun Humikkalan kalmistosta. *Suomen Museo, Vol. 35*, pp. 71–79.

Rantasalo, A. V. (1955). *Arkea ja juhlaa vuodenaikojen vaihdellessa*. Turku.

Rossing, Thomas D. (1984). Tuned Handbells, Church Bells and Carillon Bells. In Thomas D. Rossing (Ed.), *Acoustics of Bells* (pp. 398–405). New York.

Salminen, Väinö (1916). *Inkerin kansan häärunoelma muinaisine kosimis- ja häämenoineen.* Helsinki.

Schad, C.-R., Warlimont, H. (1984). Acoustical Investigations of the Influence of the Material on the Sound of Bells. In Thomas D. Rossing (Ed.), *Acoustics of Bells* (pp. 266–286). New York.

Schwindt, Theodor (1893). *Tietoja Karjalan rautakaudesta*. Helsinki.

Siikala, Anna-Leena (1994). *Suomalainen šamanismi: mielikuvien historiaa.* Helsinki.

Sirelius, Uuno Taavi (1989). *Suomen kansanomaista kulttuuria: esineellisen kansatieteen tuloksia, No 2*. Helsinki.

SKVR 1933 – *Suomen kansan vanhat runot, Vol. VII,5: Raja-Karjalan ja Pohjois-Karjalan runot. Loitsuja. Julk. Kaarle Krohn ja V. Alava*. Helsinki.

Spicyn, A. A. (1901). Древности Бассейновъ реки Оки и Камы. *Матеріалы по Археологіи Россіи, № 25.*

— (1902). Древности Камской чуди по коллекціи Теплоуховыхъ. *Матеріалы по Археологіи Россіи, № 26*.

Stankus, Jonas (1995). Bandužių kapinynas. *Lietuvos archeologija, t. 12*, pp. 75–92.

Stassiková-Stukovská, Danica (1994). Metal rattles of the Western Slavs. In Catherine Homo-Lechner (Ed.), *La Pluridisciplinarité en archéologie musicale* (No 1-2, pp. 443–446). Paris.

Tomanterä, Leena (1991). Wachsfiligran. *Fennoscandia archaeologica, Vol. 8*, pp. 35–49.

Vuorela, Toivo (1979). *Kansanperinteen sanakirja*. Porvoo.

Westcott, Wendell (*Bells and...*). Bells and Their Music. – *http://www.msu.edu/~carillon/batmbook* [Viewed July 1, 2003].

VARPELIAI, VARPAI IR VARPELIŲ PAVIDALO PAPUOŠALAI – GELEŽIES AMŽIAUS ATGARSIAI SUOMIJOJE

RIITTA RAINIO

Santrauka

Straipsnyje aptariami 467 metaliniai barškučiai – varpeliai, varpai ir varpelių pavidalo papuošalai – Suomijoje kildinami iš viduriniojo arba vėlyvojo geležies amžiaus (400–1300 m.). Šie geležiniai, bronziniai arba sidabriniai dirbiniai (neskaitant vieno kaulinio švilpuko fragmento) yra vieninteliai Suomijoje archeologiniai geležies amžiaus radiniai, kuriuos galima laikyti muzikos instrumentais. Tyrimo tikslas – bent kiek pasiaiškinti geležies amžiaus garsovaizdį ir tuometinį muzikos supratimą. Keliami klausimai: kaip šie instrumentai skambėjo? kaip jie buvo naudojami? ką jų garsai reiškė geležies amžiaus žmonėms? Ieškant atsakymų, pasitelkiami tarpdisciplininiai metodai: statistine daugelio kintamųjų analize siekiama papildyti tradicinę archeologinę tipologiją, akustine analize tiriamas nepažeistų dirbinių garso spektras, o chemine analize siekiama nustatyti varpų metalo lydinio sudėtį, nes kai kurie jo komponentai galėjo būti naudojami tikslingai, norint paveikti skambėjimą. Nevienodų liejimo ir padengimo technologijų pėdsakai gali liudyti ir skirtingą varpų liejikų profesinį meistriškumą. Interpretuojant archeologinį kontekstą (t. y. kur ir kaip šie instrumentai buvo rasti, iš viso daugiau kaip 100 kapaviečių ir sankaupų), galima iš dalies atkurti buvusią socialinę ir simbolinę jų reikšmę. Tokios analizės rezultatai lyginami su paskesne suomių liaudies tradicija, kurioje varpai būdavo traktuojami kaip amuletai ir naudojami perėjimo ritualuose, taip pat kontroliuojant aplinkinius dirbamos žemės plotus.

Gauta 2006-06-19