

11 Excavations at the Juoksemajärvi Westend Stone Age dwelling site in 2002

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Abstract

The first dwelling depression in the Karelian Isthmus was excavated in June 2002 jointly by Finnish and Russian researchers at the Juoksemajärvi Westend (Bol'shoe Zavetnoe 4) Stone Age dwelling site, in Räisälä municipality. There are altogether eight certain and two possible dwelling depressions known at the site; however, part of the site has been destroyed by a sandpit and thus originally there might have been even more depressions at the site.

Excavations showed that the site had been used in various periods during the prehistory. The earliest occupation dates back to the Mesolithic Stone Age, which is attested by the find material and one radiocarbon date. The studied dwelling depression might date to the Early Combed Ware period but also Late Neolithic dating is possible based on finds and radiocarbon dates. Other parts of the site have also been inhabited during the Typical Combed Ware period. The nature of the site points to a relative residential sedentarity in all settlement phases and the site has been possibly used year-round.

11.1 Introduction

Researchers of the Department of Archaeology, University of Helsinki and the Institute for the History of Material Culture, Russian Academy of Sciences, St. Petersburg as well as Peter the Great Museum of Anthropology and Ethnography (Kunstkamera), St. Petersburg excavated the Juoksemajärvi Westend (Ru. Bol'shoe Zavetnoe 4) Stone Age dwelling site at Lake Juoksemajärvi (Ru. ozero Bol'shoe Zavetnoe) in Räisälä (Ru. Mel'nikovo) municipality for three weeks in June 2002. The excavation was one of the first full-scale archaeological excavations conducted by Finnish researchers in the Karelian Isthmus after World War II in the sense that for the first time since the large scale excavations of the 1910's–30's a full prehistoric context, in this case a whole dwelling depression, was studied in total (cf. Takala *et al.* 2006). At the same time it served as the field school for the Department of Archaeology, University of Helsinki. The excavation was jointly led by Petri Halinen and Vladimir I. Timofeev¹. The excavations were mainly funded by a grant from the Finnish Cultural Foundation, but a part of the sampling was covered by a grant of Russian Foundation for Fundamental Research (RFFI No 02-06-80469). (Halinen 2003; Timofeev 2002; Timofeev *et al.* 2003.)

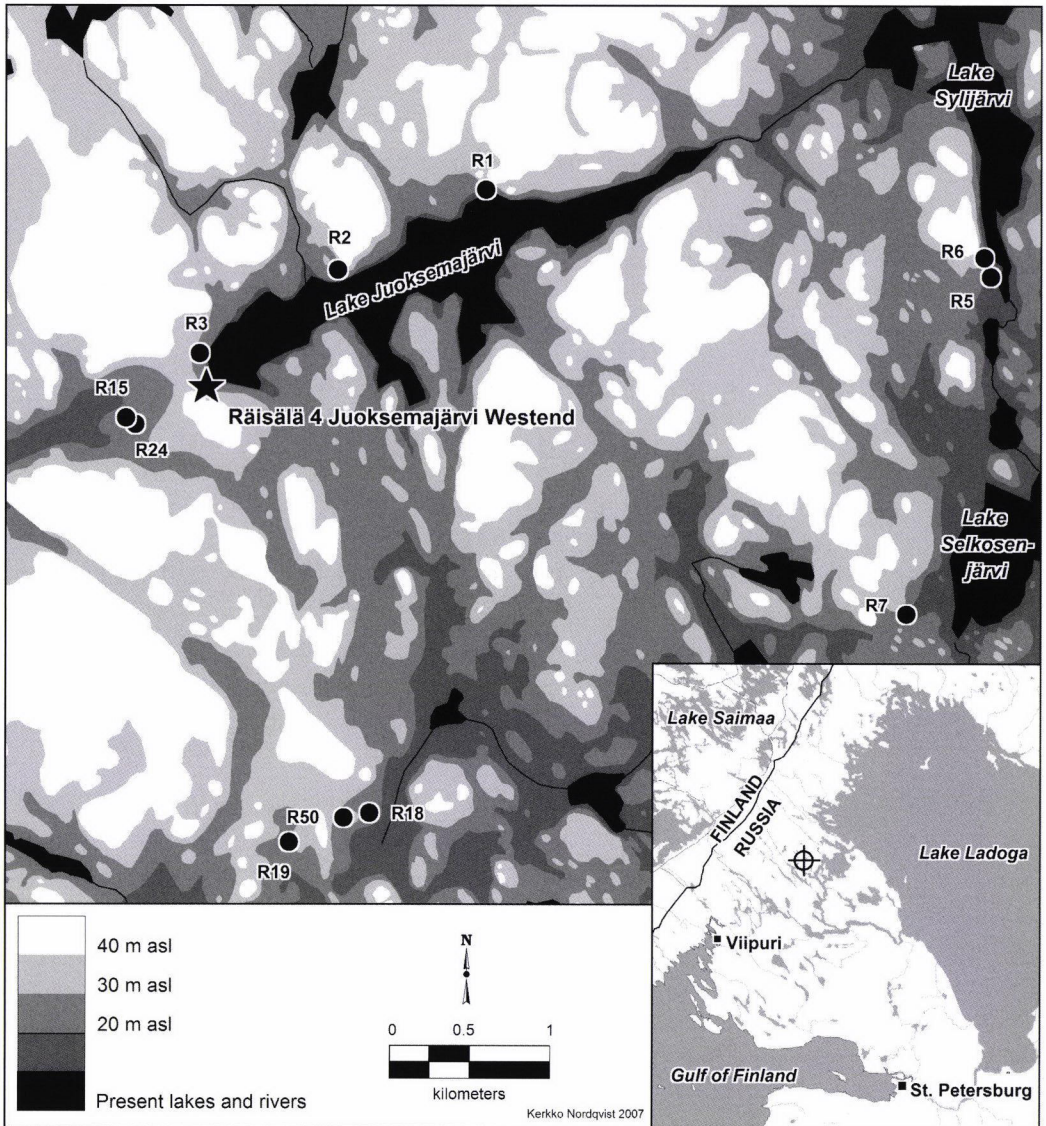


Figure 11.1 Location of the site Räsälä 4 Hytinlahti Juoksemajärvi Westend in the Karelian Isthmus and the topography and lakes of the surrounding areas. The 20 m asl level (dark grey) equals roughly the situation during most of the Stone Age and the initial Early Metal Period (ca. 10 000–3350 years ago). The numbering of the adjacent Stone Age sites refers to Appendix 1. (Map: K. Nordqvist)

Räsälä 4 Hytinlahti Juoksemajärvi Westend site was found during the seminar survey of the Department of Archaeology, University of Helsinki in 1999 (Halinen *et al.* 1999; Lavento *et al.* 2001; Gerasimov 2004; see also Nordqvist & Lavento 2008, this volume). The site lies in the south-west end of Lake Juoksemajärvi,

about 9 km north-west of the Räsälä municipal church. In the survey one whole dwelling depression and another, half-destroyed by a sand pit, were observed and tiny sherds of ceramics and a number of quartz artefacts were collected from the sand pit. (Figs. 11.1 and 11.2)

In the 2002 excavation the depression ob-

served in the survey was fully excavated, a section was cut to the half-destroyed depression and three smaller test areas were opened (Figs. 11.2 and 11.3). The excavated depression turned out to be a Neolithic semi-subterranean dwelling remains, which had been excavated through an earlier Mesolithic cultural layer. Also two new dwelling depressions were observed at the site.

The first finds from the Juoksemajärvi area were collected by Sakari Pälsi already in 1911 when he was excavating in the neighbouring Kaukola municipality. Pälsi found some sherds of Typical Combed Ware and possibly also Pitted Ware, as well as quartz and flint flakes (NM 6938) at the south-west end of the lake (Pälsi 1911; see also Nordqvist 2005). The exact find spot is shown in Pälsi's general map: it is at the crossroads and on the beach below, about 100 m north-west from the 2002 excavation area. The find material collected by him differs notably from the finds of the 2002 excavation.

During the re-mapping of the site in the summer of 2005 some new observations were made and also a new, probably Mesolithic, dwelling site was located nearby (Seitsonen *et al.* 2005). There are now altogether eight certain and two possible dwelling depressions known at the site (Fig. 11.2). Recent observations together with Pälsi's finds suggest that the site was used in the Mesolithic as well as throughout the Neolithic Period, possibly even later. It seems that the whole sandy western end of Lake Juoksemajärvi, which was separated into two sites – Juoksemajärvi Westend and West – in the 1999 survey, had actually been one large, over 300 meters long, continuous dwelling site zone. From now on it is suggested that it will be dealt as one entity called Juoksemajärvi Westend.

In this article the find material and its preliminary analyses are presented. The contexts of the finds are evaluated and composition and diversity analysed. The general interpretation of

the results and the discussion of the subsistence and the occupation season was done and written by Petri Halinen. The analyses of the find material were made by the authors: the ceramics were analyzed by Kerkko Nordqvist, the lithic analyses were made by Petri Halinen and Oula Seitsonen and the osteological analysis by Sanna Seitsonen. A sample of the lithic artefacts was earlier published by G. N. Poplevko (2003) and the finds and some of the datings preliminarily discussed by Timofeev *et al.* (2004). Part of the data presented in this article has been published in Finnish (Seitsonen 2005) but is included here to make it fully available for our foreign colleagues also.

11.2 Environmental setting of the site

During the Stone Age Lake Juoksemajärvi was connected to Lake Ladoga (Fi. Laatokka, Ru. Ladožskoe ozero) as a long south-west winding bay. The area consists of former delta sediments which lie between rocky ridges. The valley in which the site is situated ends at the south-west end of Lake Juoksemajärvi and an esker rises to the south-west of it. During the Stone Age there was another bay behind this esker which opened to the opposite direction. Several Stone Age find locations are also known from this bay. (Fig. 11.1)

In the middle of the sandy area where the site is situated is nowadays a large sand pit. Close to the south-western shore of the lake are two beach terraces that are cut by this sand pit. The dwelling depressions (numbers 1–4 in Fig. 11.2) lie on the upper terrace at c. 24–25 m asl. The lower terrace lies at c. 22 m asl. The bases of the terrace banks are at c. 22.5 m asl and 20 m asl.

The dwelling site was first habitable at the end of the Yoldia Sea Period (see Saarnisto 2003: 57). After this it was submerged by the

Figure 11.3 Excavation area seen from the northern side of the sand pit. The main excavation area is located in the middle of the photo behind people, cleaning made to the depression 3 on the edge of the sand pit in front and test pit 3 to the left of it, in front of the screening station. (Photo: K. Nordqvist 2002)



Ancylus transgression that rose over 25 m asl at the area. The Ancylus regression revealed the site again around 9000 years ago. The water level stabilised at about 20–21 m asl for thousands of years until the outbreak of the River Vuoksi (Ru. reka Vuoksa). This caused the water level to rise by a meter or two, but based on the observations made at the excavation this transgression did not affect even the lower terrace. There were no signs of the cultural layer on the lower terrace having been submerged, judging by the intact nature of the cultural remains. The outbreak of the River Neva (Ru. reka Neva) caused the Lake Juoksemajärvi level to retreat over time to its current level (c. 17.2 m asl). (Saarnisto 2003; 2008, this volume; Saarnisto & Grönlund 1996.)

The vegetation of the region today is pine forest, the undergrowth of which consists of crowberry, lingonberry and bilberry. According to the pollen samples from nearby areas, during the Mesolithic the forest consisted of birch and pine. During the Neolithic the vegetation was more diverse. (Simola 2003: 99–101.)

11.3 Excavations in 2002

The fieldwork in 2002 was started by moving the nearest fixed point to the excavation area. An old triangulation point from the year 1924 was found on top of a hill about 2 km southwest of the Juoksemajärvi Westend site. The elevation was moved from the hilltop through the forests to the end of Lake Juoksemajärvi. When the elevation of Lake Juoksemajärvi was connected to the moved fixed point it was at 17.21 m asl (on the map 17.2 m asl).

The excavation consisted of two excavation areas and three test pits. Test pit 3 was extended to about 2 m² excavation area. In the main excavation area 1 (depression 2) the finds were documented using the total station (Figs. 11.7, 11.13 and 11.14). In theory all the finds got their own x, y and z coordinates with the total station but in reality artefacts belonging to the same find category within an area of 10 x 10 cm were documented under the same coordinates. The excavation was conducted following the stratigraphic layers divided into 5–10 cm technical spits. Individual finds were documented within the spits always at the elevation at which they were observed. Screen finds were collected as 50 x 50 cm units using 4 mm wire meshes.

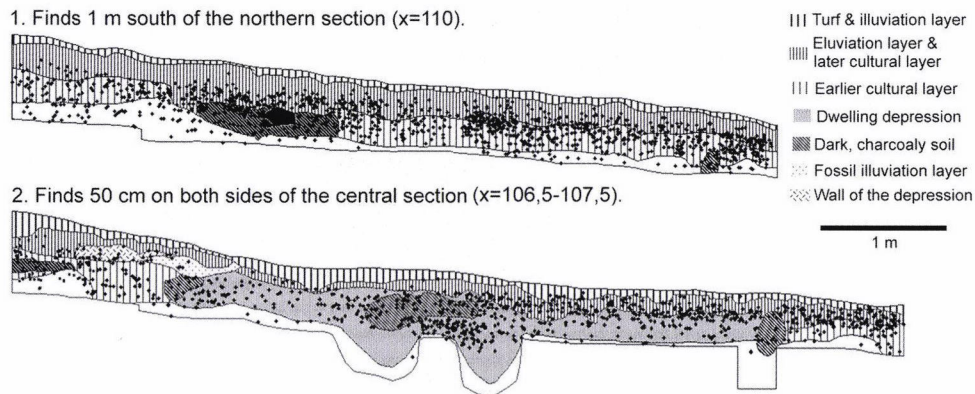


Figure 11.4 Two simplified W-E sections across the excavation area 1 showing the vertical distribution of finds. (Illustration: O. Seitsonen)

11.3.1 Excavation area 1 (depression 2)

Excavation area 1 was the main excavation area covering fully the dwelling depression number 2 (Figs. 11.2 and 11.3). This was observable at the surface as about a 5.5 x 4 m and 20–30 cm deep depression at the c. 24–25 m asl terrace. There was slight disturbance in the northern corner of the depression, which proved to derive from a recent fireplace and vehicle tracks.

In the excavation depression 2 proved to be a nearly rectangular semi-subterranean dwelling remain that had been dug through an earlier cultural layer. The inside of the dwelling pit was filled with a c. 22–30 cm thick reddish brown cultural layer. The fossil illuviation layer had survived under a wall piled up on the upslope side of the dwelling. (Fig. 11.4)

The earlier occupation was presented by a homogenous, c. 20–28 cm thick dark greyish black cultural layer, above which the later pale yellowish cultural layer had accumulated. Especially the lower part of the earlier cultural layer was at places very rich in charcoal (Fig. 11.4). This is comparable with the dark charcoal-rich Mesolithic–Early Neolithic cultural layers at e.g. the sites of Kaukola Rupunkangas

1 (Mökkönen 2005; Mökkönen *et al.* 2008), Pyhäjärvi Kunnianniemi (Seitsonen *et al. in prep.*; Gerasimov *et al.* 2007), Heinjoki Lyykylä Ozernoe 3 (Nikitin & Gerasimov 2006), and Muolaa Telkkälä Silino (Takala & Sirviö 2003; Takala 2004a) in the Karelian Isthmus.

There were altogether five prehistoric stoned hearths (Fig. 11.6: 001–005) and a number of pit features found in the excavation area. One of the hearths (001) belonged to the earlier occupation phase, three to the time of the dwelling depression (002–005). One stoned hearth was unearthed right below the turf (006, not shown in the Fig. 11.6) and connected to the 20th century disturbance observed in the northern corner of the depression – a one rouble coin from the year 1968 was found in the hearth. There was also an area of burnt and charcoal-rich sand without rocks in the western corner of the dwelling depression. Finds and observations from excavation area 1 are described in more detail below.

11.3.2 Excavation area 2 (depression 3)

The remaining part of the half-destroyed depression 3 was visible as a depression 4.5 x 3 m in size at the edge of the sand pit. It was situated

on the same terrace as depression 2, c. 7.5 m to the north-west. Depression 3 was examined by straightening a section in the side of the sand pit, which cut the northern part of the depression.

In the western part of the section was observed a dark cultural layer, the thickness of which was 58 cm. The pit seemed to have been at most c. 74 cm deep. The eastern part of the section consisted of c. 40 cm thick loose sandy soil. The depression had been dug through this loose sand layer. In the cultural layer there were some fire-cracked stones but they did not form a concentration. The function of the pit remained uncertain: it can be interpreted as either a storage pit or a dwelling depression. To gain clear evidence of its function further excavations are needed.

There were altogether 58 potsherds of Combed Ware, one of which was a rim piece. Also two clay idol fragments were found. Otherwise the finds were similar to those in depression 2: quartz, flint and stone flakes and relatively lot of burnt bone.

11.3.3 Test pits 1 and 2

Test pit 1 was a 1 x 1 m area excavated on the other (northern) side of the sand pit a little higher up the slope than the main excavation area, at c. 25.2 m asl. The test pit was excavated to a depth of c. 40 cm. A reddish brown cultural layer and some fire-cracked stones could be observed at a depth of c. 10–40 cm below the surface. Fire-cracked stones were concentrated in the southern part of the test pit. The stones possibly formed the remains of a fireplace. The finds consisted of burnt bones, quartz and stone flakes.

Test pit 2 was also a 1 x 1 m area excavated on the northern side of the sand pit. It was farther down the slope than test pit 1, at c. 24.3 m asl. The area was excavated to test the possible

dwelling depression 4. It was situated on the slight wall surrounding the depression on the downslope side.

It is possible that the cultural layer observed in the test pit had formed the wall of the depression. No definitive structures could be observed. The finds from test pit 2 were two fragments of pottery, one flint flake, some quartz and stone flakes and burnt bone. Potsherds were too small to be firmly determined but might belong to Early and Typical Combed Ware.

11.3.4 Test pit 3

Test pit 3 was began as a 1 x 1 m test pit and extended to c. 2 m² area. It was opened on the lower terrace below depression 2, where Sergej N. Astahov noticed some ceramic pieces on the edge of the sand pit. Two separate phases of occupation were observable also in this area dating to the Mesolithic and the Neolithic Periods. The upper of these occupation horizons was dated by an Early Combed Ware pot broken *in situ* (Fig. 11.5a). There was a finely made tanged flint arrow point (Fig. 11.10d) close to the contact zone of the lower occupation horizon. It seems to be connected to the Mesolithic occupation of the site. (Timofeev 2002; D. V. Gerasimov & S. N. Lisicyn 12.9.2002 pers. comm.; Timofeev *et al.* 2003.)

11.4 Occupation sequence at excavation area 1 (depression 2)

During the earliest occupation phase there were no clear signs of dwelling structures. Some charred and possibly shaped wood remains might have been connected to some kind of light structures. There was one stoned hearth (001) and some pit features connected to this horizon. The finds connected to the earlier occupation phase were three perforated stones (possibly net

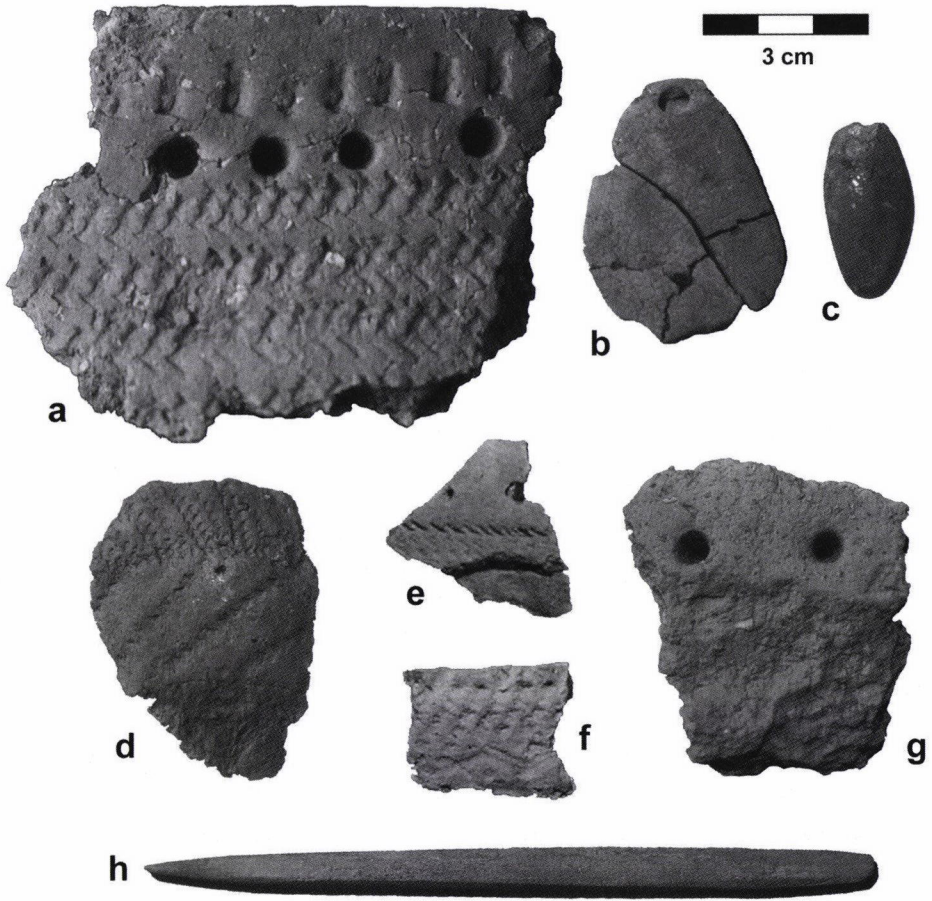


Figure 11.5 Finds from the excavations: a) Early Combed Ware from test pit 3; b–c) amber pendants from dwelling depression 2 (1826/6125, 4932); d–f) ceramics from dwelling depression 2 (8296, 2893, 2260); g) ceramics from dwelling depression 3 (8953); h) fragment of a ground point from dwelling depression 2 (4989). (Photos: K. Nordqvist)

sinkers), a 'tooth-shaped' amber pendant (Fig. 11.5c), flint, quartz, quartzite and stone flakes, ground stone tools, burnt bone and two burnt bone artefact fragments. One of the bone artefact fragments resembles an end fragment of a Šigir-type/cone-shaped bone point known from nearby areas and dated mainly to the Mesolithic Period (e.g. Brjusov 1952: 116, 171–172; Gurina 1956; Jacobs 1995: 372; Ošibkina 2006). Similar implements have been found nearby in the Karelian Isthmus e.g. in Finland at the Joutseno Kuurmanpohja-Saarenoja 2 site (Jussila 2001). However, since both the Juoksemajärvi

and Kuurmanpohja-Saarenoja 2 finds are only small tip fragments, they might also derive from other bone point types which have been used also in the later periods.

The earliest occupation phase is connected to the Mesolithic Period. This is attested both by the find material and one obtained ^{14}C -date (7750 ± 180 BP, Le-6566, 7000–6400 calBC). However, this dating might not indicate the earliest use of the dwelling site as hinted by some artefactual evidence, mostly the flint microblades which are more often found in earlier contexts (e.g. Kankaanpää & Rankama 2006;

Sample no.	Context no.	x	y	z	Material & connected feature(s)	Laboratory no.	BP	calBC (1 σ probability)
1	3	104,053	202,102	24,706	charcoal, from the cultural layer outside the dwelling	Le-6642	3450 \pm 100	1890–1630
17	7	104,237	202,53	24,397	charcoal, from the cultural layer outside the dwelling	Le-6552	3700 \pm 320	2600–1650
21	7	107,646	202,216	24,315	charcoal, from the cultural layer outside the dwelling	Le-6601	3740 \pm 90	2290–2020
24	7	103,931	203,624	24,298	charcoal, from the cultural layer outside the dwelling	Le-6641	4550 \pm 180	3520–3020
25	7	109,709	208,709	23,821	charcoal, from the cultural layer outside the dwelling	Le-6566	7750 \pm 180	7000–6400
29	5	108,666	203,516	24,094	charcoal, from the cultural layer inside the dwelling	Le-6643	2620 \pm 70	900–750
31	5	106,288	205,539	23,974	charcoal, from a charcoal concentration inside the dwelling	Le-6602	3660 \pm 30	2050–1970
34	5	108,389	203,622	23,972	charcoal, from a charcoal concentration inside the dwelling	Le-6600	3370 \pm 30	1700–1620
40	7	104,498	202,096	24,316	charcoal, from the cultural layer outside the dwelling	Le-6512	4150 \pm 59	2820–2660
43	7	110,912	203,729	23,963	charcoal, from the cultural layer outside the dwelling	Le-6558	recent	–
–	3	–	–	–	charcoal, from the cultural layer outside the dwelling	Le-6640	1400 \pm 50	600–665 calAD

Table 11.1. Radiocarbon datings from the Juoksemajärvi Westend site [calibrated using the OxCal v. 3.10 (Bronk Ramsey 2005)].

Takala 2004b). Then again, microblade use is also known from later Mesolithic and even from Early Neolithic contexts (e.g. Asplund 1997; Gurina 1956; Jacobs 1995; Jussila *et al.* 2006; O’Shea & Zvelebil 1984; Ošibkina 2006; Price & Jacobs 1990). There is also a possibility that the earliest Mesolithic occupation at the site might have been inundated by the Ancylus transgression (see Saarnisto 2003: 57).

After the earlier occupation phase the site was abandoned for some time or the main occupation area shifted within the site. This is attested by the fossil illuviation layer that has survived under the wall of the dwelling depression. At least the western side of the dwelling area was covered with turf at the time the depression was dug. Structures connected to this horizon were

four stoned hearths (002–005), two of which were inside the dwelling depression (003–004), few scattered charred wood remains possibly connected to the structure of the dwelling and some pit features. One of the stoned hearths (005) outside the dwelling was a pit hearth, with a diameter of c. 1 m (Fig. 11.6).

Finds belonging to the later occupation phase were two perforated stones, a ‘tongue-shaped’ amber pendant (Fig. 11.5b), flint, quartz, quartzite and stone flakes, ceramics (Fig. 11.5d–f), ground stone tools (Fig. 11.5h), red ochre, burnt clay, burnt bone and one burnt bone artefact fragment. The majority of the flint artefacts belonged to this occupation phase. Ceramic fragments are in general without decoration. Some of them can be identified to the

Early Combed Ware period and some probably to the Late Neolithic (Fig. 11.5a, d–f).

The available radiocarbon dates are of charcoal taken from the cultural layer and from various features (Table 11.1). Generally the obtained dates were younger than the Stone Age. At the moment most of the Stone Age ¹⁴C-datings point to the Late Neolithic Period. This period is also attested by some ground stone point fragments resembling the Pyheensilta type (Fig. 11.5h). However, no ceramics dating unquestionably to the Late Neolithic were found although some of the ceramic sherds found within dwelling depression 2 bear some weak similarities to Late Neolithic pottery (C. Carpelan 16.1.2007 pers. comm.) (Fig. 11.5d).

Combed Ware potsherds from depression 3, which lies some meters north on the same terrace, suggest that it might be of a slightly different age than dwelling depression 2. Anyway, the broken Combed Ware 1 pot in test pit 3 shows that the area was used also during the Early Neolithic Period. However, the occupational sequence of the site still needs to be dated more accurately, for instance by using the burnt bone fragments for acquiring AMS datings.

The macrofossil analysis made by Tanja Tenhunen (M.A.) did not bring any noticeable information about the site utilisation. They tell about the vegetation around the dwelling or after the dwelling had been abandoned. Seeds of crowberry (*Empetrum nigrum*), bearberry (*Arctostaphylos uva-ursi*), and Yellow water-lily/White water-lily (*Nuphar/Nymphaea*) and pine cone fragments were identified.

11.5 The semi-subterranean dwelling depression 2 (excavation area 1)

The shape of the semi-subterranean dwelling remain was roughly rectangular with rounded corners (Fig. 11.6). Its size was about 5.8 x

4.0 m (c. 23.2 m²). It had been dug through the Mesolithic cultural layer and part of the excavated soil had been piled up as a wall outside the dwelling pit on the upslope side. Based on the present find material the dating of the dwelling remains open. Some of the finds point to the Early Combed Ware Period, but most of the ¹⁴C-datings and part of the find material point to the Late Neolithic Period.

The floor of the dwelling was almost flat, sloping slightly to the east. The floor was approximately at 24 m asl. One stoned fireplace (004) was located in the northern half of the dwelling. In the middle of the dwelling, south-east from this fireplace was a pit filled with dark sand mixed with lot of charcoal and soot. There was another possible fireplace (003) in the southern part of the dwelling: an area with charcoal-rich sand and a lot of burnt bone fragments and some scattered fire-cracked stones. Another interpretation for these features might be that there had been only one fireplace close to the middle of the dwelling and the fire-cracked stones and burnt sand in the southern part of the dwelling derive from this same fireplace.

Within the southern area of charcoal-rich sand and fire-cracked stones was found a burnt polishing slab lying face down on the floor (see Fig. 11.7). This is an interesting note, because similar specimens have been found lying upside down in fireplaces in the Riukjärvi area (Ru. ozero Uzlovoe) in Kaukola municipality (Ru. Sevast'janovo) at the Kankaanmäki, Kyöstälänharju and Nököpelto sites (Pälsi 1915: 16, 44; see also Appendix 1). Pälsi reports also several other burnt sandstone polishing stone and slab fragments found in the Riukjärvi area (Pälsi 1915: 44). It seems that the heat treatment of polishing slabs and stones was a relatively common practise in the area. The explanation for this is unknown but it could have something to do with the functionality of the slabs and stones for pol-

ishing, they might simply have been reused in the hearth, or there may have been some other, currently unknown reasons for this behaviour.

Two pieces of burnt clay (7449, 8388) with branch depressions found inside the dwelling hint of the structure of the dwelling. Possibly also the red ochre occurrences which were all located within the area of the dwelling depression are connected to the structure of the dwelling: there is ethnographic evidence of tanning hides and waterproofing their seams with red ochre (B. Fitzhugh 10.7.2003 pers. comm.). Red ochre has been also used for other purposes, for example in graves (e.g. Halinen 1999; Katiskoski 2004). Often the rectangular semi-subterranean huts are proposed to have been covered with birch bark and turf: birch bark formed the waterproofing and turf formed the insulating layer on top of that (Halinen *et al.* 2002; Katiskoski 2002; Leskinen 2002).

In the southern side of the dwelling was observed a find concentration and a patch of discoloured soil which extended outside the depression in its eastern corner (Figs. 11.6 and 11.7). Also the distribution of the fire-cracked stones shows this same feature. It might be interpreted as a doorway which are often visible in the excavations by the distribution of finds, discoloured soil and fire-cracked stones (e.g. Karjalainen 1996; Pesonen 1996; 2006). Quite often the doorways were also situated on the shorter side/s of the hut (e.g. Pesonen 2002; 2006).

The phosphate analysis made by Marina A. Kul'kova (M.A.) shows that the phosphate values inside the dwelling remains are relatively low (range 5–200, mean 53, median 50 P mg/kg). Also the values from the rest of the site are low. It could be noted that inside the dwelling the highest values were concentrated in the corners and near the walls of the dwelling.



Figure 11.6 The main features of the excavation area 1. (Illustration: O. Seitsonen)

11.6 Find material

Altogether there were 9 061 find numbers documented with the total station during the three weeks of excavation. The number of individual finds under every find number varied between 1 and 175. In some excavation days over 1 000 finds were measured with the total station, which meant over 12 hours of constant documentation.

During the course of the excavation it was in places difficult to define the exact border of the dwelling depression owing to the collapse of the walls. Thus the finds from the border zone between the inside and the outside of the dwelling were collected separately. In the analyses the find distribution was refined following the borders of the depression documented in the plans and after



Figure 11.7 All finds documented using the total station in the excavation area 1 and the borders of the dwelling depression. (Illustration: O. Seitsonen)

that the finds were separated into those derived from the inside and the outside of the dwelling. As for the bones only the most certain ones belonging to either the Mesolithic or the Neolithic phases were taken into account when making a comparison between the occupation phases.

The most common find category was burnt bone fragments. At places there was so much bone that during the course of the excavation it was decided to pack the soil from these places as 10 x 10 cm units into find bags so as to retrieve even the smallest fragments. These were later screened with a fine wire mesh – however, some of them as well as some of the phosphate samples were lost in the warehouse in St. Petersburg. Altogether over 30 000 burnt bone fragments were collected. Also three bone artefact fragments were found.

The second most common find material was quartz artefacts: 4 305 find numbers and 8 101 pieces. All the other find categories were found

only in small numbers. There were 50 flint and 119 quartzite artefacts. Also 289 ground stone tools, their preforms and stone flakes were collected. Five perforated stones (possibly net sinkers or mace heads) perforated from two sides were found. Ceramics were particularly scarce: there were only 59 small fragments, nine of which were rim pieces.

There were no clear observable differences in the overall distribution of the finds in area 1 (Fig. 11.7). In the vertical distribution of the finds there are notable concentrations that follow the visually observed vertical stratigraphic layers (Fig. 11.4).

As the finds at the Juoksemajärvi Westend excavations were documented following the stratigraphic contexts, it is easy to make comparisons between the finds retrieved from the Mesolithic and the Neolithic contexts. Analyses of the site formation processes at the site have shown that at least the Mesolithic find assemblage can be separated with a fair degree of certainty. Based on the finds from the various parts of the site the whole site was in use over most of the Neolithic Period.

11.6.1 Ceramics

The ceramic material recovered in the 2002 studies is small. These ceramics derive mainly from depression 2 (main excavation), depression 3 (cleaning) and test pit 3. In addition, two sherds of Combed Ware were found in test pit 2 as well as one sherd of possibly Early Combed Ware from a near-by beach.

11.6.1.1 Ceramics from depression 2

From the main excavation area (depression 2) 59 sherds were recovered. Altogether these sherds weigh only c. 50 g implying the small size of the material; the average size of the sherds ranges between 1 x 2 cm and 3 x 3 cm, the largest one being 5 x 5 cm. Apart from their small size, the

fragmentary nature of the ceramics diminishes their usability. Of the sherds 78 % are missing one or both surfaces.

Consequently, determining the ceramic types is tricky. The sherds are mostly tempered with sand, at times also including a small amount of some organic temper, often dense and well fired. Diagnostic pieces are few because only 13 pieces (22 %) are decorated. Usually the decoration includes parts of comb stamps (9 pc.) and vertebra or other vague, undeterminable impressions (4 pc.). Pits or a drawn line each are encountered only in one sherd. There are nine rim sherds in the material but only two of these are decorated.

Using the rims three vessels can be separated. The first (2260) belongs to Early Combed Ware (Fig. 11.5f). It is decorated with a row of comb stamps under which there is a drawn zig-zag line. The rim is straight and the top is decorated with the same wide comb stamp as the brim. The sherd is sand tempered and its thickness at the rim is 7.7 cm. The second decorated rim (2893) can not be straightforwardly classified into any ceramic type (Fig. 11.5e). It is decorated with a row of small round pits and a row of apparently fish vertebra stamps that reminds decoration encountered in Early Combed Ware. The shape of the rim is, however, divergent from the others: it is narrowing upwards and round on the top. The top is undecorated. The sherd is tempered with coarse sand and is dense and well fired. The rest of the rim sherds are straight and undecorated with sand temper.

The decoration of body sherds – or actually the lack of it – prevents almost any classification of these sherds. Only one sherd (8296) allows further consideration. It is decorated with a row of slanting wide comb stamps under which there is another slanting row of unclear stamps. Together these form a kind of fishbone pattern. Under this there are vertebral impressions. (Fig.

11.5d) The sherd is tempered with coarse sand. It might be included in Early Combed Ware which would fit part of the other ceramic material found at the site. However, considering the many Late Neolithic radiocarbon datings obtained one could see some similarities in the arrangement and general impression of the decoration between this sherd (and also the relatively similar sherd 9025 found on closer to shore below the excavation area) and the Late Neolithic Volosovo ceramics (C. Carpelan 16.1.2007 pers. comm.). However, Volosovo ceramics are typically tempered with organic temper and here the temper is coarse sand – therefore this question remains open and only a hypothetical guess.

The majority of the ceramics were found within the contexts of the Neolithic cultural layer and the fill of the dwelling but interestingly c. 1/5 of the pottery was found from the context otherwise labelled as Mesolithic. This probably shows the effects of post-depositional processes and e.g. trampling during later occupation phases. Inside the house the ceramics, like the other finds also, clearly cluster in the middle of the house, near the fireplaces and the sooty area (Figs. 11.6 and 11.7). The areas near the walls are devoid of pottery. A large part of the ceramics was found on the way to the door and in the cultural soil outside the door. Two small sherds were found in the fireplace to the south-east of the door. Elsewhere outside the dwelling the ceramics were found along the walls and in the yard. There are some finds on the eastern side of the house but many also on the northern and north-western sides of it. Only on the south-eastern side of the dwelling there are no ceramics at all.

If the distribution of ceramics is observed according to weight (g), the largest concentrations are found in the centre of the dwelling and near its door (the largest singular sherds were found here). According to the number of pieces the largest concentration is on the northern side



Figure 11.8 D. V. Gerasimov and V. I. Timofeev starting the work at test pit 3. Picture taken from south-west. (Photo: P. Kouki 2002)

of the house (small morsels), but pottery is also present near the door and just outside of it. The ceramics found outside the house consist mainly of morsels and weathered small pieces. All the larger and diagnostic sherds were found inside the house, from the fill: e.g. sherds 2260, 2893 and 8296 were all in the vicinity of the central fireplace, in or near the sooty area.

11.6.1.2 Ceramics from depression 3

The ceramics found in the cleaning made in depression 3 are more abundant when compared to the amount of opened area. This material includes 58 sherds (112.6 g) but also this pottery is hard to define due to its fragmentary nature. In general the ceramics from depression 3 differ from the sherds found in depression 2. In depression 3 the sherds seem to derive mainly from one vessel, are quite thick (8.6–11.8 mm), greyish brown in colour with coarse sand and crushed stone as temper. Decoration is scarce including only a row of large round pits (5 pieces) and light comb stamp impressions (2 pieces) (Fig. 11.5g). Only one sherd differs from the rest (8948). It is a tiny rim sherd with only an outer surface and coarse sand temper. It is decorated with a row of ring impressions (bone or vertebra) on top of the rim and similar impressions pressed slantwise below the rim. Due to its small size it can not be

classified more closely.

The coarse nature of the sherds would allow classification into the Early Combed Ware. Sherds might also represent the Typical Combed Ware that has been found on the northern side of the sand pit, in test pit 2 in 2002, in Pälsi's 1911 test pits and as stray finds in the early 20th century (Nordqvist 2005) as well as in later studies in 2005 (Seitsonen *et al.* 2005).

11.6.1.3 Ceramics from test pit 3

The only easily defined and clear group of pottery derives from test pit 3 on the lower terrace. Here an Early Combed Ware vessel was found broken *in situ*. The finds include over 50 sherds, many of these quite large in size (max. 10 x 8 cm) (Fig. 11.5a). The vessel had been large and tempered with coarse sand and crushed stone. The thickness of the wall varies between 10.5–12.7 cm. The rim of the vessel is straight and the top is undecorated. Below the rim there is a row of impressions of the shape of I or two I's on top of each other, pressed with bone or vertebra. Below this row there is a line of large round pits. Under the pit row the brim is decorated with zones of 3–4 serried rows of slanting double-I impressions (see Fig. 11.5a). Between these zones there is a much less dense and more upright row of the same impressions.

11.6.1.4 Overview of ceramics

The ceramics from Juoksemajärvi give a possible dating for depression 2 to the Early Neolithic, the Early Combed Ware. The broken pot on the lower terrace points also to activities during the Early Neolithic. The ceramics from depression 3 might date to the same period but can also be Typical Combed Ware. In any case, the ceramics from depression 3 are different from the ceramics found in depression 2 and therefore, if not telling about temporal differences, possibly suggest differences in function and use of the structures. No sherds belonging indisputably to the Late Neolithic Period were found. It should be noted that the ceramics from the excavations in general differ from the ceramics recovered further north along the Lake Juoksemajärvi shore.

The small amount of ceramic morsels found inside the house indicates that pottery was not much used inside the dwelling. The finds concentrate between the central fireplace and the door and just outside the door. No finds were made inside the dwelling along the walls but outside ceramics were found along the walls and in the yard. This shows that ceramics were probably used in (or the broken pots were moved to) some other, so far unexcavated part of the yard.

11.6.2 Lithic finds

At the moment we have only preliminary results of the lithic analyses from the Räsälä Juoksemajärvi Westend site (Seitsonen 2005). The vast, nearly 8 500 artefacts including lithic assemblage from the site has only been subject to introductory analyses so far, and only a limited random sample has been subject to more thorough technologically oriented analyses². Without doubt the picture of the lithic technology will be clarified in future studies.

11.6.2.1 Raw material use

Raw material use in different occupation horizons is presented in Table 11.2. During both phases quartz was the main raw material, though also flint and quartzite were utilised. Almost two thirds of the flint artefacts are connected to the Neolithic horizon, whereas quartzite was used in approximately similar amounts in both horizons. However, 75 % of fine-grained, pale grey stripy quartzite was connected to the Neolithic horizon. It is notable that the assemblage which Sakari Pälsi excavated from the nearby Räsälä Pitkäjärvi dwelling site includes some artefacts of highly similar raw material (e.g. NM 6939: 121). The source of this quartzite is not known at the moment but its existence at two close lying sites might suggest it to be a locally available raw material and to be connected to the movements of the raw material and people. Flint seems to have been fairly rare in both occupation horizons. There are altogether only four flint artefacts with the remains of cortex and in none of these artefacts the cortex covers over half of the dorsal side. This suggests that flint was acquired to the site as significantly worked up blanks and the primary reduction took place somewhere else.

	Mesolithic	Neolithic	Σ
Quartz	3 538	4 563	8 101
	98 %	98 %	98 %
Flint	16	34	50
	0.4 %	1 %	1 %
Quartzite	62	57	119
	2 %	1 %	1 %
Σ	3 616	4 654	8 270
	44 %	56 %	100 %

Table 11.2 Lithic raw materials in the different occupation horizons.

11.6.2.2 Tool types

In general the diversity of various formal tool types follows each other closely in both hori-

zons. There are no big differences in the percentage share of the tools – only two burins were found and they belong to the Mesolithic phase. The identified formal tool types were scrapers, borers, knives, arrowheads and retouched and utilised flakes (Figs. 11.9 and 11.10). When the activities practised at a site are evaluated, it has to be remembered that the tool function can not be water tightly defined on the basis of tool morphology. (e.g. Andrefsky 1998: 189; Broadbent 1979; Halinen 2005.)

The recovered quartz and flint points might have a chronological significance. One oblique bladed quartz point was found inside the dwelling depression, close to its floor level (Fig. 11.9a) and another on the boundary of the Mesolithic and the Neolithic contexts near the wall of the depression (Fig. 11.9b) (cf. Matiskainen 1986; 1989; Schulz 1990). There is also one tanged quartz point from the Mesolithic context (Fig. 11.9c; cf. Matiskainen 1986: 88–90; Schulz 1990; 1996: 18–19).

A finely made tanged flint blade point was recovered in test pit 3 on the lower terrace connected to the Mesolithic context (Fig. 11.10d). This point was manufactured from a regular blade of even thickness. It had been retouched only from the ventral side and differs in this from almost all of the other known tanged points which usually exhibit at least some flat ventral retouch (cf. Meinander 1964; Seitsonen 2005; Takala 2004b; 2006; Takala *et al.* 2006). The tip of the point is in the proximal end and the tang in the distal end of the blade.

No exact parallels to the Juoksemajärvi tanged point are known from Finland or from the Karelian Isthmus (Takala 2004b; Takala *et al.* 2006). The Mesolithic ones that come from an unambiguous context fit usually better into the scheme of the post-Swidryan points (e.g. Meinander 1964; Takala 2004b; Takala *et al.* 2006). In the Republic of Karelia and Estonia analogous blade points and knives are clearly con-

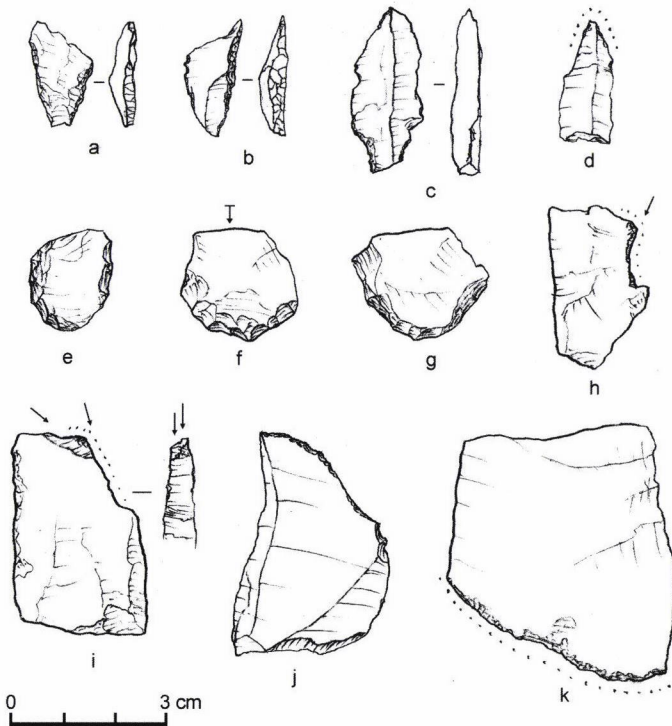


Figure 11.9 Quartz and quartzite artefacts: a–b, oblique bladed points (4421, 2441); c, tanged point (6222); d, borer (2966); e–g, scrapers (3090a, 4760, 5837a); h–i, burins (6784, 7753); j–k, knives (2017a, 1437); k is fine-grained quartzite, all others quartz. (Illustrations: O. Seitsonen)

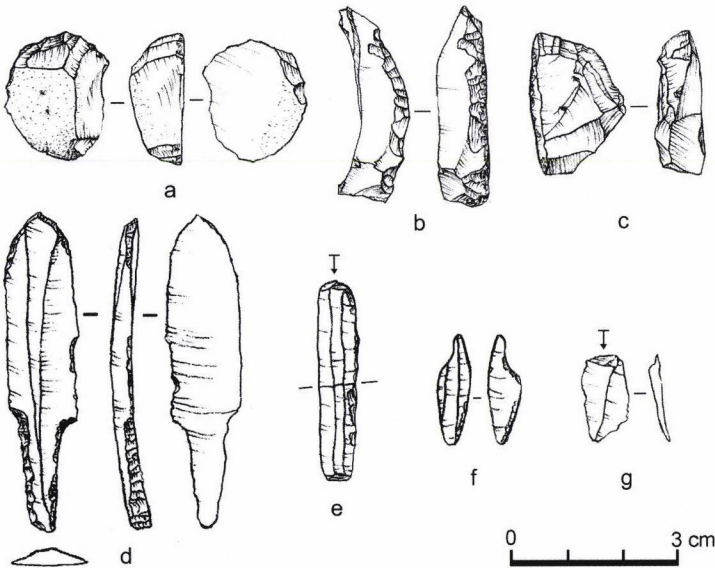


Figure 11.10 Flint artefacts: a–c, scrapers (315, 310, 8739, 5443); d, tanged flint point from test pit 3 (199); e–f, retouched microblade (8568b); g, blade-like flake (8281). (Illustrations: O. Seitsonen)

nected to the Mesolithic Period (e.g. Jaanits & Jaanits 1978; Kriiska 1997; Pankrušev 1978: 113); however some might still have been manufactured during the Early Neolithic (e.g. Jaanits 1968; Kriiska 1997; Pesonen 1991). The usefulness of the Juoksemajärvi point as an arrow point is doubtful due to its high curvature and thus it might have had some other function (Seitsonen 2005), e.g. its use as a borer has been suggested (Takala *et al.* 2006).

The thickness and length of the artefact suggest that the original blade had been relatively large, more than 5 cm long. If the point was manufactured at the site, this would give us a hint about the size of the flint cores utilised during the Mesolithic Period. The occupants might have taken the core with them while moving along or deposited it in some other part of the site. Studying this further could give us important information about their movement strategies, site use and/or social and symbolic structures (cf. Halinen 2005). However, answering these kinds of questions involves more excavations at Juoksemajärvi Westend and the nearby sites.

11.6.2.3 Reduction techniques

There are some discernible differences in the core types connected to the different horizons (Figs. 11.11 and 11.12). The majority of the so-called quartz hammer-on-anvil cores are connected to the Mesolithic Period (Fig. 11.12a–c). Also the hammer-on-anvil cores recovered from the Neolithic context might result from the mixing of the stratigraphic layers based on their spatial distribution; they all derive from the wall piled on the upslope side of the dwelling or are connected to the pit features excavated into and through the Mesolithic layer outside the dwelling depression. This core type is often connected to the blade technology (e.g. Schulz 1990: 8–9) and the scars on several anvil platform cores indicate blade production. However, it has to be remembered that the evidence given by the flake scars in the quartz can be deceptive: a single removal might cause what is apparently scars from several removals (e.g. Rankama 2002; Siiriäinen 1981). The only distinct microblade core (6186a) came also from the Mesolithic context. Conveniently over two thirds of the quartz microblades and blades (e.g.

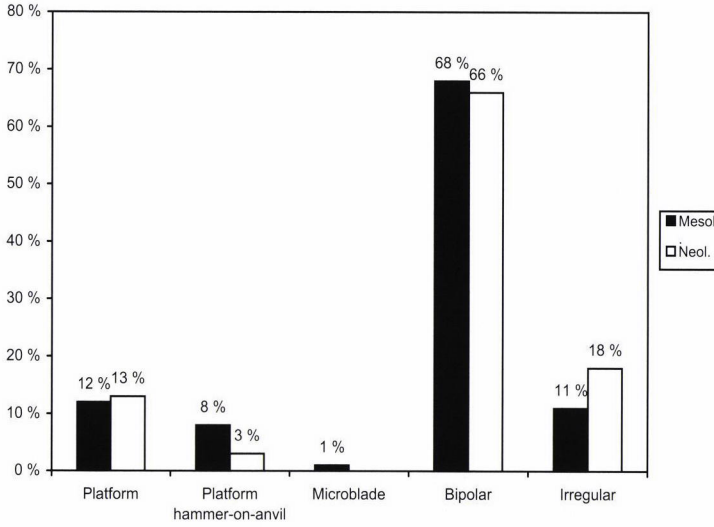


Figure 11.11 Lithic core types in different occupation horizons. (Illustration: O. Seitsonen)

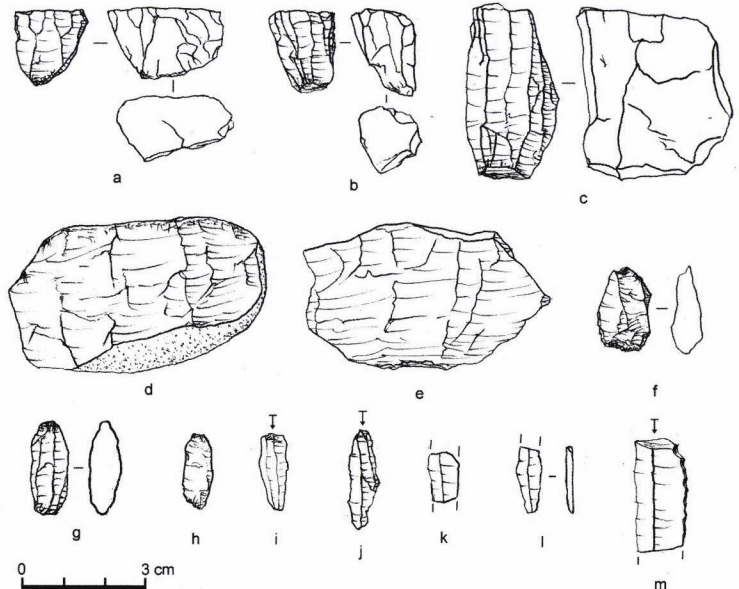
5802a–b, 5819a, 5873a, 7104) as well as all of the flint microblades and blades (3296, 3297, 8568b, 8769) were connected to this older occupation phase. A similar trend has been observed also at various other Mesolithic sites in the wider area (e.g. Luho 1956; 1967: 43; Kankaanpää

& Rankama 2006; Kriiska 1996; Kriiska & Lõugas 1999; Schulz 1990; Takala 2004b). Bipolar and free-hand platform quartz cores were utilised in relatively analogous quantities during the different occupation phases. There is at least one platform core which was knapped using the natural cortex of a quartz nodule as the striking platform (Fig. 11.12d). Bipolar cores are the majority in both occupation phases (Fig. 12.11f–g). Irregular cores knapped

from several directions are more common in the Neolithic context. Hammer-on-anvil cores are more numerous in the Mesolithic context. Also the only quartz microblade core found at the excavation belonged to this horizon.

If founded only on the core types, the evalua-

Figure 11.12 Quartz cores and blades: a–c, platform hammer-on-anvil cores (3844a, 5841a, 8003); d–e, platform cores (8164, 5005); f–g, bipolar cores (4497a, 4022); h–m, microblades, their fragments and a blade fragment (5819, 5684, 5817, 6688, 3921, 40; h= bipolar blade; m= retouched blade). (Illustrations: O. Seitsonen)



tion of reduction techniques might give a somewhat skewed picture of the manufacturing process; including also the debitage into the study might clarify this picture. Different reduction techniques leave their characteristic imprint in the flake morphology: e.g. the striking platform remnant and flake initiation and termination can be used in the study of used techniques. (e.g. Callahan *et al.* 1992; Rankama 1997; 2002.) However, it has to be remembered that morphologically similar pieces can occasionally take form with varying techniques (cf. Manninen 2003: 31; Hertell & Manninen 2005). With quartz material it is also especially important to be acquainted with the characteristic fragmentation of the raw material (cf. Knutsson 1988; Rankama 2002).

At this stage of the analysis there was no possibility to conduct a full scale study of the debitage. Instead a limited sample of debitage was analysed to discern the used reduction techniques. A random sample of whole flakes whose reduction technique could be defined was revised, half from each occupation horizon. Platform reduction formed the majority of the sample in both horizons, 67 percent in the Mesolithic and 56 percent in the Neolithic context. However, as this is based on just a minuscule sample of the whole assemblage, the result must be approached with caution.

The percentage of platform reduction observed in the Mesolithic horizon (67 percent of the random sample) is relatively analogous with remarks made about the percentage of platform reduction in the Mesolithic assemblages excavated in 2005 in Kaukola and Räisälä area, where it varies from 62 to 74 percent. Based on the analyses from these sites the platform reduction seems to have been used in the Karelian Isthmus more extensively during the Mesolithic than in the subsequent periods. (Seitsonen *unpubl. manuscript.*) The preference on platform reduction might partly be connected to the blade production

which is present at all of these above-mentioned Mesolithic sites. More research is needed to establish a more detailed picture about temporal trends in this. (cf. Jussila *et al.* 2006; Kankaanpää & Rankama 2006; Schulz 1990.)

The note about the discrepancy in the quantity of flakes and cores connected to specific reduction techniques has been made at several other sites both in Finland and in the neighbouring countries (e.g. Lindgren 1994; 2004; Rankama 2002: 85; Rähälä 1998; 1999). One given explanation for this is that the reduction sequence forms a multidimensional continuum which starts with a freehand platform or a platform hammer-on-anvil reduction and continues with bipolar knapping when the objective piece gets smaller (e.g. Callahan 1987; Knutsson 1988; Rankama 2002: 85). In the Neolithic context the core size supports this hypothesis: bipolar cores are generally smaller than platform ones. There were also no bipolar flakes which were larger than the platform flakes in general. However, in the Mesolithic context there are some bipolar flakes and one bipolar core which are larger than the platform cores. It seems that during the Mesolithic times the quartz reduction might also have started with the bipolar reduction; hence the bipolar and the platform reduction might have been parallel reduction strategies which produced blanks for differing functional purposes (cf. Lindgren 2004; Hertell & Manninen 2005).

Some of the quartz microblades in the Mesolithic context exhibit bipolar characteristics. These kinds of bipolar blades have been described also from other sites (e.g. Lindgren 2004; Hertell & Manninen 2005; Schulz 1990). However, it is uncertain whether bipolar blades could have been the primary aim of the bipolar reduction as we have no experimental knowledge connected to this. No flint microblades with bipolar characteristics were observed.

Based on their morphological characteristics all the flint artefacts in the Mesolithic context were manufactured using platform reduction. In the Neolithic phase also flint was reduced with both platform and bipolar techniques, which is indicated by the flake morphology and the only recovered flint core, a split bipolar core (see Seitsonen 2005: Fig. 2). Bipolar flint cores are also known from the lithic assemblage of the nearby Räsälä Pitkäjärvi dwelling site (NM 6939: 93, 6939: 177).

On the same basis as above, quartzite was worked during both phases with both platform and bipolar flaking. The only core knapped from the above-mentioned fine-grained, pale grey quartzite came from the Neolithic context.

There are some broad-spectrum differences in the character of debitage from different contexts. In the Mesolithic context the aim of the reduction seems to have been on the one hand to produce regular thin, straight microblades, which are well suited for use as insert blades e.g. in bone tools, and on the other hand to create thicker flakes, which were used as blanks for tool production, e.g. for scrapers. This was independent of the raw material. Quartz insert use has been reported e.g. from the bone point which belonged to the 'Antrea Net Find', but unfortunately the blades were lost later so they cannot be studied any longer (Pälsi 1920: 12; see also Huurre 2003; Matiskainen 1986). Some of the quartz blades might have been snapped into shorter and straighter segments on purpose (Fig. 12.11h–m) though this might have been caused also by the site formation processes; no signs of microburin technique were observed (cf. Schulz 1990: 13).

The regular flint microblades (Fig. 12.9e–f) and the tanged flint point (Fig. 12.9d) might also bear chronological significance. The use of analogous microblades during the Mesolithic has been documented for example from

the Kaukola area, the Karelian Isthmus (Halinen & Mökkönen 2004), Karelian Republic (Jacobs 1995; O'Shea & Zvelebil 1984; Price & Jacobs 1990); Lahti Ristola in South Finland (e.g. Edgren 1984; Takala 2004b) and from the neighbouring areas e.g. from the area of the Kunda culture in Estonia (e.g. Jaanits & Jaanits 1978) and from the Veretje culture east of the Lake Onega (Fi. Ääninen, Ru. Onežskoe ozero) area (e.g. Ošibkina 1997; 2006).

Generally the blade to flake ratio in the whole Juoksemajärvi assemblage is relatively low, c. 1 percent, yet it is comparable with several other Mesolithic sites known in Finland, Estonia and in the Karelian Isthmus (e.g. Kriiska 1996: 403; Schulz 1990: 10). In the Karelian Isthmus the blade and microblade production is better represented at other recently excavated Mesolithic sites. Blades and microblades form 4 to 9 percent of the whole Mesolithic lithic assemblages at the newly studied sites in the Kaukola and Räsälä area. In these cases the smaller assemblage sizes probably cause the comparatively high blade percentages, as well as give a hint about the possibly different character of these sites when compared to Juoksemajärvi Westend (Seitsonen *unpubl. manuscript*).

There are two blade-like flint flakes also in the Neolithic horizon (Fig. 12.9g), but these differ morphologically from the Mesolithic ones which are all relatively formal and two-ridged (Fig. 12.9e–f). In the Neolithic context the main emphasis seems to have been on the production of relatively thick flake blanks for retouched tool production.

11.6.3 Osteological material

The osteological material from the Juoksemajärvi Westend site was analysed by using the reference collection from the Finnish Museum of Natural History. The bone assemblage from the site was analysed by Sanna Puttonen (Seit-

sonen) but there are also a few brief notes made by the osteologist Aleksej K. Kasparov about a small sample of the refuse fauna from the site. (A. K. Kasparov 20.11.2003 pers. comm.)³. Sanna Puttonen made the final analysis of the material and the conclusions made here are based on her results, which will be part of her Master of Arts thesis (Seitsonen *in prep.*; see also Seitsonen 2008, this volume).

The entire material was analysed but only the main excavation area, the fully researched dwelling depression 2, is discussed in this article. The material included altogether over 30 000 burnt bone fragments of which 5 448 were determined into species, families or genera. The analysed material was quite poorly preserved and very fragmented. Bones were taken up separately or in 10 x 10 cm squares. Inside the hut depression there was an approximately 2 m² bone concentration area where the sand was packed into bags from where the bone fragments were collected afterwards using 1 x 1 mm screen. This method made it possible to pick up even the smallest bone fragments without spending too much time on it on the field. The identified animal species do not straight forwardly tell about the fauna utilised at the dwelling site, because

there are several affecting taphonomic factors for the survival of and identifying the bones (Ukkonen 1997: 50). The amount of identified species is the minimum amount of the utilised species, but when even the smallest bone fragments are taken into the collection (Fig. 11.13), the selection gives a good picture of the variety of the utilised species.

11.6.3.1 Mammals (Mammalia)

The largest mammal group in the material was seal (Phocidae), bone fragments of which formed c. 30 % of all the identified mammal bones. The fragments were from all parts of the body. These seal bone fragments belong most probably to the ringed seal that is obviously the only seal species that habited the Lake Ladoga water system during the Stone Age (Ukkonen 2001: 2–4).

Canine bones formed also a large part of the material, altogether c. 45 % of the mammals identified in the material. It is interesting that the majority of canine bone fragments belong to dogs (*Canis familiaris*), which were the second largest group after seal bone fragments. They formed c. 23 % of all the mammal bones. The fragments were from all parts of the body, also



Figure 11.13 Excavations underway, Andreas Koivisto, Laura Harjanne, Riina Mäki, Henna Sinisalo and Thomas Kroter working in the middle of the wealth of find bags waiting to be documented with total station. Picture taken from west. (Photo: K. Nordqvist 2002)

from the cranium. Only 6 % of the mammals were determined to be red fox (*Vulpes vulpes*). Dog and fox are sometimes difficult to distinguish from each other in burnt material because of their similarity. Due to this 60 fragments were identified only as dog or red fox. 5 possible wolf (*Canis lupus*) bones were also identified in the material. They are also quite difficult to distinguish from dog bones. The only basis for determining the bones as wolf and not dog was in this case their remarkably larger size compared to other dog bones.

No certain reindeer (*Rangifer tarandus*) bones were found in the material. However, six elk (*Alces alces*) bone fragments were identified. All recognised bone fragments were from the lower limbs except the tooth enamel fragments that most probably belong also to elk or reindeer.

Beaver (*Castor fiber*) is well represented in the material. Nearly 19 % of mammal bone fragments were identified as beaver. The fragments were from all parts of the body. Also seven fragments of pine marten (*Martes martes*), two fragments of squirrel (*Sciurus vulgaris*) and one fragment of arctic hare (*Lepus timidus*) were found in the material. One proximal end of a finger bone belongs most probably to a brown bear (*Ursus arctos*). The reason for uncertainty is the small size of the fragment and the fact that there are no other bear bone fragments identified at the dwelling site.

11.6.3.2 Birds (Aves)

The identified bird bone fragments formed approximately 0.7 % of the entire material. Two fragments belonged to either the great crested grebe or the red-necked grebe (*Podiceps cristatus/Podiceps griseigena*), which are almost impossible to distinguish from each other on the basis of bones in burnt material. Seven fragments were identified as anatid bones but they were not determined into species. The bones of

the white-tailed eagle and the golden eagle are also very much alike and therefore difficult to distinguish from each other. Eight bone fragments were identified as either of them. Also some fragments of capercaillie were identified in the material. Almost half of the bird bone fragments were not determined into species.

11.6.3.3 Fish (Teleostei)

Fish bone fragments formed the quantitative majority, nearly 90 %, of the entire material. However, only 20 % of the fish bones were identified into species. The rest of the bones were only determined as fish. The largest group, over 50 % of different fish species, consisted of pike (*Esox lucius*) bone fragments (511 fr. from at least 41 different individuals). In this case the minimum number of individuals was counted on the basis of jaw bones. The second largest group, over 8 %, was formed by perch (*Perca fluviatilis*) bones. Some fragments of pike perch (*Sander lucioperca*) were also found in the material. Only four fragments of salmonid fish (Salmonidae) bones were found, of which 3 fragments belonged to white fish (*Coregonus* sp.). Cyprinid fish (Cyprinidae) bones were quite common in the material. However, only tench (*Tinca tinca*) was possible to be determined into species. It was identified on the basis of the pharyngeal bone.

Of interest was that in the material there were new fish species never discovered before in the prehistoric materials of Finland and the Ceded Karelia. 10 bone fragments were identified as eel (*Anguilla anguilla*), of which one was a fragment of a jaw bone and the rest were vertebral. One jaw bone fragment in the material seems to belong to a bullhead. The most probable bullhead species in question is a four-horned sculpin (*Trigloporus quadricornis*), which is capable of living in all different salinities from seawater to lake water. There are also some other bullhead

species that live in freshwater but their sizes are too small to be this specific jaw bone fragment.

11.7 The find distribution

In this phase of the studies the find distribution was based only on visual inspection, not on statistical analyses. However, some general notes can be made.

Outside the dwelling depression the finds concentrate more on the eastern side of the dwelling, closer to the water and thus probably in the 'front yard' of the dwelling. The finds in the Mesolithic context are more equally scattered and there are no clear clusters, which could indicate any specific activity areas. In the Neolithic context there is a cluster of three flint scrapers, which were deposited in the eastern corner of the dwelling, next to the probable doorway.

Inside the dwelling depression the distribution of quartz and burnt bone show an oblong concentration around the central area of burnt and charcoal-rich sand. Probably this presents a central fireplace, around which the different activities inside the dwelling were concentrated.

Inside the hut mostly traces of bipolar reduction are encountered as indicated both by the bipolar cores and flakes. The majority of the flint artefacts were found connected to the Neolithic context inside the hut, near the central fireplace. Then again, most of the platform and hammer-on-anvil cores and flakes were deposited outside the hut, connected to the Mesolithic context. Some of the Mesolithic flint and quartz microblades were also found at the bottom of earlier pit features destroyed later by the dwelling depression.

There is no visible cleaning effect inside the hut, i.e. the finds were not scattered along the walls (e.g. Halinen *et al.* 2002; Pesonen 1996). Instead, they were concentrated around the cen-

tral hearth area represented by the burnt soil and the fire-cracked stones (hearth 004). The refuse fauna had been discarded mostly around this fireplace, perhaps first in the fireplace and thereafter spread on the floor.

Because there are no traces of cleaning and the finds cluster mostly around the central fireplace, it might suggest that the hut had not been used recurrently. If its use had been recurring, it had at least not been much cleaned between the occupation phases, or otherwise the occupation might have been continuous without much cleaning taking place during it.

11.8 Subsistence

The subsistence of a society means how people provide for their livelihood and how they use the environment. It is possible to research subsistence by studying for example the diversity of osteological and artefactual material, constructions of the site and the topography of the site (e.g. Halinen 2005; Matiskainen 1989). Because in this particular case only one dwelling and its surroundings were excavated, it is difficult to draw far reaching conclusions about subsistence strategies. Therefore in the following discussion of the subsistence and occupation season of the site remains preliminary.

The diversity of the osteological material tells us about the diversity of the species which people caught. However, due to the taphonomical processes it does not tell us how wide the selection of species really was (see e.g. Ukkonen 1997). Also the actions of prehistoric people have affected the composition of bone assemblage. For example the preservation, transportation and later consumption of meat or fish might distort the interpretations of seasonality. This has to be taken into account when discussing the occupation season.

11.8.1 Subsistence during Mesolithic and Neolithic phases

On the basis of its environmental setting the site was well suited for utilisation of aquatic species all through its use life. There were some differences between the Mesolithic and the Neolithic bone materials. Altogether 707 bone fragments belong certainly to the Mesolithic phase of the habitation and 4 116 fragments to the Neolithic phase.

The importance of aquatic species is attested by the abundance of fish and seal bones in the refuse fauna in both settlement phases. However, the relative amount of seal remains seems to get smaller during the Neolithic period compared to the Mesolithic. In the Mesolithic material seal remains form over 40 % of all identified mammal bones when the Neolithic material includes only about 20 %. Seal fragments form the majority of the refuse fauna in most analysed assemblages from the shores of Lake Ladoga. (Puttonen 2003; Seitsonen 2008, this volume; Seitsonen *in prep.*) Ringed seal was hunted usually during the winter season because it makes breathing holes in the ice through which it is rather easy to catch. The species also builds its cub nests on the ice which makes them possible to be found with the help of dogs. (Ylimaunu 2000: 76–77.)

Of special interest is the abundance of dog remains in both Mesolithic and Neolithic settlement phases. The amount of dog remains is smaller in the Mesolithic context, approximately 13 %, compared to the Neolithic phase, where dog remains form c. 24 % of the mammal bones. The number of dog bone fragments from the Neolithic context is actually higher than the amount of seal remains. The species was probably used as a draught dog and as a help in hunting. It is also possible that dog was treated as a food source. The amount of dog remains seems to get larger during the Neolithic period. Per-

haps the seal population of the area decreased for some reason and the occupants had to utilise dogs as a food source. Whatever the reason, similar amount of dog remains is not known from any other prehistoric site in Finland and the Ceded Karelia (Seitsonen *in prep.*).

Most of the elk and reindeer bone fragments belong to the Neolithic occupation phase and there were only a few dental enamel fragments found in the Mesolithic context. Elks often gather in herds and are therefore easier to hunt during the autumn and winter season (Matiskainen 1989: 53).

There was not much difference in the relative amounts of different fish species between the two phases. Most of the fish species are easiest to catch from spring to autumn. However, some species such as pike, white fish and perch are possible to catch also during winter through a hole in the ice. (Lehtonen 2003: 67, 95, 232, 227.)

All eel bone fragments, except for one, were found in the Neolithic context. Eel is almost impossible to catch during winter because the species usually eats only in summer. During winter the species acts passively and only lies at the bottom of lakes. (Koli 1990: 62–68; Lehtonen 2003: 58–61.) The two other fish species that were only found in the Neolithic context were tench and a possible four-horned sculpin. Tench is also a summer species. It behaves very passively and does not eat at all during winter. (Lehtonen 2003: 140.) The four-horned sculpin is a total opposite of the two preceding species. It thrives in cold waters the species spends the summer in deep waters far from the coasts. The species can be seen in shallow water only during winter. (Lehtonen 2003: 212.) This might indicate winter time fishing of the species.

11.9 Discussion

When discussing the function and the nature of a prehistoric site we have to consider e.g. the constructions, the environmental setting, the composition of the find material and the results of the osteological analysis. However, there are no direct answers and material from one site only is not enough for far-reaching conclusions of settlement patterns or subsistence strategies. For doing this more information is needed about the other sites of the region. However, it is possible to draw preliminary conclusions.

There are no remains of solid Mesolithic dwelling constructions at the Juoksemajärvi Westend site. The Mesolithic constructions, storage pits and one hearth (001), do not give evidence of whether the site was used in winter, during the snowless season or possibly year-round. The Neolithic semi-subterranean hut remains might refer to living during the winter season, to recurrent habitation during shorter periods or to year-round occupation, but seasonality needs more discussion of the various affecting factors. The presence or absence of ceramics is not a factor which clearly refers to a certain season. If the ceramics were used for food storage, it might be assumed that more potsherds should have been found. Some sites, which have semi-subterranean hut remains but no ceramics, have been interpreted as winter habitation sites (Halinen *et al.* 1998).

The topography of the site might refer to a winter or a year-round habitation. The site is situated in a location very suitable for wintering. The shore waters beside the site were relatively deep. This is not especially good for fishing spawning fish during spring and early summer.

The finds in both occupation phases refer to the hunting of mammals, fishing and preparing the prey; this is proven by the lithic finds (arrowheads, perforated stones and quartz tools) and

faunal remains. The preliminary results of the lithic analyses show some general differences between the Mesolithic and the Neolithic lithic assemblages already at this stage of the analyses. In the Mesolithic Period the aim of reduction was on the one hand to produce regular microblades suitable for use as in-set blades, and on the other to produce relatively thick flakes that could be retouched into heavier tools, e.g. scrapers or burins. All the flint microblades from the Mesolithic context seem to have been made using the platform reduction technique; however, some of the quartz microblades exhibit the characteristics of bipolar reduction. During the Neolithic phase thicker flakes which served as blanks for larger retouched tools are dominant. Platform reduction was used more during the Mesolithic Period and bipolar reduction during the Neolithic.

The composition of the refuse fauna differs a bit between the Mesolithic and the Neolithic. The Mesolithic mammal bones point to the winter season because the most suitable hunting/utilisation season for all the observed mammal species – canines, seal, pine marten, ruminants, beaver and bear – is late autumn or winter (Halinen 2005: 47; Matisckainen 1989). Then again, the Mesolithic bird bones point to the snowless season as most of the observed hawks, eagles and ducks are migratory birds. The most suitable season for fishing was the ice free time. Then again e.g. the pike may have been preserved by drying and consumed also during the winter season. The general picture of the occupation seasons according to the refuse fauna points to a year round occupation during the Mesolithic. The mammal bones and some of the fish bones point to the winter season but most of the bird and fish remains to the snowless season.

The Neolithic mammal bones point more clearly to late autumn or winter because the most suitable season for hunting elk, squirrel and hare is winter. The rest of the Neolithic mammal bones



Figure 11.14 O. Seitsonen and K. Nordqvist measuring in the finds while other students are excavating. Picture taken from south-east. (Photo: P. Kouki 2002)

belong to the same species as the Mesolithic mammal bones. The bird species observed only in the Neolithic assemblage are capercaillie and great crested grebe/red-necked grebe. The identified fish species (e.g. four-horned sculpin) suggest habitation during autumn-winter, although it is possible to fish tench, pike, pikeperch and perch also during summer.

The living environments of the observed animal species vary, which means that they must have been hunted at a varying distance from the site. This suggests the Juoksemajärvi site could have been a base-camp that was used during more than one season. From this base hunting trips might have been made to specialized hunting stations situated in the surrounding area. The elk and wild reindeer/elk bones in the material belong to the lower parts of the leg and

to the tooth enamel which might mean that the butchering of the prey took place relatively near the site (Halinen 2005). The large number of seal bones might suggest that they were hunted recurrently during several seasons; hunting of the ringed seal is most often practised in winter (Ylimaunu 2000: 76–77). The large number of dog bones suggests that they were treated as food animals besides their possible use as e.g. draught dogs. The use of draught dogs could also suggest long-distance hunting.

To sum up the discussion of the nature of the site, the clearest difference between the Mesolithic and the Neolithic occupation period is the semi-subterranean hut constructions, which are observed, based on the current evidence, only in the Neolithic context. The topography has remained almost the same through out use life of the site: it was well suited for winter habitation. The artefacts do not point to any particular season or specialized use of the site. The refuse fauna points to year-round habitation which is in accordance with the constructions and topography.

11.10 Conclusion

The excavations at the Juoksemajärvi Westend site revealed some very notable finds. The site has distinct occupation horizons dated to the Mesolithic and Neolithic Periods. Possibly parts of the site were used throughout the whole of the Neolithic Period.

The excavated depression 2 is the first fully studied dwelling depression in the Karelian Isthmus. It might be dated to the Early Combed Ware period, but also Late Neolithic dating can not be ruled out. The semi-subterranean dwelling was of a roughly rectangular shape with rounded corners. The floor area was c. 23.2 m². There were two fireplaces in the centre of the dwelling. The composition of the find concen-

tration inside the dwelling suggests that it was formed during one long season or during several shorter seasons with no cleaning between the phases. There were also three stoned fireplaces outside the dwelling, two of which were connected to Neolithic occupation.

Depression 2 had been excavated through a Mesolithic layer. One stoned fireplace was connected to the Mesolithic occupation. Some of the Mesolithic pit features had also survived under the later dwelling depression.

The different occupation horizons are observable in the stratigraphy, radiocarbon dates, vertical and horizontal find distribution. There were some distinct find types connected to the different periods of occupation, e.g. the quartz hammer-on-anvil cores and flint microblades connected to the Mesolithic occupation horizon. The accurate documentation of finds with total station and the clear stratigraphy provide good grounds for further analyses of the find material and the occupational sequence at the site (Fig. 11.14).

Lightly constructed huts might have been used during the Mesolithic, at least there was a fireplace and storage pits at the site at this time. The site seems to have been used as a residential base-camp with a permanent hut construction during the Neolithic. During the Neolithic the size of the site might have varied through time. At least at some point of the occupation several huts might have been in use at the same time in a village-like fashion.

The lithics use at the site seems to have been relatively expedient in both occupation horizons. This could point to a relatively low mobility, perhaps closer to the collector end of the forager – collector continuum (cf. Binford 1980). However, during the Mesolithic phase the settlement pattern might have been slightly more mobile.

Also the rich faunal assemblage collected during the excavation offers information about

the subsistence economy and sedentarity during the above-mentioned periods. The environmental setting of the site was well-suited for utilisation of aquatic species all through its use life. This is attested by the vast amount of fish and seal remains in the osteological assemblage. Only after the outburst of the River Neva Lake Juoksemajärvi was isolated and probably could not sustain a considerable seal population any longer. Seal seems to have been of special importance for the inhabitants of the shores of Lake Ladoga during the whole of the Stone Age. (Puttonen 2003; Seitsonen *in prep.*)

The osteological assemblage gives a hint of the sedentarity of the occupation. The diversity of the refuse fauna points to year-round occupation: animal species which are best suited for hunting during all the four seasons have been identified.

The nature of the site points to a relative residential sedentarity in all settlement phases (cf. Karjalainen 1999). Perhaps the site belonged to a settlement pattern which included a base-camp and several specialized locations, e.g. hunting stations, fishing camps and raw material sources. The subsistence strategy was largely based on seal hunting and fishing. Fish was possibly stored also for winter. During winter the most important hunted mammal species probably were seal, beaver and elk. Dogs were perhaps, besides being draught animals, a reserve food source, which had to be used during the hardest time of the winter.

Further analyses of the find assemblage from Juoksemajärvi Westend and the nearby sites will provide us a fuller understanding of the Mesolithic and the Neolithic settlement-subsistence systems in this part of the Karelian Isthmus. These analyses will potentially give us information for example about the sedentarity and duration of the occupation as well as of various socio-economic structures and social

contact networks of the ancient inhabitants at these sites.

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Endnotes

- 1 Professor Mika Lavento was in charge of the whole research project. Petri Halinen, Lic. Phil., was the head of excavation. On behalf of the Russian Academy of Sciences Dr. Vladimir I. Timofeev was responsible for the fieldwork. There were three Russian archaeologists from the IIMK/RAN and Kunstkamera, Dr. Sergej N. Lisicyn, Dmitrij V. Gerasimov, M.A. and Dr. Sergej N. Astahov working at the excavation. Oula Seitsonen was responsible for the documentation of the finds and structures using the total station, Sanna Puttonen and Kerkko Nordqvist were responsible for drawing the maps. Marina A. Kul'kova, M.A. (the Institute for the History of Material Culture, Russian Academy of Sciences, St. Petersburg), was responsible for soil sampling for geochemical analysis (see Gerasimov & Kul'kova 2003). Riina Mäki, Andreas Koivisto, Laura Harjanne, Henna Sinisalo and an American archaeology student Randolph Tedor (University of Anchorage, Alaska) worked as excavators. Professor Lavento and Paula Kouki, M.A., instructed the students taking part in the seminar excavation in excavation methods and documentation. The participating students were Tanja Alzheimer, Patricia Berg, Ulla Karilainen, Tiina Kinnunen, Thomas Kroter, Ulrika Kõngäs, Päivi Liukkonen, Hanna Mäki, Riku Mönkkönen, Pauliina Niskanen, Sofia Nylund, Hembo Pagi, Heidi Pasanen, Katri Peltomäki, Nora Salonen, Tommy Sjöblom, Satu Soini, Tommi Suominen, Mia Tenhunen, Simo Voutilainen and Jarno Väkiparta. Also Doc. Pirjo Uino visited the site with journalists Veijo Kantele and Timo Peltola who prepared TV-program about the archaeology in the Karelian Isthmus.
- 2 A random sample of the lithics was analysed for the technological attributes: altogether 400 whole flakes and blades, half from each occupational horizon (Seitsonen 2005). The find numbers of the analysed artefacts are available from the authors.
- 3 Possible human remains have been published from the site (Seitsonen 2005) based on a preliminary osteological analysis by Aleksej K. Kasparov (A. K. Kasparov 20.11.2003 pers. comm.); however, the recent osteological analysis has shown that there are no human remains in the osteological assemblage of the site after all, and the abovementioned faunal remains belonged to other mammals (Seitsonen *in prep.*).