Teemu Mökkönen

THE URHEILUPUISTO HOUSE AND OTHER CORDED WARE HOUSES FROM FINLAND: MINGLING BETWEEN TRADITIONS

Abstract

Although numerous settlement sites of Corded Ware culture have been discovered in Finland, only a few houses have been identified. This is in stark contrast to the abundant number of pithouses of local hunter-gatherers. This paper takes a closer look at the houses associated with Corded Ware culture, first, by introducing a recently excavated Corded Ware house from southern Finland and other houses connected to Corded Ware culture from Finland and the Karelian Isthmus, Russia, and second, by outlining the various types of Corded Ware houses around the Baltic Sea. After that, the emerging picture suggesting interaction between the regional variants of Corded Ware culture as well as between Corded Ware cultures and local hunter-gatherers will be discussed. Even if the remains of Corded Ware houses are few and often quite ambiguous, it will be concluded that several types of houses have existed in the area north of the Gulf of Finland, and the contacts between cultural traditions affected settlement types and house structures in each party involved in the process.

Keywords: Corded Ware, Neolithic, Stone Age houses, Finland, Northern Europe, Baltic Sea

Teemu Mökkönen, Cultural Environment Services, The Finnish Heritage Agency. P.O. Box 913, 00101 Helsinki, Finland: teemu.mokkonen@gmail.com, ORCID ID 0009-0005-8682-2850

Received: 20 March 2022; Revised: 29 January 2023; Accepted: 31 January 2023

Mökkönen, T., 2023. The Urheilupuisto House and Other Corded Ware Houses from Finland: Mingling between Traditions. *Fennoscandia archaeologica* XL: 5–25. https://doi.org/10.61258/fa.129430

INTRODUCTION

Corded Ware Complex dating to 2800–2200/2000 calBC is, above all, known through its graves. In contrast to other areas, the great number of Corded Ware settlement sites in Finland (over 350, Nordqvist & Häkälä 2014) makes the area of the country an exception within the whole Corded Ware Complex (hence CWC). Despite numerous settlement sites, only one study on a site with established house structures connected to Corded Ware culture has been published in Finland (Edgren 1970: 40–41). When it comes to the rarity of Corded Ware houses, Finland is quite similar to the Baltic countries, and to a degree to Sweden, where a small number of houses have been discovered (e.g., Larsson 2008; Kriiska et al. 2015; Kriiska & Nordqvist 2021).

Finland is a country located between the East and the West, both geographically and culturally, and this has been the case during the Corded Ware period, too. Traditionally, people connected to CWC in Finland have been considered to relate to the eastern Baltic unit of the CWC (e.g., Äyräpää 1973: 204–205; Edgren 1993: 92), and the east-west oriented contacts over the Baltic Sea to Sweden – evidenced by some pottery vessels (Äyräpää 1973: 200; Larsson 2009: 409–410) and battle axes (Lindström 2003: 151; Nordqvist & Häkälä 2014: 12, Table 1) – were estimated as a less significant direction in the development Corded Ware culture in Finland (Edgren 1993: 96). Here, it is worth noting that

it was not so long ago when the eastern branch of CWC in Russia (i.e., Fatyanovo and Balanovo cultures) was considered approximately half a millennium younger than the western branch (e.g., Carpelan 1999: 261) in which the Finnish Corded Ware culture is considered to belong.

A recent study on grog used as a temper in a clay matrix of Corded Ware vessels has evidenced frequent contacts over the Baltic Sea between Estonia, southern Finland and Sweden (Holmqvist et al. 2018; Holmqvist 2021). This has altered the previous ideas of contact networks and brought the east-west oriented interaction into discussion. At the same time, the connections between the Gulf of Finland and Fatyanovo culture has been put forth (Nordqvist 2016: 61–62). The movement of artefacts and the ability to manufacture new artefact types required movement of people who carried also other cultural aspects with them. In this regard, the Finnish position in the middle of the eastern and the western branches of CWC is even more underlined than before.

Previously, the Corded Ware culture in Finland has often been regarded as a static phase which was steadily kept segregated from the local hunter-gatherers (Nordqvist 2018: 112–113). During the last decades, several views on CWC have changed. The idea of pan-European A-horizon has been evidenced as incorrect, and instead of unity, the local traits of Corded Ware cultures which originate from the previous cultural backgrounds has been put forth into discussion (e.g., Furholt 2014; Kristiansen et al. 2017). In north, this mingling between CWC and local hunter-gatherers has been evidenced first and foremost in the appearance of new pottery traditions that were born out of merging diverse production practices (Larsson 2009: 356–366; Nordqvist 2016; Kholkina 2017).

This article studies the houses[1] connected to CWC in the area north of the Gulf of Finland. The new results that prove the overseas contacts in the Baltic Sea, demonstrated interaction between CWC and local cultural traditions, and the excavation of the Urheilupuisto Corded Ware settlement site in 2018 have been the driving forces of the study. The aim is to introduce the excavated Corded Ware houses discovered in the northernmost part of CWC, to compare them to the houses found in the context of CWC elsewhere around the Baltic Sea, and lastly, to discuss the interaction between CWC and local hunter-gatherers (Fig. 1) and its consequences on the archaeological data with an emphasis on site location and houses. The sites referred to in the discussion on the interaction between CWC and hunter-gatherers in Finland are not based on a wholesale archival survey. Instead, the observations have been picked up along the author's career, and not the least as a by-product of the archival survey made on the project for identifying the nationally significant archaeological sites in Finland (see Tiitinen & Halinen 2022). In this regard, the aim of this article is merely to introduce the idea, instead of giving a full list of the sites relevant to the topic.

The article starts by introducing the recently excavated Corded Ware house discovered in the Urheilupuisto settlement site, and then continues to the other houses connected to CWC located north of the Gulf of Finland in Finland and in Russia (one example). First, the well-grounded and excavated Corded Ware houses with Corded Ware artefacts will be presented, and second, the uncertain Corded Ware houses, which on

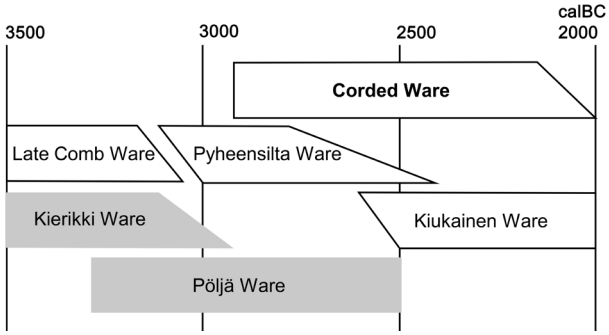

Figure 1 . Chronological schema on pottery traditions in Finland from 3500 to 2000 calBC. The pottery types that are present in the area of Corded Ware distribution are in white boxes. The asbestos- and organic-tempered potteries located mainly north of the Corded Ware Complex are in grey boxes. The schema is based on dated organic residues attached on pottery, except in case of the Pyheensilta Ware (Nordqvist 2018; Nordqvist & Mökkönen 2021; Pesonen 2021).

the basis of circumstantial evidence, potentially belong to the context of CWC, will be outlined. Then, a short review of houses found in the context of the CWC around the Baltic Sea will be provided. The focus will be in the areas that were in close connection to CWC in Finland (Baltic Countries, Russia, and Sweden). Before the conclusions, different types of Corded Ware houses and the consequences of the interplay between CWC and other local cultures in Finland will be discussed.

THE URHEILUPUISTO SETTLEMENT SITE

The Urheilupuisto settlement site is located in the city of Espoo, coastal southern Finland (Fig. 2). The site lies in a flat sandy pocket (c. 400 m^2 in size) in the middle a steep slope terrain (Fig. 3). According to the shore displacement chronology (Hyvärinen 1999), the site could have been occupied at the earliest between 3500 and 3000 calBC, and due to steep topography, it was located rather close to the seashore even in the beginning of the Bronze Age (c. 1800 calBC). Before the excavation, roughly a half of the site was already destroyed in the construction of sport routes and drainage (Jussila 1990; 2016; Lindholm 1996). At this point, no Corded Ware artefacts were recorded at the site.

In 2018, the renewal of skiing routes led to the rescue excavation of the site (Mökkönen 2018). The digging was conducted in artificial layers, except for the bottom sections of the postholes which were excavated as stratigraphic units. The excavation area (122 m^2 in total) was divided topographically into two: the eastern part was covered by a boulder field, while the western stoneless and flat part was likely cleared by a man. When excavated, cultural layers were found only in the western part.

In the western part, weakly coloured and thin cultural layers (c. 5 cm in thickness) comprised a roughly rectangular area (5 metres in length and 3.5 metres in width) which was cut by a modern ditch in the south and continued beyond the excavation area in the north (Fig. 4)[2]. In the margin of the cultural layers, two postholes filled with some stones and coloured sand (c. 40 to 50 cm in diameter) were dug 20 to 30 centimetres deeper than the cultural layers. Remains of a fireplace, represented by a grey

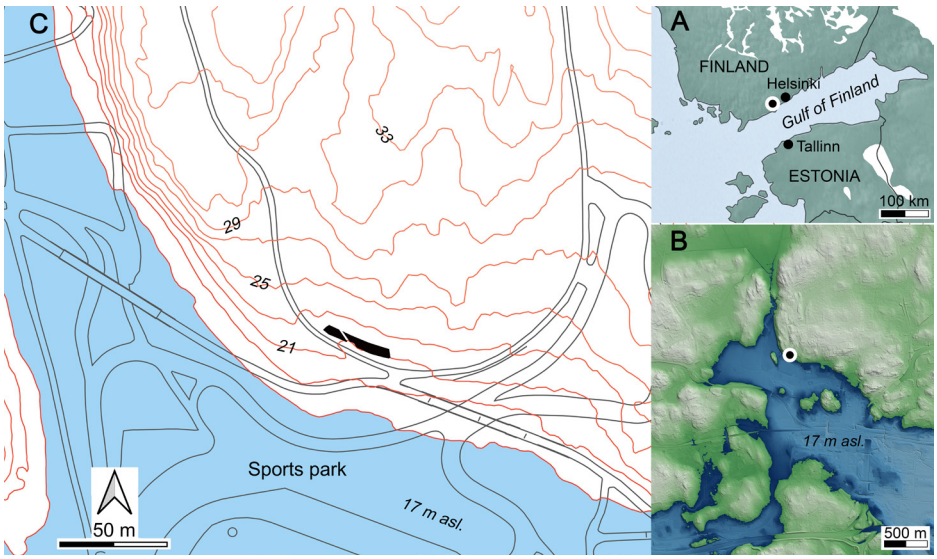

Figure 2. Location of the Urheilupuisto site: A – site location by the Gulf of Finland (Natural Earth free vector data), B – site location and the shore line around 2700 calBC at the level 17 m asl. (according to Hyvärinen 1999, digital elevation data by National Land Survey of Finland), and C – excavation area (in black), topography of the settlement site around 2700 calBC and the current sport routes (map by J. Seppä & T. Mökkönen, base map © Espoon kaupunkimittaus, City of Espoo).

Figure 3. The Urheilupuisto site is located in a sandy pocket. In the photo, the house structure in the western part of the excavation area is under excavation. The photo is taken facing west. Photo T. Mökkönen (Finnish Heritage Agency, AKDG5579:1).

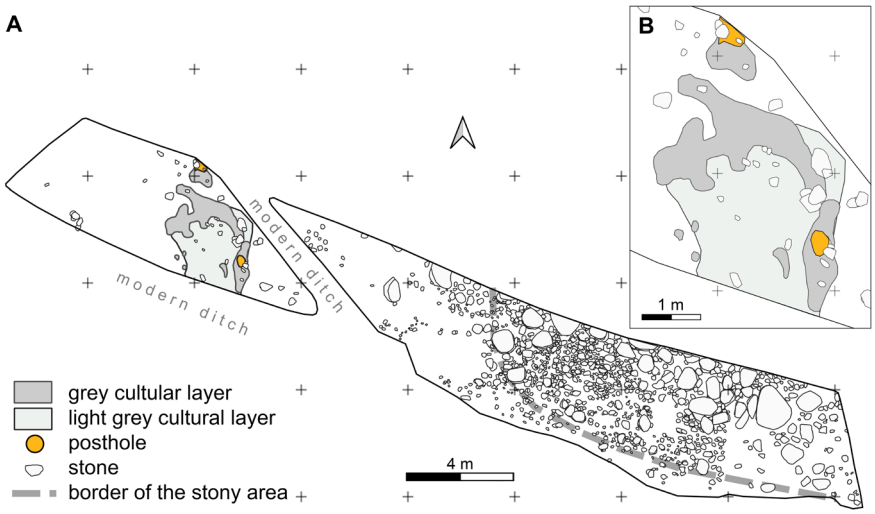

Figure 4. The main features of the excavation area. A – the stoneless western part with the features interpreted as a house and the stony eastern part. B – enlarged map of features interpreted as a house. Maps J. Seppä & T. Mökkönen.

sooty area with some small fire-cracked stones and a concentration of burnt bones, was located in the middle of the cultural layers. Although the stained soils of the cultural layer were weakly coloured, they felt greasy and preserved moisture much longer than natural soils next to them.

These features are interpreted as remains of a house: the cultural layers demonstrate the floor area and the postholes located at the rim of that area are connected to the walls. The house was approximately 3.5 metres in width, and the length exceeded 5 metres, the total dimension remaining unknown. The cultural layers of the floor area were detected at the same level as the lowermost artefacts outside the structure, which indicates that the house is likely to have been erected on the ground surface. On the contrary to the hunter-gatherers' pithouse building tradition, in which the longer sidewall of the house is typically running parallel to ancient shore formations, the longitudinal axis of the Urheilupuisto house was positioned quite the opposite, i.e., its short end was facing the ancient seashore that was located at some distance further away.

Only a small amount of fragmented pottery was found in the western part of the excavation area (Fig. 2; Appx. 1)[3]. The material consists of Corded Ware (pieces of a beaker), probably Pyheensilta Ware (see Vikkula 1987), and some unidentified organic-tempered pottery. The Corded Ware sherds were scattered inside the house and to the west side of it, while the sherds pointing to Pyheensilta Ware were mainly found close to the boulder field to the east of the house (Fig. 5a). The unidentified organic-tempered pottery was distributed in the same areas as the typified sherds, which may suggest coexistence of all the pottery types.

A few identified rim sherds of a Corded Ware beaker are fabricated of dense clay-mass in which organic matter or fine sand are sporadically present. The sherds are undecorated, partly polished, and fibrous imprints are occasionally present on the outer surfaces (Fig. 6a). In the pottery resembling Pyheensilta Ware (Fig. 6d–e), organic tempers (including at least crushed bones) are sometimes supplemented by fine sand. The rare decorative elements consist of oblong depressions and stamps pressed with the tip of a stick. Drawn lines and gently pressed comb stamps (or twisted cord stamps?) are recorded only once. The unidentified organic-tempered pottery is mostly undecorated, and both flat and rounded bottoms are present in the material. There is not much to say for sure, but both organic temper (Meinander 1939; Vikkula 1987; Nordqvist 2016; Kholkina 2017) and completely undecorated or loosely decorated vessels (Edgren 1970: 26; Vikkula 1987: 30–31, 38) are common in both two identified pottery types.

The bulk of the finds consist of knapped quartzes in which only a few retouched artefacts are present (three scrapers, one unidentified, Appx. 1). Quartzes have a three-pole distribution between the house and the western part of the boulder field. In the eastern end of the excavation area, the distribution of artefacts is delimited to a massive boulder, to the east of which no finds were recorded (Fig. 5b). Quartz cores suggest that several reduction methods were applied (20 bipolar cores, two platform cores, nine irregular cores). In addition to knapped quartzes, one light grey flint flake and a porfyrite platform core were recorded (Fig. 6h).

Several whetstones and their fragments found at the site include a large-sized unfinished preform of a whetstone slab (found at the bottom of a ditch next to the stoneless area), one four-sided whetstone (KM 41662:77, 78, fine-grained slate) and one multi-faced whetstone (KM 41662:66, beige sandstone, Fig. 6k).[4] They are all commonly associated with Corded Ware culture (Edgren 1970: 45). Two axes/adzes (Fig. 6f–g) found at the site are closely related to the types associated with Kiukainen culture (see Meinander 1954: 92–94) and a small chisel (Fig. 6j) represent a type that dates roughly to the same periods as the pottery identified at the site (see Meinander 1939; 1954: 94; Vikkula 1987: 13–15).

Based on the current data, the dating of the site remains, to a degree, unsettled. The datings of Pyheensilta Ware (3200/3000–2800/2400 calBC, Asplund 2008: Fig. 10; Pesonen & Leskinen 2009; Pesonen 2021) and Corded Ware (2800–2300/2000 calBC, Nordqvist 2016; Pesonen et al. 2019) suggest that they may have been used during the same time period, at least in theory. The two radiocarbon datings from the Urheilupuisto site do not fully resolve the question either (Table 1). The dating of a piece of birch bark tar mastic (2868–2580

Table 1. Radiocarbon dates of the Urheilupuisto site. Pre-treatment method is acid-base-acid. Radiocarbon dates are calibrated with software program OxCal v4.4 (Bronk Ramsey 2009) using the IntCal20 atmospheric curve (Reimer et al. 2020).

Lab-index	Conventional ^{14}C age BP	calBC, Max (2σ)	calBC, Min (2σ)	calBC, median	Dated material	Context	δ^{13}C (‰; IRMS)	%C	F^{14}C	Collection no. (KM)
GrM-17629	4355 ± 25	3074	2906	2967	charcoal	posthole	-23.22	62.9	0.5815	41662:1590
GrM-17630	4125 ± 25	2868	2580	2718	birch bark tar mastic	find layer	-28.16	75.0	0.5986	41662:1587

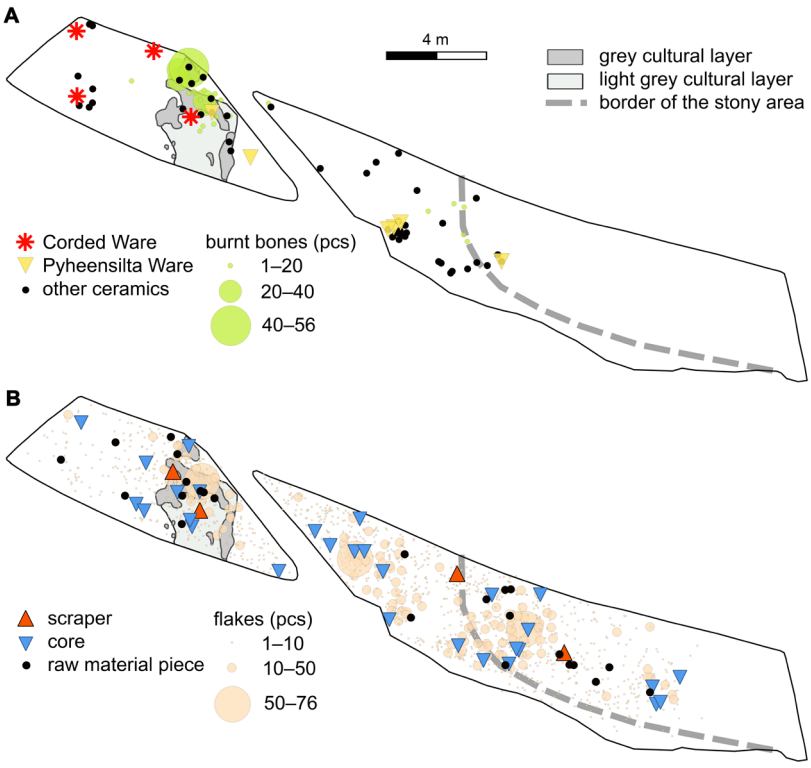

Figure 5. Distribution of materials: A – pottery and burnt bones, B – quartz lithics and artefacts. The dashed line marks the limit of the stony area. Maps T. Mökkönen.

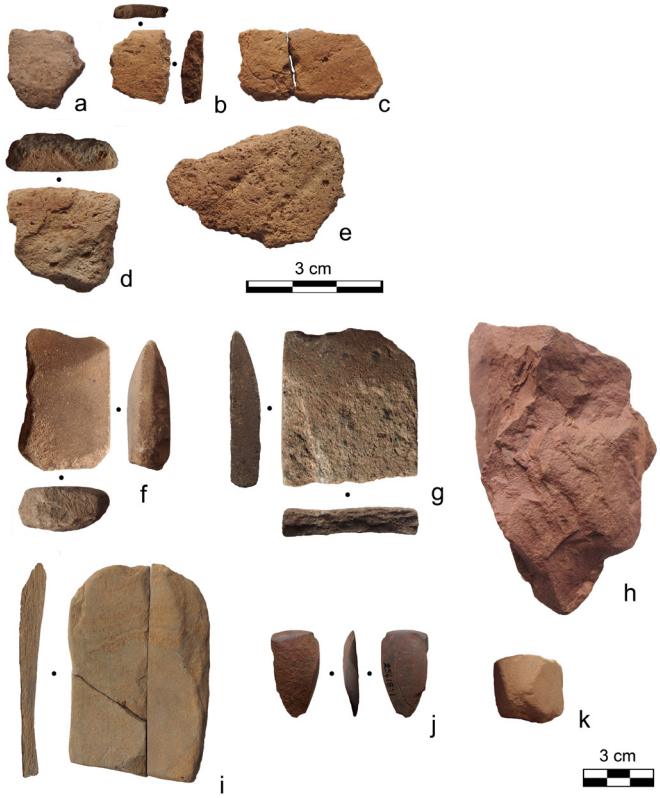

Figure 6. Artefacts from the Urheilupuisto site. Pottery: a–c – Corded Ware (KM 41662: 2; 16; 17), d–e – ceramics resembling Pyheensilta Ware (KM 41662: 13; 47). Stone artefacts: f – axe fragment (KM 41662: 67), g – adze (KM 41662 :68), h – porphyrite platform core (KM 41662:73), i – four-sided whetstone (KM 41662:77–78), j – small chisel (KM 25618:1), and k – piece of a multi-faced whetstone (KM 41662:66). Pottery and stone artefacts are in different scale. Photos T. Mökkönen.

calBC) found at the edge of the boulder field, together with quartzes, points to the Corded Ware period, while a piece of charcoal acquired from the bottom of the posthole at the eastern long wall of the house dates a bit older (3074–2906 calBC). Whether the latter date represents a post of the house, or whether it points to a potential pre-Corded Ware settlement at the site, the date is not in contradiction with dating the house to the Corded Ware period. Based on the current knowledge and the observations made on the materials found at the Urheilupuisto site, there is no compelling reason to suggest several nonsynchronous settlement episodes to have taken place at the site.

OTHER CORDED WARE HOUSES LOCATED NORTH OF THE GULF OF FINLAND

Certain Corded Ware houses

In Finland, the only dwellings previously connected to Corded Ware culture were excavated at the *Malmbacken* site in southern Finland (Cleve 1930; Edgren 1970: 40–41; Fig. 7). The excavation of the site revealed three structures interpreted as dwellings, of which one uncertain example is left out of this discussion[5]. The other two were pithouses ('dwelling pits') associated only with Corded Ware ceramics. They were 1.7 and 1.2 metres in depth. The deeper one was elliptical and 3.5 x 3.5–4 metres in size, while the shape and the exact extent of the other is unknown. Pits were filled with ash and charcoal-mixed soil, and any marks of the wall structures were not observed. Based on the Malmbacken houses, Torsten Edgren (1970: 41) concluded that Corded Ware houses in Finland were built as partly semisubterranean oblong structures without stone foundations. The other pits associated with Corded Ware that have been sometimes referred to as 'dwelling pits' are much smaller in size, and therefore, other explanations are more suitable for them (Edgren 1970: 40).

Another kind of structure is found at the *Lappfjärd-Mössåsen/Kornbäcken* site in western Finland, which is the northernmost pure Corded Ware site of the whole CWC (Fig. 7). The excavation of the site (Area 2, 69 m^2; Laulumaa 2007) produced pieces of 28 Corded Ware vessels (5.3 kg, 2506 pcs), tightly scattered in an area of 4–5 x 7–8 metres in size (Häkälä 2011: 16). Quartz lithics (983 g) were distributed in the same manner as the pottery. A cluster of burnt stones within the area with plenty of pottery is interpreted to be a fireplace (Häkälä 2011: 8). Despite the absence of actual cultural layers (Laulumaa 2007), the tightly packed distribution of artefacts is likely to indicate a house structure (see Laulumaa 2007; Larsson 2008: 122; Häkälä 2011: 14), and therefore, the observed features are considered here a probable Corded Ware house. The site is radiocarbon-dated to 2841–2465 calBC (burnt bones, Hela-1533, 4035±40 BP, median 2550 calBC, Häkälä 2011: 67).[6] Interestingly, 82% of the Corded Ware sherds found at the site have an organic component in the temper (Häkälä 2011: 29), which is a trait commonly attached to the hybrid pottery types that came to exist through the merging of Corded Ware and local pottery traditions (Larsson & Graner 2010; Nordqvist 2016).

The third example is a partly excavated pithouse in the *Rupunkangas 1A* site (ru. *Protochnoe IV*) located on the Karelian Isthmus, Russia (Mökkönen et al. 2007, Fig. 7). The pithouse that was visible on the surface contours included one square room (5 x 6 m in size, c. 35 cm in depth) and separate porch-like entrances (2 x 2 m) in each short end. Weak cultural layers inside the pithouse were associated with hair-tempered pottery (Mökkönen et al. 2007), which is identified as organic-tempered 'Estonian Corded Ware' (Nordqvist 2016). The Corded Ware pithouse was erected on the top of an older pit structure with Mesolithic and Neolithic occupation phases (Mökkönen et al. 2007).

Other houses dated to the Corded Ware period

The temporal and cultural context of some of the pithouses is a bit uncertain because their current archaeological data is incomplete for an unconditional evaluation. These fully or partly excavated pithouses are associated with both Corded Ware and another pottery type (two cases), or they are radiocarbon-dated to the Corded Ware period (two cases). In some cases, the habit to locate the site in the landscape irrespective to larger water bodies

Figure 7. Houses from the eastern part of the Baltic Sea mentioned in text. A – houses with Corded Ware artefacts, B – pithouses with Corded Ware artefacts, C – inland pithouses dating to Corded Ware period (no cultural affiliation based on finds), D – long and narrow hunter-gatherer's pithouses, E – old hunter-gatherer sites resettled as inland sites by non-Corded Ware groups during the Corded Ware period, and F – housepit sites with Corded Ware from southern Finland. The dashed line marks the approximate northern limit of CWC (according to Nordqvist & Heyd 2021). Sites:1 – Urheilupuisto, 2 – Malmbacken, 3 – Lappfjärd-Mössåsen/Kornbäcken, 4 – Rupunkangas 1A (Karelian Isthmus, Russia), 5 – Nähinmaa, 6 – Kauniinmetsänniitty 1, 7 – Isosaari, 8 – Alksnynė 3 (Lithuania), 9 – Narva-Jõesuu IIb (Estonia), 10 – Purkajasuo Vuornos, 11 – Peurasuo, 12 – Kotakangas,13 – Kivineva, 14 – Miekkakaarat, 15 – Meskäärtty, and 16 – Senatsberget 1. Map made with Natural Earth free vector data.

that is characteristic for the settlement of Corded Ware culture, can be used as circumstantial evidence. The presented examples are located both inside as well as slightly outside the established distribution of Corded Ware culture in Finland. The examples in this section, as well as the sites brought up later in the discussion, originate mostly from the coastal Bothnia Bay (Ostrobothnia) where the rapid rate of land uplift has constantly changed the landscape and maintained the constant relocation of coastal settlement sites. Therefore, temporal variation of material culture is very limited at the short-lived Ostrobothnian settlement sites.

The first example is a pithouse at the *Nähinmaa* site, in northern Ostrobothnia, that is located some 140 kilometres beyond the northern limit of Corded Ware distribution (Figs. 7, 8A.). The site includes several pithouses, and a small-scale excavation inside of an oblong and narrow pithouse (pithouse no. 5, floor area 3.5–4 x 12 m in size) produced both Corded Ware (3 pcs) and

asbestos-tempered Pöljä Ware (1 pc, Tranberg 2001). This is the only currently known pithouse context, in which both of these pottery types are present. The site is located in the area of an extremely fast land uplift rate, and according to land uplift chronology it can be dated roughly to 2500–2200 calBC (Okkonen 2003: 227; Pesonen 2016: Kuva 3; Tallavaara & Pesonen 2020: Supplement 1). The dimensions of this pithouse are of great interest, and this topic will be addressed further in the discussion.

The second example, the *Kauniinmetsänniitty 1* pithouse (Pesonen 2013), is located in Northern Ostrobothnia approximately one hundred kilometres north of the traditional northern limit of CWC (Fig. 7). The plan of the house is pretty much similar to the one found at the Rupunkangas 1A site: a rectangular room (4.3 x 6.5 m in size, 40–50 cm in depth) and porch-like entrances (1.5 x 1.5 m) in both short ends (Pesonen 2013). The excavation of the house did not produce any artefacts that allow cultural affiliation (quartzes, a whetstone slab, burnt bones), but it is radiocarbon-dated to the Corded Ware period, to 2566–2298 calBC (birch bark tar mastic, Hela-1711, 3935±35 BP, median 2420 calBC, Pesonen 2013). The pithouse was erected on the remains of a thousand years older pithouse connected to Typical Comb Ware. During the settlement dated to the Corded Ware period, the

Figure 8. Long and narrow pithouses from Northern Ostrobothnia, Finland. A – the Nähinmaa pithouse (no. 5) associated with Corded Ware and Pöljä Ware (Finnish Heritage Agency, AKDG6381:2). B – the Peurasuo pithouse dating to the Final Neolithic or to the beginning of the Bronze Age (Finnish Heritage Agency, AKDG6393:1). The dashed lines are added to the photos to display the location of the pithouses. Photos T. Mökkönen.

site was located approximately one kilometre inland at the level of some 15 metres above the simultaneous sea level (Pesonen 2013; 2016).

The third example, the *Isosaari* pithouse, is located in western Finland, within the northernmost part of the Corded Ware distribution (Fig. 7). The fully excavated rectangular pithouse (3 x 3.5–4 m in size, 0.2–0.4 in depth) was erected on a site first settled by a group who used asbestos- and organic-tempered Pöljä Ware (settlement dated to 3359–3034 calBC), and later occupied by people who used Corded Ware pottery (Kankkunen & Mönkkönen 2010). Inside the pithouse, a rectangular wood-framed fireplace (c. 1.5 x 1.5 m in size) was discovered next to the eastern short wall. Any datable artefacts were not found inside the house, but the wooden structure of the fireplace is dated to Final Neolithic, 2020–1772 calBC (Hela-2210, 3556±33 BP, median 1903 calBC, Kankkunen & Mönkkönen 2009; for the periodisation see Nordqvist & Mökkönen 2017). The dating is a bit young to be securely connected with the Corded Ware culture. However, the end of the Corded Ware period in Finland around 2200 calBC is based on a limited number of datings (n=13, Pesonen et al. 2019), and the production of Corded Ware continued around the eastern part of the Gulf of Finland at least until 2100–1900 calBC (Kriiska & Nordqvist 2021: 373–474, see also Nordqvist 2016: 61). Accordingly, the association between the pithouse and Corded Ware culture is uncertain but not unthinkable.

In addition to the examples presented above, there are few houses where the shared temporal context of a house and the Corded Ware pottery found within is somewhat or highly unlikely. In the *Meskäärtty* pithouse (three rooms, c. 8 x 35–45 m in size) located in coastal southeastern Finland, both local variant of Late Comb Ware as well as Corded Ware were found inside (Mökkönen 2008). In the subsequent research, radiocarbon datings pointed out that the pithouse was erected during the last centuries of the 4th millennia calBC, and the activities of Corded Ware population at the site took place almost one millennium later. The *Senatsberget 1* pithouse (8 x 15 m in size, flat bottom area 4 x 9 m, 0.3 m in depth) located in an archipelago in southwestern Finland is another quite similar example. The small-scale excavation inside the pithouse produced both Corded Ware and Pyheensilta Ware, as well as quartzes, pieces of whetstones and two small axes/adzes (Sipilä 1996). Although the site could have been settled at the earliest during the last centuries on the 4th millennium calBC (based on shoreline displacement) and the author of the excavation considers the common distribution of the pottery types as a sign of contemporaneity, the question of a common temporal context cannot be resolved without more extensive excavations, new stratigraphic data, and radiocarbon-dating of the materials. These two examples from southern Finland, where the rate of land uplift is twice lower compared to the shores of the Bothnian Bay where most of the other examples originate from, underline the need for more extensive excavations and radiocarbon-dated materials.

HOUSES AMONG THE OTHER NORTHERN CORDED WARE GROUPS

Eastern Baltic Corded Ware Complex

Only a few Corded Ware houses have been discovered in the Baltic countries. Further south, by the Vistula Bay in Kaliningrad district, several large oblong houses with sunken floors (built on double posts and wattle-and-daub walls, c. 15 to 35 metres in length) connected to Rzucewo culture (also known as Bay Coast Culture, Haffküstenkultur and Primorskaya culture) have been discovered (Saltsman 2004; Zaltsman 2016). Because the Rzucevo is a hybrid culture with Corded Ware and older Globular Amphora elements, it is often, and also here, excluded from the CWC.

In coastal Lithuania, on the Curonian Spit, a Corded Ware house has been discovered at the *Alksnynė 3* site (Fig. 7; Piličiauskas 2018: 30–33). The remains of the house became visible as a grey coloured area of cultural layer (3 x 3.5 m in size, up to 15 cm in thickness). A posthole (35 cm in diameter, 20 cm in depth) and an oval-shaped small hollow (50 x 64 cm in size, 9 cm in depth, filled with burnt matter) were located at the opposite margins of the house structure. The modest features that are quite similar to the ones found at the Urheilupuisto site are interpreted to be a light constructed

house erected on the ground surface with a stoneless fireplace inside.

In the Alksnynė 3 house, bones were concentrated in the fireplace, and pottery was distributed both inside as well as next to the house. This kind of artefact distribution, also seen in the Urheilupuisto house, seems to be quite typical among Corded Ware houses (Larsson 2008; Müller et al. 2009). Abundant materials found at the site included pottery (2.2 kg), flint and other stones (1 kg), bones (458 g) and amber (85 g, Piličiauskas 2018: 32). Based on radiocarbon dates, the Alksnynė 3 site was settled 2450–2350 calBC (Piličiauskas 2018: 35).

In Estonia, the old interpretation of the two possible long houses, indicated by four hearths at the Valma site (Jaanits et al. 1982: 105–106), is currently regarded unlikely (Kriiska & Nordqvist 2021: 8). Instead, definite house structures have been excavated at the Narva-Jõesuu IIb site in northern Estonia, where two pithouses with Corded Ware artefacts have been discovered (Nordqvist et al. 2014; Kriiska et al. 2015; Kriiska & Nordqvist 2021: 466–467). The larger of the houses was rectangular in shape, and it had walls 3–4 metres in width. The floor was dug into the depth of 0.7–0.8 metres below the surface. The smaller house was 2 x 4 metres in size and dug into the depth of 1.3 metres below the surface. Any clear structural details of the houses were not preserved but they were unlikely constructed on horizontal timber frames (Kriiska & Nordqvist 2021: 467). Based on radiocarbon dates on charred crust on pottery and burnt bones, the dating of the site covers the whole Corded Ware period (2800–2200/2000 calBC, Kriiska et al. 2015; 2016; Kriiska & Nordqvist 2021).

The eastern branch of the wide CWC in Russia, represented by Fatyanovo and Balanovo cultures, is actually distributed quite close to the Baltic Sea in the Leningrad Oblast (Bader & Khalikov 1987, see also Nordqvist 2016: 61; Nordqvist & Heyd 2020), and it is included here shortly. The houses discovered among the Balanovo culture, which is the eastern one of the two cultures, are semi-subterranean pithouses made of horizontal logs and occasionally connected by corridors. The sizes of the houses vary between 4 x 4 and 6 x 8 metres (Bader & Khalikov 1987: 78; Ris. 38). In the context of Fatyanovo culture, which is the western one of the two cultures, any houses have not been found, yet.

Swedish Battle Axe Complex

The Scandinavian CWC is represented by Single Grave culture in Denmark, and Battle Axe culture in Norway and Sweden. In Sweden, an aspect repeatedly attached to the houses of Battle Axe culture is that they are difficult to identify and, therefore, the number of houses is low (Malmer 2003: 144–148; Larsson 2008; Larsson & Brink 2013). The known examples are mostly post-built oblong houses 4 to 7 metres in width and 10 to 15 metres in length (the width increasing in respect to the length, Larsson 2008; Larsson & Brink 2013: 337–338). They are much smaller compared to the Corded Ware houses found in Bornholm, Denmark (over 20 metres in length, Nielsen & Nielsen 1985), or to the Late Neolithic or Bronze Age houses found in southern Scandinavia (Larsson & Brink 2013).

In general, weakly developed cultural layers and the low number of finds inside the structures are considered typical features of houses of the Swedish Battle Axe culture. Cultural layers inside the houses are characteristically thin, for example only 6 cm in thickness as recorded in the Kabusa house in Scania, or the actual cultural layers can be missing altogether (Larsson 2008). This is to say that the recognition of post-built houses is largely based on postholes. In some of the houses, part of the floor is sunken, and typically, cultural layers in this part of the floor are rather well-preserved (Larsson 2008; Larsson & Brink 2013). According to Åsa M. Larsson (2008), the weight of pottery recorded in the houses is mainly between 100–200 g (up to 1.5 kg) and the weight of knapped lithics (flint and quartz) is frequently close to 400 g (up to 2 kg).

In addition to domestic houses, mortuary houses of the Battle Axe culture have been discovered in Sweden. In comparison to regular houses, they are smaller, post-, and plank-built structures (8–4 x 5–3 m in size) outlined by ditches of 0.2 to 0.7 metres in depth (Larsson 2009: 282–293). The ditches are often filled with dark and sooty soils that contain burnt human and animal bones, as well as pottery.

Table 2. The properties of the houses related to Corded Ware culture based on artefacts, or in the absence of datable artefacts, on the combination of radiocarbon dating to Corded Ware period and non-shore bound site location. See the text for references.

Site	Type	Shape	Lenght (m)	Width (m)	Area (m^2)	Lenght to width ratio	Corded Ware artefacts
Isosaari	pithouse	rectangular	3.5–4	3	9–10,5	1.2–1.3	no
Kauniinmetsänniitty 1	pithouse	rectangular	6.5	4.5	29	1.4	no
Malmbacken	pithouse	elliptical	3.5–4	3.5	12–14	1.0–1.1	yes
Malmbacken	pithouse	–	–	> 3	–	–	yes
Mössåssen/Kornbäcken	on the ground	oblong	7–8	3–4	21–32	1.8–2.3	yes
Urheilupuisto	on the ground	–	> 5	3.5	–	>1.4	yes
Rupunkangas 1A	pithouse	rectangular	6	5	30	1.2	yes
Nähinmaa	pithouse	oblong	12	3.5–4	42–48	3–3.4	yes

DISCUSSION

Different types of Corded Ware houses

Despite the early recognition of the Malmbacken pithouses connected to Corded Ware culture (Edgren 1970: 40–41), the concept of a pithouse has usually been attached to the northern Neolithic hunter-gatherers (Pesonen 2002; Norberg 2008; Mökkönen 2011), and the Malmbacken pithouses remained for a long time as an isolated and a bit peculiar example. Now, the current evidence on Corded Ware houses, although still quite limited, suggests that several types of houses have existed in Finland.

Certain Corded Ware houses presented in the article are verified by sufficiently extensive archaeological excavations. In contrast, the other houses dated to the Corded Ware period introduced in the article have been excavated only to a limited extent. This makes it somewhat uncertain whether they belong to the context of CWC. They possess, however, a number of features that jointly support the presumption of Corded Ware context, like the presence of Corded Ware artefacts at site or in a house, radiocarbon or shore displacement dating to Corded Ware period and the location of settlement site irrespective to the concurrent shoreline of larger water bodies – i.e., similar to the habit of the Corded Ware tradition to settle the landscape. In other words, the uncertain houses are considered to potentially belong to the context of CWC based on circumstantial evidence, although current archaeological data is unable to prove it thoroughly.

The well-grounded Corded Ware pithouses found in the northern and the southern side of the Gulf of Finland, at the Malmbacken and the Narva-Jõesuu IIb sites, are quite similar to each other in respect of their dimensions, and they are remarkably deep and small compared to preceding and concurrent pithouses built by hunter-gatherers (see Pesonen 2002; Vaneekhout 2008; Mökkönen 2009; 2011). The Isosaari house from western Finland is similar to these Corded Ware pithouses in size (but not in depth).

The two other Finnish pithouses connected to Corded Ware period, both located close or beyond the northern fringe of the Corded Ware distribution (Fig. 7), the Rupunkangas 1a and the Kauniinmetsänniitty 1, are close matches in many respects: they share similar ground plan and dimensions (Table 2), and they were erected on the older pithouses. The floor areas of the two houses are almost double in size compared to the smaller pithouses presented above. Actually, with respect to their size and ground plan, they are almost identical with the pithouses with one or two separate entrances that are characteristic of the populations using asbestos- and organic-tempered potteries in the northernmost area of the CWC and beyond, dating after 3500 calBC (e.g., Katiskoski 2002; Mökkönen 2009; 2011: 25–26).

Pithouses in the Corded Ware context are not a phenomenon of Northern and Eastern Europe

alone. Corded Ware houses with sunken floors are quite common in Central Europe, too. In the Central European examples, the longer wall of the houses is typically 4–7 metres in length, although much smaller houses exist too, and the length to width ratio of the houses is generally between 1.0 and 1.5 (Hecht 2007: 157). The depth of these houses varies between 0.2 to 0.7 metres below the surface (Hecht 2007: 137, 148, 155). With respect to dimensions, the northern pithouses connected to Corded Ware culture (the length to width ratio between 1.0 and 1.4, Table 2) and the Central European houses with sunken floors seem to be pretty much comparable, and they represent traditions that are clearly different from the houses of Corded Ware/Battle Axe cultures with pots-built structures and elongated ground plans discovered in Scandinavia (see e.g., Larsson 2008).

The Finnish Corded Ware houses that were erected on the ground surface are clearly different from the western post-built house structures of the Swedish Battle Axe culture. Considering the structures, the Urheilupuisto house with modest postholes has its closest parallel in the Alksnynė 3 house in Lithuania. The possible Corded Ware house in the Lappfjärd-Mössåssen/Kornbäcken site in the western Finland, instead, has in respect of dimensions (length to width ratio 1.8–2.3, Table 2) its closest parallels among the houses of Swedish Battle Axe culture that have typically narrow and oblong ground plans (length to width ratio > 2.0; see Larsson 2008).

The data represented in this article suggest that three or four types of Corded Ware houses have existed in Finland. The small pithouses that were present on the shores of the Gulf of Finland exhibit ground plans that are of similar size to the houses with sunken floors in the context of the Central European CWC. The larger pithouses with porch-like entrances discovered close to the northern fringe of the CWC bear a close resemblance to the pithouses built among the concurrent people producing the asbestos- and organic-tempered potteries. Houses that were erected on the ground surface and were built on notably light post construction – compared to Swedish Battle Axe houses – were present in southern Finland, and the narrow and oblong versions of this type of house were possibly present in the southwestern Finland.

Interplay between the cultures

According to various theoretical perspectives in archaeology and anthropology, the types of houses and their spatial arrangement across the landscape are dependent on and interlinked with social, cultural, and ideological aspects of the groups who created them (Knapp & Ashmore 1999; Thomas 2001; Ashmore 2002; Souvatzi 2012; Halperin & Schwartz 2016). Vernacular architecture and the technologies applied in construction are considered to reflect cultural and social identities of the builders (McGuire & Schiffer 1983; Dobres 1999; Halperin & Schwartz 2016: 7–10), and thereby, the changes – e.g., in layout, organization of space, location and building techniques of the houses – imply also some alteration in the way the builders defined themselves.

Recent studies have underlined the regional variability of material culture and burial practices within the CWC (e.g., Furholt 2014; Nordqvist 2016; Ahola & Heyd 2020), which was likely caused by the process in which local societies selectively incorporated and transformed the novelties of Corded Ware culture to fit into the local contexts. This kind of a process took place in northern areas, too, and it affected all the groups involved, and resulted in (1) hybridization of Corded Ware and hunter-gatherers' pottery traditions around the Gulf of Finland (Nordqvist 2016; Kholkina 2017), in southern Ostrobothnia (Edgren 1970: 78; 1997) and along the Swedish east coast (Larsson 2009: 356–368; Larsson & Graner 2010), (2) spread of battle axes and imitations of these battle axes in the area of asbestos- and organic-tempered potteries (Äyräpää 1952; Carpelan 2004; Mökkönen 2011: 53; Nordqvist & Häkälä 2014), and (3) two-way influences in burial customs between CWC and hunter-gatherers (Ahola 2020: 14; Ahola & Heyd 2020: 87).

Just like the regional variation in material culture and customs within CWC, the variation of house types among CWC around the Baltic Sea is likely due to different preceding cultural environments that interacted and locally modified

the housebuilding traditions. In southern Sweden (and in Denmark), this is evidenced by the continuity of the same house type from the earlier Funnel Beaker culture (Middle Neolithic A) to the following CWC (Middle Neolithic B, Larsson 2015). It is likely that the mingling of groups of people and different traditions is present in the whole area of CWC and beyond, and that a wide array of aspects of life were involved in the process of hybridization.

The question of continuation in house building from earlier traditions to CWC in Finland is difficult to resolve due to shortage of data. The overall number of Stone Age houses discovered within the area of Corded Ware distribution in Finland is small (see Pesonen 2002: 23–24, 30–31). They include a few at least partly excavated pithouses, which are associated with Pyheensilta Ware and some asbestos-tempered pottery, or do not have produced any artefacts that allow cultural affiliation.[7] Even if some of the housepits associated with Pyheensilta Ware are of a similar size in width and length with the pithouses associated with Corded Ware in this article (Karjalainen 2006: 26–27), the majority are, however, of larger size. The continuation of house building tradition from earlier traditions to CWC in southern and southwestern Finland is not clearly perceivable in available data. In the areas close to the northern border of CWC, the situation is different, and there the resemblance between the few Corded Ware pithouses and the pithouses built among the groups who produced asbestos- and organic-tempered potteries is quite evident.

The Corded Ware period brought some changes to housing practiced by non-Corded Ware populations along the Bothnia Bay. At that time, more oblong and narrower ground plans appeared in hunter-gatherers' pithouses both in Sweden (Norberg 2008: 159, Fig. 5.17) and in Finland[8] (Fig. 7). In Finland, the Nähinmaa pithouse introduced above in this article and the late Final Neolithic *Peurasuo* pithouse in the Northern Ostrobothnia (floor area, 3,5 x 18 m, Ojanlatva & Alakärppä 2002) are the only examples that have been even partly excavated (Fig. 8). This change in ground plans and building traditions of pithouses around the Bothnian Bay is likely one of the consequences that followed the contacts with CWC, and especially with the Swedish Battle Axe culture, whose presence through direct or indirect contacts is seen in distribution of battle axes in the area (Carpelan 2004; see also Nordqvist & Häkälä 2014).

During the 3rd millennium calBC, hunter-gatherers' traditional mode of habitation at settlement sites that were located close to the shores of larger water bodies altered. This change is evident in the southern part of the Bothnia Bay, western Finland (Fig. 7), an area that is located close to the northern border of CWC. There the population who used asbestos-tempered Pöljä Ware (Miekkakaarat site, Skantsi 2019b) or was not associated with any pottery at all (Kivineva site, Skantsi 2019a), resettled the old settlement sites which had been altered due to land uplift from the coastal sites to inland sites. The resettling is evidenced by recent radiocarbon dates.[9] This kind of inland settlement did not exist during the previous millennia. It seems that the scattered and non-shore-bound settlement pattern practiced by Corded Ware people (see Europaeus-Äyräpää 1930: 190; Edgren 1970: 39, 70; Kriiska 2000: 74; Kylli 2001; Hecht 2007: 244; Larsson 2008; Sikk et al. 2020: Fig. 1) was employed, at least to a degree, among the other groups in close connection to CWC.

The interaction between the groups of different cultural backgrounds and traditions affected several aspects of cultural practices. Therefore, it can be assumed, that the Corded Ware tradition which produced only little archaeological record in volume compared to the preceding hunter-gatherers (Nordqvist 2018: Table 4, Figure 29; Mökkönen 2011: 63–65; 2014), might have affected the practice of producing and discarding material culture among other traditions. As a hypothesis, the observed decreasing number of seashore bound settlement sites and radiocarbon dates in Finland towards the end of the Corded Ware period (see Tallavaara et al. 2014: Fig. 1) might be a consequence of the newly shaped cultural practices that followed the mingling between the CWC and the local cultural traditions.

CONCLUSIONS

The current data available on the Corded Ware houses and on the mingling between the groups representing different cultural traditions is highly incomplete, and therefore, much of the

views presented in this article remain to a degree speculative in character. Despite that, the various house building traditions among the Corded Ware Complex around the Baltic Sea are clearly distinguishable: post-built oblong houses erected on the ground surface mark the westerns shores, whereas smaller houses erected on the ground surface as well as pithouses, both built without substantial (number of) posts, are present on the eastern shores. In Finland, the house types seen in the Baltic Countries are present in southern Finland, while the pithouses that are associated with Corded Ware and that located close to the northernmost area of the CWC are larger in size and some of them well-comparable to the pithouses associated with asbestos- and organic-tempered potteries, as well as to the Balanovo pithouses found in Russia.

In Ostrobothnia, western Finland, the housepits associated with Corded Ware via aftefacts or radiocarbon dates are difficult to interpret because of the mingling between CWC and local hunter-gatherers is clearly present in this area. During the Corded Ware period in Finland, the reshaping of cultural identities likely took place in various aspects of life (for the case of the burial practices, see Ahola & Heyd 2020) including the ways to settle the landscape and build houses. Both the Finnish Corded Ware culture and the Swedish Battle Axe culture were involved in the process, and the influence of the latter was probably more substantial in the northern part of the Bothnia Bay, where narrow and oblong ground plans that are similar in their dimensions with the houses of the Battle Axe culture appeared to pithouses during the Corded Ware period.

The emerging pattern of different house types during the Corded Ware period (Fig. 7) is likely to display both the contacts between the regional variants of Corded Ware cultures as well as the preceding and the concurrent cultural environments which the Corded Ware phenomenon arrived to and acted part in. In the process, the different house types are likely to reflect the variation of social and cultural identities that emerged in different parts of Finland during the Corded Ware period. In addition to the changes in architecture, the Corded Ware period affected how the landscape was settled. The long-lasting tradition to erect settlement sites to a close proximity to larger water bodies was not the norm anymore, and a new kind of inland sites were erected by some of the groups using asbestos- and organic-tempered potteries north of the CWC. Even if the changes are quite distinctive, the process behind it is surely a complex one. In order to evaluate and understand further the mingling between cultures and traditions proposed in the article, more large-scale excavations to produce appropriate data on the temporal contexts of settlement phases at the sites will be needed in future.

ACKNOWLEDGEMENTS

I would like to thank the two anonymous reviewers for their valuable comments on the manuscript.

REFERENCES

Ahola, M. 2020. Creating a sense of belonging: religion and migration in the context of the 3rd millennium BC Corded Ware complex in the eastern and northern Baltic Sea region. *Norwegian Archaeological Review* 53(2): 114–134. https://doi.org/10.1080/00293652.2020.1852305

Ahola, M. & Heyd, V. 2020. The Northern Way: Graves and funerary practices in Corded Ware Finland. *Praehistorische Zeitschrift* 95(1): 78–111. https://doi.org/10.1515/pz-2020-0002

Ashmore, W. 2002: "Decisions and Dispositions": Socializing Spatial Archaeology. *American Anthropologist* 104(4): 1172–1183.

Asplund, H. 2008. *KYMITTÆ. Sites, centrality and long-term settlement change in the Kemiönsaari region in SW Finland*. Annales Universitatis Turkuensis, Ser. B, Tom. 312, Humaniora.

Äyräpää, A. 1952. Veneenmuotoisten vasarakirveiden kivikautisia jäljittelyjä. *Suomen Museo* 59: 5–28.

Äyräpää, A. 1973. Båtyxkulturen i Finland. In C.F. Meinander & M. Schauman (eds.) *Opera Selecta*: 195–211. Helsingin yliopiston arkeologian laitos. Moniste 9.

Bader, O. N. & Khalikov, A. N. 1987 – Бадер, О.Н. & Халиков, А.Н. 1987. Балановская культура. In Бадер, О.Н., Крайнов, Д.А. & Косарев, М.Ф. (eds.) *Эпоха бронзы лесной полосы СССР*: 76–84. Москва: Археология СССР.

Bronk Ramsey, C. 2009. Bayesian analysis of radiocarbon dates. *Radiocarbon* 51(1): 337–360.
Carpelan, C. 1999. Käännekohtia Suomen esihistoriassa aikavälillä 5100…1000 eKr. In P. Fogelberg (ed.) *Pohjanpoluilla. Suomalaisten juuret nykytutkimuksen mukaan*: 249–280. Bidrag till kännedom av Finlands natur och folk 153. Helsinki: Societas Scientiarum Fennica.
Carpelan, C. 2004. Corded Ware culture in Northern Finland. In M. Lavento (ed.) *Early in the North, Volume* 5: 47–62. Iskos 13.
Cleve, N. 1930. Stenåldersboplatsen å Malmbacken i Norrby by av Lappträsk s:n (N. Cleves undersökning 1930). Excavation report, Finnish Heritage Agency, Helsinki.
Dobres, M.-A. 1999. Technology's Links and Chaînes: The Processual Unfolding of Technique and Technician. In M.-A. Dobres & C. R. Hoffman (eds.) *The Social Dynamics of Technology: Practica, Politics and Worldviews*: 124–146. Washington: Smithsonian Institute Press.
Edgren, T. 1970. *Studier över den snörkeramiska kulturens keramik i Finland.* Suomen Muinaismuistoyhdistyksen aikakauskirja 72.
Edgren, T. 1993. Den förhistoriska tiden. In M. Norrbäck (ed.) *Finlands historia* I: 9–270. Espoo: Schildt.
Edgren, T. 1997. Då snör- och kamkeramiken möttes i Österbotten. In K. Gullberg (ed.) *Arkeologi i Mittnorden*: 151–174. Acta Antiqua Ostrobotniensia, Studier i Österbottens förhistoria 4. Vasa: Scriptum.
Europaeus-Äyräpää, A. 1930. Die relative Chronologie der steinzeitlichen Keramik in Finnland I–II. *Acta Archaeologica* I: 165–190, 205–220.
Fast, J. 2002. Esbo Bolarskog 3. Utgrävning av en stenåldersboplats från Pyheensilta skedet. Excavation report, Finnish Heritage Agency, Helsinki.
Furholt, M. 2014. Upending a "Totality". Re-evaluating Corded Ware Variability in Late Neolithic Europe. *Proceedings of Prehistoric Society* 80: 67–86. https://doi.org/10.1017/ppr.2013.20
Häkälä, P. 2011. Keramiikkaa ja kiviä Mössåsenilta. Kristiinankaupungin Mössåsen/Kornbäckenin nuorakeraamisen asuinpaikan tutkimus. Master's thesis, University of Turku.
Halperin, C. T. & Schwartz, L. E. 2016. The archaeology of vernacular architecture in the Pre-Colombian Americas. In C. T. Halperin & L. E. Schwartz (eds.) *Vernacular Architecture in the Pre-Colombian Americas*: 3–21. New York: Routledge.
Hecht, D. 2007. *Das schnurkeramische Siedlungswesen im südlichen Mitteleuropa: eine Studie zu einer vernachlässigten Fundgattung im Übergang vom Neolithikum zur Bronzezeit*. Heidelberg: Universitätsbibliothek.
Holmqvist, E. 2021. Why not let them rest in pieces? Grog-temper. its provenance and social meanings of recycled ceramics in the Baltic Sea region (2900–2300 BCE). *Archaeometry* 64(S1): 8–25. https://doi.org/10.1111/arcm.12727
Holmqvist, E., Larsson, Å. M., Kriiska, A., Palonen, V., Pesonen, P., Mizohata, K., Kouki, P. & Räisänen, J. 2018. Tracing grog and pots to reveal neolithic Corded Ware Culture contacts in the Baltic Sea region (SEM-EDS, PIXE). *Journal of Archaeological Science* 91: 77–91. https://doi.org/10.1016/j.jas.2017.12.009
Hyvärinen, H. 1999. Shore displacement and Stone Age dwelling sites near Helsinki, southern coast of Finland. In Huurre, M. (ed.) *Dig It All. Papers dedicated to Ari Siiriäinen*: 79–89. Helsinki: The Finnish Antiquarian Society & The Archaeological Society of Finland.
Jaanits, L., Laul, S., Lougas, V. & Tönisson E. 1982. *Eesti esiajalugu.* Tallinn: Eesti Raamat.
Jussila, T. 1990. Espoon muinaisjäännösinventointi 1990. Survey report, Finnish Heritage Agency, Helsinki.
Jussila, T. 2016. Espoo Leppävaara Urheilupuisto muinaisjäännöskartoitus 2016. Archives of the Finnish Heritage Agency, Helsinki.
Kankkunen, P. & Mönkkönen, R. 2010. Seinäjoki Isosaari. Kivikautisen asuinpaikan kaivaus 27.7.-14.8.2009 ja 28.6.-23.7.2010. Excavation report, Finnish Heritage Agency, Helsinki.
Karjalainen, T. 2006. Harjavallan inventointi. Survey report, Finnish Heritage Agency, Helsinki.
Katiskoski, K. 2002. The semisubterranean dwelling at Kärmelahti in Puumala, Savo province, Eastern Finland. In H. Ranta (ed.) *Huts and Houses. Stone Age and Early Metal Age buildings in Finland*: 171–200. Helsinki: National Board of Antiquities.
Kholkina, M. 2017. Some aspects of Corded Ware on Rosson River (Narva-Luga Klint Bay). *Estonian Journal of Archaeology* 21(2): 148–160. https://doi.org/10.3176/arch.2017.2.03

Knapp, A. B. & Ashmore, W. 1999. Archaeological Landscapes: Constructed, Conceptualized, Ideational. In W. Ashmore & A. B. Knapp (eds.) *Archaeologies of Landscape. Contemporary Perspectives:* 1–30. Oxford: Blackwell Publishers.

Kriiska, A. 2000. Corded Ware culture sites in North-Eastern Estonia. In V. Lang & A. Kriiska (eds.) *De Temporibus Antiquissimis Ad Honorem Lembit Jaanits*: 59–79. Muinaisaja Teadus 8. Tallinn.

Kriiska, A. & Nordqvist, K. 2021. Estonian Corded Ware (2800–2000 cal BC) – Defining a regional group in the eastern Baltic. In V. Heyd, G. Kulcsár & B. Preda-Bălănică (eds.) *Yamnaya Interactions. Proceedings of the International Workshop held in Helsinki, 25–26 April 2019*: 463–485. Archaeolingua, vol. 44, The Yamnaya Impact on Prehistoric Europe, vol. 2.

Kriiska, A., Nordqvist, K., Gerasimov, D.V. & Sandell, S. 2015. Preliminary results of the research at Corded Ware sites in the Narva–Luga interfluve, Estonian–Russian border area in 2008–2014. *Archaeological Fieldwork in Estonia* 2014: 39–50.

Kriiska, A., Gerasimov, D.V., Nordqvist, K., Lisitsyn, S.N., Sandell, S. & Kholkina, M.A. 2016. Stone Age Research in the Narva–Luga Klint Bay Area in 2005–2014. In P. Uino & K. Nordqvist (eds.) *New Sites, New Methods. Proceedings of the Finnish-Russian Archaeological Symposium Helsinki, 19–21 November 2014*: 101–115. Iskos 21.

Kristiansen, K., Allentoft, M. E., Frei, K. M., Iversen, R., Johanssen, N. N., Kroonen, G., Pospieszny, L., Price, T. D., Rasmussen, S., Sjögren, K.-G., Sikora, M. & Willerslev, E. 2017. Re-theorising mobility and the formation of culture and language among Corded Ware Culture in Europe. *Antiquity* 91(356): 344–347. https://doi.org/10.15184/aqy.2017.17

Kylli, J. 2001. Asutussysteemi ja toimeentulo muinaisessa Espoossa ja lähiympäristössä. *Muinaistutkija* 2000(1): 2–13.

Laulumaa, V. 2007. Kristiinankaupunki Lapp-fjärd Mössåsen/Kornbäcken Kivikautisen asuinpaikan tutkimus Fingridin voimajohtolinjalla Kankaanpää-Lålby. Excavation report, Finnish Heritage Agency, Helsinki.

Larsson, L. & Brink, K. 2013. Lost and found: Houses in the Neolithic of Southern Scan-dinavia. In D. Hofmann & J. Smyth (eds.) *Tracking the Neolithic Houses in Europe*: 329–347. New York: Springer. https://doi.org/10.1007/978-1-4614-5289-8_14

Larsson, M. 2015. Places of settlement in Southern Scandinavia. In C. Fowler, J. Harding & D. Hofmann (eds.) *The Oxford handbook of Neolithic Europe*: 345–358. Oxford: Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199545841.013.018

Larsson, Å. 2008. Taking out the Trash. On excavating settlements in general, and houses of the Battle Axe Culture in particular. *Current Swedish Archaeology* 15–16: 111–136. https://doi.org/10.37718/CSA.2008.07

Larsson, Å. 2009. *Breaking and Making Bodies and Pots. Material and Ritual Practices in Sweden in the Third Millennium BC*. Aun 40. Uppsala Universitet.

Larsson, Å. M. & Graner, G. 2010. More than Meets the Eye. Pottery Craft in Transition at the End of the Middle Neolithic in Eastern Sweden. In Å. M. Larsson & L. Papmehl-Dufay (eds.) *Uniting Sea II. Stone Age societies in the Baltc Sea region*: 213–247. Occasional Papers in Archaeology 51. Uppsala: Uppsala University.

Lindholm, D. 1996. Arkeologisen kohteen tarkastus. Espoo Leppävaara Urheilupuisto. Inspection report, Finnish Heritage Agency, Helsinki.

Lindström, J. 2003. Long distance distribution of battle axes in northern Europe: some aspects of the contacts between Denmark, Sweden and Finland 2800–2300 BC. In C. Samuelsson & N. Ytterberg (eds.) *Uniting Sea. Stone Age societies in the Baltic Sea region. Proceedings from the first Unititing Sea Workshop at Uppsala University, Sweden, January 26-27, 2002*: 147–160. Occasional Papers in Archaeology 33. Uppsala: Uppsala University.

Malmer, M. P. 2003. *The Neolithic of South Sweden: TRB, GRK, and STR*. Stockholm: The Royal Swedish Academy of Letters History and Antiquities.

McGuire, R. H. & Schiffer, M. B. 1983. A Theory of Architectural Design. *Journal of Anthropological Archaeology* 2: 2077–2303. https://doi.org/10.1016/0278-4165(83)90002-8

Meinander, C. F. 1939. Pyheensilta Stenåldersboplats. *Suomen Museo* 46: 28–43.

Meinander, C. F. 1954. *Die Kiukaiskultur*. Suomen Muinaismuistoyhdistyksen aikakauskirja 53. Helsinki: The Finnish Antiquarian Society.

Mökkönen, T. 2008. A review of neolithic multi-room housepits as seen from the Meskäärtty site in Virolahti parish, extreme south-eastern

Finland. *Estonian Journal of Archaeology* 12(2): 114–151. https://doi.org/10.3176/arch.2008.2.02

Mökkönen, T. 2009. Neolithic housepits in the Vuoksi River Valley, Karelian Isthmus, Russia – chronological changes in size and location. *Fennoscandia Archaeologica* XXVI: 133–161.

Mökkönen, T. 2011. *Studies on Stone Age housepits in Fennoscandia (4000–2000 cal BC): changes in ground plan, site location and degree of sedentism.* Helsinki: Unigrafia.

Mökkönen, T. 2014. Archaeological radiocarbon dates as a population proxy: a skeptical view. *Fennoscandia Archaeologica* XXXI: 125–134.

Mökkönen, T. 2018. Espoo, Leppävaara, Urheilupuisto. Kivikautisen asuinpaikan arkeologinen kaivaus 21.5.–8.6.2018. Excavation report. Finnish Heritage Agency, Helsinki.

Mökkönen, T., Nordqvist, K. & Bel'skij, S. 2007. The Rupunkangas 1A site in the archipelago of Ancient Lake Ladoga: A housepit with several rebuilding phases. *Fennoscandia Archaeologica* XXIV: 3–28.

Müller, J., Seregély, T., Becker, C., Christensen, A.-M., Fuchs, M., Kroll, H., Mischka, D. & Schüssler, U. 2009. A Revision of Corded Ware settlement pattern – New results from the Central European Low Mountain Range. *Proceedings of the Prehistoric Society* 75: 125–142. https://doi.org/10.1017/S0079497X00000323

Nielsen F. O. & Nielsen, P. O. 1985. Middle and Late Neolithic houses at Limensgård, Bornholm. *Journal of Danish Archaeology* 4(1): 101–114. https://doi.org/10.1080/0108464X.1985.10589939

Norberg, E. 2008. *Boplatsvallen som bostad i Norrbottens kustland 5000 till 2000 före vår tideräkning. En studie av kontinuitet och förändringar.* Studia Archaeologica Universitatis Umensis 23. Umeå: Institutionen för idé- och samhällsstudier.

Nordqvist, K. 2016. From separation to interaction: Corded Ware in the eastern Gulf of Finland. *Acta Archaeologica* 87(1): 49–84. https://doi.org/10.1111/j.1600-0390.2016.12167.x

Nordqvist, K. 2018. *The Stone Age of north-eastern Europe 5500–1800 calBC. Bridging the gap between the East and the West.* Acta Universitats Ouluensis, B Humaniora 160. Oulu: University of Oulu.

Nordqvist, K. & Häkälä, P. 2014. Distribution of Corded Ware in the areas north of the Gulf of Finland – an update. *Estonian Journal of Archaeology* 18(1): 3–29. https://doi.org/10.3176/arch.2014.1.01

Nordqvist, K. & Heyd, V. 2020. The forgotten child of the wider Corded Ware family: Russian Fatyanovo culture in context. *Proceedings of the Prehistoric Society* 86: 65–93. https://doi.org/10.1017/ppr.2020.9

Nordqvist, K., Kriiska, A. & Sandell, S. 2014. Nuorakeraaminen hauta ja muuta mukavaa. *Hiisi* 2014(1): 20–25.

Nordqvist, K. & Mökkönen, T. 2017. Periodi-sation of the Neolithic and radiocarbon chronology of the Early Neolithic and the beginning of the Middle Neolithic in Finland. *Documenta Praehistorica* XLIV: 78–86. https://doi.org/10.4312/dp.44.5

Nordqvist, K. & Mökkönen, T. 2021. Pöljä Ware: Properties, Dating and Regional Variation. *Fennoscandia Archaeologica* XXXVIII: 29–58.

Ojanlatva, E. & Alakärppä, J. 2002. Interpretation of the Peurasuo house pit in Oulu. In H. Ranta (ed.) *Huts and houses. Stone Age and Early Metal Age buildings in Finland*: 109–122. Helsinki: National Board of Antiquities.

Okkonen, J. 2003. *Jättiläisen hautoja ja hirveitä kiviröykkiöitä – Pohjanmaan muinaisten kivirakennelmien arkeologiaa*. Acta Universitatis Ouluensis B Humaniora 52. Oulu: University of Oulu.

Pellinen, H.-M. 2007. Harjavalta Hiittenharju. Kivikautisen asuinpaikan koekaivaus 11.–16. 6.2007. Excavation report, Finnish Heritage Agency, Helsinki.

Pesonen, P. 2002. Semisubterranean houses in Finland – a review. In H. Ranta (ed.) *Huts and Houses. Stone Age and Early Metal Age Buildings in Finland*: 9–41. Helsinki: Finnish National Board of Antiquities.

Pesonen, P. 2013. Stratigraphy and chronology of a Stone Age pithouse in Raahe, northern Ostrobothnia. In K. Johanson & M. Tõrv (eds.) *Man, his time, artefacts, and places: collection of articles dedicated to Richard Indreko*: 517–545. Muinasaja teadus 19. Tartu : Tartu ülikooli Ajaloo ja arheoloogia instituut.

Pesonen, P. 2016. Ja merestä nousee maa. Pohjois-Pohjanmaan rannansiirtyminen ja arkeologiset radiohiiliajoitukset. *Monttu auki: arkeologisia kenttätutkimuksia* 1: 10–23.

Pesonen, P. 2021. *Continuity and Discontinuity in Early, Middle and Late Neolithic pottery types of Eastern Fennoscandia. Reflections from Bayesian chronologies.* Doctoral dissertation. Helsinki: Unigrafia.

Pesonen, P. & Leskinen, S. 2009. Pottery of the Stone Age hunter-gatherers in Finland. In P. Jordan and M. Zvelebil (eds.) *Ceramics Before Farming: The Dispersal of Pottery Among Prehistoric Eurasian Hunter-Gatherers*: 299–317. Walnut Creek: Left Coast Press.

Pesonen, P., Larsson, Å. M. & Holmqvist-Sipilä, E. 2019. The Chronology of Corded Ware Culture in Finland - Reviewing New Data. *Fennoscandia Archaeologica* XXXVI: 130–141.

Piličiauskas, G. 2018. *Virvelinės keramikos kultūra Lietuvoje 2800–2400 cal BC*. Vilnus: Lietuvos istorijos institutas. https://doi.org/10.33918/VIRVELINES

Reimer, P., Austin, W., Bard, E., Bayliss, A., Blackwell, P., Bronk Ramsey, C., Butzin, M., Cheng, H., Edwards, R., Friedrich, M., Grootes, P., Guilderson, T., Hajdas, I., Heaton, T., Hogg, A., Hughen, K., Kromer, B., Manning, S., Muscheler, R., Palmer, J., Pearson, C., van der Plicht, J., Reimer, R., Richards, D., Scott, E., Southon, J., Turney, C., Wacker, L., Adolphi, F., Büntgen, U., Capano, M., Fahrni, S., Fogtmann-Schulz, A., Friedrich, R., Köhler, P., Kudsk, S., Miyake, F., Olsen, J., Reinig, F., Sakamoto, M., Sookdeo, A. & Talamo, S. 2020. The IntCal20 Northern Hemisphere radiocarbon age calibration curve (0–55 cal kBP). *Radiocarbon* 62(4): 725–757. https://doi.org/10.1017/RDC.2020.41

Ruonavaara, L. 2005. Rävåsen, en senneolitisk boplats i Kristinestad, Södra Österbotten. Boplatsens keramik. *Finskt Museum* 2002: 25–50.

Saltsman, E. B. 2004. The settlement Pribrezhnoye. *Lietuvos Archeologija* 25: 135–156.

Sikk, K., Kriiska, A. Johanson, K., Sander, K. & Vindi, A. 2020. Environment and settlement location choice in Stone Age Estonia. *Estonian Journal of Archaeology* 24(2): 89–140. https://doi.org/10.3176/arch.2020.2.01

Sipilä, M. 1996. Dragsfjärd Hertsböle Senatberget. Kivikautisen asuinpaikan koekaivaus 21.–22.9.1996. Excavation report, Finnish Heritage Agency, Helsinki.

Skantsi, L. 2019a. Kannus Kivineva. Kivikautisen asuinpaikan arkeologiset koululais- ja yleisökaivaukset 5. –21.9.2018. Mullankaivajat hanke 2018. Excavation report, Finnish Heritage Agency, Helsinki.

Skantsi, L. 2019b. Kokkola, Miekkakaarat. Asumuspainanteen kaivaukset 28.–29.9.2019. Excavation report, Finnish Heritage Agency, Helsinki.

Souvatzi, S. 2012. Space, Place, and Architecture: A Major Meeting Point between Social Archaeology and Anthropology? In D. Shankland (ed) *Archaeology and Anthropology. Past. Present, and Future*: 173–196. London: Routledge.

Taivainen, J. 2018. Salo, Kokkila, Angelniemi. Arkeologinen inventointi 2018. Arkebuusi osuuskunta. Survey report, Finnish Heritage Agency, Helsinki.

Tallavaara, M., Pesonen, P., Oinonen, M. & Seppä, H. 2014: The mere possibility of biases does not invalidate archaeological population proxies – response to Teemu Mökkönen. *Fennoscandia Archaeologica* XXXI: 135–140.

Tallavaara, M. & Pesonen, P. 2020. Human ecodynamics in the north-west coast of Finland 10,000–2000 years ago. *Quaternary International* 549(30): 26–35. https://doi.org/10.1016/j.quaint.2018.06.032

Tranberg, A. 2001. Liminka, Kiiskinkylä, Nä-hinmaa. Excavation report, Finnish Heritage Agency, Helsinki.

Vikkula, A. 1987. Pyheensilta-keramiikka. Licen-tiate thesis. University of Helsinki, Helsinki.

Thomas, J. 2001. Archaeologies of Place and Landscape. In I. Hodder (ed), *Archaeological Theory Today*: 165–186. Cambridge: Polity.

Tiitinen, T. & Halinen, P. 2022. The values of archaeological heritage sites – how to define significance. In P. Halinen, V. Heyd & K. Mannermaa (eds.) *Oodeja Mikalle. Juhlakirja professori Mika Lavennolle hänen täyttäessään 60 vuotta / Odes to Mika. Festschrift for Professor Mika Lavento on the occasion of his 60th birthday / Оды Мике. Юбилейный сборник посвященный 60-летию профессора Мики Лавенто*: 338–345. Monographs of the Archaeological Society of Finland 10. Helsinki: Archaeological Society of Finland

Vaneeckhout, S. 2008. Dwelling depressions at Kierikki: results of a GPS-survey. *Faravid* 32: 7–17.

Zaltsman, E. 2016. Chronological problems with sites of the Primorskaya culture on the north-eastern coast of the Vistula Lagoon. *Sprawozdania Archeologiczne* 68: 263–299. https://doi.org/10.23858/SA68.2016.013

NOTES

[1] The term house is regarded here as a man-made building where human activities have taken place. The term does not refer to any specific kind of structures used in construction.

[2] The northernmost part of the thin cultural layers was cut out in the excavation (that was carried out in artificial layers 5 centimetres in thickness) before the documentation, and therefore, it seems in the maps (see Fig. 3) that the cultural layers of the house did not continue properly to the northern border of the excavation area.

[3] The amount of pottery at the Corded Ware sites varies a lot: 1.2 g/m^2 in the Urheilupuisto site, 0.2 g/m^2 in the *Rävåsen* site (Ruonavaara 2005: 43) and 82 g/m^2 in the Lappfjärd-Mössåsen/ Kornbäcken site (Häkälä 2011: 25) have been reported in Finland. For comparison to other Neolithic periods in Finland, see Nordqvist (2018: 97, Fig. 29), and for comparison to the houses of Battle Axe culture in Sweden, see Larsson (2008).

[4] KM stands for archaeological collections of the National Museum of Finland.

[5] This structure excavated at the Malmbacken site was a paved fireplace (1–1.5 x 4 m in size) with a posthole next to it. It has been interpreted as a possible hut which produced mixed materials of Corded Ware culture and the preceding Neolithic periods (Cleve 1930; Edgren 1970: 40–41).

[6] Another radiocarbon dating (Hela-1534, 4770±40 BP) of a burnt bone obtained from the site dates one thousand years older (mean 3569 calBC). As there is only Corded Ware materials found at the site, no clear explanation for the date exists.

[7] The pithouses at the *Hiittenharju (Laurilan hiekkakuoppa)* site in southwestern Finland are associated with Pyheensilta Ware. They are described as oval depressions between 3 x 6 metres and 5 x 15 metres in size, and 0.3–0.7 metres in depth (Karjalainen 2006). One pithouse is partly excavated (Pellinen 2007). The *Bolarskog 3* pithouse located in southern Finland, excavated in 2002 (Fast 2002), is described as an oval depression c. 6 x 10 metres in size (Jussila 1990). The pithouse is associated with Pyheensilta Ware. Based on the current knowledge on pithouses and the development of cultural layers inside, the structure at the Bolarskog 2 is likely a pithouse although the leader of the excavation questioned it (Fast 2002). The *Härkämäki* pithouse located in southwestern Finland, is roundish, 7 x 7 metres in size, 0.8 m in depth, and it has surrounding embankments 1.5 metres in width. The doorway (2 m in length and 1 metre in width) is facing the ancient shore. Burnt bone found inside the pithouse is dated to 3094–2926 calBC (Hela-4404, 4404±19 BP, median 3017 calBC) (Taivainen 2018). The finds of the Härkämäki pithouse do not allow affiliation to any particular culture.

[8] Two examples of narrow and oblong housepits from Northern Ostrobothinia, that can be dated on the basis of land uplift chronology to Corded Ware period, are *Purkajasuo Vuornos* (housepit 111, floor area c 3.5 x 19 m) and Kotakangas (floor area c 3 x 10 m). For the comparable sizes of hunter-gatherers' pithouses (see Norberg 2008; Vaneeckhout 2008; Mökkönen 2009). While writing the article, almost 200 examples of potential narrow and oblong housepits that are dated based on land uplift chronology to the Late and Final Neolithic have been detected with help of airborne laser-scanning data from the area that is located close to the northernmost distribution of CWC in Finland, in the provinces of Ostrobothnia and Central Ostrobothnia. So far, only some 15 of them have been verified archaeologically as housepits (J. Ikäheimo, University lecturer, Archaeology, University of Oulu, text messages to the author, 27 October 2022, 9 January 2023).

[9] The resettling episodes of the sites that were first occupied as sea-shore settlements by populations using Typical and Late Comb Ware (the 4th millennium calBC) are radiocarbon-dated as following: the Miekkakaarat site 2880–2639 calBC (Skantsi 2019b), and the Kivineva site 2280–1960 calBC (Skantsi 2019a).

APPENDIX

Appendix 1. The materials of the Urheilupuisto site (KM 41662: 1–1591) divided between the western and the eastern parts of the excavation area.

	Western part (53 m²)			Eastern part (69 m²)			Total (122 m²)		
	pcs	g	g/m²	pcs	g	g/m²	∑ (pcs)	∑ (pcs)	MED g/m²
Ceramics	159	130	2.5	10	15	0.2	169	145	1.2
Quartzes	3441	12.281	231.7	2.575	8.020	116.2	6.016	20.301	166.4
Burnt bones	300	36	0.7	4	1	0.0	304	37	0.3
Axes/adzes	1	56	-	1	79	-	2	135	-