LIETUVOS ARCHEOLOGIJA. 2015. T. 41, p. 143–168. ISSN 0207-8694

BONE AND ANTLER WORKING IN THE TALLINN SUBURB OF KIVISILLA, 14TH–19TH CENTURIES: THE RESULTS OF THE ARCHAEOLOGICAL INVESTIGATIONS AT TARTU ROAD 1

HEIDI LUIK, ULLA KADAKAS, VILLU KADAKAS, LIINA MALDRE

The paper discusses bone and antler artefacts found during the excavations at Tartu Road 1 in Tallinn during 2011–2012. Most of the bone finds date to the 14th–16th centuries, the latest to the 18th–19th centuries. Both artefacts and working debris have been found, the most abundant material among the debris being waste from bead and button making. Antler artefacts and working debris were also found. Both the plot's location and the house's size and spatial division point to a public building. A guesthouse or tavern at a river next to a bridge could have been a suitable stopping place for itinerant craftsmen who manufactured their products on the spot. The few Modern Age items are common articles used in domestic households. The buttons and button making debris belong to the 18th century.

Keywords: Estonia, Tallinn, medieval, Modern Age, bone and antler working.

Straipsnyje aptariami 2011–2012 m. Taline, Tartu kelias 1, vykusių kasinėjimų metu rasti kaulo ir rago dirbiniai. Dauguma kaulo radinių datuojami XIV–XVI, vėlyviausi – XVIII–XIX a. Aptikta kaulo dirbinių ir jų gamybos atliekų, tarp kurių daugiausia buvo karolių ir sagų gamybos atliekų, taip pat rago dirbinių ir jo nuolaužų. Tyrinėto ploto vieta, pastato dydis ir erdvių jame pasiskirstymas leidžia manyti, kad čia greičiausiai būta visuomeninės paskirties pastato. Šalia tilto per upę įsikūrę svečių namai ar smuklė galėjo būti tinkama vieta keliaujantiems amatininkams apsistoti ir čia gaminti savo produkciją. Aptikta šiek tiek naujųjų laikų dirbinių – įprastinių namų apyvokos daiktų, XVIII a. datuojamų sagų ir jų gamybos atliekų.

Reikšminiai žodžiai: Estija, Talinas, viduramžiai, naujieji laikai, kaulo ir rago apdirbimas.

INTRODUCTION

An archaeological excavation was conducted in about 1100 m^2 on the former plot of the Estonian Academy of Arts at Tartu Road 1, Tallinn in 2011–2012. The cultural layer at the site was 2.5–3 m thick. The uppermost 1–1.3 m, which was connected with recent demolition work or originated in the second half of the 19th–20th century, were removed with a backhoe under the supervision of an archaeologist. The cultural layers and construction remnants from the 14th–19th centuries were excavated manually (Kadakas *et al.* 2013, p.133). A large quantity of bone artefacts and bone working waste was discovered among the abundant archaeological material (cf. Russow *et al.* 2013, p.159, Fig. 5:2, 3). The discovered 86 bone artefacts and fragments of bone and antler with processing marks comprise a considerable collection of finds in Tallinn, but a rather scant

one compared to those in many medieval European towns. The objective of the article is to overview the discovered artefact types and the dates of the artefacts and processing waste and to discuss how bone processing occurred in the area during various periods, which materials were used, and which kind of artefacts were manufactured on the site.

LOCATION OF THE SITE AND STRATIFICATION

The plot at Tartu Road 1 is at a favourable spot roughly 0.5 km to the southeast of the town wall on the left bank of the former River Härjapea. Two major roads approaching from the east and southeast (Narva and Tartu) met next to a stone

Fig. 1. Tallinn's suburbs in the 17th century. Situation plan of the excavated area at Tartu Road 1: 1 – Town Hall Square, 2 – Toompea Hill, 3 – the harbour, 4 – Tõnismägi Hill, 5 – former River Härjapea, 6 – the road to Tartu, 7 – the medieval road to Narva, 8 – the road to Pärnu and Riga, 9 – medieval St John's hospital, 10 – St Barbara's Cemetery, 11 – Viru Gate, 12 – Karja Gate, 13 – the medieval execution site Võllamägi ('Gallows Hill'), 14 – the mill pond. *Drawing by R. Nurk and V. Kadakas.* Base map: Unpublished reconstruction of 17th-century Tallinn by K. Schultz (Tallinn City Archives, 149-4-53).

bridge crossing the river roughly 50 m southeast of the site (Fig. 1), and continued as a single road to the Old Town due northwest of the site (Nurk *et al.* 2010, pp.5–6; Kadakas *et al.* 2013, pp.133–136, Fig. 1, 2). The suburb was named after this stone bridge, i.e. *Kivisilla* (Eng. *Stone Bridge*). Although it is thought that the area might have been settled already in the prehistoric period (i.e. before the 13th century), the oldest strata discovered in 2011–2012 come from the turn of the 14th century (Kadakas *et al.* 2013, pp.138, 146). The discovered building remnants and stratification has been thoroughly described in a fieldwork review article (Kadakas *et al.* 2013) and therefore only a short summary is presented here.

Although the area had been partly disturbed by later structures, it was possible to distinguish the context of the discovered bone artefacts. The medieval layers and building remnants from the turn of the 14th – last quarter of the 16th century formed a 0.5–0.7 m thick layer with a large quantity of preserved organic material[1]. In the remains of a medieval house (Fig. 2), three major building stages during its enlargement could be identified. Based on the size and archaeological material of the house, it is thought that it might have been an inn or a tavern rather than a home. The house was probably destroyed in the 1570s during the Livonian War. The Early Modern cultural layer from the late 16th–17th centuries was roughly 0.5–1 m thick. The remains of several smaller buildings and cesspits belong to this period. Several buildings had been erected in the area later, during the 18th – first half of the 20th century (Kadakas *et al.* 2013, pp.137–145, Fig. 3–11).

Fig. 2. The remains of the medieval house during the excavation at Tartu Road 1. The earliest building phase, with a timber cesspit in the foreground. View from the E. *Photo by U. Kadakas.*

CHRONOLOGY OF THE CONTEXT OF THE BONE ARTEFACTS AND PROCESSING WASTE

During the investigation of the plot at Tartu Road 1, context-based excavation methods were applied. The chronological dates of the contexts were determined on the basis of datable artefacts (Kadakas *et al.* 2013, pp.136–137). In respect to the bone working, determining the context date was especially important for the processing waste, which, unlike artefacts, cannot be dated on the basis of typology. The bone artefacts that could be dated based on typology mostly fit with the context dates. Nevertheless, some finds did not fit the context of their discovery. For example, medieval post medieval artefacts can find their way into later contexts by chance because of later digging activities (Russow *et al.* 2013, p.159).

As has already been mentioned, the 2011–2012 fieldwork yielded 86 bone and antler artefacts. Two pieces of processing waste later discovered in the spoil cannot be dated using the context. Thus 84 finds have datable contexts. Half (43 items) of these finds are processing waste.

A bit more than a half of the finds obtained during the 2011–2012 excavations: 47 artefacts and pieces of processing waste, can be connected, based on their context, to medieval activities from the 14th – last quarter of the 16th century. Among

[1] In chronology of Estonian archaeology normally the period between 1227 and 1558 (beginning of the Livonian War) is called the Middle Ages.

the artefacts, the bone needle, the fragment of a double-sided composite comb, the bear distal phalanx, three dice, the broken disc-shaped gaming piece, the playing piece made from a cattle phalanx, the possible toggle or buzzer, the antler detail from a knife handle, the cylindrical antler artefact, two decorative antler plates, and four bone beads date to this period. Among the processing waste from medieval desposits, unlike five pieces of elk antler with processing marks, 24 pieces of bone with holes and arches are bead-making waste. Another two pieces of bead-making waste that lack a datable context probably also come from the Middle Ages.

14 artefacts date to the 17th century, the Early Modern period, according to the context of their discovery. Most are bone: two gaming pieces made from phalanges, a handle, a fork, a gaming piece, and two flutes, but some are antler: a simple comb, a decorated truncated conical item, a disc-shaped gaming piece, and a broken crossbow nut. The only processing waste that could be connected by context to this period was a piece of elk antler with the ends sawn off and a cattle horn core with a sawed-off end. It is worth mentioning that seven of these items come from a fill layer in a wide pit discovered in the southern part of the excavated area. This fill layer was barely distinguishable from the medieval deposits lying beneath it owing to its similar structure, which was rich in manure and other organic materials. The pit had probably been filled in the early 17th century, but it also included earlier items. Most of the bone artefacts from this context typologically fit the 15th–16th centuries (see below).

23 finds date to the 18th–19th centuries based on their context. Almost without exception, these are buttons and button-making waste: 10 pieces of each. Also, one round bone bead was discovered in 18th–19th-century deposits, but it is equally likely that it comes from the Middle Ages, like the other beads and their processing waste. In addition to buttons and their processing waste, only two other finds come from the 18th–19th centuries: a broken toothbrush and two halves of a tube with cylindrical ends.

Six bone artefacts: two handles and four buttons, were discovered during the 2010 field evaluation at the site: all of them come from a 16th–18th-century context (Nurk *et al.* 2010, p.14).

THE ARTEFACTS, THEIR FUNCTIONS, AND DATING

Tools

A bone needle made from a pig fibula (Fig. 3:1) was found in the organic-rich layer deposited during the construction of the western part of the southern wall of the medieval house and can be dated to the early 16th century. Bone needles are very common in medieval post medieval layers, specimens having been found, for example, at Sauna St. 10 and Roosikrantsi St. 9/11 in Tallinn as well as in Lihula (Luik 2001, p.324; 2002, pp.313–314, joon. 6; Luik, Maldre 2003, pp.8–9, joon. 4).

A bone point, made from a longitudinally split pig rib, was found during the analysis of unworked faunal remains. Based on the context of the discovery, it dates to the late 15th – early 16th century. Some tools made from ribs, one also from a pig, have been found at the Teutonic Knight castle in Viljandi, but these tools have a somewhat different shape (Haak *et al.* 2012, p.317, Fig. 19:4, 5).

The cylindrically shaped antler object has concave sides and may have been a detail meant to hold a strap or cord running around it or some kind of reel or spool for a cord (Fig. 3:6). It was found in the fill soil of a wooden cesspit built during the earliest building phase of the medieval house (Fig. 2). The cesspit was probably filled in the 16th century. A similar antler item (AI 6476: 312) was also found during the 2001 archaeologi-

Fig. 3. Bone and antler artefacts: 1 – the bone needle, 2 – the fork, 3 – the handle, 4 – the handle part, 5 – the fragment of a crossbow nut, 6 – the cylindrical antler artefact, 7 – the brown bear distal phalanx, 8 – the cylindrical tube (AI 7032: L960, L1811, L261, L1603, L1575, L1602, L1606, L395/656:1). *Photo by S. Nittim.*

cal excavation near St John's Hospital, which is near Tartu Road 1.

A small drop-shaped antler artefact, probably part of a handle (Fig. 3:4), was found in a 15th-century context: at the original ground level when the medieval house was erected. Some similar antler artefacts are known from the excavations at Sauna St. 10 in Tallinn (Luik 2001, p.324) and the bishop's castle at Otepää (e.g. AI 3371: 185, 4036 I: 1988). Similar antler handle parts, both drop- and lozenge-shaped, are known from medieval and post medieval towns in Russia, e.g. from Tver (Костыгина 1996, с.183, рис. 2:4, 3:16–19) and Novgorod (НМГ КП 28080/A-57:259, 30861/A-68:118, 31696/A-76:119–124).

The two handles have a similar shape, but different decoration. One is the handle of a two-tined bone fork decorated with ring-and-dot designs on both sides. Two notches and a knob have been carved on the handle's tip (Fig. 3:2). The other handle has a tang slot and could have been for a metal-tined fork. The handle's tip is carved into two triangular tabs with a knob between them. The handle is decorated with cross-hatching and is pierced by three round holes (Fig. 3:3). According to the context of its discovery, the fork may date to the late 17th century and the handle to the 17th century. A two-tined bone fork decorated with ring-and-dot designs is also known from Roosikrantsi St. 9/11 in Tallinn, where metal forks with bone handles have also been found (Luik, Maldre 2003, pp.13–15, joon. 10–11). Some handles with

a grid decoration have been found at other locations in the suburb of Kivisilla (e.g. Tartu Road 10, AI 6456:28; Härjapea, AI 6004:III/72) as well as elsewhere, for example from Einbeck, Germany (Heege 2002, Abb. 646). The fork and handle from Tartu Road 1 stand out owing to their fine workmanship and beautiful design.

Two handles (Fig. 4) found during the 2010 field evaluation come from a 16th–18th-century context (Nurk *et al.* 2010, p.14). About a half of the faceted handle has been preserved. It was made from a cattle long bone and is decorated with an irregular grid created with black paint (Fig. 4:1). Faceted bone handle fragments have also been found in Lihula (Luik 2002, p.314, joon. 7:2) and a faceted antler handle decorated with rings and dots in Viljandi Castle (Haak *et al.* 2012, p.319, Fig. 21:5). A handle similar to the one from Viljandi is also known from Antwerp (Ervynck 1998, Fig. 49). Bone artefacts were sometimes already coloured in the Roman period, but colour pigments have usually not survived on them. Recommendations for colouring bone have been documented in some medieval and post medieval written sources (MacGregor 1985, pp.67, 70). Instructions for colouring bone and ivory handles are also given in M. H. Landrin's 1836 book *Kunst des Messerschmiedes* (Landrin 2000 [1836], pp.362–368).

Fig. 4. Handles found during the 2010 field evaluation: 1 – the faceted bone handle, 2 – the elephant ivory handle (AI 6967: 528, 526). *Photo by H. Luik.*

The other handle is made of elephant ivory and has an expanding curve on one side of its butt (Fig. 4:2). Only a small part of the blade has survived, but it was probably a table knife. Similarly shaped bone handles, dating to the 17th–18th centuries, have also been found at other Estonian sites, for example, Proosa and Keila (Deemant 1989, Taf. XVI:8; Mandel 1994, p.394, Taf. XVIII:7, 8). Similar handles from Joniškis, Lithuania date to the 17th century (Vasiliauskas 2012, p.307) and from Einbeck, Germany to the 17th–18th centuries (Heege 2002, Abb. 670:13, 14).

An antler crossbow nut (Fig. 3:5), found in the fill layer, was dated to the early 17th century. They have also been found in Tartu, Otepää Castle, and Viljandi Castle in Estonia (Trummal 1992, tahv. IX:7; Luik 2009, joon. 27:2; Haak *et al.* 2012, pp.311–313, Fig. 16) as well as many other European sites. They mostly date to the 13th–16th centuries (e.g. MacGregor 1985, p.160, Fig. 84:d, e; van Vilsteren 1987, Fig. 28; Cnotliwy 1999, p.212, ryc. 3:16, 17; Rackevičius 1999, pav. 3:1, 2; Majantie 2007, p.44; Rijkelijkhuizen 2008, Fig. 2.2; Lang 2010, p.88, Fig. 2; Haak *et al.* 2012, pp.312–313). As mentioned, the fill layer where the nut was found also contained artefacts older than the early 17th century and so it could also be older. Some other bone items from this layer typologically belong to the medieval period as well (see below).

Two pieces of a cylindrical bone tube (Fig. 3:8) were found separately but both come from 18th–19th-century contexts.

The other finds include a distal phalanx or claw bone from a brown bear (Fig. 3:7). The bone has not been worked and probably comes from a bear skin that was used as a rug or wall hanging (Rackham 1994, p.57). Claws and skin, being keratinous, usually do not survive in the soil and so the phalanges are the only parts of a bearskin that are found. The phalanx was found at the ground level from when the medieval house was erected. Based on the context of its discovery, it dates to the 15th century. Some bear distal phalanges, also interpreted as coming from a decorative bearskin, are known from Viljandi Castle and the northern suburb of Viljandi (Rannamäe 2010, p.51, Fig. 33; Haak *et al.* 2012, p.309, table 1). Bear claw amulets dating to the second half of the 14th – 15th century are quite common in Lithuania and Latvia (Svetikas 2009), but usually have metal bails or caps, or at least a hole in the bone. Thus it seems improbable that the phalanx from Tartu Road 1 was used as a pendant.

Toiletries

Three bone items were connected with personal care: two combs and a toothbrush. The double-sided composite comb has a concave end plate and profiled connecting plates (Fig. 5:1). The other end plate is missing and some teeth are missing. The comb's bone parts are joined with copper rivets. Based on the context of its discovery, i.e. the ground level when the medieval house was erected, it dates to the 15th century. Similar combs have been found at other medieval sites in Estonia, e.g. at Lai Street in Tallinn, between Ülikooli and Küüni Streets in Tartu, and at Munga Street in Pärnu (Luik 1998, pp.100–101, joon. 84–86, tahv. IV:4–6). Typologically the comb belongs to the second half of the 13th – 14th century (Luik 1998, pp.101–102, joon. 53).

The other comb is a thin rectangular double-sided one-piece elk antler comb with a wide central reserve decorated with three parallel lines

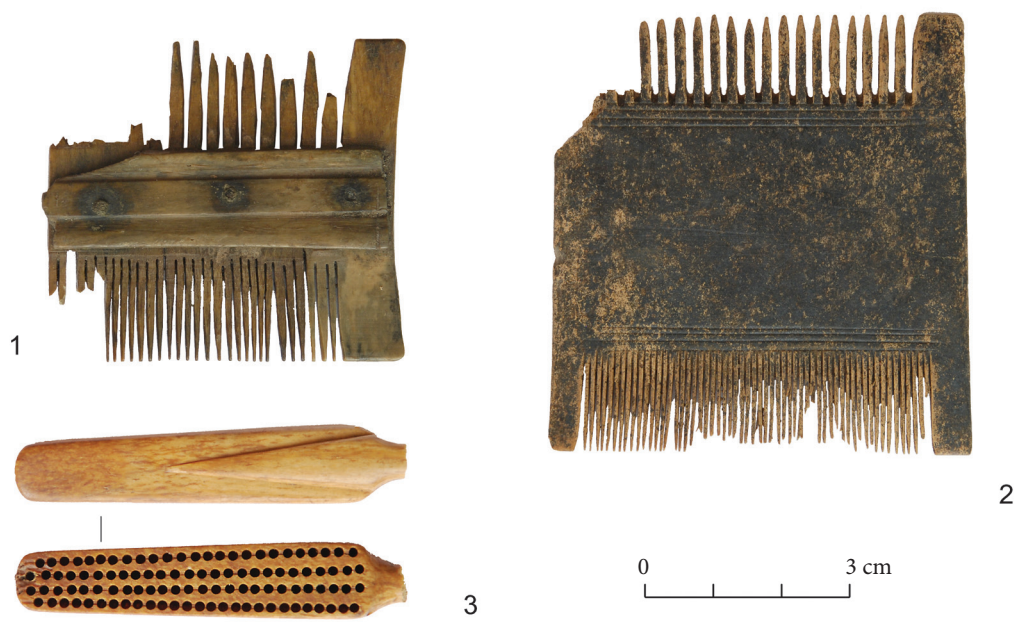

Fig. 5. Toiletries: 1 – the double-sided composite comb, 2 – the double-sided one-piece comb, 3 – the toothbrush fragment (AI 7032: L1792, L1794, L734). *Photo by S. Nittim.*

alongside each base (Fig. 5:2). It was found in the fill layer of the earliest floor of the house built in the late 17th century. The comb most similar to it is the one from Tartu Rd 10 / Pääsukese St. 2, which is also thin with closely spaced teeth on one side and widely spaced teeth on the other, but it is trapezoidal rather than rectangular (Luik 1998, pp.59, 61, joon. 42, tahv. II:6). Similar combs with different tooth densities are known, for example, from Exeter, where such combs date to the 16th–17th centuries (Megaw 1984, p.351, Fig. 195:9–15). The thin one-piece combs found in Estonia are usually double-sided with closely spaced teeth on both sides and date to the 17th–18th centuries (Luik 1998, pp.61–63). The one-piece comb from Tartu Road 1 presumably dates to the second half of the 17th century.

In addition to the two combs, a fragment of a toothbrush was found at Tartu Road 1. It has four rows of holes for bristles and a triangular protrusion on the back side (Fig. 5:3). This item was found in the construction debris layer deposited after the demolition of a log building built in the 18th century and before new walls were erected in the late 19th century. Bone toothbrushes are rare finds in Estonia: e.g. a toothbrush handle was found between Tornimäe and Liivalaia Streets in the suburb of Kivisilla (AI 6477:III 159), a second was a chance find in Veerenni Street in Tallinn (AI 6631:2), and a third was discovered in Lihula (Luik 2002, p.312, joon. 4). Toothbrushes mainly date to the 17th–20th centuries (e.g. Megaw 1984, p.351, Fig. 195:30; MacGregor 1985, Fig. 99:f; van Vilsteren 1987, p.41, Fig. 50; Heege 2002, p.303, Abb. 647). For example, in the 1870s Messrs Kent of London produced almost 9000 brushes a week, including tooth brushes, weekly consuming the long bones of 600 head of cattle, and continued producing bone brushes until the 1930s (MacGregor 1985, p.183).

Games and pastimes

The bone artefacts connected with games and pastimes consist of dice, disc-shaped gaming pieces, cattle phalanges used for playing skittles, bone flutes, and a presumed toggle. Three dice have ring-and-dot patterns and one has dimples (Fig. 6:2). The two smaller dice have a width of 0.6 and 0.7 cm, the two bigger ones 1 cm. Three were found in 14th–16th century contexts: the die with dimples was found in a 14th–15th-century organic-rich layer on sterile sand, the two small dice date to the 15th–16th centuries. One was found in the debris layer under the clay floor of a medieval house, the other on the ground's surface that existed when the medieval building was erected. The fourth die was found in an early 17th-century fill layer, but it may belong to a somewhat earlier period (see the dating of the crossbow nut above). Three of the dice have pip values arranged so that successive numbers are on opposite faces: 1:2, 3:4, 5:6, the fourth so that the opposite faces always total seven: 1:6, 2:5, 3:4. The former pip arrangement was used in the 13th–16th centuries, the latter was also in use at that time, but also before and after it, and is still in use (MacGregor 1985, pp.131–132; Heinloo *et al.* 2011, pp.44–46). Thus based on the pip arrangement, the fourth die may be later and belong to the 17th century. Bone dice have been found at other locations in Tallinn as well as other Estonian towns and castles, e.g. Otepää, Tartu, Lihula, and Viljandi (Мяэсалу 1984, табл. XVII:11; Lange, Tamm 1985, Taf. XXXII:5; Aus, Dubovik 1989, Taf. XVII:6; Luik 2002, pp.319–320, joon. 14; Heinloo *et al.* 2011, joon. 36, 37; Haak *et al.* 2012, p.315, Fig. 18:1, 2) and elsewhere in Europe (e.g. Megaw 1984, Fig. 195:40, 41; MacGregor 1985, Fig. 71:b–d; Heege 2002, Abb. 696; Majantie 2007, p.45; Blaževičius 2011, pp.140–144, 175, 212, pav. 176–181, 183).

One of the two disc-shaped gaming pieces (Fig. 6:3) could date to the 15th–16th centuries. It

Fig. 6. Toys and gaming pieces: 1 – the presumed toggle or buzzer, 2 – the dice, 3, 4 – the disc-shaped gaming pieces, 5–7 – the cattle phalanges (AI 7032: L1569, L899, L1632, L1751, L1744, L1271, L1497:3, L1586:2, L1836, L242). *Photo by S. Nittim.*

was found in a debris layer deposited after the second construction phase of the medieval house, and definitely from the period when the house was still in use. The other, an intact gaming piece (Fig. 6:4), was found in the same early 17th-century fill layer as the crossbow nut and die mentioned above. However, since this layer contained earlier artefacts, the disc-shaped gaming piece could also belong to the medieval period. Six similar gaming pieces have been found at Viljandi Castle, one in a 13th–14th century context, four in a late medieval context (Haak *et al.* 2012, p.315, Fig. 18:14–19). Such pieces are known also from other towns in Estonia, e.g. Haapsalu and Tartu (Russow 2004, Abb. 6:5; Heinloo *et al.* 2011, p.36, joon. 42). The disc-shaped gaming pieces that have been found in Lithuania mostly date to the 15th–17th centuries (Blaževičius 2011, pp.132–136, 174, 208–211, pav. 159–165), another from the Netherlands dates to the late 15th – early 16th century (van Vilsteren 1987, Fig. 80), and one from Exeter to the 17th century (Megaw 1984, p.351, Fig. 195:42). Disc-shaped gaming pieces were used in several board games (cf. e.g. Wilkins 2002, pp.103–112, Fig. 4.2; Heinloo *et al.* 2011, pp.32–38).

The three cattle phalanges were probably used for playing skittles. One has small transverse cuts on the dorsal side, the plantar side has been cut smoother, and a hole has been drilled into the proximal end (Fig. 6:5). The second also has a hole in the proximal end and the bone's cavity has been filled with metal. Three transverse lines and two oblique crosses have been cut on the dorsal side (Fig. 6:7). The third has a more complex decoration on the dorsal side: a rectangle divided into four triangles by an oblique cross inside it. There is a small dimple inside each triangle and the rectangle is surrounded by a row of small dimples (Fig. 6:6). A phalanx with a similar decoration is also known from Amsterdam (Rijkelijkhuizen

2008, Fig. 1.2). One phalanx from Tartu Road 1 was found at the ground level, from when the medieval house was erected, and could date to the 15th century. The two other phalanges date to the 17th century based on the context of their discovery. Otepää Castle is the Estonian site with the largest number of modified cattle phalanges (24), including both pierced bones and those decorated with oblique crosses (Luik 2009, joon. 46). Five phalanges have been found at Roosikrantsi St. 9/11 in Tallinn (Luik, Maldre 2003, p.9, joon. 5) and another five near the River Härjapea in a part of the suburb of Kivisilla where water mills once stood (AI 6004: I 730, 732, 733, 734, 736). Some modified phalanges are also known from Tartu (Heinloo *et al.* 2011, p.18, joon. 64) and Lihula (Luik 2002, pp.320–321, joon. 15:1). The 47 cattle phalanges found in Lithuania date to the 14th–17th centuries (Blaževičius 2008, pp.107–109, 120, pav. 35–38; 2011, pp.82–84, 167, 194–197, pav. 88–90). The phalanges from the Netherlands, e.g. Delft and Leiden, date to the 16th century (van Vilsteren 1987, Fig. 74–77) and from Germany, e.g. Einbeck, to the 13th–15th centuries (Heege 2002, p.319, Abb. 689). Phalanges with engraved designs and pierced holes are also known from Novgorod (e.g. НМГ КП 30975/A-70:41, 31696/A-76:133). Such bones were still used in 19th-century Russia for a game called *Babki* (Heinloo *et al.* 2011, p.16). To play it, the bones were placed in a straight line, proximal end down, and the player tried to knock down the upright bones with another bone or a stick. Striking bones with different designs may have yielded different results or the engraved designs could have been owner marks (MacGregor 1985, p.134, Fig. 71:m; Röber 1994, p.114, Abb. 8; Luik 2002, p.321; Heinloo *et al.* 2011, pp.16–18). Skittles being played with phalanges is depicted

Fig. 7. The bone flutes (AI 7032: L1497:1, 2). *Photos by S. Nittim and H. Luik.*

in some 16th-century drawings and paintings, including Pieter Brueghel's painting *Children's games* (Blaževičius 2008, pav. 34; 2011, pav. 86–87; Heinloo *et al.* 2011, pp.16–18, joon. 65, 67).

The two bone flutes (Fig. 7) had been made from sheep/goat tibias, the usual material for flutes (e.g. Luik 2002, pp.317–318; Heinloo *et al.* 2011, p.22; Haak *et al.* 2012, p.316), although bird bones were also used (MacGregor 1985, p.150; Gál 2005, pp.326–330; Leaf 2006, pp.13–15; 2007, pp.11–16, Fig. 2.2–2.8; Küchelmann 2010). One flute is finished, the proximal end having been cut smooth for the embouchure (Fig. 7:2) and the distal end left unworked. The flute has five round holes: a window near the proximal end, three smaller finger holes in the middle and one near the distal end. Some cutting traces are visible on the bone near the proximal end. The unfinished flute was likewise made for an embouchure at the proximal end, which has partly been cut diagonally and partly been broken off (Fig. 7:1). The distal end has also been cut smoother. A round window has been made near the proximal end and a smaller finger hole near the distal end. Two more holes have been marked with small cuts, but have been left unfinished. Some signs of cutting and smoothing are visible on the bone. The flutes were found together at the same find spot as one of the two disc-shaped gaming pieces. The context of its discovery is the aforementioned fill layer dating to the early 17th century, which also contained earlier finds.

Bone flutes are known from many medieval sites: from Tallinn, Tartu, Uderna, Lihula, and Viljandi in Estonia (Aus, Dubovik 1989, Taf. XVII:8; Ланг, Лиги 1990, табл. XXII:3; Аун 1994, табл. XXIII:1, 2; Luik 2002, pp.317–318, joon. 11; Heinloo *et al.* 2011, p.22, joon. 54; Haak *et al.* 2012, pp.315–316, Fig. 19:1), from Riga, Valmiera, Cēsis, etc. in Latvia (Caune, Celmiņs 1988, att. 49; Berga 1992, att. 7:9; Apala 1994, att. 1:1), and from elsewhere in Europe (Andersen *et al.* 1971, p.120; Brade 1978; Megaw 1984, Fig. 195:1–3, 5–7; Ulbricht 1984, Taf. 43, 91; MacGregor 1985, Fig. 78:b, c; Leaf 2007). Bone flutes mostly date to the Viking Age and the Middle Ages, but both earlier and later specimens are also known (Megaw 1984, p.349; MacGregor 1985, p.50; van Vilsteren 1987, p.55; Gál 2005, pp.326–330; Leaf 2007, Fig. 2.1). For example, in England flutes made from sheep bones mostly date to the 9th–16th centuries (Leaf 2007, p.14). Since the late medieval period, flutes have mainly been made from wood (van Vilsteren 1987, p.55).

The pig bone with cut ends and a pierced hole in the middle is probably also a toy, i.e. a toggle or a buzzer (Fig. 6:1). Buzzers were usually made from pig bones, especially metapodials, but in this case a radius was used. Thus it is not certain if this bone was used as a buzzer. It was found in a fill layer beneath the latest wooden floor of the medieval house and could date to the 16th century.

Antler artefacts and working debris

Some artefacts made from antler have already been mentioned: the double-sided one-piece comb, disc-shaped gaming pieces, crossbow nut, cylindrical object, and small handle detail. In addition to these, two decorative antler plates (Fig. 8:1, 2) and the hollow antler artefact with a truncated conical shape (Fig. 8:3) were found. All of them have been decorated with engraved lines or carved designs. The antler working debris consists of six larger and smaller antler pieces and the sawn-off tip of a cattle horn. Both plates could date to the 15th century based on the context of their discovery. Five antler pieces with signs of being worked also belong to the same period. One worked antler fragment comes from a 16th–17th century context while the conical antler item was found in the aforementioned 17th-century fill layer which also contained earlier finds. The pleated decoration carved on this item has parallels in the decoration of gunpowder horns made from antler. Figures dressed in pleated garments are some-

Fig. 8. Antler artefacts: 1, 2 – the decorative plates, 3 – the truncated conical antler artefact (AI 7032: L1585, L1677, L621). *Photo by S. Nittim.*

times depicted on such gunpowder horns dating to the 16th century. Antler gunpowder horns are known, for example, from Medemblik in the Netherlands, as well from Riga, Tartu, Viljandi Castle, and Padise Monastery (e.g. Raam, Zobel 1961, p.51; van Vilsteren 1987, Fig. 30; Caune, Celmiņš 1988, att. 58; Trummal 1992, tahv. VIII:2; Haak *et al.* 2012, pp.313–314, Fig. 17). The specimens from Tartu, Viljandi, and Padise also have a similar carved zigzag decoration like on the pleated decoration on the truncated cone from Tartu Road 1. It is possible that the plan was to carve a gunpowder horn from this object, but the blank broke during its manufacture. The craftsman may have wanted to use the broken blank to create another object, but for some reason it was left unfinished.

One of the two decorative plates is feather-shaped, but the tip is damaged (Fig. 8:2). The other is trapezoidal with a partly finished carved pattern also reminiscent of feathers or wings (Fig. 8:1). Cross-hatching has been carved on the back of both plates so that they can be glued to some surface. Both plates bear a very similar style and could have presumably been made by the same craftsman. The feather-shaped plate has no exact parallel, but some trapezoid plates are known, for example, from Viljandi Castle, although they have different patterns. These plates were probably meant for decorating weapons (Haak *et al.* 2012, p.311, Fig. 14, 15).

The worked antler pieces with signs of cutting and sawing have various shapes and sizes (Fig. 9). One, which was probably a blank for making a decorative plate, has had both the rough exterior surface and the porous inner part of antler removed (Fig. 9:3). It was found close to the trapezoid plate with the unfinished decoration. A small antler fragment, which has a curved cut, probably had some round object carved out it (Fig. 9:4). The curve is suitable for making either a disk-shaped gaming piece or a crossbow nut,

Fig. 9. Antler working debris: 1, 3–6 – pieces of elk antler, 2 – the tip of a cattle horn core (AI 7032: L1091, L1721, L1586:1, L1589:1, 2; L1275:1). *Photo by S. Nittim.*

but the fragment would be too thin for a crossbow nut. The small U-shaped fragment might be suitable for making a drop-shaped handle decoration (Fig. 9:5). The sawed-off horn tip (Fig. 9:2) comes from the same context as the hollow antler object with the truncated conical shape. This horn tip is the only discovered piece of horn core with cut marks, indicating the use of horn for making Products. Although the two antler objects (Fig. 8:3; 9:6) and the horn core could belong to the 17th century based on the context of their discovery, it seems more likely that all of the antler artefacts and working debris mentioned here belong to the 15th–16th centuries.

Antler working debris has been found also in Lihula in West Estonia (Luik 2002, pp.325, 327, joon. 21), but antler pieces with signs of being worked are more numerous in South Estonia, especially at Viljandi and Otepää Castles (Luik 2009, joon. 15, 16; Haak *et al.* 2012, pp.321–322, Fig. 24–28). In Tallinn, antler working debris has also been found at the suburban site at Roosikrantsi St. 9/11. The 20 antler pieces with signs of being worked found there are presumably medieval (Luik, Maldre 2003, pp.17–19, 29–30, joon. 14–16). A few antler pieces are also known from other sites in Tallinn, e.g. Town Hall Square and Sauna Street, but at these sites a greater percentage of the scrap comes from working bone (Luik 1998, tahv. VIII:1; Luik 2001, p.324).

Bone beads, buttons, and working debris

All six bone beads are small round rosary beads (Fig. 10) with a diameter of 1.1–1.8 cm. Five come from 14th–16th-century contexts, one from the 18th–19th century. 26 bone pieces are debris left from bead making, 21 of which were found together (Fig. 10). All of them come from the diaphysis of the long bones of large ruminants, most

Fig. 10. Bone beads and bead making waste (AI 7032: L1771 (13), L1247, L898, L1298). *Photo by S. Nittim.*

likely cattle. Most of the drilled holes and arches in the bone strips have a diameter of 0.7–0.8 cm, but some have a diameter of 1.3 cm. In all, the discovered bone strips display signs of the creation of about 160 beads. 23 bone pieces could be dated to the 15th century, one to the 14th–16th centuries. Two pieces that were found in a spoil pile could presumably date to the same period as other scrap pieces, meaning all of the bead making scrap belongs to the 15th century. Such scrap is quite common in medieval and post medieval towns. In Estonia such bone pieces with drilled holes have been found at several sites, e.g. from Lihula, Otepää, and Tartu, but usually only up to a few specimens per site (Luik 2002, pp.324–325, joon. 18; AI 4036: I 554; Tartu City Museum, 2032: A 405, etc.).

A total of 14 bone buttons were found (Fig. 11). Three thin flat buttons were made from ribs, they have porous bone tissue visible on one side, and have only one hole in the middle; these were probably unfinished buttons or blanks that were meant to be covered with cloth. Two thin buttons have four holes for attachment to a garment. Two of the thin buttons were found during the 2010 field evaluation. All of the thin buttons come from 18th–19th-century contexts. Seven buttons have a cylindrical self-shank. Two of these were found during the 2010 field evaluation in a 16th–18th-century context and five during the 2011–2012 excavations in an 18th–19th-century context. All of the self-shank buttons are very similar and belong to the same time, very likely the 18th century and may have all come from the same garment. Similar bone buttons, both thin flat and shank buttons, have also been found at other places on the other side of the River Härjapea in the suburb of Kivisilla (e.g. AI 6477:V 13, 6566:70–72, 373, 470, 704–705).

Ten pieces of button making debris were found (Fig. 11), nine from ribs and one from a long bone. They display signs of the creation of a total of 42 buttons. Only thin flat buttons had been made from these bones, it being impossible to make shank buttons from such raw materials. Based on the context of their discovery, one of the bone pieces belongs to the late 17th – first half of the 18th century, six to the 18th century, and three to the second half of the 18th – first quarter

Fig. 11. Bone buttons and button making waste (AI 7032: L1536:1–4, L1561:1–3, L1737:1–3, L656:2, 3, L 48, L319:1, 2, L1112, L1385, L333). *Photo by S. Nittim.*

of the 19th century. All of the buttons and button making debris could probably be dated to the 18th century. The largest quantity of button making refuse found in Estonia, 46 bone pieces displaying signs of the creation of 230 buttons, was at Roosikrantsi St. 9/11 in Tallinn. 33 pieces of these were from ribs, nine from cattle scapulae, two from long bones, and two from unidentifiable sources. The button making debris from Roosikrantsi St. 9/11 dates to the 15th–17th centuries (Luik, Maldre 2003, pp.21, 26, 31, tabel 1, joon. 18–20).

Bead and button making refuse has been found at many medieval, post medieval, and modern sites in Europe, the number of pieces at one place ranging from a couple or a dozen pierced bone strips to several thousands or even tens of thousands (Egan, Pritchard 1991, p.314; Spitzers 1997, p.47; Gróf, Gróh 2001, p.282; Bikić, Vitezović 2014, p.31). Written evidence about bone beads as well as beads from other materials (e.g. amber, coral, jet)[2] are known from the 14th–15th centuries (e.g. Evans 1970, p.50; Mead 1977, p.214) and some 15th–17th-century drawings and engravings depicting craftsmen making bone beads or buttons are also known (MacGregor 1985, p.60, Fig. 35; van Vilsteren 1987, pp.60, 62, Fig. 109, 111; Spitzers 1999, p.242, Abb. 3; Gróf, Gróh 2001, Fig. 4, 5; Luik, Maldre 2003, pp.24–25, joon. 21). Bone buttons dating to the 18th century are also known (e.g. Rijkelijkhuizen 2008, Fig. 1.5; Bikić, Vitezović 2014, p.31) and alongside buttons made from other materials, bone buttons were still being manufactured in the 20th century (e.g. van Vilsteren 1987, p.66, Fig. 125). Although beads and buttons were usually made from long bones and ribs (Spitzers 1997, pp.151–152, Fig. 6, 9; 1999, Abb. 7, 8, 13; Bikić, Vitezović 2014, p.31), other bones have also been used occasionally, e.g. scapulae and mandibles (van Vilsteren 1987, p.62, Fig. 111; Spitzers 1997, p.152, Fig. 9:16–18, 10, 12; 1999, pp.10, 14). Antler was only rarely used for the manufacture of beads and buttons (e.g. Rijkelijkhuizen 2008, Fig. 2.11).

DISCUSSION: THE PRODUCTION OF BONE AND ANTLER ITEMS AT TARTU ROAD 1

An attempt was made to associate all of the discovered bone tools and working debris with human activities at this location during different periods of time, taking into account both the context of their discovery and the artefact typologies (Table 1). The majority of the bone items and working debris belongs to the Middle Ages and could presumably be connected to the house dating to this period. Only a few of the objects date to the 14th century, most belonging to the 15th–16th centuries. The late 16th and 17th centuries are also represented by quite a few objects. More items may date to the 18th century, but most of them are buttons and button making debris. Only two artefacts: a cylindrical tube and a fragment of a toothbrush, can be dated to the 19th century.

Of course, not all the found bone objects reflect the bone working activities on site and many of them probably reached the location as finished items. Two kinds of bone working activities can be connected with the medieval period: the manufacture of bone (rosary) beads and antler working. The decorative antler plates were presumably made on site, as witnessed by the flat worked antler piece and the antler plate with the unfinished decoration. The antler worker, however, probably made several items, since the truncated conical object is also unfinished. The drop-shaped handle detail could also been made on site since there is an antler fragment suitable for making such

[2] Some jet beads belonging to rosaries like bone beads were found also at Tartu Road 1 (Russow *et al.* 2013, p.159, fig. 5:4, 5), but presumably these beads were not manufactured on the spot.

Table 1. Dating of the bone finds from Tartu Road 1. Both the context of their discovery and the artefact typologies have been taken into account

Artefact	Medieval (14th–16th centuries)	Modern (end of the 16th – 19th century)	Total
bone needle	1		1
bone point	1		1
bear claw bone	1		1
toggle (?)	1		1
cylindrical antler item	1		1
decorative antler plate	2		2
bone bead	6		6
bead making debris	26		26
dice	4		4
disc-shaped gaming piece	2		2
bone flute	2		2
conical antler item	1		1
crossbow nut	1		1
horn core	1		1
antler working debris	6		6
cattle phalanx	1	2	3
comb	1	1	2
handle/handle detail	1	3	4
fork		1	1
bone button		14	14
button making debris		10	10
toothbrush		1	1
cylindrical tube		1	1
Total:	**59**	**33**	**92**

an item among the scrap. One antler piece could have been from the manufacture of a disc-shaped gaming piece. One of the bone flutes is unfinished, suggesting that flutes could have also been made on site. Both flutes were found together, so the finished flute may have been made there. Another possibility is that someone used the finished flute as an example to make a new one, but owing to a lack of skill, the flute remained unfinished. In the opinion of Monika Hint (2013, p.69) who has made bone flute replicas, it is impossible to make a new instrument by replicating the exact locations of the finger holes because the shape and volume of each bone varies slightly. Therefore know-how, skill, and experience are needed to make a bone flute. The sawn-off horn core presumably also belongs to the medieval period, attesting to the use of horn in the manufacture of articles, but it was the only horn with processing marks recovered from Tartu Road 1. Some simple objects as the bone needle, the point, and the toggle could have also been made on site. The composite comb was probably not made on site since there is no evidence of comb making refuse among working debris. The dice and the crossbow nut presumably also reached the find spot as finished items.

Of the items belonging to the Early Modern period, the comb, the fork, and the handles were probably made elsewhere. The phalanges could have been modified on site. Although one phalanx has a similar design to one found in Amsterdam, this does not mean that both necessarily came from one location. The design could have had a well-known meaning like the symbols on dice and playing cards. They may have been carved on the bone where such bones were already in use. Bone working debris from the Modern period is less numerous than medieval debris. In the 18th century a small number of bone buttons were made at this site; both the working scrap and some of the buttons could have come from this activity. Some of the buttons, namely the self-shank buttons, were presumably not manufactured on site or at least no traces from their manufacture have been found. The bone tube and toothbrush presumably reached the site as finished items.

Cattle (*Bos taurus*), sheep/goat (*Ovis aries / Capra hircus*), pig (*Sus scrofa domestica*), and elk (*Alces alces*) skeletal elements were used to make the artefacts. One claw bone from a brown bear (*Ursus arctos*) was also found. Among the analysed unworked faunal remains from Tartu Road 1, the bones of domestic animals predominate,

primarily cattle followed by sheep/goats and pigs. A few horse (*Equus caballus*), dog (*Canis familiaris*), and cat (*Felis catus domesticus*) bones were found while wild animals were represented by only some mountain hare (*Lepus timidus*), wild boar (*Sus scrofa ferus*), and seal (*Phocidae*) bones. The faunal remains include both butchering and kitchen waste (cf. Russow *et al.* 2013, pp.159–161, table 2, Fig. 6). Cattle bones were used the most in making bone tools. These bones are quite large, have a thick diaphysis, and were also easily available. The three phalanges and the horn core are definitely from cattle, while the faceted handle was made from a cattle long bone. The ribs and long bones used to make beads and buttons were very likely from cattle. The comb, dice, fork, and handle are also probably from cattle bones, but as has been mentioned, most of these items were presumably not manufactured on site. Since all these items have been carefully worked and characteristic bone attributes have been removed, it is impossible to identify the bones precisely and it is possible that horse bones were also used occasionally (e.g. Spitzers 1997, p.151). Nevertheless, cattle bones were much easier to obtain than horse bones, only a few horse bones having been identified among unworked faunal remains at Tartu Road 1 (Russow *et al.* 2013, table 2). The only bone items made from sheep/goat bones are the two bone flutes. Three objects were made from pig bones: a needle from a fibula, a point from a rib, and a presumed toggle from a radius.

The antler items and working debris are relatively numerous: gaming pieces, a simple comb, decorative plates, a handle detail, a cylindrical object, and a crossbow nut. No other elk skeletal parts were represented among faunal remains from Tartu Road 1 (Russow *et al.* 2013, pp.159–162). Thus the discovered antler pieces were probably raw material brought there by the antler worker. Very few horn cores were found in the excavated area, except from the 15th century, when quite a lot goat horn cores were discovered. The small number of horn cores shows that these had been taken elsewhere, presumably to artisans who used them (Russow *et al.* 2013, p.161). That only one cattle horn core with signs of being worked was found at the site also suggests that horn was not worked there.

One handle is made of an exotic material, elephant ivory, and was definitely not made on site. A few ivory objects, mostly handles and simple combs, mainly dating to the 16th–18th centuries, are also known from other sites in Tallinn and other Estonian towns (Luik 1998, tahv. II:8; 2002, p.314, joon. 7:4; Luik, Maldre 2003, pp.13–16, joon. 12; Peets *et al.* 2013, p.101, Fig. 12). For example, some ivory combs have been found in the cemetery of St John's Hospital on the other side of the River Härjapea in the suburb of Kivisilla (e.g. AI 6477:II/140, III/168).

As has been mentioned, the large medieval house at Tartu Road 1 may have been a guesthouse or a tavern. Its location near a bridge and roads as well as the discovered material, especially the sherds of ceramic vessels, support this hypothesis (Kadakas *et al.* 2013, p.142; Russow *et al.* 2013, pp.150–155, 166). This interpretation also fits well with the bone finds. Gaming and gambling were found in medieval and post medieval taverns (Heinloo *et al.* 2011, pp.46–47, 64–66, joon. 14), the discovered dice and disc-shaped gaming pieces attesting to such pastimes. Skittles could also be connected with a tavern, but skittles played with phalanges is considered to be more a children's game (Heinloo *et al.* 2011, p.18). Two of the three phalanges found at Tartu Road 1 belong to a later period, probably the 17th century, by when the situation at the plot had already changed and the presumed tavern/guesthouse had been demolished. Music was also definitely found at taverns (Heinloo *et al.* 2011, p.24) and the bone flutes fit well with this interpretation. The few other medieval items are mostly personal belongings like a needle, a point, and a comb.

The medieval bone and antler working debris is rather scant and does not support a hypothesis about the existence of a permanent bone workshop. The scant scrap could presumably have been left by itinerant craftsmen. No stable market or sufficient customers probably existed for a bone worker's production in small towns. This has been presumed, for example, about bead and button makers, whose simple tools for drilling beads/buttons enabled an itinerant lifestyle (Gróf, Gróh 2001, p.282; Luik, Maldre 2003, p.31). The same could possibly be said about an antler worker, who probably carried a certain amount of raw material and produced objects on site in accordance with the demand. A guesthouse or tavern at a crossroads or a river crossing could have been a suitable stopping place for such craftsmen. A similar situation existed in the small town of Viljandi in South Estonia, where both bone artefacts and scrap have been found in the suburb near the Riga Gate. The working debris mainly consisted of flat rib and antler plates suitable for making decorative plates; a bone plate with engraved letters was also found there (Luik 2015, pp.94, 105–106, Fig. 6.3). A travelling bone worker or workers may have stopped at this place. Andres Tvauri, who excavated this plot, has suggested that a smithy and a tavern were probably located there. The finds from these excavations mostly date to the 14th–16th centuries (Tvauri 2000, p.56). Thus both these sites suggest the existence of itinerant bone workers in medieval Livonia.

Could the bone and antler working debris at Tartu Road 1 have been the result of the activities of one or several bone workers? It seems more likely that different craftsmen presumably specialised in specific products and the procurement of certain materials. A craftsman making beads from the diaphyses of long bones could have easily obtained the necessary raw materials on site, since a large number of cattle long bones were found among unworked faunal remains (Russow *et al.* 2013, Fig. 6). An antler worker should have carried at least some raw material with him. Elk skeletal parts are usually not found among unworked faunal remains in medieval and post medieval Livonian towns, although a few elk and red deer bones have been found at medieval and post medieval castles (e.g. Luik, Maldre 2003, pp.26–27, Haak *et al.* 2012, pp.308–309, table 1, 2). The two decorative plates from Tartu Road 1 were manufactured using similar working methods and could have been made by the same craftsman. Some of the antler pieces have been prepared in a manner suitable for the production of decorative plates. A very similarly decorated antler plate (Fig. 12:1) has also been found at Tartu Road 10 on the other side of the River Härjapea and could have been bought there from the bone worker who stayed at Tartu Road 1.

The few items belonging to the Early Modern period represent common artefacts, which were used domestically: a comb, a fork, and

Fig. 12. Finds from other sites in the suburb of Kivisilla: 1 – a fragment of a decorative plate from Tartu Road 10, 2 – the piece of antler with signs of working, from Tartu Road 18 (AI 6456: 486; AI 6566: 65). *Photo by H. Luik.*

some handles. As has been mentioned, the cattle phalanges were most likely children's toys. The bone buttons may have belonged to garments. The small quantity of bone working refuse and some of the bone buttons could have presumably originated from domestic production (cf. Egan, Pritchard 1991, p.314), but no working debris was found from the manufacture of the self-shank buttons at this site.

The early modern and later bone items found at Tartu Road 1 are in general similar to the bone finds from the rest of the suburb of Kivisilla, where cutlery with bone handles, bone combs and brushes, buttons, tubes, and cattle phalanges are common finds. But it is noteworthy that bone working debris has not been found at other sites in Kivisilla, aside from one antler piece with signs of cutting that was found at Tartu Road 18 (Fig. 12:2).

The bone finds from Roosikrantsi St. 9/11, another suburban site, are the most similar to those from Tartu Road 1: combs, needles, handles, phalanges, and decorative plates (Luik, Maldre 2003, pp.7–16, joon. 3–12). According to Vladimir Sokolovski (1997, pp.150–155) who conducted the excavation, homes and vegetable gardens existed there in the 13th–14th centuries. St Barbara's Chapel and cemetery were probably established in the area in the mid-14th century. Almost no traces of 15th–16th-century habitation have been found, new building activities starting only in the second half of the 17th century. The species composition of the unworked bone material is also similar at these two suburban sites and includes both butchering and kitchen waste. At Roosikrantsi St. 9/11, cattle bones were the most numerous, followed by sheep/goat and pig. A few horse, dog, and cat bones were found, wild animals being represented by only some mountain hare bones. Elk skeletal parts were not found except for antler pieces with signs of working (Luik, Maldre 2003, pp.26–27, joon. 22). Medieval, post medieval, and modern bone items were all found at Roosikrantsi 9/11. At 116 artefacts and pieces of scrap, the number of bone objects found during the excavations at Roosikrantsi St. 9/11 is a little larger than that at Tartu Road 1, but the excavated area was also larger (Luik, Maldre 2003, p.7, joon. 2). The bone items represent mostly the same artefact types and include a relatively large percentage of working debris, which, at 73 pieces, constitutes about 60% of all the bone objects, which is even more than at Tartu Road 1 where they comprise about half of all the bone finds. The working debris from Roosikrantsi Street can mostly be divided into two categories: antler working scrap, which could belong to the medieval period and button making scrap, which is probably somewhat later (Luik, Maldre 2003, pp.16–23, joon. 14–20).

The plot at Roosikrantsi St. 9/11 was located near the road leading from Harju Gate to West Estonia and eventually the cities of Pärnu and Riga. Thus the location is also similar to that of the plot at Tartu Road 1, which is beside the road leading from the Karja and Viru Gates to Tartu and East Estonia and could have been a suitable location for itinerant craftsmen. Bone working refuse has also been found in similar contexts in other Livonian towns. Aside from the aforementioned suburb at the Riga Gate, bone working debris has also been found at the suburb near the Tartu Gate in the small town of Viljandi in South Estonia. In Tartu, bone working debris has been found at the southern suburb of Riga, which was located near the Riga Gate (Haak 2007, p.50, joon. 2).

CONCLUSIONS

The worked bone material from the excavation at Tartu Road 1 has yielded important new information about bone working in the suburbs of medieval, early modern, and modern Tallinn. A larger quantity of bone working debris had previously been known only from Roosikrantsi St. 9/11. The bone finds from both of these sites

are quite similar and attest that suburbs located next to roads leading to other towns and castles could have been suitable stopping places for itinerant craftsmen who crafted their wares on the spot. A similar situation occurred, for example, in Viljandi where evidence of bone working is relatively numerous in the suburbs near the Riga and Tartu Gates. At Tartu Road 1, the majority of bone and antler working debris comes from the medieval period, only a few pieces of bone working scrap, i.e. button making debris, belongs to a later period, the 18th century. The finished bone items found at Tartu Road 1 represent medieval, early modern, and modern artefacts, which are common among finds from Tallinn and other Estonian towns as well as in neighbouring areas.

Acknowledgements

This research was supported by the Estonian Science Foundation (ETF grant No. 9405) and the Estonian Ministry of Education and Research (IUT 18-8). The authors would like to thank Ragnar Nurk and Sander Nittim for their help with the finds and photos and Helle Solnask for her help with English.

Translated by Villu Kadakas and Heidi Luik

We are also very thankful to Arturas Bakanauskas for language editing

REFERENCES

Andersen, H.H., Crabb, P.J., Madsen, H.J., 1971. *Århus Søndervold. En byarkæologisk undersøgelse* (=*Jysk Arkæologisk Selskabs Skrifter*, IX.). København: Gyldendalske Boghandel, Nordisk Forlag.

Apala, Z., 1994. Arheoloģiskie izrakumi Cēsu viduslaiku pilī. *ZASMA 1992. un 1993. gada pētījumu rezultātiem*. Rīga: Zinātne, 5–10.

Aus, T., Dubovik, B., 1989. Vorläufige Ausgrabungsergebnisse von der Harju-Straße in Tallinn. *TATÜ*, 38 (4), 349–354.

Berga, T., 1992. Arheoloģiskie izrakumi Valmierā. *ZASMA 1990. un 1991. gada pētījumu rezultātiem*. Rīga: Latvijas vēstures institūts, 30–34.

Bikić, V., Vitezović, S., 2014. Bone working and army: an early eighteenth-century buttons workshop at the Belgrade fortress. *In:* Vitezović, S., ed. *10th Meeting of the Worked Bone Research Group of the International Council of Zooarchaeology. Programme and abstracts. Beograd, 25–30. Avgust 2014*. Beograd: Arheološki Institut, 30–31.

Blaževičius, P., 2008. Vaikų žaislai ir žaidimai XIII–XVII a. Lietuvoje (remiantis archeologijos duomenimis). *LA*, 33, 71–122.

Blaževičius, P., 2011. *Seniausieji Lietuvos žaislai*. Vilnius: Nacionalinis muziejus, Lietuvos Didžiosios Kunigaikštytės valdovų rūmai.

Brade, C., 1978. Knöchere Kernspaltflöten aus Haithabu. *In:* Arrhenius, B., Hrsg. *Das archäologische Fundmaterial III der Ausgrabung Haithabu* (=*Berichte über die Ausgrabungen in Haithabu*, 12). Neumünster: Wachholtz Verlag, 24–35.

Caune, A., Celmiņs, A., 1988. *Rīgas arheoloģija 50. Rīgas arheoloģiskās izpētes rezultāti no 1938. līdz 1987. gadam. Izstādes katalogs*. Rīgas vēstures kuģniecibas muzejs, Latvijas PSR ZA Vēstures institūts.

Cnotliwy, E., 1999. Wczesnośredniowieczne przedmioty z poroża i kości z Kruszwicy na Kujawach. *Studia archeologiczne*, XXXI (=*Acta Universitatis Wratislaviensis*, 2151), 153–214.

Deemant, K., 1989. Neue Materialien von dem spätmittelalterlichen Siedlungsplatz Proosa. *TATÜ*, 38 (4), 348–349.

Egan, G., Pritchard, F., 1991. *Dress Accessories, c. 1150–1450* (=*Medieval Finds from Excavations in London*, 3). Museum of London.

Ervynck, A., 1998. Voorwerpen in been en gewei uit prestedelijk volmiddeleeuws Antwerpen (opgravinger Van de Walle 1952–1961). *In:* Veeckman, J., ed. *Berichten en Rapporten over het Antwerps Bodemonderzoek en Monumentenzorg,* 2. Stad Antwerpen, 9–55.

Evans, J., 1970. *A History of Jewellery 1100–1870.* New York: Dover Publications.

Gál, E., 2005. New data on bird bone artefacts from Hungary and Romania. *In:* Luik, H., Choyke,

A.M., Batey, C.E., Lõugas, L., eds. *From Hooves to Horns, from Mollusc to Mammoth. Manufacture and Use of Bone Artefacts from Prehistoric Times to the Present. Proceedings of the 4th Meeting of the ICAZ Worked Bone Research Group at Tallinn, 26th–31st of August 2003* (=*MT*, 15), 325–338.

Gróf, P., Gróh, D., 2001. The remains of Medieval bone carvings from Visegrád. *In:* Choyke, A.M., Bartosiewicz, L., eds. *Crafting Bone: Skeletal Technologies through Time and Space. Proceedings of the 2nd Meeting of the (ICAZ) Worked Bone Research Group, Budapest, 31 August – 5 September 1999* (=*BAR International Series*, 937). Oxford: Archaeopress, 281–285.

Haak, A., 2007. Loomaluude leiud keskaegses Viljandis: mäkmeid toidulaua ning luu- ja sarvetöötlemise kohta. *In:* Haak, A., toim. *Tartu Linnamuuseumi aastaraamat*, 13. Tartu Linnamuuseum, 40–53.

Haak, A., Rannamäe, E., Luik, H., Maldre, L., 2012. Worked and unworked bone from the Viljandi Castle of the Livonian Order (13th–16th centuries). *LA*, 38, 295–338.

Heege, A., 2002. *Einbeck im Mittelalter. Ein archäologisch-historische Spurensuche* (=*Studien zur Einbecker Geschichte*, 17). Oldenburg: Isensee Verlag.

Heinloo, E., Jürjo, I., Russow, E., 2011. *Kõrts keskaegses linnas: näituse „Poriveski kõrts" kataloog / Inn in a Medieval Town: Catalogue of the exhibition „Poriveski kõrts" / Трактир в средневековом городе: Каталог выставки «Поривески Кыртс»*. Tartu Linnamuuseum.

Hint, M., 2013. Luu töötlemine lamba sääreluust vilepilli näitel. *In:* Parts, P.-K., toim. *Lugusid materjalidest. Stories about materials* (=*Studia Vernacula*, 2013). Viljandi: TÜ Viljandi Kultuuriakadeemia rahvusliku käsitöö osakond, 58–72.

Kadakas, U., Toos, G., Kalm, A., Nurk, R., Vedru, G., Tasuja, K., Kadakas, V., 2013. Medieval and Early Modern suburban site in Tallinn, Tartu Road 1: contexts and structures. *AVE 2012*, 133–148.

Küchelmann, H.C., 2010. Highland tunes in the lowlands: a medieval vulture bone flute from northern Germany. *In:* Legrand-Pineau, A., Sidéra, I., Buc, N., David, E., Scheinsohn, V., eds. *Ancient and Modern Bone Artefacts from America to Russia. Cultural, Technological and Functional Signature* (=*BAR International Series*, 2136). Oxford: Archaeopress, 171–182.

Landrin, M.H., 2000 [1836]. *Kunst des Messerschmiedes* (=*Neuer Schauplatz der Künste und Handwerke*, 85). Hannover: Verlag Th. Schäfer.

Lang, F., 2010. Bone working and production in the medieval castle of Guetrat (Salzburg). *In:* Legrand-Pineau, A., Sidéra, I., Buc, N., David, E., Scheinsohn, V., eds. *Ancient and Modern Bone Artefacts from America to Russia. Cultural, Technological and Functional Signature*. (=*BAR International Series*, 2136). Oxford: Archaeopress, 87–95.

Lange, K., Tamm, J., 1985. Archäologische Untersuchungen in der Talliner Altstadt in den Jahren 1983–1984. *TATÜ*, 34 (4), 384–391.

Leaf, H., 2006. English medieval bone flutes – a brief introduction. *Galphin Society Journal*, LIX, 13–19.

Leaf, H., 2007. Medieval bone flutes in England. *In:* Pluskowski, A., ed. *Breaking and Shaping Beastly Bodies. Animals as Material Culture in the Middle Ages*. Oxford: Oxbow Books, 11–17.

Luik, H., 1998. Muinas- ja keskaegsed luukammid Eestis (=*MT*, 6).

Luik, H., 2001. Bone combs from medieval Tallinn, from the excavations in Sauna Street. *In:* Choyke, A.M., Bartosiewicz, L., eds. *Crafting Bone: Skeletal Technologies through Time and Space. Proceedings of the 2nd Meeting of the (ICAZ) Worked Bone Research Group, Budapest, 31 August – 5 September 1999* (=*BAR International Series*, 937). Oxford: Archaeopress, 321–330.

Luik, H., 2002. Luuesemed Lihula keskaegsest alevikust ja linnusest. *In:* Lang, V., toim. *Keskus – tagamaa – ääreala. Uurimusi asustushierarhia ja võimukeskuste kujunemisest Eestis* (=*MT*, 11), 301–348.

Luik, H., 2009. *Luu- ja sarvesemed Eesti arheoloogiliste leidudena* (=*Tartu Ülikooli doktoritöid*). Tartu University Press.

Luik, H., 2015. Bone workers in medieval Viljandi, Estonia: comparison of finds from downtown and the Order's castle. *In:* Hansen, G., Ashby, S., Baug, I., eds. *Everyday Products in the Middle Ages:*

Crafts, Consumption and the Individual in Northern Europe c. AD 800–1600. Oxford: Oxbow Books, 91–109.

Luik, H., Maldre, L., 2003. Luutöötlemisest Tallinna eeslinnas, Roosikrantsi tänava piirkonnas, 13.–17. sajandil. *Journal of Estonian Archaeology*, 7 (1), 3–37.

MacGregor, A., 1985. *Bone, Antler, Ivory and Horn. The Technology of Skeletal Materials Since the Roman Period*. London: Croom Helm.

Majantie, K., 2007. Löydöt kertovat elämästä, käsitöistä ja kapasta keskiajan Turussa. *In:* Majantie, K., Motuste, K., toim. *HIT – History in Turku: tietoja, taitoja ja löytöjä. Näyttely Turun linnassa 15.6.–23.9.2007*. (=*Turun Maakuntamuseo näyttelyesite*, 42), 32–49.

Mandel, M., 1994. Die Ausgrabungen in Keila. *TATHS*, 43 (4), 393–395.

Mead, V., 1977. Evidence for the manufacture of amber beads in London, 14th–15th century. *Transactions of the London and Middlesex Archaeological Society*, XXVIII, 211–214.

Megaw, J.V.S., 1984. Bone musical instruments from medieval Exeter. *In:* Allan, J.P., ed. *Medieval and Post medieval Finds from Exeter, 1971–1980* (=*Exeter Archaeological Reports*, 3). Exeter City Council and the University of Exeter, 349–351.

Nurk, R., Karro, K., Kadakas, V., Toos, G., 2010. *Arheoloogilised uuringud Tallinnas Eesti Kunstiakadeemia krundil Tartu mnt 1*. Manuscript in the archives of Tallinn Culture and Heritage Department (TKVA n.10, s.360).

Peets, J., Saage, R., Maldre, L., 2013. Medieval smithy complex in Käku, Saaremaa. Excavations in 2006–2012. *AVE 2012*, 93–108.

Raam, V., Zobel, R., 1961. *Padise kloostri varemetes 1961. aastal tehtud tööde aruanne koos fotodega*. Manuscript in the archives of National Heritage Board of Estonia (ERA.T-76.1.309).

Rackevičius, G., 1999. Arbaletų dirbtuvės Vilniuje (XIV a. II pusė – XV a. I pusė). *LA*, 18, 175–183.

Rackham, J., 1994. *Animal Bones. Interpreting the Past*. Berkeley: University of California Press.

Rannamäe, E., 2010. *A Zooarchaeological Study of Animal Consumption in Medieval Viljandi* (MA thesis). Manuscript in the archaeology archives of University of Tartu.

Rijkelijkhuizen, M., 2008. *Handleiding voor de determinatie van harde dierlijke materialen. Bot, gewei, ivoor, hoorn, schildpad, balein en hoef*. Amsterdam University Press.

Röber, R., 1994. Das Mittelalter: Hauswerk, Handwerk, Hohe Kunst. *In:* Kokabi, M., Schlenker, B., Wahl, J., Hrsg. *Knochenarbeit. Artefakte aus tierischen Rohstoffen im Wandel der Zeit* (=*Archäologische Informationen aus Baden-Württemberg*, 27). Stuttgart: Landesdenkmalamt Baden-Württenberg, 110–120.

Russow, E., 2004. Weitere Forschungen in der Stadt und Burg Haapsalu. *AVE 2003*, 148–159.

Russow, E., Lõugas, L., Maldre, L., Hiie, S., Kihno, K., Luik, H., Kadakas, V., Sarv, K., Kadakas, U., Kalm, A., Reppo, M., 2013. Medieval and Early Modern suburban site in Tallinn, Tartu Road 1: artefacts and ecofacts. *AVE 2012*, 149–170.

Sokolovski, V., 1997. *Aruanne arheoloogilistest uuringutest Tallinnas, Roosikrantsi th 9 ja 11*, I. *Uuringute tulemused*. Manuscript in the archaeology archives of AI (AI 1-87-15).

Spitzers, T., 1997. Late medieval bone-bead production: Socio-economic aspects on the basis of material from Constance, Germany. *In:* De Boe, G., Verhaeghe, F., eds. *Material Culture in Medieval Europe. Papers of the 'Medieval Europe Brugge 1997' Conference*, 7 (=*I.A.P. Rapporten*, 7). Zellik: Instituut voor het Archeologisch Patrimonium, 147–154.

Spitzers, T., 1999. Sotzialwirtschaftshistorische Aspekte der Spätmittelalterlichen Knochenbearbeitung Anhand von Abfällen der Perlendrechslerei aus Konstanz am Bodensee. *Beiträge zur Mittelalterarchäologie in Österreich*, 15, 241–250.

Svetikas, E., 2009. XIV a. pabaigos – XV a. amuletai iš apkaustyto lokio nago Lietuvos Didžiojoje Kunigaikštystėje ir kaimyniniuose kraštuose. *LA*, 34, 171–210.

Trummal, V., 1992. Arheoloogiauuringutest Tartus Lossi tänaval. *Stilus*, 2, 5–34.

Tvauri, A., 2000. The archaeological investigations in Viljandi, Tartu and Kärkna. *AVE 1999*, 54–62.

Ulbricht, I., 1984. *Die Verarbeitung von Knochen, Geweih und Horn im mittelalterlichen Schleswig*

(=*Ausgrabungen in Schleswig. Berichte und Studien*, 3). Neumünster: Wachholtz Verlag.

Van Vilsteren, V.T., 1987. *Het Benen Tijdperk. Gebruiksvoorwerpen van been, gewei, hoorn en ivoor 10.000 jaar geleden tot heden*. Assen: Drents Museum.

Vasiliauskas, E. 2012. The Excavations in Joniškis. *In:* Zabiela, G., Baubonis, Z., Marcinkevičiūtė, E., ed. *Archaeological Investigations in Independent Lithuania. 1990–2010.* Vilnius: Lietuvos archeologijos draugija, 304–309.

Wilkins, S., 2002. *Sports and Games of Medieval Cultures. Sports and Games Through History*. Connecticut: Greenwood Press.

Аун, М., 1994. Археологические исследования на улице Кююни в Тарту. *TATHS*, 43 (4), 404–408.

Костыгина (Новикова), Л. 1996. К изучению косторезного ремесла древней Твери. *In:* Хохлов, А.Н., ред. *Тверь, Тверская землья и сопредельные территории в эпоху средневековья*, 2. Тверской научно-исследовательский историко-археологический и реставрационный центр, 181–188.

Ланг, В., Лиги, П., 1990. Второе селище в Удерна. *TATÜ*, 39 (4), 433–436.

Мяэсалу, А., 1984. Форбург городища Отепя. *TATÜ*, 33 (4), 363–365.

ABBREVIATIONS

AI – Institute of History, Tallinn University

AVE – Arheoloogilised välitööd Eestis (Archaeological Fieldwork in Estonia)

BAR – British Archaeological Reports

LA – Lietuvos archeologija

MT – Muinasaja teadus

TATÜ – Eesti Teaduste Akadeemia Toimetised, Ühiskonnateadused (Proceedings of the Estonian Academy of Sciences, Social Sciences)

TATHS – Eesti Teaduste Akadeemia Toimetised, Humanitaar- ja sotsiaalteadused (Proceedings of the Estonian Academy of Sciences, Humanities and Social Sciences)

ZASMA – Zinātniskās atskaites sesijas materiāli par arheologu

НМГ – Новгородский государственный объединенный музей-заповедник

KAULO IR RAGO APDIRBIMAS TALINO KIVISILLA PRIEMIESTYJE XIV–XIX A.: TARTU KELIAS 1 ARCHEOLOGINIŲ TYRINĖJIMŲ REZULTATAI

Heidi Luik, Ulla Kadakas, Villu Kadakas, Liina Maldre

Santrauka

Straipsnyje aptariami 2011–2012 m. Taline, Kivisilla priemiestyje (Tartu kelias 1) vykusių kasinėjimų metu rasti kaulo ir rago dirbiniai. Straipsnio tikslas yra apžvelgti aptiktų radinių tipus, datavimą, apdirbimą, taip pat aptarti kaulo apdirbimą tyrinėtoje vietovėje skirtingais laikotarpiais, žaliavos pasirinkimą, dirbinių rūšis.

Tartu kelias 1 sklypas (1 pav.) yra Šiaurės rytų Estijoje, Talino priemiestyje, prie kelio į Tartu ir Šiaurės rytų Estiją. Jame buvo ištirtas apie 1100 m^2 plotas. Ankstyviausio, viduramžiais datuojamo pastato liekanos aptiktos tyrinėto ploto Š dalyje (2 pav.). Tyrinėto ploto vieta, pastato dydis ir erdvių jame pasiskirstymas leidžia manyti, kad čia greičiausiai būta visuomeninės paskirties pastato: svečių namų, smuklės ir pan. Rasti 92 kaulo ir rago dirbiniai, 43 iš jų – gamybos atliekų fragmentai. Ankstyviausi radiniai datuojami XIV–XV, vėlyviausi – XVIII–XIX a.

Daugiau kaip pusė kaulo radinių siejami su viduramžių laikotarpiu – XIV a. – XVI a. paskutiniuoju ketvirčiu. Tai kaulinė adata, lokio nagas, cilindro formos radinys, arbaleto riešutas, peilio rankenos dalis (3:1, 4–7 pav.), šukos (5:1 pav.), 4 lošimo kauliukai, skridinio formos žaidimų figūrėlės, ūžynė, galvijo pirštakaulis (6:1–5 pav.), 2 kaulinės fleitos (7 pav.), keletas raginių dekoratyvinių plokštelių (8 pav.). Viduramžių medžiagos kontekste taip pat rasta briedžio rago dirbinių fragmentų (9 pav.) ir kaulinių karolių gamybos liekanų (10 pav.). Vos keletas radinių datuojami ankstyvaisiais naujaisiais laikais – XVI a. pabaiga – XVII a.: 2 galvijo pirštakauliai (6:6, 7 pav.), raginės šukos (5:2 pav.), kaulinė šakutė ir rankenėlė (3:2, 3). Maždaug 20 radinių datuotini XVIII–XIX a., kurių daugumą sudaro kaulinės sagos ir jų gamybos atliekos (11 pav.) ir tik 2 kitokio tipo radiniai – dantų šepetukas ir kaulinė tūtelė (5:3, 3:8 pav.). 2010 m. žvalgomųjų tyrinėjimų metu aptikti XVI–XVIII a. priskirtini 6 kaulo radiniai: 2 rankenėlės (4 pav.) ir 4 sagos.

Viduramžių laikotarpio kaulo ir rago apdirbimo liekanų nėra daug. Tai leidžia daryti prielaidą, kad nuolatinių kaulo apdirbimo dirbtuvių čia nebūta, o pavienes liekanas greičiausiai paliko keliaujantys amatininkai. Tikėtina, kad mažuose miesteliuose nuolatinė prekyba kaulo dirbiniais nevyko arba nebuvo pakankamai tokios produkcijos pirkėjų. Šalia tilto per upę įsikūrę svečių namai ar smuklė galėjo būti tinkama vieta kaulo dirbinius gaminantiems amatininkams apsistoti ir čia gaminti savo produkciją bei ja prekiauti. Galbūt tam tikrų produktų gamyba ar medžiagų apdorojimas buvo atskirų amatininkų specializacija. Iš ilgųjų kaulų karolius gaminantys amatininkai galėjo nesunkiai gauti reikiamos žaliavos vietoje, kadangi tarp aptiktų neapdirbtų kaulų buvo daugybė galvijų ilgųjų kaulų, o rago apdirbėjai turėdavo tam tikrą kiekį žaliavos vežtis su savimi, nes osteologinėje medžiagoje kitų briedžio skeleto dalių nerasta.

Keli naujaisiais laikais datuojami dirbiniai yra įprasti namų apyvokos daiktai. Kaulinių sagų gamybos atliekos greičiausiai yra susijusios su gamyba savo reikmėms. Ankstyvųjų naujųjų laikų kaulo radiniai iš Tartu kelias 1 iš esmės yra panašūs į kitus Kivisilla priemiesčio kaulo radinius, tačiau kitose vietovėse nerasta kaulo apdirbimo atliekų, išskyrus vienintelį rago su pjovimo žymėmis fragmentą (12:2 pav.), aptiktą Tartu kelias 18.

Kitoje Talino priemiesčio teritorijoje, Roosikrantsi g. 9/11, aptikti kaulo radiniai taip pat gana panašūs į Tartu kelias 1. Gamybos atliekos čia sudaro apie 60% visų kaulo radinių. Roosikrantsi g. 9/11 yra netoli kelio, vedančio nuo Harju vartų link Pärnu ir į Vakarų Estiją, taigi vieta labai panaši ir į Tartu kelias 1 esančio objekto. Be to, kaulo apdirbimo liekanų panašiame kontekste aptinkama ir kituose Livonijos miestuose, pvz., Rygos priemiesčiuose, šalia Tartu vartų Viljandyje, taip pat pietiniame arba Rygos Tartu priemiestyje.

Iki šiol vykusių Talino priemiesčių archeologinių tyrinėjimų metu sukauptas gana didelis kaulo ir rago apdirbimo liekanų kiekis. Aptariamos vietos kaulo radiniai byloja apie tai, kad šalia kelių, vedančių į kitus miestus ir pilis, išsidėstę priemiesčiai turėjo būti tinkamos vietos keliaujantiems amatininkams laikinai apsistoti ir gaminti dirbinius vietoje. Tartu kelias 1 rasti viduramžių ir naujųjų laikų kaulo dirbiniai yra tipiniai radiniai, aptinkami tiek Taline ir kituose Estijos miestuose, tiek kaimyninėse teritorijose.

LENTELIŲ SĄRAŠAS

1 lentelė. Kaulo radinių, aptiktų Tartu kelias 1, datavimas (atsižvelgiant į kontekstą ir dirbinių tipologiją).

ILIUSTRACIJŲ SĄRAŠAS

1 pav. Talino priemiesčiai XVII a. Tyrimų ploto Tartu kelias 1 situacijos planas: 1 – Rotušės aikštė, 2 – Toompea kalva, 3 – uostas, 4 – Tõnismägi kalva, 5 – buvusi Härjapea upė, 6 – kelias į Tartu, 7 – viduramžių kelias į Narvą, 8 – kelias į Pärnu ir Rygą, 9 – viduramžių Šv. Jono ligoninė, 10 – Šv. Barboros kapinės, 11 – Viru vartai, 12 – Karja vartai, 13 – viduramžių egzekucijų vieta Võllamägi („Kartuvių kalva“), 14 – malūno tvenkinys. *R. Nurk, V. Kadakas brėž.* Žemėlapio pagrindas: K. Schultz XVII a. Talino nepublikuota rekonstrukcija (Talino miesto archyvas, 149–4–53).

2 pav. Tartu kelias 1 kasinėjimų metu rastos viduramžių namo liekanos, ankstyviausias pastato etapas (pirmajame plane – atliekų duobė). Vaizdas iš R. *U. Kadakas nuotr.*

3 pav. Kaulo ir rago radiniai: 1 – kaulinė adata, 2 – šakutė, 3 – rankenėlė, 4 – rankenėlės dalis, 5 – arbaleto riešuto fragmentas, 6 – cilindro formos rago radinys, 7 – rudojo lokio nagas, 8 – cilindro formos vamzdelis (AI 7032: L960, L1811, L261, L1603, L1575, L1602, L1606, L395/656:1). *S. Nittim nuotr.*

4 pav. 2010 m. žvalgomųjų tyrinėjimų metu rastos rankenėlės: 1 – briaunota kaulinė rankenėlė, 2 – dramblio kaulo rankenėlė (AI 6967: 528, 526). *H. Luik nuotr.*

5 pav. Tualeto reikmenys: 1 – dvipusės sudėtinės šukos, 2 – dvipusės paprastos šukos, 3 – dantų šepetėlio fragmentas (AI 7032: L1792, L1794, L734). *S. Nittim nuotr.*

6 pav. Žaislai ir žaidimų dalys: 1 – spėjama kaulinė ūžynė, 2 – lošimo kauliukai, 3, 4 – skridinio formos žaidimų figūrėlės, 5–7 – galvijo pirštakauliai (AI 7032: L1569, L899, L1632, L1751, L1744, L1271, L1497:3, L1586:2, L1836, L242). *S. Nittim nuotr.*

7 pav. Kaulinės fleitos (AI 7032: L1497:1, 2). *S. Nittim ir H. Luik nuotr.*

8 pav. Rago radiniai: 1, 2 – dekoratyvinės plokštelės, 3 – nupjauto kūgio formos rago dirbinys (AI 7032: L1585, L1677, L621). *S. Nittim nuotr.*

9 pav. Rago gamybos atliekos: 1, 3–6 – briedžio rago dalys, 2 – galvijo rago galas (AI 7032: L1091, L1721, L1586:1, L1589:1, 2; L1275:1). *S. Nittim nuotr.*

10 pav. Kauliniai karoliai ir jų gamybos atliekos (AI 7032: L1771 (13), L1247, L898, L1298). *S. Nittim nuotr.*

11 pav. Kaulinės sagos ir jų gamybos atliekos (AI 7032: L1536:1–4, L1561:1–3, L1737:1–3, L656:2, 3, L48, L319: 1, 2, L1112, L 1385, L333). *S. Nittim nuotr.*

12 pav. Kitose Kivisilla priemiesčio radimvietėse aptikti radiniai: 1 – Tartu kelias 10 aptiktas dekoratyvinės plokštelės fragmentas, 2 – Tartu kelias 18 aptikta rago dalis su apdirbimo žymėmis (AI 6456: 486; AI 6566: 65). *H. Luik nuotr.*

Vertė J. Žukauskaitė

Heidi Luik, PhD
Institute of History, Tallinn University
Rüütli 6, 10130 Tallinn, Estonia
E-mail: heidi.luik@tlu.ee

Ulla Kadakas, MA
National Heritage Board
Uus 18, 10111 Tallinn, Estonia
E-mail: ulla.kadakas@muinas.ee

Villu Kadakas, MA
Institute of History, Tallinn University
Rüütli 6, 10130 Tallinn, Estonia
E-mail: villu.kadakas@tlu.ee

Liina Maldre, MSc
Institute of History, Tallinn University
Rüütli 6, 10130 Tallinn, Estonia
E-mail: liina.maldre@mail.ee

Gauta 2014 12 30