Teemu Mökkönen

STUDIES ON STONE AGE HOUSEPITS IN FENNOSCANDIA (4000–2000 CAL BC)

Changes in ground plan, site location, and degree of sedentism

Academic dissertation to be publicly discussed, by due permission of the Faculty of Arts at the University of Helsinki in auditorium XV, on the 17th of June, 2011 at 10 o'clock.

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Preface

I became concretely involved with housepits in the summer of 1996. At the time, as a young student, I was more interested in Late Iron Age and Medieval archaeology. However, I ended up working as a field assistant at the excavations of two large housepit sites, Kaustinen Kangas and Yli-Ii Kuuselankangas. These sites truly fascinated me. I believe it was not only the sites but also the enthusiastic atmosphere pervading Finnish housepit research in those days that affected me. There were many new things to explore, and the topics were actively discussed at the excavations. Especially the time in Yli-Ii, with two excavation teams working at adjacent sites and spending their free time together, was perfect from this point of view. Later, I worked as field assistant on another important housepit site, Kärmelahti in Puumala parish. As a consequence, I consider the excavation leaders I worked with during the late 1990's, Petri Halinen and Kaarlo Katiskoski, partly responsible for the current state of affairs, with which I am not displeased at all.

The mid 1990's saw an intense period of housepit research in Finland. There was, of course, an active period of housepit excavations in the Kemijoki River area already in the late 1970's and 1980's but, as I see it, the 1990's research was stimulated to a greater degree by studies carried out in Sweden (e.g. Loeffler & Westfal 1985; Halén 1994) and Norway, and by the Nordic-Russian joint excavations in the Republic of Karelia, Russia (Karjalainen 1996a). Several projects in Finland resulted in the discovery of large numbers of new housepits, some of which were excavated. The Finnish Ministry of Labour financed most of the excavations in the Lake Saimaa area as well as in Yli-Ii, Northern Ostrobothnia. At the time, government employment programmes sponsored archaeological excavations in order to provide work for people with records of long-term unemployment caused by the economic depression of the early 1990's. In practice, the unemployed were forced to work as diggers if they wished to ensure the continuation of their unemployment benefits.

The archaeological boom in housepit research declined in the beginning of the 21st century. The results of the active research of the 1990's were published in the *Huts and Houses* volume (Ranta (ed.) 2002), compiled from papers presented at a seminar on Stone Age and Early Metal Period building remains. At the time, the first Stone Age timber-frame structures that were brought to light by excavations in the late 1990's were drawing much attention (Katiskoski 2002, Leskinen 2002).

This dissertation is not quite what I thought it would be in the beginning. The first article (Paper I) was my starting point for this research. It brings up the question of chronological changes in housepits and housepit sites that did not take place simultaneously with changes in material culture, especially in pottery styles.

According to my initial research plan, I was supposed to work mainly with the data gathered from the Ancient Lake Saimaa area located in the Vuoksi River catchment. I spent over six months in the archives of the Finnish National Board of Antiquities, making notes and building up a database of Stone Age sites located in that region. However, an unpleasant chain of events, including public false allegations, obliged me to open my research to a competitor, after which I lost my motivation to work on that data. Consequently, I ended up working with other material I acquired through other projects. Papers II and IV deal with housepits located on the shores of Ancient Lake Ladoga on the Karelian Isthmus, Russia. I became acquainted with this material in connection with the Kaukola–Räisälä Project (2004–2005). Another article on multi-room houses (Paper III) resulted from the discovery of the Meskäärtty site during a survey project I carried out with students in Virolahti parish in 2007–2008.

A great many persons have contributed to my work. Firstly, I want to thank my supervisors, Professor Mika Lavento (University of Helsinki) and PhD Jarmo Kankaanpää. I am especially indebted to Jarmo who – in addition to most helpful comments – revised my English in most of the papers (Papers II–V) and in this synthesis paper. I owe many thanks to a number of archaeologists who worked with me at the Department of Archaeology at the University of Helsinki. Discussions, feedback, and developing and generating ideas with Vesa-Pekka Herva, Antti Lahelma, Mikael A. Manninen, Kerkko Nordqvist, Oula Seitsonen, Miikka Tallavaara, Satu Koivisto, Petri Halinen, Eeva-Maria Viitanen, Janne Ikäheimo, Anna Wessman (née Wickholm), and Kristiina Mannermaa were of great importance both for this work and for generally coping with life at the university. On the practical level, office secretary Tuovi Laire deserves many thanks for taking care of various matters over the years.

There are also numerous other people who have contributed to my work. I owe thanks to Dr Peter Jordan (University of Aberdeen) for the encouraging and valuable comments he made on the early draft of Paper IV. Special thanks to palynologist Teija Alenius (University of Helsinki) for discussions and for her comments regarding the paper on early cereal cultivation (Paper V). I would also like to thank Dr Volker Heyd (University of Bristol) for his valuable comments in discussions during his term as visiting scholar in Helsinki.

I wish to thank the students taking part in the surveys in Virolahti parish, southeastern Finland, in 2007–2008 (listed in Paper III). Originally, these surveys were not meant to play any part in my dissertation work, but fate decided otherwise. One of the discovered sites, the Meskäärtty housepit site (Paper III), was documented in extreme conditions in November 2007 (it was freezing and the first snow fell). I thank Kerkko Norqvist, Heidi Nordqvist, and Wesa Perttola for assisting in generation of the surface model of the housepit.

If one wishes to do fieldwork abroad, cooperation with local archaeologists is essential. Two papers in this work deal with material from the Karelian Isthmus, Russia. Archaeologists Dmitriy Gerasimov and Stanislav Belskij facilitated the work in Russia. In addition to taking care of much of the practical arrangements during the field season and preparing the Russian reports, they also offered their great hospitality in St. Petersburg when I was analysing the finds there. Therefore, I owe special thanks to them and to the others participating in the fieldwork of the Kaukola–Räisälä Project (Listed in Papers II and IV).

I would also like to thank the people with whom I have had various, more or less scientifically relevant, discussions every now and then: Taisto Karjalainen, Petro Pesonen, Esa Hertell, Timo Jussila, Aivar Kriiska, Vadim Adel, and Santeri Vanhanen. Although the topics were often far from the core of this work, those discussions have been important – believe it or not! In addition, I wish to thank the personnel of the Finnish National Board of Antiquities (*Fi. Museovirasto*) who were of great help during the archival research I carried out (but which was not used in this study): Sanna Saunaluoma, Tanja Tenhunen, Leena Söyrinki-Harmo, and Leena Ruonavaara. Special thanks for the excellent and refreshing coffee breaks. In addition, I thank Helena Ranta (National Board of Antiquities) as well as Rami Urrio and Kimmo Oikarinen (Gummerus Printing House, Jyväskylä) for their efforts to provide me with a printable .pdf file of Paper I.

Last but not least, I would like to thank my family – my wife Liisa Lohtander and my sons Aarni and Kauko. Liisa has served as proofreader for some of the papers. Otherwise, my family deserves special thanks for giving me many very un-academic matters to think about (often related in some way or other to Lego building – or diapers).

Finally, I offer my gratitude to the foundations and institutions that have made it financially possible to write this dissertation. I have received generous support from *the Finnish Graduate School in Archaeology* at which I worked during 2007–2009. Before and after graduate school, my work was financed by grants awarded by the *Finnish Cultural Foundation* (*Fi. Suomen kulttuurirahasto*) and a minor grant provided by the Oskar Öflunds Stiftelse. The fieldwork on the Karelian Isthmus, Russia, carried out in connection with the Kaukola–Räisälä Project (2004–2005), was financed by a *Chancellor's research grant* (University of Helsinki, Finland). The fieldwork in Virolahti and the radiocarbon datings were financed by *The Centenary Foundation of Kymi Corporation* (*Fi. Kymin osakeyhtiön 100-vuotissäätiö*). To all of these institutions, I am thankful for the support that made this dissertation possible.

List of papers

This dissertation is composed of a synthesis paper and five previously published papers. Papers II–V are peer-reviewed. In this synthesis, the papers are referred to by their Roman numerals.

Paper I
Mökkönen, T, 2002. Chronological variation in the locations of hunter-gatherer occupation sites vis-à-vis the environment. In H. Ranta (ed.). *Huts and Houses. Stone Age and Early Metal Age Buildings in Finland*. Finnish National Board of Antiquities, Helsinki, 53–64. [references p. 240–254]

Paper II
Mökkönen, T., Nordqvist, K. & Belskij, S. 2007. The Rupunkangas 1A site in the archipelago of ancient Lake Ladoga: a housepit with several rebuilding phases. *Fennoscandia archaeologica* XXIV, 3–28.

Paper III
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*, Vol. 12, No. 2, 114–151.

Paper IV
Mökkönen, T. 2009. Neolithic housepits in the River Vuoksi Valley, Karelian Isthmus, Russia – chronological changes in size and location. *Fennoscandia Archaeologica* XXVI, 133–161. [Errata & Corrigenda. *Fennoscandia Archaeologica* XXVII, 108–109.][*]

Paper V
Mökkönen, T. 2010. Kivikautinen maanviljely Suomessa (with English summary 'Neolithic cereal cultivation in Finland'). *Suomen Museo* 2009, 5–38.

[*] The original article (*Fennoscandia Archaeologica* XXVI: 133–161) contained errors in Figures 8 and 9. Those figures were interchanged and, added to this, the figure texts contained further errors. The Errata is published in *Fennoscandia Archaeologica* XXVII (2010). For the sake of clarity, a version of the whole article with corrected figures is published here.

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Abstract

Housepits have a remarkably short research history as compared to Fennoscandian archaeological research on the Stone Age in general. The current understanding of the numbers and the distribution of Stone Age housepits in the Nordic countries has, for the most part, been shaped by archaeological studies carried out over the last twenty to thirty years.

The main subjects of this research are Neolithic housepits, which are archaeological remains of semi-subterranean pithouses. This dissertation consists of five peer-reviewed articles and a synthesis paper. The articles deal with the development of housepits as seen in the data gathered from Finland (the Lake Saimaa area and south-eastern Finland) and Russia (the Karelian Isthmus). This synthesis expands the discussion of the changes observed in the Papers to include Fennoscandian housepit research as a whole.

Certain changes in the size, shape, environmental location, and clustering of housepits extended into various cultures and ecological zones in northern Fennoscandia. Previously, the evolution of housepits has been interpreted to have been caused by the adaptation of Neolithic societies to prevailing environmental circumstances or to re-organization following contacts with the agrarian Corded Ware/Battle Axe Cultures spreading to North.

This dissertation argues for two waves of change in the pithouse building tradition. Both waves brought with them certain changes in the pithouses themselves and in the practices of locating the dwellings in the environment/landscape. The changes in housepits do not go hand in hand with other changes in material culture, nor are the changes restricted to certain ecological environments. Based on current information, it appears that the changes relate primarily to the spread of new concepts of housing and possibly to new technology, as opposed to representing merely a local response to environmental factors. This development commenced already before the birth of the Corded Ware/Battle Axe Cultures. Therefore, the changes are argued to have resulted from the spreading of new ideas through the same networks that actively distributed commodities, exotic goods, and raw materials over vast areas between the southern Baltic Sea, the north-west Russian forest zone, and Fennoscandia.

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1

INTRODUCTION

1.1 Research questions

Finnish archaeological research on housepits peaked in the 1990's (see Pesonen 2002). At the time, research was largely focused on chronological and chorological questions, the material culture associated with housepits, and structural details. The settlement pattern was expected to be either semi-sedentary or fully sedentary, and the argumentation concerning the seasonal duration of the occupation was based on the species detected in osteological analyses (e.g. Pesonen 1996b; Halinen et al. 1998; Karjalainen 1999). Most of the studies were based on a single excavated housepit or housepit site. They may be characterized as descriptions of excavated sites rather than as comprehensive studies on housepits.

As in Finland, housepits are a fairly recently discovered subject on the Karelian Isthmus (Russia). The first housepits in this area were found in 1999 (Lavento et al. 2001), and surveys in 2004 and 2005 brought the number of housepits in the Kaukola–Räsiälä area up to over eighty (see Paper IV). During the first decade of the 21st century, housepits were also discovered in other areas of the Karelian Isthmus (Nordqvist & Seitsonen 2008; Seitsonen & Gerasimov 2008; Seitsonen et al. 2009).

Based on the research carried out in the 1990's, it was known that the main building phase of housepits in Finland dated to the Middle Neolithic Period (4000–2300 cal BC) and that most of the housepits were associated with Typical Comb Ware, Late Comb Ware, and asbestos-tempered Kierikki and Pöljä(-Jysmä) wares (e.g. Kotivuori 1993; Karjalainen 1996b; 1999; 2002; Nuñez & Uino 1997; Pesonen 2002). Actually, this association with ceramics was already indicated in Meinander's article from 1976, which was based on his presentation at the Nordiska arkeologimötet (Nordic Archaeological Congress) in Helsinki in 1967. During the 1990's, it was also known that the largest structures dated to the late Middle Neolithic were often associated with asbestos-tempered Kierikki and Pöljä Wares (e.g. Nuñez & Uino 1997; Núñez & Okkonen 1999; Halinen et al. 2002; Pesonen 2002; Paper I).

Only during the last decade, however, have a number of more comprehensive studies sought to find chronological variation in the housepit building tradition with the help of chronological frameworks offered by shoreline displacement (Mökkönen 2000; Paper I; Okkonen 2003; Norberg 2008; Vaneeckhout 2008a–b; 2009a–c, 2010). These frameworks, in which the changes are studied with the help of shoreline displacement, avoid the pitfalls attached to chronological typologies in ceramics (see Mökkönen 2009). Constant shoreline displacement, a legacy of the last Ice Age, is in a global sense an exceptional natural phenomenon. In most parts of Finland, it allows the arranging of shore-bound archaeological sites into chronological order and, at the same time, allows the creation of parallel chronologies on various themes that are independent of the chronological frameworks of material culture (i.e. artefact typologies). This facilitates the relative dating of unexcavated sites without any direct dating methods such as radiocarbon dating (see more in Chapter 5.2).

This study focuses on chronological changes in the construction and design of pithouses as well as in the environmental locations of housepit sites (Papers I, II, III and IV). Other cultural aspects – such as interaction between groups with a different material culture (Paper III), degree of sedentism (Papers I, II, and IV) and early cereal cultivation (Paper V, see also Paper IV) – are discussed through the housepits and material associated with them. This thesis seeks answers to three main questions:

(1) What kind of variation is there in Neolithic housepits (size, shape, clustering) and in housepit site locations (in relation to the immediate environment as well as to larger environmental zones), and how is this variation chronologically and regionally distributed? (Papers I, III and IV)
(2) What sort of settlement system do the changes in housepits indicate? (Papers I, II, and IV)
(3) What were the driving forces behind the changes? (Papers I, III, IV and V)

This dissertation deals with housepits dating mainly from ca. 4500 to 2000 cal BC. The material derives from two case study areas, the Ancient Lake Saimaa area, Finland (Paper I), and the Karelian Isthmus, Russia (Papers III and IV). Paper III introduces a recently discovered three-room housepit from Virolahti parish, extreme south-eastern Finland, and discusses the emergence, distribution, and cultural context of large multi-room housepits in Finland and in the Republic of Karelia in Russia. Papers I–IV are based on survey data, in the gathering of which I was also involved through three research projects.

The observations made in connection with the case study in the Ancient Lake Saimaa area (Paper I) form the starting point on which the present study builds. In that data, the chronological changes in the ground plan and clustering of housepits, as well as the radical change in the pithouses' placement in the landscape, did not occur concurrently with the changes seen in the material culture, especially in ceramics. In the Lake Saimaa area, the shoreline displacement caused by isostatic land uplift rendered it possible to observe the chronological changes in housepits and to study those changes in relation to ceramics found at the sites. The first paper sets down the observations but makes no suggestions towards a wider cultural understanding of the observed phenomena.

Although housepits form the core of this study, other subjects are also discussed at length. Paper III deals with general cultural evolution during the late Middle Neolithic period as much as it does with multi-room housepits. The last article (Paper V) concentrates on the latest results concerning early cereal cultivation. It is included here because the most obvious changes in the pithouse building tradition appear approximately simultaneously with the anticipated initial cereal cultivation in the spheres of both Lake Ladoga and Lake Saimaa. Papers III–V I seek to reach a broader understanding of the cultural developments to which the changes seen in housepits are chronologically related.

1.2 The structure of the dissertation

This dissertation consists of this synthesis paper and five papers published between 2002 and 2010. The primary archaeological data used in the papers originates from three areas (Fig. 1). Papers I–IV are in English and the last one (Paper V) is in Finnish with an English summary. The papers are included here in chronological order according to the publishing date. The main theses of the papers can be summarized as follows:

Paper I. This paper presents the chronological changes in housepits and housepit sites in the Lake Saimaa case study area. The paper argues that a fairly radical change as regards the sites' immediate environment takes place at the time when Typical Comb Ware was in use. During the said period, the pithouse sites shifted from sheltered locations at the heads of bays to unsheltered islands and peninsulas. This shift was accompanied by a village-like clustering of pithouses. The period with village-like concentrations seems to have been quite short-lived. Based on the concurrent emergence of village-like pithouse sites and the drop in the number of other dwellings sites, this paper submits that the degree of sedentism increased already during the late Typical Comb Ware period. This article is based on the data I used for my Master's thesis (Mökkönen 2000). Paper IV continues this theme with data from the Karelian Isthmus, Russia.

Paper II. This paper concentrates on housepits discovered on a large former island that was once located in the archipelago of Ancient Lake Ladoga but is now part of the Karelian Isthmus, Russia. The paper focuses on a partly excavated housepit, Rupunkangas 1 A, which has a notably long reuse history that covers the whole Ancient Lake Ladoga period (ca. 7800–1350 cal BC). The scarcity of finds and the unsheltered site location in the archipelago, clearly outside the heartland of the Stone Age occupation, led me to interpret the site as a hunting station used on a recurring seasonal basis. The formation of distinctly thick cultural layers on the site is assumed to be connected with the abandonment processes rather than with the actual occupation phases. The last part of this paper discusses other housepits located on the former island.

Paper III. This paper introduces a large three-room housepit from the Meskäärtty site, extreme south-eastern Finland. This site is exceptional in several respects: previously, such large Stone Age structures were not known from the Gulf of Finland and the finds are atypical as compared to both the material usually found in Finland and to the material typically associated with housepits. The finds include a heterogeneous pottery assemblage best described as Late Comb Ware and Late Corded Ware, and a sharp-butted axe, both of which have similarities with material found on the southern shore of the Gulf of Finland in Estonia. This paper discusses the late Middle and Late Neolithic (ca. 3500–2000 cal BC) phenomena relating to cultural contacts seen in the material culture and in multi-room housepits (dating and chorology). In conclusion, this paper suggests that contact with the Corded Ware Culture had a profound impact on local cultures. This is clearly visible in the appearance of elongated multi-room houses that express ideas similar to longhouses but were built following the local building tradition in which structures were, as a rule, semi-subterranean. However, as will be noted later in this synthesis paper, the idea presented in article that the hybrid-like pottery is connected to Corded Ware contacts is not applicable in the case of the oldest pottery, the dating of which is a bit too old considering the current dating of the Corded Ware Culture (*vide* Chapter 2.2.2).

Paper IV. Since the discovery of the first housepits on the Karelian Isthmus, Russia, in 1999, a number new of housepits have been found. The housepits discovered in the study area of the Kaukola–Räisälä project (2004–2006) are published in this article. The article focuses on the chronological changes in housepit size, clustering, and location, and presents suggestions as to the causes behind the observed developments. The most distinctive change in the pithouse building tradition occurred during the time when Typical Comb Ware (ca. 4000–3400 cal BC) was the dominant pottery style. At that time, several changes appeared: the number of pithouses per site increased, the size of individual pithouses grew, and the placement of pithouse sites changed from highly sheltered to windy locations in the archipelago. The last of these developments obviously favours other than winter-only habitation. This paper argues for a growing degree of sedentism during the Typical Comb Ware period. Although it is still poorly arguable, the larger and more oblong housepits dating to the late Middle Neolithic are seen as probable multi-family houses representing fairly stationary settlement.

Paper V. The last paper deals with the beginning of cereal cultivation around the eastern shores of the Baltic. During the last decade, pollen studies have shown that cereal cultivation appeared in the Baltic States already during the Early Neolithic. As far as the northern areas are concerned, the most interesting results come from Estonia and the eastern shore of Lake Onega, Russia, where cereal cultivation was practised during the early 4th millennium cal BC. This early cultivation was practised among archaeologically detectable ‘cultures’, such as Typical Comb Ware and Comb-Pit Ware, which are either the same as or closely related to the archaeological complexes found in the study area (eastern and south-eastern Finland and the Karelian Isthmus, Russia).

The lack of evidence (i.e., unquestionable cereal pollens or macrofossils) of such early cereal cultivation in the study area may be due to the paucity of research as well as to the wrong kinds of assumptions deriving from Central European palynological research on early cultivation. This paper calls for new conventions for studies on northern early cultivation, which should be oriented towards finding low-intensity cereal cultivation unlike that practised among Central European Early Neolithic cultures. This paper points out that the prevailing model of the spreading of agriculture in the eastern Baltic Sea region synchronously with the spreading of the Corded Ware Culture is no longer valid. Instead, the presence of cereal cultivation among local (sub)Neolithic cultures over a thousand years prior to the appearance of the Corded

Ware Culture raises important questions: What is the mechanism through which early cereal cultivation spread to North European Subneolithic cultures, and is the term Subneolithic still acceptable?

The reason for including this paper in this dissertation is the fact that the suggested beginning of initial cereal cultivation and the most distinctive changes in housepits (which are interpreted to be connected with a growing degree of sedentism or even fully stationary settlement, see Papers I and IV) both take place almost simultaneously during the Typical Comb Ware Phase.

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All the papers deal with housepits and the archaeological cultures that built these structures. The papers dealing mainly with housepits pose new questions and interpretations through the observations made on the material. Paper I presents the chronological changes in housepits and, for the first time, brings up the problem of a changing settlement pattern during one cultural phase defined by its ceramic style. This idea is carried on throughout the work.

This synthesis paper is a further exploration of the most interesting themes presented in the Papers and expands the discussion to cover the corpus of research on Fennoscandian housepits. After the introduction, this synthesis continues with a general presentation of the main research areas (Chapter 2). I then define the used terminology (Chapter 3.1) and present a review of ethnographic research on pithouses (Chapter 3.2). Next, I outline the archaeological research on Fennoscandian housepits (Chapter 3.3). This chapter traces the changes in housepits as observed in the papers. This is followed by a chapter dealing with pithouses and sedentism (Chapter 3.4), which focuses on archaeological interpretations of sedentism among pithouse dwellers in Fennoscandia. Chapter 4 examines the relationships between the physical environment, culture, and housing.

The last chapter before the conclusions, 'Cultural change in the Stone Age 4000–2000 cal BC' (Chapter 5), combines and discusses further the observations made in the papers and in this synthesis paper. Both the evolution of housepits and the ways of defining an archaeological culture are at the centre of the discussion. In the last, concluding chapter, I sum up the main points of this work.

One ambition of this dissertation was to maintain an approach in which the questions are not answered only through individual sites. Here, the sites are integrated into wider chronological, environmental, and cultural contexts. In my opinion, it is necessary to maintain the connection between different cultural aspects. I believe that an understanding of a culture cannot be attained without a holistic view on various cultural phenomena. This dialogue should also be attached to the broader discourse on the subject. It is not an easy task to keep up this dialogue, but it is still worth trying.

2

A BRIEF OUTLINE OF THE RESEARCH AREAS

2.1 Geographic location and watercourses

The primary archaeological data used in this study originates from the Lake Saimaa area in the Finnish inland lake region, the River Vuoksi Valley on the Karelian Isthmus, Russia, and Virolahti Parish in extreme south-eastern Finland (Fig. 1). Although these three areas are associated with different water systems, they still lie within a radius of less than 250 kilometres. Virolahti parish is located on the Gulf of Finland, while the two case study areas are located by two major inland lake systems, Lake Saimaa and Lake Ladoga, which are connected to each other by the present outflow channel of Lake Saimaa, the Vuoksi River.

During most of the Stone Age, Ancient Lake Saimaa was a transgressive basin. Because the rate of land uplift is highest in the north-western part of the basin and lowest at the south-eastern corner, the outflow channel has slowly migrated from the north to the west and onwards to the south-eastern corner of the basin (Fig 2). After the formation of the present outflow channel, the Vuoksi River, in the south-eastern corner ca. 4000 cal BC, the shoreline has been regressive over the whole lake basin (Saarnisto 1970; Jussila 1999). The change from a transgressive to a regressive shoreline also changed the environment. Due to the regressive shoreline, new soil, more fine-grained and fertile than before (Vikkula 1994), was exposed, and this probably had some impact on the vegetation (Mökkönen 2000: 129–131).

In the case study area around Lake Saimaa (Paper I), the highest water level was reached between 4500 and 4000 cal BC, that is, just before the formation of the present outflow channel, the Vuoksi River. Nowadays, this area is referred to as the Vuoksi River catchment. Despite the fact that the whole Vuoksi River catchment area is larger than the maximum extent of Ancient Lake Saimaa, these two names are often used as synonyms.

In the region of Ancient Lake Ladoga (ca. 7800–1350 cal BC), the rate of land uplift is much slower than in the Lake Saimaa area. Actually, the present zero isobase for land uplift runs a few kilometres north of St. Petersburg, whence it continues as a roughly SW.–NE. oriented line through Lake Ladoga. During the Ancient Lake Ladoga Phase (ca. 7800–1350 cal BC), the outflow channel was located in the northern part of the Karelian Isthmus. At that time, the land uplift isobase on which the threshold was located split the ancient lake into a northern regressive area with a higher land uplift rate and a southern transgressive area with lower rate of land uplift. The case study area in the present Vuoksi River Valley (Papers II and IV) was located approximately on the same land uplift isobase as the Stone Age threshold.

Consequently, the shoreline was nearly stable before the formation of the present outflow channel, the River Neva (ca. 1350 cal BC) (see Saarnisto 2008). From ca. 4000 cal BC onwards, Lake Saimaa and Lake Ladoga have been connected by the Vuoksi River (Saarnisto 1970; Saarnisto & Siiriäinen 1970). Although the new inflow from Lake Saimaa accelerated the transgression in Lake Ladoga, the fluctuation in the research area (the Kaukola–Räisälä area) has been limited to one to two metres (Saarnisto 2008).

Lake Saimaa and Lake Ladoga are today lakes of considerable size. During the Stone Age, their surface areas were much wider still than today. Although the water was not salty and species were not as abundant as they were in the Baltic at the time, they can still be considered inland seas due to their impressive size, with their own seal populations that were trapped in the basins after the Ice Age.

In contrast to the lake areas, the whole Neolithic Stone Age in the Virolahti area on the Gulf of Finland was a period of continuous and constant shoreline regression (Miettinen, A. 2002). During the Neolithic, the easternmost part of the Finnish South Coast was topographically very similar to the Vuoksi River Valley on the

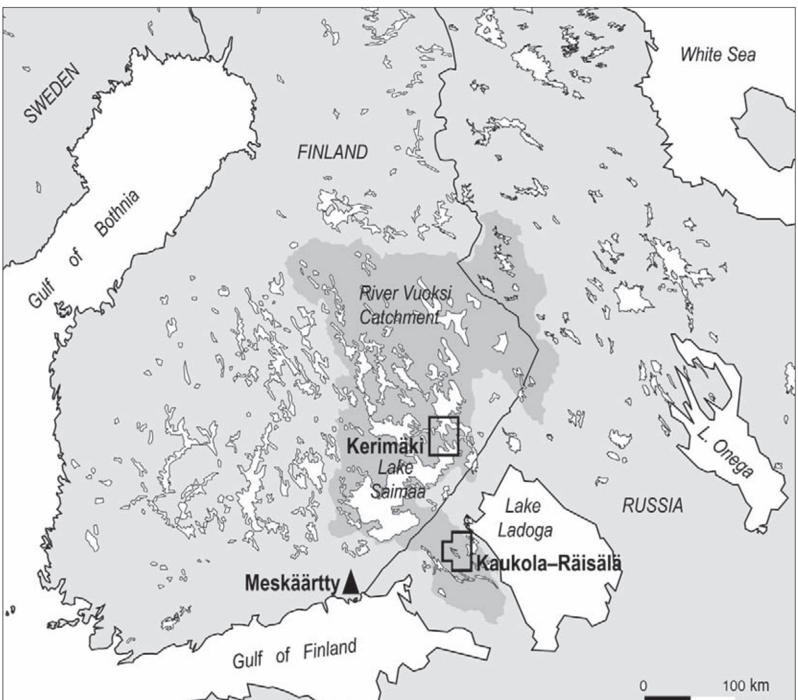


Fig. 1. The research areas. The Kerimäki case study area (Paper I) is located in the Eastern Lake Saimaa area, Finland. The Kaukola–Räisälä case study area (Papers II and IV) is located on the Karelian Isthmus, Russia. The Meskäärtty site (Paper III) is located in extreme south-eastern Finland. The area with darker grey shows the extent of the River Vuoksi catchment, which corresponds quite closely to the Ancient Lake Saimaa area (see Fig. 2).

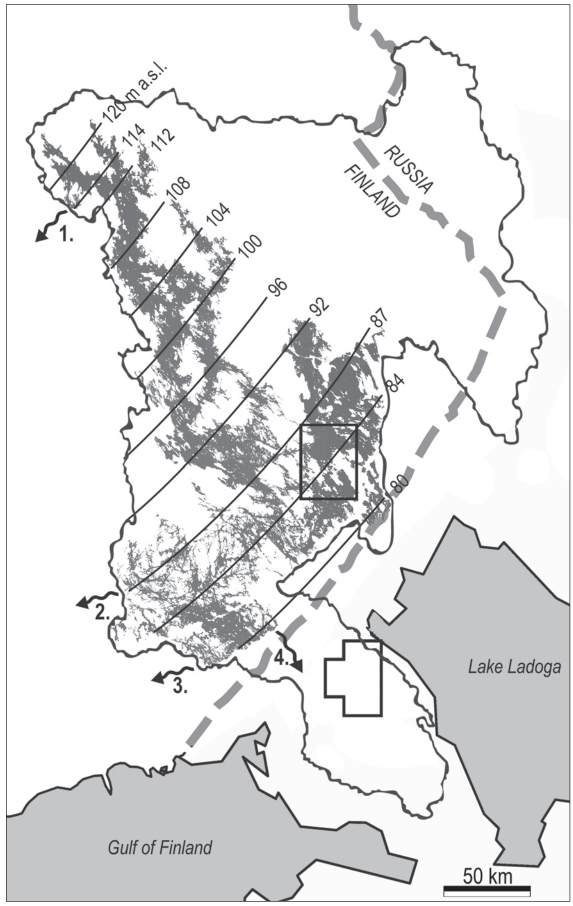


Fig. 2. The River Vuoksi catchment and the highest shoreline of Ancient Lake Saimaa. The Kerimäki case study area is marked with a square. The opening dates of the outflow channels are the following: (1) Pielavesi – ca. 7500 cal BC, (2) Matkuslampi – ca. 4900, (3) Kärenlampi – 4400 cal BC, and (4) the Vuoksi River– ca. 4000 cal BC. Before the formation of the Vuoksi River, the lake was divided into two parts, one with transgressive and the other with regressive shores, depending on the location of the active outflow channels. As a consequence of the shift of the outflow channels from the NW. to the SE. corner of basin, i.e., from the area of rapid land uplift to the one with a slower rate, the highest shoreline is metachronous in character. It is oldest in the north-western part and youngest in the south-eastern part. Therefore, the maximum extent of Ancient Lake Saimaa illustrated in the map has never existed at one time. The isobases show the elevation of the highest shorelines illustrated in the map. (Isobases after Saarnisto 1970: App. VIII; The highest shoreline after GTK 1996).

Karelian Isthmus, Russia. Deep and narrow bays stretching far into the interior and, in contrast, long capes reaching far out to sea characterized both areas (Mökkönen & Seitsonen 2007; Halinen & Mökkönen 2009). With respect to topography, south-eastern Finland and the Vuoksi River Valley are more clear-cut than the mosaic-like topography of the Ancient Lake Saimaa area.

2.2 Research history

2.2.1 Previous archaeological research

The primary data used in the Papers originate from areas where comprehensive archaeological surveys are of quite recent date. These surveys have revealed the true archaeological potential of the areas. This holds true especially in the case of house-pits, which Finnish archaeologists in general learned to indentify only in the late

1980's and early 1990's.[1] Accordingly, the corpus of housepit data from these areas has been built up during the last twenty-odd years. In addition, the two case study areas – one in Kerimäki parish and another in the Kaukola-Räisälä area – were both intensively surveyed for the case studies (see below).

During the period from the 1940's to the 1950's, a small number of excavations in the Ancient Lake Saimaa area produced asbestos-tempered pottery. Based on studies of the Pöljä site in Siilinjärvi Parish in the northern part of the Vuoksi River catchment, C. F. Meinander (1954a) defined the Pöljä type of asbestos ceramics, i.e., Pöljä Ware. Ten years later, Torsten Edgren (1964) described a Late Stone Age asbestos-tempered pottery type, Jysmä Ware, which was considered younger than Pöljä Ware. The latest typological and chronological study of asbestos-tempered ceramics deals with Early Asbestos Ware (Pesonen 1995; 1996a; 2001), which is a pottery type known to have existed from the early 20th century BC onwards (see also Meinander 1954a; Edgren 1966). Looking at the studies of ceramics, one could say that the Stone Age research history of the Ancient Lake Saimaa area is entwined with asbestos-tempered potteries.

Before the 1980's, Ancient Lake Saimaa was a poorly-studied area as far as archaeology is concerned. During the 1980's, this status began to change. In 1987, the Savonlinna Provincial Museum launched a survey project in Southern Savo Province (*Fi. Etelä-Savon muinasjäännösinventointi 2000 -projekti*), which revealed the research potential of the Lake Saimaa area (Fig. 3; Jussila et al. 1992; Lehtinen & Sepänmaa 1995). The results of this project were mainly published in a series of the Savonlinna Provincial Museum called Sihti (numbers 1–4).

The first extensive survey project was followed by *the Ancient Lake Saimaa Project* (*Fi. Muinais-Saimaa -projekti*, 1992–1996), which was conducted as a co-operation between the University of Helsinki, the provincial museums of Savonlinna and Kuopio, and the National Board of Antiquities (see Siiriäinen 1996; Vikkula 1995; Lavento 2008a). The project had a major impact on the knowledge of the prehistory of the area (Fig. 4). Even thought the studies yielded a mass of new sites and materials of various kinds, the use of this data in academic studies is still rather limited. Later on, this project was followed up by the *Saimaa-Ladoga Project* (*Fi. Saimaan Vuoksi projekti*, 1998–2003), in which the focus of the study was shifted from the Ancient Lake Saimaa area to the lower part of the Vuoksi River, i.e., to the Karelian Isthmus, Russia (Lavento 2008b).

The case study area in Kerimäki municipality, eastern Finland, was surveyed for the first time in 1991 (Jussila et al. 1992; Sepänmaa 1991, see also Sepänmaa 1995). For the case study (Mökkönen 2000; Paper I), the area was intensively re-surveyed in 1998 (Mökkönen 1999). The studies in Kerimäki parish were carried out in connection with the *Martinniemi Project* (1998–1999), which can be defined as an autonomous project intermediate between the Ancient Lake Saimaa Project and the Saimaa-Ladoga Project (Lavento 2008b) or as a sub-project within the latter.

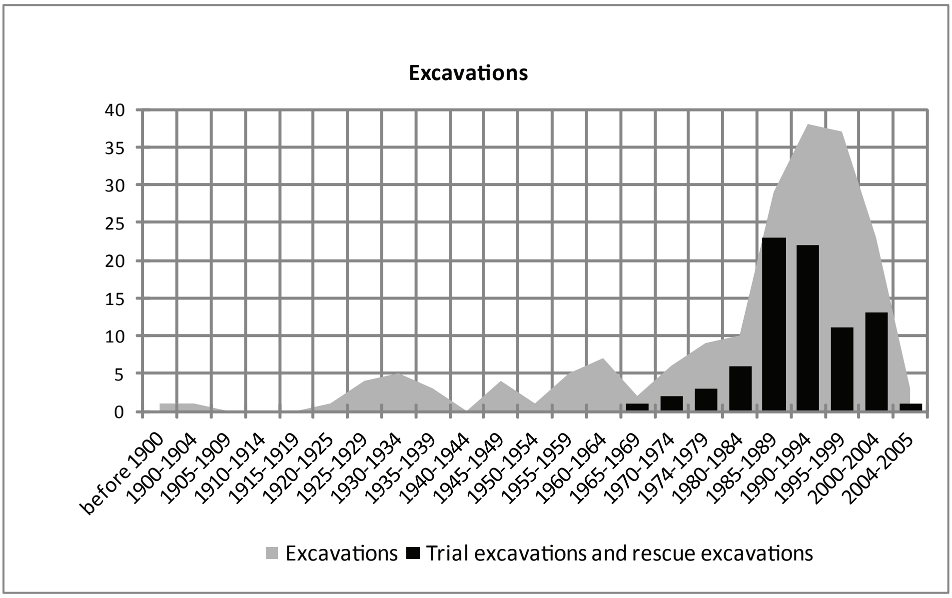
[1] It must be noted, however, that during late 1970's and the 1980's numerous housepits were found and excavated in Tervola Parish, southern Lapland, (see Kotivuori 1993; 1998; 2002). Before the 1990's, several housepits were known and some were excavated also in other parts of Finland (Meinander 1976; Matiskainen & Jussila 1984; Miettinen 1982; 1983; Hiekkanen 1984).

Fig. 3. In 1987, the Savonlinna provincial museum initiated a survey project in Southern Savo Province, in the Lake Saimaa area. The front cover of a questionnaire booklet for local inhabitants asks: 'Are there any ancient sites in Jäppilä?' (Lehtinen 1987).

The extreme south-eastern part of Finland, i.e., the south-eastern corner of Finland bounded by the Gulf of Finland and the Finnish-Russian border, has long been a weakly studied area. Until a few years ago, it lacked even the most elementary archaeological surveys. Consequently, this area has been poorly represented in the distribution maps of housepits (Miettinen, T. 1998; Pesonen 2002). Over the last few years, new archaeological surveys have revealed several new housepit sites. The Meskäärtty housepit (Paper III) is no longer the only large multi-room housepit by the Gulf of Finland. Another two-room housepit measuring 28 x 20 metres in size at the Karpankangas site in Virolahti parish was discovered in 2009 (Vuoristo 2009a–b). In addition, there are other large-sized housepits at the Karpankangas site, the largest measuring ca. 37 x 20 metres in size. Also a small number of other large housepits (Enqvist 2007; see also Nordqvist & Seitsonen 2008) as well as smaller ones (Enqvist 2006) have been reported over the last few years from the eastern Gulf of Finland coast.

The recent surveys have revealed that the Stone Age coastal zone in south-eastern Finland has been underrepresented in the data used in previous chorological studies on housepits (Pesonen 1999a; 2002). Although the latest surveys are recent, the time available for fieldwork was limited when compared to the large area of the surveyed municipalities. There are thus reasons to suspect that a large number of unknown housepit sites still remain to be discovered.

While intensive archaeological research in the Lake Saimaa area and in extreme south-eastern Finland is of recent age, the situation on the Karelian Isthmus is quite the opposite. Archaeological material collected and excavated in the Kaukola–Räisälä case study area located on the Karelian Isthmus (Russia) has played an essential part in early Stone Age research in Finland. The first Stone Age excavation ever conducted by a Finnish archaeologist took place in Räisälä in 1892, when Theodor Schvindt excavated the Teperinaho site (Uino 2003: 127). The most intensive period of Stone Age research was a bit later, during the first two decades of the 20th century (Lavento et al. 2001; Huurre 2003: 154–157; Uino 2003). The early research is well documented in publications and articles both by the archaeologists who conducted the research (Ailio 1909; Pälsi 1915; 1918) as well as by current archaeologists (Uino 1997; 2003; Lavento et al. 2001; Huurre 2003; Lavento 2008a–b; Nordqvist et al.



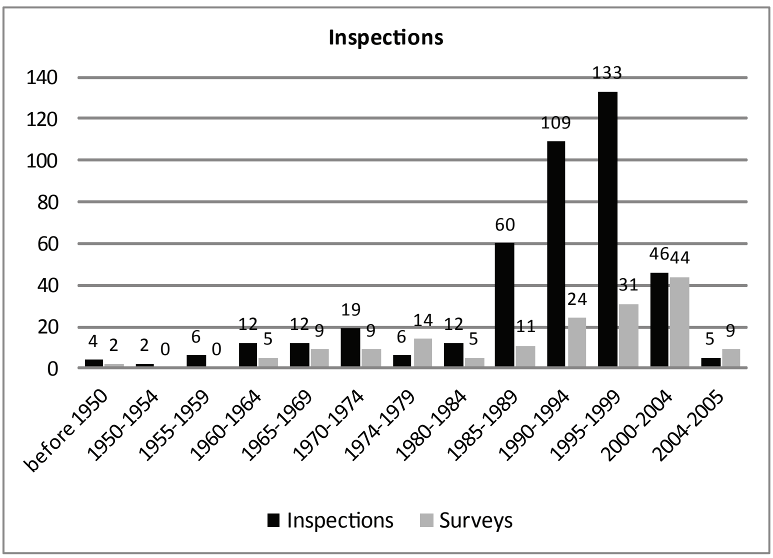


Fig. 4. The number of archaeological reports from the Ancient Lake Saimaa area up to the summer of 2005. The peak in research activities in the Ancient Lake Saimaa area associated with the projects of the late 1980's to the late 1990's is obvious. The sum total of archaeological reports consisted of 163 excavation reports, 189 survey reports, and 426 inspection reports.

2009). The material from the Kaukola–Räisälä area has been frequently used in many later studies concerning the Stone Age and Early Metal Period (e.g. Carpelan 1965; 1979; Huurre 2003; Lavento 2001; Meinander 1954a–b; Vikkula 1988).

In the Treaty of Paris (1947), the research area in Kaukola and Räisälä was ceded by Finland to the Soviet Union along with the rest of the Karelian Isthmus. This was followed by a quiet period in Stone Age research, and only a few surveys and excavations were carried out there before the 1990's. The archaeological material from the early 20th century is catalogued at the Finnish National Board of Antiquities, and consequently Russian archaeologists were not aware of the existence of sites in the area. From 1993 to 2002, a Russian archaeologist, V. I. Timofeev, conducted small-scale excavations at some of the sites around Lake Riukjärvi in Kaukola. These sites were originally discovered and excavated by Finnish archaeologists during the early 20th century. (Uino 1997: Append. 1; 2003: 141–142; Lavento et al. 2001: 6–8; Mökkönen & Nordqvist 2006; Nordqvist et al. 2008).

A second intensive research phase began in 1999, when Finnish–Russian co-operation commenced with a survey of the Kaukola–Räisälä area (Lavento et al. 2001; Nordqvist & Lavento 2008). The co-operation continued in 2002 with an excavation of a housepit site, Juoksemajärvi Westend, in Räisälä municipality (Seitsonen 2005a; Halinen et al. 2008; Timofeev et al. 2004; see also Halinen & Mökkönen 2009). The research continued in the form of the Kaukola–Räisälä Project (2004–2006), with intensive surveys and small-scale excavations (Lavento et al. 2006; Mökkönen et al. 2006; Halinen & Mökkönen 2009). Since 1999, the total number of known Stone Age and Early Metal period sites increased from 24 to 145. Similarly, after the first housepits on the Karelian Isthmus were discovered in 1999 (Lavento et al. 2001), the number of housepits in the Kaukola–Räisälä area has grown to over eighty (Papers II and IV).

2.2.2 Stone Age cultures in the research area

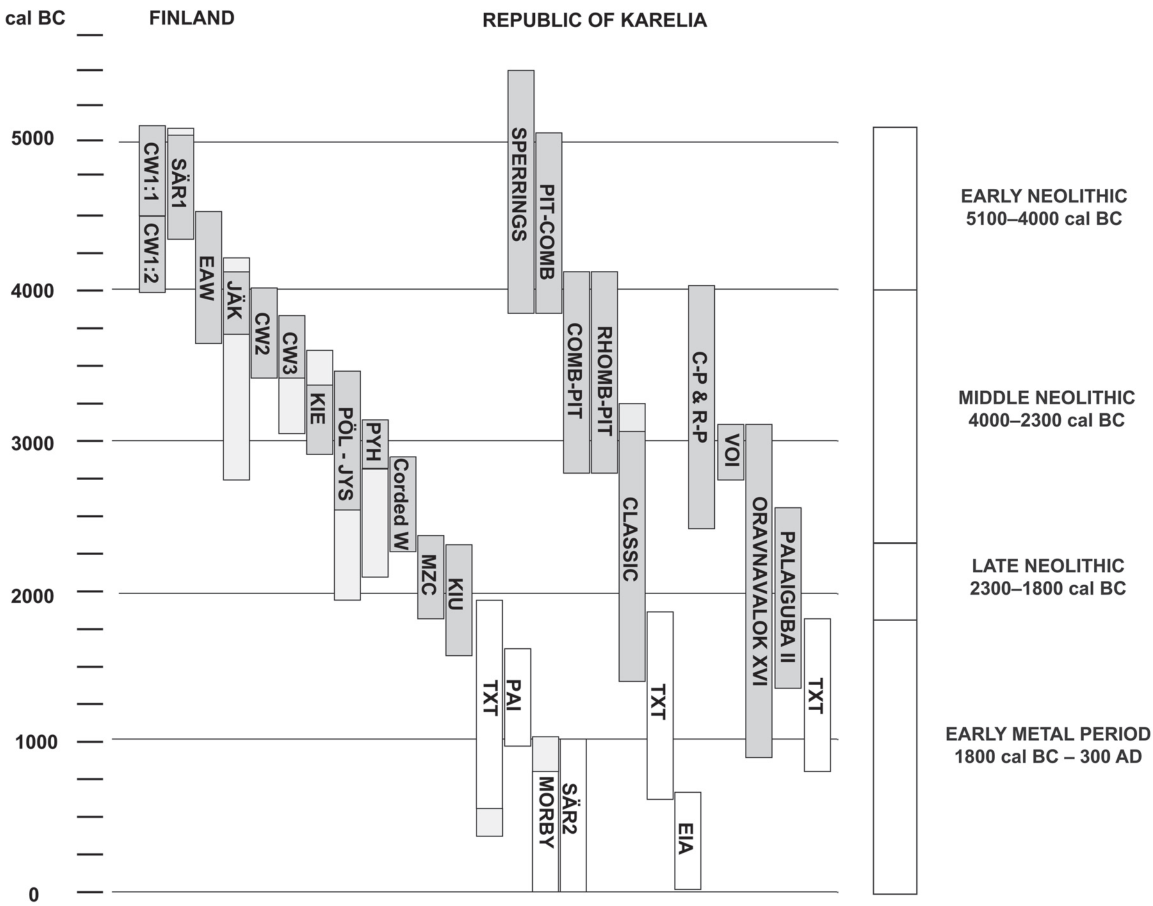
In Finnish archaeology, the typology of ceramics has played a central role. From the establishment of Äyräpää's (1930) typology of Comb Ware up to the early 21st century, pottery types were thought to form chronological periods that followed one another quite rigidly. This lead to the ceramic types being treated as chronological sequences, and these in turn were transformed into cultures or cultural phases in a similar fashion as in Russian archaeology (e.g. Lavento 2002). Finnish research has traditionally concentrated on artefact typologies, and in Neolithic and Early Metal Period contexts the ceramic types are considered cultural/ethnic markers. However, thanks to AMS radiocarbon dates on charred crust adhering to ceramics, it is now known that there is much more overlap between pottery types than has been previously thought (Fig. 5). For example, Typical Comb Ware and Late Comb Ware (referred to henceforth respectively as CW2 and CW3), which were thought to represent two successive chronological sequences, actually have a longer period of co-occurrence than the span of these ceramic types as the sole type of Comb Ware in use (Pesonen 2004; Pesonen & Leskinen 2009).

Fig. 5. Suggestion for a chronological diagram of the pottery styles in Finland and the Republic of Karelia, Russia. Stone Age ceramics in grey; Early Metal period/Bronze Age – Early Roman Iron Age ceramics in white. A lighter grey colour towards the end of the column indicates a paucity of dates. The diagram is adapted from Paper IV with slight modification. On right, the periodization of the Finnish Neolithic Stone Age after Carpelan (2002).
Abbreviations:
Finland (after Asplund 1997; 2004; Carpelan 1999; Edgren 1999; Lavento 2001; Pesonen 2004; The beginning of Corded Ware is relocated, see text)
CW1 = Early Comb Ware (a.k.a. Sperrings), SÄR1 = Säräisniemi 1 Ware, EAW = Early Asbestos Ware, JÄK = Jäkärlä Ware, CW2 = Typical Comb Ware, CW3 = Late Comb Ware, KIE = Kierikki Ware, PÖL–JYS = Pöljä and Jysmä Wares, PYH = Pyheensilta Ware, Corded W = Corded Ware, MZC = Middle Zone Ceramics/Pottery, KIU = Kiukainen ware, TXT = Textile pottery, PAI = Paimio ware, MORBY = Morby Ware, SÄR2 = Sär[äisniemi]2 ceramics.
Republic of Karelia
Left columns after Kosmenko (2004): Sperrings = Early Comb Ware, PIT-COMB = Pit-Comb Ware, COMB-PIT = Comb-Pit Ceramics, RHOMB-PIT = Rhombic Pit Ceramics, CLASSIC = “Classic” ceramics (organic and asbestos tempered), TXT = Net (“Textile”) Ware, EIA = Early Iron Age, Net Ware-Ananino mixed type ceramics
Right columns after Zhul’nikov (1999): C-P & R-P = Comb-Pit and Rhomb-Pit Ceramics, VOI = Voinavolok XXVII ceramics, TXT = Textile pottery

In the Ancient Lake Saimaa area, the Karelian Isthmus, and south-eastern Finland, the first part of the Neolithic Stone Age is considered to have been dominated by people using Comb Wares. During the few centuries before and after 4000 cal BC, Early Asbestos Ware was used alongside Early Comb Ware and CW2 (Pesonen 1996a; 2001). The centre of the distribution of Early Asbestos Ware lies in the Ancient Lake Saimaa area, but it is also found on the Karelian Isthmus and in south-eastern Finland, albeit to a lesser degree (Pesonen 1999).

At the time when CW2 was in use, the material culture of the area was fairly homogenous. There were, of course, some regional characteristics in ceramics, such as the above-mentioned Early Asbestos Ware and the occasional use of asbestos temper in CW2 in the Lake Saimaa area. Another regional characteristic is the appearance of more eastern-oriented pottery types – i.e., Pit-Comb Ware, Comb-Pit Ware, and Rhomb-Pit Ware – in the eastern Vuoksi River catchment and on the Karelian Isthmus (e.g. Luho 1948: 48; Huurre 1990: 28–32; Edgren 1993: 44–47, 104–107; Pesonen 1999b). However, CW2 dominates the overall picture of ceramics (Carpelan 1999).

The regional differences in ceramics emerge most strikingly after the middle of the Middle Neolithic (ca. 3500–3400 cal BC), when the Lake Saimaa area came to be dominated by asbestos tempered wares (Kierikki–Pöljä–Jysmä). A bit later, the differences in material culture were further amplified when the Corded Ware Culture spread to the shores of the Gulf of Finland and to the Karelian Isthmus. In south-western Finland, Pyheensilta Ware continued the Comb Ware tradition alongside Corded



Ware (e.g. Carpelan 1999). In fact, the heterogeneity of ceramics during latter part of Middle Neolithic is well represented even at individual sites, examples including the material found at the Puumala Kärmelahti (Katiskoski 2002) and Meskäärtty (Paper III) dwellings sites.

The beginning of the Corded Ware Culture is traditionally dated in Finland to ca. 3200 cal BC (see Carpelan 1999; 2004; Carpelan & Parpola 2001). In light of current Central European research this Finnish date, based on conventional radiocarbon dates on charcoal (see Carpelan 2004), is far too early.[2] In Central Europe, the oldest reliable radiocarbon dates date to 3000–2900 cal BC, while the majority date to after 2800 cal BC (Furholt 2003; 2008; Włodarczak 2009). The oldest radiocarbon date of Corded Ware on crust adhering to pottery available from the research area dates

[2] Not until the final stage of this work I did understand the weakness of the Finnish chronology concerning the beginning of the Corded Ware Culture. The early beginning date of 3200 cal BC is used in the articles, but in the chronological scheme (Fig. 5) published here, I have corrected the beginning to be more in line with the oldest reliable radiocarbon dates obtained from Central Europe. I thank Dr. Volker Heyn for drawing my attention to this peculiarity in Finnish Stone Age chronology

to 2900–2600 cal BC (Hela–468, 4130±60 BP, Saarnisto 2003). This means that the Corded Ware culture was present at the Kaukola Lavamäki site on the Karelian Isthmus, Russia, already during the very early phase.

In the papers, I have used the 'traditional', i.e., incorrect, dating of the Corded Ware Culture. This changes some of the interpretations (especially those in Paper III), but viewing the whole chronological schema, I do not consider this to be a major problem. The number of available recent AMS radiocarbon dates on crust adhering to ceramics or bones is so diminutive that the chronology is still for the most part anchored to the results of other available dating methods. In this, CW2 is an exception (see Pesonen 2004). The majority of given dates are based on conventional radiocarbon dating and shoreline displacement dating, which are not as accurate as modern radiocarbon dates. In this respect, the dates of different events in the archaeological material used in this study are to be seen as suggestive rather than absolute. The accuracy of different chronologies is discussed below in Chapters 5.1–5.2.

During the later part of the Neolithic (ca. 3400–1800 cal BC), the ceramics profile of the research area is diverse. It can be said that the material culture of the late Middle Neolithic and Late Neolithic is generally not very well known. This is especially true of material dating from 2500 to 2000 cal BC. The heterogeneity and regional differentiation of ceramic styles renders typological studies very challenging. One of the main difficulties in late Middle Neolithic and Late Neolithic pottery studies is derives from the research history. The non-asbestos-tempered ceramic types in the Finnish Baltic coastal zone, i.e., Pyheensilta Ware and Kiukainen Ware, are defined on the basis of the material of a single or a small number of dwelling sites located in south-western Finland (Meinander 1940; 1954a). Later, attempts were made to use these pottery types in a similar way as the older ceramics types. However, the ceramics dating to the latter part of the Neolithic found in other areas, e.g., south-eastern Finland and the Karelian Isthmus, do not fit very well into the mould created in south-western Finland (Paper III, see more in Chapter 5.1, see also Carpelan 1999: 260).

In the Ancient Lake Saimaa area, the later part of the Neolithic – or simply the period after CW2 – is dominated by asbestos and organic-tempered wares, of which the Pöljä-Jysmä ceramic tradition is thought to persist until the end of the Stone Age. Such wares are also found to a minor extent on the Gulf of Finland coast as well as on the Karelian Isthmus, but there the material of the later part of the Neolithic is poorly known archaeologically. In south-eastern Finland, the latter half of the Neolithic is characterized by cultural influences from every direction (see Miettinen, T. 1998; Mökkönen & Seitsonen 2007; Paper III).

On the Karelian Isthmus, the period after CW2 is also poorly known (Paper IV). The asbestos wares dominating the material in the Lake Saimaa area did not spread intensively to the Karelian Isthmus (Huurre 2003: 198). In addition, it seems possible that CW3 ceramics remained in use longer on the Karelian Isthmus and in coastal south-eastern Finland than it did in other parts of Finland (Paper IV). Likewise, in the same area, the CW3 tradition and the Corded Ware tradition presumably interacted more intensively and earlier than in south-western Finland (Carpelan et al. 2008, Paper III).

3

HOUSEPITS – ARCHAEOLOGICAL REMAINS OF PITHOUSES

3.1 About terminology

A housepit represents the remains of a dwelling structure, the floor of which was dug below the ground surface. In Finnish archaeological studies, the Finnish term for housepit – *asumuspainanne (Fi.)* – became established during the 1990's. The previously used terminology varied, and the following Finnish terms were frequently used: *Madeneva-tyypin kodanpohja – Engl. 'Madeneva-type hut floor'* (Meinander 1976; see also Karjalainen 1996a), *asuinpainanne – Engl. 'dwelling depression'* (Karjalainen 1996a; Kotivuori 1996a), *asumuksenpohja – Engl. 'base of a dwelling'* (e.g. Moisanen 1991) and *kodansija/kodanpohja – Engl. 'hut site/hut floor'* (Kotivuori 1993; 1996b; Koivunen 1996).

A standard English terminology has yet to be agreed upon. Texts written in English by Finnish archaeologists have used terms such as *semisubterranean/semi-subterranean house (remain)/dwelling* (Nuñez & Uino 1997; Núñez & Okkonen 1999; 2005; Núñez 2004; 2009a; Pesonen 2002), *dwelling depression* (Katiskoski 2002; Costopoulos 2005; Vaneeckhout 2008a–2009b), *pithouse* (Karjalainen 1996b, Pesonen 2006), *pit house* (Karjalainen 1999), *house pit* (Paper I; Halinen et al. 2002; Kankaanpää 2002; Ojanlatva & Alakärppä 2002; Rankama 2002), and *house depression* (Leskinen 2002).

In other Nordic countries, the terminology is also variable. In Sweden, terms like Stone Age *house remain* (Lundberg 1985) and *pit house* (Loeffler & Westfal 1985) have been used. Some archaeologists have used paraphrases such as 'pit construction with more or less pronounced embankments' (Liedgren 1998). In recent dissertations, the use of *semi-subterranean house (remain)* seems to be well established (Lundberg 1997; Norberg 2008).

In studies on Norwegian housepits written in English, the most frequently-used terms have been *pit house/pit-house* (Engelstad 1988; 1990; Hood 1995) and simply house (Helskog 1984; Renouf 1984; Hesjedal et al. 1996; Hodgetts 2010; Niemi 2010). In recent papers, however, the term *semi-subterranean house* has been preferred (Bjerck 1991; Engelstad 1991; Ramstad et al. 2005; Skandfer 2009; Hood & Helama 2010).

In this work, I have used the simple term *housepit* (excluding Paper I, in which the term is written separately), which I have adopted from North American archaeological literature. According to Canadian archaeologist Brian Hayden (1997), the term pithouse refers to a whole *pithouse* and its standing wooden structures. When the structures have collapsed and only a pit remains, the preferred term is *housepit*. I liked the simplicity of this terminology. Accordingly, in the terminology used in this work a housepit is an archaeological remain of a pithouse.

The appearance of housepits is rather polymorphic. In the Finnish archaeological record of housepits, the depth of the depressions visible on the surface varies usually between 20 and 60 cm, although deeper examples do exist. The shapes of the depressions vary from round to elliptical. Some are clearly rectangular. There is great variation in the size of the housepits. The smallest ones are less than 4 metres in diameter while the largest are tens of metres in length. The longest multi-room houses, also referred to as terrace houses, measure over 50 metres from end to end (Núñez & Okkonen 2005, see Paper III).

The primary data used in this study originates from an area where no other Stone Age semi-subterranean dwelling structures than housepits exist. However, housepits are not the only Stone Age semi-subterranean dwellings/dwelling-like structures in Finland. The others are known as settlement embankments (*Fi. asuinpaikkavallit*) and 'Giant's Churches' (*Fi. jätinkirkot*). Although these are usually larger than housepits, there is still some overlap in size. In addition to size, the grouping of semi-subterranean structures is based on the soil type on which the structures have been erected. Housepits lie on sandy soils, settlement embankments on very stony moraines or boulder fields, and 'Giant's Churches' mainly on boulder fields (Okkonen 2003: 28–30, 101–103; Pesonen 2002: 13–14; see also Schultz 2009). As I see it, this grouping is partly artificial, and all the structures are manifestations of a single tradition of building semi-subterranean structures (Paper III).[3]

3.2 Pithouses in enthnographic sources

This section presents some general correlations between different aspects of housing and mobility. Semi-subterranean dwelling structures known from archaeological or ethnographical sources have a distribution that largely coincides with the arctic-subarctic climate zone and includes boreal coniferous forest, temperate mixed forest, and regions such as mountains and deserts, where the climate is cold at least part of the year (Fig. 6).

[3] Traditionally, 'Giant's Churches' have been considered to be structures used for other purposes than human habitation. A wide range of propositions includes natural formations (Ailio 1923), hunter's campsites (Forss 1981; Edgren 1993: 105), storage structures (Okkonen & Ikäheimo 1993; Koivunen 1997), fortresses (Sipilä & Lahelma 2006) and ceremonial structures (Okkonen 2003; see also Okkonen & Ridderstad 2009). A more comprehensive list of suggested intepretations has been published, for example, in Okkonen (2003), Núñez & Okkonen (2005), Sipilä & Lahelma (2006) and Núñez (2009b). The great variety of interpretations is obviously due to the minute number of excavations. Recently, excavations at the 'Giant's Church' at the Honkobackaharju site, Middle Ostrobothnia, revealed well develped cultural layers and high phosphate values inside the structure, as well as marks of wooden structures and at least two building stages (Schulz 2009). The number of finds – including lithic artefacts of quartz and other rocks, and asbestos tempered pottery resembling Pöljä Ware – is low as compared to material typically found in contemporary dwelling sites (ibid.). At present, it seems that 'Giant's Churces' are to be interpreted as structures with various possible functions, including a function as a dwelling (Okkonen 2009; Schulz 2009).

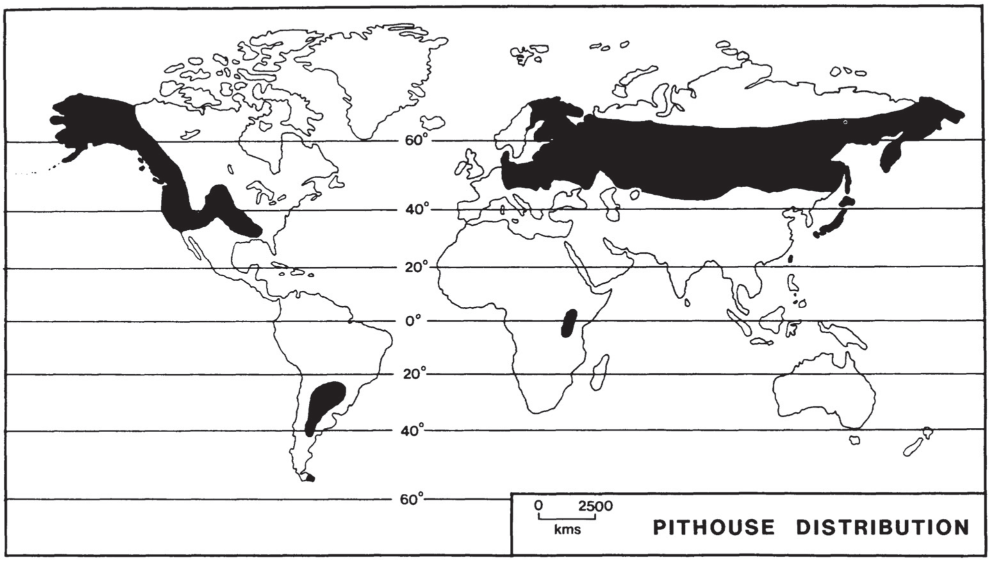


Fig. 6. The worldwide distribution of pithouses in archaeological and ethnographic sources. The original map published by Gilman (1987: Figure 1.) depicts the North Fennoscandian distribution incorrectly. It is slightly modified here. The map also lacks the housepits from the North American Central and Eastern Arctic and Subarctic as well as from the Northern Woodland on the East Coast known from ethnographic and archaeological records (e.g. Fitzhugh 1972; Trigger 1978; Helm 1981; Damas 1984; Hood 1995).

In the *Ethnographic Atlas* compiled by Georg P. Murdock (1967), 84 groups have subterranean pit structures as their primary or secondary dwellings. According to the data, three conditions are nearly always connected with pithouse habitation: (1) a non-tropical, i.e., cool or cold climate during the season of use, (2) reliance on stored food while the dwelling is inhabited, and (3) permanent winter sites or a more sedentary settlement pattern. (Gilman 1987.)

Lewis R. Binford (1990) has studied the relations between mobility, housing, and subsistence on the basis of ethnographic sources. The *Ethnographic Atlas* forms the core of his data, although he has modified it by adding new variables. According to Binford, there is a fairly strong correlation between rectangular ground plans and sedentary habitation (Fig. 7). Likewise, the distribution of semi-subterranean structures is emphasized among semi-sedentary and sedentary hunter-gatherers.

In the ethnographic sources, pithouses are used primarily as winter houses (Gilman 1987). This means that ethnographic data point to the presence of alternative summer housing, either at separate summer sites or at the same year-round dwelling site where the pithouses were built (see Binford 1990; Gilman 1987). There are only a few known examples of summer habitation in pithouses around the North Pacific Ocean, where the climate is cool to cold all year round. They include the Koryak (Kamchatka Peninsula, Russia) as well as the Aleut and the Alutiiq (Prince William Sound, the Alaska and Kenai peninsulas, Kodiak, Afognak, and the Aleutian Islands,

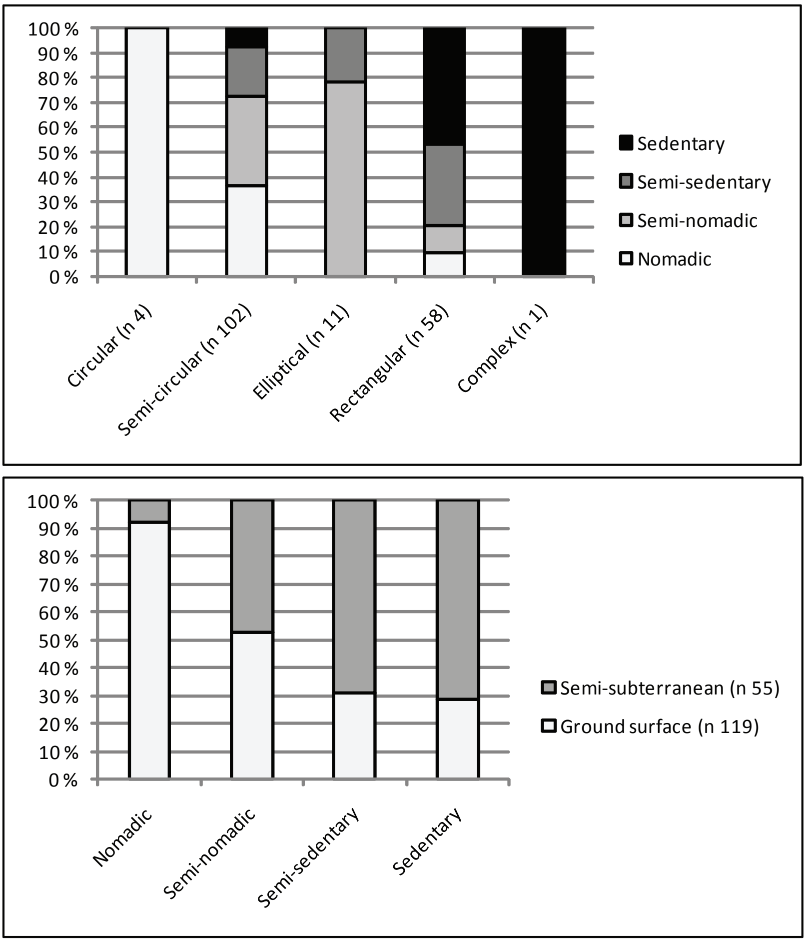


Fig. 7. The relations between hunter-gatherer mobility and primary housing in ethnographic data according to Binford (1990). A (above) – the relation between ground plan and mobility. B – the distribution of ground surface and semi-subterranean dwelling structures in relation to mobility. Complex ground plans are polygonal or quadrangular and may include an interior court.

Alaska). The Koryak have distinct winter and summer sites, the former on the coast and the latter upriver inland (Jochelson 1975). In the Aleutian region, the large communal pithouses ('barabaras') were mainly used as winter dwellings, although they were, at least during late 18th century, occasionally also used during the summer–autumn (Hoffman 1999).

I believe that prehistoric pithouses were primarily winter houses. However, the ethnographically based notion of pithouses as nearly exclusively winter houses does not necessarily hold equally well for all prehistoric cases. As concerns the Stone Age housepits considered in this study, it is probable that the conditions preventing summer habitation were not valid in the latter part of the Middle Neolithic (Paper IV). At that time, pithouses were erected in locations that suggest other than winter-only

Fig. 8. Map of Fennoscandian areas cited in text.

occupation. Therefore, I believe that there is no need to categorically deny the possibility that some Stone Age housepits are the remains of dwellings inhabited year-round (*vide* Chapter 3.5).

3.3 Archaeological research on housepits in Fennoscandia

This chapter summarizes the research history and chronological trends relating to Neolithic housepits in Fennoscandia (Fig. 8). In contrast to Finland, large numbers of Mesolithic housepits are known from the other Fennoscandian countries. Still, over all of Fennoscandia the most active period of pithouse building was the Neolithic Stone Age, the epoch with which this study is mainly concerned. This section focuses on chronological changes in size, shape, clustering, site location, and materials associated with housepits. Housepits on the Karelian Isthmus, Russia, are not discussed in this section. They are presented in Papers II and IV.

3.3.1 Finland

Housepits are a rather recently discovered subject in Finnish archaeology. Prior to the 1980's, other kinds of structures dominated the picture of Stone Age housing. The *Räisälä hut*, a conical hut with an upright frame structure supporting the roof beams, was excavated and interpreted by Sakari Pälsi (1918). It became the prototype of a Finnish Stone Age dwelling for decades. Recently, Pälsi's interpretation has been questioned, and based on a re-evaluation of Pälsi's field documentation the remains have been re-interpreted as half of a pithouse associated with asbestos tempered Pöljä Ware (Seitsonen 2006).

During 1950's and 1960's, several remains of semi-subterranean dwellings were excavated in different parts of Finland. The results were introduced in the *Nordisk arkeologimötet* conference in Helsinki in 1967. In a paper based on his presentation, Meinander (1976) introduced a new Stone Age dwelling type referred to as the *Madeneva-type hut floor*. Nowadays this term is no longer used and the Madeneva-type huts are counted as housepits.

The 1990's was the decade when Finnish housepits were discovered on a large scale. In the municipality of Tervola in Southern Lapland, a number of housepits were excavated already during late 1970's and 1980's but the results were never published, though they have since been utilized by Hannu Kotivuori (1993; see also 2002). During 1990's, large numbers of new housepit sites were found in surveys in the Finnish inland region, especially in the Lake Saimaa area, and on Stone Age shorelines of the Gulf of Bothnia in western–northwestern Finland. I assume that the housepit distribution maps published by Pesonen (2002a) are still quite well up to date. During the past five years, the largest number of new housepits (as compared to previously known numbers) has been found in south-eastern Finland, which used to be an area with a sparse housepit distribution (Fig. 9, see also Chapter 2.2.1).

As I see it, the boom in housepit research declined after the two-day seminar held at the Finnish National Museum in 2000 and the book *Huts and Houses, Stone Age and Early Metal Period buildings in Finland* (Ranta (ed.) 2002) in which the presentations were published. To be sure, the decline was not due to the seminar but to changes in the financial arrangements that had sustained the earlier research.[4] In consequence, the book became an unintentional intermediate summary of the most active period of housepit research so far. With a few exceptions, the articles in the book are still focused on empirical description concerning structural details, dating, and materials associated with housepits. Two articles in the book that described the first concrete remains of Stone Age timber frame constructions in Finland (Katiskoski 2002; Leskinen 2002) closed the debate on the possibility of timber constructions in Finnish housepits (see Meinander 1976; Karjalainen 1996a). Most of the papers in the publication deal with individual housepits or housepit sites representing the finds and structural remains. At the time, research still largely concentrated on the basics of understanding the dating and the variability of materials associated with housepits.

[4] The decline in housepit research was mainly due to the withdrawal of the government employment programmes, which were the main source of financial support for the housepit excavations in the Lake Saimaa area and Northern Ostrobothnia during the 1990's.

Fig. 9. The distribution of housepit sites in Finland up to the year 2002. The main difference as compared to the present situation is represented by the new housepit sites discovered in coastal south-eastern Finland, which was totally blank prior to 2006. (Picture from Pesonen 2002: Fig. 1).

By the year 2000, there were about 3500 known housepits distributed over approximately 650 dwelling sites. At that time, there were 117 housepits of which at least one quarter had been excavated. The greatest numbers of housepits were found on Stone Age shorelines in Ostrobothnia and southern Lapland, where several large village-like housepit clusters with tens of housepits are located. In contrast, in the Finnish inland region there are less than twenty housepit sites exceeding ten housepits per site. (Pesonen 2002.)

Most of the housepits date to the Middle Neolithic period (ca. 4000–2300 cal BC) and are associated with CW2, CW3 and asbestos tempered wares of the Kierikki and Pöljä type. A notably smaller number of housepits are associated with organic-tempered, poorly studied Stone Age ceramics (see Paper III) and Early Metal Period asbestos-tempered wares (Sär 2 group) (Paper I; Pesonen 2002). In Ostrobothnia, the largest number of housepits and housepit sites, including village-like settlements sometimes consisting of clusters of over a hundred housepits, date to a period extending less than a thousand years before and after 3000 cal BC (Núñez & Okkonen 1999; Pesonen 2002; Okkonen 2003: 169–172; Vaneeckhout 2009a–b). In coastal Ostrobothnia, a rapid increase in the number of housepit sites began after 3500 cal BC, and an even slightly more drastic decrease occurred after 2500 cal BC (Okkonen 2003: 169–172).

Parallel to the appearance of village-like settlements ran a shift towards larger houses. In Finland, the larger and deeper housepits with surrounding embankments and often with entrances or antechambers visible on the surface predominantly date from ca. 3500 cal BC to the beginning of the Bronze Age ca. 1800 cal BC (Papers I, III and IV; Halinen et al. 2002; 2003; Katiskoski 2002; Ojanlatva & Alakärppä 2002; Núñez & Okkonen 2005). The larger housepits, including multi-room examples, date predominantly later than 3300 cal BC (Okkonen 2003; Núñez & Okkonen 2005; Paper IV). In the Yli-Ii area, Northern Ostrobothnia, a nearly exponential growth of the largest housepits began during the late CW2 period and peaked about 1500 years later, ca. 2200–2000 cal BC (Vaneeckhout 2008a, b; 2009a, c). The growth of the largest housepits is frequently more to do with an increase in length than in width (Núñez & Okkonen 2005; Paper IV). Despite the fact that a similar increasing trend in housepit sizes is observed also in the Lake Saimaa area (Paper I) and on the Karelian Isthmus, Russia (Paper IV), the largest housepits in these areas are not as numerous nor as large as in Ostrobothnia.

There seems to be a general trend in Finland that the largest housepits date from the last quarter of the 4th millennium onwards. In some areas, however, this notion does not hold true. On northernmost shore of the Gulf of Bothnia, in Tervola municipality, the largest housepits are associated with CW2 while the younger housepits with Pöljä Ware are of smaller size (Kotivuori 2002: 165).

The correlation between the housepit and the original pithouse is not completely straightforward. In the opening paper of *Huts and Houses*, Pesonen (2002a: 29–31) states that all the excavated housepits have proven to be quadrangular, even though the ultimate shape of the depression itself was roundish. He seems to assume that all housepits from CW2 onwards have been rectangular. Pesonen argues that in the cases when the locations of finds have been pinpointed exactly, the foundation of the house has turned out to be rectangular.

According to Pesonen, not one of the excavated housepits has turned out to be round or oval, only quadrangular. In a table summarizing the excavated housepits, Pesonen (2002: Table 5) divided the ground plans into rectangular, quadrangular, and unidentified. I read this as a binary division into housepits with (the rectangular and square examples) and without observed corners. The examples with corners are predominantly associated with Kierikki-Pöljä asbestos wares and with material dating to the Early Metal Period. The excavated housepits with an 'unidentified' ground plan (i.e., 'the cornerless ones') are predominantly associated with CW2 and CW3, although some cornered examples of similar age are also known.

I believe that there are certain links between the visible shape of a housepit and the original pithouse. The chronological difference in housepits with or without corners cannot be merely a function of the excavator's ability to observe the shape of the dwelling. Nor do I suppose that that the presence or absence of corners derives simply from differences in post-depositional processes. In my view, it is quite possible that a real change in the way pithouses were constructed took place during the CW2 period (4000–3400 cal BC), the 'cornerless types' dominating the older phase and the ones with corners becoming predominant in the younger phase after CW2.

It is true that observations made on the surface do not automatically correspond to the shape of the original pithouse as revealed by excavations. However, measurements using the housepits' dip points as datums have turned out to correspond well with the original wall lines (e.g. Helskog 1984: 63–64; Pesonen 2002: 27). Therefore,

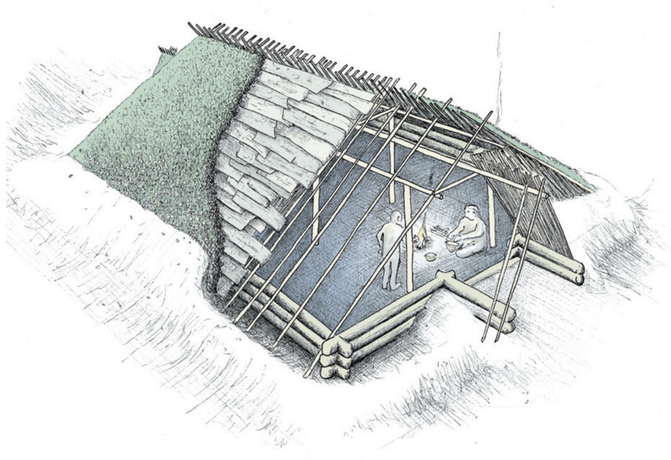


Fig. 10. Reconstruction of the Kärmelahti pithouse. The dwelling 8 x 7-7.5 metres in size dates to 3200–2800 cal BC. Drawing by Mikko Rautala from Katiskoski (2002).

the size of the original pithouse can be approximately measured on the surface of the housepit. Regarding the relation between surface observations of a housepit and the original shape of the pithouse, I am not as pessimistic as Pesonen (2002: 29). In some cases, the shape of the housepit is clearly rectangular/quadrangular with slightly rounded corners, and in some other cases it is clearly round or oval. I am convinced that there is a reasonable correlation between surface observations of housepits and the original shape of the pithouse, and that the correlation has a temporal dimension as well. The largest housepits and those with a clearly rectangular or oblong shape – in contrast to older ones of more elliptical or roundish shape – date largely later than CW2. The size of the housepit began to increase already during the CW2 phase, mainly in length and occasionally also in depth (Paper I; Núñez & Okkonen 2005; Vaneeckhout 2008a–b; 2009 a, c; Paper IV).

There is currently no concrete evidence of log frames earlier than ca. 3400–3000 cal BC, the two oldest examples being Puumala Kärmelahti (Fig. 10, Katiskoski 2002) and Yli-Ii Purkajansuo/Korvala (Fig. 11, Shultz 2000). I believe it is too early to conclude that all the housepits that date later than the CW2 phase (4000–3400 cal BC) have been rectangular and constructed on a log frame foundation. It is noteworthy that a rectangular shape does not automatically indicate a log house (Vaara 2000; see also Chapter 3.3.2), and other types of structures are still fully conceivable. As an example, the structure of the Martinniemi housepit, located in Kerimäki parish in the Lake Saimaa area and associated with Kierikki and Pöljä wares, is interpreted to be composed only of a ridged roof constructed of poles leaning against each other (Halinen et al. 2002). This type of house or hut does not have any form of upright wall.

So far, only few studies have dealt with the environmental location of housepit sites. In the Lake Saimaa case study area (Paper I) the location of housepits changed from highly sheltered heads of bays to windy islands and capes during CW2 phase. Some of the new unsheltered housepit sites were used repeatedly over long periods by people using CW2, CW3, Kierikki Ware, and Pöljä Ware. This led to the formation of village-like concentrations of housepits, the degree of contemporaneity of which, however, is not currently known.

In the Lake Saimaa area (Paper I), an aquatic orientation coupled with changes in site location is not particularly clearly pronounced. Although the change in terms of larger environmental zones is very small, the shift of site locations to capes and islands during the latter part of CW2 is conspicuous. These sites are aquatically oriented according to the specific parameters that apply to Lake Saimaa. In other words, an aquatic orientation cannot be as clearly distinguishable in a topographically mosaic-like inland lake system as on the seacoast or in an area with large-scale topographical features.

In the Kaukola–Räisälä case study area on the Karelian Isthmus, Russia, a similar change – one could say a colonization of the archipelago by pithouses – is also as-

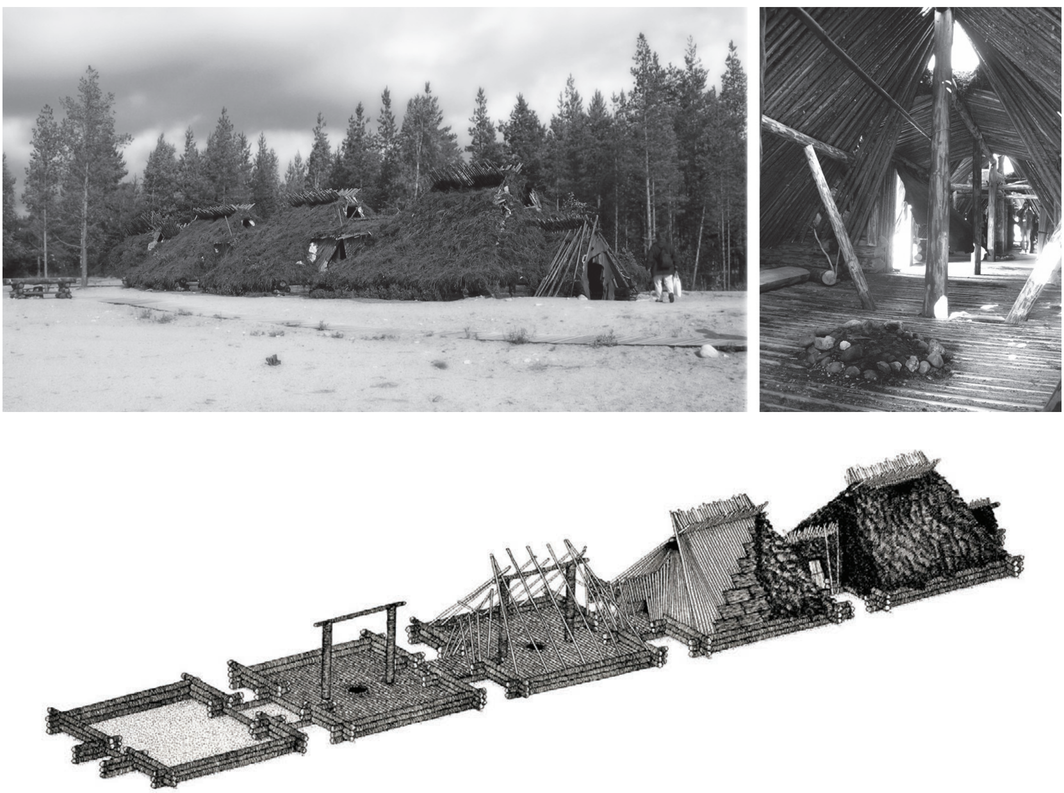


Fig. 11. A reconstruction of the Purkajansuo/Korvala terrace house at the Kierikki Stone Age Centre (Fi Kierikkikeskus). The dwelling is dated to 3360–2930 cal BC based on a radiocarbon date on charred crust adhering to Pöljä Ware found inside the dwelling (Schultz 2000). For more information on the reconstruction, see Vaara (2000). Drawing by Antti Heikkilä/Kierikki Centre, photos by the author.

sociated with the CW2 phase (Paper IV). Comparable changes in the environmental location of housepit sites during the CW2 phase have not been observed in other Finnish studies. However, the number of studies concerning the environmental location of housepits is very limited, and therefore it is too early to evaluate whether changes similar to those in the Ancient Lake Saimaa and Ancient Lake Ladoga areas have taken place also in other parts of Finland, in the inland lake district or the coastal regions. It is also possible, if not even probable, that there were different kinds of adaptations taking place in different environments.

In most of the studies carried out in coastal Ostrobothnia, where housepits often occur in village-like concentrations, such concentrations have been located close to river mouths (e.g. Halinen 1997; Núñez & Okkonen 1999; Ikäheimo 2002; Vaneeckhout 2008a–b; 2009). There are rare examples of housepit sites located in the archipelago. In the estuary of the Oulujoki River, the housepit sites dating to ca. 2500–1800 cal BC are located on an island outside the river mouth (Ikäheimo 2002). As an exception, the large stone enclosures called 'Giant's Churches', which often form complexes accompanied by housepits, cairns, and heaps of fire-cracked stones, are usually located by the sea on islands, necks of land, and capes (Forss 1996; Koivunen 1997). The sites with 'Giant's churches' (ca. 3000–2000 cal BC according to Okkonen 2003: 123) are located in decidedly marine environments as compared to housepit clusters located in the river estuaries.

In the northernmost part of the Gulf of Bothnia, the housepits in the Stone Age estuary of the River Kemijoki in Tervola municipality in southern Lapland have been located both on large islands and on the shores of an inlet. The sites located on the large bay outside the estuary were directly exposed to open water. There appear to have been no changes regarding site location during the most active occupation phase with pithouses ca. 4000–2500 cal BC (Kotivuori 1993; 2002).

3.3.2 Sweden

In Sweden, housepits are found mainly in Norrland. There, they are distributed in both inland and coastal areas (see Lundberg 1997; Liedgren 1998). The first housepits (*Swe. boplatsvall or skärvstenvall*) were recognized and studied already in the 1920's, but the actual housepit boom followed surveys carried out during the 1980's (Liedgren 1998; Norberg 2008: 16-18). In order to learn how to identify a housepit, the Swedish archaeologist responsible for the surveys embarked on a field trip to Finnish housepit sites by the River Kemijoki in the Tervola area (Norberg 2008: 47).

Swedish housepits date from the Mesolithic Period to the end of the Stone Age. In Norrbotten, the northernmost part of Upper Norrland, the number of housepits increases for the first time during the Late Mesolithic (at sites around 90 m a.s.l.). However, the most impressive increase occurred during the Middle and Late Neolithic periods, when the number of housepits peaked at 60–45 m a.s.l., corresponding roughly to 3000–2300 cal BC. This increase in numbers is accompanied by a concurrent increase in housepit size. During this period, the average size of a housepit was

28.6 m^2, which is remarkably high as compared to the average sizes of Mesolithic housepits (less than 10 m^2) and Early and late Neolithic/Early Bronze Age housepits (around 15 m^2). (Norberg 2008.)

During the peak period between 60 and 40 m a.s.l., housepit sizes exhibit a growing trend with the largest housepits being found at the lowest elevations. Average housepit size at 50–45 m a.s.l (ca. 2800–2300 cal BC) is over 30 m^2, and at 45–40 m a.s.l. (ca. 2300–1800 cal BC) it is even larger, over 40 m^2 (Norberg 2008: 56–57). It should be noted, however, that by the time that housepit size peaked, the total number of housepits had already drastically decreased.

In Sweden, the Neolithic pithouses are thought to have been constructed over a framework made of horizontal logs with or without central posts (Halén 1994: 96–97; Norberg 2008: 87–88). Another proposed construction is that of merely a simple roof structure made of slanting poles resting against each other at the ridge (Lundberg 1997: 107–108).

The great variability in house building traditions is testified to by two recently excavated sites in Middle Norrland, namely Bjästamon and Kornsjövägen in Örnsköldsvik municipality. The distance between the sites is only 400 metres. The Bjästamon site, with an overall date of 2800–2100 cal BC, shows that dwellings with round and oblong floor plans as well as housepits and surface dwellings were in use concurrently (Holback 2007; Runeson 2007). Excavations at the site have revealed an interesting two-room house. The northern part of the house is interpreted to have been constructed on a horizontal timber framework, while the wall of the southern room consisted of an upright post-and-wattle structure that was covered with earth on the outside (Fig. 12). The northern room with four hearths is interpreted as the residential part and the southern room with a grinding stone as storage space. Between the rooms there was a hallway, where a 5 x 2 x 0.6 metre storage pit was located beneath the floor level. The house measured ca. 24 x 6.5 metres from wall to wall and dated to 2400–2200 cal BC. (Holback 2007.)

The second site, Kornsjövägen, indicates that rounded and oblong structures utilizing upright posts were also being built around 3000–2300 cal BC. Here, the housepit-like dwellings (Houses 1, 3 and 4) were partly dug into the slope. In the two largest houses at the site, House 1 (15 x 4.5 metres) and House 4 (13 x 5 metres), a number of postholes indicated a frame structure based on upright posts. In House 1, a line consisting of a trench and postholes shows the location of the wall (or possibly of two non-contemporaneous walls) in the northern long façade and at the ends. The trench shows that the house was not rectangular but rounded at the corners. House 1 was surrounded by 1–1.5 metre wide embankments, whereas House 4 did not have any clear embankment. (Lindqvist 2007.)

These two sites show that different building traditions co-existed in Middle Norrland during the Neolithic: one with housepits founded on sandy moraines, a second one with housepit-like dwellings built on stony moraine hillsides, and a third one with surface dwellings accompanying the former two. In addition, both sites, Bjästamon and Kornsjövägen, yielded similar pottery referred to as the ‘3rd group’ (*Swe. ‘tredje gruppen’*). ‘3rd group’ pottery possesses traits originating predominantly from

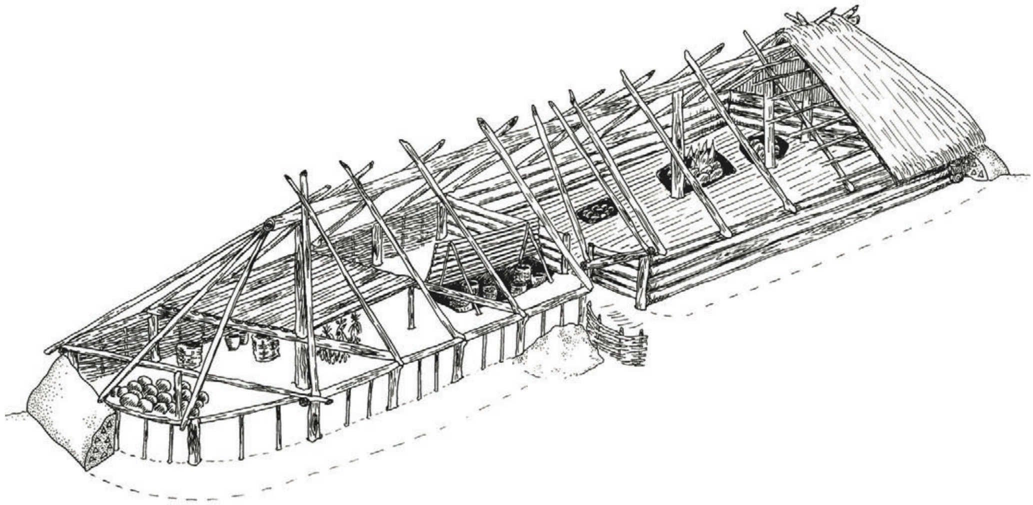


Fig. 12. Interpretation of a pithouse structure at the Bjästamon site. The storage area (left) and the residential part (right) have been connected by a hallway with underground storage. Drawing by Franciska Sieurin-Lönnqvist from Holback 2007: Figur 123.

Corded Ware, moderately from (East Swedish) Pitted Ware, and slightly also from the Comb Ware tradition (i.e., Pyheensilta Ware) and Kiukainen Ware (Lindholm et al. 2007). Other ceramics found at the sites include Fagervik III/IV –type pottery and some unidentified asbestos tempered pottery from one of the housepits at the Bjästamon site.

In Norrbotten, Upper Norrland, there is a change in the way housepits were located in the landscape. During the Mesolithic Period, housepit sites were located in the bays of river estuaries. During the Neolithic Period, which begins in the area ca. 4200 cal BC, a shift occurred in the way the pithouses were located. At elevations between 59–40 m asl., which corresponds to ca. 3000–1800 cal BC, the location of pithouses was not tightly bound to river estuaries and pithouses were erected in a more maritime environment, often on islands, capes or large bays in the outer archipelago (Norberg 2008: 161–165, 173). At the same time, housepits were erected in locations that were exposed to the east, i.e., towards the sea (Norberg 2008: 61, 127). The shift in site location was simultaneous with other changes, namely the increase of housepit size combined with more solid evidence of the sedentary nature of the occupation, and, in the final Neolithic, with a decrease in the number of sites (see Chapter 3.4.2).

In Middle Norrland, the Bjästamon and Kornsjövägen sites exhibit a maritime orientation, manifested in their location by larger open-water areas and in a rich osteological fauna dominated by seals (Lindholm & Runeson 2007; Lundberg 2007; Olson et al. 2007). In this region, a maritime orientation is clearly visible in sites dating to 2800–2100 cal BC (Gustafsson 2007: 320). Similar trends have been noticed further south, in southern Norrland and northern Uppland, where the focus of Neolithic settlement first shifted from the river mouths towards the outer archipelago between 3400–3000 cal BC, and then moved entirely to the archipelago between 3000–2300 cal BC (Björk 2003; see also Hallgren 2010). The first period was associated with an increase both in the size and in the number of dwelling sites, and the latter period with a contrary development. It seems that a tendency to settle in more marine areas commenced in the area ca. 3400/3000 cal BC.

3.3.3 Norway

Norwegian archaeology has the longest history of research on housepits in the Nordic countries. Although the original excavations of the eponymous sites for the housepit types – Karlebotn, Nyelv, Gressbakken, and Mortensnes – took place already between the 1930's and 1960's, the chronological typology of housepits was first published somewhat later by Simonsen (1976). The classification of housepits, however, was generated already during the 1960's on the basis of extensive surveys and excavations (Engelstad 1988: 71).

There are thousands of housepits in coastal northern Norway in the area between Nordland–Troms in the west and Finnmark in the east (Olsen 1994: 38–39; 1998). The oldest housepits date to the Mesolithic period. They are shallow depressions of moderate size, usually ca. 3–4 metres in diameter (Olsen 1998). Most of them are possibly foundations for tent-like structures, but in the Varangerfjord area there are also dwellings of similar size that were built of sod (Olsen 1994: 39). Besides northernmost Norway, Mesolithic housepits are also known from Nordland, south of Troms (Bjerck 1991).

In Finnmark, northern Norway, the Younger – or Late – Stone Age is divided into three phases: Phase I 4500–3700 cal BC, Phase II 3700–3000 cal BC, and Phase III 3000–1800 cal BC (Olsen 1994: 52–59). During the Younger Stone Age, which nearly corresponds to the Finnish Neolithic Stone Age (5100–1800 cal BC), the sizes and shapes of housepits go through developments similar to those observed in other parts of Fennoscandia.

During Phase I, the slightly larger so-called *Karlebotn* house type appeared. In the beginning, the larger rectangular houses with a ca. 12–20 m^2 floor area were quite uncommon, but during the 4th millennium cal BC, they became predominant (Olsen 1994: 65–68). During Phase III, evolution led towards larger pithouses. In the Varangerfjord area, the somewhat larger *Nyelv* house type with two or three central hearths and a rectangular ground plan was in use during the transition between Phases II and III (3200–2500 cal BC). During 3200–3000 cal BC, both the Karlebotn and the Nyelv house types were concurrently in use (Olsen 1994: 58–59, 71).

The trend toward larger houses culminated in Finnmark with the introduction of the *Gressbakken* house type, which was both larger and deeper than the previous pithouses (Olsen 1994: 72–82). At this time, the number of houses was at its highest (Helskog 1984: 53). In Gressbakken houses, starting from ca. 2500 cal BC, the rectangular ground plan was typically around 30 m^2 in size, although larger examples are also known (Helskog 1984: 63–65; Engelstad 1988: 72; Olsen 1998: 186). The period with larger pithouses was rather short. According to Schanche (1995), most of the Gressbakken houses date to 2200–1800 cal BC.

Following the decline of the Gressbakken house type, the size and numbers of dwellings declined as well. The next new house type, with a smaller square ground plan and a foundation dug deep into ground, is called the *Mortensnes* house. These date to ca. 1700–1200 cal BC. No pithouses are known from the following Kjelmøy Phase, corresponding to the 1st millennium BC (Olsen 1994: 113–116).

In Norway, the debate on the number of pithouses in use contemporaneously has been lively. During the early period of research, the large housepit clusters were thought to represent large villages of contemporaneous pithouses (Gjessing 1942: 501). In the early studies of Gutorm Gjessing and Povl Simonsen, not all the housepits in large dwelling sites were thought to have been simultaneously in use (see Schanche 1995: 176). The number of supposed contemporaneous pithouses was, however, quite high. Simonsen (1979: 397–402) proposed, that 20–30 out of the over 80 housepits at the Gressbakken Nedre Vest site were in use at the same time.

In his studies on North Norwegian housepit villages, Knut Helskog has claimed that Povl Simonsen merely repeated the assumptions made in earlier studies (Helskog 1984: 39). Based on radiocarbon dates, the housepits' elevation in relation to shoreline displacement chronology, and a suggested lifespan of a pithouse made of sod, Helskog argues that there were no large villages in the Varangerfjord area. He suggests that there were only one to six contemporaneous pithouses in use at individual sites (Helskog 1984: 51–52).

During the 1990's, the discussion concerning the number of simultaneously occupied housepits continued. In her study on coastal housepit sites in Finnmark, Kjersti Schanche (1995) suggested that 10–20 houses at the largest dwelling sites with Gressbakken houses were occupied contemporaneously. By analysing the radiocarbon dates, she concluded that during the limited use period of Gressbakken houses around the Varangerfjord (2200–1800 cal BC), both smaller and larger housepit sites were in use contemporaneously. Schanche considered that the dwelling sites belonging to one society were divided in a hierarchical manner.

Bryan Hood has also taken part in discussion. He seems to think that the correct number of simultaneously occupied houses is somewhere between the minimum (Helskog 1984) and the maximum (Schanche 1995) calculations (Hood 1995: 83).

Although there are certain chronological trends to be seen in housepits, the comprehensive validity of the 'chronological typology of pithouses' has been questioned. In a correspondence analysis of North Norwegian housepits, Erica Engelstad (1988) has shown that Karlebotn and Gressbakken are not typologically definable house types. According to Engelstad, there is great variation in housepits in North Norway and the 'traditional' house types are to be found, as they are described, only in Varangerfjord area.

A number of changes in the maritime orientation of the region's population took place during the Younger Stone Age. During Phase II (3700–3000 cal BC), there occurs a stronger shift towards maritime resources and an increase in the number of housepits on the coast as compared to Phase I (Olsen 1994: 68, 70–71). During Phase III (3000–1800 cal BC) the maritime orientation continues, the settlement pattern connected with Gressbakken houses is more sedentary (fully or semi-sedentary), and during the end of the Phase III there is also more material from the inland (Olsen 1994: 73–75, 85; Hood 1995: 85).

3.3.4 The Republic of Karelia, Russia

In the Republic of Karelia, which lies on the Russian side of the Finnish-Russian border between the Karelian Isthmus and the Kola Peninsula, the oldest housepits date to the Mesolithic Period. There, the history of research on housepits goes back a fair stretch, starting from the first half of 20th century (Zhul'nikov 2003: Tab. 2). Currently, nearly 900 housepits are known from the area, and over 170 have been excavated (Zhul'nikov 2003: 101).

During the late Mesolithic and early Neolithic, there was a period when pithouses were not built in the Republic of Karelia. In the Lake Onega area, the first rectangular pithouses with a frame of horizontal logs date approximately to 4500 cal BC. The pottery associated with the housepits is Pit-Comb Ware. During 5000–4000 cal BC, the groups using Pit-Comb Ware built winter houses with both round and rectangular ground plans. Summer houses built on the ground surface and inter-connected pithouses are also known from the same period (Zhul'nikov 2003: 101–2).

In the Republic of Karelia, as in Finland, pithouses reached their peak in numbers and size during the latter part of the Middle Neolithic. The increase in the number of housepits began after 4000 cal BC. In the course of the Eneolithic period (ca. 3300–2000/1800 cal BC), which is a transitional period between the Neolithic Stone Age and the Bronze Age, both the number and the size of housepits first peaked (ca. 3300–2500 cal BC) and then decreased (ca. 2500–2000/1800 cal BC). During the latter part of Eneolithic, preferences for locating pithouses in the terrain changed and became more variable. The changes are thought to represent influences that originate from contacts with southern societies practicing animal husbandry (i.e. Baltic Corded Ware and Fatyanovo). Before the beginning of the Bronze Age (from ca. 2000/1800 cal BC), housepits vanished from the archaeological record. (Zhul'nikov 1999; 2003: 101–2).

3.4 Housepits and sedentism in archaeological research

One of the most essential questions concerning Stone Age housepit research concerns the degree of sedentism, i.e., the length and seasons of occupation. Do housepits represent winter-only occupation, or were they occupied permanently year-round? Here, I follow a commonly used definition of sedentism that focuses on year-round habitation at one dwelling site by at least part of the population (Rafferty 1985: 115; Kelly 1992). It is possible to distinguish several degrees of sedentism that are more detailed than the traditional categorization of mobility using a four-step division ranging from fully sedentary to fully mobile nomadic hunter-gatherers. This means that there are grounds for suggesting that the data indicates a growing degree of sedentism at a certain point, although it cannot be stated whether the outcome is fully sedentary or something better described as semi-sedentary (see Kelly 1992).

There is no such thing as a single or definite indicator of sedentism in the archaeological record. Usually, arguments advocating the presence of sedentism are based on the co-occurrence of several factors supporting the interpretation. The most essential elements in the identification of sedentism are the nature of dwellings and dwelling sites (Rafferty 1985: 128; Marshall 2006: 157). Changes in settlement pattern, substantial houses, the presence of pottery, cemeteries, ceremonial structures (i.e. monumental structures), storage, heavy artefacts, luxury goods, agriculture, and osteological or palaeobotanical material indicating year-round habitation are typically included in the palette used for justifying an interpretation of sedentary settlement (Rafferty 1985; Kelly 1992; 2007: 152, 160; Marshall 2006).

This section summarises the arguments presented for and against the sedentary nature of pithouse occupations in archaeological research. The focus is on Nordic research.

3.4.1 Finland

The degree of sedentism has proven to be a difficult matter to deal with. In Finnish studies, housepits are most often associated with a sedentary or semi-sedentary settlement pattern. It should be noted that comments on the question of sedentism among Stone Age pithouse dwellers are usually imprecise. Typically, this question is bypassed by general statements about the nature of structures and finds that suggest a certain degree of sedentary occupation (e.g. Núñez & Okkonen 1999; Leskinen 2002; Ojanlatva & Alakärppä 2002; Okkonen 2003: 171). The statements usually do not specify what sort of settlement pattern is envisaged. As a basic default, housepit sites are considered to have been used, at least, for winter habitation.

In the early phase of housepit research, the Middle Neolithic housepits located in the River Kemijoki estuary in Tervola, southern Lapland, were suggested to represent winter sites in the yearly cycle of semi-sedentary groups. The housepit sites on the seaside were interpreted as winter sites used for seal hunting, while the inland sites by the river and lakes were used during warmer seasons (Kotivuori 1993; 1996a–b; 1998; for a similar settlement pattern see Siiriäinen 1981; 1987). In his licentiate thesis, Hannu Kotivuori (2002) articulates on behalf of a yearly cycle along the River Kemijoki. His interpretation of coastal housepit clusters as winter sites is based on several observations. In addition to semi-subterranean structures themselves, osteological data distinctly dominated by seals, the distribution of finds concentrated inside the structures, and the presence of thin, weakly developed cultural layers all point to winter-only/early spring habitation. In contrast, the inland sites extending nearly one hundred kilometres upstream are mostly devoid of housepits, and the diverse osteological data suggests habitation during the warmer seasons.

However, such a strict dualism of seasonal sites is not evident in the archaeological material. The housepit sites and their surroundings have also produced finds that indicate late spring–summer occupation, and therefore Kotivuori (2002: 167) suggests that only the most active members of the society left the winter base camps during warmer seasons in order to exploit the hunting and fishing grounds located upriver in the inland regions. Hence, Kotivuori's (2002) interpretation of an active yearly cycle does not actually mean a semi-sedentary but rather close to a fully sedentary settlement pattern.

Other archaeologists have put forth similar opinions about the season of habitation as Kotivuori. In studies based on the Kauvonkangas housepit site in Tervola, Jarmo Kankaanpää (2002; 2003) also argues on behalf of seasonal habitation (most probably winter habitation) by a group that hunted seals and fished by the sea just outside the River Kemijoki estuary. He develops his argumentation using the same features as Kotivuori, and adds new ones. Kankaanpää (2002) points out that according to ethnographic parallels of housepit habitation in arctic and subarctic environments, such structures were usually winter dwellings. He notes that the site location by the sea is suitable for sealing but not for salmon fishing. This points in the same direction as the other evidence, i.e., towards winter habitation.

In studies dealing with other parts of Finland, housepits are thought to represent a more sedentary type of settlement than winter-only. It has been suggested that a relatively high degree of sedentism is reflected by the occurrence of several indicators: (1) Housepits are substantial and massive structures, the building of which imposes a notable workload (Núñez & Okkonen 1999; 2005; Leskinen 2002; Núñez 2004). (2) Rectangular or quadrangular floor plans suggest a high degree of sedentariness (Karjalainen 1999). (3) The presence of large pots at the housepit sites is interpreted to mark summer habitation. This is based on the ideas that large pots were not suitable for transportation and that pottery making was a summer activity (Halinen 1997; Núñez & Okkonen 1999; 2005; Núñez 2004; see also Karjalainen 1999). Other suggested indicators of summer habitation are a high proportion of fish in the bone assemblage (Halinen 1997, Halinen et al. 1998, probably also Pesonen 1996b cf. Pesonen 2006), the presence of fishing equipment (Halinen 1997), and the presence of red-ochre graves at the sites (Halinen 1997).

In coastal Northern Ostrobothnia, the idea of the sedentary nature of the occupation is based on diverse arguments. In addition to phenomena implying sedentism, such as non-portable pottery vessels and labour investments on houses appearing in large clusters (e.g. Núñez & Okkonen 1999; 2005; Okkonen 2003: 171), there are plenty of other signals of sedentism. The other phenomena presumed to substantiate , or to suggest, an increasing rate of sedentism are the following: a resource rich environment maintained by an abnormally high rate of land uplift (Núñez & Okkonen 1999), territoriality expressed by large megastructures called 'Giant's churches' (Núñez & Okkonen 1999), the presence of long-distance trade (Núñez & Okkonen 1999; 2005), intensified hunting (Vaneeckhout 2009c), and the shortening of the coastal shoreline due to land uplift. The latter has been recently put forth as a factor working together with the abundant resource base, which eventually increases the rate of sedentism among the groups packed together in the river estuary (Vaneeckhout 2008b; 2009a, c; 2010).

Two papers of this study discuss the question of sedentism through changes in housepit sizes/shapes and site locations. Paper I argues for an increasing rate of sedentism in the Lake Saimaa area during the CW2 period, when larger housepit clusters start to appear on windy locations such as capes and small islands and the numbers of other kinds of dwelling sites simultaneously decreases. Paper IV presents a similar argument concerning the succession of housepit sites during the CW2 period on the Karelian Isthmus, but due to the low temporal resolution of the available data, the decrease of dwelling sites without housepits cannot be observed in this area. In Paper IV, I have argued that housepits sites located in windy, unsheltered locations in an aquatic environment present several aspects that would support longer than winter-only, i.e., possibly year-round, habitation.

Although most of the studies on housepits imprecisely refer to 'a certain degree of sedentary occupation' without specifying what is really meant, there are also other lines of interpretation. In two quite recent studies, inland housepit sites are interpreted as winter-only dwelling sites. This interpretation is based on the osteological fauna and the restricted distribution of both finds and cultural layers either exclusively inside the housepit or in its immediate vicinity (Katiskoski 2002; Pesonen 2006). Interestingly, the interpretation of the Late Stone Age Kuorikkikangas site in Posio, Southern Lapland, has changed from year-round (Pesonen 1996b) to winter-only habitation (Pesonen 2006). Obviously, the change in interpretation results at least in part from a re-evaluation of fish bones as an indicator of habitation during the non-freezing seasons.

In the Lake Saimaa area, the overall osteological material associated with Neolithic (ca. 4000–2000 cal BC) housepit sites (sample size: 26) differs from the assemblages of other dwelling sites (sample size: 68) (Mökkönen 2000: 52–58; 2001). In the housepit sites, the proportions of mammals and birds, both terrestrial and aquatic species, are slightly higher than on the other sites. However, the largest part of identified bone fragments consists of fish, which constitute 80% at housepit sites and 93% at other sites of all bones by numbers. If the bones not identified to species are also counted, the proportion of fish is smaller: 71% at housepit sites and 91% at the others. The most notable distinction in individual species was in the number of pike (*Esox lucius*), which constituted 74% of all fish and 38% of all identified bones at the housepit sites, and 19% and 17% respectively at the other sites. One cannot be sure, of course, but I would suggest that the high proportion of pike might be connected with the consumption of dried fish during the winter. Pike is a good fish for drying and was traditionally caught and dried during the spawning season in the spring/early summer and consumed later during cold seasons (Itkonen 1948: 283).

In the Finnish inland, the year-round occupation of housepits has also been argued on the basis of archaeobotanical studies. According to Pirjo Jussila (1992; 1994), the charred plant remains found at two housepit sites – the Naarajärvi site with CW2 (Matiskainen & Jussila 1984) and the Tahinniemi site with Pöljä Ware, both located in Pieksämäki parish in the inland lake area – indicate year-round habitation. Especially the presence of plants gathered and used during the summer, such as strawberry and raspberry, is interpreted to indicate summer occupation. Only two of the charred seeds (both bearberry) from the Tahinniemi site have been dated. One was found to be contemporaneous with the Stone Age occupation while the other dated to the Early Metal Period.

It would appear that the emphasis on a sedentary interpretation of housepits has increased in recent papers. There is still a certain ambivalence in the interpretations. The most obvious weakness is the lack of studies in which all dwelling sites are included. Were the coastal housepit sites really occupied year-round, or have the settlements dispersed to summer sites on inland lakes and riverbanks? In his article dealing with sedentism and Stone Age houses in the Lake Saimaa area, Taisto Karjalainen (1999: 189) asks a reasonable question about the relation between housepit sites and other sites: on what grounds do we attach more significance to the housepit structures than to the other archaeological material – thick cultural layers, rich stone tool assemblages, and the presence of pottery – when defining the permanence of a settlement? I cannot be certain, but I presume Karjalainen had the CW2 sites in mind, since they often yield large numbers of finds scattered over vast areas.

Studies that include all the dwellings give different answers to the prevailing settlement pattern. In the area of the Kemijoki River, a semi-sedentary annual round based on coastal winter sites with housepits and inland summer sites mostly without housepits has been suggested by Kotivuori (1993; 2002). Following the definition of sedentism applied here, the suggestion that part of the population spent the whole year on the coastal housepit sites (Kotivuori 2002: 167) actually refers to fully sedentary settlement. In both the Lake Saimaa area and the Vuoksi River area, Ancient Lake Ladoga, a change in the settlement pattern is suggested to have taken place during the CW2 phase (ca. 4000–3400 cal BC) when dwelling sites with a higher number of housepits than before were established in highly unsheltered places (Papers I and IV). In the Lake Saimaa area, this change was accompanied by a reduction in the number of other types of dwelling sites. If similar changes in site location and in ratios between different site types could be observed in coastal areas adjacent inland areas, then we would have better grounds for arguing for sedentariness at the coastal sites.

3.4.2 Sweden

In Sweden, there are also different interpretations concerning the degree of sedentism at the housepit sites. In inland Norrland, the housepit sites dating to 4500–2500 cal BC have been interpreted as winter villages (Lundberg 1997). In contrast, the coastal housepits are interpreted to have been inhabited on a more permanent basis.

Arguments concerning a winter-only or longer occupation period at housepit sites are often based on osteological material. In the inland regions, the dominance of elk bones in housepit sites and the location of sites close to large pitfall systems are interpreted to indicate winter-only habitation (Lundberg 1997: 136). In coastal housepit sites, arguments concerning the degree of sedentism are also based on osteological material. In Överkalix, Upper Norrland, the Lillberget site with CW2 pottery dates to 3900–3500 cal BC. It is thought to have been a sedentary site because the optimal hunting seasons of the species in the osteological material cover all the seasons (Halén 1994: 164–167, see also Norberg 2008: tabell 4.6.). The previously mentioned Bjästamon housepit site in Middle Norrland (Chapter 3.3.2) is interpreted to have been occupied year-round based on the osteological material (Olsson et al.

2007; Runeson 2007). Similarly, the Neolithic housepit sites in coastal Norrbotten, Upper Norrland, yielded species in the osteological material that indicate longer than winter-only habitation, but the sites are nevertheless interpreted not to have been fully sedentary (Norberg 2008: 177, see also tables 4.5–4.9).

On the coast, other factors also support the interpretation of sedentary habitation. In his dissertation on the Lillberget housepit site with CW2, Ove Halén presents several arguments supporting sedentary year-round habitation at the site. According to Halén (1994: 177–178) the presence of pottery, the rectangular house form, site location in a productive environment, great variation in stone tool types, and increased exchange relations (i.e., the presence of amber and copper in the finds) all speak for fully sedentary settlement. He considers Lillberget to be an extraordinary pioneering site that has been permanently settled at a time when most other contemporary sites have still been occupied on a less permanent basis (for a similar opinion see Norberg 2008: 174).

Although the pithouse was primarily a winter dwelling, the Neolithic coastal housepit sites are thought to have been occupied for longer periods. This interpretation is accompanied, at least in Norberg (2008: 177–179), by the assumed presence of surface dwellings obviously to be used as alternative summerhouses at the housepit sites. At the Bjästamon site, year-round occupation is argued – in addition to osteological material and the presence of the dwellings themselves – on the basis of the archaeobotanical material (charred grains of barley – *Hordeum vulgar*e, one grain of wheat – *Triticum compactum*, seeds of raspberry and hazelnuts) and the presence of burials (Olson et al. 2007, Runeson 2007).

As concerns the osteological material associated with coastal housepits, summer occupation has for the most part been deduced from the presence of the bones of the harp seal (*Phoca groenlandica*), which was hunted on the Norrland coast during the summer. The fishing and hunting of other species, excluding certain fishes such as flounder (*Platichthys flesus*) and bullhead (Cottidae sp.), is not limited to a certain season, and the species can be caught at almost any time of the year. (Olsen et al. 2007.)

In coastal Norrbotten, Upper Norrland, the osteological material from Neolithic housepit sites yields species that could support an interpretation of sedentary habitation at the sites. In addition, the growing size of the housepits and sites, together with a concurrent decrease in the number of sites and the increased exploitation of marine resources (as seen in the bones and in site location), is interpreted to mark a growing degree of sedentism during the Neolithic period (Norberg 2008: 161–164). Even so, Erik Norberg (2008: 177) does not consider Neolithic coastal housepit sites to be fully sedentary sites but rather sites with winter houses with a longer than winter-only yearly occupation phase. In contrast, the Bjästamon site in Middle Norrland is interpreted as a sedentary site with year-round occupation (Runeson 2007).

3.4.3 Norway

In the early studies on North Norwegian Stone Age housepits, the structures were presumed to go together with a semi-nomadic settlement pattern (Gjessing 1941: 38; 1945: 170–172). From the 1960's to the late 1970's, the large coastal agglomerations of housepits were thought to represent the winter–early spring component of an annual round that consisted of seasonal sites extending from the outer archipelago to the inland mountain region (Gjessing 1975; Simonsen 1975; 1979).

During the 1980's, several new studies suggested that settlement has been more sedentary than was previously thought. The archaeological material, that is, osteological data and lithics, reflects an extensive degree of variation during the Late Stone Age. Both semi-sedentary and year-round, permanently settled sites as well as sites used for shorter periods have been identified. According to Erica Engelstad, this variation results from different organizational levels of the population, and on the other hand, from flexible adaptation systems that adapted to fluctuating resource abundance (Engelstad 1984; see also Engelstad 1990). Other archaeologists have used the osteological material to argue that at least some of the Late Stone Age pithouses were occupied all year round (Helskog 1983; Renouf 1984: 24; 1986; 1988).

During the two first phases of the Younger Stone Age (4500–3000 cal BC), settlement patterns have obviously been based on seasonal sites (Olsen 1994: 65–66, 69; Hesjedal et al. 1996: 206–211). Alongside the trend towards larger-sized pithouses and the occurrence of Gressbakken-type pithouses during Phase III (3000–1800 cal BC), the archaeological material reflects a greater degree of sedentism than before. This has even been interpreted as evidence of year-round habitation (Olsen 1994: 71, 82; Schanche 1995; Hesjedal et al. 1996: 210–211). Olsen (1994: 73–74) argues that the variation in both osteological and archaeological materials, the construction of permanent houses, the high number of settlement phases on the sites, and the increased number of burials at sites all support a hypothesis of sedentism during Phase III. He considers the coastal settlement to have been sedentary or semi-sedentary (Olsen 1994: 76, 85).

Recently, Lisa Hodgetts (2010) has pointed out the differences in mammal fauna at the Gressbakken type housepit sites in the Varangerfjord area. According to Hodgetts, there is a clear difference between *the inner fjord sites* with high proportions of whale and dolphin at Gressbakken and a high proportion of reindeer at Karlebotn, and *the southern fjord sites* with an absolute dominance of seal. She suggests that the communities that settled each site had a restricted hunting territory, which also defined the exploitable species and thereby the seasons the sites were settled. Judging by the species, all of the sites have evidence of spring occupation (seals), while the high number of reindeer at Karlebotn speaks for intensive autumn occupation and the notable proportion of cetaceans (whales and dolphins) at Gressbakken points to intensive summer occupation. Hodgetts argues that the variability in refuse fauna reflects the differences of locally available resources within hunting territories and, hence, also, the variation in the seasonal intensity of settlement at each site.

Another recent study on the Karlebotnbakken housepit site in the Varangerfjord (Hood & Helama 2010) has shed a shadow on the interpretations based on osteological data referred above. In contrast to previous studies, new radiocarbon dates have shown that the housepit and the surrounding middens are of different ages. The material in midden dates to 3360–2870 cal BC and the house of Gressbakken type to 2210–1530 cal BC. The new dates displace the whole midden material from the Gressbakken phase. The archaeological materials found in the midden deposits are of notably older age than the last habitation on the site during the Gressbakken phase. The thick midden deposits include a few pottery shards related to CW3 and Kierikki Ware, the context dating of which now makes sense. Interestingly, the copper dagger/point previously dated to the beginning of the Bronze Age is now dated following the context in the midden to ca. 3200–2800 cal BC.

Another recent study also shares the view of a high degree of sedentism among the coastal Late Stone Age societies in the Finnmark area. The settlement at Sundfæra, Melkøya Island, is interpreted to be fairly sedentary during the most intensive occupation period (4000–3300 cal BC). Thick cultural layers, huge amounts of fire-cracked stones, remains of substantial pithouses, and other structures together with a rich artefact inventory reflecting a maritime orientation are thought to indicate repeated and long-lasting occupation at least during the cold part of the year (Niemi 2010). This can be referred to as a semi-sedentary settlement pattern.

In the beginning of the Early Metal Period (1800 cal BC), the size and number of housepits decline. At this time, the settlement pattern is thought to have become more mobile again, with seasonal settlement sites (Olsen 1998: 187).

3.5 Summation and discussion of housepit research in Fennoscandia

In this section, I summarize the main trends in the Neolithic pithouse building tradition of Fennoscandia (Chapter 3.3). These trends include a large number of concurrent or nearly concurrent changes in size, shape and number of housepits as well as in site location in relation to the environment. After a chorological and chronological summation of the pithouse tradition, I will summarize and briefly discuss the bases on which the interpretations concerning the degree of sedentism (Chapter 3.4) are built.

At the moment, Finland, with only a few Mesolithic housepits, is an anomalous area as compared to neighbouring countries at the same latitude. Otherwise, in the course of the Neolithic Stone Age, there is much common development in housepits (see Norberg 2008: 159–160). In Scandinavian countries on average, the highest number of housepits appear ca. 3000–2500 cal BC, while the largest ones come along slightly later, ca. 2400–1800 cal BC. Simultaneously with the occurrence of the largest housepits comes a decreasing trend in the total number of housepits.

There are, however, some regional distinctions (see Fig. 13 and further discussion in Chapter 5.3). As a subtle temporal discrepancy, the peak period concerning both size and number in the Republic of Karelia, Russia, dates slightly earlier than in other areas of Fennoscandia. The peak in the Republic of Karelia dates to ca. 3300–2500 cal BC, and similarly, the decrease in size and number took place earlier than elsewhere in Fennoscandia, ca. 2500–2000/1800 cal BC. As distinct from the rest of Fennoscandia, there are no known Bronze Age/Early Metal Period housepits in the Republic of Karelia. I cannot say for sure, but I presume that the development of housepits in the case study areas on the Karelian Isthmus and in the Lake Saimaa area was quite similar to what is seen in the Republic of Karelia, at least as concerns the decrease in the number of housepits. In the Lake Saimaa area, there are only a few housepits with Early Metal Period material (1800 BC – AD 300), and no Stone Age housepits dating unquestionably to 2500–1800 cal BC (Karjalainen 1999; 2002).[5]

By the Gulf of Finland in south-eastern Finland lie a few large housepit sites that are associated with both CW2 and later Middle Neolithic ceramics. The only solitary large multi-room housepit in this area with datable material and radiocarbon dates, the Meskäärtty site, is proof that the largest housepits were in use at least during the latter part of the 3rd millennium cal BC and possibly even as early as the late 4th millennium (Paper III).

On the Ostrobothnian coast in north-western Finland, the increase in size of the largest housepits began already during the late CW2 period, beginning ca. 3500 cal BC, although the fastest growth rate was reached slightly later (Vaneeckhout 2009a, c; 2010). In Norrbotten, Sweden, the most rapid change in housepit size measured as average floor area took place after 2800 cal BC (Norberg 2008: 57). In Finland, the shift towards larger pithouses took place earlier than in Sweden and Norway. In the Republic of Karelia, Russia, the increase in size seems to be fairly concurrent with the development seen in Finland, but in Russia pithouse size peaked slightly earlier than in Finland.

The preferred type of location for building pithouses changed in the course of the Neolithic. On the Karelian Isthmus (Russia), in the Lake Saimaa area (Finland), and on the coastal areas around the Gulf of Bothnia (at least in Sweden), the sites shifted during the Neolithic to more aquatically oriented locations. Interestingly, this change appeared at different times in different areas. In the Vuoksi River Valley, on the Karelian Isthmus, housepits 'colonized' the archipelago during the period when CW2 was in use (ca. 4000–3400 cal BC).[6] There, the chronological division of the sites is based on the ceramics associated with the housepits, and therefore it is difficult to give specific dates. However, it is probable that the largest oblong housepits in this area date younger than 3300 cal BC. They appeared as solitary structures by strategic water routes in a more terrestrial environment than the older housepits located in the archipelago (Paper IV).

In the Lake Saimaa case study area, the change in housepit site locations also occurred during the CW2 period (Paper I). In this area, the very same unsheltered sites on capes and islands where the housepits were located during the latter part of

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[5] At least there are no housepits dated to this period by radiocarbon. This statement is also based on my own database on Stone Age and Early Metal Period sites in the River Vuoksi catchment, updated to the summer of 2006. Reports filed at the Archives of the Department of Archaeology, National Board of Antiquities (Helsinki, Finland) after July 2006 are excluded.

[6] On a large former island in the outer archipelago of Ancient Lake Ladoga, there were pithouses already during the Mesolithic Period (Paper III, Halinen & Mökkönen 2009).

CW2 phase were often utilized later by groups that used asbestos tempered wares (Kierikki–Pöljä–Jysmä).

In northern Upland – southern Norrland (Sweden), settlement shifted to a maritime environment in two stages: first, colonizing the archipelago (3400–3000 cal BC), and later shifting the whole focus of settlement to the archipelago (3000–2300 cal BC). In more northern areas of Norrland, the location of housepit sites shifted towards more maritime environments ca. 3000–1800 cal BC. There, the maritime orientation is also apparent in the osteological material found at the sites.

Parallel developments in housepits and housepit sites occurred earlier in the south-east and later in the north-west. The changes appear to represent a chain of events, but the absolute timing as well as the duration of the development phases varies from place to place. The increase in numbers and the aquatic/maritime orientation of housepit sites seem to emerge together on the Karelian Isthmus (ca. 4000–3400 cal BC, Paper IV), in the Lake Saimaa area (ca. 4000–3400 cal BC, Paper I), and in coastal Norrbotten, Sweden (3400/3000–2300/1800 cal BC). The development in the Stone Age estuary of the Kemijoki River seems to be exceptional with respect to other areas. There, the development towards larger housepits after the CW2 phase is missing, and unlike elsewhere, the largest housepits in the area are associated with CW2.

The changes have their own temporal cycles and occurrences. The temporal distance between (1) the growing number of housepits and the concurrent relocation of sites, and (2) the growth in housepit size is longer in the Lake Saimaa area and on the Karelian Isthmus than in Norrbotten, where all three changes (the increase in number and size, and aquatic orientation) appeared during a notably shorter time span. In coastal Central and Northern Sweden, the relocation of dwelling sites is associated with the first signs of cereal cultivation (see also Paper V).

I have examined here only those trends in housepits that I have found interesting in my articles. Therefore, it is probable that the relocation of housepit sites into more maritime environments is not the whole story. Some societies focussed on utilizing rich resources that occurred only in a restricted area. Thus, it is not surprising that pithouse villages that controlled salmon fishing did not go through a relocation phase but continued their life on the riverside near the weirs. This was probably the case at, e.g., the housepit sites by the Iijoki River in Yli-Ii, Finland (Kankaanpää 2002: 73). No relocation of housepit sites to a more maritime environment occurred at this area (Vaneeckhout 2009a; c; 2010).

It is obviously not an easy task to present a well-founded argument concerning the degree of *sedentism*. The osteological material, which would offer the clearest evidence of particular seasons of occupation, is quite limited in Finland, especially in the inland lake areas. Species with a short and intensive exploitation period are the most useful ones for specifying the season. Unfortunately, such species are rare during the summer, and thus the identification of summer habitation is challenging.

On the shores of Gulf of Bothnia, the only species in the osteological material clearly associated with hunting and fishing during summer are the harp seal (*Phoca groenlandica*) and the flounder (*Platichthys flesus*) (Olsen et al. 2007). If there are only two species in the northern Baltic exclusively connected to summer subsistence activities, in the Finnish inland lake district there are none. It is always possible to emphasize the season with the easiest catch (fish spawning etc.), but nearly all species, excluding migratory birds, are also available for fishing or hunting during the rest of the year.

In some studies, the distributions of finds and cultural layers have been used to distinguish winter-only habitation. Nevertheless, one may ask whether it is possible to interpret a find distribution that is closely concentrated in a housepit as a signal of winter-only occupation. In Finland, the idea of the connection between such a find distribution and winter-only occupation has been put forward in two rather recent articles on totally excavated housepits, one dating to 3200–2800 cal BC (Katiskoski 2002) and another to 2900–2300 cal BC (Pesonen 2006). There are, however, a few aspects challenging that idea. First, the excavation areas were restricted to the housepits and the surrounding areas were excavated only with a coarse grid of test pits. Second, the excavations in Middle Norrland, Sweden, in which large areas adjacent to year-round inhabited housepits were excavated, revealed that starting from c. 2800 cal BC, the find material clearly concentrated inside the dwellings and the activities in the 'yard' were limited and well organised following a cultural schema of acting in space (Gustafsson 2007; Holback 2007; Runeson 2007).

The excavations in Middle Norrland, Sweden, have shown that from ca. 2800 cal BC onwards, activities were both more well-ordered and more concentrated inside the dwellings than on older sites (Gustafsson 2007). Although comparable extensive excavations on which to base such arguments have not been executed in Finland, a similar development towards an increased concentration of activities inside dwellings have taken place also in Finland. Therefore, I suggest that simultaneously with the increase in housepit size, which occurred in Finland mainly after CW2 (4000–3400 cal BC) and culminated around the mid 3rd millennium cal BC, the activities performed at the dwelling sites may have increasingly been concentrated inside the dwellings. Consequently, a find distribution concentrated inside a housepit may not necessarily be considered a self-evident marker of winter-only habitation.

Another aspect to highlight here is that the richness or poorness of finds inside or outside a housepit cannot be measured between two non-contemporaneous sites. It is not reasonable to measure the richness of Neolithic sites based on experiences gained with CW2 sites, where the rich material is usually spread over vast areas. The CW2 presuppositions are not automatically valid in other contexts during the Neolithic Stone Age (see Chapter 5.7).

4

HOUSING vis-à-vis ENVIRONMENT

In this chapter about housing and environment, I first describe the relations between the subsistence base and the settlement pattern and then define the cultural aspects related to housing. The third section is concerned with environmental studies carried out in connection with Finnish Stone Age research. Here, I discuss research carried out both in natural environments and within the concept of landscape.

4.1 The relation between subsistence and settlement pattern

> *… the environment figures prominently in how hunter-gatherers decide what to eat, whether to move or stay, to share or to hoard, to let someone into their territory or not….. (Kelly 2007:64).*

The environment defines the stage and marks the borders in which man finds his ways to adapt. The density, predictability, and nature of resources all are directly linked to the applicable subsistence strategies and thus also to settlement patterns. Subsistence is the primary variable affecting mobility (Binford 1980; Kelly 1992: 46). Other factors that affect the selection of certain subsistence strategies and settlement patterns are cultural concepts and general knowledge, for example, of the environment and technological innovations (e.g. in tools, mass-capture devices, storage, and transport) (Kelly 1992; 2007: 108–110; Ames 2002; 2003: 24, 32).

According to Binford (1990), there is a very straightforward pattern between effective temperature (ET, measuring the overall warmth and length of growing season) and hunter-gatherer mobility: the more severe the winters, the less mobile the hunter-gatherers. During the Neolithic Stone Age, the effective temperature in Finland is estimated to have been 12.1–11.5 degrees Centigrade (Hertell 2009). According to Binford (1990: Table 8), ethnographically documented hunter-gatherers in such circumstances (ET 12) practise residential mobility in the following proportions: fully nomadic 4.5 %, semi-nomadic 59.1 %, semi-sedentary 31.8 %, and fully sedentary 4.5 %. However, it must be noted that in this result the subsistence base of the communities has not been taken into account.

The major resources in the subsistence base have an effect on mobility. According to Binford (1990), there is a difference between hunter-gatherers favouring terrestrial resources and those favouring aquatic resources. The groups with a high dependence on aquatic resources, especially fish, are usually less mobile than the ones oriented towards terrestrial hunting. They tend to have smaller territories and make fewer residential moves than their terrestrially oriented fellows. Binford suspects that the groups with logistical mobility strategies (‘collectors’) are a consequence of an ‘aquatic resource revolution’ and the perfection of water transport.

Globally, the dependence on aquatic resources increases towards higher latitudes (Binford 1990: 137). One can say that Finnish Neolithic cultures are aquatically oriented: in the coastal areas both fishing and sealing have played an important role in subsistence (Siiriäinen 1981; 1982; Hertell 2009; Núñez 2009) and in inland lake areas fishing has been the base of livelihood (Ukkonen 1996; Mökkönen 2000: 42–52; 2001). Therefore, it might be expected that the aquatically oriented Neolithic hunter-gatherers who built non-portable pithouses were rather less than highly mobile in Finland as well.

The settlement pattern is not defined only by the quality and abundance of certain resources but also by the way the resources are distributed. In Fennoscandia, the movements of animals and fish are regulated by the seasons. In certain areas, there are clear ‘hotspots’ in the abundance of resources. In the Baltic Sea area, locations close to river mouths are the number one ‘hotspots’. There, particularly salmon fishing is a highly productive activity that is concentrated in a few exceptionally suitable locations. The seasonality and the volume are both, basically, higher by the sea than in the inland lakes, where the modest resources are spread more evenly. It is clear than if ‘hotspots’ are present, there is not much room for variation in site location, at least in the case of the communities holding the rights to exploit the ‘hotspot’.

Although the environment sets the limits to subsistence and mobility strategies, there is still room for variation. A good ethnographic example comes from the Varangerfjord area in northern Norway, were two historically documented 18th century Sami groups had different settlement patterns in use at the same time within a restricted area. According to Engelstad (1990: 29–31), both groups had seasonal base camps, one for summer and another for winter use. One group, which settled the fjord area year-round, had winter settlements in the northern interior part of the fjord and summer settlements further out in the fjord towards the sea. The second group settled the interior part of the fjord during summer and had winter settlements inland, located a few kilometres from the head of the fjord. Quite similar observations have been made about Stone Age communities practising different subsistence strategies and settlement patterns in the same area (Hodgetts 2010, see Chapter 3.4.3).

During the Neolithic Stone Age, housepit sites were found in different environmental settings. After, or maybe already during, the CW2 phase, dwelling sites with semi-subterranean dwelling structures were located by the rivers, at the river mouths, and in the archipelago along the coasts of the Bothnian Bay. Although I cannot prove this view with the help of osteological material, I presume that during the Middle Neolithic each community may have had its own subsistence ‘niche’. According to this idea, it may be expected that the communities that lived in different environmental zones focussed on the utilization of certain available species. A simplified version might run something like this: communities by the rivers based their subsistence on salmon fishing while the others in the coastal areas specialized in seal hunting. This is only a coarse generalization, but I believe that there were different branches of resource utilization and settlement pattern within communities with fairly a uniform material culture. So far, the only data supporting this view is the varying location of the Middle Neolithic housepit sites (see Chapter 3.3.1).

4.2 Cultural and technological aspects of housing

The relations between hunter-gatherers and the environment are not defined only through subsistence practices. In research that emphasizes the experience of place/landscape, the way prehistoric man has acted in his environment is seen as a culturally constructed phenomenon (e.g., Tilley 1994: 15–17, 67; Ingold 2000: 153, 171; Thomas 2001).

Although different approaches have their own emphases on studying the physical world as a natural environment or culturally defined place/landscape, these approaches do not need to be in conflict with one another. The ecological approaches establish the broader framework for resource utilization, while approaches concerned with place/landscape introduce the culture-related aspects of resource selection and the sites chosen to be inhabited (Jones 2002: 87). According to Ingold (2000: 60), there can be no radical break between human social and ecological relations with the environment. He considers the social/cultural aspects to constitute a subset of the ecological relations.

Building a dwelling is a combination of technological aspects (such as available material, technological knowledge of construction) and culturally defined housing needs (Sanders 1990: 44). Usually, there is a positive correlation between the degrees of segmented architecture, segmented use of space, and segmentation of culture (Kent 1990b). Just as in the case of available resources (vs. actually exploited resources), the existence of required knowledge is not enough to cause it to be utilized in practise. A new technology and architecture can be adopted into a culture only if it is compatible with prevailing cultural convention (see Kent 1990a).

I accept both environmental factors and cultural aspects as determinants for the selection of a dwelling site. In research, these ‘opposites’ can be maintained as different points of departure, but I do not consider it reasonable to separate these aspects. I have tried to understand site location in relation to both broader environmental zones (Mökkönen 2000; Paper IV) and the immediate environment (Papers I and IV). I propose that a site’s immediate environment, i.e., the surroundings of a site observable by human senses at the site, tell us about the specific circumstances that were of major significance when choosing the particular location for habitation. In an environment where larger ecological and geographical zones are clearly separable, as in the Stone Age Vuoksi River Valley (Paper IV), the changes in demands on the sites’ immediate environment resulted in clear changes also in the geographical distribution of the sites. In a mosaic-like environment such the Lake Saimaa area (Paper I), the physical distance between two dwelling sites that display very different aspects regarding the sites’ immediate environment can be very short. In other words, the essence of the natural environment affects the physical distance between housepit sites that exhibit different concepts of housing/dwelling. Here, it must be remembered that both areas discussed above do not include any particular resource concentrations of high productivity, and that there is therefore much room for cultural variation not dictated by the resources.

On the Ostrobothnian coast, the building of 'Giants' churches' (also simply called megastructures), settlement embankments, and cairns is seen as the beginnings of an artificially modified landscape. Following the dating of various large-scale structures and village-like concentrations of housepits, the beginning of a conscious shaping of the landscape in Ostrobothnia is dated to 3500–2200/2000 cal BC (Okkonen 2001; 2003; Núñez 2004; Núñez & Okkonen 2005). Although the changes are not as clearly visible elsewhere as they are around the Gulf of Bothnia, a trend towards larger-size pithouses appeared in most of Fennoscandia during the late 4th and the 3rd millennium cal BC (see Chapter 5.3, Fig. 13).

Looking at the variety of structures and site locations, it can be said that a change in attitudes towards dwelling and subsistence practises occurred during the CW2 phase (see also Okkonen 2003; 2009; Vaneeckhout 2010). During the 3rd millenium cal BC, the increasing variety in structures and site locations may refer to specialised resource utilization. As concerns the practise of cereal cultivation (Paper V), it fits well into this background.

4.3 Environmental studies in Finnish Stone Age research

Studies focusing on the relations between Stone Age dwelling sites and the environment can be divided into three categories: (1) studies utilizing the ideas of site catchment analysis, including both non-computer-aided and computer based GIS-studies, (2) studies concerned with the location of dwelling sites in relation to ecological zones, and (3) studies focusing on the immediate environment of the dwelling sites. Other studies that can be labelled environmental, such as zooarchaeological (e.g. Ukkonen 1993; Nurminen 2007; Mannermaa 2008; Seitsonen, S. 2008) and ecological studies (e.g. Siiriäinen 1982; Hertell 2009) are excluded because they are not focused on dwelling site–environment relations.

Environmental reconstructions have long been based on shoreline displacement (see e.g. Ailio 1915; Pälsi 1915) but the first environmental studies in Finnish Stone Age research, in the sense meant here, were carried out by Marek Zvelebil (1981). Zvelebil used site catchment analysis and von Thünen's rings in defining the resources most easily exploitable from the sites. It took a while before Finnish archaeologist produced the first studies relating to the ideas of site catchment analysis. The first studies were manual (Saukkonen 1990; 1994); later ones were carried out in a GIS-environment and studied Stone Age settlement in relation to soil type (Vikkula 1994b; Kylli 2000; 2001) or – in the absence of accurate soil maps – to modern vegetation, which has certain links to Stone Age vegetation (Mökkönen 2000).

The 1980's and 1990's also produced other studies comparable to site catchment analysis. In these studies, the locations of dwelling sites were studied in relation to ecological zones on a coast–inland axis (Siiriäinen 1981; 1987; Matiskainen 1989, Sartes 1991; 1994; see also Halinen & Mökkönen 2009). The authors defined the prevailing settlement patterns of different ages based on the distribution of different kind of sites in ecological zones with certain resources available during certain seasons.

GIS-based environmental studies have been carried out also in order to understand environmental change caused by land uplift. Milton Núñez and Jari Okkonen (1999) explored the temporal changes in the interplay between land uplift and local topography. They found that the florescence period of the North Ostrobothnian Neolithic Stone Age coincided quite closely with an abnormal increase of new land, which produced extensive wetlands. Ever since that study, this environmental phenomenon has been considered the main factor behind both the rise of local cultural complexity that began during the CW2 period and the decrease in signs of prosperity and complexity that occurred simultaneously with the termination of the wetland period around 2500 cal BC (Núñez & Okkonen 1999; 2005; Núñez 2004; 2009; cf. Paper III and Chapter 5.3).

In addition to these studies, carried out, as it were, from a 'satellite perspective' and in a more or less environmentally deterministic mode, some studies have concentrated on the immediate environment of Stone Age dwelling sites (Vikkula 1994a; Wilhelms 1995; Pesonen 1996a; Mökkönen 2000; Nordqvist & Lavento 2008; Seitsonen & Gerasimov 2008; Halinen & Mökkönen 2009; Papers I and IV). These studies describe the dwelling sites' immediate physical surroundings through several variables (shoreline type, amount of open water and direction into which the dwelling site faces) first described by Vikkula (1994a) and later slightly modified by others. In general, the aim of these studies was to understand the variation in the dwelling sites' topographic location. Some of the studies have focused purely on the degree of protection from winds (Halinen & Mökkönen 2009; Paper IV).

My MA thesis on the Lake Saimaa area did not produce any remarkable results in the section employing the ideas of site catchment in a GIS-environment – there were no noteworthy changes in site location in relation to larger environmental variables (Mökkönen 2000). Instead, the part of the study dealing with changes in the sites' immediate environment did produce highly interesting results (Mökkönen 2000, Paper I). In the Lake Saimaa case study area, where the environment is a fine-grained mosaic of land and water and where the resources are evenly distributed, the radical change in the way the landscape was occupied was visible only in the change in the housepit sites' immediate environment (see Paper I).

In the case of Lake Saimaa, the change in site location occurred within a very limited area. The distance between the older well-sheltered housepit sites and the younger ones in unsheltered windy locations was often less than one kilometre. It appears that the change in settlement pattern was not related to change in the resource base exploitable from the site but rather a cultural change in the way of settling the landscape. This is supported by the osteological analyses, which do not show any great disruptions in resource utilization during the Neolithic Stone Age (Mökkönen 2000; 2001).

5

CULTURAL CHANGE IN THE STONE AGE, 4000–2000 CAL BC

In this chapter, I discuss further aspects more or less explicitly touched upon in this study. First, I summarize my views concerning the late Middle Neolithic 'cultures' as defined with the help of ceramics. I then briefly review the use of shoreline displacement as a useful tool for detecting cultural changes irrespective of periodizations based on artefacts. This discussion is of vital importance for two reasons. First, the changes in the way landscape has been inhabited cannot be observed in a reliable way if time is incorporated into the study as blocks defined by distinct pottery styles (Paper I, see also Mökkönen 2009), and second, the late Middle Neolithic cannot be outlined on the basis of distinct ceramic styles – simply because ceramics are too heterogeneous for reliable typologization.

After making my point concerning the possibilities of outlining late Neolithic 'cultures' purely on the basis of ceramics typologies, the changes in housepits are introduced as the focus of discussion. The changes in housepits in Fennoscandia are discussed, and the cause of the changes is proposed to lie in cultural and technological innovations rather than in environmental changes. I then discuss aspects of Middle Neolithic sedentism and the parallel development seen in the contact zone at the northern limit of the Corded Ware Culture in Fennoscandia. Lastly, I present my reasons for scepticism concerning the proposed population decline during the late Neolithic and the beginning of the Early Metal Period, which I believe has more to do with cultural changes affecting the visibility of archaeological material than with an actual large-scale population decline.

5.1 The burden of research history: Pottery types as a synonym for culture

The tradition of typological studies on ceramics remains strong in Finnish archaeology. In the Neolithic Stone Age, cultural phases are still referred to through pottery types (see Lavento 2006), some of which were created over fifty years ago based on the materials of a single or just few dwelling sites. Neolithic 'cultures' defined on the basis of typologies of ceramics have been seen to follow one another with only minor temporal overlap. Today, there are good reasons to question the traditional ceramics-based view of cultural development in the Finnish Neolithic Stone Age, and particularly during its latter part.

The fragility of pottery typology as a chronological tool is revealed by recent AMS radiocarbon dates on organic crust adhering to clay vessels. New dates have shown that the use periods of Neolithic pottery types overlapped more than was previously thought (Leskinen 2003; Pesonen 2004; Pesonen & Leskinen 2009; see Fig. 5). Hence, pottery types are not chronological sequences directly following one another. This has an enormous impact on Stone Age research. Previously, the chronological framework of ceramics typology was used in nearly all studies on the Neolithic Stone Age, and thereby all the studied topics were based on that chronology (see also Mökkönen 2009). Now that the traditional chronology has turned out to be poorly based, it appears that a number of studies utilizing the ceramics-based chronological framework have treated contemporaneous materials as though they derived from different chronological levels. This has had an impact, for example, on studies of settlement patterns.

Another problem of the chronological framework based on traditional pottery typology is the way it forces us to handle time. The basic problem is the perception of time as blocks. Each 'cultural block' is identified with a certain type of ceramics lasting some five hundred years. Since the chronological framework defines the accuracy of the results, it is not difficult to foresee the consequences. A chronology with fixed long periods tends to have a self-fulfilling character. This means that it is difficult to observe change within a 'cultural block', while the interfaces between the successive blocks automatically become illusory 'periods of change'.

In my view, late Middle and Late Neolithic potteries in the southern part of Finland may be too varied in shape, size, decoration, and temper to be easily dealt with using traditional pottery typology. I assume that the strong belief in the accuracy of existing ceramics typologies has limited the studies in two ways: by forcing some ceramics into the current typology (e.g. Kiukainen Ware in south-eastern Finland, Paper III), and, on the other hand, by excluding some ceramics from typologies (e.g. organic tempered variants of Pöljä–Jysmä wares). As an example of the latter, the definition of Oravnavalok XVI –type pottery in the Republic of Karelia, Russia (Zhul'nikov 1999), which is a parallel of the Finnish Pöljä–Jysmä wares, includes both asbestos and organic tempered variants. This differs from the definitions of Pöljä–Jysmä wares, where asbestos temper is highlighted as a dominant characteristic of the type (Meinander 1954a: 162, cf. Huurre 1984; 1986).

The existing pottery typology has directed archaeological thinking to a marked degree. Since the definition of Kiukainen Ware (see Meinander 1954a), the relations between Corded Ware and the pottery traditions that previously existed in Finland have been conceptualized through the ideas incorporated into Kiukainen Ware, which is seen as an amalgamation of two distinct pottery traditions, namely the Comb Ware and Corded Ware traditions. Consequently, 'Middle Zone Pottery', which is distributed inland at the northern limit of the Corded Ware Culture, was seen as an inland parallel to Kiukainen Ware (Carpelan 1979:15). However, a number of recent studies challenge the traditional view of the cultural development after the arrival of the Corded Ware Culture (Edgren 1997; Carpelan et al. 2008; Paper III). These studies argue that the contacts between the local traditions and the Corded Ware tradition started long before the birth of Kiukainen Ware. It now appears that the whole concept of late Middle and Late Neolithic cultural development might be turned upside down. The mutual contacts between Corded Ware and local pottery traditions probably took place first in the northern contact zone, and, thereby, Kiukainen Ware may not belong to the beginning but rather to the last phase of the amalgamation. 'Middle Zone Pottery'[7] and Kiukainen Ware might display parallel ideas, but I believe that they are not chronological parallels. 'Middle Zone Pottery' may actually be older than is currently believed.[8] For example, the stratigraphy of the Kouvola Huhdasjärvi housepit site suggests that 'Middle Zone Pottery' was in use at the site earlier than Pöljä Ware (Miettinen, T. 2004).

In Finland, the main contact zone between Corded Ware and the local pottery traditions was definitely located along the northern limit of the distribution of Corded Ware. There, the contacts may be observed in coastal Southern Ostrobothnia in the west (Edgren 1997; see also Miettinen, M. 1998) and in extreme south-eastern Finland (Paper III). In Russia, on the Karelian Isthmus and in the Republic of Karelia, the influence of the Corded Ware culture reached farther north, towards Lake Onega, than it did in south-eastern Finland (Huurre 1998: 235–236). In the Republic of Karelia, Palaiguba II –type ceramics (ca. 2500–1500 cal BC) have been suggested to display influences from southern cultures already practising agriculture, i.e., from the Corded Ware Culture or Fatyanovo (Zhul'nikov 1999). Such influences are seen in vessels shapes, i.e., in the profiling and the flat bottom.

In addition to Kiukainen Ware, Corded Ware influence may possibly be observed also in other Finnish ceramics. As an example, both profiling and flat bottoms are present in Pöljä Ware found in a housepit at the Outokumpu Laavussuo site (2700–2400 cal BC)[9] (O'Caellacháin 2008). The influence of Corded Ware may be presumed because profiling and the flat bottom are not known from the local pottery traditions, Pyheensilta Ware being an exception. It is reasonable to suggest that the interaction between Corded Ware and the local traditions commenced immediately after the arrival of the Corded Ware Culture (see Carpelan 2004).

Archaeology encompasses various kinds of studies. In this chapter, I have tried to underline the problems involved in studies where the chronological framework is based on ceramics typologies. In such studies, the main problems are an inability to observe change within long pottery sequences and the ephemeral nature of poorly based typologies. The chronological framework of ceramic 'cultures' is certainly a practical means of chronological perception (see Paper IV), but ceramics types should be only a medium for discussion, not the master. In the repertoire of Finnish archae-

[7] In his article on asbestos tempered ceramics in Fennoscandia, Carpelan (1979) placed 'Middle Zone Pottery'/'Middle Zone Ceramics' – a poorly studied late Middle–Late Neolithic organic tempered pottery type that displays similarities with Late Corded Ware found in the Northern Baltic region – chronologically in the same period with Kiukainen Ware. However, I would characterise the 'Middle Zone Pottery' as a possible outcome of similar contacts between the local and Corded Ware traditions as observed in Southern Ostrobothnia (Edgren 1997) and in south-eastern Finland (Paper III).

[8] As far as I know, there are no radiocarbon dates from the context of 'Middle Zone Pottery'. The current dating of that poorly studied material is based on reasoning.

[9] The radiocarbon date (4010 ±60 BP, Hela-153) was obtained from a wad of chewing resin found inside the house. Other conventional radiocarbon dates on charcoal and birch bark from the house structures date to a slightly broader period ca. 2900–2350 cal BC (see Karjalainen 1999).

ology, there are much better vehicles for measuring the tempo of cultural change. From a global perspective, the still continuing phenomenon of land uplift, combined with archaeological material, offers an almost unique possibility to observe cultural changes by creating parallel independent levels describing different aspects of cultural change. This is discussed further in the next chapter.

5.2 Shoreline displacement: A tool for observing cultural change

During the last Ice Age in Fennoscandia, the Earth's crust sank under the pressure of a huge mass of ice. After the Ice Age, the crust began to rebound slowly, and this process still continues. This phenomenon is called land uplift, and its effect vis-á-vis water systems is called shoreline displacement (see e.g. Miettinen, A. 2002). Shoreline displacement is basic knowledge for every archaeologist in Finland, whatever period is studied.

In Finnish archaeology, shoreline displacement is used for dating and reconstructing the past environment. As a chronological tool, shoreline displacement can be used for relative dating, and especially after the introduction of radiocarbon dating, for a kind of absolute dating as well (see Siiriäinen 1969; 1970; 1971; 1972; 1974; 1978). In my opinion, the utilization of shoreline displacement in archaeological research after the early 1970's has mostly been concerned with 'absolute' dating. During the period of conventional radiocarbon dating, the rate of land uplift, which was anchored to calendrical time with the help of radiocarbon-dated limnological samples, facilitated the relatively accurate dating of shorebound dwelling sites.

From the current point of view, shoreline displacement chronologies cannot reach the same level of accuracy as modern AMS radiocarbon dates. The imprecise nature of dating based on shoreline displacement, however, does not mean that the whole method belongs to the past. It seems to me that the basic idea and strength of shoreline displacement as a tool for relative dating was, in a sense, forgotten at the time the focus was on 'absolute' dating.

Considering the great potential of relative dating based on shoreline displacement, there are surprisingly few recent studies that utilize it. Within the last ten years, however, a number of housepit studies employing relative shoreline dating have been carried out in Finland (Mökkönen 2000; Paper I; Okkonen 2003; Vaneeckhout 2008a–b; 2009a–c; 2010) and in Sweden (Norberg 2008). The possibility of dating archaeological sites relatively with the help of elevation renders it possible to arrange a large number of sites in chronological order. In a normal situation, in an area without land uplift, such a chronological arrangement of a multitude of sites would require a massive amount of radiocarbon dates.

It has been proposed that Stone Age sites followed the regressive shoreline towards lower elevations. This might be the rule on the seashore, but not really in riverine environments. In Yli-Ii, Northern Ostrobothnia, it has been suggested that the settlement was relocated once in every 20–40 years following the rate of land uplift (Núñez 2009). However, the archaeological material and radiocarbon dates from the most extensively studied village-like housepit site in Finland present contradicting evidence. The housepits at the Kuuselankangas site, all located within ca. 1.5 metres in elevation, date to ca. 3700–2900 cal BC (Vaneeckhout 2009c; Mökkönen 2010). This means that the site remained inhabited irrespective of the regressive shoreline. This was most probably due to good fishing conditions at the Kierikinkoski rapids, which were located next to the site before the building of the current hydroelectric power plants. Although it is clear that not all the sites followed the regressive shoreline, the relative dating based on shoreline displacement facilitates the observation of the main trends.

From my point of view, the most fundamental characteristic of shoreline displacement chronology is that it provides an opportunity to study temporal changes without recourse to ceramic typologies (Mökkönen 2009), and thus to recognize the changes that have taken place within a certain period of time or within an archaeological 'culture' manifested in a certain material. In Paper I, quite a radical change in the method of placing pithouses in the environment was observed to take place during the CW2 period.[10] This example shows that the changes in material culture and in other aspects of culture do not go hand in hand. Therefore, it is necessary to study different cultural aspects without interdependence, as contiguous levels of culture. The dialogue between the levels should be carried out, whenever possible, without any subordinate relationships.

5.3 Changes in houses

The parallel development of the shape and size of pithouses all over northern Fennoscandia over a rather short period is an interesting phenomenon. There are some regional differences in the dating and duration of the development. In this chapter, the changes in housepits regarding size, shape, clustering, and site location are discussed further.

In this study, I have demonstrated that the period of rapid growth in size began at different times in different areas, and also that the duration of the growth period differed from place to place. Likewise, the periods that represent an increase in the number of housepits vary. It seems to me that the different events – growth in size, increase in number, decrease in number, and the period with the largest housepits – appeared first in south-eastern and later in north–northwestern Fennoscandia (see Chapters 3.3–3.5).

In figure 13, I have tried to illustrate the temporal changes in housepits in Fennoscandia based on the data presented in Chapters 3.3–3.4 and Papers I and IV. The absolute dating of certain developments in each of the areas is difficult due to the different nature of the data. However, it is possible to arrange different developmental stages roughly in chronological order. Obviously, the details, such as the size and number of housepits, vary between regions, but the main point here is to demonstrate the dating of the main trends in pithouse building.

[10] In Paper I, however, the chronological horizons based on ceramics types are included alongside the chronological changes observed with help of shoreline displacement and elevation of the sites. At that time, it was still thought that ceramics types could really be applied as chronological horizons that did not overlap extensively

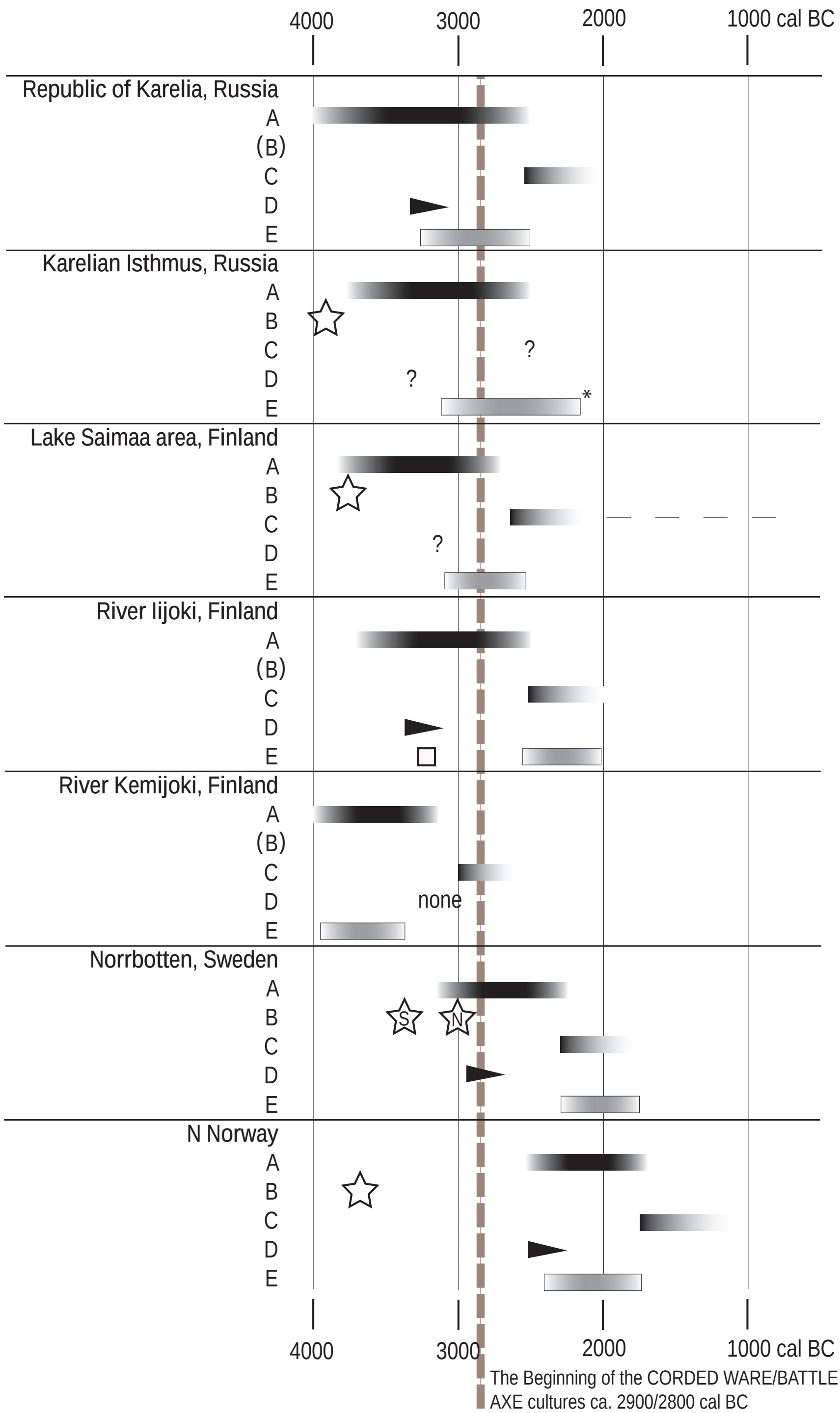
The dates are based for the most part on shoreline displacement studies (Paper I) combined with a number of radiocarbon dates (the developments around Gulf of Bothnia). In the Republic of Karelia, the chronology is based on conventional radiocarbon dates. On the Karelian Isthmus (Paper IV), the chronology is based – for lack of anything better – on associated ceramics types, a few radiocarbon dates, and general trends in pithouse building traditions in nearby areas. As it is with the beginning of the Corded Ware Culture in Finland (see Chapter 2.2.2), the chronological difficulties relating to the old wood effect and conventional radiocarbon dates are present here, too. In addition, the settlement at some of the sites dating to the 3rd millennium cal BC were no longer tightly shorebound and might therefore be dated too old by shoreline displacement chronology (see Chapter 5.5; Paper III).

Figure 13 shows how the eastern part of the Gulf of Bothnia (Finland and Russia) differs from the western part (Sweden). It seems that the different trends in pithouse building appeared as a series of events following each other. Despite the discrepancies in the bases of the chronologies of the different areas, I believe that the main trend in which certain developments take place slightly earlier in south–southeastern than in north–northeastern Fennoscandia reflects the correct direction. The only 'exception to the rule' is the Stone Age estuary of the Kemijoki River in Tervola municipality, southern Finnish Lapland, where the actual growth in the size of housepits (which occurred elsewhere after CW2) is not observed.

As compared to other changes affecting housepits, the shift to windy and aquatically oriented locations falls within the same period as the beginning of the peak periods in the number of housepits, northern Norway being an exception (Fig. 13). This is seen in case study areas around Lake Saimaa (Paper I), on the Karelian Isthmus (Paper IV), and in Norrbotten in Sweden. In coastal Norrland, the settlement concentrated in the archipelago around 3400/3000–2300 cal BC in the southern area and around 3000–1800 cal BC in northern Norrbotten. The trend was accompanied by a growing utilization of seals (Norberg 2008: 169-170). On the Finnish side of the Gulf of Bothnia, the period with an increase in the number of housepits is also linked to the intensive exploitation of seals (Halinen et al. 1998; Hertell 2009), even though a similar shift in site location towards the seaside as seen in Norrland is not observed, most probably because it has not been studied.

Fig. 13 (next page)**.** A rough chronological table showing the main trends in housepits and housepit sites in Fennoscandia. In Norrbotten column B, the stars mark the development in southern Norrland (S) and northern Norrland (N). * This is a rough estimation. A square with black outline in River Iijoki marks the appearance of the terrace house.

The key to letters:
A = increase in number of housepits/peak period
B = beginning of maritime/aquatic orientation of housepit sites
C = decrease in number of housepits
D = beginning of rapid growth in housepit sizes
E = largest housepits



4000
3000
2000
1000 cal BC
Republic of Karelia, Russia
A
(B)
C
D
E
Karelian Isthmus, Russia
A
B
C
D
E
?
?
*
Lake Saimaa area, Finland
A
B
C
D
E
?
River Iijoki, Finland
A
(B)
C
D
E
River Kemijoki, Finland
A
(B)
C
D
E
none
Norrbotten, Sweden
A
B
C
D
E
S
N
N Norway
A
B
C
D
E
4000
3000
2000
1000 cal BC
The Beginning of the CORDED WARE/BATTLE AXE cultures ca. 2900/2800 cal BC

As with the other changes, the shift towards more aquatic site locations also took place in different environmental settings. On the Karelian Isthmus (Paper IV) and in the Lake Saimaa case study area (Paper I), the aquatically oriented and unsheltered housepit sites came predominantly into use around 3700 cal BC as a rough estimate. In southern Finland, the shift in housepit site location to islands did not take place only in larger inland lake areas. Smaller roundish housepits and larger, rectangular housepits surrounded by earth embankments are found also on islands in smaller lakes (Miettinen, T. 1998: 58; Kivimäki 2007; Lavento et al. 2007; Nordqvist 2007). These structures date to the Middle Neolithic, from Typical Comb Ware onwards. From coastal Ostrobothnia, there are only a few studies in which maritime site locations have been observed. For example, settlement in the Oulujoki River estuary moved to an island outside the river mouth ca. 2500–1800 cal BC (Ikäheimo 2002).

The changes that befell housepits in the coastal areas as well as on large and small inland lakes provide insights into the nature of change, which obviously was not tied to specific environments. What is particularly interesting here is that the parallel developments in housepits extended over vast areas and into various 'cultures'. The changes in the way pithouses were constructed and located were not limited to the sphere of a certain material culture complex. It seems quite justified to state that the development of societies as reflected in the housepits was not brought on by environmental causes, as is proposed in the case of Northern Ostrobothnia (Núñez & Okkonen 1999; Vaneeckhout 2008a–b; 2009 a–c; Núñez 2009) and also in the Lake Saimaa area (Paper I). Environmental factors have certainly had an effect on the volume of the changes, but they were not the main reasons for the developments. My impression is that the changes in the pithouse building tradition were largely the result of applying new ideas of dwelling into practise, rather than merely societal responses to environmental causes (see also Paper III; Norberg 2008: 158–159, 179).

In Paper III, I noted that the appearance of multi-room housepits was concurrent with the spread of the Corded Ware Culture to the north-eastern part of the Baltic Sea. I presumed that the multi-room housepits were dwelling structures that displayed the idea of a longhouse while the construction techniques followed the local pithouse building tradition. When writing that article, I did not question the traditional Finnish chronology, which dated the beginning of the Corded Ware Culture as early as 3200 cal BC. Now, when the actual beginning of the culture has been established at approximately 2900/2800 cal BC (see Chapter 2.2.2), the conclusion concerning the nature of multi-room housepits as dwellings displaying an idea similar to longhouses is possible, but the initial adoption of this idea from the Corded Ware Culture is improbable. In a number of cases introduced in Paper III, the dating of the sites is based on radiocarbon dates on wood charcoal. However, charred crust adhering to Pöljä Ware found in the terrace house at the Purkajansuo/Korvala site in Yli-Ii parish, northern Ostrobothnia, is dated to 3360–2930 cal BC (2 sigma, 4475±60 BP, Hela-136) (Schultz 2000). Likewise, the oldest radiocarbon dates of the Meskäärtty site date to the same period (Paper III). This gives a reason to believe that the first appearance of multi-room houses actually pre-dates the earliest possible contact with the Corded Ware Culture.

Is it possible that the Neolithic ideas came first, before the spread of the cultures that actually carried with them a Neolithic identity? In Norrland, Sweden, it has been proposed that Neolithic ideas were present around 2800 cal BC although the material culture exhibits only an ephemeral influence of the Battle Axe Culture (Gustafsson 2007). In Norrbotten, the maritime orientation of the settlement, the increase in the number of housepits, the beginning of a rapid growth in housepit size, and the beginning of the Corded Ware/Battle Axe Cultures are temporally closer to each other than elsewhere in Fennoscandia.

Christian Carpelan (2004) has demonstrated that the there were two peaks in the influence of the Corded Ware/Battle Axe Cultures in northern areas. According to Carpelan, the first peak at ca. 3000–2750 cal BC carried the material of the Corded Ware Culture as far north as the Arctic Circle in Finland, but not to modern Sweden.

The first peak cannot actually be quite so old, but it undoubtedly dates to the very beginning of the spread of the Corded Ware Culture to the North. During the second peak around 2500–2300 cal BC, the influence of the Finnish Corded Ware Culture spread up to the Oulu area while regions further to the north received influences from the sphere of the Swedish Battle Axe Culture (2900/2800–2400/2300 cal BC). Interestingly, northern Norway has also produced finds of imports from southern Scandinavian agricultural cultures (a battleaxe, arrows and flint daggers) that are dating to the Gressbakken Phase (Olssen 1994: 91). Similarly, the influence of the Corded Ware/Battle Axe Cultures and the largest housepits (and dwelling embankments and ‘Giants’ Churches’) are in the main temporally and geographically concurrent phenomena around the Gulf of Bothnia.

Now, after sifting through the main trends in the pithouse building traditions of Fennoscandia (Fig. 13), I believe that the periods of change were consequences of new cultural concepts that spread over northern Fennoscandia in two waves. *The first wave*, the origin of which lies somewhere among the Comb Ware-related cultures flourishing south or south-east of Finland, disseminated a new idea of more sedentary settlement, probably supported by logistical mobility based on water transportation. This is reflected in an increase in the number of housepits, often associated with village-like concentrations, and in a shift in the location of housepits in more aquatic environments than previously (Papers I and IV). This wave spread to northern Fennoscandia during the CW2 period, starting from the south-east and appearing a bit later in the north-west. It is also possible that the initial stage of cereal cultivation spread with this wave (Paper V). Because we do not know very much about the development of Stone Age water transportation, it is possible that no technical improvements occurred. In this case, the change in the first wave was only about putting new ideas into practise.

The second wave is associated with an increase in the size of pithouses and with more complex ground plans. The trend towards the largest pithouses all over Fennoscandia was a consequence of societal re-organization that followed the spread of Neolithic ideas, which had been introduced already some time before the northward spread of the Corded Ware/Battle Axe Cultures. This idea has been proposed before, as a cause for the cultural changes in Middle Norrland sites after 2800 cal BC (Gustafsson 2007: 321). The second wave spread from south to north. Although the beginning of this wave slightly preceded the appearance of the Corded Ware/Battle Axe Cultures on the eastern side of the northern Baltic Sea, it spread more full-blown Neolithic ideas than the first wave, including new cultural concepts of what a dwelling should be. The second wave brought with it changes in society that favoured larger, more oblong or multi-room houses. At least in some cases, the locations of the pithouse changed to exhibit a less shorebound mode of settlement than before.

These two waves met temporally in Norrland, Sweden. In Norrbotten, the contact with the Battle Axe Culture is presumed to have brought with it both agrarian elements and a re-organization of the settlement pattern. According to Norberg (2008: 202), this re-organization is observable as a decreasing number of housepits ca. 2300 cal BC, when other types of dwellings replaced pithouses. In Finland, as I have sought to illustrate here, the contacts between native cultures and Neolithic ideas took place already during an early phase, slightly before the Corded Ware/Battle Axe Cultures. After the arrival of the Corded Ware Culture, the influence of the newcomer culture presumably coincided with the second wave. The contacts were followed by changes in the housepit building tradition.

Erik Norberg (2008: 158–159, 178–179, 186)) presumes that the changes seen in Norrlandic and other Fennoscandian housepits during the 3rd millennium cal BC are of social origin, and that one explanation for the parallel developments in vast areas might be found in cultural contacts maintained through contact networks. In Finland, the Neolithic cultural development by the Gulf of Bothnia has also been interpreted through the interaction of societies with different subsistence bases. Based on Ostrobothnian material, Jari Okkonen (2003; 2009) has interpreted the radical changes in building traditions ca. 3000–2500 cal BC ('Giant's Churches' and the beginning of cairn building) to be the result of both an increase in social complexity resulting from economic growth and of new ideologies acquired through long-distance maritime connections with southern cultures that were already practicing agriculture.

I agree with Norberg (2008: 178–179) that the reason for the parallel development of housepits in Fennoscandia is not explicable through the presence of certain resources. In addition, I have demonstrated that the parallel development of housepits took place earlier in the south-east and later in the north-west and north. Furthermore, I believe that the changes in housing were primarily caused by new ideas, new concepts of housing, the origin of which lies among the southern-southeastern Neolithic cultures.

I believe that these new ideas were adopted into northern Fennoscandia beginning in the Typical Comb Ware period. As opposed to Okkonen's (2009) emphasis on direct contacts, I would submit that the trade networks were the instrument that transported the exotic materials as well as new ideas. Direct long-distance contacts were probably established later on, when we have more examples in the archaeological record of everyday objects travelling across the sea. I consider this to have taken place primarily during the 3rd millennium cal BC.

5.5 Middle Neolithic sedentism

An aquatic resource base provides a good foundation for a growing degree of sedentism, as noted in Chapter 4.1. In the Middle Neolithic, when an aquatic orientation is clearly detectable in the diet and in site location, there are also other traits that may point towards fully sedentary occupation at the housepit sites.

According to Erica Engelstad (1990: 23), the growing significance of a single dwelling site already indicates territoriality and a certain rate of sedentism. The concentration of the occupation to a few specific sites that were occupied either permanently or repeatedly on seasonal basis can be interpreted to mark the presence of a sedentary or semi-sedentary settlement pattern. In this respect, the question concerning the contemporaneity of housepits at one site, often raised in discussions of sedentism, is not the key issue.

Sedentism can be manifested in long residential continuums. This is an interesting theme especially in Finland, where coastal areas are undergoing continual change due to the constant land uplift. In the Lake Saimaa case study area (Paper I), the growing significance of particular places used for habitation began to be felt during the CW2 period. There, some of the village-like housepit sites that were occupied for the first time during the CW2 period remained in use by later people with Kierikki and Pöljä asbestos wares (see also Karjalainen 1999; Halinen et al. 2002).

In south-eastern Finland, the Meskäärtty site remained in use over a thousand years (Paper III). The results of the 2010 excavations showed that the occupation began earlier than had been supposed based on different ceramics types and radiocarbon dates (from 3300 to 2200 cal BC). The first occupation phase at the site dates to the CW2 period (4000–3400 cal BC), when the site was located on an extremely small island. In the course of time, land uplift changed the site location to a spit by a small bay of the Baltic, and during the final occupation phase, the site was located by a small lake.

The change in attitudes towards regressive shorelines is seen also in Norrbotten, Sweden. After 2800 cal BC, a number of dwelling sites in Middle Norrland were in continuous use for longer periods. The occupation no longer followed the regressive shoreline as diligently as before (Gustafsson 2007; Runeson 2007). For example, at the Bjästamon housepit site in Middle Norrland, Sweden, the oldest occupation at the site, ca. 2800 cal BC, was located in the immediate vicinity of the beach, while during the youngest occupation phase ca. 2100 cal BC the distance between the shore and the settlement site was over one hundred metres (Spång 2007: 39). There, the change in the way the activities were carried out at the site was associated with large housepits and non-shorebound habitation. Similar observations have also been made at the Karlebotnbakken site in the Varangerfjord, Norway. There, a housepit dating to the Gressbakken phase (2200–1600 cal BC) is located far from the regressive shoreline, on a site where habitation commenced already ca. 3300 cal BC (Hood & Helama 2010).

I cannot verify this statement properly, but I assume that the long continuum in habitation at certain dwelling sites has to do with a higher degree of sedentism and the growing significant of particular inhabited locations. I believe that the changes in settlement described above reflect an altered attitude towards settlement practices.

I will now return to the discussion on the maritime orientation of the resource base and the nature of habitation. In two papers, I have connected the changes in housepits and housepit sites to a growing degree of sedentism, logistical transportation based on watercraft, and a probable, albeit not yet verified, beginning of agricultural practices (Papers I, IV, and V). In this introduction paper, I have also illustrated how the aquatic orientation of settlement and/or an aquatic mode of subsistence occur together with the peak period in the number of housepits.

It has been suggested that sedentary hunter-gatherer communities with effective water transportation could have integrated both domestic plants and animals into their economy without any radical dislocation of other aspects of their society (Bogucki 2004). This is an interesting suggestion, since the changes in housepit site locations to more unsheltered and aquatically oriented locations go together with the appearance of the first signs of cultivation in coastal Central and Northern Sweden. Similar change occurred on the Karelian Isthmus (Paper IV) and in the Lake Saimaa area (Paper I) around the suggested, but not verified, beginning of cereal cultivation (Paper V).

Unfortunately, there are no boat finds dating to the Stone Age in Finland.[11] The only direct references to boats are rock paintings in which the boat motifs are mostly found in the upper parts of the painting surfaces. In the Lake Saimaa area, the majority of boat motifs date to older than 3500 cal BC, i.e., to the CW2 period (Seitsonen 2005b). Although there is no concrete evidence of boats, they were undoubtedly present. I presume that the maritime diet and changes in site locations indicate an increasing importance of water transportation, and some technological innovations in watercraft might have been involved in the process.

5.6 At the northern limit of Corded Ware distribution

Because the interaction between the Corded Ware Culture and native cultural traditions are central in my interpretations, and because the contacts on the northern borderline of the Corded Ware culture have been touched in this study (Paper III, see Chapters 3.3.2 and 5.1), I will briefly list a few observations concerning the interaction between the Corded Ware Culture and local cultural traditions.

A certain degree of cultural hybridization and loans that most likely originate from interaction may be discerned around the northern limit of the Corded Ware Culture. In south-eastern Finland and on the Karelian Isthmus, Russia, the early beginning of contacts between the Corded Ware Culture and local cultural traditions apparently resulted in assimilation (Paper III, Carpelan et al. 2008). Similarly, in Southern Ostrobothnia, western Finland, the Corded Ware Culture and contemporaneous local pottery traditions are found in the same dwelling sites (Edgren 1997; Miettinen, M.

[11] The only suggested candidate, the dugout found in Helsinki Aleksis Kiven katu, is probably of notably younger age (Mökkönen 2007; cf. Luho et al. 1956).

1998; Carpelan 2004) and some ceramics thought to represent hybrids of Corded Ware and Comb Ware traditions are present (Edgren 1997).

The Corded Ware influences on local pottery traditions, including profiling and flat bottoms, are present in Pöljä Ware (ca. 3500–2600/1900 cal BC) in the Finnish inland (O'Caellacháin 2008) and in Palaiguba II pottery (ca. 2500–1500 cal BC) in the Republic of Karelia, Russia (Zhul'nikov 1999). Likewise, the 'Middle Zone Pottery' occurring in the Finnish inland close to the northern limit of the Corded Ware Culture exhibits elements from both the Corded Ware and the Comb Ware traditions (Carpelan 1979).

In Eastern Sweden, the outcome of the hybridization of the Battle Axe and local Pitted Ware pottery traditions is called '3rd group' pottery and dated to the Middle Neolithic B (2800–2300 cal BC) (Larsson 2009: 356–). Åsa Larsson (2009: 367) has suggested that this kind of pottery existed also in western and south-western Finland. The Bjästamon site (ca. 2800–2100 cal BC) with '3rd group' pottery in Middle Norrland is also of great interest (Lindholm et al. 2007; Larsson 2009: 365, Fig. 11.5). It is a housepit site with one two-room housepit that displays hybrid characteristics also in its construction (see Chapter 3.3.2, Fig. 12). One room with a horizontal timber framework suggests the northern pithouse building tradition, while the wall construction of the second room, which is made of upright poles, is known from the building tradition typical of Neolithic cultures further to the south.

It seems that fairly analogous phenomena occur close to the northern limit of the distribution of the Corded Ware/Battle Axe Cultures all over Fennoscandia. It is interesting that contacts with the Corded Ware/Battle Axe Cultures evoke similar phenomena among different local cultural traditions. It seems that there is great variation in details in ceramics in each site, but the similar main trends are repeated from site to site with an emphasis on every site's particular characteristics.

5.7 After Typical Comb Ware: Population decline or merely cultural change?

Several authors have proposed that the population of Finland declined during the Late Neolithic and the beginning of the Early Metal Period. This opinion is based on several observations: the decrease in the number of dwelling sites, low find densities, thin cultural layers, a lack of substantial dwelling structures, a low number of radiocarbon dates, and a suggested population bottleneck in genetic studies ca. 1900 cal BC (Siiriäinen 1981; Sajantila et al. 1996; Okkonen 2003: 231; Tallavaara et al. 2010).

It is also assumed that the Early Metal Period settlement was more mobile than the previous Neolithic settlement with housepits (Lavento 2001). The meagre available knowledge about the Late Neolithic material culture has even led some authors to suggest a discontinuity of settlement (Lavento 2001: 183). In this chapter, I propose an alternative hypothesis based on cultural changes, all of which had a negative impact on the visibility of archaeological materials.

It is clear that archaeological sites must be discovered before they can be studied, and that dwelling sites dating to certain periods are easier to find than others. The archaeological visibility of the sites weakens radically after the decline in housepits. It is obvious that other type of dwellings replaced pithouses. The Rusavierto house gives a hint of this development. It is a dwelling with a timber frame, dating to 2300–1900 cal BC (Leskinen 2002), one end of which is slightly dug into a natural slope while other parts have been built above ground. I would suggest that the radical decline in the number of housepits is not the result of a decline in the number of dwellings *per se*, but a result of the shift from semi-subterranean dwelling structures to above-ground dwellings (see also Ikäheimo 2005), which obviously diminishes the archaeological visibility of dwelling structures detectable without excavations.

Another change involves the prevailing settlement pattern. As noted above (Chapters 3.3–3.5), the increase in the size of housepits was already accompanied by a decrease in numbers, and during the period with the largest housepits, signs of a high degree of sedentism are already present. It is obvious that sedentary groups leave fewer archaeologically detectable and dateable sites than less sedentary groups do. A possible increase in indoor activities may also restrict the archaeological visibility outside the dwelling (see Chapters 3.4–3.5). There is a well-established opinion that Early Metal Period sites are more restricted in size than Stone Age dwelling sites (e.g. Lavento 1998). Janne Ikäheimo (2005) has noted that, due to this phenomenon, Bronze Age sites on the Oulujoki River have been discovered only in cases where the topsoil has been disturbed by modern land use activities.

Further changes in material culture also took place in the course of the Neolithic. It seems to me that the CW2 period, with its great number of find-rich sites, is used as a yardstick for evaluating the whole Neolithic Stone Age in Finland. If the material culture found in the excavations is poorer than the rich CW2 assemblages, the settlement at the site is thought to have been less pronounced. Furthermore, when we come to Early Metal Period sites, which are typically scarce in finds and have no easily detectable structures, the interpretations tend to diagnose a growing degree of residential mobility (Lavento 2001: 141–143).

The decline of the Comb Ware tradition is followed by changes that indicate alterations in the functions of pottery. The size of vessels decrease, the residues adhering to shards of Kierikki–Pöljä Wares point rather to cooking than to storage (Joensuu 2000), and storage pits appear (e.g. Vaneeckhout 2008a, Paper III). In this respect, there is also an interface between local cultural traditions and the Corded Ware tradition, where the pottery was not used for large-scale storage (e.g. Salo 1989: 11). The altered function of pottery and the reduced size of the pots results in fewer shards to be found.

The suggested late Neolithic population decline has something to do with research history. I am of the opinion that the late Neolithic is so poorly studied as a period that the problem of the low number of sites may also be due to the inability to recognize late Neolithic material. Moreover, the Late Neolithic settlement was probably not as shorebound as it was during previous periods (Chapter 5.5), which makes them difficult to discover.

To sum up this short discussion, I would suggest that the following aspects collectively challenge the prevailing interpretation of a dramatic population decline: (1) a growing rate of sedentism (cf. Tallavaara et al. 2010), (2) a shift from semi-subterranean to above-ground dwellings, (3) a shift from outdoor to indoor activities, (4) changes in ceramics (smaller size, and altered function), (5) problems in identifying the material, and (6) the less-shorebound character of late Neolithic dwelling sites. These changes, which occurred mostly after the decline of the Comb Ware tradition, weaken the visibility of archaeological material.

The latest paper dealing with the Neolithic population decline as seen through the probability distribution of radiocarbon dates (Tallavaara et al. 2010) admits to a lack of cultural processes in the analysis. Here, I have put forth my reasons for scepticism. My arguments are not bound to any environmental causes. I merely rely on general trends in cultural development and on the effect they have on archaeologists' ability to identify late Neolithic material. The late Neolithic population decline holds true only if one believes that current archaeological knowledge on late Neolithic Stone Age and its material record is truly accurate.

6

CONCLUSIONS

In this dissertation, I have tracked changes in the Neolithic pithouse building tradition in Fennoscandia. The chronological changes in the size, shape, environmental location, and clustering of housepits observed in the Lake Saimaa area, Finland, and on the Karelian Isthmus, Russia, are interpreted as marking a growing degree of sedentism (Papers I and IV). In Paper III, the multi-room pithouses that appeared during the last quarter of the 4th millennium cal BC are interpreted as expressions of the idea of the long-house, borrowed from the contemporaneous Neolithic cultures further to the south.

In this synthesis paper, I have explored the changes in the housepit building tradition, similar to those observed in the Papers, as they are to be seen in the Fennoscandian archaeological record on housepits. As a result, I have discovered that there are certain changes in size, shape, environmental location, and clustering of housepits that extended into various cultures and ecological zones in northern Fennoscandia. This dissertation argues for two mostly non-contemporaneous waves that spread certain changes in the pithouses themselves and in the practices of locating the dwellings in the environment/landscape.

The beginning of *the first wave* appears in the archaeological record during the early Typical Comb Ware period (4000–3400 cal BC, referred to as CW2). It is visible in the archaeological record as an increasing tendency to locate housepit sites in unsheltered and aquatically oriented locations. The environmental relocating of housepit sites was coincident with the appearance of village-like clusters of housepits, an increase in the number of housepits, a decrease in the number of other types of dwelling sites, the beginning of an increase in housepit size, and the increased significance of dwelling sites as reflected by longer continuums in occupation. I have interpreted these changes to reflect a growing degree of sedentism. The changes connected with the first wave appeared first in the southeast and a bit later in the northwest. In the Lake Saimaa area, the changes took place in the middle of the CW2 period (Paper I), and on the western side of Gulf of Bothnia somewhat later. It is also possible that this first wave brought with it the beginnings of cereal cultivation, although I do not consider even earlier experiments completely unthinkable (Paper V).

The second wave of change introduced larger housepits with more oblong ground plans, multi-room houses, and in some cases less shore-bound occupation. On the eastern side of the Gulf of Bothnia, this wave probably precedes the beginning of the Corded Ware/Battle Axe Cultures (2900/2800 cal BC) by a few hundred years. On the western side, in Swedish Norrland, the changes of the first and the second waves and the beginning of influences from the Battle Axe Culture appeared simultaneously around 2800 cal BC. Current data allows us to presume that ideas connected to truly Neolithic cultures might have spread to the North somewhat earlier than the material culture of the Corded Ware/Battle Axe Cultures.

The waves I refer to here are not zones that spread everywhere. It is likely that the incorporation of new ideas might have been similar to the adoption of early agriculture in Central Europe. There, agriculture spread as scattered cells, and consequently there were groups living within a sphere of similar material culture but with different subsistence practices (see Paper V). I presume that something like this happened also in north–northeastern Fennoscandia. It is likely that some groups were more receptive to new influences than others were. Therefore, not all groups adopted the new ideas straight away.

The evolution of housepits around the Bothnian Bay has previously been interpreted to have been caused by the adaptation of the local societies to prevailing environmental circumstances (Núñez & Okkonen 1999; 2005; Núñez 2004; 2009a; Okkonen 2003; Vaneeckhout 2008b; 2009a, c; 2010), and also by re-organization following contacts with the agrarian Corded Ware/Battle Axe Cultures spreading to North (Norberg 2008: 202). Erik Norberg (2008: 158–159, 178–179, 186) has proposed that on a Nordic scale, the developments in housepits were parallel and concurrent, and that the resource-based explanation was therefore very unlikely. He presumes that the changes were of social origin, and that the explanation for the development might be found in cultural contacts maintained through contact networks.

It appears to me that the changes in the pithouse building tradition had more to do with applying new ideas of dwelling into practise than with societies merely responding to environmental stimuli (see also Norberg 2008: 158–159, 179; Paper III). Like Norberg (2008), I also propose that the ideas spread via the same trade networks that transported exotic material around Fennoscandia. In contrast to Norberg, I would submit that the spread of new ideas was not just a short concurrent episode but rather a long process with a varying speed of dispersion which began already during the CW2 period (4000–3400 cal BC).

In Paper V and in the last section of this synthesis paper (Chapter 5), I have wished to take a closer look at a few cultural changes and contacts dating to the studied period. The results of Paper V showed that there was no unquestionable palynological or botanical evidence of cereal cultivation in Finland dating as early as the beginning of the changes in housepits during the CW2 phase (4000–3400 cal BC). What seems to be clear, however, is that the Corded Ware Culture was not the source of initial cereal cultivation. East of the Baltic Sea, cereal cultivation was practiced among cultures previously labeled Subneolithic or Forest Neolithic more than a thousand years before the emergence of the Corded Ware Culture. Therefore, it seems that the origin of the first northern Fennoscandian cereal cultivation was to be found in eastern connections. This means that the contacts through which the knowledge of cultivation was adopted by the cultures inhabiting the north-eastern European forest zone took place in an area with active trade/social networks.

In Chapter 5, I have briefly discussed a few topics involved with cultural change, with emphasis on the 3rd millennium cal BC. During this millennium, the number and size of housepits first peaked, and then during latter part, the number of housepits drastically decreased. Many of the discussed topics are still rather poorly explored. It appears, however, that the contacts between the Corded Ware/Battle Axe Cultures and local cultures commenced immediately, and the outcome of this interaction seems to have produced highly similar phenomena all around the northernmost limit of the distribution of the Corded Ware/Battle Axe cultures. Near that limit, there are signs of cultural loans and hybridization both in ceramics and in dwelling structures. Concurrently, there are some observations pointing to a less shore-bound mode of habitation and an intensification of indoor activities at the expense of outdoor activities.

The changes in housing and in material culture that took place during the 3rd millennium cal BC all had an effect on the archaeological visibility of dwelling sites. I am rather doubtful about the suggested Late Neolithic population decline in Finland. I would suggest that the small number of Late Neolithic sites and radiocarbon dates falling around the final Neolithic Stone Age has more to do with cultural changes that weaken the archaeological visibility of the occupation, and with the (in)ability of archaeologists to identify sites of that period.

From a Neolithic viewpoint, north-eastern Fennoscandia has always been a marginal area, at least when agriculture is considered a key factor. In this region, the Neolithic ideas were incorporated gradually. This process began during the Early Comb Ware phase, when the first ceramics came into use around 5500–5100 cal BC. The efficiency of the transportation routes in the north-eastern European forest zone is evident in the rapid tempo of the spread of early pottery technology (Carpelan & Parpola 2001: 63; Jordan 2010). During the Neolithic Stone Age, these networks spread artefacts and undoubtedly also ideas to vast areas, even to the most northern parts of Fennoscandia by the north Atlantic and the Arctic Ocean (see e.g. Torvinen 2000; Ramstadt et al. 2005; Damm 2008; Hood & Helama 2010).

In this dissertation, I have argued for the presence of ideas and possibly technological innovations that spread over northern Fennoscandia and across different cultures and ecological zones. This study has revealed two waves of change in the housepit building tradition, both of which dispersed from the south–south-east to the north–north-west. Since the CW2 period, the ideas that brought with them the changes spread through the same networks that actively distributed commodities, exotic goods, and raw materials over vast areas between the southern Baltic Sea, the north-west Russian forest zone, and Fennoscandia. As I see it, the abandonment of pithouses during the Late Neolithic, which is most probably due to the replacement of pithouses by aboveground dwellings, was merely the final phase of the developments in which the new concepts of housing were incorporated.

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