ARCHAEOLOGICAL TEST EXCAVATIONS AT THE MESOLITHIC AND IRON AGE SETTLEMENT SITE JÄGALA-JOA IV

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INTRODUCTION

The lower course of the Jägala River in northern Estonia is rich in prehistoric monuments. In addition to the largest Iron Age hill fort in Estonia (Spreckelsen 1924/1925; Johanson & Veldi 2006; Lõhmus & Oras 2008) six Stone Age1, one Bronze Age2, seven Iron Age settlement sites3 and a cup-marked stone have been discovered there (Vedru 2006; Kriiska et al. 2009; Kriiska 2011; 2012, fig. 2). Remains of prehistoric fields have been found on extensive areas nearby (Kriiska et al. 2009; Kriiska 2012, fig. 2). By find material and radiocarbon dating acquired so far, the oldest of the settlements in the Jägala region is Jägala-Joa IV.

The Jägala-Joa IV dwelling site is located in Harjumaa, Jõelähtme parish in the village of Jägala-Joa (Fig. 1: A). It is situated just by the Ruu-Ihasalu road, approximately 100 metres from the eastern bank of the Jägala River (Fig. 1: B, C). Coastal formations and sand dunes dominate the whole area. The cultural layer of the Jägala-Joa IV site is partly covered by dune sands. As the Iron Age settlement layer did not contain any significant amount of Stone Age finds, it can be presumed that dune sands covered the older layer already before resettlement in the Iron Age.

Jägala-Joa IV was found during fieldwork in 2011. During the roadworks on the Ruu-Ihasalu road, it was thought to be part of the Jägala-Jõesuu IV settlement site (Kriiska 2011, 8). Disregarding prior agreements between the archaeologist in charge and representatives of the

1 Jägala Jõesuu I, II, III, V; Jägala-Joa I and Jägala-Joa IV.
2 Jägala-Joa II.
3 Jägala Jõesuu Linnamäe dwelling site, Jägala Jõesuu I, IV and V and Jägala-Joa II, III and IV.

Fig. 1. The location of Jägala-Joa IV site (A–B), excavation trench (C: 1) and traces of Iron Age combustion (C: 2) (B and C are based on the elevation map of the Estonian Land Board).

Jn 1. Jägala-Joa IV asulakoha (A–B), proovi-kaevandi (C: 1) ja rauaaegsete ulatuslike põlengujälgede asukoht (C: 2) (B ja C aluseks maa-ametis reljeefikaart).

Drawing, processing and location / Joonis, töötlus ja kohateave: Kaarel Sikk
National Heritage Board, the Estonian Road Administration and the construction company Nordecon Infra AS, a road ditch was arbitrarily dug without prior archaeological investigations (Kriiska 2011, 8). About 120 metres of the road-ditch wall was documented in detail in the summer of 2011. The site stratigraphy and finds (pottery sherds and flint artefacts) made it clear that it was a previously unknown monument and not a part of the Jägala-Jõesuu IV settlement site. It was possible to distinguish an Iron Age and a Stone Age layer (Fig. 2).

Two deeper pits, where dark soil was mixed with charcoal were found in the cultural layer, probably remnants of fireplaces. Pieces of charcoal were collected from the north-eastern pit (Fig. 2, A), only its bottom part had still preserved. The charcoal was radiocarbon dated to 8030±40 BP\(^4\), calibrated 7076–6780 cal BC with probability of 95.4\%\(^5\).

In July 2013 small-scale excavations were carried out at the Jägala-Jõesuu IV Mesolithic and Iron Age settlement site (Fig. 3). The site is being gradually destroyed by erosion and routine road maintenance work, as it is cut through by a road-side ditch. Thus, the main aim of the excavation was to get information about the Stone Age and Iron Age settlement in the area before the site will be degraded. Another purpose was to conduct a detailed study of the previously located Mesolithic fireplace.

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\(^4\) Poz-46731.

\(^5\) OxCal v4.2. Bronk Ramsey (2013); r.5; IntCal13 atmospheric curve (Reimer et al. 2013).
RESULTS OF THE EXCAVATION

Excavations were carried out by a roadside ditch (Fig. 1: B, C). The excavation trench was positioned taking into consideration different historical time soil works. A significant part of the cultural layer has been destroyed by road construction. There is also a large area of mixed soil, probably resulting from sand extraction or construction work in the Soviet time (Fig. 2). This mixed-soil region, north of the excavation pit also contained finds and remnants of both Stone Age and Iron Age cultural layers.

The purpose was to excavate the side of the ditch, which contained a known Mesolithic fireplace. Initially 3 m² was opened, but while digging down the side of the ditch the area widened, resulting in 6 m² when the excavation finished (Fig. 3).

Both Iron Age and Mesolithic cultural layers covered the whole excavation area, except the parts removed by roadworks and erosion at the side of the ditch. The Iron Age cultural layer was buried under a thin layer of humus, sand and spruce needles. The topmost layer and the upper part of the Iron Age layer contained a lot of pieces of asphalt that had been flown there during road construction and later by passing cars. It also contained pieces of glass, some nails and two redware sherds. Soil probing revealed a 20 m long and more than one metre wide burnt area around the excavation trench (Fig. 1: C).

**The Iron Age layer** was up to 20 cm thick, dark, rich in organic content. Signs of high temperature combustion were visible. While there was no charcoal from the burnt constructions themselves, the area surrounding them contained greyish black sand with carbonized organics and charcoal pieces from adjacent objects (Fig. 3: 1; 4). The Iron Age cultural layer contained a lot of small pieces of burnt stones, which were absent in the Mesolithic layer below. Almost no bigger stones were present.

The Iron Age cultural layer contained small nodules of natural iron ore. Preliminary XRF analysis indicated two variations of them. One had very high manganese content, in the other it was significantly lower. Nodules of the first variation are manganese-iron concretions which have formed in the bottom of the sea and can be found in the sedimentary sand layer in Estonian coastal areas (Tvauri 2012, 114). The second variation looks visually similar to bog iron ore, mainly used for iron production in prehistoric Estonia (Peets 2003, 31f.). Still, the manganese content is higher than in typical bog ore (Peets 2003, 34). As the ore distribution correlated with the Iron Age cultural layer and the nodules could not have naturally formed during or after the Iron Age in the given location, they must have been gathered by inhabitants. Given the differences in composition of found ore pieces, there must have been multiple sources for them. Although no slag or other signs of metalworking were found, it is a strong indication that the site was connected to metal production and manganese-iron concretions could have been used for it during the Iron Age. A similar observation about the concretions has been made at the Viking Age iron production site of Tööva (Kiudsoo et al. 2009).

Altogether 127 hand-made potsherds and 3 lumps of burnt clay were found from the Iron Age cultural layer (Fig. 4). The sherds derive both from pots and from bowls (at least 16 fragments) (Fig. 5). They originate mostly from vessels made of clay mixed with rock debris, only 9 of the sherds have some organic (porous texture and plant imprints on clay) materials in moulding mass together with rock debris. Two sherds include

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6 Analysed by Ragnar Saage (TÜ).
sand and one rock debris and grog. The wall thickness is from 3.5 mm to 10 mm. N-type contact surface used to connect the clay coils can be seen on one sherd.

From pottery sherds with two preserved surfaces and sufficient size to determine 41 have both surfaces smoothed, 11 have a smoothed inner surface and a polished outer surface, 4 have both surfaces polished, one has inner surface polished and the outer one smoothed and one sherd is striated on both surfaces.

Some vessels have been burned in oxidizing and some in reducing environment. 8 rim fragments have survived; most of them are 4–5 mm thick, with one exception, which is 9 mm. The fragments indicate that the bowls had thinning rims with straight fringes. The largest diameter is at the shoulder. Transition to the shoulder is convex or with a small berm. Only one sherd was ornamented with notches on the fringe.

The Iron Age settlement site probably lasted throughout a single period with homogeneous find material and a clearly distinguishable event of combustion. By analogues in shape and surface treatment (frequent polishing, scarcity of striation) with pottery from mainly the Iru hill fort and settlement (Lang 1996, 78–81) the pottery sherds of Jägala-Joa IV are preliminarily dated to the Viking Age.7 One bowl sherd belongs to Iru AII type, indicated by a small rectangular berm in transition from the neck to the shoulder (Fig. 5: 2). Iru AII pottery has been dated to the 8th – 10th century (Lang 1996, 78–81). It is worth noting that Jägala-Joa IV settlement site is lacking sherds from carinate vessels. The tradition of making carinate vessels disappeared probably in the Tallinn area during the 7th – 8th century (Lang 1991, 56).

About 20 cm thick Mesolithic cultural layer, formed probably on the Ancylus Lake sand sediments, contained fireplaces deepened in the ground reaching an additional depth of 20 cm. The layer was of dark red/brown colour and contained small pieces of burnt bones, carbonised pieces of hazelnut shells and other plant remains. A fireplace without stones with minor radius of 0.6 metres and major radius of 1 metre stands out from surrounding ground as a darker area containing small pieces of charcoal (Fig. 3: 3; 6). There was another pit dug into natural soil close to the fireplace (Fig. 3: 2; 6) – probably a household pit.

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7The dating was confirmed by Valter Lang (TÜ) who examined the characteristic fragments of bowls (pers. comm. April 2014).
Altogether 270 finds originated from the Stone Age: 252 flint objects (93.3% of finds), 8 quartz objects (3% of finds), 8 sandstone objects (3% of finds) and 2 objects made of other stone (0.7% of finds). In addition 52 calcinated bone fragments were found. Most of the finds were situated in the fireplace or close to it, no finds were found from the other pit (Fig. 6).

Flint is of uneven quality and varying colour. The main tone is grey (159 cases), but there are also objects of red (9), white (7), beige (4) and black (1) colour. Quite often (28.6% of cases) the found objects are multicolour. In case of two coloured finds there are combinations of grey and red (23), grey and beige (19), red and beige (5), grey and white (2), red and black (2), yellow and grey (2) and red and white (1). Multicoloured combinations include grey, beige and red (10); grey, black and red (2); grey, black and yellow (1), red, black and white (1) and grey, beige, black and red (3).

By comparison to other Estonian Stone-Age flint material it can be supposed that flint material origins from the Central-Estonian Silurian limestone system. More precise locations of the source of flint is currently impossible to track. 29% of the flint material has fragments of cortex remaining, in most cases the crust is rough as if it had been broken from limestone block, but in some cases it is smooth, as if collected from Quaternary sediments.

Flakes and flake fragments (175, Fig. 7: 3) and blades and blade fragments (63; Fig. 7: 1–2) make up a large part of the flint finds. Also 5 flint nucleuses were found (Fig. 7: 7–9). All products of primary processing have been made in platform method. The direction of percussion may have been changed – there is one nucleus with 2 striking platforms and the change of direction of impact is visible on several flakes. Several flakes were struck during reparation of platform. Flint blades are small with length varying from 0.8 cm to 3 cm. Most often they have one (11) and sometimes two (6) ridges. Among blade fragments there are 27 proximal and 8 distal ends, other fragments come from the middle part.

In 74 cases (29% of flint finds) the reduction technique could be determined. This is of course provisional and based on experiments and published parametres (e.g. Inizan et al. 1992, 60–65). But experiments have convincingly shown that no marker is absolute, so rates of error can be relatively high. If the classifications are correct, in 66 cases (89.2% of objects classified by reduction technique) produced flake, blade, fragment or other item the object was struck with an organic or soft-stone hammer. In six cases (8.1%) hard-hammer percussion has been used. In two cases of blade fragments the blades had been produced by pressure-flaking.

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Fig. 6. Map of Mesolithic cultural layer. 1 – fireplace, 2 – presumed household pit, 3 – area destroyed by construction works, 4 – quartz finds, 5 – burnt bone fragment, 6 – flint finds.


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10 retouched flint tools were also found (4% of flint finds). Most of them are scrapers (Fig. 7: 4–6), 7 pieces altogether (70% of finds with secondary processing). Four scrapers have their working edge on a side, three on the end and three on the side and on the end. The working edge of six scrapers is rounded and steep, one scraper has a rounded steep and slanting edge and one scraper has a straight and serrate edge. The size of the scrapers varies from 1–2.7 cm in length, 0.9–2.3 cm in width and the thickness varies from 0.3–0.7 cm.

Also a burin, a fragment of retouched flake and a fragment of retouched blade were found. The burin (17.9 × 11.5 × 4.7 cm) has an angle edge and is made of a flake. Several flakes and blades bear traces of wear, which is an indication of that in addition to the retouched items the items of primary processing were also used as tools. Other stone artefacts include eight polishing fragments of sand stone and one hammer stone (6.4 × 3.3 × 2.4 cm).

**DISCUSSION AND FINAL REMARKS**

Jägala-Joa IV settlement site comprises of two cultural layers formed during two different time periods (Figs 2–3). The younger layer dates from the Iron Age and can be dated by pottery (Fig. 5) to the Viking Age. As a result of soil probing around the excavation trench, a 20 m long and more than one metre wide burnt area was found (Fig. 1: C). Although a high temperature combustion event is visible at the site, it cannot be determined what exactly has burnt without additional excavations. Iron ore has been gathered on the site, indicating metal processing nearby.

The Viking Age settlement phase was recently quite poorly known from Jägala area (e.g. Lang 1996, 274, fig. 29; Vedru 2006). This period has not been discovered on the Jägala hill fort, either (Kriiska et al. 2009, 45–46). Still – several new settlement sites have been found during fieldwork since 2008, among them several sites where
finds from the Viking Age have been gathered. Most of them were found during rescue excavations connected to road construction works during 2011 in Jägala Jõesuu IV and V settlement sites – analysis of finds from those sites is still in progress. But preliminary information about the Jägala-Joa IV and Jägala-Joa I settlement, found in 2001 (Vedru 2006, 107), gives a strong indication of Jägala as a Viking Age population centre in northern Estonia.

As a result the excavation a Mesolithic settlement phase was also studied. The site contains mostly flint production waste (inter alia lots of strongly burnt pieces) and some tools (Fig. 7), but virtually no quartz. One fireplace and a possible household pit close to it were observed. Around the fireplaces carbonized organic content, including small bone fragments and hazelnuts had preserved.

Among more than 200 Late Mesolithic sites in Estonia only two have been radio-carbon dated to the same period as Jägala-Joa IV. Those are Sindi-Lodja I and II settlement sites in south-eastern Estonia on the lower course of the Pärnu River (Kriiska & Lõugas 2009). Those sites have several similarities with Jägala-Joa IV.

As with Sindi-Lodja I and II (Rosentau et al. 2011, fig 8.7: f), Jägala-Joa IV had not been situated directly by the sea, but somewhat farther on the shore of the river. Until a thorough paleogeographic study it is not possible to reconstruct the natural environment for the period of the settlement phase. But the shore displacement chronology of Estonia shows that the shoreline of the sea was close to the settlement site (about 20 m a.s.l.) considerably later – during the Litorina Sea maximum, 1500 years after its Mesolithic use (computer program Rantaajoitus_viro.exe ver. 1 (Jussila & Kriiska 2004a); base data published by Jussila & Kriiska 2004b). At the time of the settlement the sea level was considerably lower and closer to modern-day shoreline than to the site. Another similarity is the dominance of flint over quartz in both Sindi-Lodja and Jägala-Joa sites. In Sindi-Lodja II settlement the percentage of flint among flint and quartz finds is 99% (Kriiska et al. 2002, 33), in Jägala-Joa IV the ratio is 96.9%. Also the ratio of tools with secondary processing is similar, in Sindi-Lodja II they make up 3.2% of the finds (ibid., 33) and in Jägala-Joa IV 4% of the finds.

The ratio of blades (including fragments and tools made of them) to flakes (including fragments and tools made of them) is higher in Jägala-Joa (25.4%) than in Sindi-Lodja II (14.4% – Kriiska & Lõugas 2009, fig. 26.5). It must be considered that different activities can produce different ratios of blades and flakes, which can vary among single sites material. So there is no need to search for a statistically significant reason behind the difference in given figures.

Stone usage in Jägala-Joa IV site is completely different from Jägala Jõesuu II site, which is situated only a couple of hundred metres to the north-west and is dated to 6500 cal BC. Among finds gathered during the surface survey, quartz also dominated in the nearby Jägala-Jõesuu IV site (Kriiska et al. 2009, 46), which is only a couple of hundred years later. In all later Mesolithic settlements in Estonian coastal regions and islands, quartz is also the main material for making stone tools (Kriiska 2002, 36).

Changes of stone usage could be so far dated only at the Sindi-Lodja II site, where flint is the dominating material (Kriiska et al. 2002, 33), and also in the cultural layer of Narva Joaaru settlement ‘I Mesolithic cultural layer’ in north-eastern Estonia, where quartz is the dominating material (Jaanits et al. 1982, 47). The sites are dated
accordingly to about 7000 cal BC and 6500 cal BC. As those monuments are located far from each other, there was a high chance that the difference was caused by local variations. But the material from Jägala Jõesuu II and Jägala-Joa IV settlements confirms the hypothesis that during the 7th Millennium BC a change in stone usage occurred in coastal settlements – flint was replaced by quartz. The change can reflect the decrease of hunter-gatherer mobility because more permanent settlements were being established in the coastal region (look e.g. Kriiska et al. 2011, 85).

Although only a small test excavation was carried out during the summer of 2013, important information was acquired regarding the Iron Age and the Stone Age settlement in the region. Also, the results confirmed several hypotheses about more general settlement processes in the Late Mesolithic in Estonian coastal regions.

Acknowledgements: the research was financed by European Union via the European Regional Development Fund (Centre of Excellence in Cultural Theory), research project of the Estonian Research Council ‘The reflections of the Eurasian Stone and Bronze Age social networks in the archaeological material of the Eastern Baltic’ and ‘Estonia in Circum-Baltic space: archaeology of economic, social, and cultural processes’, OÜ Arheograator and Museum of Rebala. The authors are grateful to Ragnar Saage for XRF analysis, to Janek Šafranovski, Andres Tvauri, Valter Lang and Gurly Vedru for useful comments, to Kristel Roog for drawing and revising the illustrations and all the members of the Jägala expedition.
REFERENCES
Jägala jõe alamjooksul Põhja-Eestis tuntkse rohkesti eriaegseid muinasjäänuseid, praeguseks on lisaks juba varaseast teadaolevalt mitmeid asustatud viis kiviaegset, kaks pronksiaegset ja seitse rauaaegset asulakohata, üks lohukivi ja mitmeid fossiilseid põllujaanuseid. Leimu materjali ja radiosüsiniku dateeringu alusel on vanim neist Jägala jõest tänapäeval üle 100 m kaugusel paiknev Jägala-Joa IV asulakoht (jn 1).


Kohati tumedamate pinnaselaikudega (jn 4) eristuv rauaaegne kultuurkiht oli kuni 20 cm poldenud kivide purdu. Kaevandisse jäid osaliselt ka põlenugülal, mis jättikud üleslukul alal kaevald lähedal (jn 1: C).


Mesoliitiline kultuurkiht oli samuti üle 20 cm paksune. Selles eristus tumedama sõese laiguna 0,6–1 m läbimõõduga ja 20 cm sügavusele mitmeid lõhutud tulease reast (jn 3: 3 ja 6). Tuleaseme lähedal paikneb enamastik kivide pinnaselle. Kiviaegset kultuurkihti reast leiutati 270 leiduga, neist 252 tulekivist, 8 kvartsist, 8 liivakivist ja 2 muudest kivimitest; liitsaks veel 52 kaltsineerunud luutükki. Enamik leidudest on käsitsi keraamikast või seelikast, mis on võimalik, et neid on leitud kasutades kiviekserite ja laastute ülemuses. Kiviküülikudest on enamus killud ja killukatked (175, jn 7: 3) ning kaasatud ka laastukatke (63; jn 7: 1–2), lisaks 5 nukleest (jn 7: 7–9). Kõik esmatöötluse produktid on platvormtehnikas. Tulekivi on lõhestatud enamasti keraamikast, harvem kõvas lööektehnikas ning erandina esineb ka surulõhestest. Retušitud tööriistu leiti 10 (% tulekivileitust): 7 kõõvitsat, 1 uurits, 1 retušitud laastu katke ja 1 retušitud killu katke. Muu-dest kivimeistridest leidud on lihmimiskivide katked ja üks lõögikivi.