From a concentration of finds to Stone Age architecture: the Lommi III pit-house in Northwestern Russia

Irina Khrustaleva [1], Aivar Kriiska [2]

1 Chair of Laboratory Archaeology, University of Tartu, Tartu, EE; Department of Archaeology of Eastern Europe and Siberia, the State Hermitage Museum, St Petersburg, RU; irina.khrustaleva@ut.ee

2 Chair of Laboratory Archaeology, University of Tartu, Tartu, EE; aivar.kriiska@ut.ee

ABSTRACT – *High-quality documentation that was made during fieldwork at archaeological sites can provide new information for old excavations, even decades later. The revision of the archival data of the Stone Age settlement site Lommi III, located in the border zone of Russia and Estonia and excavated by Richard Indreko in 1940, allowed us to identify the remains of a Comb Ware culture (4th millennium cal BC) pit-house based on the concentration of artefacts marked in the field drawings. The rectangular shape and size of the concentration (*c. *7.1x4.4m, depth 0.7–0.75m) corresponds to the architectural form common in the European forest zone and has numerous analogies at the settlement sites of that time in Finland, Karelia (Russia) and Estonia. The composition and diversity of the finds and their distribution indicate the (semi-)sedentary way of life of inhabitants of the pit-house. The radiocarbon age obtained from the organic crust on pottery fragments collected in the pit-house corresponds to the first half of 4th millennium cal BC.*

KEY WORDS – *Luga River basin; Stone Age; Comb Ware culture; concentration of finds; pit-house; architecture*

Od koncentracije najdb do kamenodobne arhitekture: vkopana hiša na najdišču Lommi III v severozahodni Rusiji

IZVLEČEK – *Kakovostna terenska dokumentacija arheoloških najdišč lahko prinese nove podatke o starih izkopavanjih, tudi desetletja kasneje. Z revizijo arhivskih podatkov o kamenodobnem najdišču Lommi III, ki se nahaja na meji med Rusijo in Estonijo in ga je izkopaval Richard Indreko leta 1940, smo lahko prepoznali ostanke vkopane hiše z najdbami kulture z glavničasto keramiko (4. tisočletje pr. n. št.), in sicer na podlagi koncentracij najdb, ki so bile dokumentirane na terenskih skicah. Pravokotna oblika in velikost te koncentracije (ok. 7,1x4,4 m, globina 0,7–0,75 m) se sklada z arhitekturno obliko, ki je pogosta na evropskem gozdnem območju in ima številne primerjave s sočasnimi naselbinami na Finskem, v Kareliji (Rusiji) in Estoniji. Sestava in raznolikost najdb ter njihova razprostranjenost kažejo na to, da ima ta vkopana hiša značilnosti (delno) stalne poselitve. Vkopano hišo smo s pomočjo organskih ostankov na keramičnih odlomkih radiokarbonsko datirali v prvo polovico 4. tisočletja pr. n. št.*

KLJUČNE BESEDE – *porečje Luge; kamena doba; kultura glavničaste keramike; koncentracija najdb; vkopana hiša; arhitektura*

Introduction

While pictorial sources (sculptural images, engravings and drawings) are available to study dwellings mainly from the Chalcolithic period, and written sources from the earliest civilizations of the Old World (*e.g., Passek 1938; Nechaeva 1975; Frayne 1998; Tallet 2017*), the research base for Stone Age dwellings is almost entirely limited to archaeological remains of buildings or traces of such structures.

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There are very few exceptions for Palaeolithic period from different parts of the World (*Pidoplichko 1969.Fig. 58; Marshack 1979.290; Svoboda 1997. Fig. 8; Olenkovskiy 2000.376; García-Diez, Vaquero 2015*). However, not a single image of the dwellings of the Stone Age hunter-gatherer societies of the European forest zone is known.

Folk dwellings, as can be seen from ethnographic data (*Popov 1961; Hole, Heizer 1973.112*), can be very diverse depending on natural conditions, historical period, lifestyle of the residents and building traditions. At the same time, although building remains from archaeological contexts are relatively numerous, the data are mostly limited in the architectural sense and the level of detail. We subscribe here to the idea that from an archaeological point of view a dwelling is a set of archaeological materials with certain boundaries and a way of accumulation; quite often a dwelling can only be identified as an artificially allocated or transformed natural space that can accommodate at least one person, in short, often just the floor of the dwelling can be found (*Boriskovskiy 1958.4; Grigorjev 1974.12; Rogachev, Anikovich 1984.189; Grøn 2003.686–688; Leonova 2004.66*).

The main architectural remains, destroyed and decayed structural elements are usually not preserved in the sandy soils of the Stone Age sites in the European forest zone without special conditions (such as wetlands or other kinds of anaerobic soils, burning of wooden elements or clay daub, *etc.*). Sometimes only post holes, stones or ash and charcoal spots can indicate the location and existence of an ancient dwelling (*Loze 1979.55–60; 1988; Zhulnikov 2003.20; Leonova 2004; Khrustaleva 2017*). Often, however, only concentrations of artefacts or, vice versa, empty zones can indicate the presence of settlement features (*Pesonen 2002.11; Zhulnikov 2003.19; Gelhausen* et al. *2009; Larsson, Sjöström 2013.506–508; Kriiska* et al. *2016; Rostedt, Kriiska 2019.18*). The high quality of the excavations and the documentation required for such an analysis are usually only achieved through modern excavations. However, archival data may also provide new discoveries for some studies conducted decades ago.

The results of the revision of the archival data of the Stone Age settlement site Lommi III, located in Ingria (Leningrad Region, northwestern Russia) and excavated by Richard Indreko in 1940 (at that time this territory was part of Estonia), can also be called a discovery. When working with the materials from this site, attention was drawn to a rather expressive concentration of artefacts marked on field drawings, both on the horizontal plan and on the stratigraphic section of one of the excavation areas. The size and shape of this concentration suggested a structure that had divided space and limited the distribution of cultural remains. All this indicated the presence of a pit-house that Indreko had discovered without even realising it. After excavating in the area that is at the heart of our paper, he wrote in his field report: "*To see how widespread the finds are, and also partly in search of a dwelling, 5 small test pits were dug in different places on the right bank of the Notika River...*" (*Indreko 1940.6*). As the quote suggests, Indreko went to look for a dwelling elsewhere, but the quality of his field documentation, which is very high for its era, allows for a new analysis using modern knowledge and methods.

This discovery determined the purpose of our work – to analyse the materials of the settlement site and substantiate the presence of the dwelling remains, and, if possible, establish its function and construction details. The methodological basis of the study includes spatial and comparative-typological analysis and analysis of the proportions of raw materials used, as well as radiocarbon (AMS) dating of burnt animal bones and organic crust on pottery fragments. In addition to an overview of the general context of contemporaneous settlement sites, this work also prompted us to delve into the theoretical discourse on the history and methods of studying Stone Age pit-houses in a larger territory and broader chronology.

Lommi III settlement site

Lommi Stone Age settlement sites (named after a now lost village) are located on the banks of the small River Notika, a left tributary of the Luga River in Ingria, near the Gulf of Finland of the Baltic Sea. The area is a coastal lowland bounded in the south and east by the Cambrian and Ordovician bedrocks (Baltic Klint) and located on the border of Estonia and Russia (Fig. 1.1). Two major rivers, Narva and Luga, flow through the lowlands and numerous different coastal landforms of Middle and Late Holocene are preserved in the area (*Rosentau* et al. *2013*). Nearly a hundred archaeological sites, mostly Stone Age settlements (Fig. 1. 2), have been discovered in the basins of the two rivers during a century of research (*Kriiska 1996a; Kriiska* et al. *2016b; Gerasimov* et al. *2019*).

The story of the discovery of the Stone Age settlement sites in Lommi began in the winter of 1939 with a careful border guard who found potsherds and flint artefacts from the gravel transported to build a road near the cordon. He interviewed the transporters, stopped the gravel quarrying and sent the finds to the head of the border guards, who in turn took them to the Narva Museum (*Soom 1939; Indreko 1940*). In October of the same year, the director of the Narva Museum visited the place together with the border guard and collected Stone Age artefacts from both banks of the Notika River (*Soom 1939*). Finds and documentation of field observations were sent to the Institute of Archaeology of the University of Tartu (*Soom 1939; Indreko 1940*). After that, Richard Indreko of the University of Tartu conducted an inspection and excavations at the site from 1 to 19 July 1940. In addition to the leader, six other people took part in the expedition. The field report (*Indreko 1940*), which has not been completed and does not contain any photos, shows the ensuing war (Fig. 2). This naturally affected all archaeological work in Europe as a whole, and for Indreko personally ended with emigration from Estonia (*Johanson, Tõrv 2013*). He published the results of the excavations only after the Second World War (*Indreko 1948; 1964*).

Indreko provided general information and a map of the locations of the discovered sites. Two of them were situated on the left bank of the Notika River, in the territory of the former farms of Männimetsa/Passi (Lommi I) and Saare/E. Hämäläinen (Lommi II). The Lommi III site was located on the right bank of the Notika, opposite Lommi II. The modern riverbed was formed later and partially destroyed the settlements, as indicated by the Stone Age finds (including potsherds) from the Notika River (*Indreko 1940.3*). Full-scale excavations were conducted at Lommi III (Fig. 1.3). The find assemblage of more than 150 excavated square meters included potsherds, flint artefacts, whetstones, stone and amber ornaments and clay figurines (the finds are stored in the Archaeological Research Collection of the University of Tallinn, Estonia; collection number AI 3867). Indreko associated all the excavated materials with the Comb Ware culture, and suggested that the cultural layer had developed 'simultaneously' (*Indreko 1940.6; 1948.299*); currently the Comb Ware culture in Estonia is divided into two parts, the Typical and Late Comb Ware culture, dating 3900–3500 cal BC and 3500–1750 cal BC respectively (*Kriiska* et al. *2020.Fig. 1*).

Later, only minor fieldwork was done in Lommi. In 1952, Nina Gurina from the Institute of Archaeology (Leningrad, USSR) surveyed the area and made two test trenches measuring 2x2m on the left bank of the Notika River (*Gurina 1961*). This was the territory of the Lommi I or II site, as became apparent after the recent detailed revision of her fieldwork plans and written site descriptions. However, Gurina

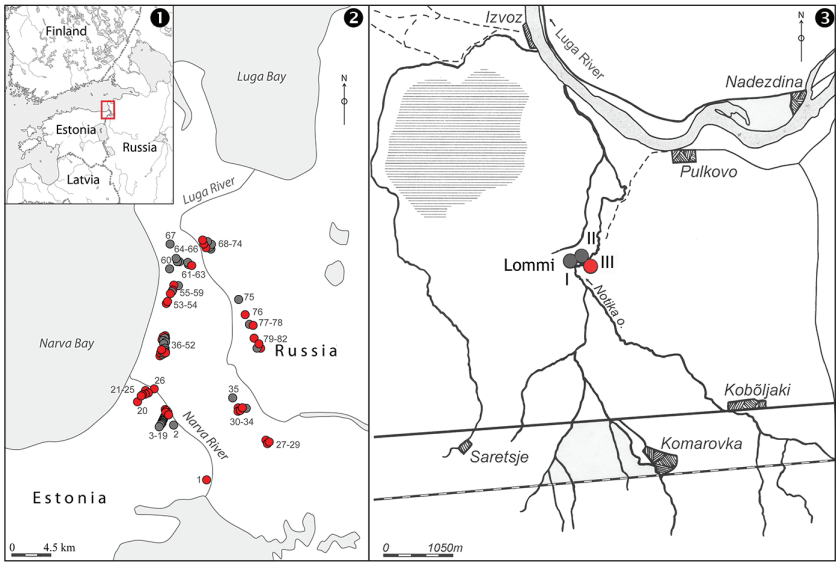

Fig. 1. Location of the research area:* 1 *Narva-Luga interfluve (red rectangle) on the map of the Eastern Baltic;* 2 *Stone Age sites known in the Narva-Luga interfluve (after* Kriiska et al. 2016; Gerasimov 2019*; amended by the authors), red dots mark the settlement sites of the Comb Ware culture:* 1 *Narva Joaorg;* 2 *Vasa;* 3–19 *Riigiküla I–XVII;* 20 *Viljapea;* 21–25 *Narva-Jõesuu I–IV;* 26 *Venkul (Väiküla);* 27–29 *Lommi I–III;* 30–34 *Izvoz 2–6;* 35 *Keykino;* 36–52 *Rosson 1–16;* 53–54 *Väike-Ropsu 6–7;* 55–59 *Väike-Ropsu 1–5;* 60 *Kuzemkino 3;* 61–63 *Kuzemkino 5–7;* 64–66 *Kuzemkino 1, 2, and 4;* 67 *Strupovo;* 68–74 *Galik 3, 4, and 6–10;* 75 *Kurovitsy 7;* 76 *Kurovitsy 1;* 77–78 *Kurovitsy 4 and 8;* 79–82 *Kurovitsy 2, 3, 5, and 6.* 3 *location of Lommi settlement sites (after: Map AI 4-1-51-1-1= Narvataguse khk. Lommi kl. kammkeraamilise kult. asulakoha ümbruskonna plaan. Kaevamised R. Indreko 1940. a. 1–19.VII. AI 4-1-51-1-1. Drawing in the Archaeological Research Collection of the University of Tallinn, Estonia), red dot – Lommi III.

seems to have assumed that this was site III, as she included it in the general context of artefacts found by Indreko in Lommi III. Gurina also described the stratigraphy of the site, but it is not clear from her text which finds were directly made in the test trenches (at least part of the finds is kept in the Kingisepp Museum of History and Local Lore, Russia). She dated the settlement site to the 'advanced Neolithic' (*Gurina 1961.412*).

The Lommi I settlement site was again localised in 2011 by Dmitry Gerasimov (Peter the Great Museum of Anthropology and Ethnography, the Kunstkamera; St. Petersburg, Russia) and Aivar Kriiska. Archaeological finds (Comb Ware sherds and a few bone fragments) were collected from the surface of a small sandy hillock (*Gerasimov 2019. 183*). A fragment of Estonian Corded Ware (2800–2000 cal BC; *Kriiska* et al. *2020.Fig. 1*) was also discovered, indicating that the same places by the Notika River were used at the end of the Stone Age as well.

12. VII. 40

4500-aastane asula Narva taga.

[redacted] Lommi külas satuti rikkalikule kiviaegsele leiukohale. [redacted]

[redacted]

TEADUSLIK KAEVAMISTÖÖ Lommi küla metsas. [redacted]

Narwa lähedal [redacted] Lommi küla maa peal Notika oja juures on juba mõnda aega käimas [redacted] arheoloogilised kaewamised, mis on annud rikkalikke tulemusi. Siin on satutud kiviaegsete inimeste elualsemele, kust on kaewamisel päewawalgele tulnud mitusada eset, mis walgustawad nn. kammkeraamilist ajajärku.

koos kuue ülikõpilasega kohale teostama kawakindlat teadusliku kaewamist. Uurijate poolt on kindlaks tehtud, et

selles kohas, kust talumehed kaewajd kruusa, oli kiwiaja elamu tulease korrapäraselt kiwidest laotud koldega,

mida tõendab paks tahma- ja tuhakiht selles kohas. Kahjuks on aga liiwawedajad selle koha ära lõhkunud.

Sellel alal, kus praegu on käimas kaewamised, on tulnud ka ette lahtiseid tuleasemeid ühes kui teises kohas. Nende kohtade ümber koonduwad ka leiud. Peaasjalikult on seni leitud hulk sawinõude killde, mis kuuluwad nn. kammkeraamilisse kultuuri. Pealeselle tuleb järjest päewawalgele wäga palju tulekiwikilde, mis osalt wõibolla on pudenenud teiste esemete wäljatöötamisel. Ka leidub palju mitmesuguseid kõwitsaid, millega tehti wanasti wäga mitmesuguseid töid, näit. kraabiti nahka, silutl puuriistu, töötati wälja tarbeesemeteks luu- ja sarwmaterjali. Wäärtuslikuma osa leiust moodustawad

pajulehe-kujulised, peenelt wälja-töötatud tulekiwist nooleotsad, mida on seni leitud ohtrasti.

Sellised nooleotsad on kammkeraamilisele kultuurile wäga tüüpilised. Siis on weel leitud üks kiwist ripats ja poolik ehterõngas, samuti kiwist. Suuremaid asju pole seni lagedale tulnud, wälja arwatud üks kiwikirwe tükk. Seni on registreeritud 178 leiunumbrit, kuid tegelikult on ühe numbri alla koondatud kuni sada üksikleidu.

Kammkeraamiline kultuur on tüüpiline Põhja-Euroopas. See kuulub jahipidajatele ning ajaliselt kolmandasse aastatuhandesse enne Kristust, sawinõude ornamentide järgi otsustades umbes selle aastatuhande keskpaiku. Seega on siin tegemist

inimeste elualsemega, mille wanus ümmarguselt 4500 aastat.

Kõik tundemärgid näitawad, et siin on elatud pikemaajaliselt, mistõttu jäänuseid on säilinud üsna paksu kihina, maapinnast alates kuni 60 jm. jügawuseni. Omal ajal oli siin wäga soodus elamiskoht ümbruskonna soodest kõrgematel ja kuiwematel liiwaluidetel. Pealegi pole kahtlust, et Notika oja oli hallis minewikus palju suurem weekogu kui praegu.

[redacted] märkis jutuajamisel meie lehe esindajaga, et kammkeraamilise kultuuri kohta on meil seni olnud wähe selgitawaid leide, mistõttu käesolew leiukoht annab selles suhtes head materjali. Kawas on weel lähemas ümbruskonnas ette wõtta proowikaewamisi,

et leida weel mõnda teist elamu asukohta.

Teispool Lommi küla teed on weel üks endine kruusawõtukoht, kust sageli on päewawalgele tulnud mitmesuguseid esemeid. Seal on aga kogu see maa-ala niiwõrd segi kaewatud, et süsteemitsindla teaduslikku kaewamise teostamiseks pole wõimalusi.

Fig. 2. The only surviving photo from the excavations of Lommi was published in Estonian newspapers on July 12, 1940 (4500-aastane asula Narva taga. Maa Hääl: maarahva ajaleht, 80, 12 juuli 1940). On September 29, 1950 (as indicated by a stamp faintly visible in place of text cut out from a newspaper article, kept in the Archaeological Research Collection of the University of Tallinn, Estonia), history was corrected with the 'Soviet method' – part of the text was completely cut out, and the name of Richard Indreko, together with the words 'near the border' and 'border guard' were painted over with black ink, because after the war this border area of the Republic of Estonia was annexed to the Russian Soviet Federative Socialist Republic, and because Indreko had become "an enemy of the people" due to his escape to the 'West'.

To summarize, only Indreko conducted a full-scale excavation at the Lommi III settlement site during one season. He opened two large areas east of the gravel pit from which the artefacts collected by the border guard came, and also dug five test pits and a trench with a total area of probably only a few square meters (*Indreko 1940*). Unfortunately, some parts of the documentation were lost during World War II, including the general plan of the excavations. Plans are only available for two large excavation areas, but their spatial relationship to each other is unclear. The larger excavation area was 128m^2, and the second area of 24m^2 was apparently located to the west of it. The excavation and documentation methods were very precise, but since sieving was not practiced in those days some of the small items were obviously overlooked. Most of the artefacts were collected individually, in some cases small groups were recovered from a single location. Each of them got its own number and was drawn on horizontal and vertical plans; thus, all finds have a documented three-dimensional position.

This paper focuses only on the large excavation area, and especially its northern part, where the concen-

tration of finds that initially caught our attention is located (Fig. 3). We analysed the artefacts drawn on the plans (401 numbers, 1538 items; more than 95% of all finds from this area), but without other documentation it is impossible to localize the rest. All of these artefacts were found *in situ*, with the exception of the gravel pit edge in the northeastern part of the area.

At the time of Indreko's fieldwork, a thin layer of moss covered the entire study area. Beneath it a sandy cultural layer, intersected by lenses of dark sand of varying thickness. The upper part of the layer also contained lenses of ash along with occasional charcoal pieces (thickness *c.* 0.1–0.3m). The base layer consisted of white-greenish sand. The upper part of the cultural layer was mixed to a depth of about 0.1m and, in addition to the Stone Age finds, also contained nails, bullets and cartridge cases. Finds from the cultural layer were made up to a depth of 1.15m from the surface at that time. According to the lithological layers drawn on the horizontal plans, the main artefact concentration, visually estimated, is mainly associated with the dark sand and ash layers, the boundaries of which cannot be clearly outlined on the horizontal level (Fig. 4.1). In the stratigraphic section, however, the inter-layered dark sands and ash spots quite clearly stand out against the background of other layers (Fig. 4.2). Still, it is difficult to determine what these 'ash' layers actually mean in Indreko's documentation: was it a description of a colour (gray as ash) or did it mean inclusions of charcoal pieces? We suppose that it meant the presence of charcoal, since there are quite a few pieces of it present in the find collection. However, it cannot be unambiguously confirmed whether they are related to Stone Age activities at the site.

Methods

The methodological basis of the study includes spatial and comparative-typological analysis and analysis of the proportions of raw materials used, as well as radiocarbon (AMS) dating of burnt animal bones and organic crust on pottery fragments. Plans of the horizontal and vertical distribution of lithological layers, finds and archaeological features drawn on paper were digitized using the AutoCAD 2013 Autodesk Software. The coordinates (x, y, z) of all artefacts were determined according to their position on the drawings and recorded together with their description in a table. This enabled further easy manipulation of this data in three-dimensional space using the computer programs AutoCAD 2013 Autodesk Software and Surfer 11 Golden Software. Spatial analysis (see *Binford 1972; Hodder, Orton 1979; Blankholm 1991; Lancelotti* et al. *2017*) was the main method for substantiating the presence of dwelling remains at the site and determining its outlines.

All finds were classified and their raw material, type, size (stone artefacts) and weight (flint items) recorded. The composition of the admixture added to the moulding clay mass was determined visually for potsherds. To investigate the homogeneity of the cultural layer and determine the relationship of features at the settlement site, the links between stone finds made from the same raw material were traced.

To establish the age of the settlement site, radiocarbon dates were obtained from burnt animal bones and organic crusts on pottery fragments. The samples were dated by the acceleration mass spectrometry (AMS) technique at the Kiel Leibniz-Laboratory for Radiometric Dating and Isotope Research (KIA), the Beta Analytic Testing Laboratory (Beta) and the Poznań Radiocarbon Laboratory (Poz). The obtained dates were calibrated using the OxCal 4.4.2 program (*Bronk Ramsey 2020*) with the IntCal 20 atmospheric curve (*Reimer* et al. *2020*).

Results

Most finds from the large excavation area (Fig. 5) are pottery sherds (1331 pcs), flint tools, blanks and production waste (150 pcs) and sandstone whetstones (34 pcs); the absence of micro debris noted in the course of the analysis is likely the result of the lack of sieving during excavations. Pottery is represented by sherds of Typical Comb Ware, both with mineral and organic admixture, two fragments can be associated with Narva Ware (typo-chronological date in Estonia and Ingria 5200–3900 cal BC; *Kriiska* et al. *2017.77*).

The main concentration of finds includes 1236 artefacts (80% of all finds from this excavation area; Table 1). It is located in the northern part of the excavation, rectangular in shape and *c.* 7.1x4.4m in size. The finds reach a depth of 0.7–0.75m from the ground surface of that time, with most artefacts found at a depth of 0.2m to 0.7m. In the northeastern corner of this concentration, more than 680 finds have been recorded under one number (AI 3867:51). As can be seen on the plan (Fig. 3.1), this part was disturbed by a later (gravel?) pit and it can be assumed that this number includes all the finds collected from this pit during excavations.

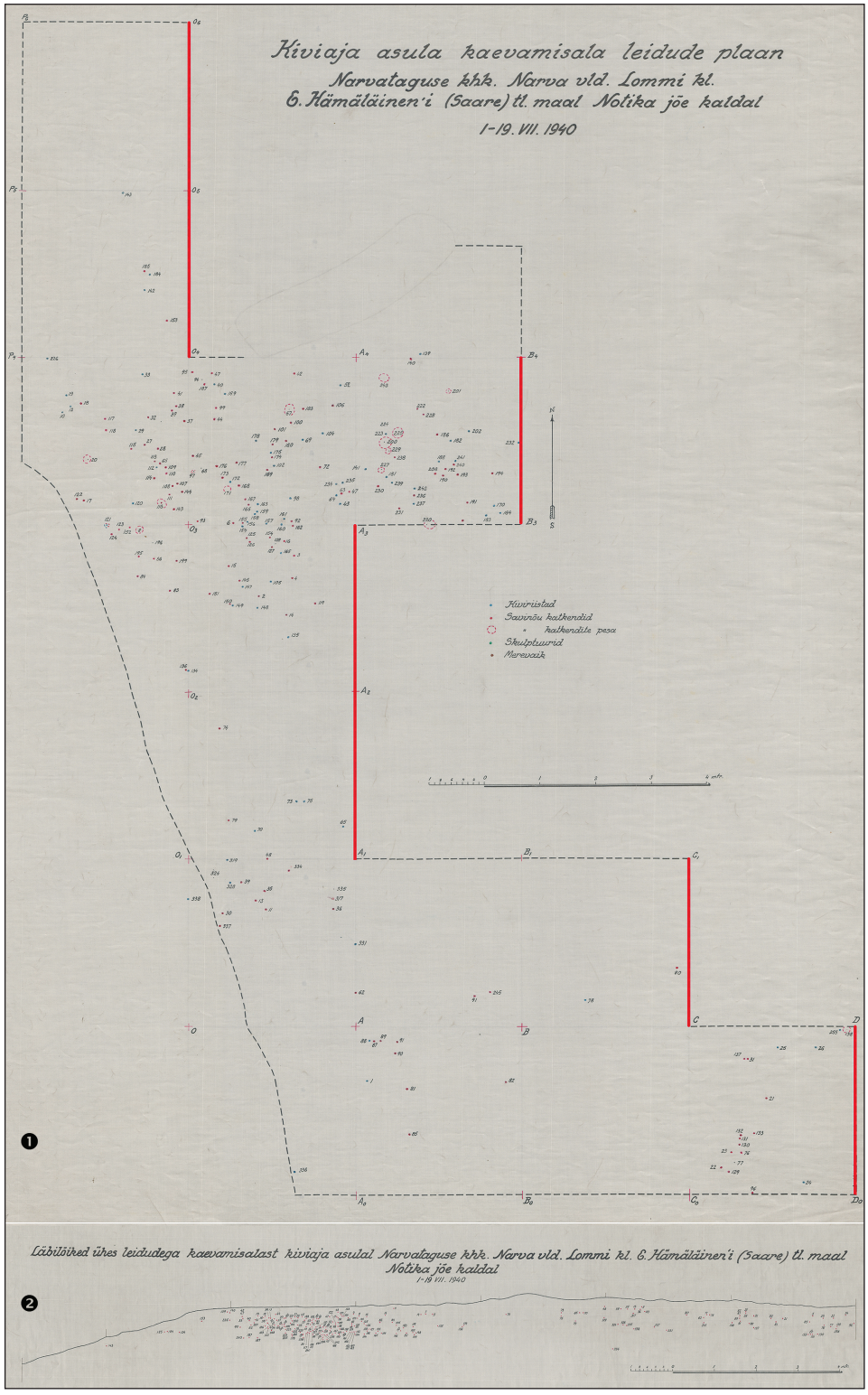

Fig. 3. Lommi III, the large excavation area. All artefact finds measured during excavations drawn on the plans.* 1 *Horizontal projection, the red lines show the positions of vertical sections; a gray oval drawn in pencil in the northern part of the excavation area marks a probable gravel pit (Plan of finds AI 4-1-51-1-11 = Kiviaja asula kaevamisala leidude plaan. Narvataguse khk. Narva vld. Lommi kl. E. Hämäläinen'i (Saare) tl. maal Notika jõe kaldal 1–19.VII.1940. AI 4-1-51-1-11. Drawing in the archaeological Research Collection of the University of Tallinn, Estonia).* 2 *Vertical section (Composite profile AI 4-1-51-1-4 = Läbilõige ühes leidudega kaevamisalast kiviaja asulal Narvataguse khk. Narva vld. Lommi kl. E. Hämäläinen'i (Saare) tl. maal Notika jõe kaldal 1–19.VII.1940. AI 4-1-51-1-4. Drawing in the Archaeological Research Collection of the University of Tallinn, Estonia).

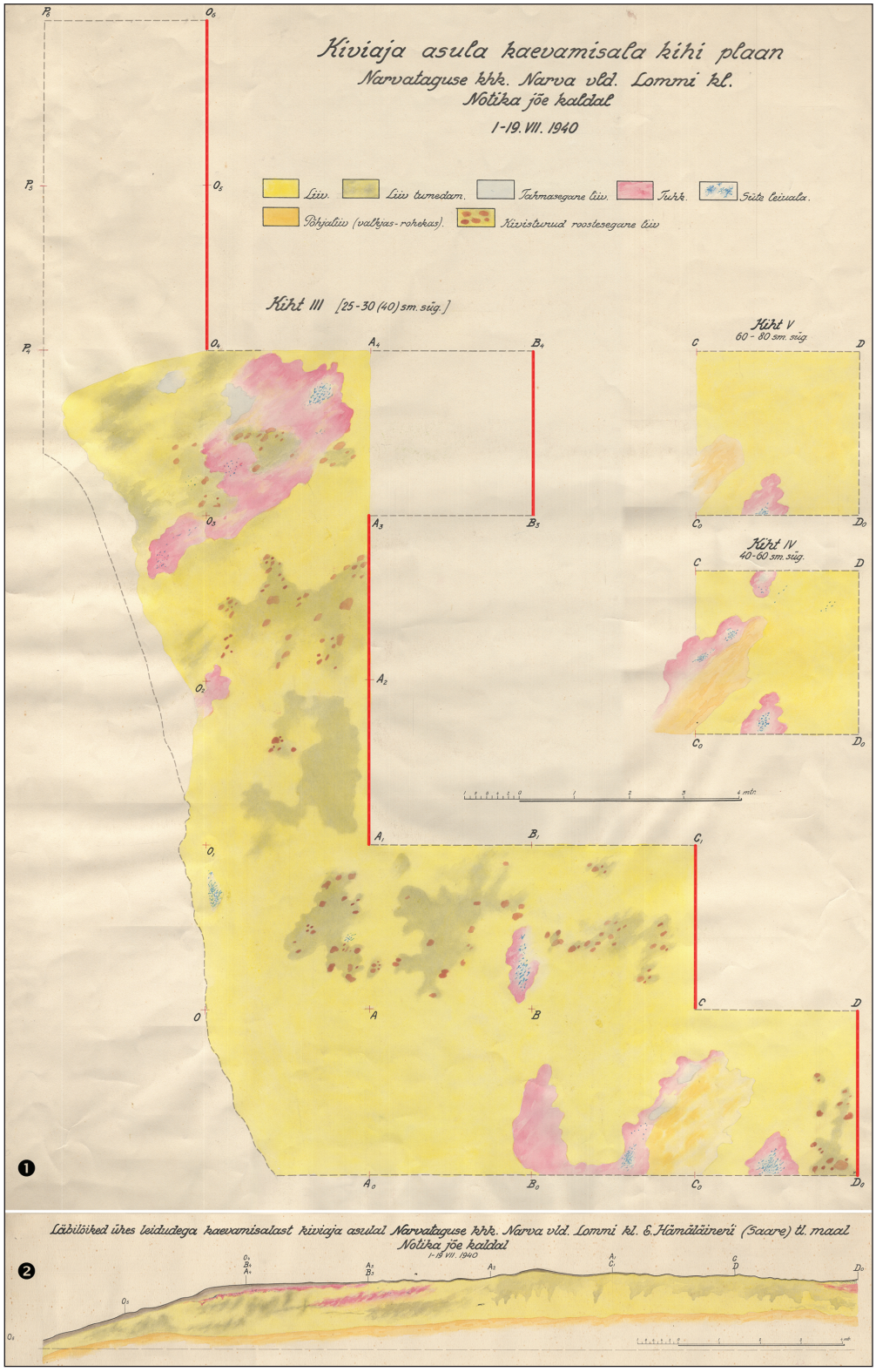

Fig. 4. Lommi III, the large excavation area. Lithological layers drawn on the plans.* 1 *Horizontal projection, level of the third layer (0.25–0.3m) (Layer III AI 4-1-51-1-8 = Kiviaja asula kaevamisala kihi plaan. narvataguse khk. Narva vld. Lommi kl. Notika jõe kaldal 1–19.VII.1940. Kiht III (25–30 (40) sm. süg.). AI 4-1-51-1-8. Drawing in the Archaeological Research Collection of the University of Tallinn, Estonia), the red lines show the positions of vertical sections.* 2 *Vertical projection (Composite profile AI 4-1-51-1-5 = Läbilõige ühes leidudega kaevamisalast kiviaja asulal Narvataguse khk. Narva vld. Lommi kl. E. Hämäläinen'i (Saare) tl. maal Notika jõe kaldal 1–19.VII.1940. AI 4-1-51-1-5. Drawing in the Archaeological Research Collection of the University of Tallinn, Estonia).

Among the artefacts from the main concentration are 1118 potsherds. Of these, 63% are Typical Comb Ware with mineral admixture (Fig. 6.1 and 3) and 36% Typical Comb Ware with organic admixture (Fig. 6.2), less than 1% can be classified as Narva Ware. In addition to pottery, one small clay lump with a pit ('figurine') was found (Fig. 6.4). The Typical Comb Ware vessels have round or pointed bottoms, are weakly profiled and often large (according to the measurable fragments found in the settlement, the volume could reach 43 litres; *Kriiska 1995.Tab. 4*). They are made of iron-rich clays (*Kriiska 1996b. 377*) and crushed rock debris of the granite-gneiss group (the main minerals are quartz, feldspar and biotite) and, in individual cases, grog (probably crushed pottery), are present as mineral admixtures (*Kriiska 1996; 2008.198*). Organic admixture is represented by burnt-away pieces of crushed plant.

Artefact category	Number, pcs	% (pcs) of finds of the same category in the large excavation area
Pottery:	**1118**	**84**
Mineral-tempered Typical Comb Ware	709	91
Organic-tempered Typical Comb Ware	407	74
Narva Ware	2	100
Flint:	**80**	**53**
Flakes	39	48
Blades	5	36
Cores	2	67
Tools:	34	64
Scrapers	*11*	*46*
Retouched flakes (or fragments)	*11*	*85*
Bifacial arrowheads	*3*	*50*
Blanks of arrowhead	*3*	*100*
Retouched blades (or fragments)	*3*	*100*
Points	*2*	*100*
Bifacial tool	*1*	*100*
Other stone items:	**34**	**67**
Whetstones	24	71
Fragments of polished tools	3	
Fragments of stone tools	5	
Stones without processing	2	
Other finds:	**3**	
Slate pendant	1	
Clay lump	1	
Amber bead	1	
Burnt bone	**1**	**100**
TOTAL	**1236**	**80**

Tab. 1. Find material from the main concentration of artefacts (i.e. filling of the supposed pit-house).

Most of the potsherds have some decoration indicating that often the entire surface of the vessels was ornamented. Decoration elements include comb stamp impressions, pits and notches, which are combined in different motifs and often located in horizontal zones (*Kriiska 1995.83, 91*).

Most of the 80 artefacts of Carboniferous flint found from the main concentration were of material with a distinctive purple and pink tint. The total weight of these finds is 239.5g, 44.5% of the weight of all flint from the excavation. The assemblage includes one double-platform core for blades and flakes (Fig. 6.6) and one fragment of a blade core that was retouched into a scraper (Fig. 6.5), but flakes, blades and various tools, such as bifacial arrowheads (Fig. 6.7) and blanks of arrowheads (Fig. 6.8), scrapers (Fig. 6.9), points, and retouched flakes and blades were also found (Tab. 1). Items made of other types of stone, mainly sandstones and slates, are represented by whetstones of different shapes and sizes and with intensive traces of abrasion (Fig. 6.10,11), fragments of polished tools (Fig. 6.12), fragments of undefined tools, as well as stones with no traces of processing. In addition, a flat slate pendant (Fig. 6. 14), an amber bead (Fig. 6.13) and only one fragment of burnt animal bone were found in this concentration.

The concentration of artefacts, its shape and size obviously indicate the remains of a settlement structure (building). The composition and diversity of the finds are similar to the assemblages commonly encountered in dwellings of the Comb Ware and contemporary cultures from the neighbouring territories (*Foss 1940.35; Karjalainen 2002; Miettinen 2002.142–144; Zhulnikov 2003.Tab. 9*). Judging by the concentration of artefacts, the depth of the pit, its regular geometric shape and vertical walls, the feature can therefore only be interpreted as the remains of a pit-house (Fig. 7). Its horizontal and vertical boundaries are most clearly marked with whetstones (Fig. 7), but the distribution of artefacts and different artefact types does not allow determining the internal structure of the pit-house or revealing any specific activity areas. Despite the alternation of zones with a high density of finds and zones without finds, there is no specific pattern in the distribution of artefacts within this concentration; rather, they are distributed over it relatively unevenly. The finds at the bottom level were mainly sherds of Typical Comb Ware with mineral admixture, flint and some other stone flakes, as well as the amber bead (Fig. 7). Higher up, all other artefact categories

were found together, including Typical Comb Ware with various admixtures.

Tracing links between artefacts based on their raw material was not carried out systematically for Lommi III, and only items and materials that could more or less easily be identified by the naked eye when classifying finds were studied. They include various flint raw materials of a specific colour combination or containing visually identifiable inclusions and fragments of sandstone slabs, differing in their structure and thickness. No pottery was studied, with the exception of fragments of one 'mini-pot', which strongly stood out from the other material due to its

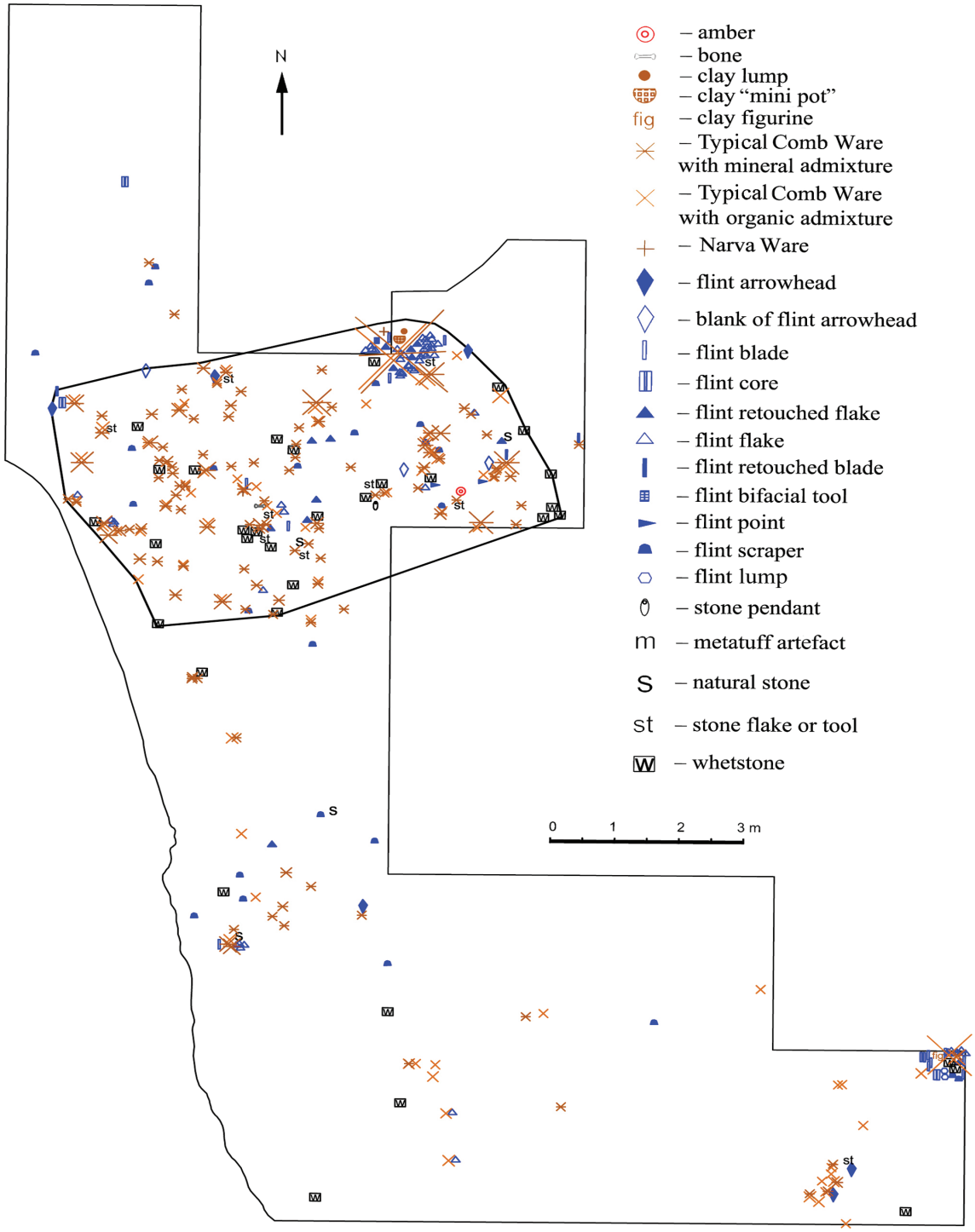

Fig. 5. Lommi III, the large excavation area. Horizontal distribution of artefacts, the black solid line shows the limits of the main concentration. The size of the symbols depends on the number of artefacts recorded with the same number.

size and ornamentation. As a result, a few link chains were distinguished: three of them for flint artefacts (consisting of four, five and eight items), one for sandstone whetstones (consisting of four fragments) and one for pottery (two fragments). Only two whetstone fragments could be refitted into one item, and these were found close to each other in the southeastern corner of the pit-house. Raw material links between artefacts found inside the concentration, in- and outside of it and in other excavation areas can be traced. In vertical projection all items from each chain of links lay mostly in similar elevations. However, it cannot be proven that the whole excavated part of the settlement site would have been occupied only once and at the same time (for discussion on the same topic, see *Kravtsov, Zhilin 1995.138; Grøn 1998.12*).

Outside the pit-house remains, finds are spread irregularly and only small accumulations can be distinguished. Some of these find concentrations could also be settlement features, such as pits or fireplaces, but their nature can no longer be confirmed due to a lack of documentation.

To solve the chronology of the site, radiocarbon dates were obtained from two burnt bones found in different parts of the second (smaller) excavation area and from crust on two Typical Comb Ware pottery fragments with mineral admixture found in the pit-house. Unfortunately, most of the numerous pieces of charcoal and burnt bones included in the assemblage are from unclear contexts or too small for analysis (for example, the single fragment of bone originating in the pit-house). The first date obtained from a burnt animal bone (large mammal, AI 3867: 436) gave an age 4784–4552 cal BC (5820±30 BP, Beta-309096, first published by *Rosentau* et al. *2013. Tab. 2*; all dates are given with 95.4% probability), and the second one (ringed seal, AI 3867:285) 4454–4352 cal BC (5578±26 BP, KIA-55278, from apatite). The crusts on two Typical Comb Ware fragments gave ages 3946–3642 cal BC and 3948–3661 cal BC (4970±70 BP, Poz-133669, and 5020±40 BP, Poz-133186).

Discussion

As it was documented in several cases in Estonia and Finland (*e.g., Pesonen 2004.90; Kriiska, Nordqvist 2012.30; Khrustaleva et al. 2020.14*), both admixtures mineral and the organic were used in the production of Typical and Late Comb Ware. Based on this knowledge and on the similarity of ornamentation, there is no reason to see different pottery types according to the admixture at the Lommi III settlement site (*c.* 64% of mineral-tempered sherds and 36% of organic-tempered sherds). Along with the Riigiküla II site materials (3765–3532 cal BC, *Kriiska* et al. *2016.76*) in the lower reach of the Narva River, it rather indicates that the coexistence of two types of admixture began relatively fast during the early stage of Typical Comb Ware. One of the main lithic raw materials of the Comb Ware culture was flint. It predominated in Estonia and was also present in Finland, sometimes in significant amounts, at the sites with Typical Comb Ware, while at the Late Comb Ware site its amount significantly decreased (*Kriiska, Rappu 2008.18–19; Mökkönen, Nordqvist 2016; Mökkönen* et al. *2017.182; Kriiska* et al. *2020.124*). The closest natural sources of flint for the Lommi sites are in eastern Estonia (Silurian flint), in the southeastern part of the Novgorod Region in Russia (Valday Hills area; Carboniferous flint) and in

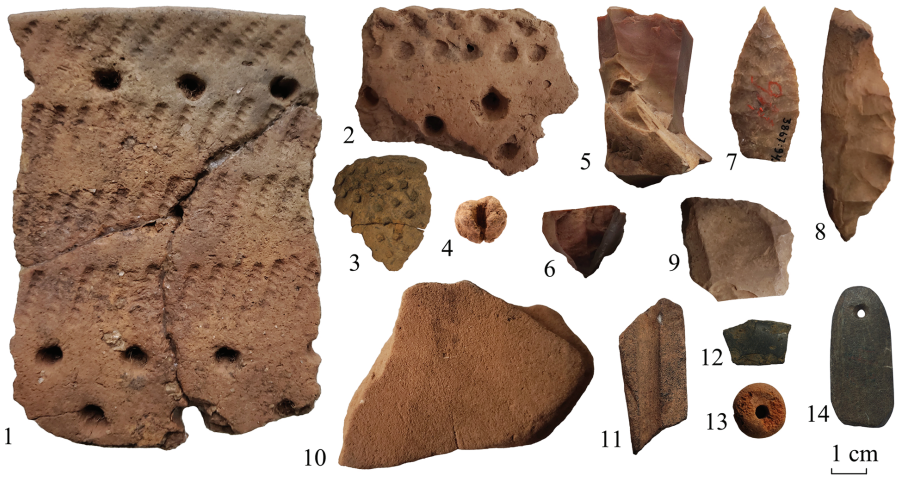

Fig. 6. Lommi III, examples of artefacts from the main concentration:* 1 *Comb Ware fragment with mineral admixture (AI 3867:28);* 2 *Comb Ware fragment with organic admixture (AI 3867:140);* 3 *fragment of a 'mini-pot' (AI 3867: 51);* 4 *clay lump with a pit ('figurine'; AI 3867: 51);* 5–6 *flint cores (AI 3867:143, 12);* 7 *bifacial flint arrowhead (AI 3867: 94);* 8 *broken blank of a bifacial flint arrowhead (AI 3867:33);* 9 *flint scraper (AI 3867:104);* 10–11 *sandstone whetstones (AI 3867:105, 148);* 12 *fragment of a polished tool of metatuff (AI 3867:115);* 13 *amber bead (AI 3867:242);* 14 *slate pendant (AI 3867:43).

southern Lithuania and Belarus (Cretaceous flint) (*Galibin, Timofeev 1993; Baltrūnas* et al. *2006; Kriiska* et al. *2018.37*). In Lommi III, flint makes up more than 70% of all the lithics, and the specific Carboniferous variant with a characteristic purple and pink tint from the Valday Hills prevails. At the other sites, the composition of different flints varies, but often predominately Carboniferous and to a lesser degree Silurian and Cretaceous flint are present. Carboniferous flint from Estonian and Ingrian sites varies in colour and quality, reflecting the different sources of raw material used at different sites. However, we cannot assume that there were permanent contacts between the inhabitants of the Comb Ware culture settlements in our area and some specific 'suppliers' of any particular type of natural flint, because a one-time arrival of raw materials to the site is also a real possibility. For example, at the large excavation area of Lommi III, 150 flint items with a total weight of only 550g were discovered. Usually micro debris make up a large percentage of flint finds, nevertheless, even if we multiply the current quantity several times, the weight of the flint raw material remains within the limits that could be brought to the site during one episode.

The earliest radiocarbon dates obtained from bones correlate with the time of Narva culture (*Kriiska* et al. *2017*) and probably point to the first habitation phase of the Lommi III settlement site, which is also indicated by the few fragments of Narva Ware (*Kriiska 1995.60*). These two pieces of Narva Ware revealed in the large excavation area, both in the pit-house, indicate that the Typical Comb Ware dwelling was dug through a layer containing some earlier artefacts. Moreover, their small number does not call into question the assignment of the remaining material to the context of the Comb Ware culture. Radiocarbon dates obtained from organic crust on the Comb Ware sherds with mineral admixture together gave an age of 3948–3642 cal BC. Lipid analysis (going to be published elsewhere) of both dated

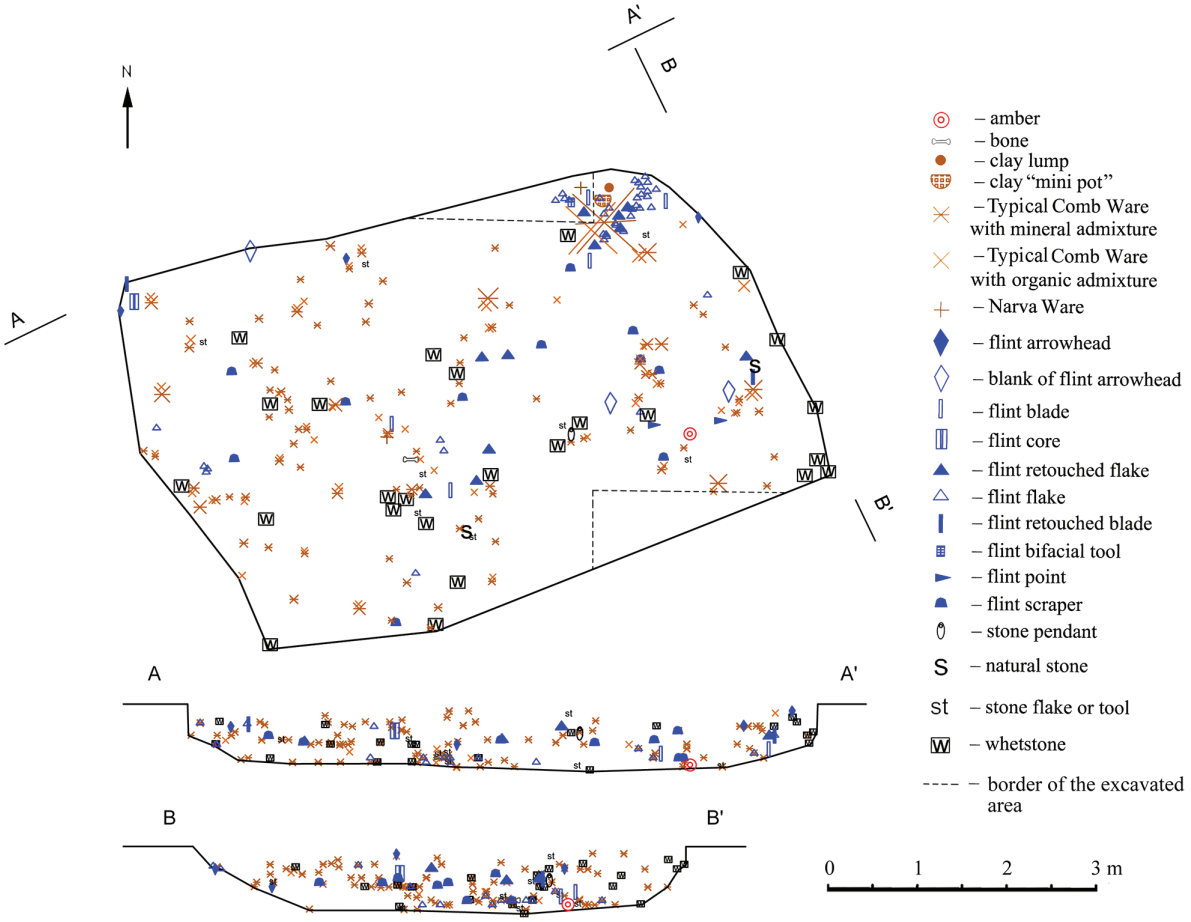

Fig. 7. Lommi III, horizontal and vertical outlines of the pit-house, drawn according to the concentration of artefacts. The size of the symbols on the horizontal plan depends on the amount of artefacts recorded with the same number.* A–A' *projection of all artefacts onto the northern 'wall' of the pit-house and* B–B' *projection of all artefacts onto the eastern 'wall'. Artefacts without elevation data were excluded from vertical projections.

fragments showed that the crust does not contain aquatic markers (pers. com. Ester Oras, 29 June 2021). Therefore, we have no reason to suspect the existence of a reservoir effect in the obtained dates, which are also not inconsistent with the archaeological material of the southern shore of the Gulf of Finland. The predominance of mineral-tempered pottery and the use of flint raw material may indicate the earlier phase of the Comb Ware culture, as the settlements of the late 4th millennium cal BC are already dominated organic-tempered pottery and quartz is the main material compared to flint (*Kadakas* et al. *2010.35, 37; Khrustaleva* et al. *2020.14; Kriiska* et al. *2020.126*).

Prior knowledge and preconceptions play an important role in archaeological discoveries and interpretations, because much depends on the personal experience of the archaeologist, on what one has encountered during earlier excavations, what one has read or heard about and what one is 'ready to see' (for a discussion of the same question regarding the study of Stone Age architecture, see *e.g., Seitsonen 2006.141; Fretheim 2017.17*). This can probably explain the fact that Indreko did not recognise the pit-house in Lommi III, since according to the main ideas of that time huts with a tent-like construction were supposed to exist during the Stone Age in the Baltic region (*Pälsi 1918.28–31; Indreko 1932.216–217*; see also *Johanson* et al. *2013.108–109*). According to Indreko (*1937.103,105*), Stone Age houses had parallels even in the Estonian folk architecture, where "*the rudiment [of the houses] has been preserved to this day as an outdoor kitchen, especially on the islands and in coastal areas, where they are mostly conical structures of stacked stakes*", and in the architecture of modern Siberian peoples like 'Voguls, Ostyaks, *etc.*' (modern names Mansi and Khanty, see *Indreko 1937.103, 105*). Lommi III is not the first example of the discovery of a Stone Age dwelling decades after its excavation in eastern and northern Europe (*Rogachev, Anikovich 1984.190; Pesonen 2002.16; Seitsonen 2006; Fretheim 2017. 17*).

Nowadays the main field methodology of studying Stone Age settlement sites consists of careful excavation, observation of lithological layers, analysis of the stratigraphic situation and detailed documentation of all objects and features of the cultural layer. However, the methods used at different sites vary, and not all information extraction possibilities are used everywhere. Field methodology has changed mainly with the development of post-excavation information processing technologies and methods. Among the methods used to uncover and study Stone Age architecture, the most important are spatial analysis (using visual or various statistical and three-dimensional computer visualization and modelling methods) and refitting analysis (*Grøn 1995. 5–11; 1998; Katiskoski 2002; Halinen* et al. *2008. 257; Gelhausen* et al. *2009*). Since all of these methods started to develop gradually only from the 1960s on, the materials from old excavations are often unsuitable or only partially suitable for such analyses (*Leonova 2004.63; Larionova 2019*), because the documentation does not contain enough data.

The main difficulty in studying Stone Age architecture is the discovery and interpretation of its remains. Most pit-houses can easily be found during excavations due to the depressions (sunken house floors filled with cultural layer) visible at the natural lithological level, and in some regions the house depressions can be observed even in the modern landscape, although there are variations. More than 100 years of research into Stone Age architecture in eastern and northern Europe has gradually accumulated knowledge, but the process has been slow and irregular (for a more detailed research history see *Bryusov 1959; Loze 1978; Gurina 1996a.141, 143; 1996b.150; Karjalainen 1996.75–80; Pesonen 2002; Zhulnikov 2003; Leonova 2004; Norberg 2008; Mökkönen 2011; Zimina 2014*). From published accounts on Stone Age pit-houses, it can be concluded that the first were excavated in the first quarter of the 20th century on the East European Plain (*Gorodtsov 1914*) and in Finland (*Itkonen 1913.3–4; Pälsi 1918; 1920.45,105; Europaeus 1922.67–68; Tanner 1929.13–15*). However, research interest in these objects increased mainly after the 1980s, although there were also a few earlier waves of research in the 1950s and 1970s (*Pesonen 2002.Tab. 2; Zhulnikov 2003.5; Norberg 2008.Fig. 2.3; Fretheim 2017. Fig. 1.3*).

The distribution of discovered pit-houses in eastern and northern Europe is uneven. Thousands of dwelling depressions visible in the modern landscape are known in Scandinavia (*Norberg 2008.16, Fig. 6.1*), Finland and the Karelian Republic of Russia (*Pesonen 2002.14; Zhulnikov 2003.Tab. 1*), while in the territory of the Baltic countries and in the northern part of the European Russia to the Middle Volga region pit-houses have been discovered only during excavations. According to published data and excluding the pit-houses of Scandinavia, more than 350 buildings have been excavated in this area, includ-

ing over 310 in Finland, Karelia and the Baltic countries (*Gurina 1967.22–30; Girininkas 1994.212; Ostrauskas 2001.180–181; Pesonen 2002.14, 30–31; Zhulnikov 2003; Filatova 2004.23–50; Grasis 2010; Juodagalvis 2016.71, Figs. 8, 9; Marcinkevičiūtė 2016.61–63; Šatavičius 2016.27, 32, 37–38; Kriiska* et al. *2016; Rostedt, Kriiska 2019; Khrustaleva* et al. *2020*) and about 40 in the forested part of western area of European Russia (excluding Karelia) (*Oshibkina 1978.106–107; Koltsov 1985; Vereschagina* et al. *1995; Koltsov, Zhilin 1999.11–44; Polkovnikova 2003; Leonova 2004; Mazurkevich* et al. *2012; Zimina 2014; Khrustaleva 2016*). The earliest pit-house is dated to the Late Palaeolithic (*Šatavičius 2016.27*), and this form of architecture was used throughout the Stone Age (*Grasis 2010.61–62; Kriiska* et al. *2016.23–24*). However, of the more than 220 pit-houses that can be dated to the 4th and 3rd millennia cal BC in the territory of Finland, Karelia and the Baltic countries, over 150 are associated with the Comb Ware culture and its contemporaries (*Pesonen 2002.Tab. 5; Zhulnikov 2003.Tab. 2; Khrustaleva* et al. *2020*).

Stone Age pit-houses are rare finds, especially in Estonia and Ingria, where only nine of them are known and associated with different cultures (*Khrustaleva* et al. *2020*). Of the 91 known settlements of the Comb Ware culture in this area (*Gerasimov 2019; Sikk* et al. *2020.93*), the remains of a dwelling were only revealed at one other site besides Lommi III, namely at the Jägala Jõesuu V site in northern Estonia. Here, too, the pit-house had an almost rectangular shape and contained the main concentration of the site's artefacts inside. In addition, at the Riigiküla I settlement site in northeastern Estonia, some settlement structures of the Comb Ware culture are known, but their construction cannot be distinguished (*Khrustaleva* et al. *2019*).

The distribution area of Comb Ware and contemporary cultures discussed here covers Finland, the Karelian Republic and the Pskov, Novgorod and Leningrad Regions in Russia, Estonia, Latvia, as well as the northern parts of Lithuania and Belarus (see *Kriiska* et al. *2020.Fig. 25*). The pit-houses of these cultures are currently known mainly in areas north and northeast of the northern coast of Estonia. They are usually rectangular or rarely square in shape, with an average size of 20–50m^2 (although some can reach 80m^2) and a depth of 0.2–0.6m, and are often surrounded by an embankment of sand dug from the house pit (*Halén 1996.284; Ojanlatva, Alakärppä 2002; Pesonen 2002.27–31; Zhulnikov 2003.56–57, Tab. 4; Mökkönen 2009*). For Karelian and Finnish pit-house sites, the most typical locations are sheltered places on the lake shores or along the sea bays of the Finnish Ostrobothnia (*Kankaanpää 2002.66; Mökkönen 2002; 2009.143–145; Zhulnikov 2003.53; Seitsonen 2006.142; Nordqvist, Lavento 2008.155*), and the known sites in Estonia are also connected to the shores of the bays (*Khrustaleva* et al. *2020.15*). Lommi III is also located on the coast of the Litorina Sea, along a lagoon and possibly on the bank of a small river that flowed into it (*Rosentau* et al. *2013.Fig. 7*; the Litorina phase of the Baltic Sea dates back to 7800–2500 cal BC).

The Fennoscandian pit-houses mainly correlate with the main find concentration in these settlement sites (*Boaz 1999.135; Grøn 2003.692*), and this is also true for Lommi III. In some pit-houses, most of the finds are concentrated along the walls (*Zhulnikov 2003.54*). Usually micro debris (first of all, flint or quartz and bone) is the best indicator of the dwelling floor in both horizontal and vertical projection (*Grøn 1995.34; Ojanlatva, Alakärppä 2002.116*), but this material is missing in Lommi. The elevation of the artefacts in the Lommi III pit-house is not tied to any particular level, they are almost evenly distributed throughout its entire filling. This may indicate a long lifespan of the pit-house, during which repeated living and cleaning episodes could have contributed to the formation of floor fillings. In numerous other cases, the finds correlate only with the bottom level, as documented, for example, in some Karelian pit-houses (*Zhuravlev 1990; Zhulnikov 2003.5*).

No fireplace was revealed in the Lommi III pit-house by Indreko, although a fireplace or hearth is often one of the main attributes of a dwelling. However, aboveground fireplaces without any construction may not have been preserved at all. In rare cases only small pieces of charcoal, calcined bones or other burnt finds may be present, less often spots of ash or burnt soil (*Pesonen 2002.15*). In the pit-houses in Karelia and Finland, in many cases no stone hearth was revealed and other traces of fireplaces, even if documented, were not given due attention (*Karjalainen 1996.76; Zhulnikov 2003.54*). In some sites where fire cracked stones were found in or near the pit-house, heating with hot stones or reuse of the house for purposes other than living is assumed (*Kankaanpää 2002.77*). In the Lommi III pit-house, some charcoal pieces, burnt bone, flint artefacts and stones were found, as well as an ash lens. Currently, ash and charcoal pieces can no longer be clearly as-

sociated with the Stone Age and, in particular, with the construction. The location of other burnt items does not reveal any system that would indicate the location of the fireplace, but we cannot say for sure that there was no fireplace in the dwelling.

Since no construction details were preserved or recorded, the location of the entrance cannot be determined either. Linking the artefacts based on their raw material can provide additional information about the characteristics of the dwelling (*Petersen, Johansen 1996.81–83; Boaz 1999.135*), although this method is rarely used in Stone Age sites with pottery (*Cuenca-Solana* et al. *2018.904*). When studying the remains of an ancient dwelling, the directions and concentrations of these links can reveal not only the so-called 'wall effect', but also the location of the entrance if there is sufficient documentation (*Grøn 1998; Leonova 2004.63; Gelhausen* et al. *2009*). In Lommi III, the 'wall effect' cannot be shown, firstly, due to the small number of links found between the artefacts, and secondly, due to the absence of micro debris. Although most of the links run to the west from the house, it is not known what was to the east of it, as this territory was already destroyed before the earlier studies and was not excavated. Thus, the location of the entrance (or the entrances) of the pit-house in Lommi III remains an open question.

Despite the fact that many individual details of construction cannot be distinguished, the shape and size of the pit-house in Lommi III and the types of artefacts inside it are analogous to those of the Stone Age houses of Fennoscandia (*Halinen* et al. *2002. Fig. 6; Pesonen 2002.15–22*). The diversity and number of artefacts inside the pit-house in Lommi III can probably show its (semi-)sedentary way of life of its inhabitants. It was likely a timber building, similar to the analogies from the surrounding areas (*Halén 1996.284–285*), but it is impossible to determine whether it was based on a post or log construction, since no traces of posts or logs have been preserved or were documented during excavations. The regular shape of the pit indicates that it most probably had straight vertical walls, at least in the subterranean part.

Conclusion

The discovery of the archived plans of the Lommi III settlement site and its largest excavation area, with the expressive concentration of finds drawn on it, marked the beginning of the present research. All finds from this excavation area were analysed, and it turned out that *c.* 80% of finds are concentrated in an area of 7.1x4.4m, forming a rectangular pit with a depth of 0.7–0.75m from the ground surface. Most of the artefact assemblage consists of fragments of Typical Comb Ware (mineral and organic-tempered), flint tools and debris, and sandstone whetstones. Links between artefacts, determined by their raw materials, connect items both within the concentration and between it and the area outside, and indicate the homogeneity of the cultural layer, at least in this part of the site.

Based on the shape and size of the concentration, the composition and variety of finds (including pottery, flint tools, whetstones and other stone items, as well as an amber bead, stone pendant and clay figurine), and parallels from neighbouring areas, it is concluded that a pit-house existed in this location. The distribution of the different artefact types is unsystematic and cannot be used to distinguish any structural features in the pit-house, although its borders are indicated by whetstones. The number of finds, their relatively regular vertical distribution over the entire thickness of the pit filling and the lack of correlation to a particular elevation level indicate the (semi-)sedentary way of life. The absence of clearly identified traces of fireplace does not contradict this conclusion, as without a stone construction, it may not have preserved and recognized during fieldwork. All these arguments are supported by numerous analogies from other contemporaneous settlement sites in Finland, Karelia and Estonia.

According to the radiocarbon analysis of organic crusts on pottery, the Lommi III pit-house can be dated to the first half of the 4th millennium cal BC. This date is broadly supported by the typo-chronological date of the archaeological material, which shows the predominance of mineral admixture over organic-tempered pottery, together with the predominance of flint raw material. While the history of the study of Stone Age architecture started in eastern and northern Europe at the beginning of the 20th century, the main research methods were mainly developed from the 1960s or even the 1980s on. However, assuming high-quality documentation is available, these methods can provide new information for old excavations even decades later. While the interpretation is influenced by prior knowledge and preconceptions of the researcher, the main task during fieldwork is the thoroughness of the excavation and documentation processes. The case of Lommi III is a good example of such an approach.

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